

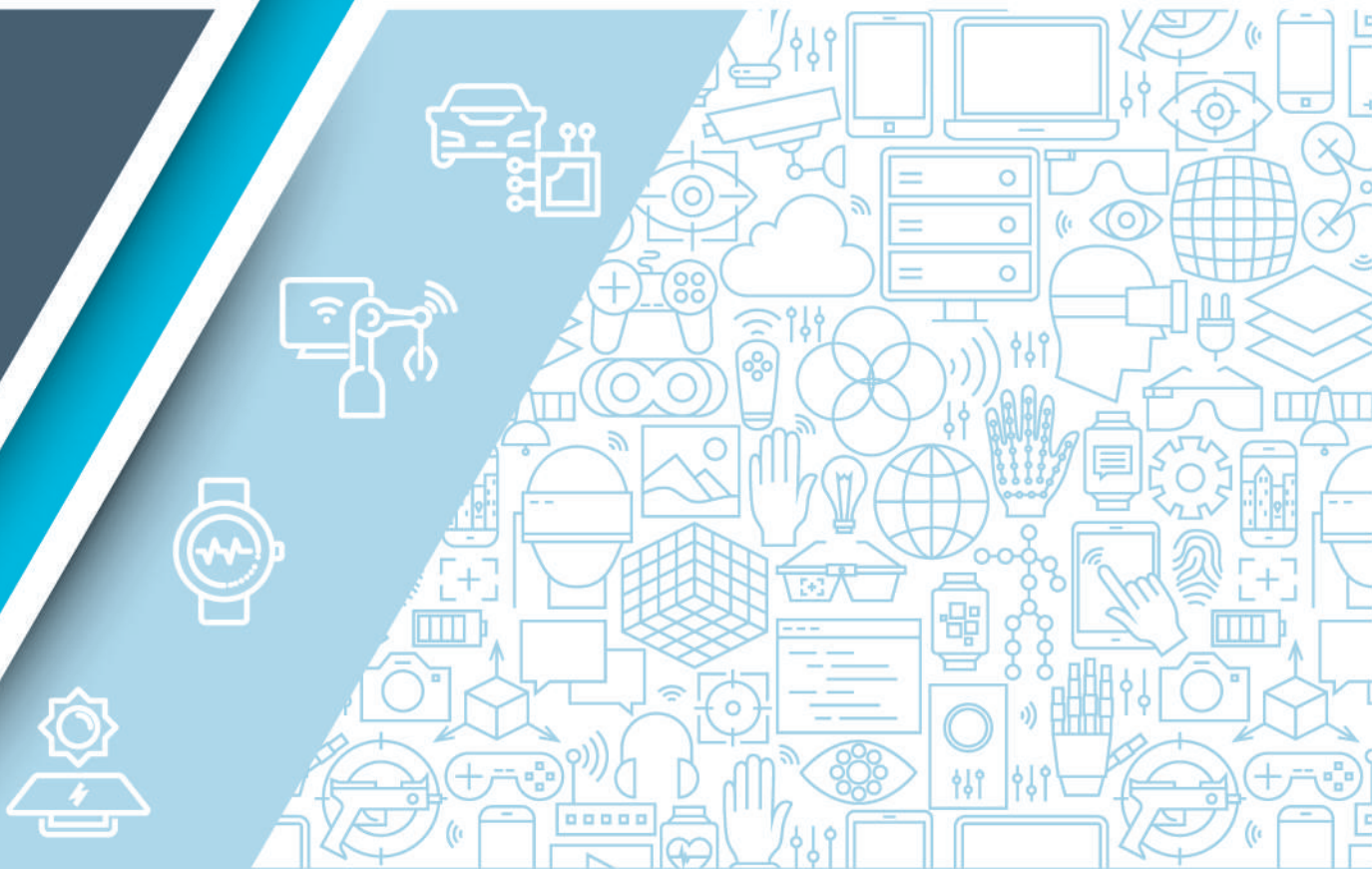


FUZETEC

Circuit Protection Solutions for Today & Tomorrow's Industries

TVS Diode

Transient Voltage Suppression Devices



Fuzetec Technology
2021 TVS Product Catalog

www.fuzetec.com



TVS Products

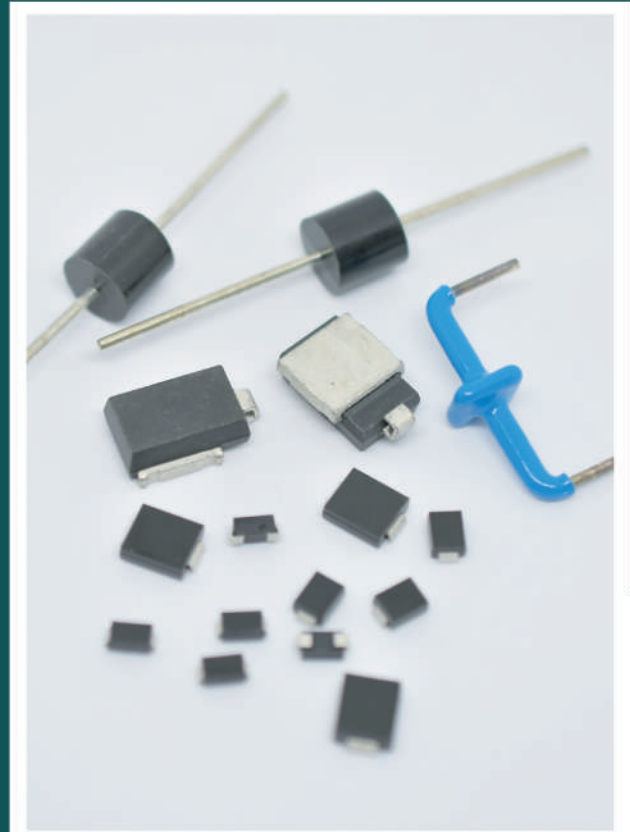
Peak Pulse Power	Series Name	Package Type	Page
SMD Standard TVS			
400W	SMAJ	DO-214AC	P4
	P4SMA	DO-214AC	P9
600W	SMA6J	DO-214AC	P14
	SMBJ	DO-214AA	P19
	P6SMB	DO-214AA	P24
1500W	SMCJ	DO-214AB	P29
	1.5SMC	DO-214AB	P34
3000W	SMDJ	DO-214AB	P39
5000W	5.0SMDJ	DO-214AB	P44
Automotive SMD TVS			
3600W	SM5Z	DO-218AB	P50
4600W	SM6Z	DO-218AB	P54
6600W	SM8Z	DO-218AB	P58
Axial Leaded High Power TVS			
15000W	15KPA	R6/P600	P63
30000W	30KPA	R6/P600	P67
	KA	Custom	P72

Transient Surge Protection

Transient Surges

Transient surges are brief overvoltage spikes or disturbances on a power waveform that can damage, degrade, or destroy electronic equipment. Transient surges originate from a variety of electrical circuits and sources regardless of whether they operate from an AC or DC supply as they are often generated within the circuit itself or transmitted into the circuit from external sources.

Transients within a circuit can increase the voltage to several thousand volts with a duration of less than a half-cycle of the normal voltage waveform, and it is these voltage spikes which must be prevented from appearing across delicate electronic circuits and components.



TVS Diodes



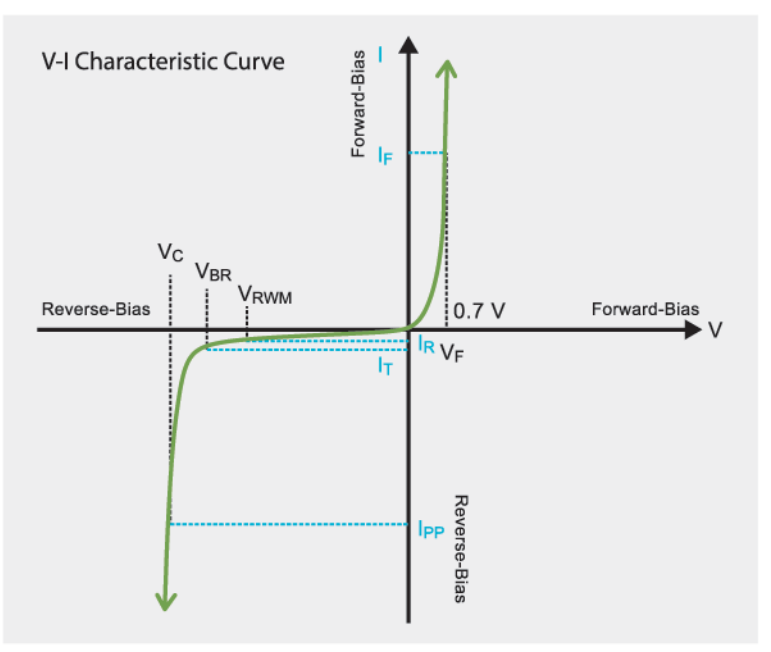
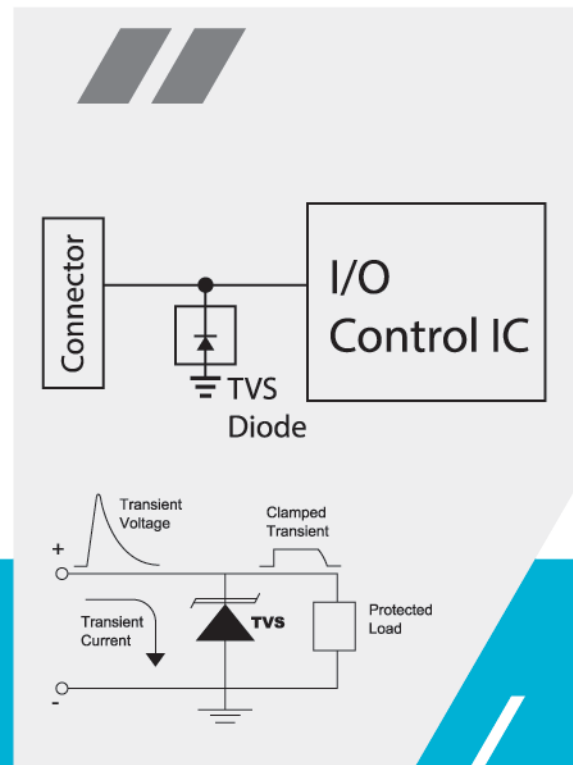
TVS Diodes are electronic components designed to protect sensitive electronics from high-voltage transients. They can respond to overvoltage events faster than most other types of circuit protection devices, and are offered in a variety of surface mount and through-hole circuit board mounting formats.

Fuzetec TVS Diodes can fit a wide range of circuit protection applications but were primarily designed to protect I/O interfaces in telecommunication and industrial equipment, computers and consumer electronics.



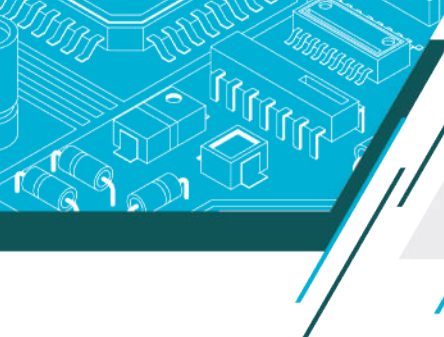
How a TVS Diode Work

TVS diodes function by limiting voltage to a certain level (referred to as a "clamping" device) with p-n junctions that have a larger cross-sectional area than those of a normal diode, allowing them to conduct large currents to ground without sustaining damage.



TVS Diode Characteristics

Symbol	Parameter
V_F	Forward Voltage @ I_F
V_{RWM}	Working Peak Reverse Voltage
V_{BR}	Breakdown Voltage @ I_T
V_C	Clamping Voltage @ I_{PP}
I_F	Forward Current
I_R	Maximum Reverse Leak Current @ V_{RWM}
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current



SMAJ Series

400W



Operating Voltage: 5.0 to 440V
 Peak Pulse Power: 400W
SMA/ DO-214AC



FUZETEC TVS SMAJ



Features

- Glass passivated chip
- 400 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle) : 0.01%
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Devices For Bipolar Application

- For Bidirectional types, use C or CA as suffix; suffixes without A, the VBR is $\pm 10\%$. (e.g. SMAJ5.0C , SMAJ440CA).
- Electrical characteristics apply in both directions



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1,2 ,Fig.1)	PPPM	Minimum 400	Watts
Peak Pulse Current of on 10/1000 μ s waveform (Note 1, Fig.3)	I _{PP}	SEE TABLE 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note 2,3)	I _{FSM}	40	Amps
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 150	°C

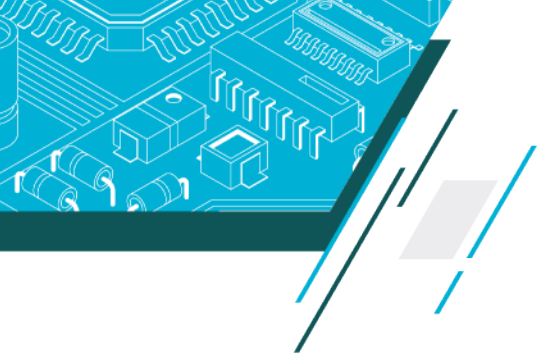
- Notes :**
1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2
 2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal
 3. 8.3ms single half sine-wave , or equivalent square wave, Duty cycle = 4 pulses per minutes maximum



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{VRWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{VRWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMAJ5.0A	SMAJ5.0CA	AE	WE	5.0	6.40	7.00	10	9.2	43.5	800
SMAJ6.0A	SMAJ6.0CA	AG	WG	6.0	6.67	7.37	10	10.3	38.8	800
SMAJ6.5A	SMAJ6.5CA	AK	WK	6.5	7.22	7.98	10	11.2	35.7	500
SMAJ7.0A	SMAJ7.0CA	AM	WM	7.0	7.78	8.60	10	12.0	33.3	200
SMAJ7.5A	SMAJ7.5CA	AP	WP	7.5	8.33	9.21	1	12.9	31.0	100
SMAJ8.0A	SMAJ8.0CA	AR	WR	8.0	8.89	9.83	1	13.6	29.4	50
SMAJ8.5A	SMAJ8.5CA	AT	WT	8.5	9.44	10.40	1	14.4	27.8	20
SMAJ9.0A	SMAJ9.0CA	AV	WV	9.0	10.00	11.10	1	15.4	26.0	10
SMAJ10A	SMAJ10CA	AX	WX	10.0	11.10	12.30	1	17.0	23.5	5
SMAJ11A	SMAJ11CA	AZ	WZ	11.0	12.20	13.50	1	18.2	22.0	1
SMAJ12A	SMAJ12CA	BE	XE	12.0	13.30	14.70	1	19.9	20.1	1
SMAJ13A	SMAJ13CA	BG	XG	13.0	14.40	15.90	1	21.5	18.6	1
SMAJ14A	SMAJ14CA	BK	XK	14.0	15.60	17.20	1	23.2	17.2	1
SMAJ15A	SMAJ15CA	BM	XM	15.0	16.70	18.50	1	24.4	16.4	1
SMAJ16A	SMAJ16CA	BP	XP	16.0	17.80	19.70	1	26.0	15.4	1
SMAJ17A	SMAJ17CA	BR	XR	17.0	18.90	20.90	1	27.6	14.5	1
SMAJ18A	SMAJ18CA	BT	XT	18.0	20.00	22.10	1	29.2	13.7	1
SMAJ20A	SMAJ20CA	BV	XV	20.0	22.20	24.50	1	32.4	12.3	1
SMAJ22A	SMAJ22CA	BX	XX	22.0	24.40	26.90	1	35.5	11.3	1
SMAJ24A	SMAJ24CA	BZ	XZ	24.0	26.70	29.50	1	38.9	10.3	1
SMAJ26A	SMAJ26CA	CE	YE	26.0	28.90	31.90	1	42.1	9.5	1
SMAJ28A	SMAJ28CA	CG	YG	28.0	31.10	34.40	1	45.4	8.8	1
SMAJ30A	SMAJ30CA	CK	YK	30.0	33.30	36.80	1	48.4	8.3	1
SMAJ33A	SMAJ33CA	CM	YM	33.0	36.70	40.60	1	53.3	7.5	1
SMAJ36A	SMAJ36CA	CP	YP	36.0	40.00	44.20	1	58.1	6.9	1
SMAJ40A	SMAJ40CA	CR	YR	40.0	44.40	49.10	1	64.5	6.2	1
SMAJ43A	SMAJ43CA	CT	YT	43.0	47.80	52.80	1	69.4	5.8	1
SMAJ45A	SMAJ45CA	CV	YV	45.0	50.00	55.30	1	72.7	5.5	1
SMAJ48A	SMAJ48CA	CX	YX	48.0	53.30	58.90	1	77.4	5.2	1

* For bidirectional type having V_{VRWM} of 10 volts and less, the I_R limit is double.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage VRWM(V)	Breakdown Voltage VBR(V) @IT		Test Current IT (mA)	Maximum Clamping Voltage Vc(V)@IPP	Maximum Peak Pulse Current (IPP)	Maximum Reverse Leakage IR@ VRWM (µA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMAJ51A	SMAJ51CA	CZ	YZ	51.0	56.70	62.70	1	82.4	4.9	1
SMAJ54A	SMAJ54CA	RE	ZE	54.0	60.00	66.30	1	87.1	4.6	1
SMAJ58A	SMAJ58CA	RG	ZG	58.0	64.40	71.20	1	93.6	4.3	1
SMAJ60A	SMAJ60CA	RK	ZK	60.0	66.70	73.70	1	96.8	4.1	1
SMAJ64A	SMAJ64CA	RM	ZM	64.0	71.10	78.60	1	103.0	3.9	1
SMAJ70A	SMAJ70CA	RP	ZP	70.0	77.80	86.00	1	113.0	3.5	1
SMAJ75A	SMAJ75CA	RR	ZR	75.0	83.30	92.10	1	121.0	3.3	1
SMAJ78A	SMAJ78CA	RT	ZT	78.0	86.70	95.80	1	126.0	3.2	1
SMAJ85A	SMAJ85CA	RV	ZV	85.0	94.40	104.00	1	137.0	2.9	1
SMAJ90A	SMAJ90CA	RX	ZX	90.0	100.00	111.00	1	146.0	2.7	1
SMAJ100A	SMAJ100CA	RZ	ZZ	100.0	111.00	123.00	1	162.0	2.5	1
SMAJ110A	SMAJ110CA	SE	VE	110.0	122.00	135.00	1	177.0	2.3	1
SMAJ120A	SMAJ120CA	SG	VG	120.0	133.00	147.00	1	193.0	2.1	1
SMAJ130A	SMAJ130CA	SK	VK	130.0	144.00	159.00	1	209.0	1.9	1
SMAJ150A	SMAJ150CA	SM	VM	150.0	167.00	185.00	1	243.0	1.6	1
SMAJ160A	SMAJ160CA	SP	VP	160.0	178.00	197.00	1	259.0	1.5	1
SMAJ170A	SMAJ170CA	SR	VR	170.0	189.00	209.00	1	275.0	1.5	1
SMAJ180A	SMAJ180CA	ST	VT	180.0	201.00	222.00	1	292.0	1.4	1
SMAJ200A	SMAJ200CA	SV	VV	200.0	224.00	247.00	1	324.0	1.2	1
SMAJ220A	SMAJ220CA	SX	VX	220.0	246.00	272.00	1	356.0	1.1	1
SMAJ250A	SMAJ250CA	SZ	VZ	250.0	279.00	309.00	1	405.0	1.0	1
SMAJ300A	SMAJ300CA	TE	UE	300.0	335.00	371.00	1	486.0	0.8	1
SMAJ350A	SMAJ350CA	TG	UG	350.0	391.00	432.00	1	567.0	0.7	1
SMAJ400A	SMAJ400CA	TK	UK	400.0	447.00	494.00	1	648.0	0.6	1
SMAJ440A	SMAJ440CA	TM	UM	440.0	492.00	543.00	1	713.0	0.6	1

* For bidirectional type having Vrwm of 10 volts and less, the IR limit is double.



