Bencent®

GDT / TSS / TVS / ESD / Compound devices

V1703

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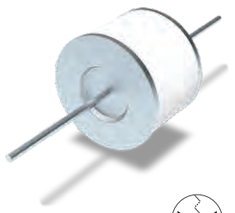
What's New?

GDT



Communication power supply

AC POWER

BGO1001A05-LC2

Φ8.0*7.0mm Page 63

Ipp=5KA@8/20μs Failsafe

GDT

RRU

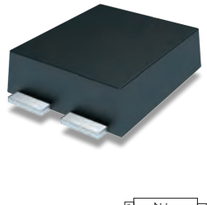
DC POWER

BD122-2

16.5*8.3*9.5mm Page 41

Ipp=20KA@8/20μs ArcVoltage>60V@50A

TSS



RRU

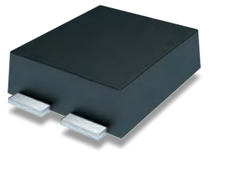
RS485

BS0060U-2G

8.0*5.9*2.0mm Page 45

Ipp=3KA@8/20μs

TVS



Camera

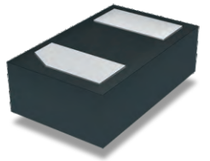
RJ45

BV-SMCT-58CAS

8.0*5.9*3.0mm Page 59

Ipp=150A@5/320μs

TVS



Mobile phone

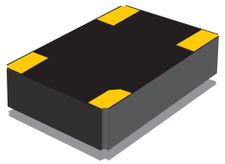
DC POWER

BV-FE05ZA

1.6*1.0*0.5mm Page 61

Ipp=140A@8/20μs

Compound devices



Camera

DC POWER

BVF0200AX5-MD4

5.0*3.2*1.65mm Page 63

Ipp=500A@8/20μs IF=4A Failsafe

GDT

xDSL

RJ11

BGO3600V06-MA2

4.2*3.5*3.5mm Page 63

Ipp=150A@5/320μs Failsafe

GDT

LNB

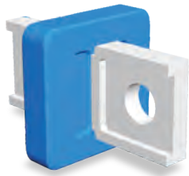
COAXIAL

BW231M

7.0*6.0*6.0mm Page 39

Ipp=10KA@8/20μs Co<0.45pF

TSS



Pipeline

PE

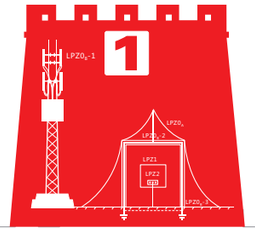
BSG0060L-H

40*27*27mm Page 63

Ipp=20KA@8/20μs

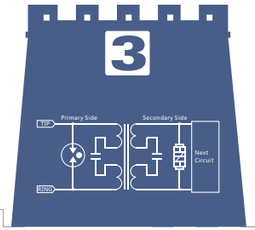
Six—Steps to Success

Environmental Analysis

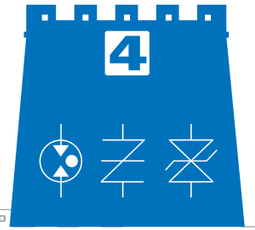


Choose a Standard

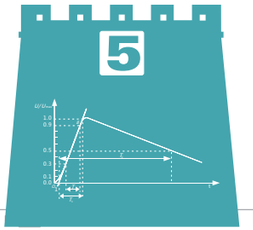
Application Guide



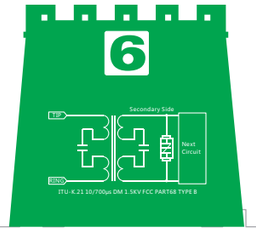
Select Components



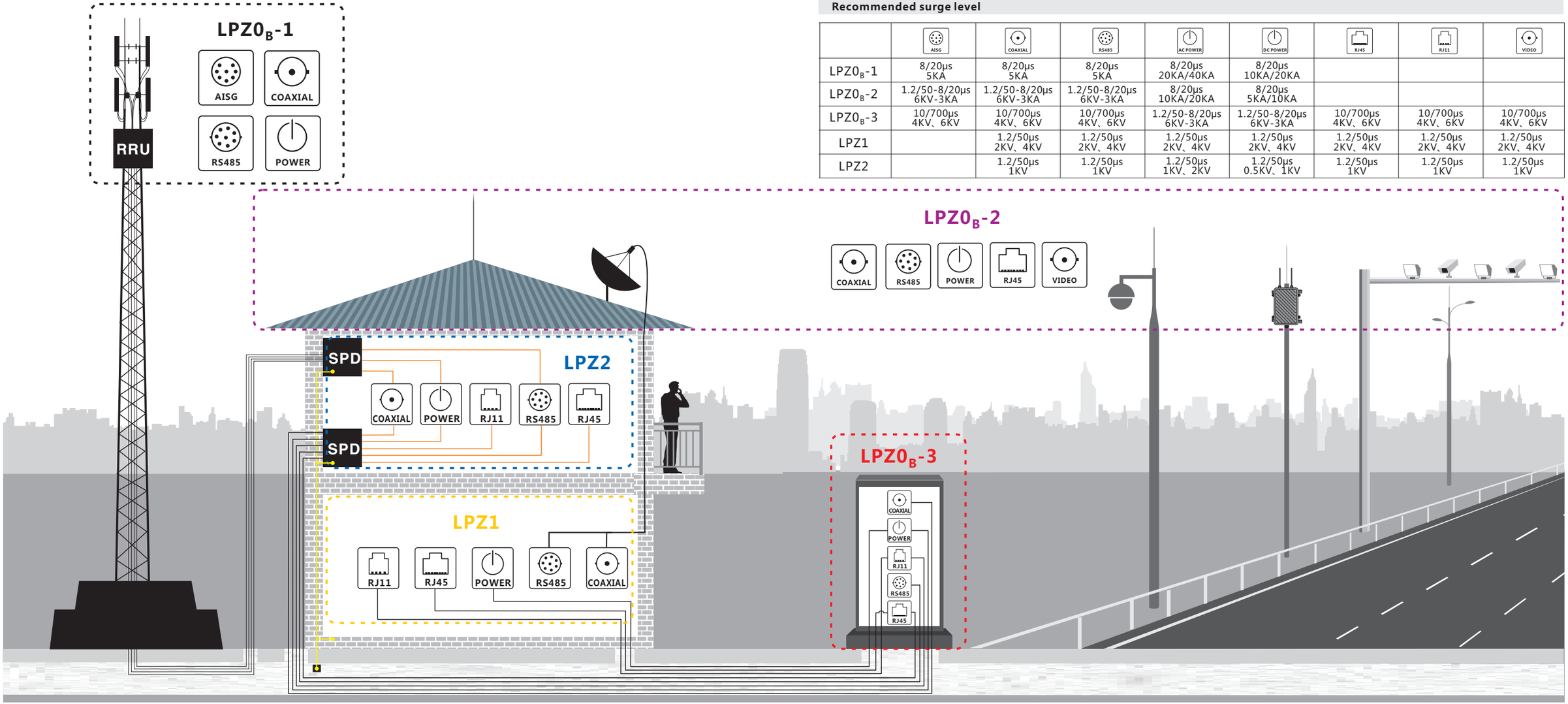
System Test



Apply & Optimize



INDEX



Recommended surge level

	AISG	COAXIAL	RS485	AC POWER	DC POWER	RJ45	RJ11	VIDEO
$LPZ0_B$-1	8/20μs 5KA	8/20μs 5KA	8/20μs 5KA	8/20μs 20KA/40KA	8/20μs 10KA/20KA			
$LPZ0_B$-2	1.2/50-8/20μs 6KV-3KA	1.2/50-8/20μs 6KV-3KA	1.2/50-8/20μs 6KV-3KA	8/20μs 10KA/20KA	8/20μs 5KA/10KA			
$LPZ0_B$-3	10/700μs 4KV、6KV	10/700μs 4KV、6KV	10/700μs 4KV、6KV	1.2/50-8/20μs 6KV-3KA	1.2/50-8/20μs 6KV-3KA	10/700μs 4KV、6KV	10/700μs 4KV、6KV	10/700μs 4KV、6KV
LPZ1		1.2/50μs 2KV、4KV	1.2/50μs 2KV、4KV	1.2/50μs 2KV、4KV	1.2/50μs 2KV、4KV	1.2/50μs 2KV、4KV	1.2/50μs 2KV、4KV	1.2/50μs 2KV、4KV
LPZ2		1.2/50μs 1KV	1.2/50μs 1KV	1.2/50μs 1KV、2KV	1.2/50μs 0.5KV、1KV	1.2/50μs 1KV	1.2/50μs 1KV	1.2/50μs 1KV

$LPZ0_B$-1 Application environment on telecom transmission tower

$LPZ0_B$-2 Outdoor cabinet on rooftops (high speed aerial included)

$LPZ0_B$-3 General outdoors, walls, hanging bars

LPZ1 OTHER areas inside buildingexcept $LPZ0_B$ classification defined, e. g. passageway, weak current wells, switching room, basement, inside room

LPZ2 To be provided with good line-to-ground connection system and the specific room with primaryprotection, e.g. inside building,generator room or outdoor container-style mini generator room etc.

AC

AC(Alternating current)

Is an electric current in which the flow of electric charge periodically reverses direction, whereas in direct current (DC, also dc), the flow of electric charge is only in one direction. AC is the form in which electric power is delivered to businesses and residences, and it is the form of electric power that consumers typically use when they plug kitchen appliances, televisions and electric lamps into a wall socket. A common example of DC power is a battery cell in a flashlight. The abbreviations AC and DC are often used to mean simply alternating and direct, as when they modify current or voltage.

The usual waveform of alternating current in most electric power circuits is a sine wave. In certain applications, different waveforms are used, such as triangular or square waves. Audio and radio signals carried on electrical wires are also examples of alternating current. These types of alternating current carry information encoded (or modulated) onto the AC signal, such as sound (audio) or images (video). These currents typically alternate at higher frequencies than those used in power transmission.

The world voltage profiles:

The interior world generally has two kinds of electricity used by the voltage, ac 100 v to 130v, respectively, with two types of AC 220 ~ 240 v.
100 v ~ 130 v low voltage are classified, such as the United States, Japan, and the ship's voltage, pay attention to safety;
220 ~ 240 v is known as the high pressure, including the China of 220 v and 230 v of the British and most European countries, pay attention to the energy conversion efficiency.
Use 220 ~ 230 v voltage, also have the use of 110 ~ 110 v voltage, such as Sweden and Russia.
100v AC: Japan, South Korea
110 ~ 130v AC: Taiwan, China, the United States, Canada, Mexico, panama, Cuba, Lebanon and other 30 countries
220 ~ 230v AC: China, Hong Kong (200 v), UK, Germany, France, Italy, Australia, India, Singapore, Thailand, the Netherlands, Spain, Greece, Austria, the Philippines, Norway, about 120 countries

DC

DC(Direct current)

Is the unidirectional flow of electric charge. Direct current is produced by sources such as batteries, power supplies, solar cells, or dynamos. Direct current may flow in a conductor such as a wire, but can also flow through semiconductors, insulators, or even through a vacuum as in electron or ion beams. The electric current flows in a constant direction, distinguishing it from alternating current (AC). A term formerly used for this type of current was galvanic current.
The abbreviations AC and DC are often used to mean simply alternating and direct, as when they modify current or voltage. Direct current may be obtained from an alternating current supply by use of a rectifier, which contains electronic elements (usually) or electromechanical elements (historically) that allow current to flow only in one direction. Direct current may be converted into alternating current with an inverter or a motor-generator set.

Direct current is used to charge batteries and as power supply for electronic systems. Very large quantities of direct-current power are used in production of aluminum and other electrochemical processes. It is also used for some railways, especially in urban areas. High-voltage direct current is used to transmit large amounts of power from remote generating sites or to connect alternating current power grids.

There are several kinds of the dc voltage level:

1.2 v rechargeable battery
1.5 v batteries
3 v power requirement of the remote control
5v of the SCM needs
6 volt motor vehicle power supply
9 volt digital table class needs
12 v for many occasions
24 v car use
48 v electric vehicle
Some other unusual

DSL

DSL (Digital Subscriber Line)

The rise of the Internet, people through telephone dial-up Internet, speed is slow, can not meet the growing needs of users.

DSL Chinese name is a digital subscriber line, is a telephone line for the transmission of media transmission technology combination. DSL technical support for symmetric and asymmetric transmission mode of transmission in the public telephone network subscriber loop transmission, solved the bottleneck problem that often occurs in the network service providers and end users of the "last mile". As the DSL access scheme does not need to transform the telephone lines, it can make full use of a large number of telephone users can already lay the loop, greatly reducing the overhead. Therefore, the use of copper line to provide high-speed Internet access, more popular with users, the various aspects of attention, has been widely used in some countries and regions.

category	Name	velocity	Transmission distance	advantage
Symmetrical DSL	HDSL	N×64kbps Various velocity	Within 3.6 km	Compared with the traditional T1/E1 technology, the most prominent advantage is that the deployment cost is low, and the installation is convenient.
	SDSL	Rate range from 160kbps to 2.084Mbps	0.4mm twisted pair on the maximum transmission distance of up to 3 km or more	Compared with SDSL, HDSL can save a pair of twisted pair, so the deployment is more simple and convenient.
	MVL	128kbps	Effective transmission distance of up to 7 km	Using a pair of twisted pair to achieve high speed data access, the deployment cost and power consumption are relatively low, and can be carried out with high density,
	IDSL	128kbps	Effective transmission distance of up to 7 km	IDSL can provide 128kbps services
Asymmetric DSL	ADSL	Up to 8Mbps of the high-speed downlink rate, and the uplink rate of 1Mbps	Effective transmission distance of up to 5 to 3 km	Make full use of the existing PSTN telephone network, only in line at both ends of the installation of ADSL equipment can provide users with high-speed broadband services, no need to re wiring, and thus greatly reduce the cost of service
	RADSL	Downlink transmission rate between 640kbps to 12Mbps, the uplink transmission rate is between 128kbps to 1Mbps	Effective transmission distance of up to 5 to 3 km	The data transmission can be realized by using a pair of twisted pair wires, which can support synchronous and asynchronous transmission.
	VDSL	Maximum can achieve the transmission rate of 58Mbps	In the case of less than 1.5 km of the user loop length, 13Mbps or higher access rates can be provided	VDSL actually can be regarded as the next generation of ADSL technology, its average transmission rate can be 5 to 10 times higher than the ADSL.

POE

POE (Power Over Ethernet)

POE refers to the existing Cat.5 Ethernet cabling infrastructure does not make any changes in the situation, for some IP based terminal (such as IP telephony, wireless LAN access point AP network camera, etc.) for the transmission of data signals at the same time, can also provide DC power supply technology for this kind of equipment. POE technology can ensure the normal operation of the existing network while ensuring the normal operation of the existing structure, and reduce the cost to the maximum extent.

Standard

In order to regulate and promote the development and application of POE in June 2003, IEEE 802.3 working group established the IEEE 802.3af standard, as an extension of the Ethernet standard, power supply, power supply network for transmitting and receiving all the detailed provisions.
IEEE 802.3af standard is a new standard Ethernet power supply system based on POE, which based on the IEEE 802.3 increased by standard direct power line, is to extend the existing Ethernet standard, is the first international standard on power distribution.
In October 2009, the 802.3at IEEE standard should be born to the needs of high power terminals, in the basis of compatible with 802.3af standards, to provide greater power supply needs to meet the new needs.

The main power characteristic parameters of POE :

(1) Voltage between 44 ~ 57V, the typical value is 48V.
(2) Maximum allowable current is 550mA and the maximum starting current is 500mA.
(3) Typical operating current is 10 ~ 350mA, the overload detection current is 350 ~ 500mA.
(4) Under no-load condition, the maximum current is 5mA.
(5) For PD equipment to provide 3.84 to 12.95W three level of electrical power request, the maximum not more than 13W.

The difference between Poe and POE+:

(1) POE+ maximum power support up to 25.5W, part of the factory products can support the 50W, and Poe can get the power of 25.4W;
(2) POE maximum support current is 350mA, POE+ maximum support current is 600mA;
(3) POE+ added a power management mode;

COAXIAL

CVBS

CVBS

CVBS is a widely used standard, also called baseband video or RCA video, is the (US) National Television Standards Committee (NTSC) TV signal of traditional image data transmission method. Composite video contains color difference (hue and saturation) and brightness (light) information.

The signal standard bandwidth is 6MHz. In composite video, the interference of color difference and luminance information is inevitable, especially when the signal is weak. CVBS is the first generation of video display output (the second generation is S-VIDEO, the third generation is VGA, the fourth generation is DVI, the fifth generation is HDMI).
(1) CVBS (AV interface or Video interface), Audio and Video separate transmission
(2) CVBS transmit the mixed video signal (Y and C) with the sound signal.
(3) Close transmission, Used Simulation waveform to transmit data

Advantage:
Audio and Video signals are separately transmitted, Reduce the video and audio mutual interference.

Disadvantage:
CVBS transmit the mixed video signal will cause quality loss.

COAXIAL

SDI

SDI(Serial digital interface)

Is a family of digital video interfaces first standardized by SMPTE(The Society of Motion Picture and Television Engineers) in 1989.For example, ITU-R BT.656 and SMPTE 259M define digital video interfaces used for broadcast-grade video. A related standard, known as high-definition serial digital interface (HD-SDI), is standardized in SMPTE 292M; this provides a nominal data rate of 1.485 Gbit/s.

Additional SDI standards have been introduced to support increasing video resolutions (HD, UHD and beyond), frame rates, stereoscopic (3D) video, and color depth. Dual link HD-SDI consists of a pair of SMPTE 292M links, standardized by SMPTE 372M in 1998; this provides a nominal 2.970 Gbit/s interface used in applications (such as digital cinema or HDTV 1080P) that require greater fidelity and resolution than standard HDTV can provide.

These standards are used for transmission of uncompressed, unencrypted digital video signals (optionally including embedded audio and time code) within television facilities; they can also be used for packetized data. Coaxial variants of the specification range in length but are typically less than 300 meters . Fiber optic variants of the specification such as 297M allow for long-distance transmission limited only by maximum fiber length or repeaters. SDI and HD-SDI are usually available only in professional video equipment because various licensing agreements restrict the use of unencrypted digital interfaces, such as SDI, prohibiting their use in consumer equipment.

COAXIAL

AHD

AHD

AHD technology used the Y/C signal separation and filtering technology which can effectively reduce the noise in high frequency and have the better image. It can transmit long distance (500 m) with high-definition video signal. Compared with the traditional analog products, AHD image quality has a qualitative upgrade; the highest definition can be equivalent to the 1080P.

Three format:
AHD-L definition (TVL)
Far higher than the traditional analog 960H,
AHD-M definition (TVL)
Equivalent to the 720P level,
AHD-H definition (TVL)
Equivalent to the full HD 1080P level,

Characteristic:
(1) Advanced color separation, clear signal filtering, 3D noise reduction technology, higher image quality,
(2) The transmission can reach 500 meters with 75-3 coaxial line,
(3) Zero time delay data , real time performance, high fidelity
(4) The good compatibility including D1 ,960H signal and so on
(5) The design for OSD menu is easy to operate.
(6) The cheap price with analog HD quality .
(7) The open standard which is easy to do the market promotion

COAXIAL

TVI

TVI (Transport Video Interface)

In the security industry, is a kind of high definition video transmission based on coaxial cable. In China, hikvision has launched HDTVI chip, TVI camera Joanne is also about to launch.

TVI, a new generation of connected transmission system architecture, a new generation of brightness and chroma separation, signal processing circuit, HD to 720P, 1080P, DVR mixed use of 720P and 1080P signals, can use the original coaxial cable, no need to change the original line, and can adapt to the engineering with twisted pair compatibility stronger.

TVI can also use coaxial cable 75-3 (5C2V) two-way transmission of mega pixel high-definition video signal, the transmission distance of up to 500m, no delay, no compression, low loss, high performance of video transmission.
At the same time, the TVI market is completely open, break the traditional restrictions, compatible with any TVI products in the market, the chip provided by the third party manufacturers, chip has stable supply capacity, is no longer fixed manufacturer restrictions, users have more choices on hd.

HDMI

HDMI (High definition multimedia interface)

Is a digital video / audio interface technology, is a special type of image transmission for digital interface, which can transmit audio and video signals at the same time, the maximum data transmission speed is 4.5GB/s. HDMI can be paired with broadband digital content protection (HDCP) to prevent unauthorized copying of copyright video content. The longest transmission can be 30 meters, to ensure the normal of sound and image. HDMI 1.4 version of the cable a total of 5 types, the standard way of marking: Standard HDMI Cable; Standard HDMI Cable with Ethernet; Standard Automotive HDMI Cable; High Speed HDMI Cable; High Speed HDMI Cable with Ethernet.

Advantage:

HDMI relative to existing analog video interfaces such as composite, S-Video, and component video:

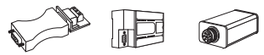
(1) quality: HDMI is a digital interface, since all analog connections (such as component video or S-video) require no loss in the conversion from analog to digital, so it can provide the best video quality. This difference is particularly evident at higher resolutions, such as 1080p. Digital video will be clearer than component video, found in eliminating the component video softness and smearing. This text such as small, high contrast details of the difference will be to maximize.

(2) ease of use: HDMI integrates video and multi-channel audio in a single cable, eliminating the cost, complexity, and confusion of the multi cable used in the current A/V system. This is especially useful when upgrading or adding devices.

(3) High Intelligence: HDMI supports two-way communication between video sources (such as DVD players) and DTV to implement new features such as auto configuration and one touch play. Through the use of HDMI equipment is connected to the monitor automatically the most efficient transmission format (such as 480p vs 720p, 16:9 vs 4:3) eliminates the need for consumers to scroll through all formatting options to guess the best viewing format.

(4) high clear content ready: Support for HDCP HDMI devices to access advanced high-definition content, bring us some comfort. HD-DVD and Blu-ray have the high definition movie delay starting image resisting marking (also called content protection mark), to help minimize due to potential problems caused by the conversion, but is expected to start this sign in a few years, Means that the future of high-definition movies will not be able to play through an unprotected interface, such as analog components.

RS485



RS232, RS422, RS485 Difference

RS232, RS422, RS485 is the electrical standard, the main difference is that the logic of how to express.

RS232 12V /-12V said the logic 1, logic 0, full duplex, at least 3 lines of communication (RX, TX, GND), said that because of the use of absolute voltage logic, because of the interference, the wire resistance and other reasons, not far communication distance, speed can be tens of meters.

RS422, launched in RS232, using the TTL differential logic level said, is two voltage difference logic, RS422 is defined as full duplex, so at least 4 lines of communication (generally more additional ground wire), a driver can drive up to 10 receivers (i.e. the receiver load for 1/10 units) a relationship, communication distance and communication speed, short distance in general can use the high-speed communication rate is low when it is used for long distance communication, generally up to hundreds of kilometers.

RS485, launched in RS422, most inherited 422, the main difference is that RS485 is half duplex, and a drive capability of the drive can be driven at least 32 receivers (i.e. the receiver for 1/32, when the unit load) receiver using higher impedance can drive more receiver. So now most of the full duplex 485 driver / receiver is the standard: RS422/485, because the full duplex RS485 driver / receiver can be used in the RS422 network.

Characteristic:

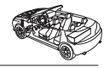
(1) RS-485 electrical characteristics: the use of differential signal negative logic, logic "0" to the difference between the two lines - (2~6) V said; logic "1" to the difference between the two lines is + (2~6) V. The interface signal level is lower than the RS-232-C, and it is not easy to damage the chip of the interface circuit, and the level is compatible with the TTL level, and can be conveniently connected with the TTL circuit.

(2) RS-485 data maximum transmission rate of 10Mbps.

(3) RS-485 interface is a combination of a balanced driver and a differential receiver, and the ability to resist common mode interference is enhanced, that is, anti noise interference is good.

The maximum communication distance of 4 RS-485 is about 1219m, the maximum transmission rate is 10Mbps, the transmission rate and the transmission distance is inversely proportional to the transmission rate of 100KbpS, it can achieve maximum communication distance, if need to transport a longer distance, need to add 485 repeaters. RS-485 bus generally supports 32 nodes, if the use of a special 485 chips, you can reach 128 or 256 nodes, the maximum can support to 400 nodes.

CAN



CAN(Controller Area Network)

As industrial measurement and control technology and production automation technology advances, the traditional RS - 232, RS - 485 and CCITTV. 24 communication technologies cannot meet the needs of modern industrial control, and field bus (Fieldbus), with its low price, reliable performance, and gradually become a new kind of communication technology in the field of industrial measurement and control. Field bus is used in production field, between microcomputer-based measuring control equipment to realize the bidirectional serial multi-node digital communication system, is a kind of open, digital, multipoint communication bottom control network. Brings together computer technology, network communication technology and automatic control technology (3 c) field bus technology, developed in the 1980 s, and gradually in the manufacturing and process industries, transportation, building automation system has been widely attention and application. Fieldbus basically has the following several types: [1-3] foundation fieldbus (FF), Lon Works, ProfiBus, CAN, HART, and which CAN namely controller local area network (LAN) because of the high performance, high reliability and unique design is more and more attention, already formed the international standard, is recognized as one of the most promising fieldbus.

The main features of CAN bus:

(1) CAN work for many, any node on the network at any time you can take the initiative to send information to other nodes, regardless of master-slave, flexible

(2) CAN order of precedence network nodes can be arranged to meet and coordinate their different real-time requirements

(3) Adopting nondestructive bus arbitration technology more, send information at the same time, in order of priority communications, saves bus arbitration conflicts between, avoid paralysis

(4) From point to point, point to multipoint, and global broadcast message

(5) Communication speed of up to 1M bps (40m), the longest transmission distance up to 10km (rate for 5kbps)

(6) Network nodes are currently up to 110, packet identifier 2 032 (CAN2.0A), extended (CAN2.0B) virtually unlimited message marker

(7) Short frame data structures, transmission time is short, strong anti-jamming ability, good error detection effect

(8) Communication medium can be used twisted pair, coaxial cable, or fiber

(9) Network nodes in the case of error severity can automatically turn off the output function from the network

(10) Realize the standardization and normalization (ISO11898)

USB

USB (Universal Serial Bus)

USB Is an external bus standard, for the specification of computer and external equipment connection and communication. Is the application of interface technology in the field of PC. ‘Plug and play ‘and hot swap function for USB interface support device. USB is at the end of 1994 by Intel, Compaq, IBM, Microsoft and other companies jointly proposed.

USB version	Transmission rate	Rate designation	Maximum output current	Launch date
USB1.0	1.5Mbps(192KB/s)	Low-Speed	5V/500mA	January 1996
USB1.1	12Mbps(1.5MB/s)	Full-Speed	5V/500mA	September 1998
USB2.0	480Mbps(60MB/s)	High-Speed	5V/500mA	April 2000
USB3.0	5Gbps(500MB/s)	Super-Speed	5V/900mA	November 2008
USB 3.1Gen 2	10Gbps(1280MB/s)	Super-speed+	20V/5A	December 2013

USB devices will be a large number of applications, mainly with the following advantages:

1 Can be hot swap.
2 Easy to carry.
3 Standardization.
4 Can connect multiple devices.

Difference between USB3.0 and USB2.0:

(1) distinguishes from the base color:
USB2.0 interface base is generally black or white.
USB3.0 interface base is usually blue;
Distinguished from the U disc pin socket:
USB 2 is a 4 pin, and USB 3 uses a 9 pin, the pin is more than USB2.0.

(2) distinguish between transmission speeds:
This method requires the use of tools, in theory, the rate of USB 2.0 is 480 Mbps, and USB 3.0 can reach 4.8 Gbps.

(3) Observe the contact
This approach is more cautious, USB 2.0 only with 4Pin metal contact, while USB 3.0 is the 9pin touch. Front 4Pin is consistent with USB 2.0; the rear 5pin is exclusive for USB 3.0

(4) observation marking
USB 3.0 logo "SS" represents the "Super Speed", in the USB 3.0 interface part will have the identity. In addition, the USB 3.0 cable due to an increase of 5 routes, it will also be slightly thicker than the USB 2.0 cable.