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating

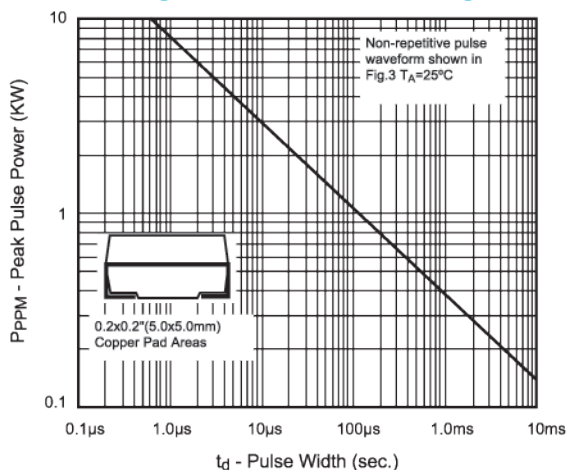


Fig. 2 - Pulse Derating Curve

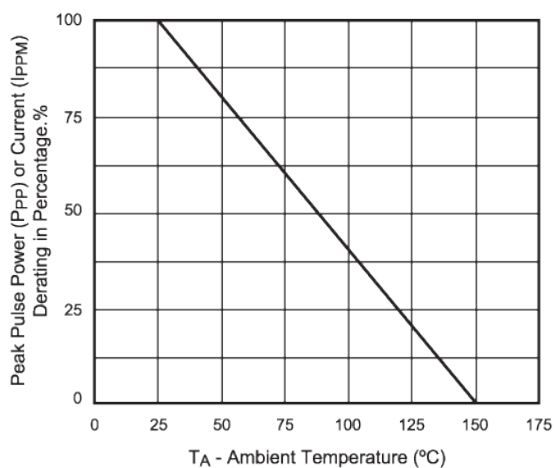


Fig. 3 - Pulse Waveform

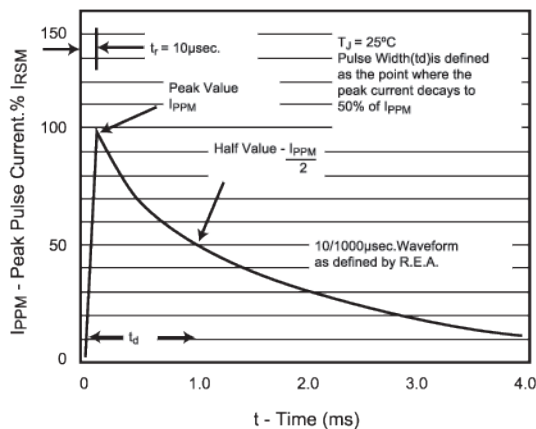


Fig. 4 - Typical Junction Capacitance

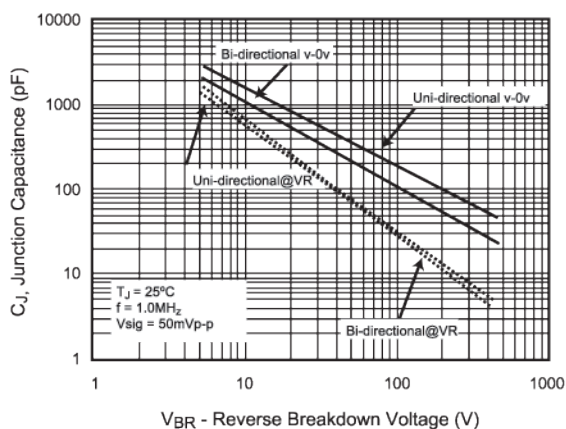


Fig. 5 - Steady State Power Derating Curve

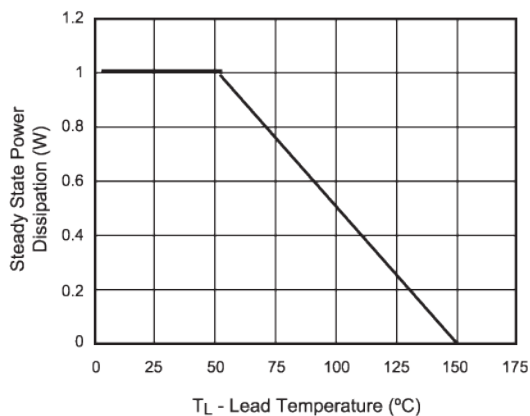
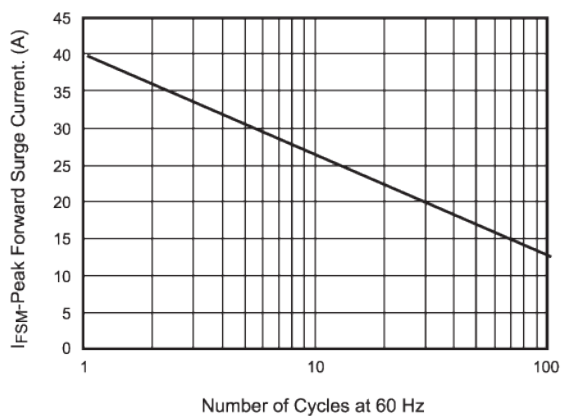
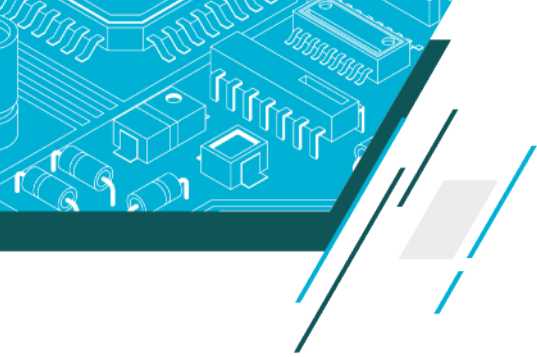
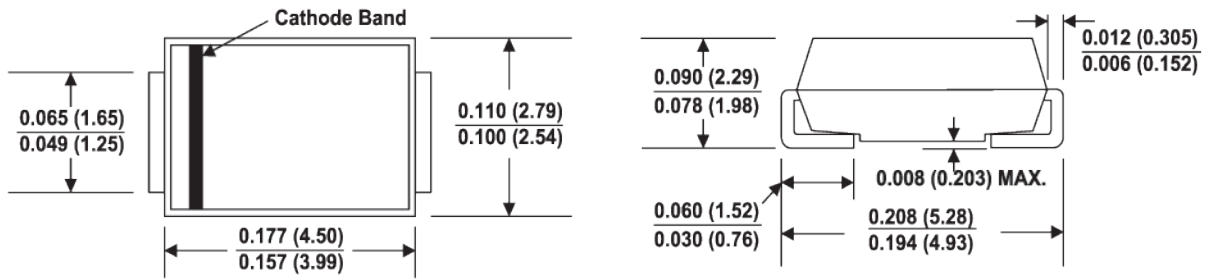


Fig. 6 - Maximum Non-repetitive Forward Surge current uni-directional only



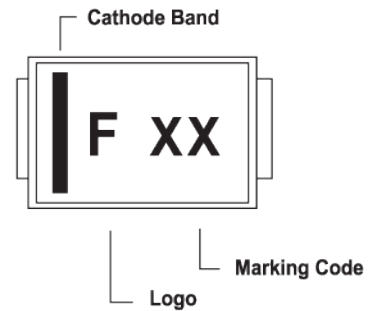
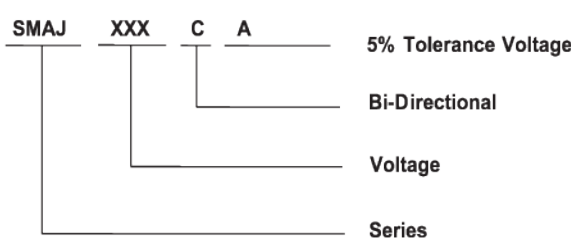


Dimension / DO-214AC (SMA)



Dimensions in inches and (millimeters)

Part Numbering and Marking System



Packaging Specification

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
SMAJxxxXX	DO-214AC	5000	Tape & Reel - 12mm/13" tape	EIA STD RS-481
SMAJxxxXX	DO-214AC	1000	Tape & Reel - 12mm/ 7" tape	EIA STD RS-481

P4SMA Series

400W

Operating Voltage : 6.8 to 550V

Peak Pulse Power : 400W

SMA/ DO-214AC



Features

- Glass passivated chip
- 400 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle) : 0.01 %
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Devices For Bipolar Application

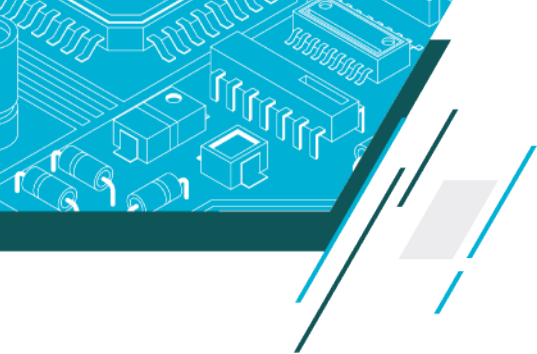
- For Bidirectional types, use C or CA as suffix ; suffixes without A, the VBR is $\pm 10\%$. (e.g. P4SMAJ6.8C , P4SMA550CA).
- Electrical characteristics apply in both directions



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1,2 ,Fig.1)	PPPM	Minimum 400	Watts
Peak Pulse Current of on 10/1000 μ s waveform (Note 1, Fig.3)	IPP	SEE TABLE 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note 2,3)	IFSM	40	Amps
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 150	°C

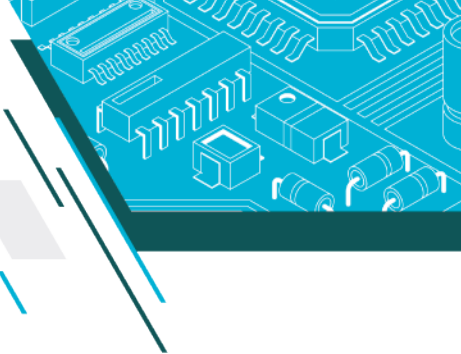
- Notes :**
1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2
 2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal
 3. 8.3ms single half sine-wave , or equivalent square wave, Duty cycle = 4 pulses per minutes maximum



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
P4SMA6.8A	P4SMA6.8CA	6V8A	6V8C	5.8	6.45	7.14	10	10.5	39.0	1000
P4SMA7.5A	P4SMA7.5CA	7V5A	7V5C	6.4	7.13	7.88	10	11.3	36.3	500
P4SMA8.2A	P4SMA8.2CA	8V2A	8V2C	7.0	7.79	8.61	10	12.1	33.9	200
P4SMA9.1A	P4SMA9.1CA	9V1A	9V1C	7.8	8.65	9.55	1	13.4	30.6	50
P4SMA10A	P4SMA10CA	10A	10C	8.6	9.50	10.50	1	14.5	28.3	10
P4SMA11A	P4SMA11CA	11A	11C	9.4	10.50	11.60	1	15.2	26.3	5
P4SMA12A	P4SMA12CA	12A	12C	10.2	11.40	12.60	1	16.7	24.6	5
P4SMA13A	P4SMA13CA	13A	13C	11.1	12.40	13.70	1	18.2	22.5	1
P4SMA15A	P4SMA15CA	15A	15C	12.8	14.30	15.80	1	21.2	19.3	1
P4SMA16A	P4SMA16CA	16A	16C	13.6	15.20	16.80	1	22.5	18.2	1
P4SMA18A	P4SMA18CA	18A	18C	15.3	17.10	18.90	1	25.3	16.1	1
P4SMA20A	P4SMA20CA	20A	20C	17.1	19.00	21.00	1	27.7	14.8	1
P4SMA22A	P4SMA22CA	22A	22C	18.8	20.90	23.10	1	30.6	13.4	1
P4SMA24A	P4SMA24CA	24A	24C	20.5	22.80	25.20	1	33.2	12.3	1
P4SMA27A	P4SMA27CA	27A	27C	23.1	25.70	28.40	1	37.5	10.9	1
P4SMA30A	P4SMA30CA	30A	30C	25.6	28.50	31.50	1	41.4	9.9	1
P4SMA33A	P4SMA33CA	33A	33C	28.2	31.40	34.70	1	45.7	9.0	1
P4SMA36A	P4SMA36CA	36A	36C	30.8	34.20	37.80	1	49.9	8.2	1
P4SMA39A	P4SMA39CA	39A	39C	33.3	37.10	41.00	1	53.9	7.6	1
P4SMA43A	P4SMA43CA	43A	43C	36.8	40.90	45.20	1	59.3	6.9	1
P4SMA47A	P4SMA47CA	47A	47C	40.2	44.70	49.40	1	64.8	6.3	1
P4SMA51A	P4SMA51CA	51A	51C	43.6	48.50	53.60	1	70.1	5.8	1
P4SMA56A	P4SMA56CA	56A	56C	47.8	53.20	58.80	1	77.0	5.3	1
P4SMA62A	P4SMA62CA	62A	62C	53.0	58.90	65.10	1	85.0	4.8	1
P4SMA68A	P4SMA68CA	68A	68C	58.1	64.60	71.40	1	92.0	4.5	1
P4SMA75A	P4SMA75CA	75A	75C	64.1	71.30	78.80	1	103.0	4.0	1
P4SMA82A	P4SMA82CA	82A	82C	70.1	77.90	86.10	1	113.0	3.6	1
P4SMA91A	P4SMA91CA	91A	91C	77.8	86.50	95.50	1	125.0	3.3	1
P4SMA100A	P4SMA100CA	100A	100C	85.5	95.00	105.00	1	137.0	3.0	1

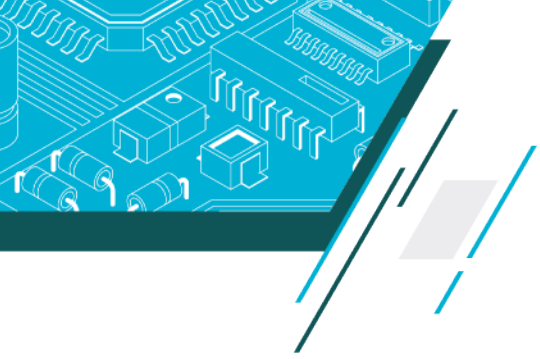
* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage VRWM(V)	Breakdown Voltage VBR(V) @IT		Test Current IT (mA)	Maximum Clamping Voltage Vc(V)@IPP	Maximum Peak Pulse Current (IPP)	Maximum Reverse Leakage IR@ VRWM (µA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
P4SMA110A	P4SMA110CA	110A	110C	94.0	105.00	116.00	1	152.0	2.7	1
P4SMA120A	P4SMA120CA	120A	120C	102.0	114.00	126.00	1	165.0	2.5	1
P4SMA130A	P4SMA130CA	130A	130C	111.0	124.00	137.00	1	179.0	2.3	1
P4SMA150A	P4SMA150CA	150A	150C	128.0	143.00	158.00	1	207.0	2.0	1
P4SMA160A	P4SMA160CA	160A	160C	136.0	152.00	168.00	1	219.0	1.9	1
P4SMA170A	P4SMA170CA	170A	170C	145.0	162.00	179.00	1	234.0	1.8	1
P4SMA180A	P4SMA180CA	180A	180C	154.0	171.00	189.00	1	246.0	1.7	1
P4SMA200A	P4SMA200CA	200A	200C	171.0	190.00	210.00	1	274.0	1.5	1
P4SMA220A	P4SMA220CA	220A	220C	185.0	209.00	231.00	1	328.0	1.3	1
P4SMA250A	P4SMA250CA	250A	250C	214.0	237.00	263.00	1	344.0	1.2	1
P4SMA300A	P4SMA300CA	300A	300C	256.0	285.00	315.00	1	414.0	1.0	1
P4SMA350A	P4SMA350CA	350A	350C	300.0	332.00	368.00	1	482.0	0.9	1
P4SMA400A	P4SMA400CA	400A	400C	342.0	380.00	420.00	1	548.0	0.8	1
P4SMA440A	P4SMA440CA	440A	440C	376.0	418.00	462.00	1	602.0	0.7	1
P4SMA480A	P4SMA480CA	480A	480C	408.0	456.00	504.00	1	658.0	0.6	1
P4SMA510A	P4SMA510CA	510A	510C	434.0	485.00	535.00	1	698.0	0.6	1
P4SMA530A	P4SMA530CA	530A	530C	477.0	503.50	556.50	1	725.0	0.6	1
P4SMA540A	P4SMA540CA	540A	540C	486.0	513.00	567.00	1	740.0	0.5	1
P4SMA550A	P4SMA550CA	550A	550C	495.0	522.50	577.50	1	760.0	0.5	1

* For bidirectional type having Vrwm of 10 volts and less, the IR limit is double.



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating

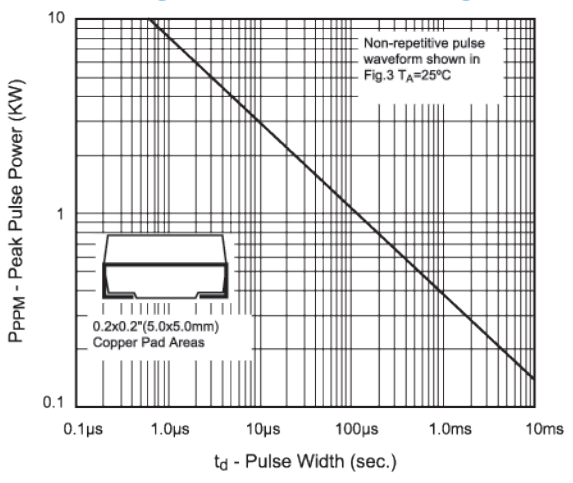


Fig. 2 - Pulse Derating Curve

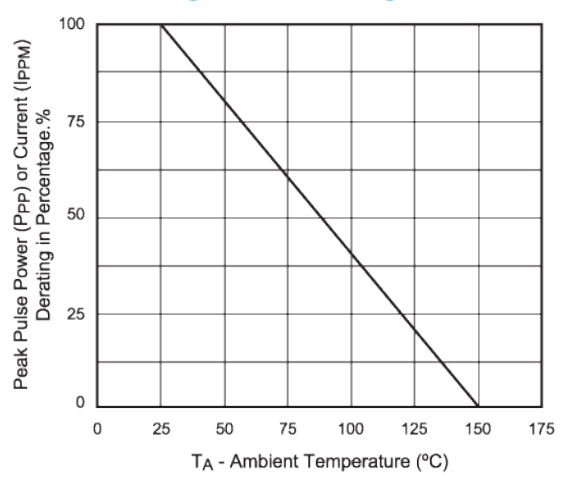


Fig. 3 - Pulse Waveform

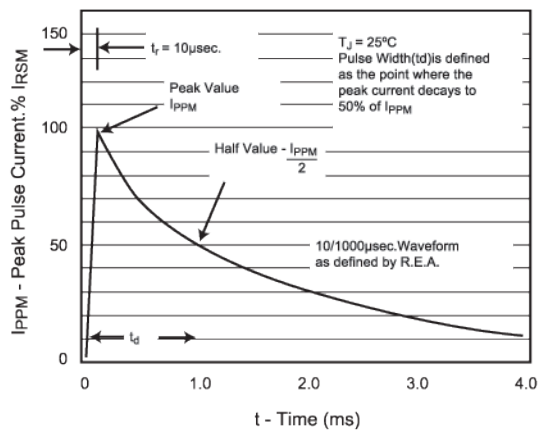


Fig. 4 - Typical Junction Capacitance

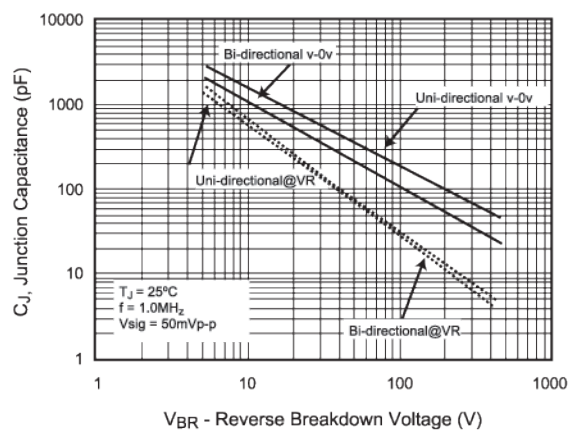


Fig. 5 - Steady State Power Derating Curve

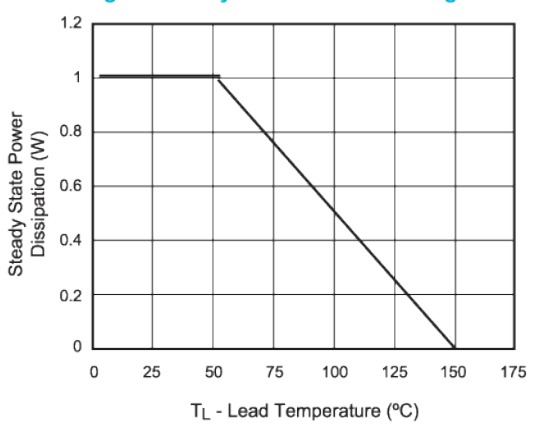
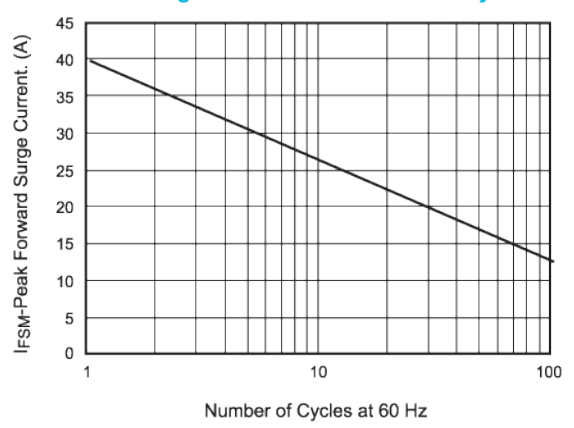