ITU-T K.20 (JUN 2016) Resistibility of telecommunication equipment installed in a telecommunication centre voltages and overcurrents

Applicable tests for external ports

Test type	No. of pairs simultaneously tested	Test connection	Primary protection	Port type							
				Symmetric port		Coaxial port		Dedicated power feed port		Mains power port	
				Basic	Enhanced	Basic	Enhanced	Basic	Enhanced	Basic	Enhanced
Lightning Voltage	Single	Transverse/ differential	No	1KV,25Ω 10/700μs	1.5KV,25Ω 10/700μs	1KV,0Ω 1.2/50 - 8/20μs	1.5KV,0Ω 1.2/50 - 8/20μs	1KV,25Ω 10/700μs	1.5KV,25Ω 10/700μs	2.5KV,0Ω 1.2/50 - 8/20μs	6KV,0Ω 1.2/50 - 8/20μs
		Port to earth	No	1KV,25Ω 10/700μs	1.5KV,25Ω 10/700μs	n. a.		1KV,25Ω 10/700μs	1.5KV,25Ω 10/700μs	2.5KV,0Ω 1.2/50 - 8/20μs	6KV,0Ω 1.2/50 - 8/20μs
		Port to external port	No	n. a.		n. a.		n. a.		2.5KV,0Ω 1.2/50 - 8/20μs	6KV,0Ω 1.2/50 - 8/20μs
		Coordination/ Transverse/ differential	Yes	4KV,25Ω 10/700μs	4KV,25Ω 10/700μs	4KV,0Ω 1.2/50 - 8/20μs	6KV,0Ω 1.2/50 - 8/20μs	4KV,25Ω 10/700μs	4KV,25Ω 10/700μs	6KV,0Ω 1.2/50 - 8/20μs	10KV,0Ω 1.2/50 - 8/20μs
		Coordination/ Port to earth	Yes	4KV,25Ω 10/700μs	4KV,25Ω 10/700μs	n. a.		4KV,25Ω 10/700μs	4KV,25Ω 10/700μs	6KV,0Ω 1.2/50 - 8/20μs	10KV,0Ω 1.2/50 - 8/20μs
		Coordination/ Port to external port	Yes	n. a.		n. a.		n. a.		6KV,0Ω 1.2/50 - 8/20μs	10KV,0Ω 1.2/50 - 8/20μs
	Multiple	Port to earth	No	1.5KV,25Ω 10/700μs	1.5KV,25Ω 10/700μs	n. a.		n. a.		n. a.	
		Port to external port	No	n. a.		n. a.		n. a.		n. a.	
		Port to earth	Yes	4KV,25Ω 10/700μs	6KV,25Ω 10/700μs	n. a.		n. a.		n. a.	
		Port to external port	Yes	n. a.		n. a.		n. a.		n. a.	
	Unshielded twisted pair (UTP) Ethernet	Port to earth	No	n. a.		n. a.		n. a.		n. a.	
		Transverse	No	600V,10Ω 1.2/50 - 8/20μs	1.5KV,10Ω 1.2/50 - 8/20μs	n. a.		n. a.		n. a.	
		Voltage impulse test	No	2.5KV,5Ω 1.2/50 - 8/20μs	6KV,5Ω 1.2/50 - 8/20μs	2.5KV,5Ω 1.2/50 - 8/20μs	6KV,5Ω 1.2/50 - 8/20μs	n. a.		n. a.	
		Power over Ethernet(PoE)	No	600V,10Ω 1.2/50 - 8/20μs	1.5KV,10Ω 1.2/50 - 8/20μs	600V,10Ω 1.2/50 - 8/20μs	1.5KV,5Ω 1.2/50 - 8/20μs	n. a.		n. a.	
	Shielded twisted pair (STP) Ethernet	Port to earth	No	2.5KV,10Ω 1.2/50 - 8/20μs	6KV,10Ω 1.2/50 - 8/20μs	2.5V,10Ω 1.2/50 - 8/20μs	6KV,5Ω 1.2/50 - 8/20μs	n. a.		n. a.	
		Shield test	No	1.5KV,10Ω 1.2/50 - 8/20μs	6KV,10Ω 1.2/50 - 8/20μs	1.5KV,10Ω 1.2/50 - 8/20μs	6KV,10Ω 1.2/50 - 8/20μs	n. a.		n. a.	
Lightning Current	Single	Port to earth	No	1KA/wire, 0Ω, 8/20μs	5KA/wire, 0Ω, 8/20μs	n. a.		1KA/wire, 0Ω,8/20μs	5KA/wire, 0Ω,8/20μs	n. a.	
		Port to external port	No	n. a.		n. a.		n. a.		n. a.	
		Differential	n. a.	n. a.		1 KA, 8/20μs	5 KA 8/20μs	n. a.		n. a.	
		Shield to earth	n. a.	n. a.		4KA(Note 1), 2KA (Note 2) 8/20μs	20KA(Note 1), 5KA (Note 2) 8/20μs	n. a.		n. a.	
		Shield to external port	n. a.	n. a.		n. a.		n. a.		n. a.	
	Multiple	Port to earth	No	1 kA/wire, Limited to 6 kA, R = 0 , 8/20μs	5 kA/wire, Limited to 30 kA,R = 0 , 8/20μs	n. a.		n. a.		n. a.	
		Port to external port	No	n. a.		n. a.		n. a.		n. a.	
Insulation	Multiple	Port to earth	n. a.	2500V,5Ω 1.2/50 - 8/20μs	6000V,5Ω 1.2/50 - 8/20μs	n. a.		n. a.		n. a.	
Power induction and earth Potential rise	Single	Transverse	No	600V, 600Ω,0.2s	600V, 600Ω,0.2s	Under study		600V, 600Ω,0.2s	600V, 600Ω,0.2s	n. a.	
		Port to earth	No	600V, 600Ω,0.2s	600V, 600Ω,0.2s	n. a.		600V, 600Ω,0.2s	600V, 600Ω,0.2s	Under study	Under study
		Port to external port	No	n. a.		n. a.		n. a.		n. a.	
		Coordination Transverse	Yes	600V, 600Ω,0.2s	1500V, 600Ω,0.2s	Under study		600V, 600Ω,0.2s	1500V, 600Ω,0.2s	n. a.	
		Coordination Port to earth	Yes	600V, 600Ω,0.2s	1500V, 600Ω,0.2s	n. a.		600V, 600Ω,0.2s	1500V, 600Ω,0.2s	n. a.	
		Coordination Port to external port	Yes	n. a.		n. a.		n. a.	n. a.	n. a.	
Neutral potential rise	Single	Port to earth	No	n. a.		n. a.		n. a.		600V, 200Ω,1.0s	1500V, 200Ω,1.0s
		Port to external port	No	n. a.		n. a.		n. a.		600V, 200Ω,1.0s	1500V, 200Ω,1.0s
Main power contact	Single	Transverse	No	230V,10,20, 40,80,160, 300,600 and 1000Ω, 15min	230V,10,20, 40,80,160, 300,600 and 1000Ω, 15min	n. a.		230V,10,20, 40,80,160, 300,600 and 1000Ω, 15min	230V,10,20, 40,80,160, 300,600 and 1000Ω, 15min	n. a.	
		Port to earth	No	230V,10,20, 40,80,160, 300,600 and 1000Ω, 15min	230V,10,20, 40,80,160, 300,600 and 1000Ω, 15min	n. a.		230V,10,20, 40,80,160, 300,600 and 1000Ω, 15min	230V,10,20, 40,80,160, 300,600 and 1000Ω, 15min	n. a.	
		Port to external port	No	n. a.		n. a.		n. a.		n. a.	

NOTE 1 – Equipment designed to be connected to antennas/equipment exposed to direct lightning currents, e.g., connected to antennas/equipment mounted on a tower.NOTE 2 – Applicable equipment not covered by Note 1.

Applicable tests for internal ports

Test type	Primary protection	Unshielded			Shielded cable			POE		Floating d.c.power interface		Earthed d.c.power interface	
			Basic	Enhanced		Basic	Enhanced	Basic	Enhanced	Basic	Enhanced	Basic	Enhanced
Lightning	No	Unshielded cable with symmetric pairs	500V,10Ω 1.2/50μs –8/20μs	1KV,10Ω 1.2/50μs –8/20μs	Shielded cable to earth	500V,0Ω 1.2/50μs –8/20μs	1.0KV,0Ω 1.2/50μs –8/20μs	600V,10Ω 1.2/50μs –8/20μs	1KV,10Ω 1.2/50μs –8/20μs	500V,0Ω 1.2/50μs –8/20μs	1KV,0Ω 1.2/50μs –8/20μs	500V,0Ω 1.2/50μs –8/20μs	1KV,0Ω 1.2/50μs –8/20μs
					USB shielded cable to earth	100V,0Ω 1.2/50μs –8/20μs	150V,0Ω 1.2/50μs –8/20μs						
		UTPEthernet portrated impulse voltage test	2.5KV,5Ω 1.2/50μs –8/20μs	6KV,5Ω 1.2/50μs –8/20μs	STP Ethernet simultaneousport to earth	1KV,0Ω 1.2/50μs –8/20μs	1.5KV,0Ω 1.2/50μs –8/20μs						
					UTP Ethernet portrated impulse voltage test	2.5KV,5Ω 1.2/50μs –8/20μs	6KV,5Ω 1.2/50μs –8/20μs						
		Floating d.c. power interface	500V,0Ω 1.2/50μs –8/20μs	1KV,0Ω 1.2/50μs –8/20μs	Floating d.c. power interface	500V,0Ω 1.2/50μs –8/20μs	1KV,0Ω 1.2/50μs –8/20μs						

ITU-T K.21 (JUN 2016) Resistibility of telecommunication equipment installed in customer premises to voltages and overcurrents

Applicable tests for external ports

Test type	No. of pairs simultaneously tested	Test connection	Primary protection	Port type							
				Symmetric port		Coaxial port		Dedicated power feed port		Mains power port	
				Basic	Enhanced	Basic	Enhanced	Basic	Enhanced	Basic	Enhanced
Lightning Voltage	Single	Transverse/ differential	No	1.5KV,25Ω 10/700μs	1.5KV,25Ω 10/700μs	1KV,0Ω 1.2/50 - 8/20μs	1.5KV,0Ω 1.2/50 - 8/20μs	1.5KV,25Ω 10/700μs	1.5KV,25Ω 10/700μs	2.5KV,0Ω 1.2/50 - 8/20μs	6KV,0Ω 1.2/50 - 8/20μs
		Port to earth	No	1.5KV,25Ω 10/700μs	6KV,25Ω 10/700μs	n. a.		1.5KV,25Ω 10/700μs	6KV,25Ω 10/700μs	2.5KV,0Ω 1.2/50 - 8/20μs	6KV,0Ω 1.2/50 - 8/20μs
		Port to external port	No	1.5KV,25Ω 10/700μs	6KV,25Ω 10/700μs	n. a.		1.5KV,25Ω 10/700μs	6KV,25Ω 10/700μs	2.5KV,0Ω 1.2/50 - 8/20μs	6KV,0Ω 1.2/50 - 8/20μs
		Coordination/ Transverse/ differential	Yes	4KV,25Ω 10/700μs	6KV,25Ω 10/700μs	4KV,0Ω 1.2/50 - 8/20μs	6KV,0Ω 1.2/50 - 8/20μs	4KV,25Ω 10/700μs	6KV,25Ω 10/700μs	6KV,0Ω 1.2/50μs– 8/20μs	10KV,0Ω 1.2/50μs– 8/20μs
		Coordination/ Port to earth	Yes	4KV,25Ω 10/700μs	6KV,25Ω 10/700μs	n. a.		4KV,25Ω 10/700μs	6KV,25Ω 10/700μs	6KV,0Ω 1.2/50μs– 8/20μs	10KV,0Ω 1.2/50μs– 8/20μs
		Coordination/ Port to external port	Yes	4KV,25Ω 10/700μs	6KV,25Ω 10/700μs	n. a.		4KV,25Ω 10/700μs	6KV,25Ω 10/700μs	6KV,0Ω 1.2/50μs– 8/20μs	10KV,0Ω 1.2/50μs– 8/20μs
	Multiple	Port to earth	No	1.5KV,25Ω 10/700μs	1.5KV,25Ω 10/700μs	n. a.		n. a.		n. a.	
		Port to external port	No	1.5KV,25Ω 10/700μs	1.5KV,25Ω 10/700μs	n. a.		n. a.		n. a.	
		Port to earth	Yes	4KV,25Ω 10/700μs	6KV,25Ω 10/700μs	n. a.		n. a.		n. a.	
		Port to external port	Yes	4KV,25Ω 10/700μs	6KV,25Ω 10/700μs	n. a.		n. a.		n. a.	
	Unshielded twisted pair (UTP) Ethernet	Port to earth	No	n. a.		n. a.		n. a.		n. a.	
		Transverse	No	600V,10Ω 1.2/50 - 8/20μs	1.5KV,10Ω 1.2/50 - 8/20μs	n. a.		n. a.		n. a.	
		Voltage impulse test	No	2.5KV,5Ω 1.2/50 - 8/20μs	6KV,5Ω 1.2/50 - 8/20μs	n. a.		n. a.		n. a.	
		Power over Ethernet (PoE)	No	600V,10Ω 1.2/50 - 8/20μs	1.5KV,10Ω 1.2/50 - 8/20μs	n. a.		n. a.		n. a.	
	Shielded twisted pair (STP) Ethernet	Shield test	No	1.5KV,10Ω 1.2/50 - 8/20μs	6KV,10Ω 1.2/50 - 8/20μs	1.5KV,10Ω 1.2/50 - 8/20μs	6KV,10Ω 1.2/50 - 8/20μs	n. a.		n. a.	
		Port to earth	No	1.5KV,0Ω 1.2/50 - 8/20μs	6KV,0Ω 1.2/50 - 8/20μs	1.5KV,10Ω 1.2/50 - 8/20μs	6KV,10Ω 1.2/50 - 8/20μs	n. a.		n. a.	
Lightning Current	Single	Port to earth	No	1KA/wire,0Ω ,8/20μs	5KA/wire,0Ω ,8/20μs	n. a.		1KA/wire,0Ω ,8/20μs	5KA/wire,0Ω ,8/20μs	n. a.	
		Port to external port	No	1KA/wire,0Ω ,8/20μs	5KA/wire,0Ω ,8/20μs	n. a.		1KA/wire,0Ω ,8/20μs	5KA/wire,0Ω ,8/20μs	n. a.	
	Multiple	Port to earth	n. a.	1 kA/wire, Limited to 6kA,R = 0 ,8/20μs	5 kA/wire, Limited to 30 kA,R = 0 ,8/20μs	n. a.		n. a.		n. a.	
		Port to external port	n. a.	1 kA/wire, Limited to 6kA,R = 0 ,8/20μs	5 kA/wire, Limited to 30 kA,R = 0 ,8/20μs	n. a.		n. a.		n. a.	
		Differential	n. a.	n. a.		1 kA, 8/20μs	5 kA 8/20μs	n. a.		n. a.	
		Shield to earth	No	n. a.		1 kA, 8/20μs	5 kA 8/20μs	n. a.		n. a.	
		Shield to external port	No	n. a.		4kA(Note 1), 2kA (Note 2) 8/20μs	20kA(Note 1), 5kA (Note 2) 8/20μs	n. a.		n. a.	
Insulation	Multiple	Port to earth	n. a.	2.5V,5Ω 1.2/50 - 8/20μs	6KV,5Ω 1.2/50 - 8/20μs	n. a.		n. a.		n. a.	
Power induction and earth Potential rise	Single	Transverse	No	600V,600Ω ,0.2s	600V,600Ω ,0.2s	Under study		600V,600Ω ,0.2s	600V,600Ω ,0.2s	n. a.	
		Port to earth	No	600V,600Ω, 0.2s	600V,600Ω, 0.2s	n. a.		600V,600Ω, 0.2s	600V,600Ω, 0.2s	Under study	Under study
		Port to external port	No	600V,600Ω, 0.2s	600V,600Ω, 0.2s	n. a.		600V,600Ω, 0.2s	600V,600Ω, 0.2s	Under study	Under study
		Coordination Transverse	Yes	600V,600Ω, 1s	1.5KV,200Ω ,2s	Under study		600V,600Ω, 1s	1.5KV,200Ω ,2s	n. a.	
		Coordination Port to earth	Yes	600V,600Ω, 1s	1.5KV,200Ω ,2s	n. a.		600V,600Ω, 1s	1.5KV,200Ω ,2s	n. a.	
		Coordination Port to external port	Yes	600V,600Ω, 1s	1.5KV,200Ω ,2s	n. a.		600V,600Ω, 1s	1.5KV,200Ω ,2s	n. a.	
Neutral potentialrise	Single	Port to earth	No	n. a.		n. a.		n. a.		600V 200Ω,1s	1500V 200Ω,1s
		Port to external port	No	n. a.		n. a.		n. a.		600V 200Ω,1s	1500V 200Ω,1s
Main power contact	Single	Transverse	No	230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	n. a.		230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	n. a.	
		Port to earth	No	230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	n. a.		230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	n. a.	
		Port to external port	No	230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	n. a.		230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	230V,10,20,40, 80,160, 300, 600 and 1000Ω,15min	n. a.	

NOTE 1 – Equipment designed to be connected to antennas/equipment exposed to direct lightning currents, e.g., connected to antennas/equipment mounted on a tower.NOTE 2 – Applicable equipment not covered by Note 1.

Applicable tests for internal ports

Test type	Primary protection	Unshielded cable			Shielded cable			PoE		Floating d.c. power interface		Earthed d.c. power interface	
			Basic	Enhanced		Basic	Enhanced	Basic	Enhanced	Basic	Enhanced	Basic	Enhanced
Lightning	No	Unshielded cable with symmetric pairs	1KV,10Ω 1.2/50μs– 8/20μs	1.5KV,10Ω 1.2/50μs– 8/20μs	Shielded cable to earth	1KV,0Ω 1.2/50μs– 8/20μs	1.5KV,0Ω 1.2/50μs– 8/20μs	600V,10Ω 1.2/50μs– 8/20μs	1KV,10Ω 1.2/50μs– 8/20μs	1KV,0Ω 1.2/50μs– 8/20μs	1.5KV,0Ω 1.2/50μs– 8/20μs	1KV,0Ω 1.2/50μs– 8/20μs	1.5KV,0Ω 1.2/50μs– 8/20μs
					USB shielded cable to earth	100V,0Ω 1.2/50μs– 8/20μs	150V,0Ω 1.2/50μs– 8/20μs						
		UTP Ethernet portrated impulse voltage	2.5KV,5Ω 1.2/50μs– 8/20μs	6KV,5Ω 1.2/50μs– 8/20μs	STP Ethernet simultaneous port to earth	1KV,0Ω 1.2/50μs– 8/20μs	1.5KV,0Ω 1.2/50μs –8/20μs						
					Floating d.c. power interface	1KV,0Ω 1.2/50μs– 8/20μs	1.5KV,0Ω 1.2/50μs– 8/20μs						

GR1089-2:(2010) Electromagnetic Compatibility (EMC) and Electrical Safety - Generic Criteria for Network Telecommunications Equipment

First-Level Lightning Surge

Surge Test Number	Port Types	Test Description	Min.Peak Open-CircuitVoltage (Volts)	Min. Peak Short-Circuit Current per Conductor (Amperes)	Surge Maximum Rise/Minimum Decay Timefor Voltage and Current(μs)	Value of External Non-Inductive Resistors	Repetitions Each Polarity	Test Connections
1	1,3,3b/5b,5	Multiport OSP Test	±1000	25	10/360	N/A	5	Up to 24conductors
1.1	3b/5b	Short Loop OSP Interface	±1000	25	10/360	N/A	5	A
1.2	3b/5b	Short Loop OSP Interface - with Secondary Protectors	±Vs	25(at 1000 V)	10/360	N/A	5	A
2	1,3,5	OSP Interface	±100 to ±1000	10(at 100 V)to 100(at 1000 V)	10/1000	N/A	5 at each voltage increment	A
2.1	1,3,5	Extended OSP Interface	±100 to ±2000	10(at 100 V)to 100(at 2000 V)	10/1000	N/A	5 at each voltage increment	A
2.2	1,3,5	OSP Interface–with SecondaryProtectors	±Vs	100(at 1000 V)	10/1000	N/A	5	A
3	1,3,3b/5b,5	Gas Tube Interaction Test	±4000	SeeFigure 4-6	10/700 voltage 5/310 current	25	5	(A5 and A6) orB
4	3,5	Inductive Kick Test for OSP Interfaces	±2500	500	2/10	N/A	10	See Figure 4-1
5	3,3b/5b,5	Fast Rise Time Test for Remote OSP Interfaces	±1000	200	2/10	N/A	5	A
6	3,5	Higher Ground Resistancefor Remote OSP Interfaces – Longitudinal	±1000	100	10/1000	N/A	5	A5, A6
7	3,5	High Lightning ExposureTest for Remote OSP Inter faces	±400 to ±4000	50 (at 400 V) to 500(at 4000 V)	10/250	N/A	5 at each voltage increment	B
8	2,3a/5a,4,4a	Intra-Building with up to 2 Pairs per Port (Metallic)	±800	100	2/10	N/A	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	A1, A2, A3,A4
8.1	2,3a/5a,4,4a	Intra-Building with Secondary Protectors up to 2 Pairs per Port (Metallic)	±Vs	100 (at 800 V)	2/10	N/A	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	A1, A2, A3,A4
9	2,4,4a	Intra-Building with up to 2 Pairs per Port (Longitudinal)	±1500	100	2/10	N/A	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	B
9.1	2,4,4a	Intra-building with Secondary Protectors up to 2 Pairs per Port (Longitudinal)	±Vs	100 (at 1500 V)	2/10	N/A	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	B
10	2,3a/5a,4,4a	Alternative Intra-Building for up to 2 Pairs per Port (Metallic)	±800	400	1.2/50-8/20	6	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	A1, A2, A3,A4
10.1	2,3a/5a,4,4a	Alternative Intra-Building with Secondary Protectors up to 2 Pairs per Port (Metallic)	±Vs	Vs/2	1.2/50-8/20	6	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	A1, A2, A3,A4
11	2,4,4a	Alternative Intra-Building up to 2 Pairs per Port (Longitudinal)	±1500	750	1.2/50-8/20	10	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	B
11.1	2,4,4a	Alternative Intra-Building Undervoltage up to 2 Pairs per Port(Longitudinal)	±Vs	Vs/2	1.2/50-8/20	10	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	B
12	2,3a/5a,4,4a	Intra-Building for 3 or 4 Pairs per Port (Metallic)	±800	400	1.2/50-8/20	6	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	Test per Figure 4-10
12.1	2,3a/5a,4,4a	Intra-Building with Secondary Protectors, 3 or 4 Pairs per Port (Metallic)	±Vs	Vs/2	1.2/50-8/20	6	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	Test per Figure 4-10
13	2,4,4a	Intra-Building 3 or 4 Pairs per Port (Longitudinal)	±1500	750	1.2/50-8/20	20	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	B
13.1	2,4,4a	Intra-Building Undervoltage 3 or 4 Pairs per Port (Longitudinal)	±Vs	Vs/2	1.2/50-8/20	20	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	B
14	2,3a/5a,4,4a	Intra-Building for > 4 Pairs per Port(Metallic)	±800	400	1.2/50-8/20	6	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	Test per Figure 4-10
14.1	2,3a/5a,4,4a	Intra-Building with Secondary Protectors, > 4 Pairs per Port (Metallic)	±Vs	Vs/2	1.2/50-8/20	6	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	Test per Figure 4-10
15	2,4,4a	Intra-Building for > 4 Pairs per Port(Longitudinal)	±1500	750	1.2/50-8/20	40	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	B
15.1	2,4,4a	Intra-Building with Secondary Protectors for > 4 Pairs per Port(Longitudinal)	±Vs	Vs/2	1.2/50-8/20	40	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	B
16	2,3a/5a,4,4a	Intra-Building for Paired Shielded Cables	±1500	750	1.2/50-8/20	2	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	See Figure 4-12
17	2,3a/5a,4,4a	Intra-Building for Coaxial	±1500	750	1.2/50-8/20	2	Repetitions each polarity may be 5 on 1 sample, or 1 on 3 samples.	See Figure 4-13
18	4a	Customer Side ONT Interfaces	±1000	100	10/1000	N/A	5	A5, A6
19	6	Antenna Port Test	±600	300	1.2/50-8/20	N/A	5	Center conductor to shield
19.1	6	Antenna Port with Secondary Protector Test	±Vs	300(at 600 V)	1.2/50-8/20	N/A	5	Center conductor to shield
20	7	AC Power Port Test with External SPD	±2000	1000	1.2/50-8/20	N/A	5	Phase to neutral, phase to ground, neutral to ground
21	7	AC Power Port Test with External SPD	±6000	3000	1.2/50-8/20	N/A	5	Phase to neutral, phase to ground, neutral to ground
21.1	7	AC Power Port with Secondary Protector	±Vs	3000(at 6000 V)	1.2/50-8/20	N/A	5	Phase to neutral, phase to ground, neutral to ground
22	8a	Tower Mounted Transceiver Fed with Remote DC Power Test (Longitudinal)	±6000	Minimum peak short-circuit current per port is 3000 A.	1.2/50-8/20	N/A	5	See Figure 4-15. Feed and return to shield simultaneously
23	3a/5a,8b	Voltage Limiting for Intra-Site Cell Site Ports (Longitudinal)	±2500	Minimum peak short-circuit current per port is 5000 A.	8/20current	N/A	5	B

1=CO OSP Cable Ports, 2=CO Intra-building Cable Ports, 3=CO Intra-building Cable Ports, 3a/5a=Non-CO Intra-Building Ports, 3b/5b=Short Reach OSP Cable Ports, 4=Intra-Cell Site Cable Ports, 4a=Customer-Side Optical Network Terminals (ONTs) and Intelligent Network Interface Devices (iNIDs) Cable Ports, 5=OSP Site OSP Cable Ports, 6=Antenna Ports, 7=AC Power Ports, 8a=DC Power to Antenna, 8b=Intra-Cell Site DC Power

Second-Level Lightning Surge

Surge Test Number	Port Types	Test Description	Min.Peak Open-Circuit Voltage(Volts)	Min. Peak Short-Circuit Current per Conductor (Amperes)	Surge Maximum Rise/Minimum DecayTimefor Voltageand Current(μs)	Repetitions Each Polarity	Test Connections
1	1,3,5	Inductive Kick Test for OSP Interfaces	±5000	500	2/10	1	See Figure 4-1
2	7	Lightning to AC Power Port	±6000	3000	1.2/50-8/20	1	Phase conductors to neutral, phase conductors to ground, neutral conductor to ground
2.1	7	Lightning to AC Power Port With Secondary Protectors	±Vs	3000(at 6000 V)	1.2/50-8/20	1	Phase conductors to neutral, phase conductors to ground, neutral conductor to ground

1=CO OSP Cable Ports, 3=CO Intra-building Cable Ports, 5=OSP Site OSP Cable Ports, 7=AC Power Ports,

ISO7637-2:2011 Road vehicles --Electrical disturbances from conduction and coupling--Part 2: Electrical transient conduction along supply lines only

Examples of test pulse severity levels for nominal 12V and 24V system

Test pulse[a]	Selected test level[b]	Test pulse severity level,Us[c,d] (V)						Min.number of pulses or test time	Burst cycle/pulse repetition tim[e]	
		IV		III		I/II				
		12	24	12	24	12	24		min.	max.
1		-150	-600	-112	-450	-75	-300	500Pulses	0.5s	e
2a		+112	+112	+55	+55	+37	+37	500Pulses	0.2s	5s
2b		+10	+20	+10	+20	+10	+20	10Pulses	0.5s	5s
3a		-220	-300	-165	-220	-112	-150	1h	90ms	100ms
3a		+150	+300	+112	+220	+75	+150	1h	90ms	100ms

a: Test pulses as in 5.6
b: Values agreed between vehicle manufacturer and equipment suppller.
c: The amplitudes are the values of Us as defined for each test pulse in 5.6.
d: The former levels I and II are revised because they did not ensure sufficient immunity in subsequent road vehicles'design.
e: The maximum pulse repetition time shall be chosen such that it is the minimum time for the DUT to be correctly initialized before the application of the next pulse and shall be ≥0.5S.