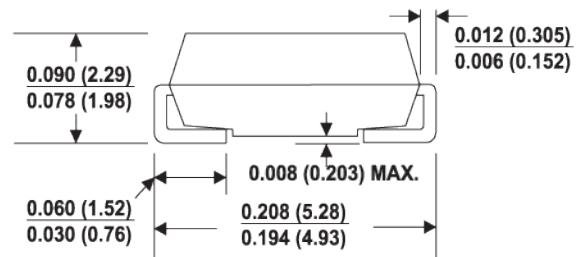
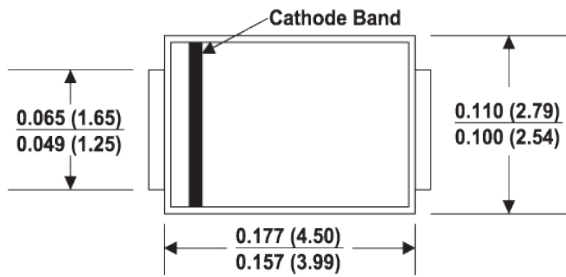
Fig. 6 - Maximum Non-repetitive Forward Surge current uni-directional only



FUZETEC TVS P4SMA

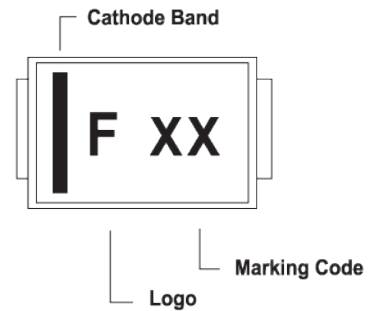
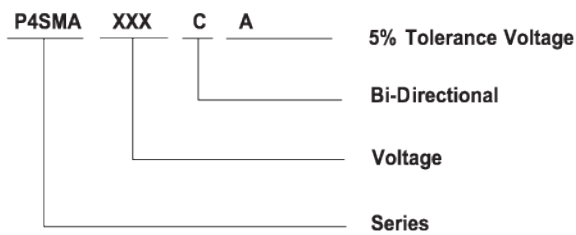


Dimension / DO-214AC (SMA)



Dimensions in inches and (millimeters)

Part Numbering and Marking System

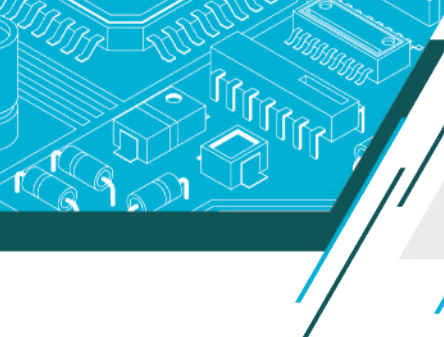


FUZETEC TVS P4SMA



Packaging Specification

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
P4SMAxxxXX	DO-214AC	5000	Tape & Reel - 12mm/13" tape	EIA STD RS-481
P4SMAxxxXX	DO-214AC	1000	Tape & Reel - 12mm/ 7" tape	EIA STD RS-481



SMA6J Series

600W



Operating Voltage : 5.0 to 130V
 Peak Pulse Power: 600W
SMA/ DO-214AC



FUZETEC | TVS SMA6J



Features

- Glass passivated chip
- 600 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle) : 0.01%
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Devices For Bipolar Application

- For Bidirectional types, use C or CA as suffix; suffixes without A, the VBR is $\pm 10\%$. (e.g. SMA6J5.0C, SMA6J90CA).
- Electrical characteristics apply in both directions



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1,2 ,Fig.1)	PPPM	Minimum 600	Watts
Peak Pulse Current of on 10/1000 μ s waveform (Note 1, Fig.3)	I _{PP}	SEE TABLE 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note 2,3)	I _{FSM}	65	Amps
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 150	°C

- Notes :**
1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2
 2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal
 3. 8.3ms single half sine-wave , or equivalent square wave, Duty cycle = 4 pulses per minutes maximum

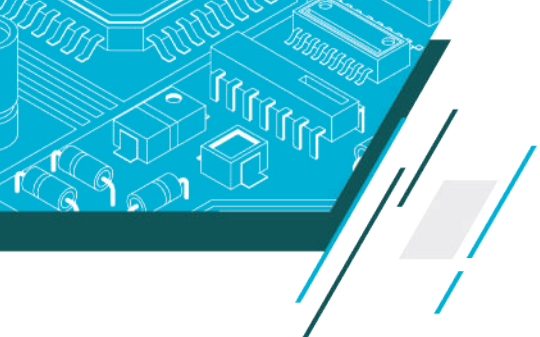


Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMA6J5.0A	SMA6J5.0CA	KE	TE	5.0	6.40	7.00	10	9.2	65.3	800
SMA6J6.0A	SMA6J6.0CA	KG	TG	6.0	6.67	7.37	10	10.3	58.3	800
SMA6J6.5A	SMA6J6.5CA	KK	TK	6.5	7.22	7.98	10	11.2	53.6	500
SMA6J7.0A	SMA6J7.0CA	KM	TM	7.0	7.78	8.60	10	12.0	50.0	200
SMA6J7.5A	SMA6J7.5CA	KP	TP	7.5	8.33	9.21	1	12.9	46.6	100
SMA6J8.0A	SMA6J8.0CA	KR	TR	8.0	8.89	9.83	1	13.6	44.2	50
SMA6J8.5A	SMA6J8.5CA	KT	TT	8.5	9.44	10.40	1	14.4	41.7	20
SMA6J9.0A	SMA6J9.0CA	KV	TV	9.0	10.00	11.10	1	15.4	39.0	10
SMA6J10A	SMA6J10CA	KX	TX	10.0	11.10	12.30	1	17.0	35.3	5
SMA6J11A	SMA6J11CA	KZ	TZ	11.0	12.20	13.50	1	18.2	33.0	1
SMA6J12A	SMA6J12CA	LE	UE	12.0	13.30	14.70	1	19.9	30.2	1
SMA6J13A	SMA6J13CA	LG	UG	13.0	14.40	15.90	1	21.5	28.0	1
SMA6J14A	SMA6J14CA	LK	UK	14.0	15.60	17.20	1	23.2	25.9	1
SMA6J15A	SMA6J15CA	LM	UM	15.0	16.70	18.50	1	24.4	24.6	1
SMA6J16A	SMA6J16CA	LP	UP	16.0	17.80	19.70	1	26.0	23.1	1
SMA6J17A	SMA6J17CA	LR	UR	17.0	18.90	20.90	1	27.6	21.8	1
SMA6J18A	SMA6J18CA	LT	UT	18.0	20.00	22.10	1	29.2	20.6	1
SMA6J20A	SMA6J20CA	LV	UV	20.0	22.20	24.50	1	32.4	18.6	1
SMA6J22A	SMA6J22CA	LX	UX	22.0	24.40	26.90	1	35.5	16.9	1
SMA6J24A	SMA6J24CA	LZ	UZ	24.0	26.70	29.50	1	38.9	15.5	1
SMA6J26A	SMA6J26CA	ME	WE	26.0	28.90	31.90	1	42.1	14.3	1
SMA6J28A	SMA6J28CA	MG	WG	28.0	31.10	34.40	1	45.4	13.3	1
SMA6J30A	SMA6J30CA	MK	WK	30.0	33.30	36.80	1	48.4	12.4	1
SMA6J33A	SMA6J33CA	MM	WM	33.0	36.70	40.60	1	53.3	11.3	1
SMA6J36A	SMA6J36CA	MP	WP	36.0	40.00	44.20	1	58.1	10.4	1
SMA6J40A	SMA6J40CA	MR	WR	40.0	44.40	49.10	1	64.5	9.3	1
SMA6J43A	SMA6J43CA	MT	WT	43.0	47.80	52.80	1	69.4	8.7	1
SMA6J45A	SMA6J45CA	MV	WV	45.0	50.00	55.30	1	72.7	8.3	1
SMA6J48A	SMA6J48CA	MX	WX	48.0	53.30	58.90	1	77.4	7.8	1

* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.

FUZETEC | TVS SMA6J



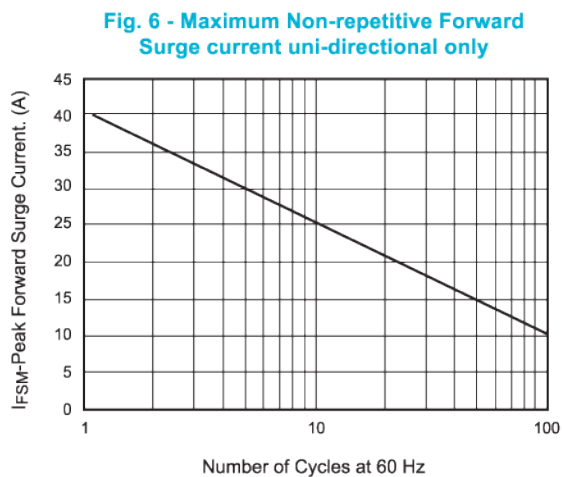
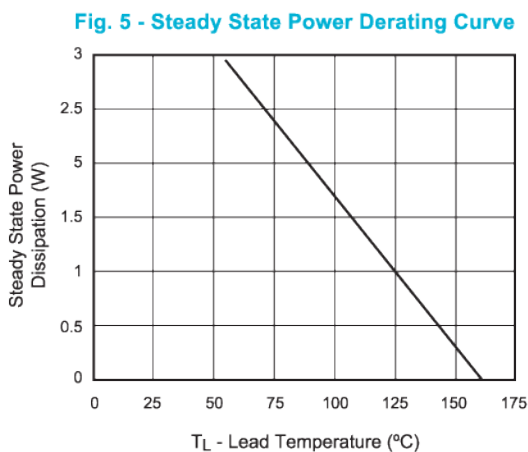
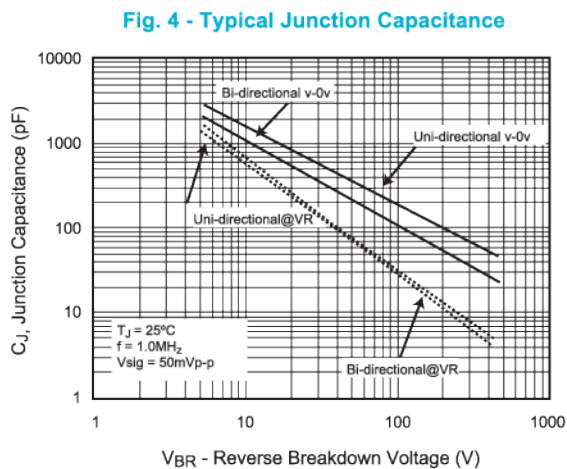
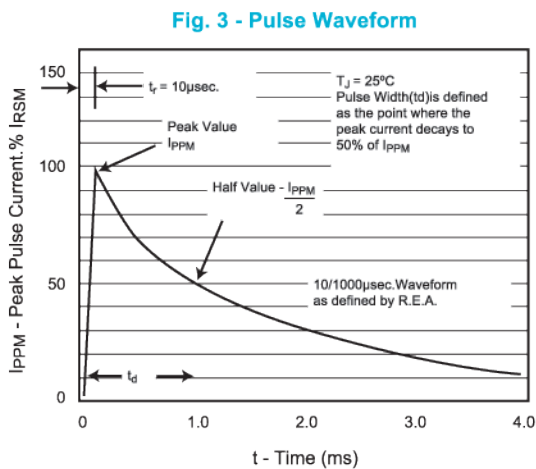
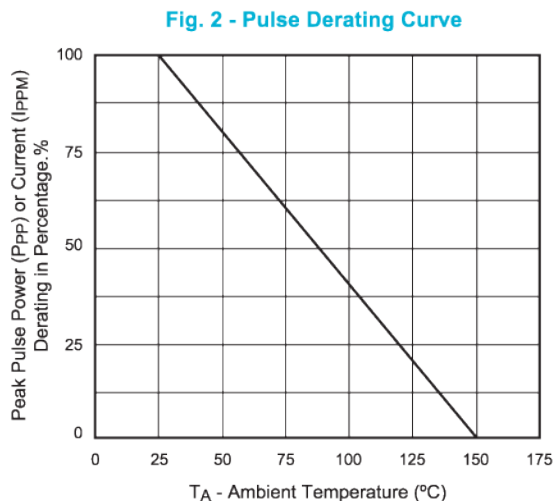
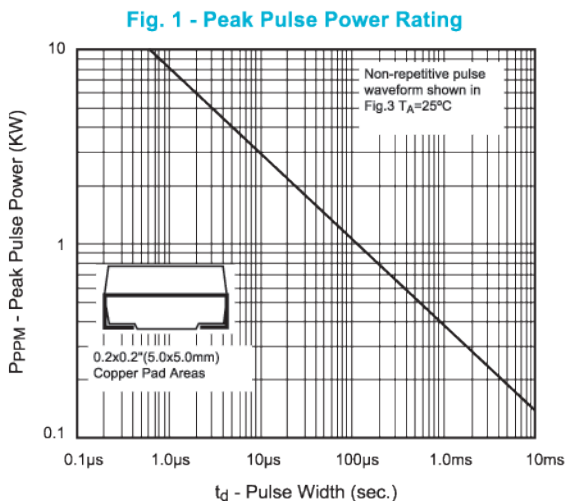
Electrical Characteristics (TA=25°C unless otherwise noted)

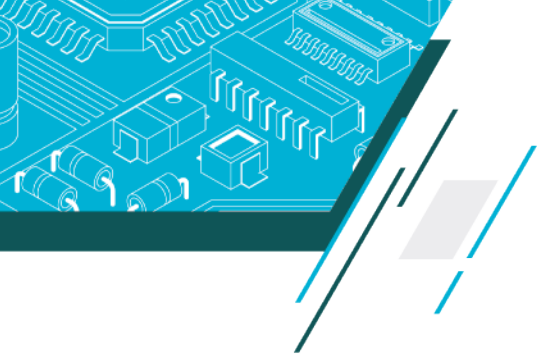
Part Number		Device Marking Code		Reverse Stand-Off Voltage VRWM(V)	Breakdown Voltage VBR(V) @IT		Test Current IT (mA)	Maximum Clamping Voltage Vc(V)@IPP	Maximum Peak Pulse Current (IPP)	Maximum Reverse Leakage IR@ VRWM (µA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMA6J51A	SMA6J51CA	MZ	WZ	51.0	56.70	62.70	1	82.4	7.3	1
SMA6J54A	SMA6J54CA	NE	XE	54.0	60.00	66.30	1	87.1	6.9	1
SMA6J58A	SMA6J58CA	NG	XG	58.0	64.40	71.20	1	93.6	6.5	1
SMA6J60A	SMA6J60CA	NK	XK	60.0	66.70	73.70	1	96.8	6.2	1
SMA6J64A	SMA6J64CA	NM	XM	64.0	71.10	78.60	1	103.0	5.9	1
SMA6J70A	SMA6J70CA	NP	XP	70.0	77.80	86.00	1	113.0	5.3	1
SMA6J75A	SMA6J75CA	NR	XR	75.0	83.30	92.10	1	121.0	5.0	1
SMA6J78A	SMA6J78CA	NT	XT	78.0	86.70	95.80	1	126.0	4.8	1
SMA6J85A	SMA6J85CA	NV	XV	85.0	94.40	104.00	1	137.0	4.4	1
SMA6J90A	SMA6J90CA	PE	YE	90.0	100.00	111.00	1	146.0	4.1	1
SMA6J100A	-	PG	-	100.0	111.00	123.00	1	162.0	3.7	1
SMA6J110A	-	PK	-	110.0	122.00	135.00	1	177.0	3.4	1
SMA6J120A	-	PM	-	120.0	133.00	147.00	1	193.0	3.1	1
SMA6J130A	-	PP	-	130.0	144.00	159.00	1	209.0	2.9	1

* For bidirectional type having Vrwm of 10 volts and less, the IR limit is double.

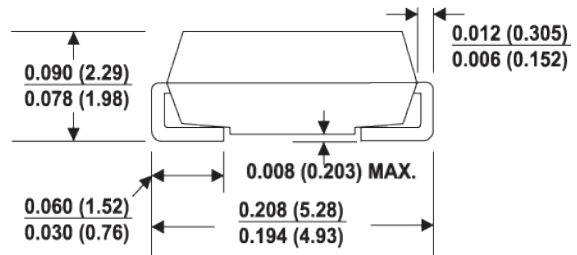
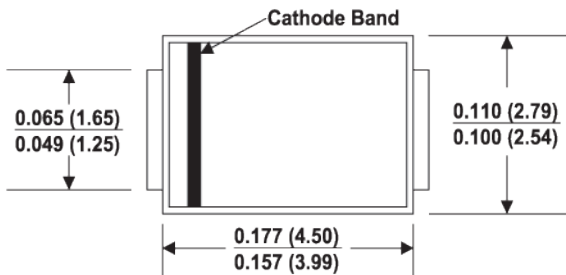


Ratings and Characteristic Curves (TA=25°C unless otherwise noted)



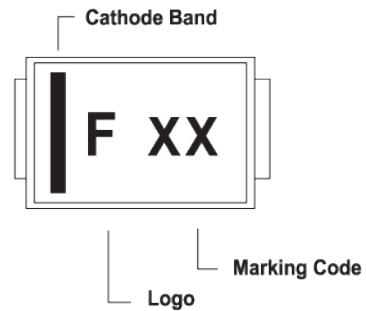


Dimension / DO-214AC (SMA)



Dimensions in inches and (millimeters)

Part Numbering and Marking System

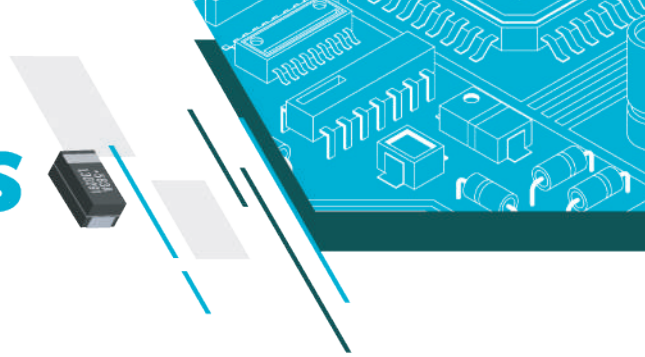


Packaging Specification

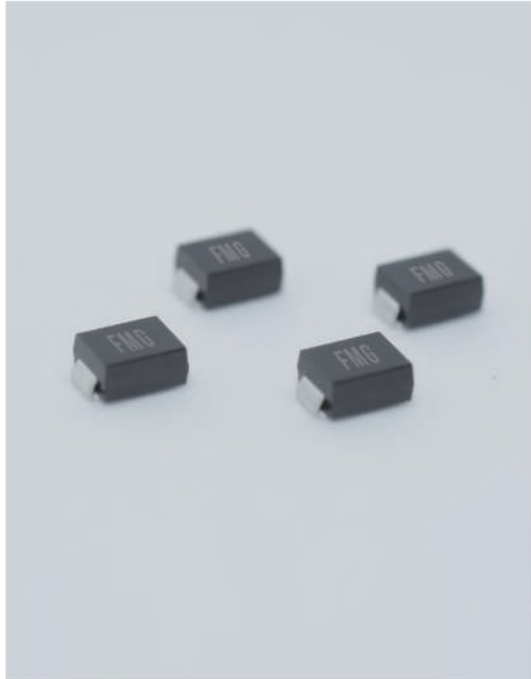
Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
SMA6JxxxXX	DO-214AC	5000	Tape & Reel - 12mm/13" tape	EIA STD RS-481
SMA6JxxxXX	DO-214AC	1000	Tape & Reel - 12mm/ 7" tape	EIA STD RS-481

SMBJ Series

600W



Operating Voltage : 5.0 to 440V
 Peak Pulse Power: 600W
SMB/ DO-214AA



Features

- Glass passivated chip
- 600 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle) : 0.01%
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Devices For Bipolar Application

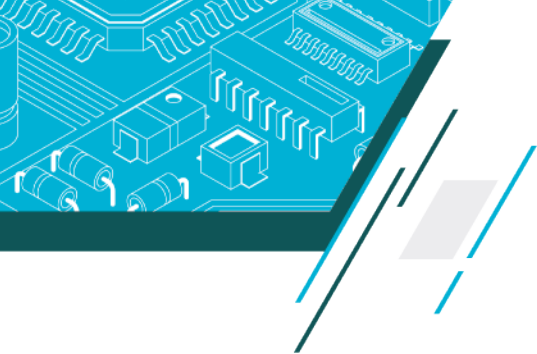
- For Bidirectional types, use C or CA as suffix; suffixes without A, the VBR is $\pm 10\%$. (e.g. SMBJ5.0C , SMBJ440CA).
- Electrical characteristics apply in both directions



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1,2 ,Fig.1)	PPPM	Minimum 600	Watts
Peak Pulse Current of on 10/1000 μ s waveform (Note 1, Fig.3)	IPP	SEE TABLE 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note 2,3)	IFSM	100	Amps
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 150	°C

- Notes :**
1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2
 2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal
 3. 8.3ms single half sine-wave , or equivalent square wave, Duty cycle = 4 pulses per minutes maximum



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMBJ5.0A	SMBJ5.0CA	KE	AE	5.0	6.40	7.00	10	9.2	65.3	800
SMBJ6.0A	SMBJ6.0CA	KG	AG	6.0	6.67	7.37	10	10.3	58.3	800
SMBJ6.5A	SMBJ6.5CA	KK	AK	6.5	7.22	7.98	10	11.2	53.6	500
SMBJ7.0A	SMBJ7.0CA	KM	AM	7.0	7.78	8.60	10	12.0	50.0	200
SMBJ7.5A	SMBJ7.5CA	KP	AP	7.5	8.33	9.21	1	12.9	46.6	100
SMBJ8.0A	SMBJ8.0CA	KR	AR	8.0	8.89	9.83	1	13.6	44.2	50
SMBJ8.5A	SMBJ8.5CA	KT	AT	8.5	9.44	10.40	1	14.4	41.7	20
SMBJ9.0A	SMBJ9.0CA	KV	AV	9.0	10.00	11.10	1	15.4	39.0	10
SMBJ10A	SMBJ10CA	KX	AX	10.0	11.10	12.30	1	17.0	35.3	5
SMBJ11A	SMBJ11CA	KZ	AZ	11.0	12.20	13.50	1	18.2	33.0	1
SMBJ12A	SMBJ12CA	LE	BE	12.0	13.30	14.70	1	19.9	30.2	1
SMBJ13A	SMBJ13CA	LG	BG	13.0	14.40	15.90	1	21.5	28.0	1
SMBJ14A	SMBJ14CA	LK	BK	14.0	15.60	17.20	1	23.2	25.9	1
SMBJ15A	SMBJ15CA	LM	BM	15.0	16.70	18.50	1	24.4	24.6	1
SMBJ16A	SMBJ16CA	LP	BP	16.0	17.80	19.70	1	26.0	23.1	1
SMBJ17A	SMBJ17CA	LR	BR	17.0	18.90	20.90	1	27.6	21.8	1
SMBJ18A	SMBJ18CA	LT	BT	18.0	20.00	22.10	1	29.2	20.6	1
SMBJ20A	SMBJ20CA	LV	BV	20.0	22.20	24.50	1	32.4	18.6	1
SMBJ22A	SMBJ22CA	LX	BX	22.0	24.40	26.90	1	35.5	16.9	1
SMBJ24A	SMBJ24CA	LZ	BZ	24.0	26.70	29.50	1	38.9	15.5	1
SMBJ26A	SMBJ26CA	ME	CE	26.0	28.90	31.90	1	42.1	14.3	1
SMBJ28A	SMBJ28CA	MG	CG	28.0	31.10	34.40	1	45.4	13.3	1
SMBJ30A	SMBJ30CA	MK	CK	30.0	33.30	36.80	1	48.4	12.4	1
SMBJ33A	SMBJ33CA	MM	CM	33.0	36.70	40.60	1	53.3	11.3	1
SMBJ36A	SMBJ36CA	MP	CP	36.0	40.00	44.20	1	58.1	10.4	1
SMBJ40A	SMBJ40CA	MR	CR	40.0	44.40	49.10	1	64.5	9.3	1
SMBJ43A	SMBJ43CA	MT	CT	43.0	47.80	52.80	1	69.4	8.7	1
SMBJ45A	SMBJ45CA	MV	CV	45.0	50.00	55.30	1	72.7	8.3	1
SMBJ48A	SMBJ48CA	MX	CX	48.0	53.30	58.90	1	77.4	7.8	1

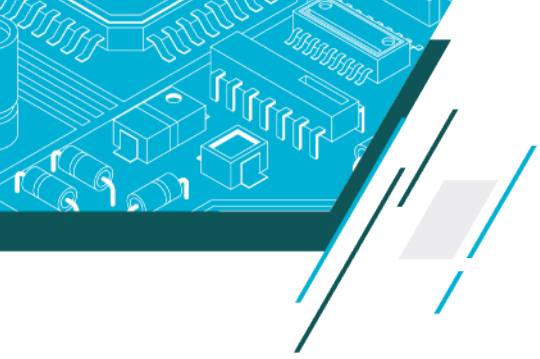
* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMBJ51A	SMBJ51CA	MZ	CZ	51.0	56.70	62.70	1	82.4	7.3	1
SMBJ54A	SMBJ54CA	NE	DE	54.0	60.00	66.30	1	87.1	6.9	1
SMBJ58A	SMBJ58CA	NG	DG	58.0	64.40	71.20	1	93.6	6.5	1
SMBJ60A	SMBJ60CA	NK	DK	60.0	66.70	73.70	1	96.8	6.2	1
SMBJ64A	SMBJ64CA	NM	DM	64.0	71.10	78.60	1	103.0	5.9	1
SMBJ70A	SMBJ70CA	NP	DP	70.0	77.80	86.00	1	113.0	5.3	1
SMBJ75A	SMBJ75CA	NR	DR	75.0	83.30	92.10	1	121.0	5.0	1
SMBJ78A	SMBJ78CA	NT	DT	78.0	86.70	95.80	1	126.0	4.8	1
SMBJ85A	SMBJ85CA	NV	DV	85.0	94.40	104.00	1	137.0	4.4	1
SMBJ90A	SMBJ90CA	NX	DX	90.0	100.00	111.00	1	146.0	4.1	1
SMBJ100A	SMBJ100CA	NZ	DZ	100.0	111.00	123.00	1	162.0	3.7	1
SMBJ110A	SMBJ110CA	PE	EE	110.0	122.00	135.00	1	177.0	3.4	1
SMBJ120A	SMBJ120CA	PG	EG	120.0	133.00	147.00	1	193.0	3.1	1
SMBJ130A	SMBJ130CA	PK	EK	130.0	144.00	159.00	1	209.0	2.9	1
SMBJ150A	SMBJ150CA	PM	EM	150.0	167.00	185.00	1	243.0	2.5	1
SMBJ160A	SMBJ160CA	PP	EP	160.0	178.00	197.00	1	259.0	2.3	1
SMBJ170A	SMBJ170CA	PR	ER	170.0	189.00	209.00	1	275.0	2.2	1
SMBJ180A	SMBJ180CA	PT	ET	180.0	201.00	222.00	1	292.0	2.1	1
SMBJ200A	SMBJ200CA	PV	EV	200.0	224.00	247.00	1	324.0	1.9	1
SMBJ220A	SMBJ220CA	PX	EX	220.0	246.00	272.00	1	356.0	1.7	1
SMBJ250A	SMBJ250CA	PZ	EZ	250.0	279.00	309.00	1	405.0	1.5	1
SMBJ300A	SMBJ300CA	QE	FE	300.0	335.00	371.00	1	486.0	1.3	1
SMBJ350A	SMBJ350CA	QG	FG	350.0	391.00	432.00	1	567.0	1.1	1
SMBJ400A	SMBJ400CA	QK	FK	400.0	447.00	494.00	1	648.0	0.9	1
SMBJ440A	SMBJ440CA	QM	FM	440.0	492.00	543.00	1	713.0	0.9	1

* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating

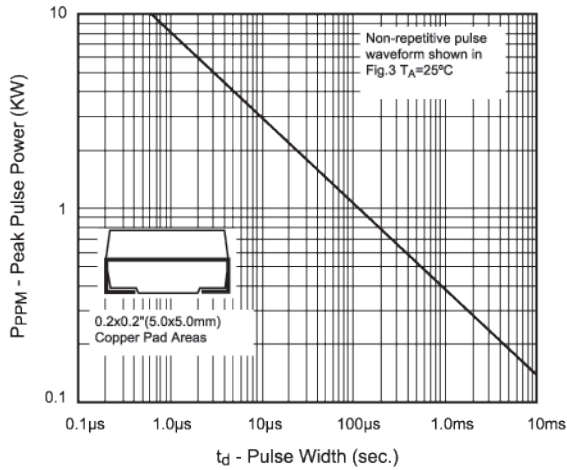


Fig. 2 - Pulse Derating Curve

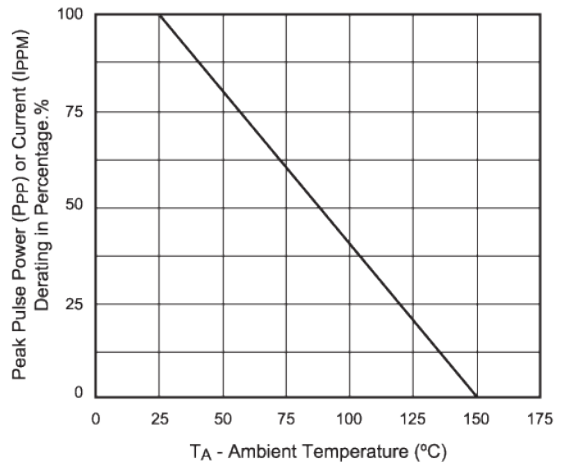


Fig. 3 - Pulse Waveform

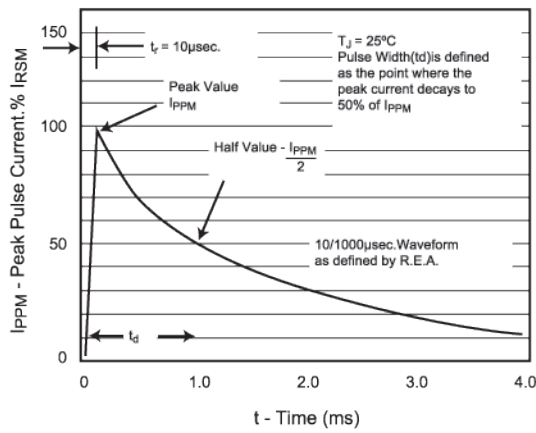


Fig. 4 - Typical Junction Capacitance

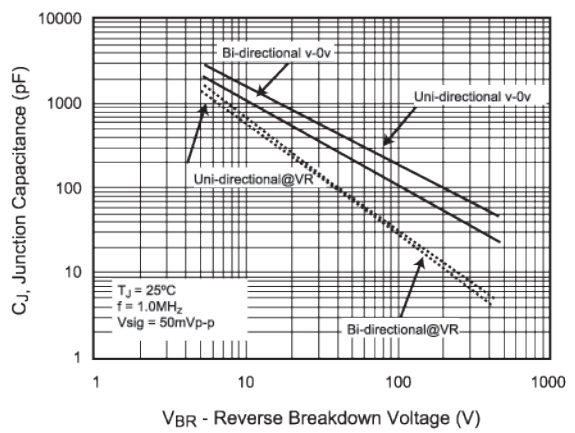


Fig. 5 - Steady State Power Derating Curve

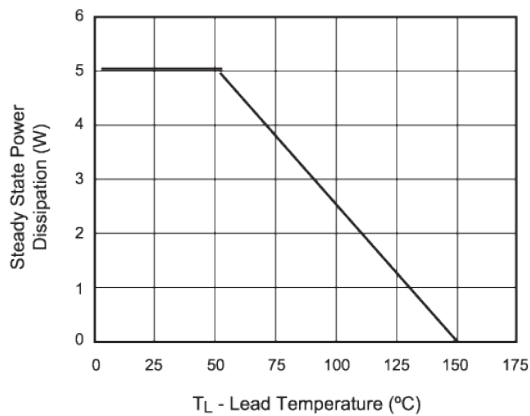
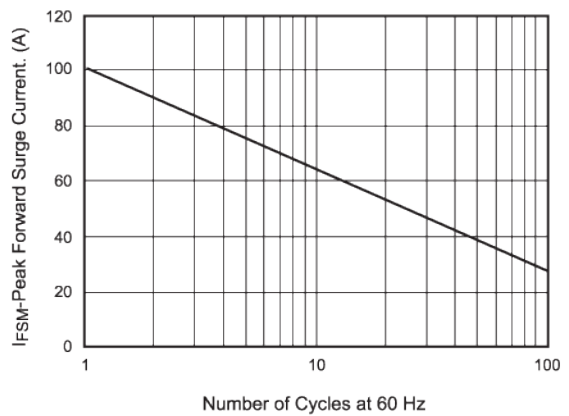
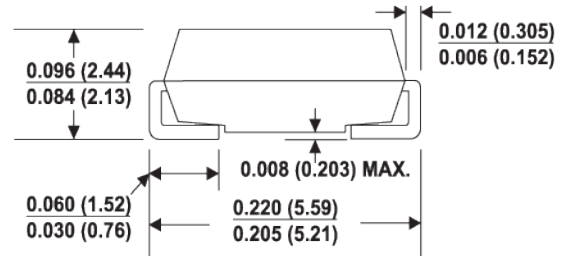
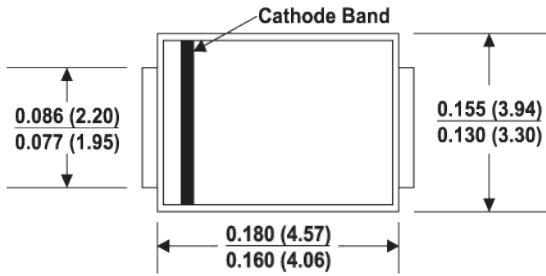


Fig. 6 - Maximum Non-repetitive Forward Surge current uni-directional only



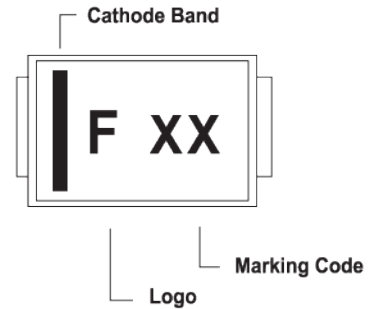
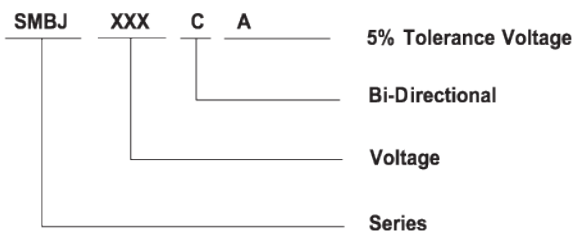


Dimension / DO-214AA (SMB J-Bend)



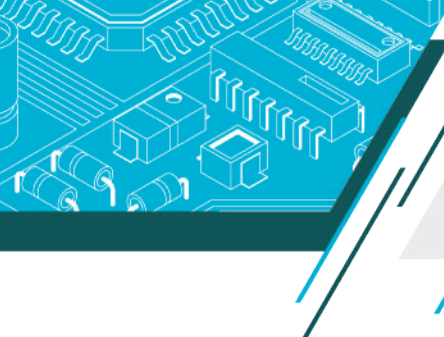
Dimensions in inches and (millimeters)

Part Numbering and Marking System



Packaging Specification

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
SMBJxxxXX	DO-214AA	3000	Tape & Reel - 12mm/13" tape	EIA STD RS-481
SMBJxxxXX	DO-214AA	500	Tape & Reel - 12mm/ 7" tape	EIA STD RS-481

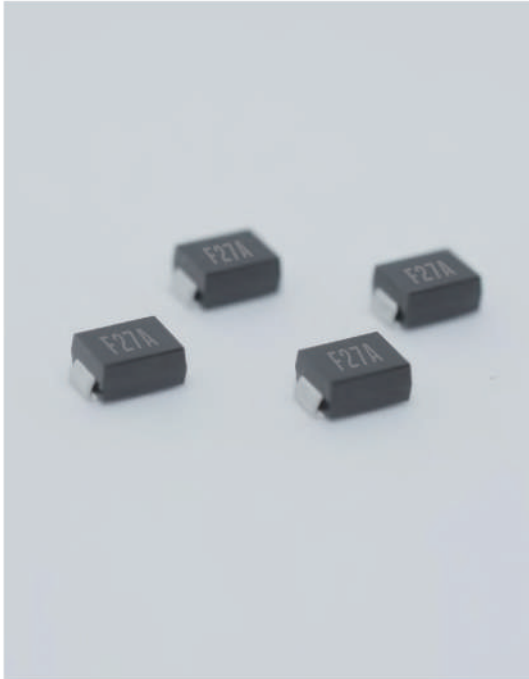


P6SMB Series

600W



Operating Voltage : 6.8 to 550V
 Peak Pulse Power: 600W
SMB/ DO-214AA



FUZETEC TVS P6SMB



Features

- Glass passivated chip
- 600 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle) : 0.01 %
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Devices For Bipolar Application

- For Bidirectional types, use C or CA as suffix ; suffixes without A, the VBR is $\pm 10\%$. (e.g. P6SMB6.8C , P6SMB550CA).
- Electrical characteristics apply in both directions



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1,2 ,Fig.1)	PPPM	Minimum 600	Watts
Peak Pulse Current of on 10/1000 μ s waveform (Note 1, Fig.3)	I _{PP}	SEE TABLE 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note 2,3)	I _{FSM}	100	Amps
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 150	°C

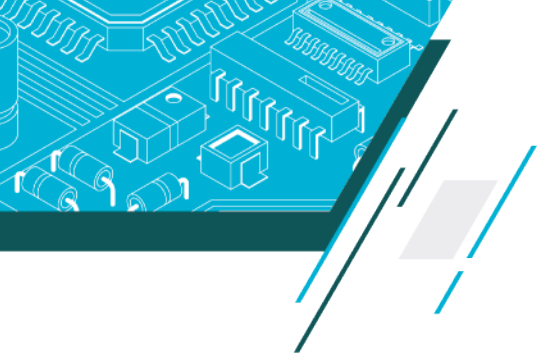
- Notes :**
1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2
 2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal
 3. 8.3ms single half sine-wave , or equivalent square wave, Duty cycle = 4 pulses per minutes maximum