ISO16750-2:2010 Road vehicles -- Environmental conditions and testing for electrical and electronic equipment -- part 2: electrical loads

Starting profile values for systems with 12V and 24V nominal voltage

Parameter		Level						
		I		II		III		IV
		12V	24V	12V	24V	12V	24V	12V
Voltage V	U_{S6}	8(-0.2)	10(-0.2)	4.5(-0.2)	8(-0.2)	3(-0.2)	6(-0.2)	6(-0.2)
	U_S	9.5(-0.2)	20(-0.2)	6.5(-0.2)	15(-0.2)	5(-0.2)	10(-0.2)	6,5(-0.2)
Duration ms	t_f	5(±0.5)	10(±1)	5(±0.5)	10(±1)	5(±0.5)	10(±1)	5(±0.5)
	t_6	15(±1.5)	50(±5)	15(±1.5)	50(±5)	15(±1.5)	50(±5)	15(±1.5)
	t_7	50(±5)	50(±5)	50(±5)	50(±5)	50(±5)	50(±5)	50(±5)
	t_8	1000(±100)	1000(±100)	10000(±1000)	1000(±100)	1000(±100)	1000(±100)	10000(±1000)
	t_r	40(±4)	40(±4)	100(±10)	100(±10)	100(±10)	40(±10)	100(±10)
Minimum functional status		A[a]	A[e]	B[a]	B[e]	B[a]	B[e]	A[a]
		A[b]	B[f]	B[b]	C[f]	C[b]	C[f]	B[b]
		B[c]	B[g]	C[c]	C[g]	C[c]	C[g]	C[c]
		B[d]	B[h]	C[d]	C[h]	C[d]	C[h]	C[d]

a: $U_S$min = 6 V; $U_S$max = 16 V (see Table 1, Code A).
b: $U_S$min = 8 V; $U_S$max = 16 V (see Table 1, Code B).
c: $U_S$min = 9 V; $U_S$max = 16 V (see Table 1, Code C).
d: $U_s$min = 10.5 V; $U_s$max = 16 V (see Table 1, Code D).
e: $U_S$min = 10 V; $U_S$max = 32 V (see Table 2, Code E).
f : $U_S$min = 16 V; $U_S$max = 32 V (see Table 2, Code F).
g: $U_S$min = 22 V; $U_S$max = 32 V (see Table 2, Code G).
h: $U_s$min = 18 V; $U_s$max = 32 V (see Table 2, Code H).

Pulse for test A in systems with 12 V and 24 V nominal voltage

Parameter	Type of system		Minimum test requirements
	U_N=12V	U_N=24V	
U_s[a] (V)	79≤U_S≤101	151≤U_S≤202	10 pulses at intervals of 1 min
R_i[a] (Ω)	0.5≤R_i≤4	1≤R_i≤8	
t_d (ms)	40≤t_d≤400	100≤t_d≤350	
t_d (ms)	$10(^{0}_{-5})$	$10(^{0}_{-5})$	

a: If not otherwise agreed, use the higher voltage level with the higher value for internal resistance, or use the lower voltage level with the lower value for internal resistance.

IEC61000-4-5:2014 Electromagnetic compatibility (EMC) –Part 4-5: Testing and measurement techniques – Surge immunity test

Installation class	Test levels (kV)																			
	AC power supply and a.c. I/O				DC power supply and d.c. I/O				Unsymmetrical operated circuits/lines[a,d,e]				Symmetrical operated circuits/lines[a,d,e]				Shielded circuits/lines[a,d,f]			
	External ports[a]		Internal ports[a,d]		External ports[a]		Internal ports[a,d]		External port		Internal port		External port		Internal port		External port		Internal port	
	Line to line	Line to ground	Line to line	Line to ground	Line to line	Line to ground	Line to line	Line to ground	Line to line	Line to ground	Line to line	Line to ground	Line to line	Line to ground	Line to line	Line to ground	Line to line	Line to ground	Line to line	Line to ground
0	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
1	/	0.5	/	/	/	/	/	/	/	/	/	0.5	/	/	/	0.5	/	/	/	/
2	0.5	1.0	/	/	/	/	/	/	/	/	0.5	1.0	/	/	/	1.0	/	/	/	0.5
3	1.0	2.0	1.0	2.0	/	/	/	/	/	/	1.0	2.0	/	/	/	2.0	/	/	/	2.0
4	2.0[b]	4.0[b]	2.0[b]	4.0[b]	2.0[b]	4.0[b]	2.0[b]	4.0[b]	2.0[b]	4.0[b]	2.0[b]	4.0[b]	/	4.0[b]	/	4.0[b]	/	4.0[b]	/	4.0[b]
5	[c,b]	[c,b]	2.0[b]	4.0[b]	2.0[b]	4.0[b]	2.0[b]	4.0[b]	2.0[b]	4.0[b]	2.0[b]	4.0[b]	/	4.0[b]	/	4.0[b]	/	4.0[b]	/	4.0[b]

a: No test is advised if the cable length is shorter than or equal to 10 m.
b: Where the port is always intended to be used with specified primary protection, testing is performed with the primary protection in place to ensure coordination with the protection elements. If primary protection is required to protect the interface but not provided, testing is also performed at the maximum let through level of the specified primary protection and with a typical primary protector.
c: Depends on the class of the local power supply system.
d: The testing of intra-system ports is generally not required.
e: Line-to-line surges (transverse) may occur in networks where SPDs (surge protective devices) with connection to ground are used for protection. Such surges are outside the scope of this standard. This phenomenon can however be simulated by applying common mode surges through the defined primary protection elements.
f: The testing of ports connecting to antennas is outside the scope of this standard.

IEC61000-4-4:2012 Electromagnetic compatibility (EMC) – Part 4-4:Testing and measurement techniques – Electrical fast transient/burst immunity test

Open circuit output test voltage and repetition frequency of the impulses

Level	Power ports, earth port (PE)		Signal and control ports	
	Voltage peak kV	Repetition frequency kHz	Voltage peak kV	Repetition frequency kHz
1	0.5	5 or 100	0.25	5 or 100
2	1	5 or 100	0.25	5 or 100
3	2	5 or 100	1	5 or 100
4	4	5 or 100	2	5 or 100
X[a]	Special	Special	Special	Special

The use of 5 kHz repetition frequency is traditional, however, 100 kHz is closer to reality. Product committeesshould determine which frequencies are relevant for specific products or product types.

With some products, there may be no clear distinction between power ports and signal ports, in which case it is up to product committees to make this determination for test purposes.

a: "X" can be any level, above, below or in between the others. The level shall be specified in the dedicatedequipment specification.

IEC61000-4-2:2008 Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test

Contact discharge		Air discharge	
Level	Test voltage KV	Level	Test voltage KV
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
x[a]	Special	x[a]	Special

a:"x" can be any level, above, below or in between the others. The level shall be specified in thededicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed.

UL60950-1:2013 Information Technology Equipment – Safety – Part 1: General Requirements

Test voltages for eletric strength tests based on peak working voltages part 1

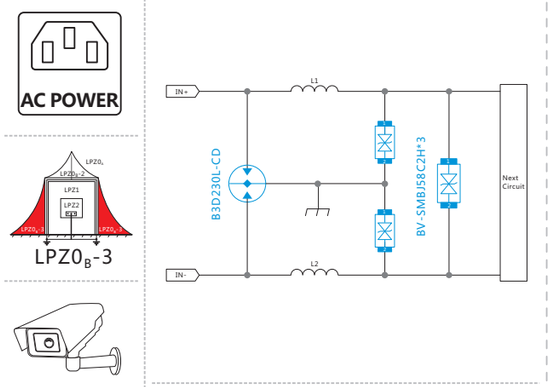
Grade of insulation	Points of application (as appropriate)						
	PRIMARY CIRCUIT to BODY PRIMARY CIRCUIT to SECONDARY CIRCUIT between Parts in PRIMARY CIRCUIT					SECONDARY CIRCUIT to BODY between independent SECONDARY CIRCUITS	
	WORKING VOLTAGE VPEAK OR DC					WORKING VOLTAGE V	
	U≤210Vpeak or d.c.[2]	210V < U≤420V peak or d.c.[3]	420 < U≤ 1.41KVpeak or d.c.	1.41KV < U≤ 10KVpeak or d.c.[4]	10KV < U≤ 50KVpeak or d.c.	U≤42.4Vpeak or 60V d.c.	42.4V peak or 60Vd.c. < U≤10KVpeak or d.c.[5]
	Test voltage , volts r.m.s.[1]						
FUNCTIONAL	1000	1500	See Va in table 5B , Part2	See Va in table 5B , Part2	1.06U	500	See Va in table 5B , Part2
BASIC , SUPPLEMENTARY	1000	1500	See Va in table 5B , Part2	See Va in table 5B , Part2	1.06U	no test	See Va in table 5B , Part2
REINFORCED	2000	3000	3000	See Vb in table 5B , Part2	1.06U	no test	See Vb in table 5B , Part2

1) For WORKING VOLTAGES exceeding 10KV peak or d.c. in SECONDARY CIRCUITS , the same test voltage as for PRIMARY CIRCUITS apply。
2) Use this column for unearthed DC MAINS SUPPLIES up to and including 210V d.c.。
3) Use this column for unearthed DC MAINS SUPPLIES over 210V d.c. up to and including 420V d.c.。
4) Use this column for unearthed DC MAINS SUPPLIES over 420 V d.c.。
5) Use these columns for d.c. derived within the equipment from an AC MAINS SUPPLIES , or for DC MAINS SUPPLIES that are earthed within the same building。

Equipment V Ports

Trade	Equipment	Port								
		RJ11	RJ45	RS485	AC	DC	HDMI	USB	Coaxial	ECGcable
Telecommunication	xDSL moden	●	●			●				
	Cable moden		●			●			●	
	Telephone	●								
	Splitter	●								
	Router		●			●				
	RRU		●	●	●	●				
	Corded Phone	●								
	Cordless Phone	●				●				
	IP Phone	●				●				
	Micro Power Cell Base Station	●	●		●	●				
	VoIP Telephone Adapter	●								
	Wireless LAN Access Point		●		●	●				
	BBU		●	●	●	●				
	Telephone switchboard	●			●					
	Network switch		●		●					
	NXU IAD VOIP PSTN	●	●		●	●				
Consumer Electronics	Television		●		●		●	●	●	
	Personal computer		●		●	●	●	●		
	Printer	●	●		●			●		
	Set top box		●		●		●	●	●	
	Digital Multimedia Broadcast Receiver				●	●	●	●	●	
	Digital Still and Video Camera				●	●	●	●		
	DVD Player and Recorder				●	●	●	●		
	LCD Projector		●		●	●	●	●		
	LCD TV		●		●	●	●	●		
Industrial	LED driver				●	●				
	POS	●	●			●				
	Parking management		●	●	●	●				
	Outdoor LED Lighting				●					
	Power Line Network			●	●					
	Power Supply				●					
	Satellite Radio				●	●				
	SMPS Embedded				●					
	SMPS External				●					
	Clothes Dryer				●					
	Dishwasher				●					
	Electric Inductive Cooktop				●					
	Electric Range Oven				●					
	Electric Resistive Cooktop				●					
	Gas Cooktop				●					
	Gas Range Oven				●					
	Microwave Oven				●					
	Range Hood				●					
	Refrigerator				●					
	Room AC				●					
	Solar Power System (Residential)			●	●					
	Washing Machine				●					
Security	Camera		●	●	●	●	●	●	●	
	NVR/DVR		●	●	●		●	●	●	
Medical	ECG monitor				●					●
Automobile	Navigator					●		●		
	Body control system					●				
	Audio and video entertainment system					●	●			
	Automobile air-condition					●				
	Display instrument					●				

AC24V/DC12V

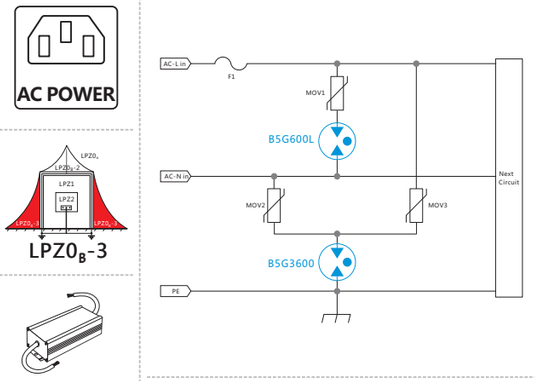


Test Level: 1.2/50μs-8/20μs
CM6KV-500A DM4KV-2KA

B3D230L-CD
7.8*5.0*6.0mm
Page 41

BV-SMBJ58C2H
5.45×3.75×2.6mm
Page 59

AC90-264V

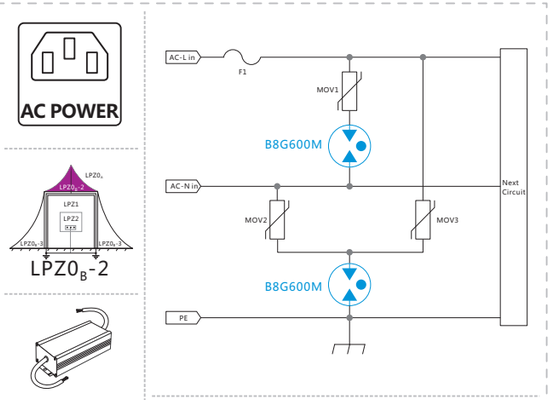


Test Level: 1.2/50μs-8/20μs
CM/DM 6KV-3KA Hipot AC1750V

B5G600L
Φ5.5*6.0mm
Page 41

B5G3600
Φ5.5*6.0mm
Page 41

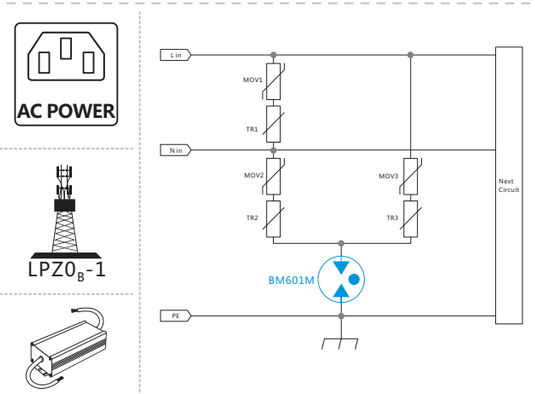
AC90-264V



Test Level: 1.2/50μs-8/20μs CM/DM10KV-5KA

B8G600M
Φ8.0*6.0mm
Page 41

AC90-264V



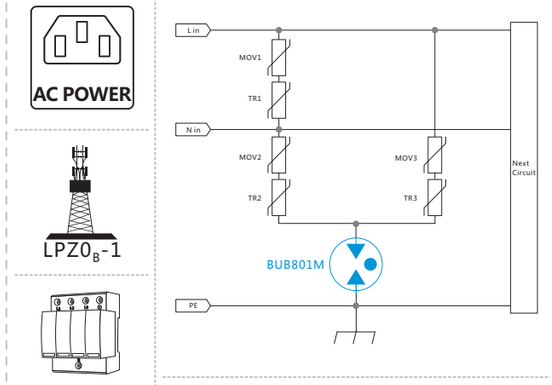
Test Level: 8/20μs CM/DM 20KA

BM601M
8.3*8.3*6.0mm
Page 41

Notes: CM=Common Mode / DM=Differential Mode

Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

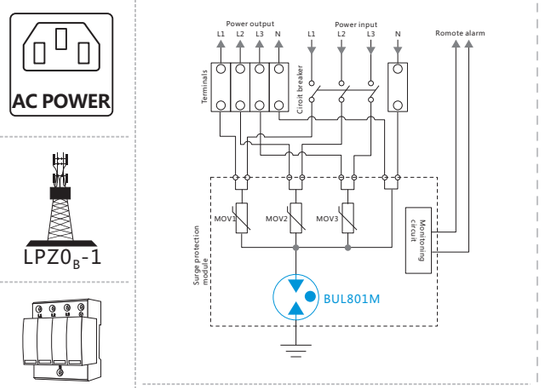
SPD AC90-264V



Test Level: 8/20μs CM/DM 20KA

BUB801M
Φ16*4.6mm
Page 41

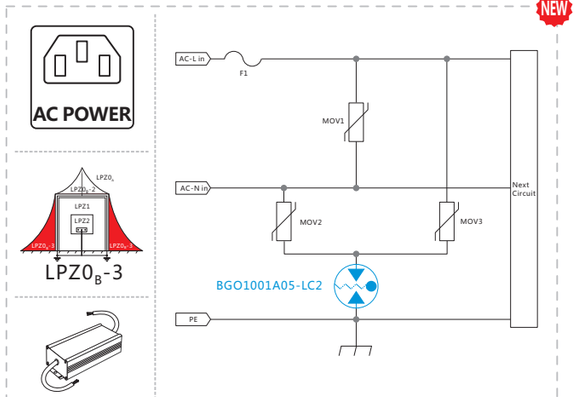
SPD AC380V



Test Level: 8/20μs CM/DM 120KA

BUL801M
Φ30*8.2mm
Page 41

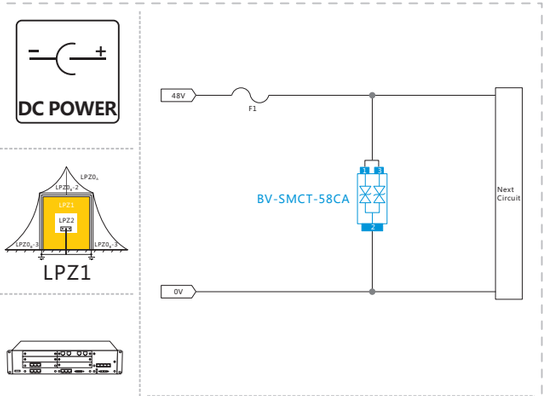
AC90-264V



Test Level: 1.2/50μs-8/20μs
CM/DM 10KV-5KA Failsafe

BGO1001A05-LC2
Φ8.0*7.0mm
Page 63

DC48V



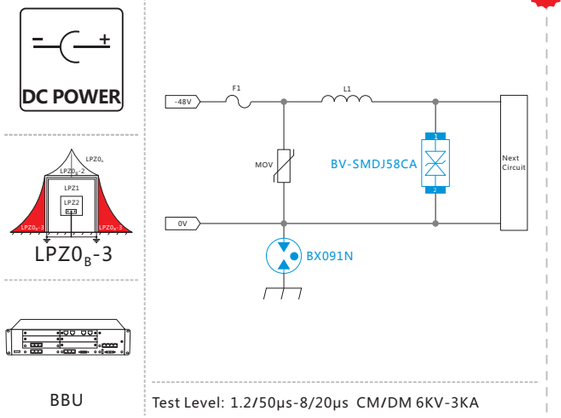
Test Level: 1.2/50μs-8/20μs CM/DM 2KV-1KA

BV-SMCT-58CA
8.0*5.9*2.0mm
Page 59

Notes: CM=Common Mode / DM=Differential Mode

Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

DC48V

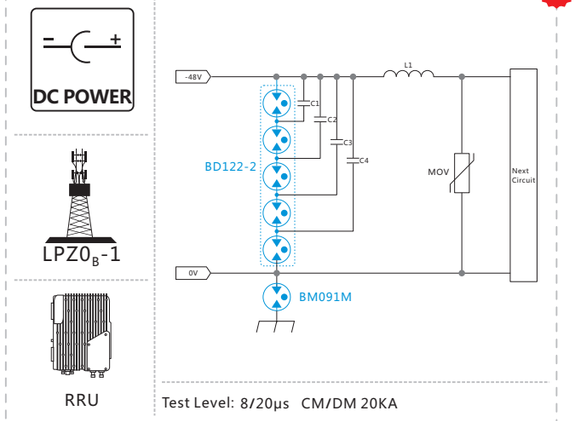


Test Level: 1.2/50μs-8/20μs CM/DM 6KV-3KA

BX091N
4.2*3.5*3.5mm
Page 39

BV-SMDJ58CA
8.25*6.15*2.95mm
Page 55

DC48V

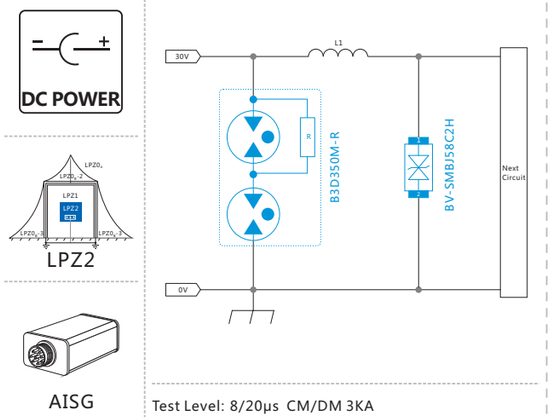


Test Level: 8/20μs CM/DM 20KA

BD122-2
8.3*9.5*16.5mm
Page 41

BM091M
8.3*8.3*6.0mm
Page 41

DC30V

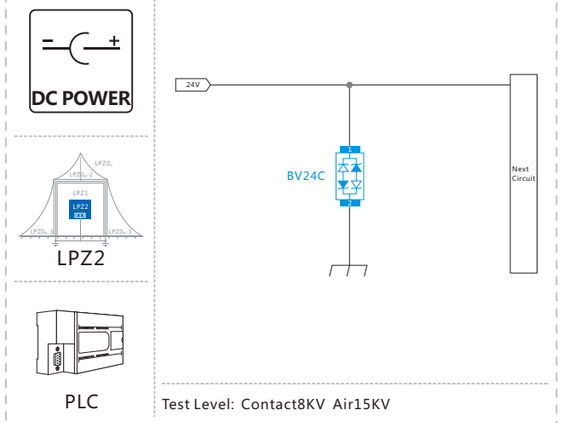


Test Level: 8/20μs CM/DM 3KA

B3D350M-R
7.8*5.0*6.0mm
Page 41

BV-SMBJ58C2H
5.45×3.75×2.6mm
Page 59

DC24V



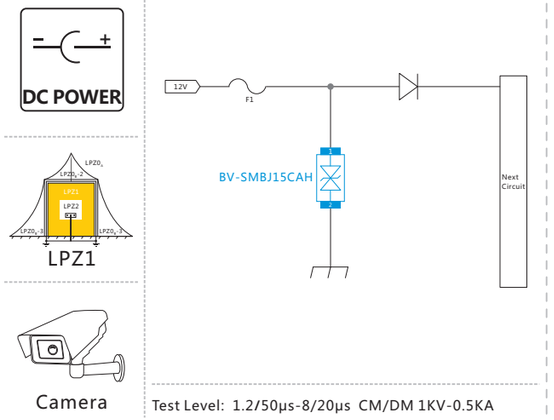
Test Level: Contact8KV Air15KV

BV24C
2.5*1.28*1.17mm
Page 59

Notes: CM=Common Mode / DM=Differential Mode

Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

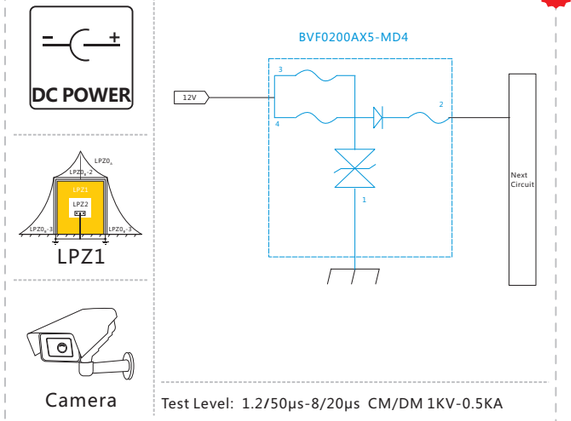
DC12V



Test Level: 1.2/50μs-8/20μs CM/DM 1KV-0.5KA

BV-SMBJ15CAH
5.45×3.75×2.6mm
Page 59

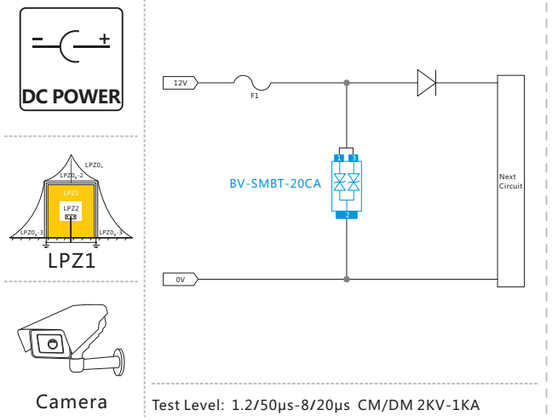
DC12V



Test Level: 1.2/50μs-8/20μs CM/DM 1KV-0.5KA

BVF0200AX5-MD4
5.4*3.3*1.6mm
Page 63

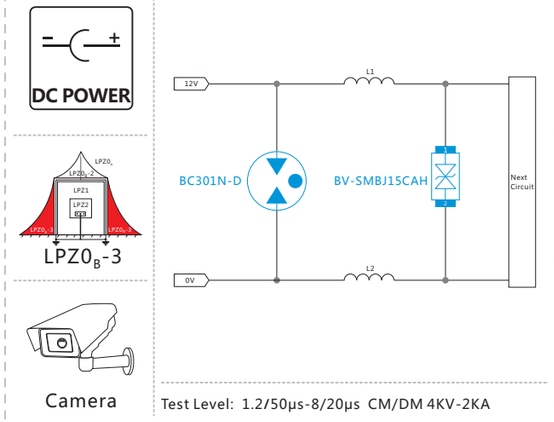
DC12V



Test Level: 1.2/50μs-8/20μs CM/DM 2KV-1KA

BV-SMBT-20CA
5.4*3.3*2.0mm
Page 59

DC12V



Test Level: 1.2/50μs-8/20μs CM/DM 4KV-2KA

BC301N-D
4.5*3.2*2.7mm
Page 39

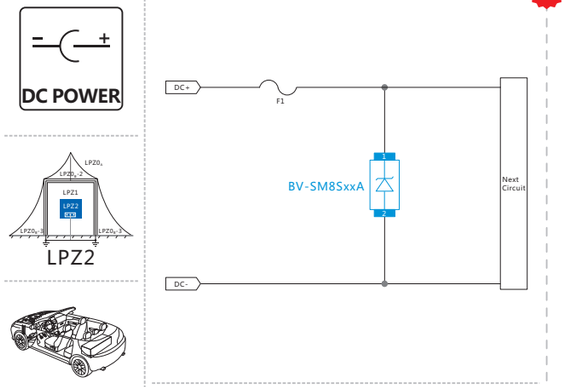
BV-SMBJ15CAH
5.45×3.75×2.6mm
Page 59

Notes: CM=Common Mode / DM=Differential Mode

Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

DC12V IN CAR

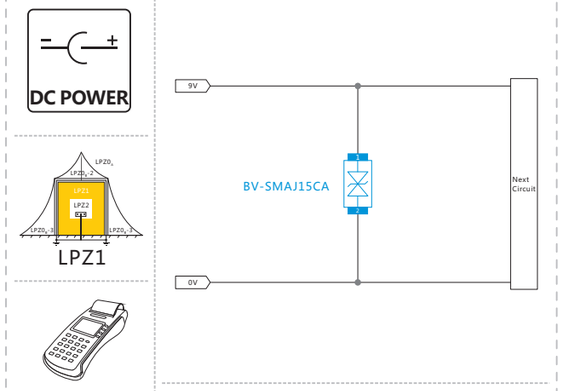
NEW



Test Level: P5a 101V 4Ω 400ms

BV-SM8SxxA
15.5*10.2*5.0mm
Page 59

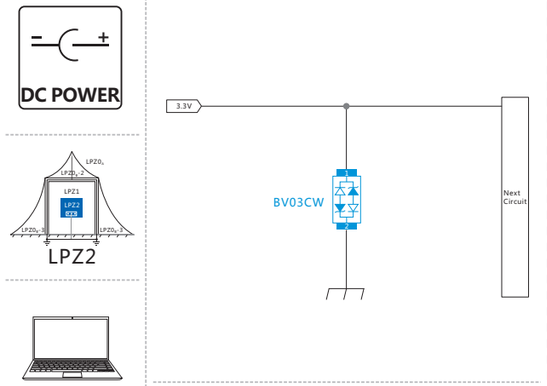
DC9V



Test Level: 1.2/50μs-8/20μs CM/DM 500V-41A

BV-SMAJ15CA
5.25*2.85*2.5mm
Page 47

DC3.3V

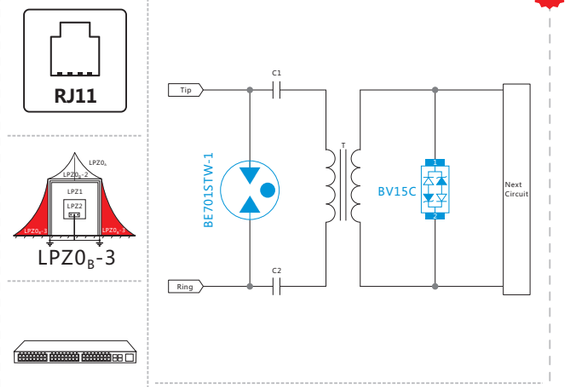


Test Level: Contact8KV Air15KV

BV03CW
2.5*1.28*1.17mm
Page 61

RJ11 G.Fast

NEW



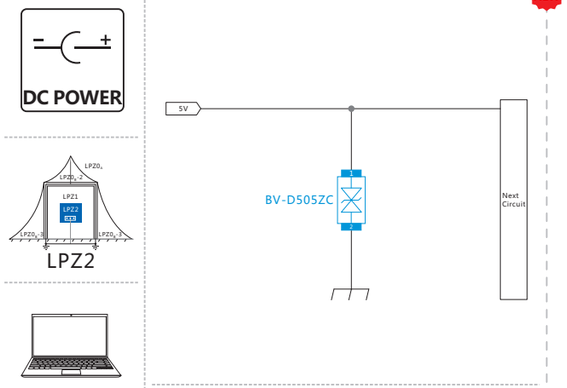
Test Level: 10/700μs-5/320μs CM/DM 6KV-150A

BE701STW-1
10.0*8.0*1.6mm
Page 63

BV15C
2.5*1.28*1.17mm
Page 61

DC5V

NEW

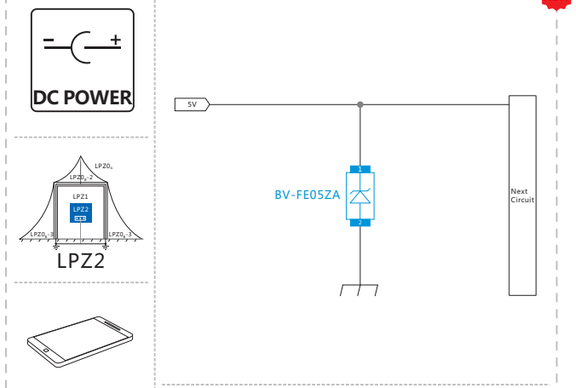


Test Level: Contact8KV Air15KV

BV-D505ZC
1.6*0.8*0.6mm
Page 61

DC5V

NEW

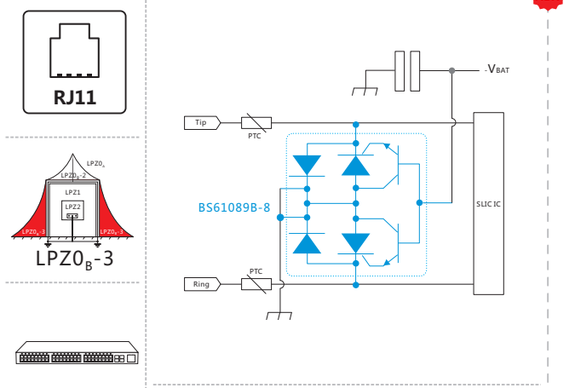


Test Level: 1.2/50μs-8/20μs CM/DM 300V-140A

BV-FE05ZA
1.6*1.0*0.5mm
Page 61

RJ11 SLIC

NEW

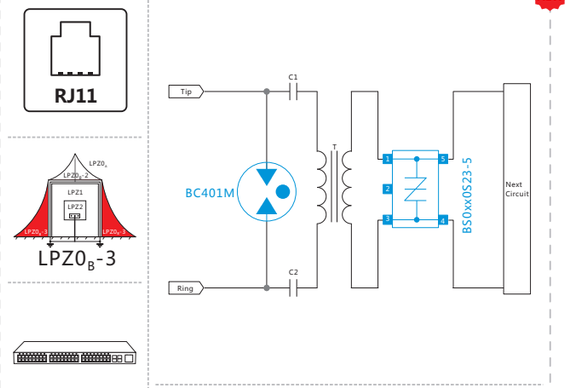


Test Level: 10/700μs-5/320μs CM/DM 6KV-150A

BS61089B-8
4.9*6.0*1.7mm
Page 63

RJ11 xDSL

NEW



Test Level: 10/700μs-5/320μs CM/DM 6KV-150A

BC401M
4.5*3.2*2.7mm
Page 12

BS0xx0S23-5
3.0*2.8*1.25mm
Page 45

Notes: CM=Common Mode / DM=Differential Mode

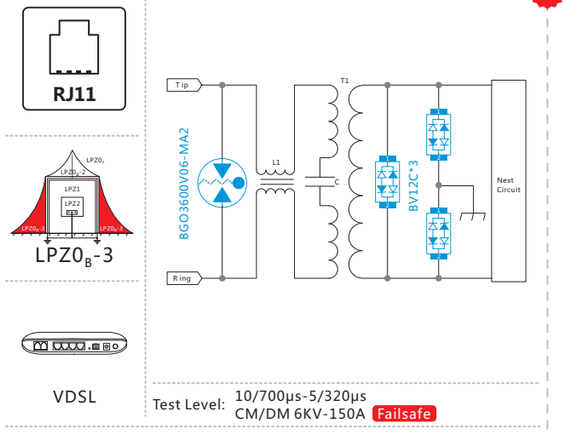
Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

Notes: CM=Common Mode / DM=Differential Mode

Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

RJ11

NEW



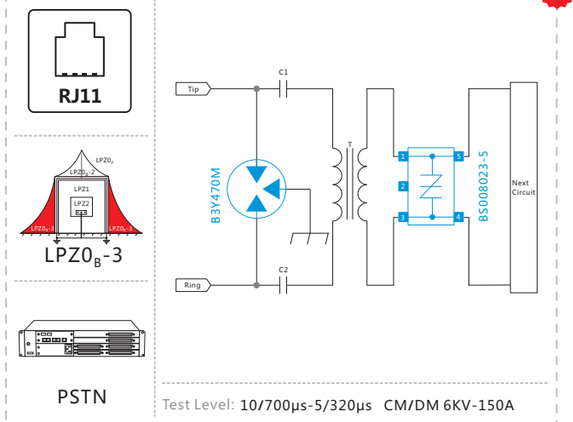
Test Level: 10/700μs-5/320μs
CM/DM 6KV-150A Failsafe

BGO3600V06-MA2
4.2*3.5*3.5mm
Page 63

BV12C
2.5*1.28*1.17mm
Page 61

RJ11

NEW

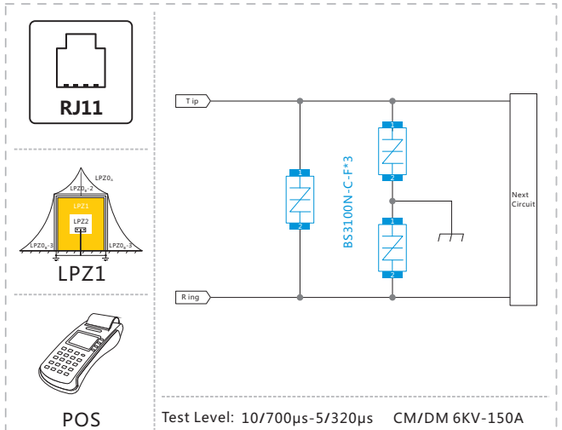


Test Level: 10/700μs-5/320μs CM/DM 6KV-150A

B3Y470M
6.2*3.2*2.3mm
Page 41

BS008023-5
3.0*2.8*1.25mm
Page 45

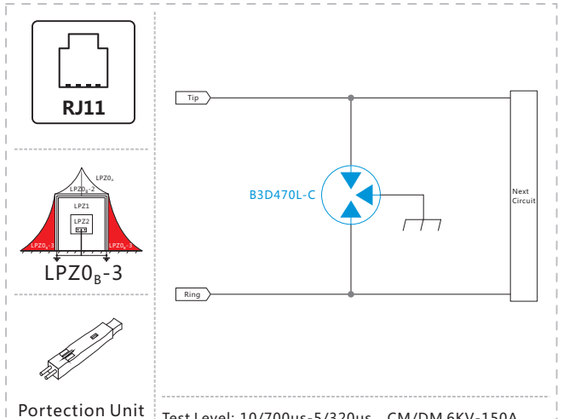
RJ11



Test Level: 10/700μs-5/320μs CM/DM 6KV-150A

BS3100N-C-F
5.4*3.3*2.0mm
Page 45

RJ11



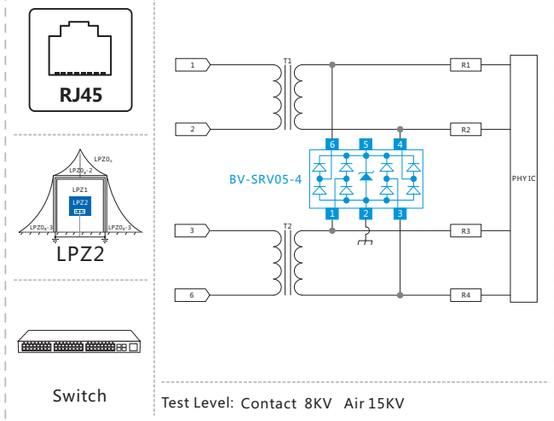
Test Level: 10/700μs-5/320μs CM/DM 6KV-150A

B3D470L-C
7.8*5.0*6.0mm
Page 41

Notes: CM=Common Mode / DM=Differential Mode

Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

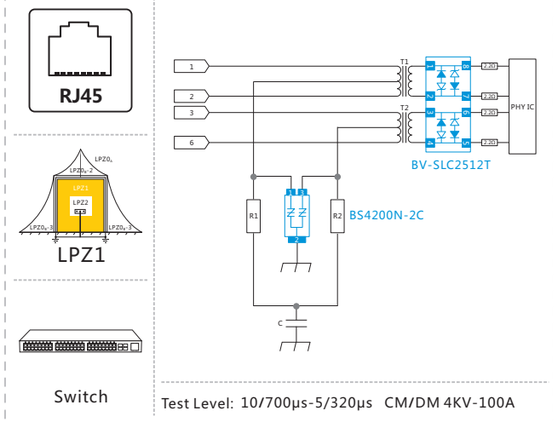
RJ45



Test Level: Contact 8KV Air 15KV

BV-SRV05-4
2.9*2.8*1.25mm
Page 61

RJ45

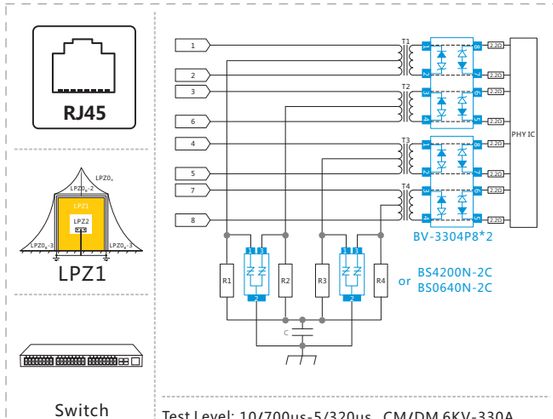


Test Level: 10/700μs-5/320μs CM/DM 4KV-100A

BS4200N-2C
5.4*3.3*2.0mm
Page 45

BV-SLC2512T
2.0*1.0*0.75mm
Page 61

RJ45



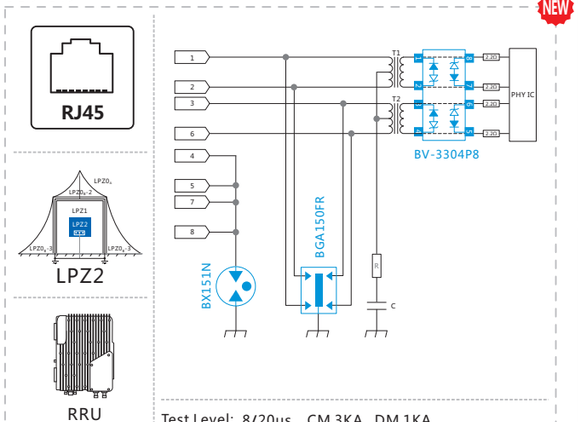
Test Level: 10/700μs-5/320μs CM/DM 6KV-330A

BS4200N-2C/BS0640N-2C
5.4*3.3*2.0mm
Page 45

BV-3304P8
4.9*6.0*1.55mm
Page 61

RJ45

NEW



Test Level: 8/20μs CM 3KA DM 1KA

BX151N
4.2*3.5*3.5mm
Page 39

BGA150FR
7.0*5.8*1.5mm
Page 63

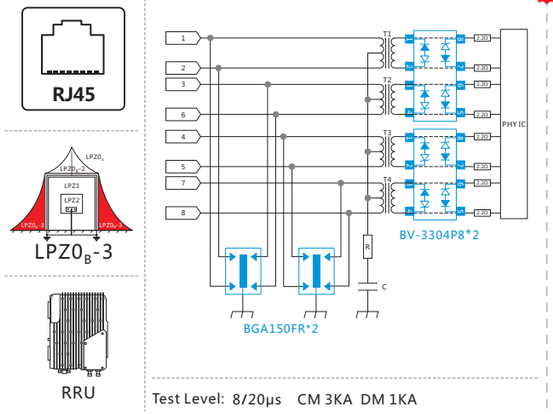
BV-3304P8
4.9*6.0*1.55mm
Page 61

Notes: CM=Common Mode / DM=Differential Mode

Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

RJ45

NEW

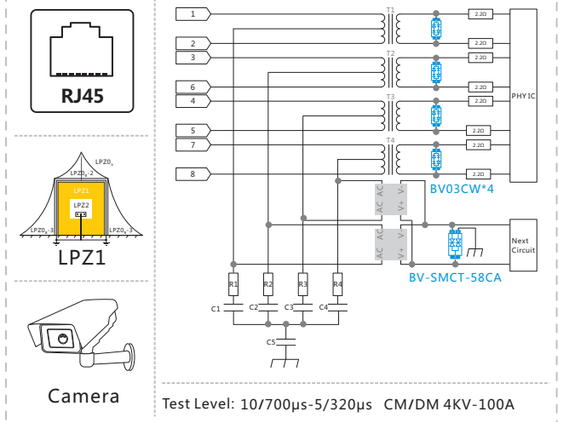


Test Level: 8/20μs CM 3KA DM 1KA

BGA150FR
7.0*5.8*1.5mm
Page 63

BV-3304P8
4.9*6.0*1.55mm
Page 61

RJ45 POE-PD

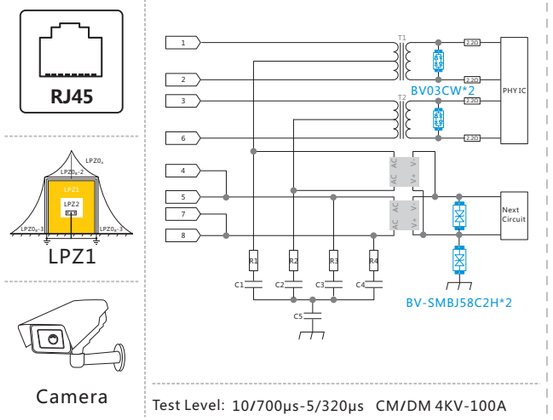


Test Level: 10/700μs-5/320μs CM/DM 4KV-100A

BV-SMCT-58CA
8.0*5.9*2.0mm
Page 59

BV03CW
2.5*1.28*1.17mm
Page 61

RJ45 POE-PD

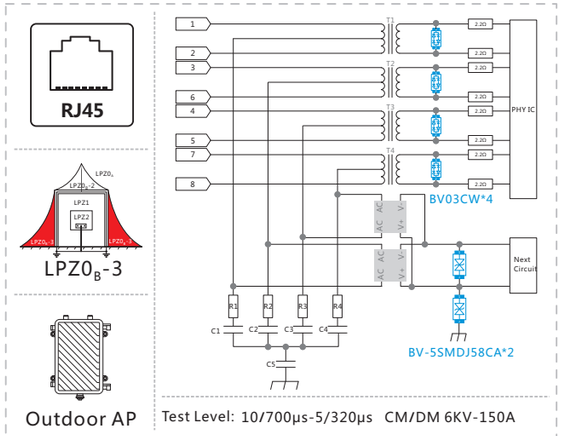


Test Level: 10/700μs-5/320μs CM/DM 4KV-100A

BV-SMBJ58C2H
5.45×3.75×2.6mm
Page 59

BV03CW
2.5*1.28*1.17mm
Page 61

RJ45 POE-PD



Test Level: 10/700μs-5/320μs CM/DM 6KV-150A

BV-5SMDJ58CA
8.25*6.15*2.95mm
Page 57

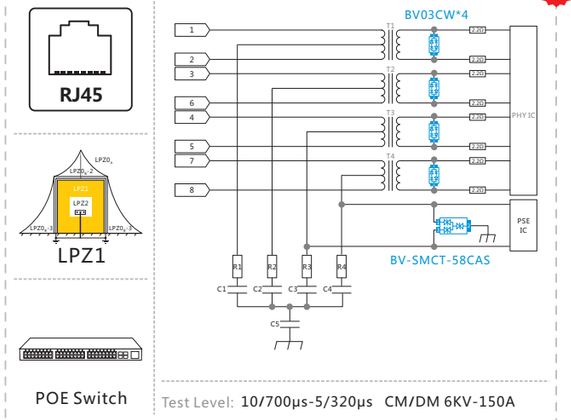
BV03CW
2.5*1.28*1.17mm
Page 61

Notes: CM=Common Mode / DM=Differential Mode

Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

RJ45 POE-PSE

NEW



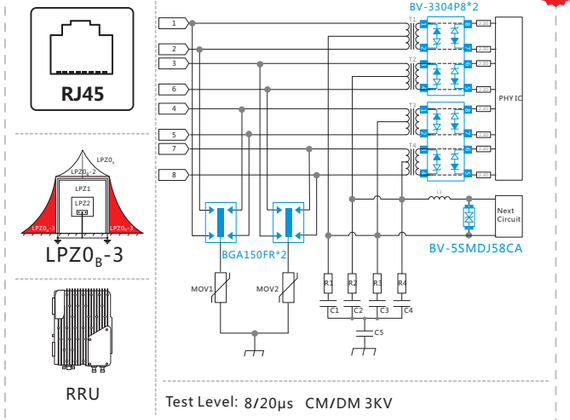
Test Level: 10/700μs-5/320μs CM/DM 6KV-150A

BV-SMCT-58CAS
8.0*5.9*3.0mm
Page 59

BV03CW
2.5*1.28*1.17mm
Page 61

RJ45 POE-PSE

NEW



Test Level: 8/20μs CM/DM 3KV

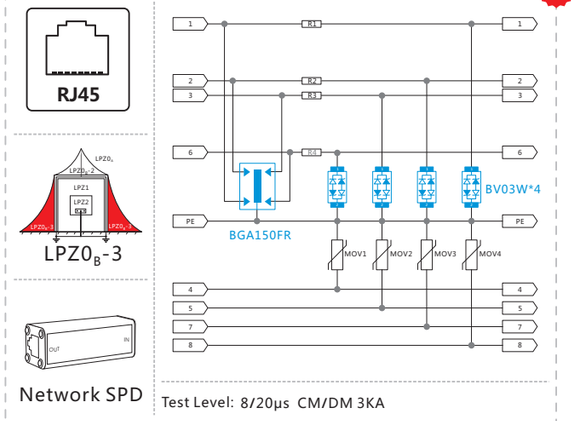
BGA150FR
7.0*5.8*1.5mm
Page 63

BV-5SMDJ58CA
8.25*6.15*2.95mm
Page 57

BV-3304P8
4.9*6.0*1.55mm
Page 61

RJ45 POE-SPD

NEW

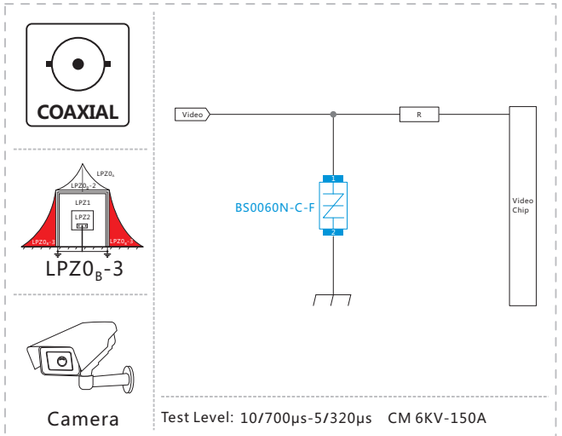


Test Level: 8/20μs CM/DM 3KA

BGA150FR
7.0*5.8*1.5mm
Page 63

BV03CW
2.5*1.28*1.17mm
Page 61

CVBS



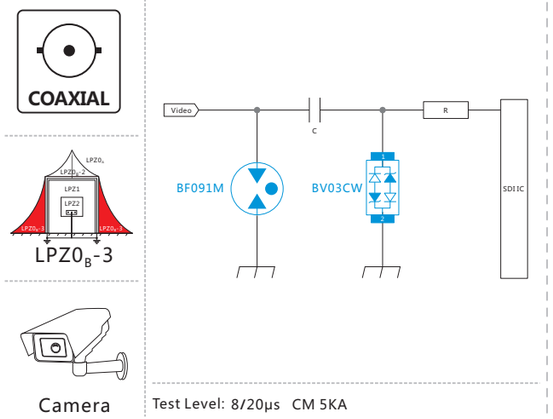
Test Level: 10/700μs-5/320μs CM 6KV-150A

BS0060N-C-F
5.4*3.3*2.0mm
Page 43

Notes: CM=Common Mode / DM=Differential Mode

Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

SDI



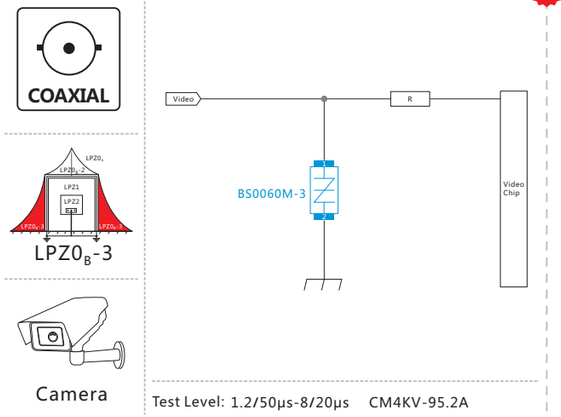
Test Level: 8/20μs CM 5KA

BF091M
4.2*5.0*5.0mm
Page 39

BV03CW
2.5*1.28*1.17mm
Page 61

HD-Analog

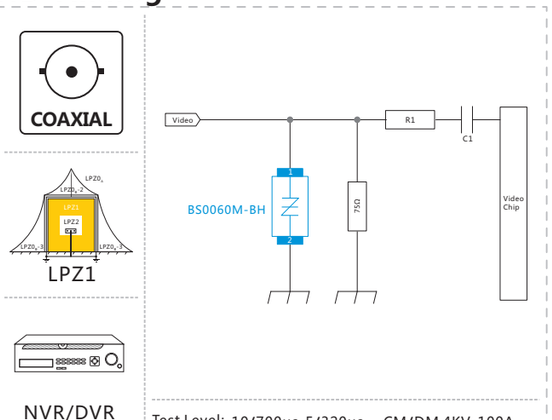
NEW



Test Level: 1.2/50μs-8/20μs CM4KV-95.2A

BS0060M-3
5.0*2.5*2.3mm
Page 43

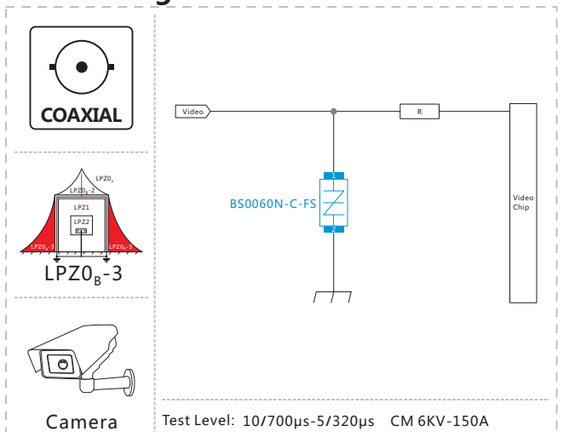
HD-Analog



Test Level: 10/700μs-5/320μs CM/DM 4KV-100A

BS0060M-BH
5.0*2.5*2.3mm
Page 43

HD-Analog

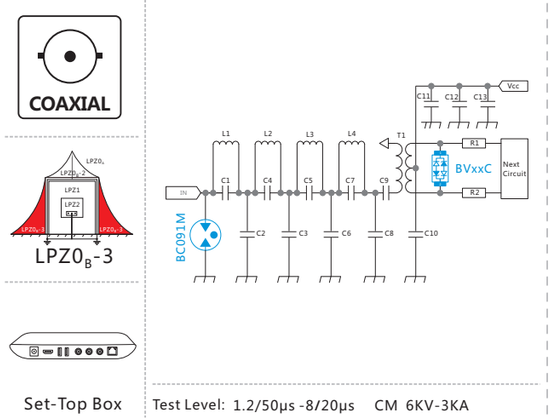


Test Level: 10/700μs-5/320μs CM 6KV-150A

BS0060N-C-FS
5.4*3.3*2.0mm
Page 43

Notes: CM=Common Mode / DM=Differential Mode
Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

Coaxial

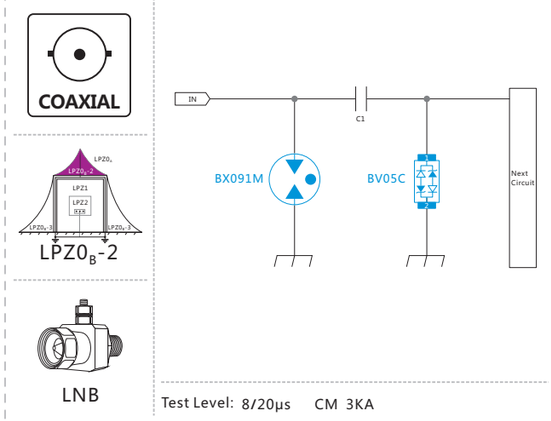


Test Level: 1.2/50μs -8/20μs CM 6KV-3KA

BC091M
4.5*3.2*2.7mm
Page 39

BVxxC
2.5*1.28*1.17mm
Page 61

Coaxial



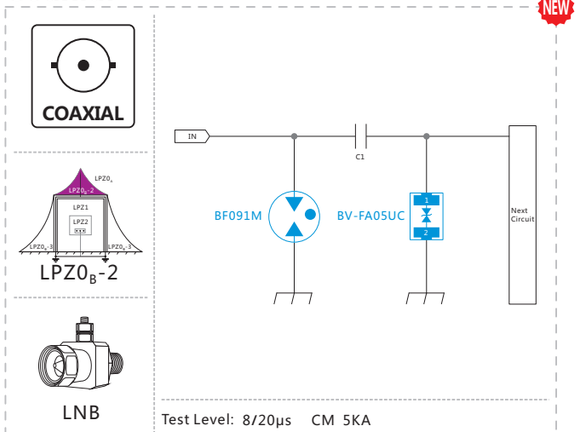
Test Level: 8/20μs CM 3KA

BX091M
4.2*3.5*3.5mm
Page 39

BV05C
2.5*1.28*1.17mm
Page 61

Coaxial

NEW



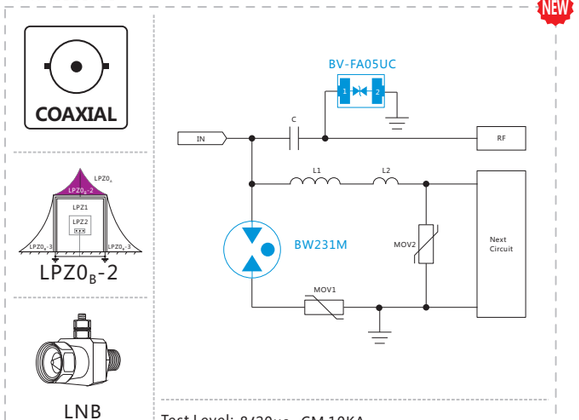
Test Level: 8/20μs CM 5KA

BF091M
4.2*5.0*5.0mm
Page 39

BV-FA05UC
1.0*0.6*0.5mm
Page 61

Coaxial

NEW



Test Level: 8/20μs CM 10KA

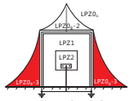
BW231M
7.0*6.0*6.0mm
Page 39

BV-FA05UC
1.0*0.6*0.5mm
Page 61

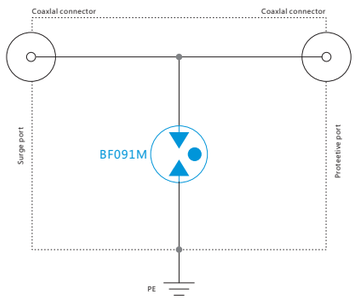
Notes: CM=Common Mode / DM=Differential Mode
Statement: This solution is only for reference, the final solution will be based on the actual test results. Shenzhen Bencent Electronics Co.,Ltd reserves the right of final explanation.