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
P6SMB6.8A	P6SMB6.8CA	6V8A	6V8C	5.8	6.45	7.14	10	10.5	58.1	1000
P6SMB7.5A	P6SMB7.5CA	7V5A	7V5C	6.4	7.13	7.88	10	11.3	54.0	500
P6SMB8.2A	P6SMB8.2CA	8V2A	8V2C	7.0	7.79	8.61	10	12.1	50.4	200
P6SMB9.1A	P6SMB9.1CA	9V1A	9V1C	7.8	8.65	9.55	1	13.4	45.5	50
P6SMB10A	P6SMB10CA	10A	10C	8.6	9.50	10.50	1	14.5	42.1	10
P6SMB11A	P6SMB11CA	11A	11C	9.4	10.50	11.60	1	15.2	39.1	5
P6SMB12A	P6SMB12CA	12A	12C	10.2	11.40	12.60	1	16.7	36.5	5
P6SMB13A	P6SMB13CA	13A	13C	11.1	12.40	13.70	1	18.2	33.5	1
P6SMB15A	P6SMB15CA	15A	15C	12.8	14.30	15.80	1	21.2	28.8	1
P6SMB16A	P6SMB16CA	16A	16C	13.6	15.20	16.80	1	22.5	27.1	1
P6SMB18A	P6SMB18CA	18A	18C	15.3	17.10	18.90	1	25.5	24.2	1
P6SMB20A	P6SMB20CA	20A	20C	17.1	19.00	21.00	1	27.7	22.0	1
P6SMB22A	P6SMB22CA	22A	22C	18.8	20.90	23.10	1	30.6	19.9	1
P6SMB24A	P6SMB24CA	24A	24C	20.5	22.80	25.20	1	33.2	18.4	1
P6SMB27A	P6SMB27CA	27A	27C	23.1	25.70	28.40	1	37.5	16.3	1
P6SMB30A	P6SMB30CA	30A	30C	25.6	28.50	31.50	1	41.4	14.7	1
P6SMB33A	P6SMB33CA	33A	33C	28.2	31.40	34.70	1	45.7	13.3	1
P6SMB36A	P6SMB36CA	36A	36C	30.8	34.20	37.80	1	49.9	12.2	1
P6SMB39A	P6SMB39CA	39A	39C	33.3	37.10	41.00	1	53.9	11.3	1
P6SMB43A	P6SMB43CA	43A	43C	36.8	40.90	45.20	1	59.3	10.3	1
P6SMB47A	P6SMB47CA	47A	47C	40.2	44.70	49.40	1	64.8	9.4	1
P6SMB51A	P6SMB51CA	51A	51C	43.6	48.50	53.60	1	70.1	8.7	1
P6SMB56A	P6SMB56CA	56A	56C	47.8	53.20	58.80	1	77.0	7.9	1
P6SMB62A	P6SMB62CA	62A	62C	53.0	58.90	65.10	1	85.0	7.2	1
P6SMB68A	P6SMB68CA	68A	68C	58.1	64.60	71.40	1	92.0	6.6	1
P6SMB75A	P6SMB75CA	75A	75C	64.1	71.30	78.80	1	103.0	5.9	1
P6SMB82A	P6SMB82CA	82A	82C	70.1	77.90	86.10	1	113.0	5.4	1
P6SMB91A	P6SMB91CA	91A	91C	77.8	86.50	95.50	1	125.0	4.9	1
P6SMB100A	P6SMB100CA	100A	100C	85.5	95.00	105.00	1	137.0	4.5	1

* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Electrical Characteristics (TA=25°C unless otherwise noted)

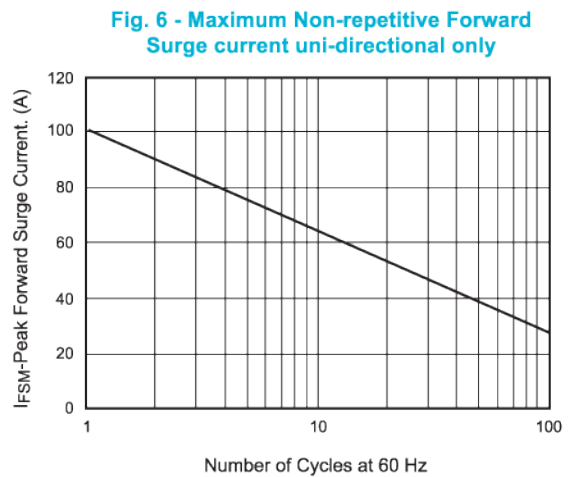
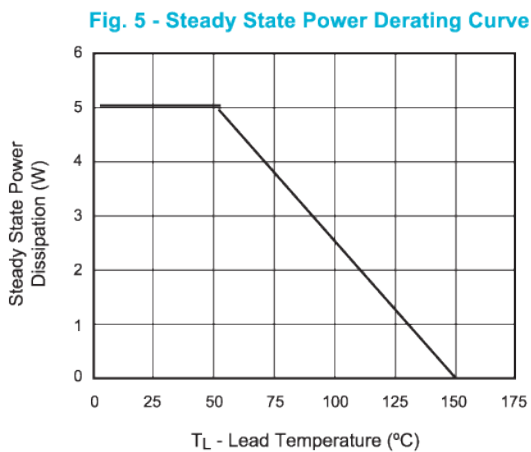
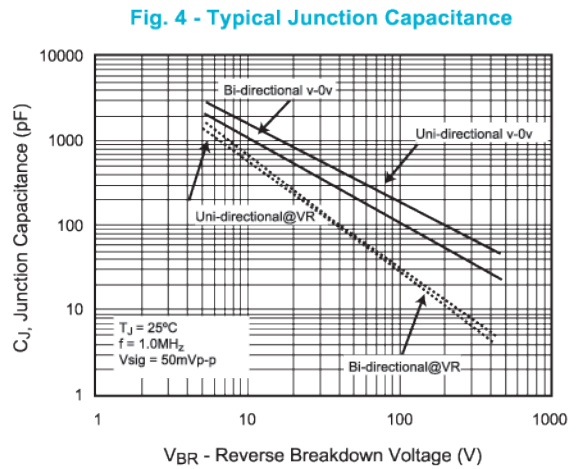
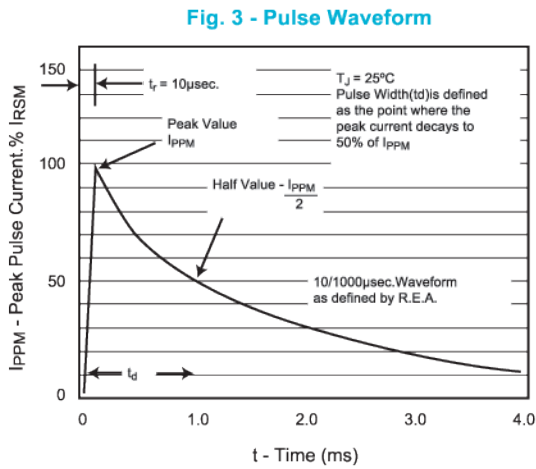
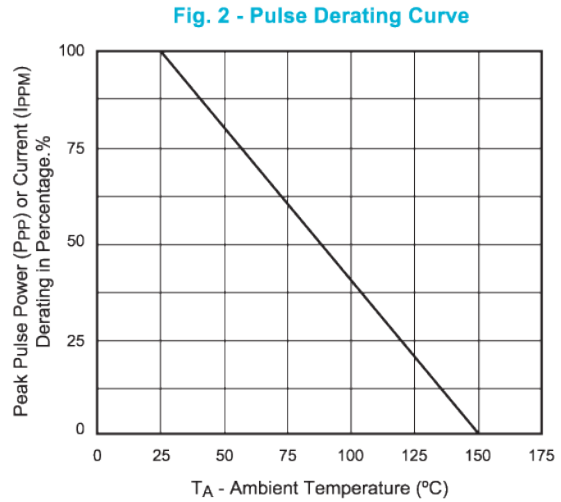
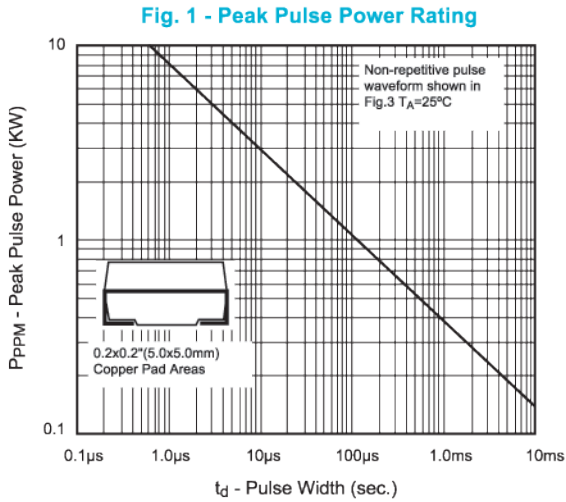
Part Number		Device Marking Code		Reverse Stand-Off Voltage VRWM(V)	Breakdown Voltage VBR(V) @IT		Test Current IT (mA)	Maximum Clamping Voltage Vc(V)@IPP	Maximum Peak Pulse Current (IPP)	Maximum Reverse Leakage IR@VRWM (µA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
P6SMB110A	P6SMB110CA	110A	110C	94.0	105.00	116.00	1	152.0	4.0	1
P6SMB120A	P6SMB120CA	120A	120C	102.0	114.00	126.00	1	165.0	3.7	1
P6SMB130A	P6SMB130CA	130A	130C	111.0	124.00	137.00	1	179.0	3.4	1
P6SMB150A	P6SMB150CA	150A	150C	128.0	143.00	158.00	1	207.0	2.9	1
P6SMB160A	P6SMB160CA	160A	160C	136.0	152.00	168.00	1	219.0	2.8	1
P6SMB170A	P6SMB170CA	170A	170C	145.0	162.00	179.00	1	234.0	2.6	1
P6SMB180A	P6SMB180CA	180A	180C	154.0	171.00	189.00	1	246.0	2.5	1
P6SMB200A	P6SMB200CA	200A	200C	171.0	190.00	210.00	1	274.0	2.2	1
P6SMB220A	P6SMB220CA	220A	220C	185.0	209.00	231.00	1	328.0	1.9	1
P6SMB250A	P6SMB250CA	250A	250C	214.0	237.00	263.00	1	344.0	1.8	1
P6SMB300A	P6SMB300CA	300A	300C	256.0	285.00	315.00	1	414.0	1.5	1
P6SMB350A	P6SMB350CA	350A	350C	300.0	332.00	368.00	1	482.0	1.3	1
P6SMB400A	P6SMB400CA	400A	400C	342.0	380.00	420.00	1	548.0	1.1	1
P6SMB440A	P6SMB440CA	440A	440C	376.0	418.00	462.00	1	602.0	1.0	1
P6SMB480A	P6SMB480CA	480A	480C	408.0	456.00	504.00	1	658.0	0.9	1
P6SMB510A	P6SMB510CA	510A	510C	434.0	485.00	535.00	1	698.0	0.9	1
P6SMB530A	P6SMB530CA	530A	530C	477.0	503.50	556.50	1	725.0	0.8	1
P6SMB540A	P6SMB540CA	540A	540C	486.0	513.00	567.00	1	740.0	0.8	1
P6SMB550A	P6SMB550CA	550A	550C	495.0	522.50	577.50	1	760.0	0.8	1

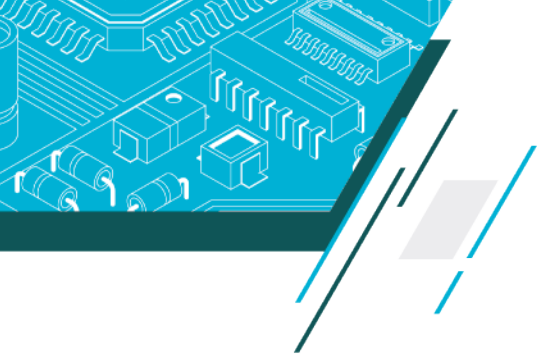
* For bidirectional type having Vrwm of 10 volts and less, the IR limit is double.

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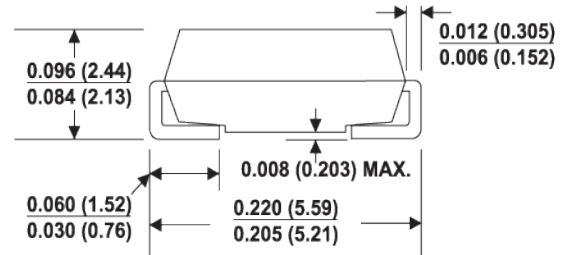
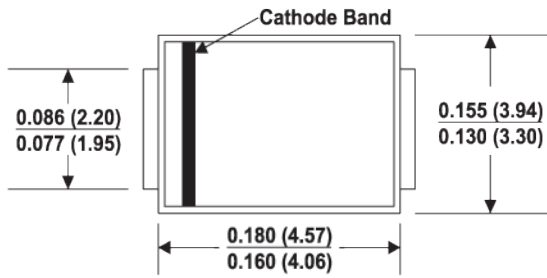


Ratings and Characteristic Curves (TA=25°C unless otherwise noted)



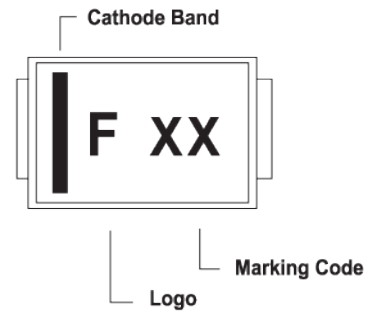
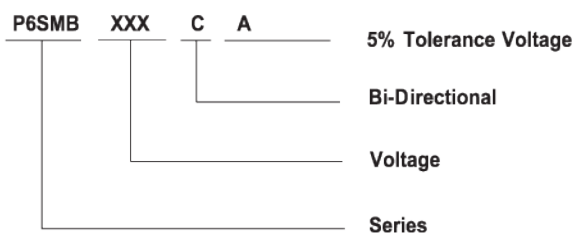


Dimension / DO-214AA (SMB J-Bend)



Dimensions in inches and (millimeters)

Part Numbering and Marking System

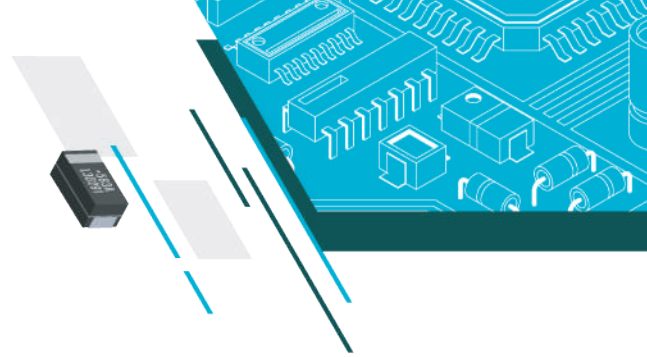


Packaging Specification

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
P6SMBxxxXX	DO-214AA	3000	Tape & Reel - 12mm/13" tape	EIA STD RS-481
P6SMBxxxXX	DO-214AA	500	Tape & Reel - 12mm/ 7" tape	EIA STD RS-481

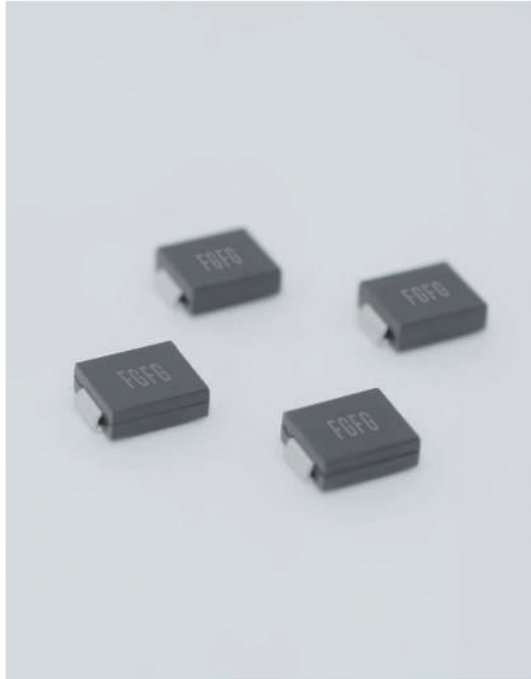
SMCJ Series

1500W



Operating Voltage : 5.0 to 440V
Peak Pulse Power: 1500W

SMC/ DO-214AB



Features

- Glass passivated chip
- 1500 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle) : 0.01 %
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant
- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Devices For Bipolar Application

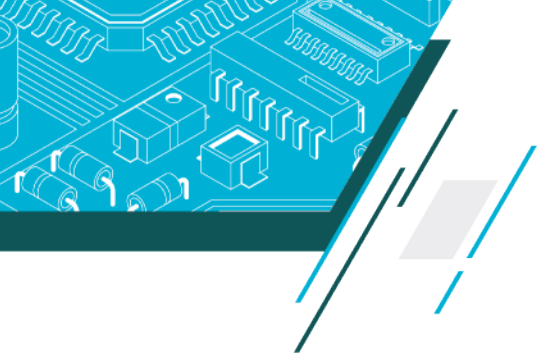
- For Bidirectional types, use C or CA as suffix ; suffixes without A, the VBR is $\pm 10\%$. (e.g. SMCJ5.0C , SMCJ440CA).
- Electrical characteristics apply in both directions



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1,2 ,Fig.1)	PPPM	Minimum 1500	Watts
Peak Pulse Current of on 10/1000 μ s waveform (Note 1, Fig.3)	IPP	SEE TABLE 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note 2,3)	IFSM	200	Amps
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 150	°C

- Notes :**
1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2
 2. Mounted on 5.0mm x 5.0mm (0.03mm thick) Copper Pads to each terminal
 3. 8.3ms single half sine-wave , or equivalent square wave, Duty cycle = 4 pulses per minutes maximum



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMCJ5.0A	SMCJ5.0CA	GDE	GDE	5.0	6.40	7.00	10	9.2	163.0	800
SMCJ6.0A	SMCJ6.0CA	GDG	GDG	6.0	6.67	7.37	10	10.3	145.7	800
SMCJ6.5A	SMCJ6.5CA	GDK	GDK	6.5	7.22	7.98	10	11.2	134.0	500
SMCJ7.0A	SMCJ7.0CA	GDM	GDM	7.0	7.78	8.60	10	12.0	125.0	200
SMCJ7.5A	SMCJ7.5CA	GDP	GDP	7.5	8.33	9.21	1	12.9	116.3	100
SMCJ8.0A	SMCJ8.0CA	GDR	GDR	8.0	8.89	9.83	1	13.6	110.3	50
SMCJ8.5A	SMCJ8.5CA	GDT	GDT	8.5	9.44	10.40	1	14.4	104.2	20
SMCJ9.0A	SMCJ9.0CA	GDV	GDV	9.0	10.00	11.10	1	15.4	97.4	10
SMCJ10A	SMCJ10CA	GDX	GDX	10.0	11.10	12.30	1	17.0	88.3	5
SMCJ11A	SMCJ11CA	GDZ	GDZ	11.0	12.20	13.50	1	18.2	82.5	1
SMCJ12A	SMCJ12CA	GEE	GEE	12.0	13.30	14.70	1	19.9	75.4	1
SMCJ13A	SMCJ13CA	GEG	GEG	13.0	14.40	15.90	1	21.5	69.8	1
SMCJ14A	SMCJ14CA	GEK	GEK	14.0	15.60	17.20	1	23.2	64.7	1
SMCJ15A	SMCJ15CA	GEM	GEM	15.0	16.70	18.50	1	24.4	61.5	1
SMCJ16A	SMCJ16CA	GEP	GEP	16.0	17.80	19.70	1	26.0	57.7	1
SMCJ17A	SMCJ17CA	GER	GER	17.0	18.90	20.90	1	27.6	54.4	1
SMCJ18A	SMCJ18CA	GET	GET	18.0	20.00	22.10	1	29.2	51.4	1
SMCJ20A	SMCJ20CA	GEV	GEV	20.0	22.20	24.50	1	32.4	46.3	1
SMCJ22A	SMCJ22CA	GEX	GEX	22.0	24.40	26.90	1	35.5	42.3	1
SMCJ24A	SMCJ24CA	GEZ	GEZ	24.0	26.70	29.50	1	38.9	38.6	1
SMCJ26A	SMCJ26CA	GFE	GFE	26.0	28.90	31.90	1	42.1	35.7	1
SMCJ28A	SMCJ28CA	GFG	GFG	28.0	31.10	34.40	1	45.4	33.1	1
SMCJ30A	SMCJ30CA	GFK	GFK	30.0	33.30	36.80	1	48.4	31.0	1
SMCJ33A	SMCJ33CA	GFM	GFM	33.0	36.70	40.60	1	53.3	28.2	1
SMCJ36A	SMCJ36CA	GFP	GFP	36.0	40.00	44.20	1	58.1	25.9	1
SMCJ40A	SMCJ40CA	GFR	GFR	40.0	44.40	49.10	1	64.5	23.3	1
SMCJ43A	SMCJ43CA	GFT	GFT	43.0	47.80	52.80	1	69.4	21.7	1
SMCJ45A	SMCJ45CA	GFV	GFV	45.0	50.00	55.30	1	72.7	20.6	1
SMCJ48A	SMCJ48CA	GFX	GFX	48.0	53.30	58.90	1	77.4	19.4	1

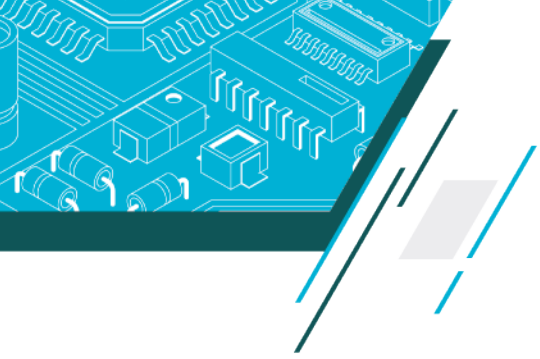
* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMCJ51A	SMCJ51CA	GFZ	BFZ	51.0	56.70	62.70	1	82.4	18.2	1
SMCJ54A	SMCJ54CA	GGE	BGE	54.0	60.00	66.30	1	87.1	17.3	1
SMCJ58A	SMCJ58CA	GGG	BGG	58.0	64.40	71.20	1	93.6	16.1	1
SMCJ60A	SMCJ60CA	GGK	BGK	60.0	66.70	73.70	1	96.8	15.5	1
SMCJ64A	SMCJ64CA	GGM	BGM	64.0	71.10	78.60	1	103.0	14.6	1
SMCJ70A	SMCJ70CA	GGP	BGP	70.0	77.80	86.00	1	113.0	13.3	1
SMCJ75A	SMCJ75CA	GGR	BGR	75.0	83.30	92.10	1	121.0	12.4	1
SMCJ78A	SMCJ78CA	GGT	BGT	78.0	86.70	95.80	1	126.0	11.9	1
SMCJ85A	SMCJ85CA	GGV	BGV	85.0	94.40	104.00	1	137.0	11.0	1
SMCJ90A	SMCJ90CA	GGX	BGX	90.0	100.00	111.00	1	146.0	10.3	1
SMCJ100A	SMCJ100CA	GGZ	BGZ	100.0	111.00	123.00	1	162.0	9.3	1
SMCJ110A	SMCJ110CA	GHE	BHE	110.0	122.00	135.00	1	177.0	8.5	1
SMCJ120A	SMCJ120CA	GHG	BHG	120.0	133.00	147.00	1	193.0	7.8	1
SMCJ130A	SMCJ130CA	GHK	BHK	130.0	144.00	159.00	1	209.0	7.2	1
SMCJ150A	SMCJ150CA	GHM	BHM	150.0	167.00	185.00	1	243.0	6.2	1
SMCJ160A	SMCJ160CA	GHP	BHP	160.0	178.00	197.00	1	259.0	5.8	1
SMCJ170A	SMCJ170CA	GHR	BHR	170.0	189.00	209.00	1	275.0	5.5	1
SMCJ180A	SMCJ180CA	GHT	BHT	180.0	201.00	222.00	1	292.0	5.1	1
SMCJ200A	SMCJ200CA	GHV	BHV	200.0	224.00	247.00	1	324.0	4.6	1
SMCJ220A	SMCJ220CA	GHX	BHX	220.0	246.00	272.00	1	356.0	4.2	1
SMCJ250A	SMCJ250CA	GHZ	BHZ	250.0	279.00	309.00	1	405.0	3.7	1
SMCJ300A	SMCJ300CA	GJE	BJE	300.0	335.00	371.00	1	486.0	3.1	1
SMCJ350A	SMCJ350CA	GJG	BJG	350.0	391.00	432.00	1	567.0	2.6	1
SMCJ400A	SMCJ400CA	GJK	BJK	400.0	447.00	494.00	1	648.0	2.3	1
SMCJ440A	SMCJ440CA	GJM	BJM	440.0	492.00	543.00	1	713.0	2.1	1

* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating

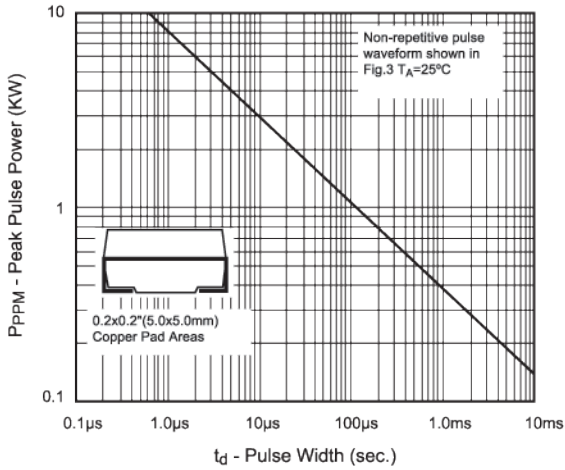


Fig. 2 - Pulse Derating Curve

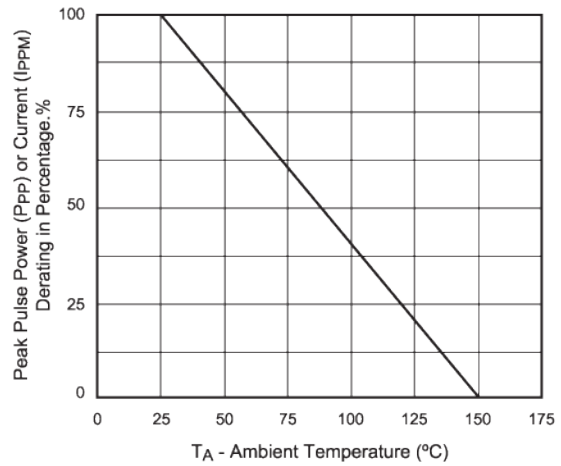


Fig. 3 - Pulse Waveform

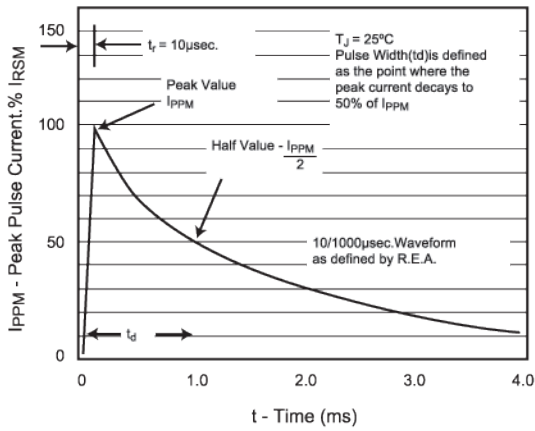


Fig. 4 - Typical Junction Capacitance

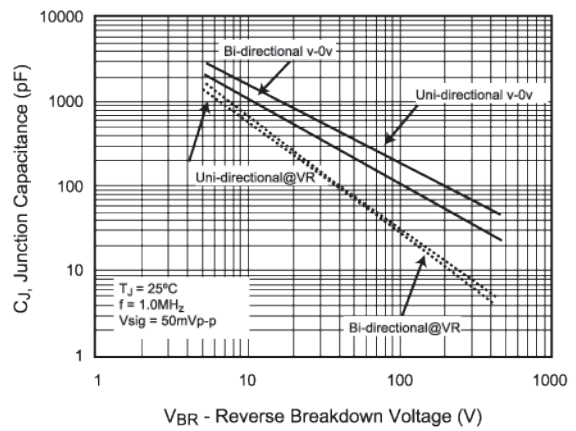


Fig. 5 - Steady State Power Derating Curve

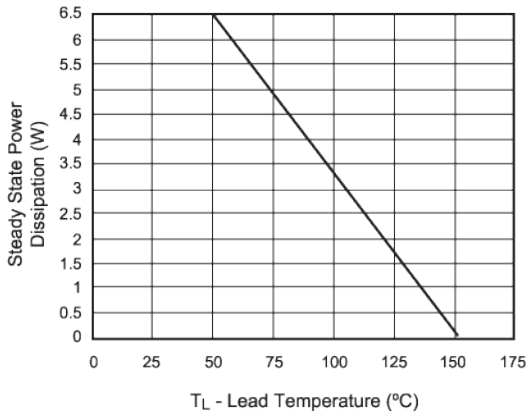
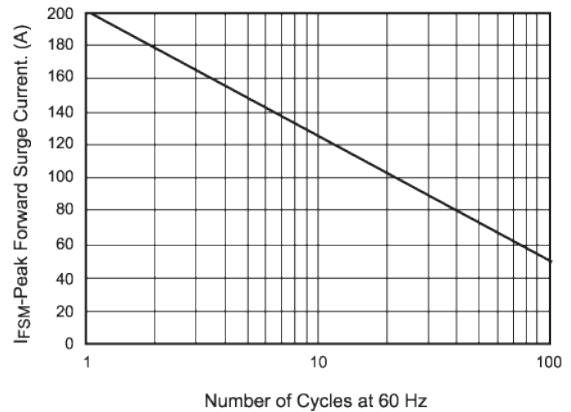
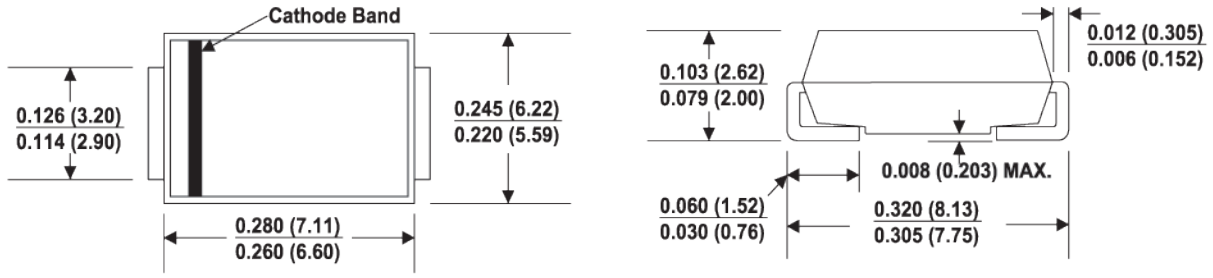


Fig. 6 - Maximum Non-repetitive Forward Surge current uni-directional only



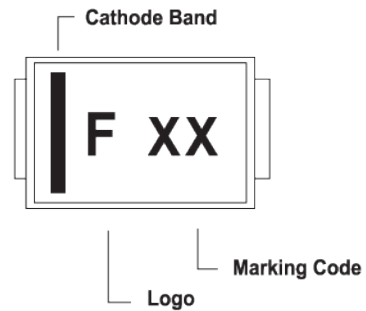
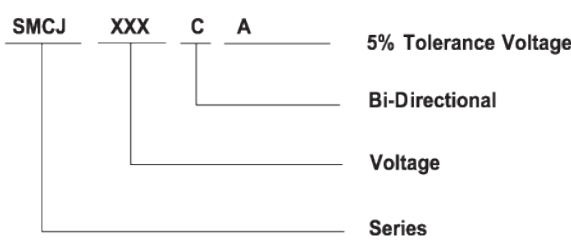


Dimension / DO-214AB (SMC J-Bend)



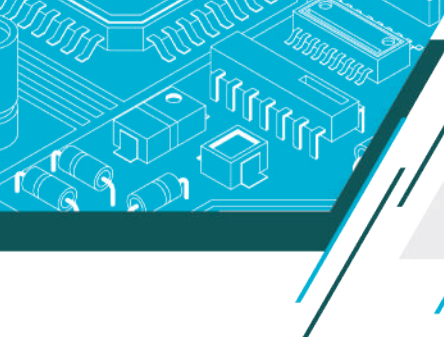
Dimensions in inches and (millimeters)

Part Numbering and Marking System



Packaging Specification

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
SMCJxxxXX	DO-214AB	3000	Tape & Reel - 12mm/13" tape	EIA STD RS-481
SMCJxxxXX	DO-214AB	500	Tape & Reel - 12mm/ 7" tape	EIA STD RS-481

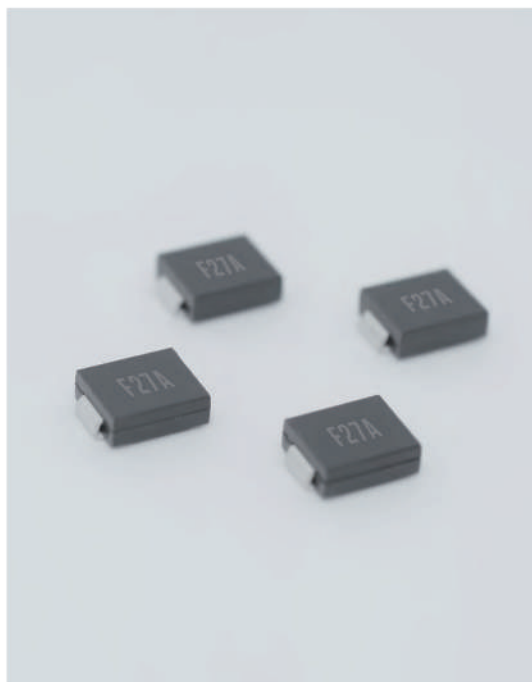


1.5SMC Series

1500W



Operating Voltage : 5.8 to 550V
 Peak Pulse Power: 1500W
SMC/ DO-214AB



FUZETEC | TVS 1.5SMC



Features

- Glass passivated chip
- 1500 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle) : 0.01%
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Devices For Bipolar Application

- For Bidirectional types, use C or CA as suffix; suffixes without A, the VBR is $\pm 10\%$. (e.g. 1.5SMC6.8C, 1.5SMC440CA).
- Electrical characteristics apply in both directions



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1,2 ,Fig.1)	PPPM	Minimum 1500	Watts
Peak Pulse Current of on 10/1000 μ s waveform (Note 1, Fig.3)	I _{PP}	SEE TABLE 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note 2,3)	I _{FSM}	200	Amps
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 150	°C

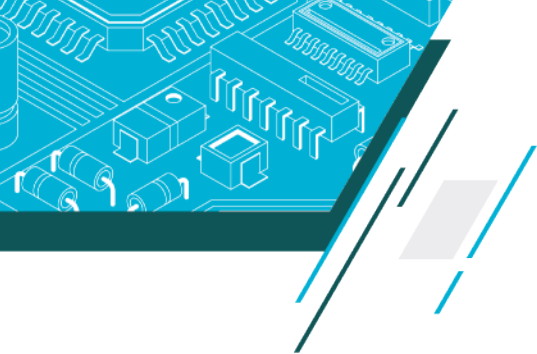
- Notes :**
1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2
 2. Mounted on 8.0mm x 8.0mm (0.03mm thick) Copper Pads to each terminal
 3. 8.3ms single half sine-wave , or equivalent square wave, Duty cycle = 4 pulses per minutes maximum



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
1.5SMC6.8A	1.5SMC6.8CA	6V8A	6V8C	5.8	6.45	7.14	10	10.5	144.8	1000
1.5SMC7.5A	1.5SMC7.5CA	7V5A	7V5C	6.4	7.13	7.88	10	11.3	134.5	500
1.5SMC8.2A	1.5SMC8.2CA	8V2A	8V2C	7.0	7.79	8.61	10	12.1	125.6	200
1.5SMC9.1A	1.5SMC9.1CA	9V1A	9V1C	7.8	8.65	9.50	1	13.4	113.4	50
1.5SMC10A	1.5SMC10CA	10A	10C	8.6	9.50	10.50	1	14.5	104.8	10
1.5SMC11A	1.5SMC11CA	11A	11C	9.4	10.50	11.60	1	15.6	97.4	5
1.5SMC12A	1.5SMC12CA	12A	12C	10.2	11.40	12.60	1	16.7	91.0	5
1.5SMC13A	1.5SMC13CA	13A	13C	11.1	12.40	13.70	1	18.2	83.5	1
1.5SMC15A	1.5SMC15CA	15A	15C	12.8	14.30	15.80	1	21.2	71.7	1
1.5SMC16A	1.5SMC16CA	16A	16C	13.6	15.20	16.80	1	22.5	67.6	1
1.5SMC18A	1.5SMC18CA	18A	18C	15.3	17.10	18.90	1	25.2	60.3	1
1.5SMC20A	1.5SMC20CA	20A	20C	17.1	19.00	21.00	1	27.7	54.9	1
1.5SMC22A	1.5SMC22CA	22A	22C	18.8	20.90	23.10	1	30.6	49.7	1
1.5SMC24A	1.5SMC24CA	24A	24C	20.5	22.80	25.20	1	33.2	45.8	1
1.5SMC27A	1.5SMC27CA	27A	27C	23.1	25.70	28.40	1	37.5	40.5	1
1.5SMC30A	1.5SMC30CA	30A	30C	25.6	28.50	31.50	1	41.4	36.7	1
1.5SMC33A	1.5SMC33CA	33A	33C	28.2	31.40	34.70	1	45.7	33.3	1
1.5SMC36A	1.5SMC36CA	36A	36C	30.8	34.20	37.80	1	49.9	30.5	1
1.5SMC39A	1.5SMC39CA	39A	39C	33.3	37.10	41.00	1	53.9	28.2	1
1.5SMC43A	1.5SMC43CA	43A	43C	36.8	40.90	45.20	1	59.3	25.6	1
1.5SMC47A	1.5SMC47CA	47A	47C	40.2	44.70	49.40	1	64.8	23.5	1
1.5SMC51A	1.5SMC51CA	51A	51C	43.6	48.50	53.60	1	70.1	21.7	1
1.5SMC56A	1.5SMC56CA	56A	56C	47.8	53.20	58.80	1	77.0	19.7	1
1.5SMC62A	1.5SMC62CA	62A	62C	53.0	58.90	65.10	1	85.0	17.9	1
1.5SMC68A	1.5SMC68CA	68A	68C	58.1	64.60	71.40	1	92.0	16.5	1
1.5SMC75A	1.5SMC75CA	75A	75C	64.1	71.30	78.80	1	103.0	14.8	1
1.5SMC82A	1.5SMC82CA	82A	82C	70.1	77.90	86.10	1	113.0	13.5	1
1.5SMC91A	1.5SMC91CA	91A	91C	77.8	86.50	95.50	1	125.0	12.2	1
1.5SMC100A	1.5SMC100CA	100A	100C	85.5	95.00	105.00	1	137.0	11.1	1

* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (µA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
1.5SMC110A	1.5SMC110CA	110A	110C	94.0	105.00	116.00	1	152.0	10.0	1
1.5SMC120A	1.5SMC120CA	120A	120C	102.0	114.00	126.00	1	165.0	9.2	1
1.5SMC130A	1.5SMC130CA	130A	130C	111.0	124.00	137.00	1	179.0	8.5	1
1.5SMC150A	1.5SMC150CA	150A	150C	128.0	143.00	158.00	1	207.0	7.3	1
1.5SMC160A	1.5SMC160CA	160A	160C	136.0	152.00	168.00	1	219.0	6.9	1
1.5SMC170A	1.5SMC170CA	170A	170C	145.0	162.00	179.00	1	234.0	6.5	1
1.5SMC180A	1.5SMC180CA	180A	180C	154.0	171.00	189.00	1	246.0	6.2	1
1.5SMC200A	1.5SMC200CA	200A	200C	171.0	190.00	210.00	1	274.0	5.5	1
1.5SMC220A	1.5SMC220CA	220A	220C	185.0	209.00	231.00	1	328.0	4.6	1
1.5SMC250A	1.5SMC250CA	250A	250C	214.0	237.00	263.00	1	344.0	4.4	1
1.5SMC300A	1.5SMC300CA	300A	300C	256.0	285.00	315.00	1	414.0	3.7	1
1.5SMC350A	1.5SMC350CA	350A	350C	300.0	332.00	368.00	1	482.0	3.2	1
1.5SMC400A	1.5SMC400CA	400A	400C	342.0	380.00	420.00	1	548.0	2.8	1
1.5SMC440A	1.5SMC440CA	440A	440C	376.0	418.00	462.00	1	602.0	2.5	1
1.5SMC480A	1.5SMC480CA	480A	480C	408.0	456.00	504.00	1	658.0	2.3	1
1.5SMC510A	1.5SMC510CA	510A	510C	434.0	485.00	535.00	1	698.0	2.1	1
1.5SMC530A	1.5SMC530CA	530A	530C	477.0	503.50	556.50	1	725.0	2.1	1
1.5SMC540A	1.5SMC540CA	540A	540C	486.0	513.00	567.00	1	740.0	2.0	1
1.5SMC550A	1.5SMC550CA	550A	550C	495.0	522.50	577.50	1	760.0	2.0	1

* For bidirectional type having V_{RWM} of 10 volts and less, the IR limit is double.