SPD Coaxial

COAXIAL



Coaxial SPD

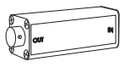


Test Level: 8/20μs CM 5KA

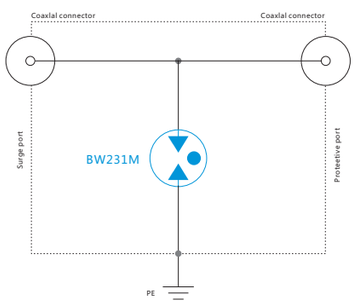
BF091M
4.2*5.0*5.0mm
Page 39

SPD Coaxial

COAXIAL



Coaxial SPD

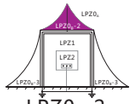


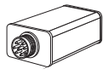
Test Level: 8/20μs CM 10KA

BW231M
7.0*6.0*6.0mm
Page 39

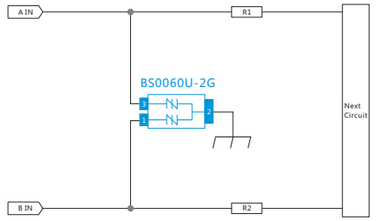
RS485

RS485





AISG

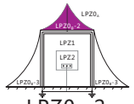


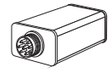
Test Level: 8/20μs CM/DM 3KA

BS0060U-2G
8.0*5.9*2.0mm
Page 45

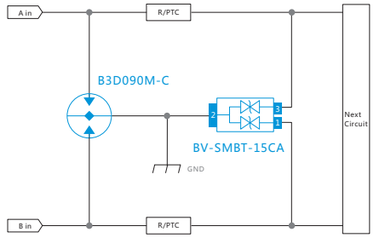
RS485

RS485





AISG



Test Level: 8/20μs CM/DM 3KA

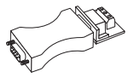
B3D090M-C
7.8*5.0*6.0mm
Page 41

BV-SMBT-15CA
5.4*3.3*2.0mm
Page 59

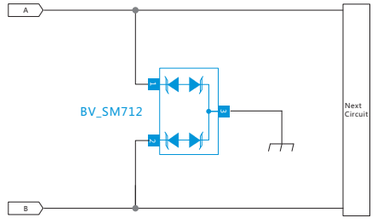
RS485

RS485

LPZ2



RS485 Converter

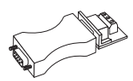


Test Level: Contact8KV Air15KV

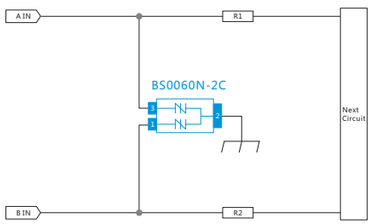
BV_SM712
2.9*2.4*1.0mm
Page 61

RS485

RS485



RS485 Converter



Test Level: 10/700μs-5/320μs CM/DM 6KV-150A

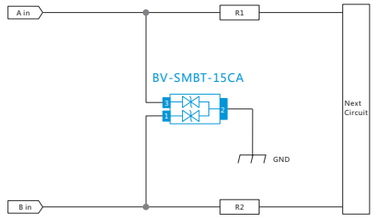
BS0060N-2C
5.4*3.3*2.0mm
Page 45

ALARM

ALARM

LPZ1

Camera



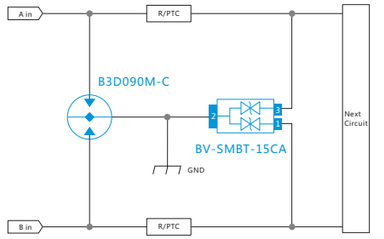
Test Level: 1.2/50μs-8/20μs CM/DM 1KV-500A

BV-SMBT-15CA
5.4*3.3*2.0mm
Page 59

ALARM

ALARM

Camera



Test Level: 8/20μs CM/DM 3KA

B3D090M-C
7.8*5.0*6.0mm
Page 41

BV-SMBT-15CA
5.4*3.3*2.0mm
Page 59

Notes: CM=Common Mode / DM=Differential Mode

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Notes: CM=Common Mode / DM=Differential Mode

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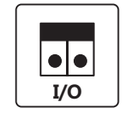
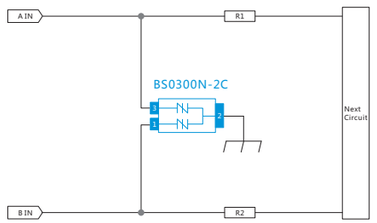
IO



I/O module

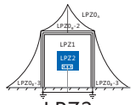


Test Level: 10/700μs-5/320μs CM/DM 6KV 150A

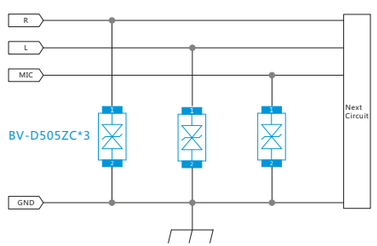
BS0300N-2C
5.4*3.3*2.0mm
Page 45

AUDIO

NEW



Laptop

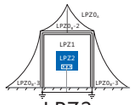


Test Level: Contact8KV Air15KV

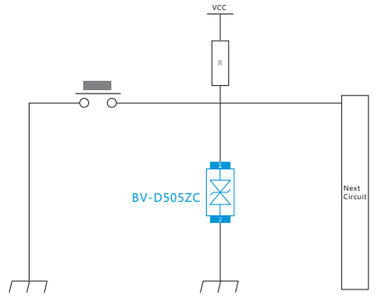
BV-D505ZC
1.6*0.8*0.6mm
Page 61

KEY

NEW



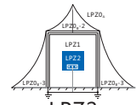
ECG monitor

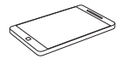


Test Level: Contact8KV Air15KV

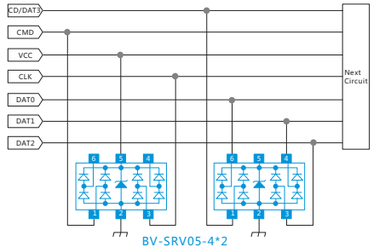
BV-D505ZC
1.6*0.8*0.6mm
Page 61

SD





Mobile phone

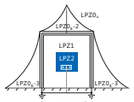


Test Level: Contact8KV Air15KV

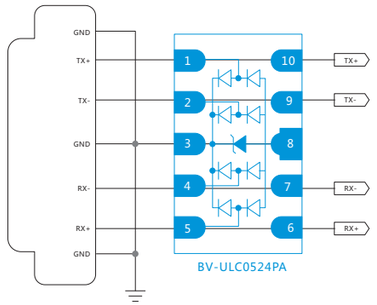
BV-SRV05-4
2.9*2.8*1.25mm
Page 61

E-SATA

NEW



Laptop

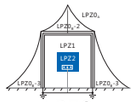


Test Level: Contact8KV Air15KV

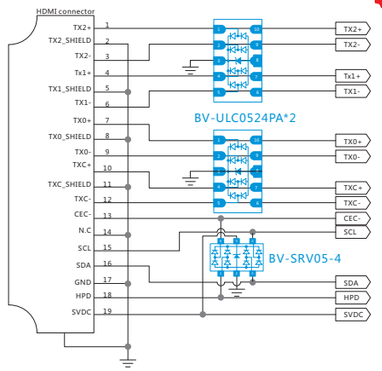
BV-ULC0524PA
2.5*1.0*0.58mm
Page 61

HDMI2.0

NEW



Laptop

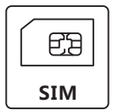


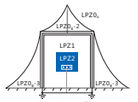
Test Level: Contact8KV Air15KV

BV-ULC0524PA
2.5*1.0*0.58mm
Page 61

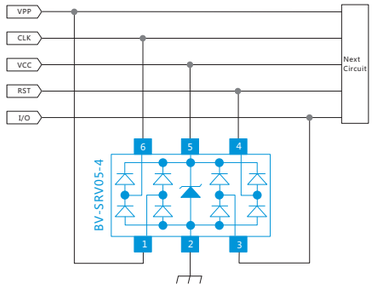
BV-SRV05-4
2.9*2.8*1.25mm
Page 61

SIM





Mobile phone

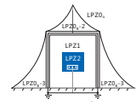


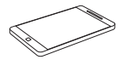
Test Level: Contact8KV Air15KV

BV-SRV05-4
2.9*2.8*1.25mm
Page 61

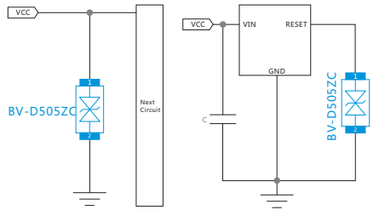
Speaker Headphone and Reset

NEW





Mobile phone



Test Level: Contact8KV Air15KV

BV-D505ZC
1.6*0.8*0.6mm
Page 61

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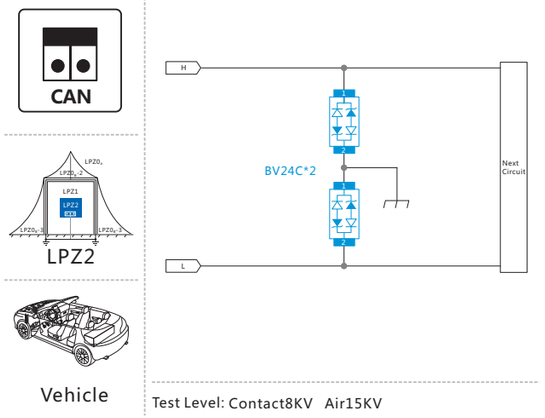
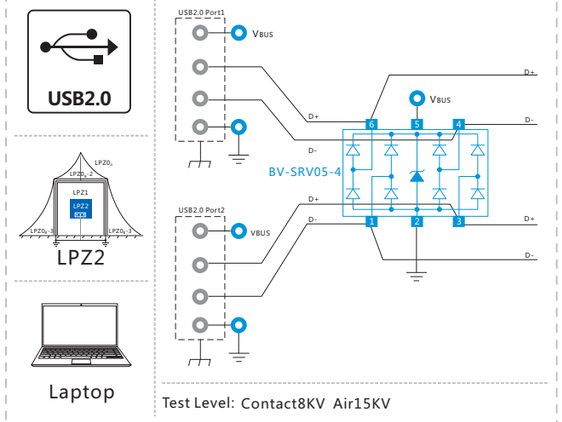
CAN BUS



Test Level: Contact8KV Air15KV

BV24C
2.5*1.28*1.17mm
Page 61

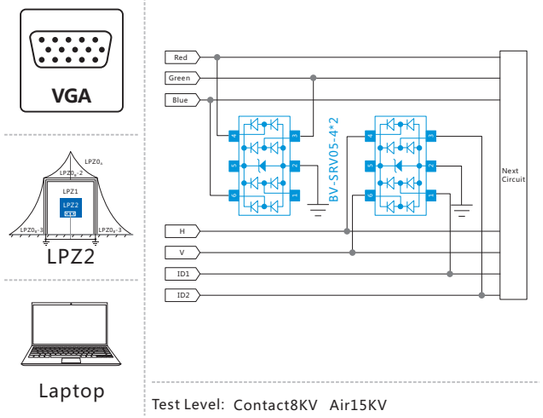
USB2.0 2in1



Test Level: Contact8KV Air15KV

BV-SRV05-4
2.9*2.8*1.25mm
Page 61

VGA

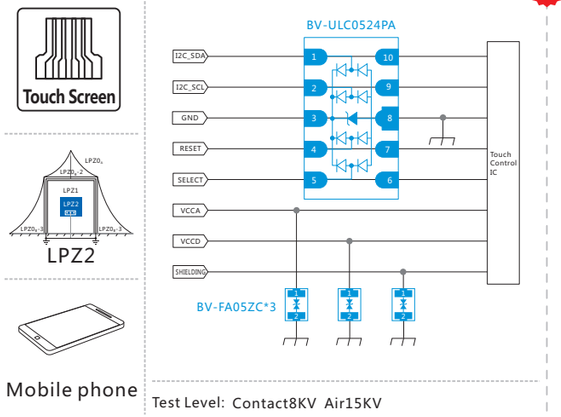


Test Level: Contact8KV Air15KV

BV-SRV05-4
2.9*2.8*1.25mm
Page 61

Touch Screen

NEW

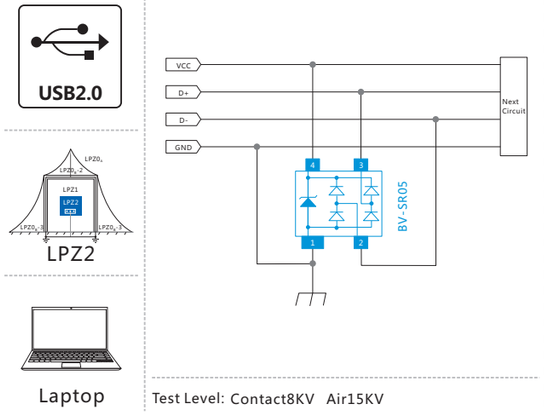


Test Level: Contact8KV Air15KV

BV-ULC0524PA
2.5*1.0*0.58mm
Page 61

BV-FA05ZC
1.0*0.6*0.5mm
Page 61

USB2.0

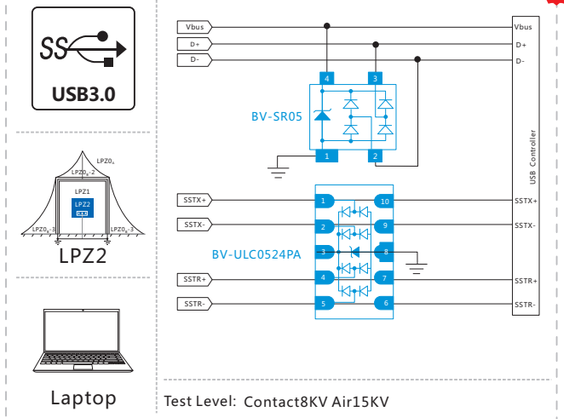


Test Level: Contact8KV Air15KV

BV-SR05
3.0*2.55*1.15mm
Page 61

USB3.0

NEW



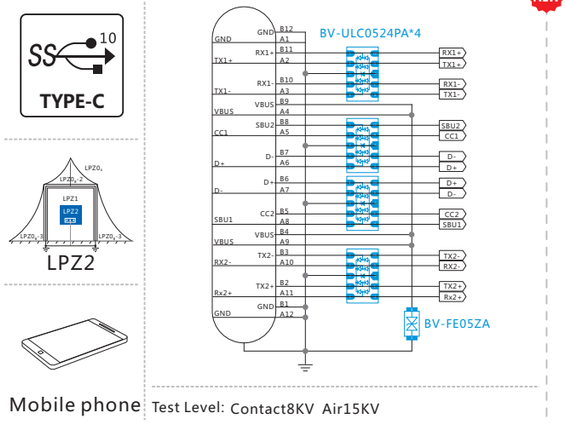
Test Level: Contact8KV Air15KV

BV-SR05
3.0*2.55*1.15mm
Page 61

BV-ULC0524PA
2.5*1.0*0.58mm
Page 61

TYPE-C

NEW

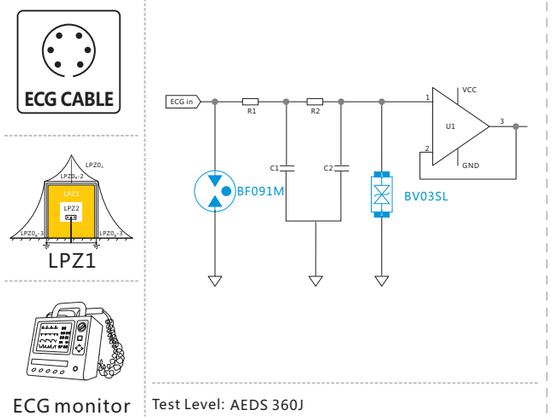


Test Level: Contact8KV Air15KV

BV-ULC0524PA
2.5*1.0*0.58mm
Page 61

BV-FE05ZA
1.6*0.8*0.5mm
Page 61

ECG Cable



Test Level: AEDS 360J

BF091M
4.0*5.0*5.0mm
Page 39

BV03SL
2.5*1.28*1.17mm
Page 61

Notes: CM=Common Mode / DM=Differential Mode

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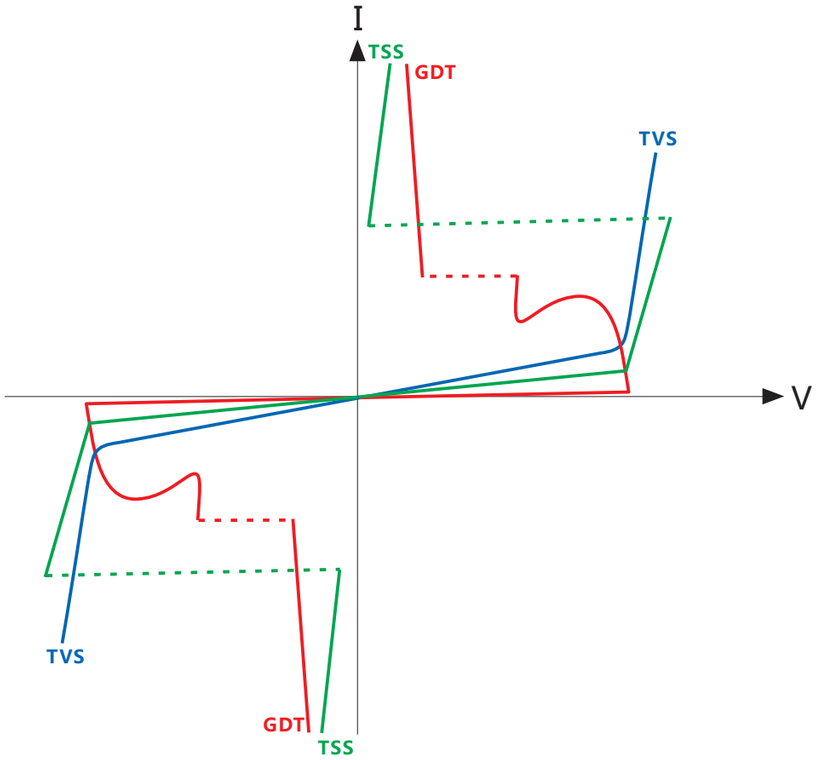
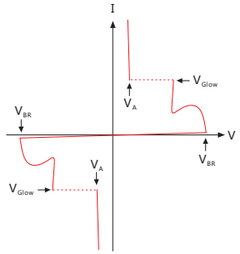
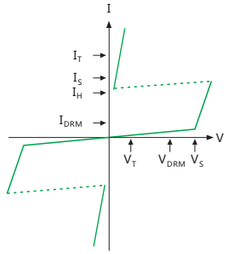
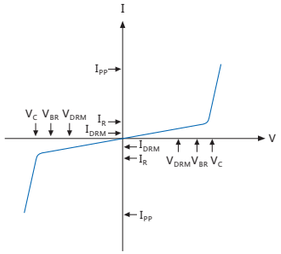




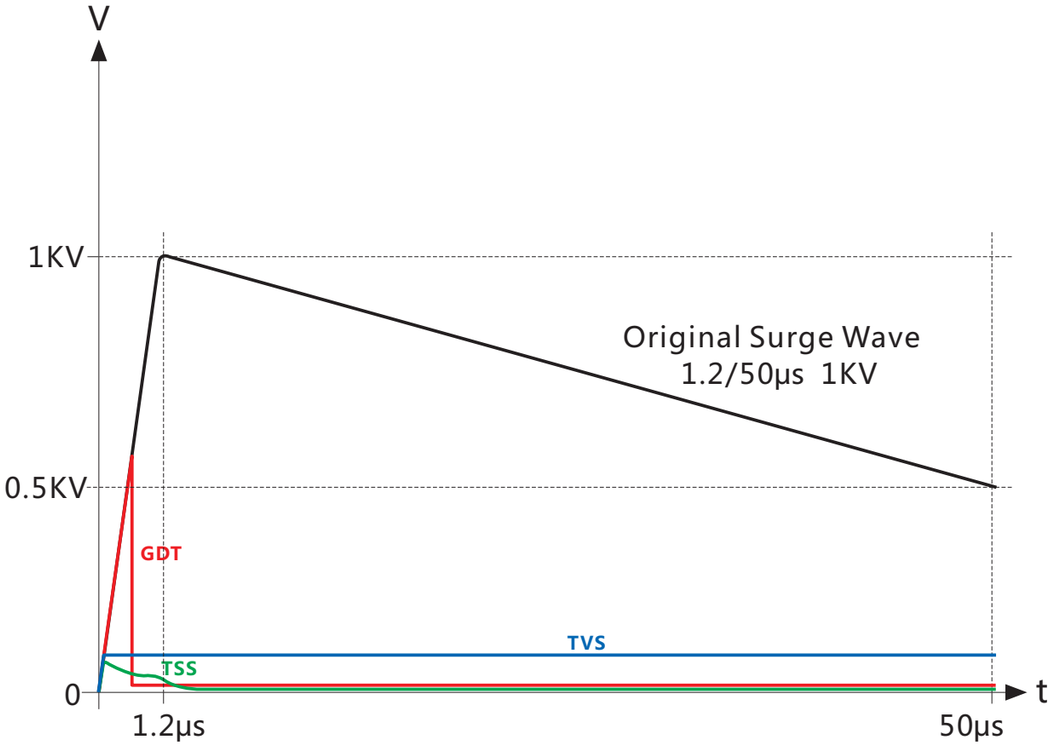
GDT

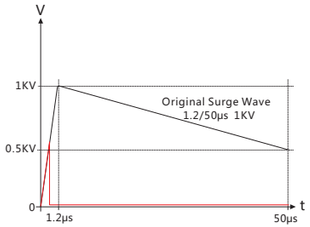


TSS

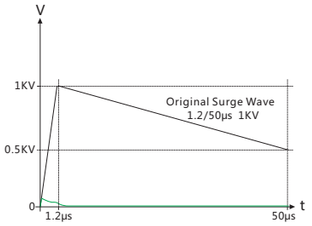


TVS

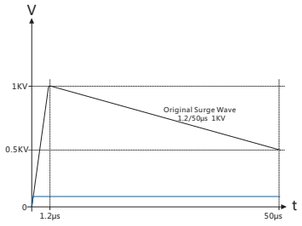




GDT
V_{DRM}=90V



TSS
V_{DRM}=58V



TVS
V_{DRM}=58V

Part Number	DC Breakdown Voltage(V_{BR}) 100V/s (V)	Tolerance of V_{BR} (V)	Impulse Spark-over Voltage 1KV/μs (V)	Arc Voltage (V_a) (V)@1A	Impulse Discharge Current 8/20μs (KA)	Insulation Resistance @DC (GΩ)	(V)	Capacitance Co(pF) 0.5VDC@1MHz	Size L*W*H (mm)	Application	Circuit	Outline	Remarks UL497B	UL1449	New products
BS201N	200	140-260	≤850	~10	0.5	≥1	100	≤0.6	3.2x1.6x1.6	Ethernet			●	○	○
BS401N	400	280-520	≤1100	~8	0.5	≥1	100	≤0.6	3.2x1.6x1.6	Ethernet			●	○	○
BZ091N	90	63-117	≤700	~8	1	≥1	50	≤0.5	3.2x2.5x2.5	Coaxial/Internet			○	○	●
BZ201M	200	160-240	≤800	~8	1	≥1	100	≤0.5	3.2x2.5x2.5	RJ11/RJ45			○	○	○
BZ301M	300	240-360	≤850	~8	1	≥1	100	≤0.5	3.2x2.5x2.5	RS485/232/422			○	○	●
BZ401M	400	360-580	≤950	~10	1	≥1	100	≤1.0	3.2x2.5x2.5	Ethernet			●	○	●
BA151N	150	105-195	≤750	~8	1	≥1	50	≤1	4.5x3.2x2.7	Coaxial			●	○	○
BA201N	200	140-260	≤750	~8	1	≥1	100	≤1	4.5x3.2x2.7	RS485/232/422			●	○	○
BA301N	300	210-390	≤800	~8	1	≥1	100	≤1	4.5x3.2x2.7	RS485/232/422			●	○	○
BA301N-D	300	210-390	≤750	~15	1	≥1	100	≤1	4.5x3.2x2.7	DC12V/AC24V			●	○	○
BA401N-D	400	340-550	≤750	~15	1	≥1	100	≤1	4.5x3.2x2.7	xDSL			●	○	○
BA601N	600	420-780	≤1200	~15	1	≥1	100	≤1	4.5x3.2x2.7	Ethernet			●	○	○
BC091N	90	63-117	≤650	~8	2	≥1	50	≤1	4.5x3.2x2.7	Coaxial			○	○	○
BC151N	150	105-195	≤750	~8	2	≥1	50	≤1	4.5x3.2x2.7	Coaxial			●	○	○
BC201N	200	140-260	≤800	~8	2	≥1	100	≤1	4.5x3.2x2.7	RS485/232/422			●	○	○
BC301N-D	300	210-390	≤750	~15	2	≥1	100	≤1	4.5x3.2x2.7	DC12V/AC24V			●	○	○
BC401M	400	360-560	≤950	~15	2	≥1	100	≤1	4.5x3.2x2.7	xDSL			●	○	○
BC601N	600	420-780	≤1200	~15	2	≥1	100	≤1	4.5x3.2x2.7	Ethernet			●	○	○
BX091N	90	63-117	≤650	~10	3	≥1	50	≤0.6	4.2x3.5x3.5	Coaxial			○	○	○
BX151N	150	105-195	≤650	~10	3	≥1	100	≤0.6	4.2x3.5x3.5	Ethernet			○	○	○
BX201N	200	140-260	≤750	~10	3	≥1	100	≤0.6	4.2x3.5x3.5	Coaxial			○	○	○
BX301N	300	210-390	≤850	~10	3	≥1	100	≤0.6	4.2x3.5x3.5	Ethernet			○	○	○
BF091M	90	72-108	≤650	~8	5	≥1	50	≤1.0	4.2x5.0x5.0	RS485/232/422			●	○	○
BF151M	150	120-180	≤420	~13	5	≥1	100	≤0.8	4.2x5.0x5.0	AC Power/xDSL			●	○	○
BF231M	230	184-276	≤700	~8	5	≥1	100	≤1.0	4.2x5.0x5.0	RS485/232/422			●	○	○
BF351M	350	280-420	≤750	≥15	5	≥1	100	≤1.0	4.2x5.0x5.0	DC12V/AC24V			●	○	○
BF471M	470	376-564	≤850	~15	5	≥1	100	≤0.8	4.2x5.0x5.0	xDSL			●	○	○
BF601M	600	480-720	≤1200	~8	5	≥1	100	≤1.0	4.2x5.0x5.0	AC Power			●	○	○
BF801M	800	640-960	≤1600	~15	3	≥1	100	≤1.0	4.2x5.0x5.0	AC Power/xDSL			●	○	○
BF102M	1000	800-1200	≤1800	~15	3	≥1	100	≤1.0	4.2x5.0x5.0	AC Power			●	○	○
BF122M	1200	960-1440	≤2000	~15	3	≥1	100	≤1.0	4.2x5.0x5.0	AC Power			○	○	○
BW231M	230	184-276	≤800	~12	10	≥1	100	≤0.45	7.0x6.0x6.0	Coaxial			●	○	●