FUZETEC TVS 1.5SMC



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating

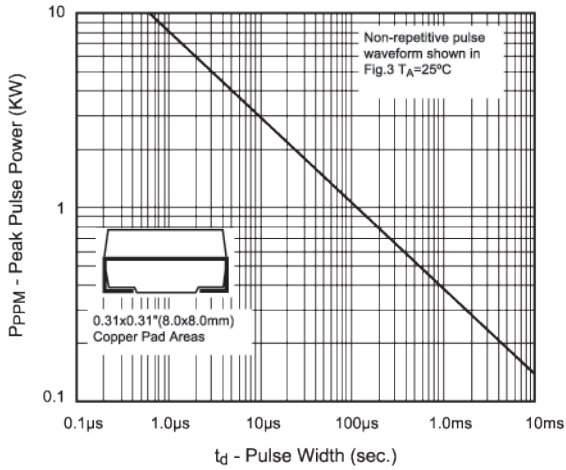


Fig. 2 - Pulse Derating Curve

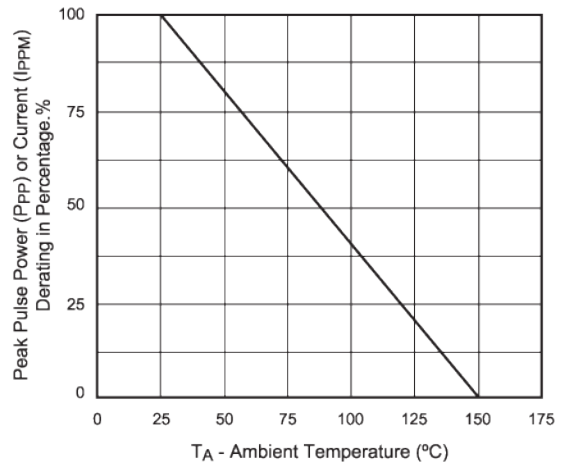


Fig. 3 - Pulse Waveform

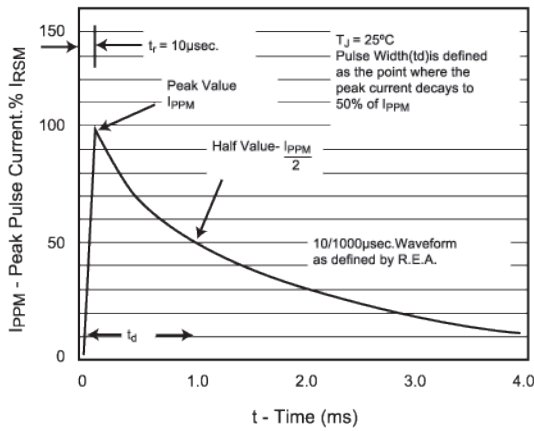


Fig. 4 - Typical Junction Capacitance

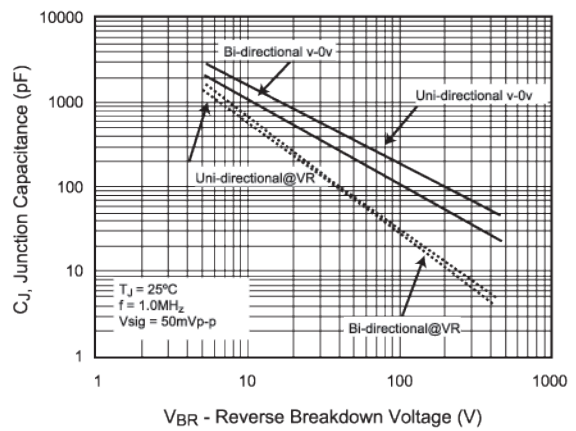


Fig. 5 - Steady State Power Derating Curve

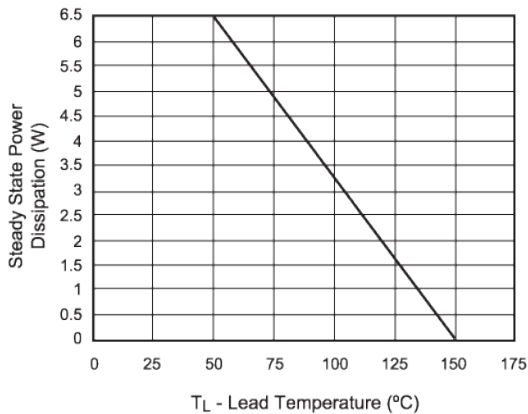
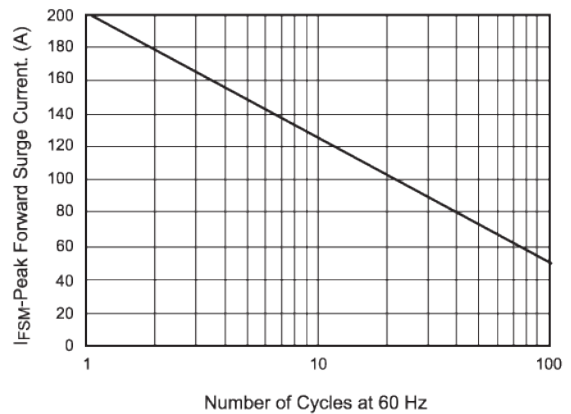
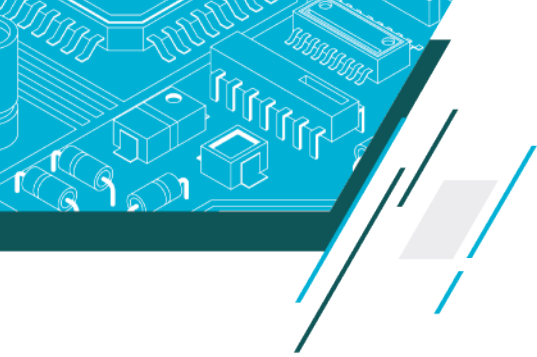
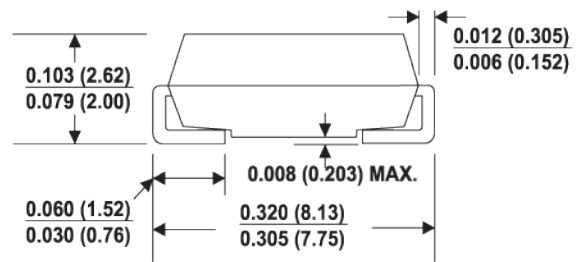
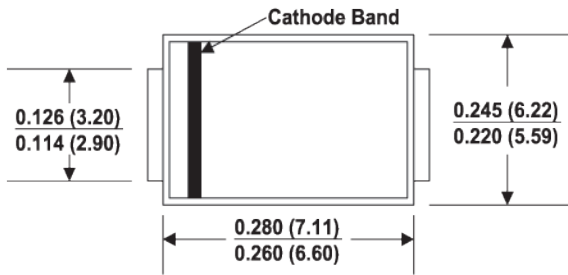


Fig. 6 - Maximum Non-repetitive Forward Surge current uni-directional only



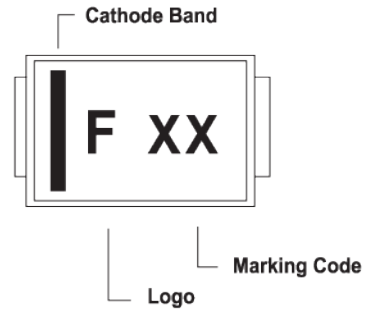
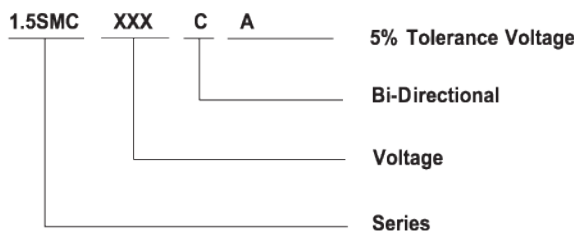


Dimension / DO-214AB (SMC J-Bend)



Dimensions in inches and (millimeters)

Part Numbering and Marking System

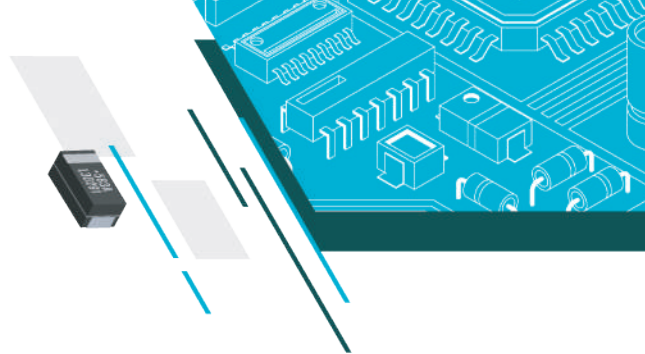


Packaging Specification

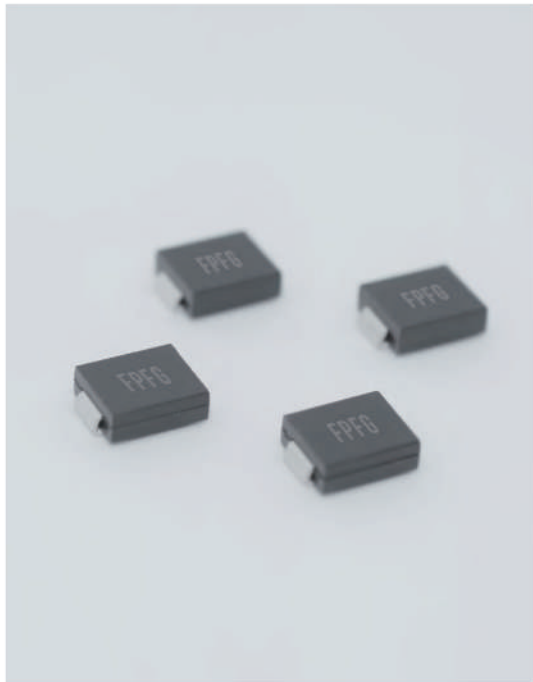
Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
1.5SMCxxxXX	DO-214AB	3000	Tape & Reel - 16mm/13" tape	EIA STD RS-481
1.5SMCxxxXX	DO-214AB	500	Tape & Reel - 16mm/ 7" tape	EIA STD RS-481

SMDJ Series

3000W



Operating Voltage : 5.0 to 250V
 Peak Pulse Power: 3000W
SMC/ DO-214AB



Features

- Glass passivated chip
- 3000 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle) : 0.01 %
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant
- IEC-61000-4-2 ESD 15kV(Air), 8kV (Contact)



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Devices For Bipolar Application

- For Bidirectional types, use C or CA as suffix ; suffixes without A, the VBR is \pm 10%. (e.g. SMDJ5.0C, SMDJ40CA).
- Electrical characteristics apply in both directions

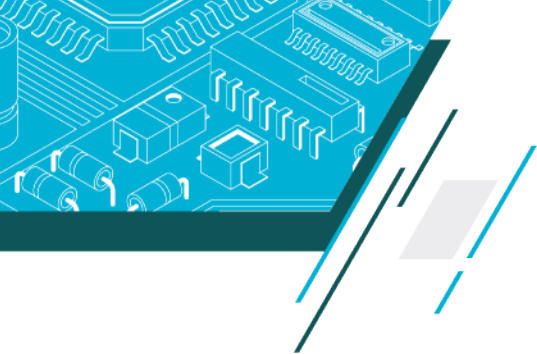
FUZETEC | TVS SMDJ



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1,2 ,Fig.1)	PPPM	Minimum 3000	Watts
Peak Pulse Current of on 10/1000 μ s waveform (Note 1, Fig.3)	IPP	SEE TABLE 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note 2,3)	IFSM	300	Amps
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 150	°C

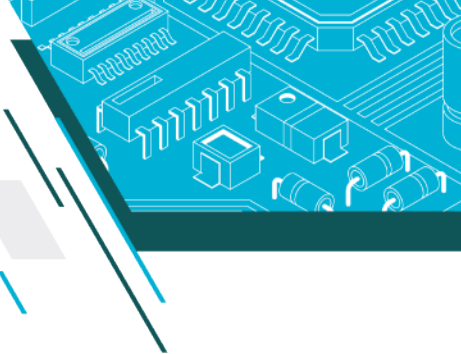
- Notes :**
1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2
 2. Mounted on 8.0mm x 8.0mm (0.03mm thick) Copper Pads to each terminal
 3. 8.3ms single half sine-wave , or equivalent square wave, Duty cycle = 4 pulses per minutes maximum



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (μA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMDJ5.0A	SMDJ5.0CA	RDE	DDE	5.0	6.40	7.00	10	9.2	326.1	800
SMDJ6.0A	SMDJ6.0CA	RDG	DDG	6.0	6.67	7.37	10	10.3	291.3	800
SMDJ6.5A	SMDJ6.5CA	RDK	DDK	6.5	7.22	7.98	10	11.2	267.9	500
SMDJ7.0A	SMDJ7.0CA	PDM	DDM	7.0	7.78	8.60	10	12.0	250.0	200
SMDJ7.5A	SMDJ7.5CA	PDP	DDP	7.5	8.33	9.21	1	12.9	232.6	100
SMDJ8.0A	SMDJ8.0CA	PDR	DDR	8.0	8.89	9.83	1	13.6	220.6	50
SMDJ8.5A	SMDJ8.5CA	PDT	DDT	8.5	9.44	10.40	1	14.4	208.3	20
SMDJ9.0A	SMDJ9.0CA	PDV	DDV	9.0	10.00	11.10	1	15.4	194.8	10
SMDJ10A	SMDJ10CA	PDX	DDX	10.0	11.10	12.30	1	17.0	176.5	5
SMDJ11A	SMDJ11CA	PDZ	DDZ	11.0	12.20	13.50	1	18.2	164.8	2
SMDJ12A	SMDJ12CA	PEE	DEE	12.0	13.30	14.70	1	19.9	150.8	2
SMDJ13A	SMDJ13CA	PEG	DEG	13.0	14.40	15.90	1	21.5	139.5	2
SMDJ14A	SMDJ14CA	PEK	DEK	14.0	15.60	17.20	1	23.2	129.3	2
SMDJ15A	SMDJ15CA	PEM	DEM	15.0	16.70	18.50	1	24.4	123.0	2
SMDJ16A	SMDJ16CA	PEP	DEP	16.0	17.80	19.70	1	26.0	115.4	2
SMDJ17A	SMDJ17CA	PER	DER	17.0	18.90	20.90	1	27.6	108.7	2
SMDJ18A	SMDJ18CA	PET	DET	18.0	20.00	22.10	1	29.2	102.7	2
SMDJ20A	SMDJ20CA	PEV	DEV	20.0	22.20	24.50	1	32.4	92.6	2
SMDJ21A	SMDJ21CA	PHV	DHV	21.0	23.31	25.73	1	34.1	88.0	2
SMDJ22A	SMDJ22CA	PEX	DEX	22.0	24.40	26.90	1	35.5	84.5	2
SMDJ24A	SMDJ24CA	PEZ	DEZ	24.0	26.70	29.50	1	38.9	77.1	2
SMDJ26A	SMDJ26CA	PFE	DFE	26.0	28.90	31.90	1	42.1	71.3	2
SMDJ28A	SMDJ28CA	PFG	DFG	28.0	31.10	34.40	1	45.4	66.1	2
SMDJ30A	SMDJ30CA	PFK	DFK	30.0	33.30	36.80	1	48.4	62.0	2
SMDJ33A	SMDJ33CA	PFM	DFM	33.0	36.70	40.60	1	53.3	56.3	2
SMDJ36A	SMDJ36CA	PFP	DFP	36.0	40.00	44.20	1	58.1	51.6	2
SMDJ40A	SMDJ40CA	PFR	DFR	40.0	44.40	49.10	1	64.5	46.5	2
SMDJ43A	SMDJ43CA	PFT	DFT	43.0	47.80	52.80	1	69.4	43.2	2
SMDJ45A	SMDJ45CA	PFV	DFV	45.0	50.00	55.30	1	72.7	41.3	2

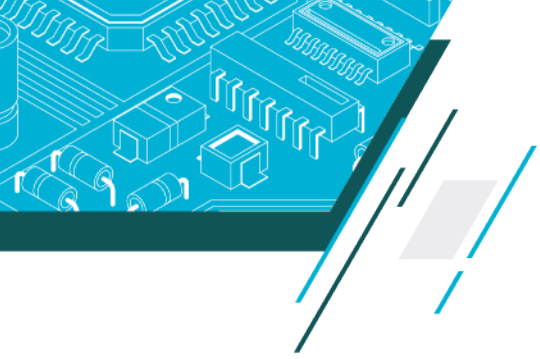
* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (µA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
SMDJ48A	SMDJ48CA	PFX	DFX	48.0	53.30	58.90	1	77.4	38.8	2
SMDJ51A	SMDJ51CA	PFZ	DFZ	51.0	56.70	62.70	1	82.4	36.4	2
SMDJ54A	SMDJ54CA	RGE	DGE	54.0	60.00	66.30	1	87.1	34.4	2
SMDJ58A	SMDJ58CA	PGG	DGG	58.0	64.40	71.20	1	93.6	32.1	2
SMDJ60A	SMDJ60CA	PGK	DGK	60.0	66.70	73.70	1	96.8	31.0	2
SMDJ64A	SMDJ64CA	PGM	DGM	64.0	71.10	78.60	1	103.0	29.1	2
SMDJ70A	SMDJ70CA	PGP	DGP	70.0	77.80	86.00	1	113.0	26.5	2
SMDJ75A	SMDJ75CA	PGR	DGR	75.0	83.30	92.10	1	121.0	24.8	2
SMDJ78A	SMDJ78CA	PGT	DGT	78.0	86.70	95.80	1	126.0	23.8	2
SMDJ85A	SMDJ85CA	PGV	DGV	85.0	94.40	104.00	1	137.0	21.9	2
SMDJ90A	SMDJ90CA	PGX	DGX	90.0	100.00	111.00	1	146.0	20.5	2
SMDJ100A	SMDJ100CA	PGZ	DGZ	100.0	111.00	123.00	1	162.0	18.5	2
SMDJ110A	SMDJ110CA	PHE	DHE	110.0	122.00	135.00	1	177.0	16.9	2
SMDJ120A	SMDJ120CA	PHG	DHG	120.0	133.00	147.00	1	193.0	15.5	2
SMDJ130A	SMDJ130CA	PHK	DHK	130.0	144.00	159.00	1	209.0	14.4	2
SMDJ150A	SMDJ150CA	PHM	DHM	150.0	167.00	185.00	1	243.0	12.3	2
SMDJ160A	SMDJ160CA	PHP	DHP	160.0	178.00	197.00	1	259.0	11.6	2
SMDJ170A	SMDJ170CA	PHR	DHR	170.0	189.00	209.00	1	275.0	10.9	2
SMDJ180A	SMDJ180CA	PHT	DHT	180.0	201.00	222.00	1	292.0	10.3	2
SMDJ200A	SMDJ200CA	PHX	DHX	200.0	224.00	247.00	1	324.0	9.3	2
SMDJ220A	SMDJ220CA	PHZ	DHZ	220.0	246.00	272.00	1	356.0	8.4	2
SMDJ250A	SMDJ250CA	PIE	DIE	250.0	279.00	309.00	1	405.0	7.5	2

* For bidirectional type having V_{RWM} of 10 volts and less, the IR limit is double.