Part Number	DC Breakdown Voltage(V_{BR}) 100V/s (V)	Tolerance of V_{BR} (V)	Impulse Spark-over Voltage 1KV/μs (V)	Arc Voltage (V_a) (V)@1A	Impulse Discharge Current 8/20μs (KA)	Insulation Resistance (GΩ)	@DC (V)	Capacitance Co(pF) 0.5VDC@1MHz	Size L*W*H (mm)	Application	Circuit	Outline	Remarks UL497B	UL1449	New products
BM091M	90	72-108	≤600	~8	20	≥1	50	≤1.5	8.3x8.3x6.0	DC Power			○	●	○
BM351M	350	280-420	≤650	~15	20	≥1	100	≤1.5	8.3x8.3x6.0	DC Power			○	○	○
BM471M	470	376-564	≤850	~15	20	≥1	100	≤1.5	8.3x8.3x6.0	AC Power			○	○	○
BM601M	600	480-720	≤950	~15	20	≥1	100	≤1.5	8.3x8.3x6.0	AC Power			○	○	○
BM801M	800	640-960	≤1200	~15	20	≥1	100	≤1.5	8.3x8.3x6.0	AC Power			○	●	○
BM152M	1500	1200-1800	≤2500	~15	10	≥1	100	≤1.5	8.3x8.3x6.0	AC Power			○	○	○
BM362M	3600	2880-4320	≤5500	~30	5	≥1	100	≤1.5	8.3x8.3x6.0	AC Power			○	○	○
BD122-2	1200	700-1200	≤2300	≥60@50A	20	≥1.5	100	≤1	16.5x9.5x8.3	DC 48V			○	●	○
B5G470L	470	376-564	≤ 850	~15	5	≥1	100	≤1	Φ5.5x6.0	AC Power			●	○	○
B5G600L	600	480-720	≤950	~15	5	≥1	100	≤1	Φ5.5x6.0	AC Power			●	○	○
B5G800L	800	640-960	≤1600	~15	5	≥1	100	≤1	Φ5.5x6.0	AC Power			○	○	○
B5G3600	3600	2880-4680	≤5500@1.2/50μs 6KV	~15	3	≥1	100	≤1	Φ5.5x6.0	AC Power			○	●	○
B8G600M	600	480-720	≤1400	~15	10	≥1	100	≤1.5	Φ8.0x6.0	AC Power			●	○	○
B8G800M	800	640-960	≤1600	~15	10	≥1	100	≤1.5	Φ8.0x6.0	AC Power			●	○	○
B8G1500M	1500	1200-1800	≤2700	~15	10	≥1	100	≤1.5	Φ8.0x6.0	AC Power			○	●	○
B8G3600L	3600	2880-4320	≤6000	~15	5	≥1	100	≤1.5	Φ8.0x6.0	AC Power			○	●	○
B3Y471M	470	360-540	≤1000	~8	1	≥1	100	≤1.5	6.2x3.2x2.3	xDSL			●	○	○
B3Q420	420	360-560	≤950	~20	2	≥1	100	≤1	6.8x3.5x3.5	xDSL			●	○	○
B3D090L-C	90	68-112	≤700	~8	5	≥1	50	≤1.5	7.8x5.0x6.0	RS485/232/422			●	○	○
B3D230L-CD	230	200-380	≤800	~15	5	≥1	100	≤1.5	7.8x5.0x6.0	DC12V/AC24V			○	○	○
B3D230L-C	230	200-380	≤800	~8	5	≥1	100	≤1.5	7.8x5.0x6.0	DC12V/AC24V			●	○	○
B3D420L-C	420	336-504	≤950	~8	5	≥1	100	≤1.5	7.8x5.0x6.0	xDSL			●	○	○
B3D470L-C	470	360-560	≤950	~8	5	≥1	100	≤1.5	7.8x5.0x6.0	xDSL			●	○	○
B3D090M-C	90	72-108	≤600	~10	10	≥1	50	≤1.5	7.8x5.0x6.0	RS485/232/422/Ethernet			●	○	○
B3D350M-R	350	245-455	≤850	≥33	5	≥1	100	≤1.5	7.8x5.0x6.0	DC30V			●	○	○
BUB601M-03	600	550-800	≤1500@1.2/50μs 6KV	~24	40	≥1	100	≤4.0	Φ16.0x4.6	AC Power			○	●	○
BUB801M-01	800	640-960	≤1500@1.2/50μs 6KV	~24	40	≥1	100	≤4.0	Φ16.0x5.1	AC Power			○	●	○
BUB801M-02	800	640-960	≤1500@1.2/50μs 6KV	~24	40	≥1	100	≤4.0	Φ16.0x4.6	AC Power			○	●	○
BUB801M-06	800	640-960	≤1500@1.2/50μs 6KV	~24	40	≥1	100	≤4.0	Φ16.0x5.6	AC Power			○	●	○
BUL801M-01	800	600-920	≤1500@1.2/50μs 6KV	~30	120	≥1	100	≤10.0	Φ30.0x8.2	AC Power			○	●	○

Part Number	Off state Voltage V_{DRM} (V)	I_D (μA) Max	Switching Voltage V_S (V) Max	I_S (mA)	On state Voltage V_T (V) Max	I_T (A)	Holding Current I_H(mA)	Capacitance Co (pF) 2V@1MHz Max	Surge Waveform (μs)	Surge Peak (KV)	Package	Size L*W*H (mm)	Mark	Application	Circuit	Outline	Remarks UL497B	UL1449	New products
BS0060D1	6	5	25	800	4	2.2	≥15	80	10/700	1.5	SOD123	3.7×1.6×1.1	B006D-1	video			○	○	○
BS0060D-2	6	5	25	800	4	2.2	≥10	10	1.2/50	3KV(42Ω)	SOD123F	3.7×1.8×1.2	B006D-2	video			○	○	○
BS0060M-2	6	5	25	800	4	2.2	≥10	10	1.2/50	3KV(42Ω)	SMA	5.0×2.5×2.3	B006M-2	video			○	○	○
BS0060M-3	6	5	25	800	4	2.2	≥10	20	1.2/50	4KV(42Ω)	SMA	5.0×2.5×2.3	B006M-3	video			○	○	●
BS0060M	6	5	25	800	4	2.2	≥50	50	10/700	2	SMA	5.0×2.5×2.3	B006M	video			○	○	○
BS0060M-BH	6	5	25	800	4	2.2	≥10	20	10/700	4	SMA	5.0×2.5×2.3	6MLC	video			○	○	○
BS0060M-BC	6	5	15	800	4	2.2	≥15	80	10/700	4	SMA	5.0×2.5×2.3	6MSA	video			○	○	○
BS0080M	6	5	25	800	4	2.2	≥50	60	10/700	3	SMA	5.0×2.5×2.3	B008M	video			○	○	○
BS0060N-C	6	5	25	800	4	2.2	≥15	100	10/700	6	SMB	5.2×3.6×2.3	B006NC	video			●	○	○
BS0300N-C	25	5	40	800	4	2.2	≥50	100	10/700	6	SMB	5.2×3.6×2.3	B03NC	RS485/232/422			●	○	○
BS0640N-C	58	5	77	800	4	2.2	≥150	100	10/700	6	SMB	5.2×3.6×2.3	B06NC	POE			●	○	○
BS1100N1	95	5	130	800	4	2.2	≥120	150	10/700	3	SMB	5.2×3.6×2.3	B11NB1	SLIC			●	○	○
BS1300N-C	120	5	160	800	4	2.2	≥120	85	10/700	6	SMB	5.2×3.6×2.3	B13NC	IPC			○	○	○
BS2300N	190	5	260	800	4	2.2	≥150	80	10/700	4	SMB	5.2×3.6×2.3	B23NB	xDSL/SLIC			●	○	○
BS2300N-C	190	5	260	800	4	2.2	≥150	45	10/700	6	SMB	5.2×3.6×2.3	B23NC	RJ11			●	○	○
BS3100N	275	5	350	800	4	2.2	≥150	60	10/700	4	SMB	5.2×3.6×2.3	B31NB	POS			●	○	○
BS3100N-C	275	5	350	800	4	2.2	≥120	80	10/700	6	SMB	5.2×3.6×2.3	B31NC	RJ45			●	○	○
BS3500N-A	320	5	400	800	4	2.2	≥150	20	10/700	3	SMB	5.2×3.6×2.3	B35NA	xDSL			●	○	○
BS3500N	320	5	400	800	4	2.2	≥150	25	10/700	4	SMB	5.2×3.6×2.3	B35NB	xDSL			●	○	○
BS3500N-C	320	5	400	800	4	2.2	≥150	35	10/700	6	SMB	5.2×3.6×2.3	B35NC	xDSL			●	○	○
BS0060N-C-F	6	5	25	800	4	2.2	≥15	100	10/700	6	SMB-F	5.4×3.3×2.0	B006NC	video			●	○	○
BS0060N-C-FLC	6	5	25	800	4	2.2	≥15	55	10/700	6	SMB-F	5.4×3.3×2.0	6NCLC	video			○	○	○
BS0060N-C-FS	6	5	25	800	4	2.2	≥10	25	10/700	6	SMB-F	5.4×3.3×2.0	6NCS	video			○	○	○
BS0300N-C-F	25	5	40	800	4	2.2	≥50	100	10/700	6	SMB-F	5.4×3.3×2.0	B03NC	RS485/232/422			●	○	○
BS0640N-C-F	58	5	77	800	4	2.2	≥150	100	10/700	6	SMB-F	5.4×3.3×2.0	B06NC	POE			●	○	○
BS1100N-A1-F	95	5	130	800	4	2.2	≥120	100	10/700	3	SMB-F	5.4×3.3×2.0	B11NA1	SLIC			●	○	○
BS1100N-D1	95	5	130	800	4	2.2	≥50	150	8/20	800(A)	SMB-F	5.4×3.3×2.0	B11ND1	SLIC			○	○	○
BS1100N-D1-L	115	5	135	800	4	2.2	≥120	160	8/20	800(A)	SMB-F	5.4×3.3×2.0	B11ND1L	SLIC			○	○	○
BS1300N-C-F	120	5	160	800	4	2.2	≥120	85	10/700	6	SMB-F	5.4×3.3×2.0	B13NC	IPC			○	○	○
BS2300N-A-F	190	1	260	800	4	2.2	≥150	25	10/700	3	SMB-F	5.4×3.3×2.0	B23NA	xDSL			●	○	○
BS2300N-F	190	5	260	800	4	2.2	≥150	80	10/700	4	SMB-F	5.4×3.3×2.0	B23NB	xDSL/SLIC			●	○	○
BS2300N-C-F	190	5	260	800	4	2.2	≥150	45	10/700	6	SMB-F	5.4×3.3×2.0	B23NC	RJ11			●	○	○

Part Number	Off state Voltage V_{DRM} (V)	I_D (μA) Max	Switching V_S (V) Max	Voltage I_S (mA)	On state Voltage V_T (V) Max	I_T (A)	Holding Current I_H(mA)	Capacitance Co (pF) 2V@1MHz Max	Surge Waveform (μs)	Surge Peak (KV)	Package	Size L*W*H (mm)	Mark	Application	Circuit	Outline	Remarks UL497B	UL1449	New products
BS3100N-F	275	5	350	800	4	2.2	≥150	60	10/700	4	SMB-F	5.4×3.3×2.0	B31NB	POS			●	○	○
BS3100N-C-F	275	5	350	800	4	2.2	≥120	80	10/700	6	SMB-F	5.4×3.3×2.0	B31NC	RJ45			●	○	○
BS3100N-E-F	275	5	350	800	4	2.2	≥50	80	10/1000	200A	SMB-F	5.4×3.3×2.0	B31NE	Ethernet			○	○	●
BS3500N-A-F	320	5	400	800	4	2.2	≥150	20	10/700	3	SMB-F	5.4×3.3×2.0	B35NA	xDSL			●	○	○
BS3500N-F	320	5	400	800	4	2.2	≥150	25	10/700	4	SMB-F	5.4×3.3×2.0	B35NB	xDSL			●	○	○
BS3500N-C-F	320	5	400	800	4	2.2	≥150	35	10/700	6	SMB-F	5.4×3.3×2.0	B35NC	xDSL			●	○	○
BS4200N-C-F	400	5	520	800	4	2.2	≤50	35	10/700	6	SMB-F	5.4×3.3×2.0	B42NC	Ethernet			●	○	○
BS4200N-D-F	400	5	520	800	4	2.2	≤50	35	10/700	8	SMB-F	5.4×3.3×2.0	B42ND	Ethernet			●	○	○
BS4200N-E-F	400	5	520	800	4	2.2	≤50	70	10/1000	200(A)	SMB-F	5.4×3.3×2.0	B42NE	Ethernet			○	○	○
BS7000N-C-F	700	10	850	800	4	2.2	≤50	50	10/700	6	SMB-F	5.4×3.3×2.0	B70NC	G.FAST			○	○	○
BS8000N-C-F	750	10	1000	800	4	2.2	≤50	50	10/700	6	SMB-F	5.4×3.3×2.0	B80NC	Ethernet			○	○	○
BS0060N-2C	6 (Pin1,3-2)	5	25 (Pin1,3-2)	800	4	2.2	≥15	120	10/700	6	SMB-T	5.4×3.3×2.0	B006N2C	video			●	○	○
BS0300N-2C	25 (Pin1,3-2)	5	40 (Pin1,3-2)	800	4	2.2	≥50	100	10/700	6	SMB-T	5.4×3.3×2.0	B03N2C	RS485/232/422			●	○	○
BS0640N-2C	58 (Pin1,3-2)	5	77 (Pin1,3-2)	800	4	2.2	≥150	100	10/700	6	SMB-T	5.4×3.3×2.0	B06N2C	Ethernet			●	○	○
BS4200N-2C	400 (Pin1,3-2)	5	520 (Pin1,3-2)	800	4	2.2	≤50	35	10/700	6	SMB-T	5.4×3.3×2.0	B422NC	Ethernet			●	○	○
BS3500N-2B	320 (Pin1,3-2)	5	400 (Pin1,3-2)	800	4	2.2	≥10	50	10/700	4	SMB-T	5.4×3.3×2.0	B35N2B	Ethernet			●	○	○
BS3500N-2C	320 (Pin1,3-2)	5	520 (Pin1,3-2)	800	4	2.2	≤400	35	10/700	6	SMB-T	5.4×3.3×2.0	B35N2C	Ethernet			●	○	○
BS0060N-2B	6 (Pin1,3-2)	5	25 (Pin1,3-2)	800	4	2.2	≥15	90	10/700	4	SMB-T	5.4×3.3×2.0	B006N2B	RS485			●	○	●
BS1100N-2A1	95 (Pin1,3-2)	5	130 (Pin1,3-2)	800	4	2.2	≥120	100	10/700	2	SMB-T	5.4×3.3×2.0	B11N2A1	SLIC			○	○	○
BS0060U-2G	6 (Pin1,3-2)	5	25 (Pin1,3-2)	800	4	2.2	≥50	500	8/20	3(KA)	SMC-T	8.0×5.9×2.0	B006U2G	RS485/232/422			○	○	●
BS4200Q-C	400	5	520	800	4	2.2	50	35	10/700	6	DFN	3.3×3.3×1.0	B420QC	Ethernet			●	○	○
BS0080S23-5	8	5	15	500	4	1	≥20	10	8/20	50(A)	SOT23-5	3.0×2.8×1.25	B008S23-5	xDSL			○	○	●
BS0120S23-5	12	5	20	500	4	1	≥20	10	8/20	50(A)	SOT23-5	3.0×2.8×1.25	B012S23-5	xDSL			○	○	●
BS0180S23-5	18	5	25	500	4	1	≥20	10	8/20	50(A)	SOT23-5	3.0×2.8×1.25	B018S23-5	xDSL			○	○	●
BS0240S23-5	24	5	35	500	4	1	≥20	10	8/20	50(A)	SOT23-5	3.0×2.8×1.25	B024S23-5	xDSL			○	○	●

Part Number		Off state Voltage		Breakdown Voltage		Clamp Voltage @		Surge Waveform (μs)	Ppp (W)	Package	Size L*W*H (mm)	Mark		Application	Circuit		Outline	Remarks		
BI	UNI	V_{DRM} (V)	I_{DRM} 25℃(μA) Max	V_{BR} (V) Max	I_R (mA)	V_C (V) Max	I_{PP} (A)					BI	UNI		BI	UNI		UL497B	UL1449	New products
BV-SMAJ5CA	BV-SMAJ5A	5	800	7	10	9.2	43.5	10/1000	400	SMA	5.25×2.85×2.5	A5C	A5	DC Power				○	○	○
BV-SMAJ6CA	BV-SMAJ6A	6	800	7.37	10	10.3	38.8	10/1000	400	SMA	5.25×2.85×2.5	A6C	A6	DC Power				○	○	○
BV-SMAJ6.5CA	BV-SMAJ6.5A	6.5	500	7.98	10	11.2	35.7	10/1000	400	SMA	5.25×2.85×2.5	A6.5C	A6.5	DC Power				○	○	○
BV-SMAJ7CA	BV-SMAJ7A	7	200	8.6	10	12	33.3	10/1000	400	SMA	5.25×2.85×2.5	A7C	A7	DC Power				○	○	○
BV-SMAJ7.5CA	BV-SMAJ7.5A	7.5	100	9.21	1	12.9	31	10/1000	400	SMA	5.25×2.85×2.5	A7.5C	A7.5	DC Power				○	○	○
BV-SMAJ8CA	BV-SMAJ8A	8	50	9.83	1	13.6	29.4	10/1000	400	SMA	5.25×2.85×2.5	A8C	A8	DC Power				○	○	○
BV-SMAJ8.5CA	BV-SMAJ8.5A	8.5	20	10.4	1	14.4	27.8	10/1000	400	SMA	5.25×2.85×2.5	A8.5C	A8.5	DC Power				○	○	○
BV-SMAJ9CA	BV-SMAJ9A	9	10	11.1	1	15.4	26	10/1000	400	SMA	5.25×2.85×2.5	A9C	A9	DC Power				○	○	○
BV-SMAJ10CA	BV-SMAJ10A	10	5	12.3	1	17	23.5	10/1000	400	SMA	5.25×2.85×2.5	A10C	A10	DC Power				○	○	○
BV-SMAJ11CA	BV-SMAJ11A	11	1	13.5	1	18.2	22	10/1000	400	SMA	5.25×2.85×2.5	A11C	A11	DC Power				○	○	○
BV-SMAJ12CA	BV-SMAJ12A	12	1	14.7	1	19.9	20.1	10/1000	400	SMA	5.25×2.85×2.5	A12C	A12	DC Power				○	○	○
BV-SMAJ13CA	BV-SMAJ13A	13	1	15.9	1	21.5	18.6	10/1000	400	SMA	5.25×2.85×2.5	A13C	A13	DC Power				○	○	○
BV-SMAJ14CA	BV-SMAJ14A	14	1	17.2	1	23.2	17.2	10/1000	400	SMA	5.25×2.85×2.5	A14C	A14	DC Power				○	○	○
BV-SMAJ15CA	BV-SMAJ15A	15	1	18.5	1	24.4	16.4	10/1000	400	SMA	5.25×2.85×2.5	A15C	A15	DC Power				○	○	○
BV-SMAJ16CA	BV-SMAJ16A	16	1	19.7	1	26	15.4	10/1000	400	SMA	5.25×2.85×2.5	A16C	A16	DC Power				○	○	○
BV-SMAJ17CA	BV-SMAJ17A	17	1	20.9	1	27.6	14.5	10/1000	400	SMA	5.25×2.85×2.5	A17C	A17	DC Power				○	○	○
BV-SMAJ18CA	BV-SMAJ18A	18	1	22.1	1	29.2	13.7	10/1000	400	SMA	5.25×2.85×2.5	A18C	A18	DC Power				○	○	○
BV-SMAJ20CA	BV-SMAJ20A	20	1	24.5	1	32.4	12.3	10/1000	400	SMA	5.25×2.85×2.5	A20C	A20	DC Power				○	○	○
BV-SMAJ22CA	BV-SMAJ22A	22	1	26.9	1	35.5	11.3	10/1000	400	SMA	5.25×2.85×2.5	A22C	A22	DC Power				○	○	○
BV-SMAJ24CA	BV-SMAJ24A	24	1	29.5	1	38.9	10.3	10/1000	400	SMA	5.25×2.85×2.5	A24C	A24	DC Power				○	○	○
BV-SMAJ26CA	BV-SMAJ26A	26	1	31.9	1	42.1	9.5	10/1000	400	SMA	5.25×2.85×2.5	A26C	A26	DC Power				○	○	○
BV-SMAJ28CA	BV-SMAJ28A	28	1	34.4	1	45.4	8.8	10/1000	400	SMA	5.25×2.85×2.5	A28C	A28	DC Power				○	○	○
BV-SMAJ30CA	BV-SMAJ30A	30	1	36.8	1	48.4	8.3	10/1000	400	SMA	5.25×2.85×2.5	A30C	A30	DC Power				○	○	○
BV-SMAJ33CA	BV-SMAJ33A	33	1	40.6	1	53.3	7.5	10/1000	400	SMA	5.25×2.85×2.5	A33C	A33	DC Power				○	○	○
BV-SMAJ36CA	BV-SMAJ36A	36	1	44.2	1	58.1	6.9	10/1000	400	SMA	5.25×2.85×2.5	A36C	A36	DC Power				○	○	○
BV-SMAJ40CA	BV-SMAJ40A	40	1	49.1	1	64.5	6.2	10/1000	400	SMA	5.25×2.85×2.5	A40C	A40	DC Power				○	○	○
BV-SMAJ43CA	BV-SMAJ43A	43	1	52.8	1	69.4	5.8	10/1000	400	SMA	5.25×2.85×2.5	A43C	A43	DC Power				○	○	○
BV-SMAJ45CA	BV-SMAJ45A	45	1	55.3	1	72.7	5.5	10/1000	400	SMA	5.25×2.85×2.5	A45C	A45	DC Power				○	○	○
BV-SMAJ48CA	BV-SMAJ48A	48	1	58.9	1	77.4	5.2	10/1000	400	SMA	5.25×2.85×2.5	A48C	A48	DC Power				○	○	○
BV-SMAJ51CA	BV-SMAJ51A	51	1	62.7	1	82.4	4.9	10/1000	400	SMA	5.25×2.85×2.5	A51C	A51	DC Power				○	○	○
BV-SMAJ54CA	BV-SMAJ54A	54	1	66.3	1	87.1	4.6	10/1000	400	SMA	5.25×2.85×2.5	A54C	A54	DC Power				○	○	○
BV-SMAJ58CA	BV-SMAJ58A	58	1	71.2	1	93.6	4.3	10/1000	400	SMA	5.25×2.85×2.5	A58C	A58	DC Power				○	○	○

Part Number		Off state Voltage		Breakdown Voltage		Clamp Voltage @		Surge Waveform (μs)	Ppp (W)	Package	Size L*W*H (mm)	Mark		Application	Circuit		Outline	Remarks		
BI	UNI	V_{DRM} (V)	I_{DRM} 25℃(μA) Max	V_{BR} (V) Max	I_R (mA)	V_C (V) Max	I_{PP} (A)					BI	UNI		BI	UNI		UL497B	UL1449	New products
BV-SMAJ60CA	BV-SMAJ60A	60	1	73.7	1	96.8	4.1	10/1000	400	SMA	5.25×2.85×2.5	A60C	A60	DC Power				○	○	○
BV-SMAJ64CA	BV-SMAJ64A	64	1	78.6	1	103	3.9	10/1000	400	SMA	5.25×2.85×2.5	A64C	A64	DC Power				○	○	○
BV-SMAJ70CA	BV-SMAJ70A	70	1	86	1	113	3.5	10/1000	400	SMA	5.25×2.85×2.5	A70C	A70	DC Power				○	○	○
BV-SMAJ75CA	BV-SMAJ75A	75	1	92.1	1	121	3.3	10/1000	400	SMA	5.25×2.85×2.5	A75C	A75	DC Power				○	○	○
BV-SMAJ78CA	BV-SMAJ78A	78	1	95.8	1	126	3.2	10/1000	400	SMA	5.25×2.85×2.5	A78C	A78	DC Power				○	○	○
BV-SMAJ85CA	BV-SMAJ85A	85	1	104	1	137	2.9	10/1000	400	SMA	5.25×2.85×2.5	A85C	A85	DC Power				○	○	○
BV-SMAJ90CA	BV-SMAJ90A	90	1	111	1	146	2.7	10/1000	400	SMA	5.25×2.85×2.5	A90C	A90	DC Power				○	○	○
BV-SMAJ100CA	BV-SMAJ100A	100	1	123	1	162	2.5	10/1000	400	SMA	5.25×2.85×2.5	A100C	A100	DC Power				○	○	○
BV-SMAJ110CA	BV-SMAJ110A	110	1	135	1	177	2.3	10/1000	400	SMA	5.25×2.85×2.5	A110C	A110	DC Power				○	○	○
BV-SMBJ5CA	BV-SMBJ5A	5	800	7	10	9.2	65.3	10/1000	600	SMB	5.45×3.75×2.6	B5C	B5	DC Power				○	○	○
BV-SMBJ6CA	BV-SMBJ6A	6	800	7.37	10	10.3	58.3	10/1000	600	SMB	5.45×3.75×2.6	B6C	B6	DC Power				○	○	○
BV-SMBJ6.5CA	BV-SMBJ6.5A	6.5	500	7.98	10	11.2	53.6	10/1000	600	SMB	5.45×3.75×2.6	B6.5C	B6.5	DC Power				○	○	○
BV-SMBJ7CA	BV-SMBJ7A	7	200	8.6	10	12	50	10/1000	600	SMB	5.45×3.75×2.6	B7C	B7	DC Power				○	○	○
BV-SMBJ7.5CA	BV-SMBJ7.5A	7.5	100	9.21	1	12.9	46.6	10/1000	600	SMB	5.45×3.75×2.6	B7.5C	B7.5	DC Power				○	○	○
BV-SMBJ8CA	BV-SMBJ8A	8	50	9.83	1	13.6	44.2	10/1000	600	SMB	5.45×3.75×2.6	B8C	B8	DC Power				○	○	○
BV-SMBJ8.5CA	BV-SMBJ8.5A	8.5	20	10.4	1	14.4	41.7	10/1000	600	SMB	5.45×3.75×2.6	B8.5C	B8.5	DC Power				○	○	○
BV-SMBJ9CA	BV-SMBJ9A	9	10	11.1	1	15.4	39	10/1000	600	SMB	5.45×3.75×2.6	B9C	B9	DC Power				○	○	○
BV-SMBJ10CA	BV-SMBJ10A	10	5	12.3	1	17	35.3	10/1000	600	SMB	5.45×3.75×2.6	B10C	B10	DC Power				○	○	○
BV-SMBJ11CA	BV-SMBJ11A	11	1	13.5	1	18.2	33	10/1000	600	SMB	5.45×3.75×2.6	B11C	B11	DC Power				○	○	○
BV-SMBJ12CA	BV-SMBJ12A	12	1	14.7	1	19.9	30.2	10/1000	600	SMB	5.45×3.75×2.6	B12C	B12	DC Power				○	○	○
BV-SMBJ13CA	BV-SMBJ13A	13	1	15.9	1	21.5	28	10/1000	600	SMB	5.45×3.75×2.6	B13C	B13	DC Power				○	○	○
BV-SMBJ14CA	BV-SMBJ14A	14	1	17.2	1	23.2	25.9	10/1000	600	SMB	5.45×3.75×2.6	B14C	B14	DC Power				○	○	○
BV-SMBJ15CA	BV-SMBJ15A	15	1	18.5	1	24.4	24.6	10/1000	600	SMB	5.45×3.75×2.6	B15C	B15	DC Power				○	○	○
BV-SMBJ16CA	BV-SMBJ16A	16	1	19.7	1	26	23.1	10/1000	600	SMB	5.45×3.75×2.6	B16C	B16	DC Power				○	○	○
BV-SMBJ17CA	BV-SMBJ17A	17	1	20.9	1	27.6	21.8	10/1000	600	SMB	5.45×3.75×2.6	B17C	B17	DC Power				○	○	○
BV-SMBJ18CA	BV-SMBJ18A	18	1	22.1	1	29.2	20.6	10/1000	600	SMB	5.45×3.75×2.6	B18C	B18	DC Power				○	○	○
BV-SMBJ20CA	BV-SMBJ20A	20	1	24.5	1	32.4	18.6	10/1000	600	SMB	5.45×3.75×2.6	B20C	B20	DC Power				○	○	○
BV-SMBJ22CA	BV-SMBJ22A	22	1	26.9	1	35.5	16.9	10/1000	600	SMB	5.45×3.75×2.6	B22C	B22	DC Power				○	○	○
BV-SMBJ24CA	BV-SMBJ24A	24	1	29.5	1	38.9	15.5	10/1000	600	SMB	5.45×3.75×2.6	B24C	B24	DC Power				○	○	○
BV-SMBJ26CA	BV-SMBJ26A	26	1	31.9	1	42.1	14.3	10/1000	600	SMB	5.45×3.75×2.6	B26C	B26	DC Power				○	○	○
BV-SMBJ28CA	BV-SMBJ28A	28	1	34.4	1	45.4	13.3	10/1000	600	SMB	5.45×3.75×2.6	B28C	B28	DC Power				○	○	○
BV-SMBJ30CA	BV-SMBJ30A	30	1	36.8	1	48.4	12.4	10/1000	600	SMB	5.45×3.75×2.6	B30C	B30	DC Power				○	○	○

Part Number		Off state Voltage		Breakdown Voltage		Clamp Voltage @		Surge Waveform (μs)	Ppp (W)	Package	Size L*W*H (mm)	Mark		Application	Circuit		Outline	Remarks		
BI	UNI	V_{DRM} (V)	I_{DRM} 25℃(μA) Max	V_{BR} (V) Max	I_R (mA)	V_C (V) Max	I_{PP} (A)					BI	UNI		BI	UNI		UL497B	UL1449	New products
BV-SMBJ33CA	BV-SMBJ33A	33	1	40.6	1	53.3	11.3	10/1000	600	SMB	5.45×3.75×2.6	B33C	B33	DC Power				○	○	○
BV-SMBJ36CA	BV-SMBJ36A	36	1	44.2	1	58.1	10.4	10/1000	600	SMB	5.45×3.75×2.6	B36C	B36	DC Power				○	○	○
BV-SMBJ40CA	BV-SMBJ40A	40	1	49.1	1	64.5	9.3	10/1000	600	SMB	5.45×3.75×2.6	B40C	B40	DC Power				○	○	○
BV-SMBJ43CA	BV-SMBJ43A	43	1	52.8	1	69.4	8.7	10/1000	600	SMB	5.45×3.75×2.6	B43C	B43	DC Power				○	○	○
BV-SMBJ45CA	BV-SMBJ45A	45	1	55.3	1	72.7	8.3	10/1000	600	SMB	5.45×3.75×2.6	B45C	B45	DC Power				○	○	○
BV-SMBJ48CA	BV-SMBJ48A	48	1	58.9	1	77.4	7.8	10/1000	600	SMB	5.45×3.75×2.6	B48C	B48	DC Power				○	○	○
BV-SMBJ51CA	BV-SMBJ51A	51	1	62.7	1	82.4	7.3	10/1000	600	SMB	5.45×3.75×2.6	B51C	B51	DC Power				○	○	○
BV-SMBJ54CA	BV-SMBJ54A	54	1	66.3	1	87.1	6.9	10/1000	600	SMB	5.45×3.75×2.6	B54C	B54	DC Power				○	○	○
BV-SMBJ58CA	BV-SMBJ58A	58	1	71.2	1	93.6	6.5	10/1000	600	SMB	5.45×3.75×2.6	B58C	B58	DC Power				○	○	○
BV-SMBJ60CA	BV-SMBJ60A	60	1	73.7	1	96.8	6.2	10/1000	600	SMB	5.45×3.75×2.6	B60C	B60	DC Power				○	○	○
BV-SMBJ64CA	BV-SMBJ64A	64	1	78.6	1	103	5.9	10/1000	600	SMB	5.45×3.75×2.6	B64C	B64	DC Power				○	○	○
BV-SMBJ70CA	BV-SMBJ70A	70	1	86	1	113	5.3	10/1000	600	SMB	5.45×3.75×2.6	B70C	B70	DC Power				○	○	○
BV-SMBJ75CA	BV-SMBJ75A	75	1	92.1	1	121	5	10/1000	600	SMB	5.45×3.75×2.6	B75C	B75	DC Power				○	○	○
BV-SMBJ78CA	BV-SMBJ78A	78	1	95.8	1	126	4.8	10/1000	600	SMB	5.45×3.75×2.6	B78C	B78	DC Power				○	○	○
BV-SMBJ85CA	BV-SMBJ85A	85	1	104	1	137	4.4	10/1000	600	SMB	5.45×3.75×2.6	B85C	B85	DC Power				○	○	○
BV-SMBJ90CA	BV-SMBJ90A	90	1	111	1	146	4.1	10/1000	600	SMB	5.45×3.75×2.6	B90C	B90	DC Power				○	○	○
BV-SMBJ100CA	BV-SMBJ100A	100	1	123	1	162	3.7	10/1000	600	SMB	5.45×3.75×2.6	B100C	B100	DC Power				○	○	○
BV-SMBJ110CA	BV-SMBJ110A	110	1	135	1	177	3.4	10/1000	600	SMB	5.45×3.75×2.6	B110C	B110	DC Power				○	○	○
BV-SMCJ5CA	BV-SMCJ5A	5	800	7	10	9.2	163.0	10/1000	1500	SMC	8.25×6.15×2.95	C5C	C5	DC Power				○	○	○
BV-SMCJ6CA	BV-SMCJ6A	6	800	7.37	10	10.3	145.7	10/1000	1500	SMC	8.25×6.15×2.95	C6C	C6	DC Power				○	○	○
BV-SMCJ6.5CA	BV-SMCJ6.5A	6.5	500	7.98	10	11.2	134.0	10/1000	1500	SMC	8.25×6.15×2.95	C6.5C	C6.5	DC Power				○	○	○
BV-SMCJ7CA	BV-SMCJ7A	7	200	8.6	10	12	125.0	10/1000	1500	SMC	8.25×6.15×2.95	C7C	C7	DC Power				○	○	○
BV-SMCJ7.5CA	BV-SMCJ7.5A	7.5	100	9.21	1	12.9	116.3	10/1000	1500	SMC	8.25×6.15×2.95	C7.5C	C7.5	DC Power				○	○	○
BV-SMCJ8CA	BV-SMCJ8A	8	50	9.83	1	13.6	110.3	10/1000	1500	SMC	8.25×6.15×2.95	C8C	C8	DC Power				○	○	○
BV-SMCJ8.5CA	BV-SMCJ8.5A	8.5	20	10.4	1	14.4	104.2	10/1000	1500	SMC	8.25×6.15×2.95	C8.5C	C8.5	DC Power				○	○	○
BV-SMCJ9CA	BV-SMCJ9A	9	10	11.1	1	15.4	97.4	10/1000	1500	SMC	8.25×6.15×2.95	C9C	C9	DC Power				○	○	○
BV-SMCJ10CA	BV-SMCJ10A	10	5	12.3	1	17	88.3	10/1000	1500	SMC	8.25×6.15×2.95	C10C	C10	DC Power				○	○	○
BV-SMCJ11CA	BV-SMCJ11A	11	1	13.5	1	18.2	82.5	10/1000	1500	SMC	8.25×6.15×2.95	C11C	C11	DC Power				○	○	○
BV-SMCJ12CA	BV-SMCJ12A	12	1	14.7	1	19.9	75.4	10/1000	1500	SMC	8.25×6.15×2.95	C12C	C12	DC Power				○	○	○
BV-SMCJ13CA	BV-SMCJ13A	13	1	15.9	1	21.5	69.8	10/1000	1500	SMC	8.25×6.15×2.95	C13C	C13	DC Power				○	○	○
BV-SMCJ14CA	BV-SMCJ14A	14	1	17.2	1	23.2	64.7	10/1000	1500	SMC	8.25×6.15×2.95	C14C	C14	DC Power				○	○	○
BV-SMCJ15CA	BV-SMCJ15A	15	1	18.5	1	24.4	61.5	10/1000	1500	SMC	8.25×6.15×2.95	C15C	C15	DC Power				○	○	○

Part Number		Off state Voltage		Breakdown Voltage		Clamp Voltage @		Surge Waveform (μs)	Ppp (W)	Package	Size L*W*H (mm)	Mark		Application	Circuit		Outline	Remarks		
BI	UNI	V_{DRM} (V)	I_{DRM} 25℃(μA) Max	V_{BR} (V) Max	I_R (mA)	V_C (V) Max	I_{PP} (A)					BI	UNI		BI	UNI		UL497B	UL1449	New products
BV-SMCJ16CA	BV-SMCJ16A	16	1	19.7	1	26	57.7	10/1000	1500	SMC	8.25×6.15×2.95	C16C	C16	DC Power				○	○	○
BV-SMCJ17CA	BV-SMCJ17A	17	1	20.9	1	27.6	54.4	10/1000	1500	SMC	8.25×6.15×2.95	C17C	C17	DC Power				○	○	○
BV-SMCJ18CA	BV-SMCJ18A	18	1	22.1	1	29.2	51.4	10/1000	1500	SMC	8.25×6.15×2.95	C18C	C18	DC Power				○	○	○
BV-SMCJ20CA	BV-SMCJ20A	20	1	24.5	1	32.4	46.3	10/1000	1500	SMC	8.25×6.15×2.95	C20C	C20	DC Power				○	○	○
BV-SMCJ22CA	BV-SMCJ22A	22	1	26.9	1	35.5	42.3	10/1000	1500	SMC	8.25×6.15×2.95	C22C	C22	DC Power				○	○	○
BV-SMCJ24CA	BV-SMCJ24A	24	1	29.5	1	38.9	38.6	10/1000	1500	SMC	8.25×6.15×2.95	C24C	C24	DC Power				○	○	○
BV-SMCJ26CA	BV-SMCJ26A	26	1	31.9	1	42.1	35.7	10/1000	1500	SMC	8.25×6.15×2.95	C26C	C26	DC Power				○	○	○
BV-SMCJ28CA	BV-SMCJ28A	28	1	34.4	1	45.4	33.1	10/1000	1500	SMC	8.25×6.15×2.95	C28C	C28	DC Power				○	○	○
BV-SMCJ30CA	BV-SMCJ30A	30	1	36.8	1	48.4	31.0	10/1000	1500	SMC	8.25×6.15×2.95	C30C	C30	DC Power				○	○	○
BV-SMCJ33CA	BV-SMCJ33A	33	1	40.6	1	53.3	28.2	10/1000	1500	SMC	8.25×6.15×2.95	C33C	C33	DC Power				○	○	○
BV-SMCJ36CA	BV-SMCJ36A	36	1	44.2	1	58.1	25.9	10/1000	1500	SMC	8.25×6.15×2.95	C36C	C36	DC Power				○	○	○
BV-SMCJ40CA	BV-SMCJ40A	40	1	49.1	1	64.5	23.3	10/1000	1500	SMC	8.25×6.15×2.95	C40C	C40	DC Power				○	○	○
BV-SMCJ43CA	BV-SMCJ43A	43	1	52.8	1	69.4	21.7	10/1000	1500	SMC	8.25×6.15×2.95	C43C	C43	DC Power				○	○	○
BV-SMCJ45CA	BV-SMCJ45A	45	1	55.3	1	72.7	20.6	10/1000	1500	SMC	8.25×6.15×2.95	C45C	C45	DC Power				○	○	○
BV-SMCJ48CA	BV-SMCJ48A	48	1	58.9	1	77.4	19.4	10/1000	1500	SMC	8.25×6.15×2.95	C48C	C48	DC Power				○	○	○
BV-SMCJ51CA	BV-SMCJ51A	51	1	62.7	1	82.4	18.2	10/1000	1500	SMC	8.25×6.15×2.95	C51C	C51	DC Power				○	○	○
BV-SMCJ54CA	BV-SMCJ54A	54	1	66.3	1	87.1	17.3	10/1000	1500	SMC	8.25×6.15×2.95	C54C	C54	DC Power				○	○	○
BV-SMCJ58CA	BV-SMCJ58A	58	1	71.2	1	93.6	16.1	10/1000	1500	SMC	8.25×6.15×2.95	C58C	C58	DC Power				○	○	○
BV-SMCJ60CA	BV-SMCJ60A	60	1	73.7	1	96.8	15.5	10/1000	1500	SMC	8.25×6.15×2.95	C60C	C60	DC Power				○	○	○
BV-SMCJ64CA	BV-SMCJ64A	64	1	78.6	1	103	14.6	10/1000	1500	SMC	8.25×6.15×2.95	C64C	C64	DC Power				○	○	○
BV-SMCJ70CA	BV-SMCJ70A	70	1	86	1	113	13.3	10/1000	1500	SMC	8.25×6.15×2.95	C70C	C70	DC Power				○	○	○
BV-SMCJ75CA	BV-SMCJ75A	75	1	92.1	1	121	12.4	10/1000	1500	SMC	8.25×6.15×2.95	C75C	C75	DC Power				○	○	○
BV-SMCJ78CA	BV-SMCJ78A	78	1	95.8	1	126	11.9	10/1000	1500	SMC	8.25×6.15×2.95	C78C	C78	DC Power				○	○	○
BV-SMCJ85CA	BV-SMCJ85A	85	1	104	1	137	11.0	10/1000	1500	SMC	8.25×6.15×2.95	C85C	C85	DC Power				○	○	○
BV-SMCJ90CA	BV-SMCJ90A	90	1	111	1	146	10.3	10/1000	1500	SMC	8.25×6.15×2.95	C90C	C90	DC Power				○	○	○
BV-SMCJ100CA	BV-SMCJ100A	100	1	123	1	162	9.3	10/1000	1500	SMC	8.25×6.15×2.95	C100C	C100	DC Power				○	○	○
BV-SMCJ110CA	BV-SMCJ110A	110	1	135	1	177	8.5	10/1000	1500	SMC	8.25×6.15×2.95	C110C	C110	DC Power				○	○	○
BV-SMDJ5CA	BV-SMDJ5A	5	800	7	10	9.2	326.1	10/1000	3000	SMC	8.25×6.15×2.95	D5C	D5	DC Power				○	○	○
BV-SMDJ6CA	BV-SMDJ6A	6	800	7.37	10	10.3	291.3	10/1000	3000	SMC	8.25×6.15×2.95	D6C	D6	DC Power				○	○	○
BV-SMDJ6.5CA	BV-SMDJ6.5A	6.5	500	7.98	10	11.2	267.9	10/1000	3000	SMC	8.25×6.15×2.95	D6.5C	D6.5	DC Power				○	○	○
BV-SMDJ7CA	BV-SMDJ7A	7	200	8.6	10	12	250.0	10/1000	3000	SMC	8.25×6.15×2.95	D7C	D7	DC Power				○	○	○
BV-SMDJ7.5CA	BV-SMDJ7.5A	7.5	100	9.21	1	12.9	232.6	10/1000	3000	SMC	8.25×6.15×2.95	D7.5C	D7.5	DC Power				○	○	○

Part Number		Off state Voltage		Breakdown Voltage		Clamp Voltage @		Surge Waveform (μs)	Ppp (W)	Package	Size L*W*H (mm)	Mark		Application	Circuit		Outline	Remarks		
BI	UNI	V_{DRM} (V)	I_{DRM} 25℃(μA) Max	V_{BR} (V) Max	I_R (mA)	V_C (V) Max	I_{PP} (A)					BI	UNI		BI	UNI		UL497B	UL1449	New products
BV-SMDJ8CA	BV-SMDJ8A	8	50	9.83	1	13.6	220.6	10/1000	3000	SMC	8.25×6.15×2.95	D8C	D8	DC Power				○	○	○
BV-SMDJ8.5CA	BV-SMDJ8.5A	8.5	20	10.4	1	14.4	208.3	10/1000	3000	SMC	8.25×6.15×2.95	D8.5C	D8.5	DC Power				○	○	○
BV-SMDJ9CA	BV-SMDJ9A	9	10	11.1	1	15.4	194.8	10/1000	3000	SMC	8.25×6.15×2.95	D9C	D9	DC Power				○	○	○
BV-SMDJ10CA	BV-SMDJ10A	10	5	12.3	1	17	176.5	10/1000	3000	SMC	8.25×6.15×2.95	D10C	D10	DC Power				○	○	○
BV-SMDJ11CA	BV-SMDJ11A	11	1	13.5	1	18.2	164.8	10/1000	3000	SMC	8.25×6.15×2.95	D11C	D11	DC Power				○	○	○
BV-SMDJ12CA	BV-SMDJ12A	12	1	14.7	1	19.9	150.8	10/1000	3000	SMC	8.25×6.15×2.95	D12C	D12	DC Power				○	○	○
BV-SMDJ13CA	BV-SMDJ13A	13	1	15.9	1	21.5	139.5	10/1000	3000	SMC	8.25×6.15×2.95	D13C	D13	DC Power				○	○	○
BV-SMDJ14CA	BV-SMDJ14A	14	1	17.2	1	23.2	129.3	10/1000	3000	SMC	8.25×6.15×2.95	D14C	D14	DC Power				○	○	○
BV-SMDJ15CA	BV-SMDJ15A	15	1	18.5	1	24.4	123.0	10/1000	3000	SMC	8.25×6.15×2.95	D15C	D15	DC Power				○	○	○
BV-SMDJ16CA	BV-SMDJ16A	16	1	19.7	1	26	115.4	10/1000	3000	SMC	8.25×6.15×2.95	D16C	D16	DC Power				○	○	○
BV-SMDJ17CA	BV-SMDJ17A	17	1	20.9	1	27.6	108.7	10/1000	3000	SMC	8.25×6.15×2.95	D17C	D17	DC Power				○	○	○
BV-SMDJ18CA	BV-SMDJ18A	18	1	22.1	1	29.2	102.7	10/1000	3000	SMC	8.25×6.15×2.95	D18C	D18	DC Power				○	○	○
BV-SMDJ20CA	BV-SMDJ20A	20	1	24.5	1	32.4	92.6	10/1000	3000	SMC	8.25×6.15×2.95	D20C	D20	DC Power				○	○	○
BV-SMDJ22CA	BV-SMDJ22A	22	1	26.9	1	35.5	84.5	10/1000	3000	SMC	8.25×6.15×2.95	D22C	D22	DC Power				○	○	○
BV-SMDJ24CA	BV-SMDJ24A	24	1	29.5	1	38.9	77.1	10/1000	3000	SMC	8.25×6.15×2.95	D24C	D24	DC Power				○	○	○
BV-SMDJ26CA	BV-SMDJ26A	26	1	31.9	1	42.1	71.3	10/1000	3000	SMC	8.25×6.15×2.95	D26C	D26	DC Power				○	○	○
BV-SMDJ28CA	BV-SMDJ28A	28	1	34.4	1	45.4	66.1	10/1000	3000	SMC	8.25×6.15×2.95	D28C	D28	DC Power				○	○	○
BV-SMDJ30CA	BV-SMDJ30A	30	1	36.8	1	48.4	62.0	10/1000	3000	SMC	8.25×6.15×2.95	D30C	D30	DC Power				○	○	○
BV-SMDJ33CA	BV-SMDJ33A	33	1	40.6	1	53.3	56.3	10/1000	3000	SMC	8.25×6.15×2.95	D33C	D33	DC Power				○	○	○
BV-SMDJ36CA	BV-SMDJ36A	36	1	44.2	1	58.1	51.6	10/1000	3000	SMC	8.25×6.15×2.95	D36C	D36	DC Power				○	○	○
BV-SMDJ40CA	BV-SMDJ40A	40	1	49.1	1	64.5	46.5	10/1000	3000	SMC	8.25×6.15×2.95	D40C	D40	DC Power				○	○	○
BV-SMDJ43CA	BV-SMDJ43A	43	1	52.8	1	69.4	43.2	10/1000	3000	SMC	8.25×6.15×2.95	D43C	D43	DC Power				○	○	○
BV-SMDJ45CA	BV-SMDJ45A	45	1	55.3	1	72.7	41.3	10/1000	3000	SMC	8.25×6.15×2.95	D45C	D45	DC Power				○	○	○
BV-SMDJ48CA	BV-SMDJ48A	48	1	58.9	1	77.4	38.8	10/1000	3000	SMC	8.25×6.15×2.95	D48C	D48	DC Power				○	○	○
BV-SMDJ51CA	BV-SMDJ51A	51	1	62.7	1	82.4	36.4	10/1000	3000	SMC	8.25×6.15×2.95	D51C	D51	DC Power				○	○	○
BV-SMDJ54CA	BV-SMDJ54A	54	1	66.3	1	87.1	34.4	10/1000	3000	SMC	8.25×6.15×2.95	D54C	D54	DC Power				○	○	○
BV-SMDJ58CA	BV-SMDJ58A	58	1	71.2	1	93.6	32.1	10/1000	3000	SMC	8.25×6.15×2.95	D58C	D58	DC Power				○	○	○
BV-SMDJ60CA	BV-SMDJ60A	60	1	73.7	1	96.8	31.0	10/1000	3000	SMC	8.25×6.15×2.95	D60C	D60	DC Power				○	○	○
BV-SMDJ64CA	BV-SMDJ64A	64	1	78.6	1	103	29.1	10/1000	3000	SMC	8.25×6.15×2.95	D64C	D64	DC Power				○	○	○
BV-SMDJ70CA	BV-SMDJ70A	70	1	86	1	113	26.5	10/1000	3000	SMC	8.25×6.15×2.95	D70C	D70	DC Power				○	○	○
BV-SMDJ75CA	BV-SMDJ75A	75	1	92.1	1	121	24.8	10/1000	3000	SMC	8.25×6.15×2.95	D75C	D75	DC Power				○	○	○
BV-SMDJ78CA	BV-SMDJ78A	78	1	95.8	1	126	23.8	10/1000	3000	SMC	8.25×6.15×2.95	D78C	D78	DC Power				○	○	○

Part Number		Off state Voltage		Breakdown Voltage		Clamp Voltage @		Surge Waveform (μs)	Ppp (W)	Package	Size L*W*H (mm)	Mark		Application	Circuit		Outline	Remarks		
BI	UNI	V_{DRM} (V)	I_{DRM} 25℃(μA) Max	V_{BR} (V) Max	I_R (mA)	V_C (V) Max	I_{PP} (A)					BI	UNI		BI	UNI		UL497B	UL1449	New products
BV-SMDJ85CA	BV-SMDJ85A	85	1	104	1	137	21.9	10/1000	3000	SMC	8.25×6.15×2.95	D85C	D85	DC Power				○	○	○
BV-SMDJ90CA	BV-SMDJ90A	90	1	111	1	146	20.5	10/1000	3000	SMC	8.25×6.15×2.95	D90C	D90	DC Power				○	○	○
BV-SMDJ100CA	BV-SMDJ100A	100	1	123	1	162	18.5	10/1000	3000	SMC	8.25×6.15×2.95	D100C	D100	DC Power				○	○	○
BV-SMDJ110CA	BV-SMDJ110A	110	1	135	1	177	16.9	10/1000	3000	SMC	8.25×6.15×2.95	D110C	D110	DC Power				○	○	○
BV-5SMDJ11CA	BV-5SMDJ11A	11	800	13.5	1	18.2	275	10/1000	5000	SMC	8.25×6.15×2.95	5D11C	5D11	DC Power				○	○	○
BV-5 SMDJ12CA	BV-5 SMDJ12A	12	800	14.7	1	19.9	252	10/1000	5000	SMC	8.25×6.15×2.95	5D12C	5D12	DC Power				○	○	○
BV-5SMDJ13CA	BV-5SMDJ13A	13	500	15.9	1	21.5	233	10/1000	5000	SMC	8.25×6.15×2.95	5D13C	5D13	DC Power				○	○	○
BV-5SMDJ14CA	BV-5SMDJ14A	14	200	17.2	1	23.2	216	10/1000	5000	SMC	8.25×6.15×2.95	5D14C	5D14	DC Power				○	○	○
BV-5SMDJ15CA	BV-5SMDJ15A	15	100	18.5	1	24.4	205	10/1000	5000	SMC	8.25×6.15×2.95	5D15C	5D15	DC Power				○	○	○
BV-5SMDJ16CA	BV-5SMDJ16A	16	50	19.7	1	26	193	10/1000	5000	SMC	8.25×6.15×2.95	5D16C	5D16	DC Power				○	○	○
BV-5SMDJ17CA	BV-5SMDJ17A	17	20	20.9	1	27.6	181	10/1000	5000	SMC	8.25×6.15×2.95	5D17C	5D17	DC Power				○	○	○
BV-5SMDJ18CA	BV-5SMDJ18A	18	10	22.1	1	29.2	172	10/1000	5000	SMC	8.25×6.15×2.95	5D18C	5D18	DC Power				○	○	○
BV-5SMDJ20CA	BV-5SMDJ20A	20	5	24.5	1	32.4	155	10/1000	5000	SMC	8.25×6.15×2.95	5D20C	5D20	DC Power				○	○	○
BV-5SMDJ22CA	BV-5SMDJ22A	22	5	26.9	1	35.5	141	10/1000	5000	SMC	8.25×6.15×2.95	5D22C	5D22	DC Power				○	○	○
BV-5SMDJ24CA	BV-5SMDJ24A	24	2	29.5	1	38.9	129	10/1000	5000	SMC	8.25×6.15×2.95	5D24C	5D24	DC Power				○	○	○
BV-5SMDJ26CA	BV-5SMDJ26A	26	2	31.9	1	42.1	119	10/1000	5000	SMC	8.25×6.15×2.95	5D26C	5D26	DC Power				○	○	○
BV-5SMDJ28CA	BV-5SMDJ28A	28	2	34.4	1	45.4	110	10/1000	5000	SMC	8.25×6.15×2.95	5D28C	5D28	DC Power				○	○	○
BV-5SMDJ30CA	BV-5SMDJ30A	30	2	36.8	1	48.4	103	10/1000	5000	SMC	8.25×6.15×2.95	5D30C	5D30	DC Power				○	○	○
BV-5SMDJ33CA	BV-5SMDJ33A	33	2	40.6	1	53.3	93.9	10/1000	5000	SMC	8.25×6.15×2.95	5D33C	5D33	DC Power				○	○	○
BV-5SMDJ36CA	BV-5SMDJ36A	36	2	44.2	1	58.1	86.1	10/1000	5000	SMC	8.25×6.15×2.95	5D36C	5D36	DC Power				○	○	○
BV-5SMDJ40CA	BV-5SMDJ40A	40	2	49.1	1	64.5	77.6	10/1000	5000	SMC	8.25×6.15×2.95	5D40C	5D40	DC Power				○	○	○
BV-5SMDJ43CA	BV-5SMDJ43A	43	2	52.8	1	69.4	72.1	10/1000	5000	SMC	8.25×6.15×2.95	5D43C	5D43	DC Power				○	○	○
BV-5SMDJ45CA	BV-5SMDJ45A	45	2	55.3	1	72.7	68.8	10/1000	5000	SMC	8.25×6.15×2.95	5D45C	5D45	DC Power				○	○	○
BV-5SMDJ48CA	BV-5SMDJ48A	48	2	58.9	1	77.4	64.7	10/1000	5000	SMC	8.25×6.15×2.95	5D48C	5D48	DC Power				○	○	○
BV-5SMDJ51CA	BV-5SMDJ51A	51	2	62.7	1	82.4	60.7	10/1000	5000	SMC	8.25×6.15×2.95	5D51C	5D51	DC Power				○	○	○
BV-5SMDJ54CA	BV-5SMDJ54A	54	2	66.3	1	87.1	57.5	10/1000	5000	SMC	8.25×6.15×2.95	5D54C	5D54	DC Power				○	○	○
BV-5SMDJ58CA	BV-5SMDJ58A	58	2	71.2	1	93.6	53.5	10/1000	5000	SMC	8.25×6.15×2.95	5D58C	5D58	DC Power				○	○	○
BV-5SMDJ60CA	BV-5SMDJ60A	60	2	73.7	1	96.8	51.7	10/1000	5000	SMC	8.25×6.15×2.95	5D60C	5D60	DC Power				○	○	○
BV-5SMDJ64CA	BV-5SMDJ64A	64	2	78.6	1	103	48.6	10/1000	5000	SMC	8.25×6.15×2.95	5D64C	5D64	DC Power				○	○	○
BV-5SMDJ70CA	BV-5SMDJ70A	70	2	86	1	113	44.3	10/1000	5000	SMC	8.25×6.15×2.95	5D70C	5D70	DC Power				○	○	○
BV-5SMDJ75CA	BV-5SMDJ75A	75	2	92.1	1	121	41.4	10/1000	5000	SMC	8.25×6.15×2.95	5D75C	5D75	DC Power				○	○	○
BV-5SMDJ78CA	BV-5SMDJ78A	78	2	95.8	1	126	39.7	10/1000	5000	SMC	8.25×6.15×2.95	5D78C	5D78	DC Power				○	○	○

Part Number		Off state Voltage		Breakdown Voltage		Clamp Voltage @		Surge Waveform (μs)	Ppp (W)	Package	Size L*W*H (mm)	Mark		Application	Circuit		Outline	Remarks		
BI	UNI	V_{DRM} (V)	I_{DRM} 25℃(μA) Max	V_{BR} (V) Max	I_R (mA)	V_C (V) Max	I_{PP} (A)					BI	UNI		BI	UNI		UL497B	UL1449	New products
BV-5SMDJ85CA	BV-5SMDJ85A	85	2	104	1	137	36.5	10/1000	5000	SMC	8.25×6.15×2.95	5D85C	5D85	DC Power				○	○	○
BV-5SMDJ90CA	BV-5SMDJ90A	90	2	111	1	146	34.3	10/1000	5000	SMC	8.25×6.15×2.95	5D90C	5D90	DC Power				○	○	○
BV-5SMDJ100CA	BV-5SMDJ100A	100	2	123	1	162	30.9	10/1000	5000	SMC	8.25×6.15×2.95	5D100C	5D100	DC Power				○	○	○
BV-5SMDJ110CA	BV-5SMDJ110A	110	2	135	1	177	28.3	10/1000	5000	SMC	8.25×6.15×2.95	5D110C	5D110	DC Power				○	○	○
BV-SMBJ15CAH		15	1	18.5	1	24.4	40.8	10/1000	1000	SMB	5.45×3.75×2.6	SB15CH		DC Power				○	○	○
BV-SMBJ58C2H		58	1	71.2	1	85	150	10/700	4(KV)	SMB	5.45×3.75×2.6	B58C2		POE				○	○	○
BV-SMBT-15CA		15	1	18.5	1	24.4	40.8	10/1000	1000 (Pin1,3 to 2)	SMB-T	5.4×3.3×2.0	B15CT		DC Power				○	○	○
BV-SMBT-20CA		20	1	24.5	1	32.4	30.8	10/1000	1000 (Pin1,3 to 2)	SMB-T	5.4×3.3×2.0	B20CT		DC Power				○	○	○
BV-SMCT-30CA		30	1	36.8	1	48.4	62.0	10/1000	3000 (Pin1,3 to 2)	SMC-T	8.0×5.9×2.0	C30CT		POE				○	○	○
BV-SMCT-58CA		58	1	71.2	1	93.6	32.1	10/1000	3000 (Pin1,3 to 2)	SMC-T	8.0×5.9×2.0	C58CT		POE				○	○	○
BV-SMCT-58CAS		58 (PIN1to2	1 Pin2to3 Pin1to3)	71.2 (PIN1to2	1 Pin2to3 Pin1to3)	93.6	53.5	10/1000	3000	SMC-T	8.0×5.9×3.0	C58CTS		POE				○	○	○
BV-SM8S24A		24	5	29.5	5	38.9	170	10/1000	6600	DO-218AB	15.5×10.2×5.0	SM8S24A		Automotive				○	○	○
BV-SM8S36A		36	5	44.2	5	58.1	114	10/1000	6600	DO-218AB	15.5×10.2×5.0	SM8S36A		Automotive				○	○	○
BV-SM8S40A		40	5	49.1	5	64.5	102	10/1000	6600	DO-218AB	15.5×10.2×5.0	SM8S40A		Automotive				○	○	○

Part Number	Off state Voltage V_{DRM} (V)	Off state Voltage I_{DRM} 25℃(μA) Max	Breakdown Voltage V_{BR} (V) Min	Breakdown Voltage I_R (mA)	Clamp Voltage V_C (V) Max	Clamp Voltage @ I_{PP} (A)	Clamp Voltage V_C (V) Max	Clamp Voltage @ I_{PP} (A)	Capacitance Co (pF) 0V@1MHz Max	Surge Waveform (μs)	Ppp (W)	Package	Size L*W*H (mm)	Mark	Application	Circuit	Outline	Remarks UL497B	Remarks UL1449	Remarks New products
BV-D505ZC	5	1	5.6	1	11.6	5	19	8	15	8/20	150	SOD523FL	1.6×0.8×0.6	5C∞	Audio			○	○	●
BV-FA05UC	5	1	6	1	12	1	14	2	0.5	8/20	25	DFN1006-2	1.0×0.6×0.5	S	HDMI			○	○	●
BV-FA05ZC	5	1	6	1	11	1	15	4.5	15	8/20	65	DFN1006-2	1.0×0.6×0.5	PB	Cell phone			○	○	●
BV-FE05ZA	5	1	6	1	9	100	13	140	2000	8/20	1800	DFN1610-2	1.6×1.0×0.5	U5Z	Cell phone			○	○	●
BV_SD05	5	5	6	1	9.8	1	15	24	320	8/20	350	SOD-323	2.5×1.28×1.0	5U	ADSL2+			○	○	○
BV03CW	3	0.5	3.5	1	5.8	1	15	10	1.5	8/20	150	SOD-323	2.5×1.28×1.0	CA1	Ethernet			○	○	○
BV03CL	3	5	4	1	7	1	15	17	3	8/20	350	SOD-323	2.5×1.28×1.0	L3	Ethernet			○	○	○
BV03DW	3.3	0.5	3.5	1	7	1	18	25	3	8/20	450	SOD-323	2.5×1.28×1.0	K3	Ethernet			○	○	○
BV05C	5	5	6	1	9.8	1	18.3	8	1.5	8/20	150	SOD-323	2.5×1.28×1.0	AC	xDSL			○	○	○
BV08C	8	2	8.5	1	13.4	1	18.5	8	1.5	8/20	150	SOD-323	2.5×1.28×1.0	BC	xDSL			○	○	○
BV12C	12	1	13.3	1	19	1	28.6	6	1.5	8/20	150	SOD-323	2.5×1.28×1.0	DC	xDSL			○	○	○
BV15C	15	1	16.7	1	24	1	31.8	5	1.5	8/20	150	SOD-323	2.5×1.28×1.0	EC	xDSL			○	○	○
BV24C	24	1	26.7	1	43	1	56	3	1.5	8/20	150	SOD-323	2.5×1.28×1.0	HC	xDSL			○	○	○
BV-D303UC	3	0.5	3.5	1	5.15	1	13.9	15	1	8/20	350	SOD-323	2.5×1.28×1.0	CC.	Ethernet			○	○	●
BV03SL	3.3	0.1	3.5	1	5.5	1	15	27	50	8/20	400	SOD-323	2.5×1.28×1.0	2C3	ECG			○	○	○
BV-ULC0524PA	5	5	6	1	15	1	25	4	0.6	8/20	100	DFN-2510-10	2.5×1.0×0.58	P524	HDMI			○	○	●
BV-SR05	5	1	6	1	15	1	25	5	1.2	8/20	125	SOT143	2.9x2.4x1.00	R05	Video			○	○	○
BV-SRV05-4	5	0.5	6	1	/	/	15	5	1.8	8/20	75	SOT23-6	2.9x2.8x1.10	V05	Video			○	○	○
BV-3304P8	3.3	0.1	3.5	1	5.8	1	18	25	2	8/20	450	SOP-8	4.9x6.0x1.55	LC3304EP8	Ethernet			○	○	○
BV-P806Z2	6	25	6.8	1	14	25	20	100	20	8/20	2000	SOP-8	4.9x6.0x1.55	0306	Ethernet			○	○	●
BV-SM712 Pin3to1,2 Pin1,2to3	7 12	10 2	7.5 13.3	1 1	/ /	/ /	22 26	17 12	55 55	8/20	400	SOT23	2.9x2.4x1.0	M72	RS485			○	○	●
BV-SLC2512T	3	1	3.5	1	7	1	17	12	1.2	8/20	200	DFN2010	2.0x1.0x0.75	U33	Ethernet			○	○	●
BV-FG03U4CA	3	1	3.5	1	7	1	17	12	1.2	8/20	200	DFN2010	2.0x1.0x0.4	U33	Ethernet			○	○	●
BV-D303ZCA	3.3	40	4	1	7.5	1	16	25	200	8/20	400	SOD323	2.5×1.28×1.0	2A	Audio			○	○	●
BV-D305ZCA	5	1	6	1	9.8	1	17	24	200	8/20	400	SOD323	2.5×1.28×1.0	2B	DC power			○	○	●
BV-D308ZCA	8	1	8.5	1	13.4	1	20	18	100	8/20	360	SOD323	2.5×1.28×1.0	2C	DC power			○	○	●
BV-D312ZCA	12	1	13.3	1	20	1	30	11	50	8/20	330	SOD323	2.5×1.28×1.0	2D	DC power			○	○	●
BV-D315ZCA	15	1	16.7	1	25	1	36	9	45	8/20	320	SOD323	2.5×1.28×1.0	2J	DC power			○	○	●
BV-D318ZCA	18	1	19.5	1	30	1	40	8	42	8/20	320	SOD323	2.5×1.28×1.0	2K	DC power			○	○	●
BV-D324ZCA	24	1	26.7	1	45	1	50	5	40	8/20	250	SOD323	2.5×1.28×1.0	2H	DC power			○	○	●
BV-D330ZCA	30	1	31.8	1	52	1	56	4.5	32	8/20	250	SOD323	2.5×1.28×1.0	2L	DC power			○	○	●
BV-D333ZCA	33	1	34.6	1	58	1	60	4	28	8/20	240	SOD323	2.5×1.28×1.0	2M	DC power			○	○	●
BV-D336ZCA	36	1	40	1	65	1	75	3	25	8/20	225	SOD323	2.5×1.28×1.0	2N	DC power			○	○	●

Part Number	DC Breakdown Voltage(V_{BR}) 100V/s (V)	Tolerance of V_{BR} (V)	Impulse Spark-over Voltage 1KV/μs (V)	Arc Voltage (V_a) (V)@1A	Impulse Discharge Current 8/20μs (KA)	Capacitance Co(pF) 0.5VDC@1MHz	Size L*W*H (mm)	Application	Circuit	Outline	Remarks UL497B	UL1449	New products
BGO1001A05-LC2	1000	≥800	≤2000	~50	5	≤1.5	Φ8.0x7.0	AC Power			○	○	●
BGO3600V06-MA2	360	≥360	99%≤1050	/	6KV@10/700μs	≤1.0	4.2×3.5×3.5	xDSL			○	○	●
BGA150FR	150	≥150	99%≤850	~10	Pin1or3or4or6-Pin2or5 1KA Pin1&3&4&6-Pin2or5 3.5KA	≤3.0	7.0×5.8×1.5	Ethernet			○	○	●
BE701STW-1	700	≥700	99%≤1500	~20	5	≤3.0	10.5×8.0×1.6	G.FAST			○	○	●

Part Number	Off state Voltage V_{DRM} (V)	I_D (μA) Max	Switching Voltage V_S (V) Max	I_S (mA)	On state Voltage V_T (V) Max	I_T (A)	Holding Current I_H (mA)	Capacitance Co (pF) 2V@1MHz Max	Surge Waveform	Surge Peak	Size L*W*H (mm)	Application	Circuit	Outline	Remarks UL497B	UL1449	New products
BSG0060L-H	6	5	11	800	4	2.2	≥90	/	8/20μs	20KA	40.0×27.0×27.0	Pipeline			○	○	●

Part Number	Off state Voltage V_{DRM} (V)	I_{DRM} 25℃(μA) Max	Breakdown Voltage V_{BR} (V) Max	I_R (mA)	Clamp Voltage V_C @ I_{PP} (V) Max	(A)	Surge Waveform (μs)	Size L*W*H (mm)	Application	Circuit	Outline	Remarks UL497B	UL1449	New products
BVF0200AX5-MD4	20	1	24.5	1	55	500	8/20	5.0×3.2×1.6	DC12V			○	○	●

Part Number	Off state Voltage VDRM (V)	ID (μA) Max	Switching Trigger VS (V) Max	Waveform	Gate reverse current VGK (V)	IGAS (μA) Max	forward voltage VF (V) Max	IF (A)	Gate trigger Voltage VGT (V) Max	Gate trigger current IGT (mA) Max	Capacitance Co (pF) 2V@1MHZ Max	Surge Waveform (μs)	Surge Peak (KV)	Package	Size L*W*H (mm)	Mark	Application	Circuit	Outline	Remarks UL497B	UL1449	New products
BS61089B-8	-170	5	-112	2/10μs	-167	5	3	5	2.5	5	100	10/700	1.6	SOP8	4.9×6.0×1.7	B61089B	SLIC			○	○	●
BS61089D-8	-170	5	-64	10/700μs	-167	5	3	5	2.5	5	100	10/700	1.6	SOP8	4.9×6.0×1.7	B61089D	SLIC			○	○	●

Surge Lab

GR-1089 Surge Test

2/10μs
0-5000V
0-500A

10/360μs
0-1000V
0-100A

IEC61000-4-5 Surge Test

10/700μs
0-15KV
0-1000A

1.2/50μs-8/20μs
0-15KV
0-7500A

ITU-T K Series Surge Test

10/700μs
0-6000V
0-400A

1.2/50μs-8/20μs
0-6000V
0-3000A

IEC61643-11 TOV Test

AC1200V
0-300A

IEC61643-1 Surge Test

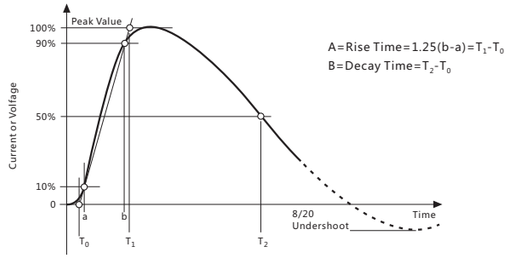
8/20μs
0-160KA

10/350μs
0-50KA

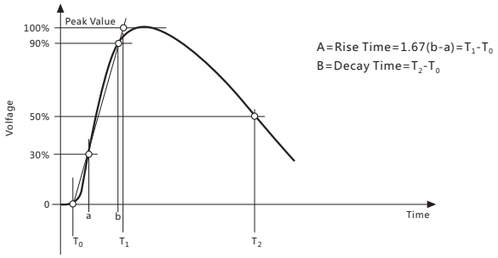
ISO7637-2:2011 &ISO16750:2010 Surge Test

P1/P2a/P2b/P3a/
P3b/P4a/P5a/P5b

GR1089-2:2010 Exponential Voltage/Current Waveform of A/B



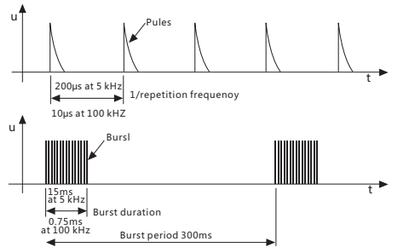
GR1089-2:2010 Double Exponential Voltage/Current Waveform of A/B for 1.2/50 and 10/700 Surges



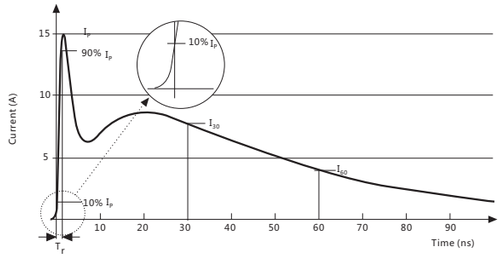
Designation	Condition	Edge	Time and Tolerance	Amplitude
2/10	Open-Circuit Voltage	Rise	2μs+0μs to-1μs	0% to+20%
		Decay	2μs+7μs to-0μs	
	Short-Circuit Current	Rise	2μs+0μs to-1μs	0% to+20%
		Decay	2μs+7μs to-0μs	
1.2/50-8/20 (See Note 1)	Open-Circuit Voltage	Rise	1.2μs±0.36μs	±10%
		Decay	50μs±1.6μs	
	Short-Circuit Current	Rise	8μs±1.6μs	±10% (See Note 2)
		Decay	20μs±4μs	
8/20	Open-Circuit Voltage	Rise	(See Note 3)	(See Note 4)
		Decay	(See Note 3)	
	Short-Circuit Current	Rise	8μs±1.6μs	±10% (See Note 2)
		Decay	20μs±4μs	
10/250	Open-Circuit Voltage	Rise	10μs+0μs to-6.0μs	0% to+16%
		Decay	250μs+150μs to-0μs	
	Short-Circuit Current	Rise	10μs+0μs to-3.0μs	0% to+16%
		Decay	250μs+50μs to-0μs	
10/360	Open-Circuit Voltage	Rise	10μs+0μs to-2.5μs	0% to+15%
		Decay	250μs+108μs to-0μs	
	Short-Circuit Current	Rise	10μs+0μs to-2.5μs	0% to+15%
		Decay	250μs+108μs to-0μs	
10/700 Dual Output Version	Open-Circuit Voltage - Both terminals open	Rise	10μs±3μs	±10%
		Decay	700μs±140μs	
	Open-Circuit Voltage - Other terminal shorted	Rise	5μs±1.5μs	±10%
		Decay	320μs±64μs	
	Short-Circuit Current - Other terminal open	Rise	5μs±1.5μs	±10%
		Decay	320μs±64μs	
	Short-Circuit Current - Both terminals shorted	Rise	4μs±1.2μs	±10%
		Decay	250μs±50μs	
10/1000	Open-Circuit Voltage	Rise	10μs+0μs to-4.0μs	0% to+15%
		Decay	1000μs+500μs to-0μs	
	Short-Circuit Current	Dise	10μs+0μs to-4.0μs	0% to+15%
		Decay	1000μs+500μs to-0μs	

Note 1: Fictive impedance (open-circuit peak voltage value/short-circuit peak current value) 2Ω
Note 2: Undershoot < 30% of the peak short-circuit value.
Note 3: Voltage waveshape not defined.
Note 4: Minimum peak open-circuit voltage defined in test conditions.

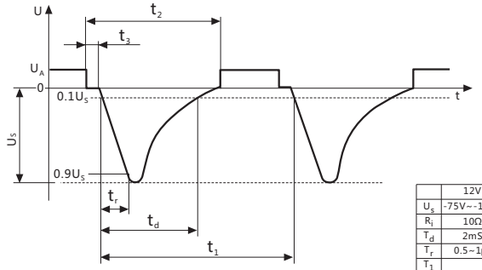
IEC61000-4-4:2012 Representation of an electrical fast transient / burst



IEC61000-4-2:2008 Ideal contact discharge current waveform at 4 kV

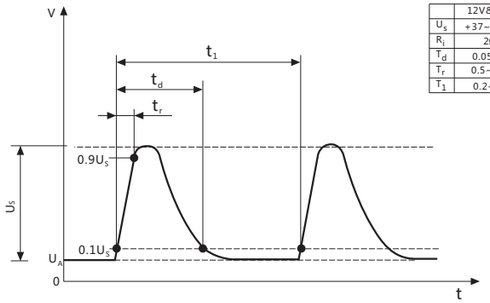


ISO7637-2:2011 Test pulse generator for immunity testing——Test pulse 1



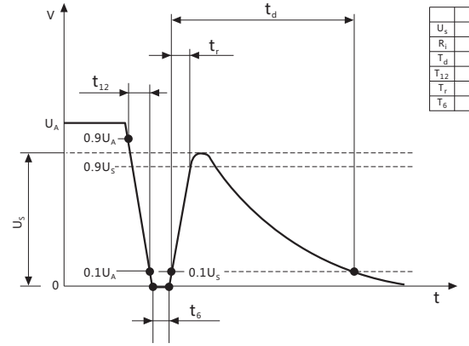
	12V	24V
U_S	-75V~-150V	-300V~-600V
R_i	10Ω	50Ω
T_d	2mS	1ms
T_r	0.5~1μs	1.5~3μs
T_1	≥0.5s	
T_2	200ms	
T_3	<100	

ISO7637-2:2011 Test pulse generator for immunity testing——Test pulse 2a



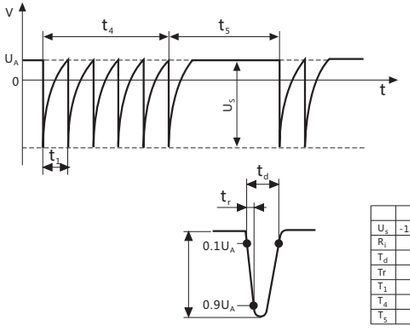
	12V&24V
U_S	+37~112V
R_i	2Ω
T_d	0.05ms
T_r	0.5~1μs
T_1	0.2~5s

ISO7637-2:2011 Test pulse generator for immunity testing——Test pulse 2b



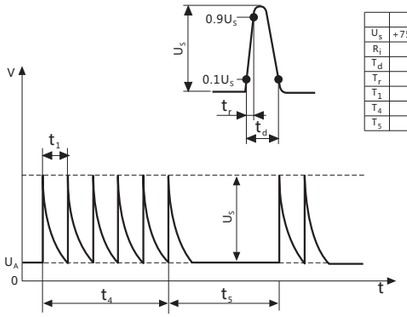
	12V	24V
U_S	10V	20V
R_i	0~0.05Ω	
T_d	0.2~2s	
T_{12}	1ms±0.5ms	
T_r	1ms±0.5ms	
T_6	1ms±0.5ms	

ISO7637-2:2011 Test pulse generator for immunity testing——Test pulse 3a



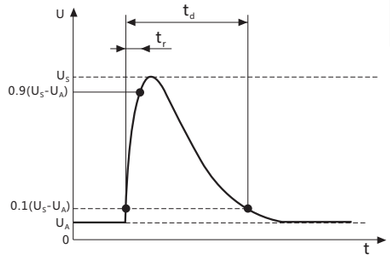
	12V	24V
U_S	-112V~-220V	-150V~-300V
R_i	50Ω	
T_d	150ns±45ns	
Tr	5ns±1.5ns	
T_1	100μs	
T_4	10ms	
T_5	90ms	

ISO7637-2:2011 Test pulse generator for immunity testing——Test pulse 3b



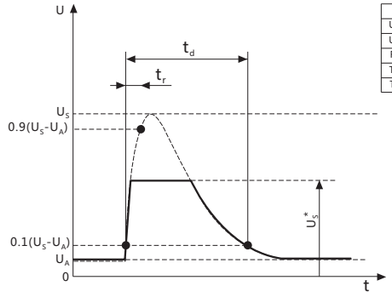
	12V	24V
U_S	+75V~+150V	+150~+300V
R_i	50Ω	
T_d	150ns±45ns	
T_r	5ns±1.5ns	
T_1	100μs	
T_4	10ms	
T_5	90ms	

ISO16750-2:2010 Test pulse generator for immunity testing——Test pulse 5a



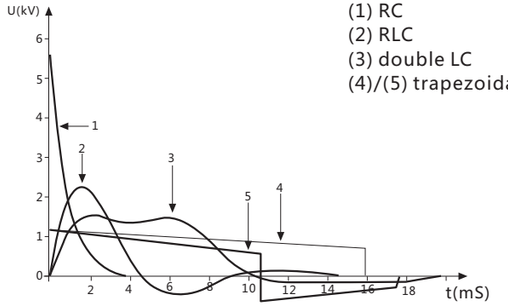
	12V	24V
U_S	79V~101V	151V~202V
R_i	0.5~4Ω	1~8Ω
T_d	40~400ms	100~350ms
T_r	5~10ms	5~10ms

ISO16750-2:2010 Test pulse generator for immunity testing——Test pulse 5b



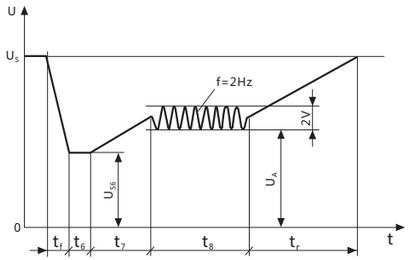
	12V	24V
U_S	79V~101V	151V~202V
U_A^*	35V	65V
R_i	0.5~4Ω	1~8Ω
T_d	40~400ms	100~350ms
T_r	5~10ms	5~10ms

IEC60601:2008 Response of defibrillator circuits



(1) RC
(2) RLC
(3) double LC
(4)/(5) trapezoidal

ISO16750-2:2010 Test pulse generator for immunity testing——Test pulse 4



	I		II		III		IV
	12V	24V	12V	24V	12V	24V	12V
U_{S6}(V)	8(-0.2)	10(-0.2)	4.5(-0.2)	8(-0.2)	3(-0.2)	6(-0.2)	6(-0.2)
U_S(V)	9.5(-0.2)	20(-0.2)	6.5(-0.2)	15(-0.2)	5(-0.2)	10(-0.2)	6,5(-0.2)
t_f(ms)	5(±0.5)	10(±1)	5(±0.5)	10(±1)	5(±0.5)	10(±1)	5(±0.5)
t_6(ms)	15(±1.5)	50(±5)	15(±1.5)	50(±5)	15(±1.5)	50(±5)	15(±1.5)
t_7(ms)	50(±5)	50(±5)	50(±5)	50(±5)	50(±5)	50(±5)	50(±5)
t_8(ms)	1000(±100)	1000(±100)	10000(±1000)	1000(±100)	1000(±100)	1000(±100)	10000(±1000)
t_r(ms)	40(±4)	40(±4)	100(±10)	100(±10)	100(±10)	40(±10)	100(±10)


Certificate

Standard: GB/T 19001-2008/ISO 9001:2008

Certificate Holder: Shenzhen Bencent Electronics Co., Ltd.

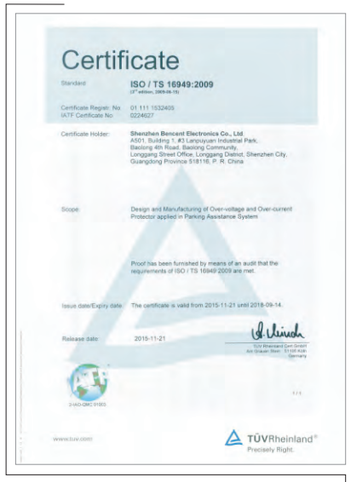
Scope: Design and Manufacturing of Over-Voltage and Over-Current Protector

Validity: The certificate is valid from 2016-11-04 until 2018-09-14.

2016-11-04

TÜVRheinland® Precisely Right.

ISO9001:2008


Certificate

Standard: ISO / TS 16949:2009

Certificate Holder: Shenzhen Bencent Electronics Co., Ltd

Scope: Design and Manufacturing of Over-voltage and Over-current Protector applied in Parking Assistance System

Issue date/Expiry date: The certificate is valid from 2015-11-21 until 2018-09-14.

Release date: 2015-11-21

TÜVRheinland® Precisely Right.

TS16949:2009


中国电子信息产品污染控制

自愿性产品认证证书

C-RoHS


CTI

职业健康安全管理体系认证证书

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM CERTIFICATE

兹 证 明

This is to certify that

深圳市槟城电子有限公司

建立的职业健康安全管理体系符合标准

has been awarded this certificate for compliance with the standard

GB/T 28001-2011/OHSAS 18001:2007

CNAS

总经理 General Manager

OHSAS 18001:2007


CTI

环境管理体系认证证书

ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

兹 证 明

This is to certify that

深圳市槟城电子有限公司

建立的环境管理体系符合标准

has been awarded this certificate for compliance with the standard

GB/T24001-2004/ISO14001:2004

IAF CNAS

总经理 General Manager

ISO14001:2004


CERTIFICATE OF PARTICIPATION

Issued by

UL-CCIC on behalf of UL

SHENZHEN BENCENT ELECTRONIC CO LTD

5/F BLD 1 NO 3 HAINENGDA SCIENCE &TECHNOLOGY PARK BAOLONG 4TH RD

BAOLONG INDUSTRIAL CITY LONGGANG DISTRICT, SHENZHEN, GUANGDONG 518116, CHINA

has been assessed and found eligible to participate in UL

WITNESS TEST DATA PROGRAM

FOR UL/CSA 60950 and UL/CSA 60065

Party Site Number: 623773

Issued: December 28, 2016

Expire: December 27, 2017

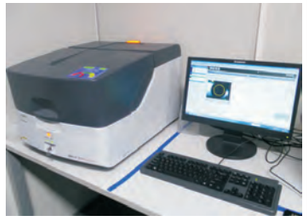
Gordon Lv

Engineering Manager

UL-CCIC Company Limited

UL-CCIC

Reliability Lab

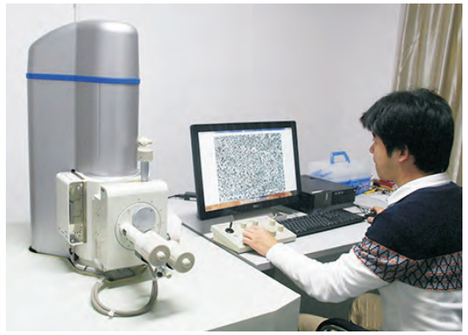


RoHS Tester

Metallographic analysis microscope

Film thickness tester

X-RAY perspective detector



Scanning electron microscope

High-temperature reverse bias

High temperature and humidity

Highly accelerated stress test

Layout Recommended

10/700μs - 5/320μs(40Ω) 1KV-6KV

Voltage(KV)	Copper thickness(OZ)	Trace widths@Surface(mil)	Test times
1	1	5	±30
3		8	±30
4		10	±30
5		12	±30
6		15	±30
4	2	5	±30
6		8	±30

8/20μs 0.5KA-20KA(1OZ)

Current(KA)	Trace widths @Surface(mil)	Trace widths@Inlayer (mil)	Test times
0.5	12	20	±30
1	30	40	±30
1.5	30	60	±30
2	40	80	±30
2.5	50	100	±30
3	80	100	±30
3.5	80	140	±30
4	80	180	±30
4.5	100	180	±30
5	100	200	±30
5.5	120	240	±30
6	120	250	±30
6.5	200	300	±30
7	200	300	±30
7.5	200	360	±30
8	200	360	±30
8.5	200	360	±30
9	250	360	±30
9.5	250	400	±30
10	250	400	±30