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating

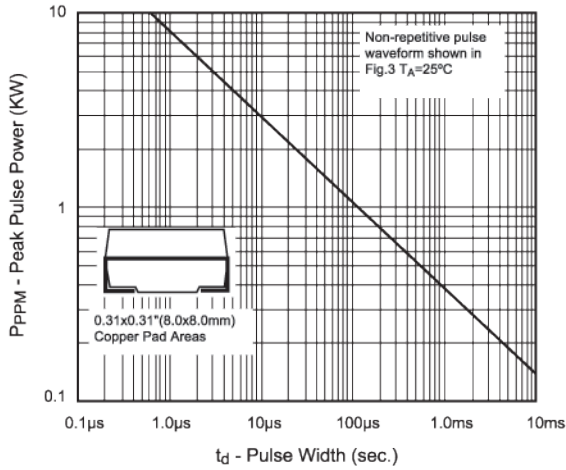


Fig. 2 - Pulse Derating Curve

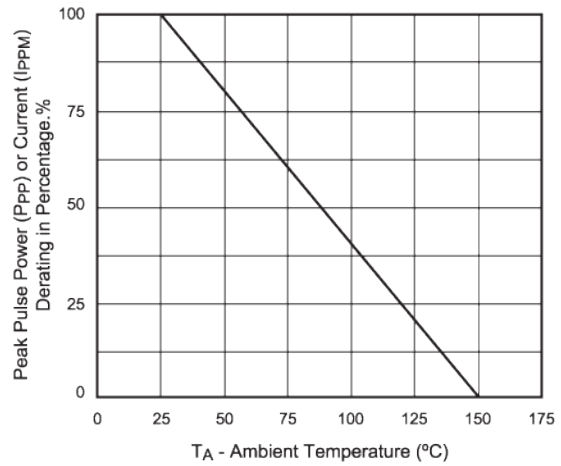


Fig. 3 - Pulse Waveform

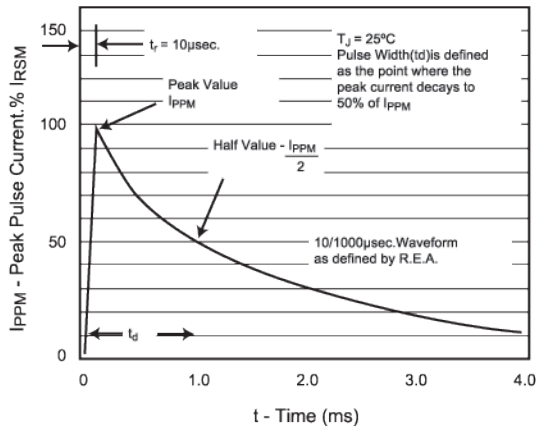


Fig. 4 - Typical Junction Capacitance

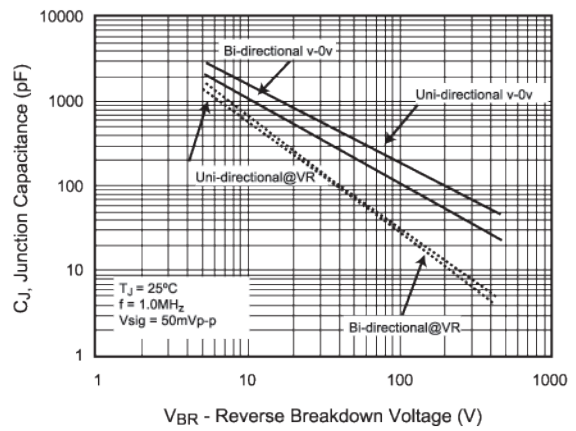


Fig. 5 - Steady State Power Derating Curve

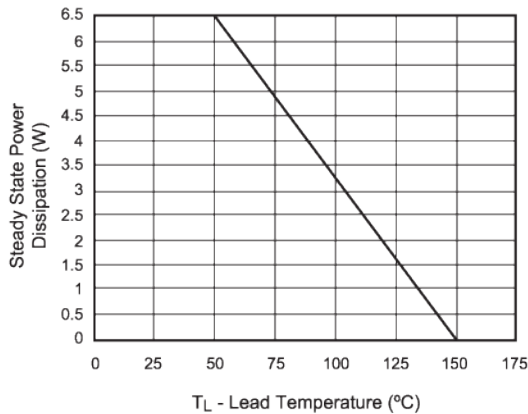
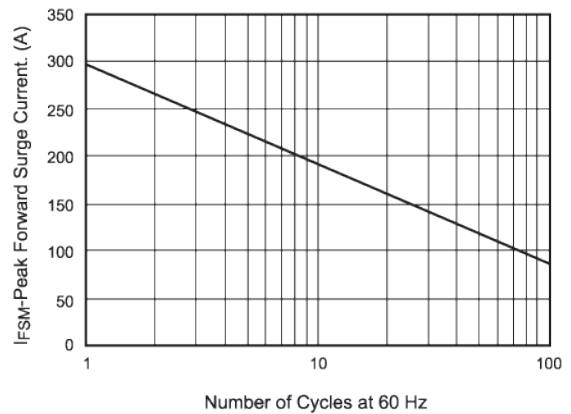
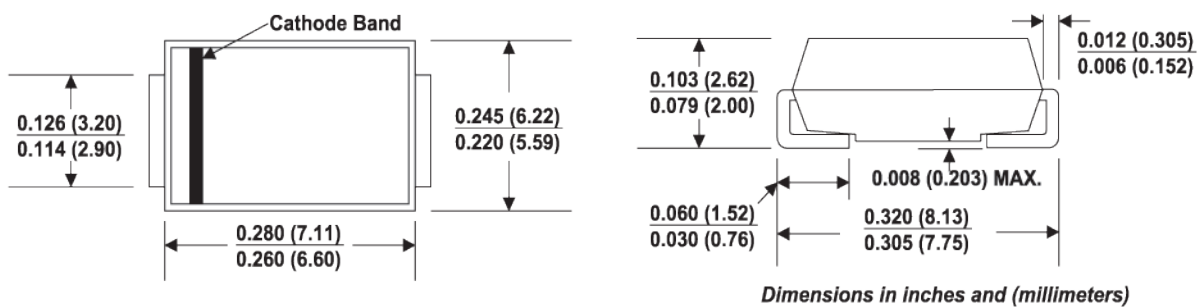


Fig. 6 - Maximum Non-repetitive Forward Surge current uni-directional only

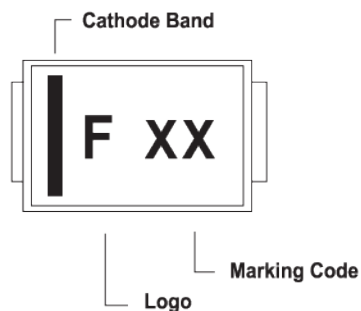
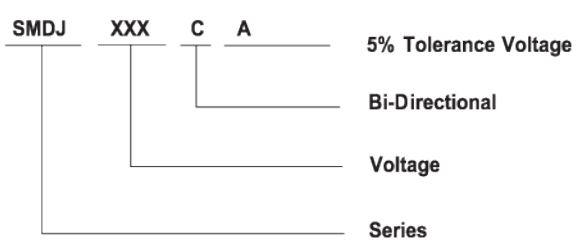




Dimension / DO-214AB (SMC J-Bend)



Part Numbering and Marking System

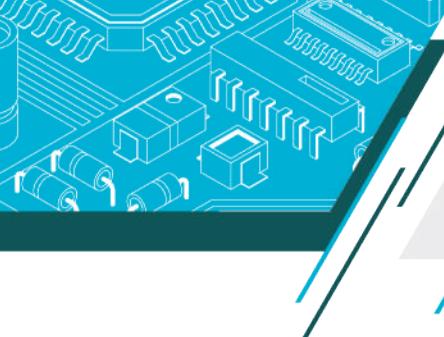


FUZETEC TVS SMDJ



Packaging Specification

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
SMDJxxxXX	DO-214AB	3000	Tape & Reel - 16mm/13" tape	EIA STD RS-481
SMDJxxxXX	DO-214AB	500	Tape & Reel - 16mm/ 7" tape	EIA STD RS-481

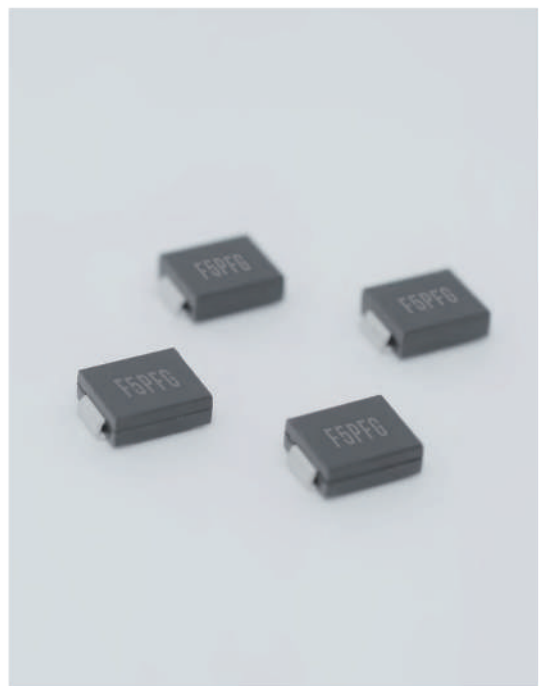


5.0SMDJ Series

5000W



Operating Voltage : 5.0 to 170V
 Peak Pulse Power: 5000W
SMC/ DO-214AB



FUZETEC | TVS 5.0SMDJ



Features

- Glass passivated chip
- 5000 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle) : 0.01%
- Low leakage
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



Devices For Bipolar Application

- For Bidirectional types, use C or CA as suffix; suffixes without A, the VBR is $\pm 10\%$. (e.g. 5.0SMDJ5.0C, 5.0SMDJ40CA).
- Electrical characteristics apply in both directions



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 μ s waveform (Note 1,2 ,Fig.1)	PPPM	Minimum 5000	Watts
Peak Pulse Current of on 10/1000 μ s waveform (Note 1, Fig.3)	I _{PP}	SEE TABLE 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-Wave Superimposed on Rated Load (JEDEC Method) (Note 2,3)	I _{FSM}	300	Amps
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 150	°C

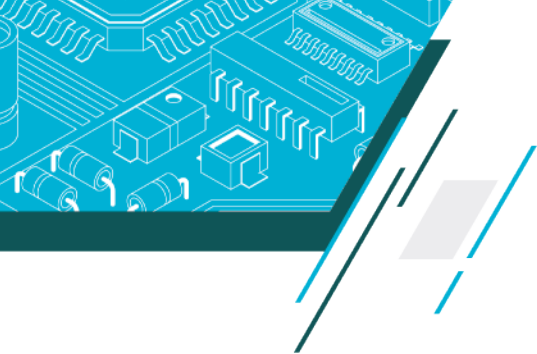
- Notes :**
1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2
 2. Mounted on 8.0mm x 8.0mm (0.03mm thick) Copper Pads to each terminal
 3. 8.3ms single half sine-wave , or equivalent square wave, Duty cycle = 4 pulses per minutes maximum



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V) @I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C (V)@I _{PP}	Maximum Peak Pulse Current (I _{PP})	Maximum Reverse Leakage I _R @ V _{RWM} (µA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
5.0SMDJ5.0A	5.0SMDJ5.0CA	5RDE	5DDE	5.0	6.40	7.00	10	9.2	543.6	1050
5.0SMDJ6.0A	5.0SMDJ6.0CA	5RDG	5DDG	6.0	6.67	7.37	10	10.3	485.5	1050
5.0SMDJ6.5A	5.0SMDJ6.5CA	5RDK	5DDK	6.5	7.22	7.98	10	11.2	446.5	750
5.0SMDJ7.0A	5.0SMDJ7.0CA	5PDM	5DDM	7.0	7.78	8.60	10	12.0	416.8	300
5.0SMDJ7.5A	5.0SMDJ7.5CA	5PDP	5DDP	7.5	8.33	9.21	1	12.9	387.7	150
5.0SMDJ8.0A	5.0SMDJ8.0CA	5PDR	5DDR	8.0	8.89	9.83	1	13.6	367.7	70
5.0SMDJ8.5A	5.0SMDJ8.5CA	5PDT	5DDT	8.5	9.44	10.40	1	14.4	347.3	30
5.0SMDJ9.0A	5.0SMDJ9.0CA	5PDV	5DDV	9.0	10.00	11.10	1	15.4	324.8	12
5.0SMDJ10A	5.0SMDJ10CA	5PDX	5DDX	10.0	11.10	12.30	1	17.0	294.2	6
5.0SMDJ11A	5.0SMDJ11CA	5PDZ	5DDZ	11.0	12.20	13.50	1	18.2	274.8	2
5.0SMDJ12A	5.0SMDJ12CA	5PEP	5BEP	12.0	13.30	14.70	1	19.9	252.0	2
5.0SMDJ13A	5.0SMDJ13CA	5PEQ	5BEQ	13.0	14.40	15.90	1	21.5	233.0	2
5.0SMDJ14A	5.0SMDJ14CA	5PER	5BER	14.0	15.60	17.20	1	23.2	216.0	2
5.0SMDJ15A	5.0SMDJ15CA	5PES	5BES	15.0	16.70	18.50	1	24.4	205.0	2
5.0SMDJ16A	5.0SMDJ16CA	5PET	5BET	16.0	17.80	19.70	1	26.0	193.0	2
5.0SMDJ17A	5.0SMDJ17CA	5PEU	5BEU	17.0	18.90	20.90	1	27.6	181.0	2
5.0SMDJ18A	5.0SMDJ18CA	5PEV	5BEV	18.0	20.00	22.10	1	29.2	172.0	2
5.0SMDJ20A	5.0SMDJ20CA	5PEW	5BEW	20.0	22.20	24.50	1	32.4	155.0	2
5.0SMDJ22A	5.0SMDJ22CA	5PEX	5BEX	22.0	24.40	26.90	1	35.5	141.0	2
5.0SMDJ24A	5.0SMDJ24CA	5PEZ	5BEZ	24.0	26.70	29.50	1	38.9	129.0	2
5.0SMDJ26A	5.0SMDJ26CA	5PFE	5BFE	26.0	28.90	31.90	1	42.1	119.0	2
5.0SMDJ28A	5.0SMDJ28CA	5PFG	5BFG	28.0	31.10	34.40	1	45.4	110.0	2
5.0SMDJ30A	5.0SMDJ30CA	5PFK	5BFK	30.0	33.30	36.80	1	48.4	103.0	2
5.0SMDJ33A	5.0SMDJ33CA	5PFM	5BFM	33.0	36.70	40.60	1	53.3	93.9	2
5.0SMDJ36A	5.0SMDJ36CA	5PFP	5BFP	36.0	40.00	44.20	1	58.1	86.1	2
5.0SMDJ40A	5.0SMDJ40CA	5PFR	5BFR	40.0	44.40	49.10	1	64.5	77.6	2
5.0SMDJ43A	5.0SMDJ43CA	5PFT	5BFT	43.0	47.80	52.80	1	69.4	72.1	2
5.0SMDJ45A	5.0SMDJ45CA	5PFV	5BFV	45.0	50.00	55.30	1	72.7	68.8	2
5.0SMDJ48A	5.0SMDJ48CA	5PFX	5BFX	48.0	53.30	58.90	1	77.4	64.7	2

* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-Off Voltage VRWM(V)	Breakdown Voltage VBR(V) @IT		Test Current IT (mA)	Maximum Clamping Voltage Vc(V)@IPP	Maximum Peak Pulse Current (IPP)	Maximum Reverse Leakage IR@ VRWM (µA)
Uni-Polar	Bi-Polar	Uni	Bi		Min	Max				
5.0SMDJ51A	5.0SMDJ51CA	5PFZ	5BFZ	51.0	56.70	62.70	1	82.4	60.7	2
5.0SMDJ54A	5.0SMDJ54CA	5RGE	5BGE	54.0	60.00	66.30	1	87.1	57.5	2
5.0SMDJ58A	5.0SMDJ58CA	5PGG	5BGG	58.0	64.40	71.20	1	93.6	53.5	2
5.0SMDJ60A	5.0SMDJ60CA	5PGK	5BGK	60.0	66.70	73.70	1	96.8	51.7	2
5.0SMDJ64A	5.0SMDJ64CA	5PGM	5BGM	64.0	71.10	78.60	1	103.0	48.6	2
5.0SMDJ70A	5.0SMDJ70CA	5PGP	5BGP	70.0	77.80	86.00	1	113.0	44.3	2
5.0SMDJ75A	5.0SMDJ75CA	5PGR	5BGR	75.0	83.30	92.10	1	121.0	41.4	2
5.0SMDJ78A	5.0SMDJ78CA	5PGT	5BGT	78.0	86.70	95.80	1	126.0	39.7	2
5.0SMDJ85A	5.0SMDJ85CA	5PGV	5BGV	85.0	94.40	104.00	1	137.0	36.5	2
5.0SMDJ90A	-	5PGX	-	90.0	100.00	111.00	1	146.0	34.3	2
5.0SMDJ100A	-	5PGZ	-	100.0	111.00	123.00	1	162.0	30.9	2
5.0SMDJ110A	-	5PHE	-	110.0	122.00	135.00	1	177.0	28.3	2
5.0SMDJ120A	-	5PHG	-	120.0	133.00	147.00	1	193.0	26.0	2
5.0SMDJ130A	-	5PHK	-	130.0	144.00	159.00	1	209.0	24.0	2
5.0SMDJ150A	-	5PHM	-	150.0	167.00	185.00	1	243.0	20.6	2
5.0SMDJ160A	-	5PHP	-	160.0	178.00	197.00	1	259.0	19.3	2
5.0SMDJ170A	-	5PHR	-	170.0	189.00	209.00	1	275.0	18.2	2

* For bidirectional type having Vrwm of 10 volts and less, the IR limit is double.



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Peak Pulse Power Rating

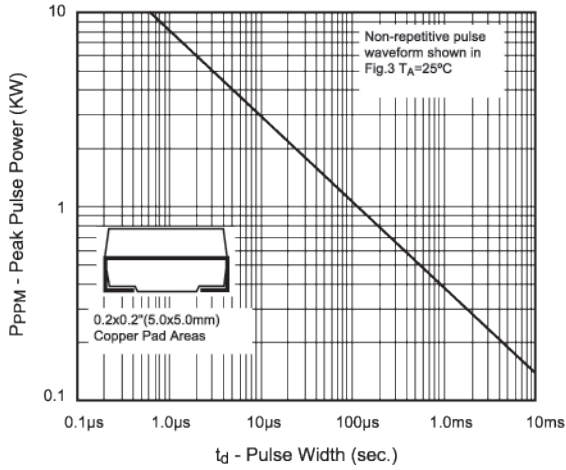


Fig. 2 - Pulse Derating Curve

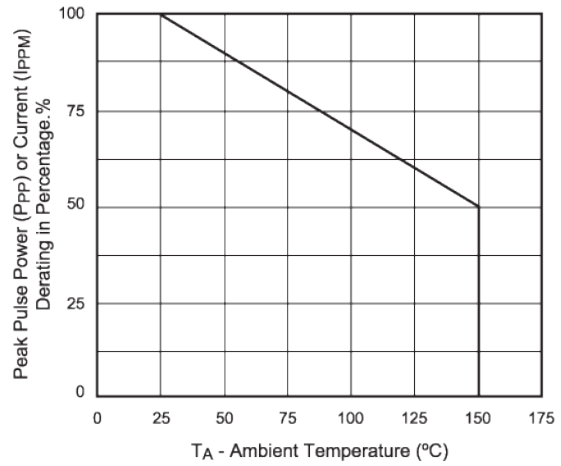


Fig. 3 - Pulse Waveform

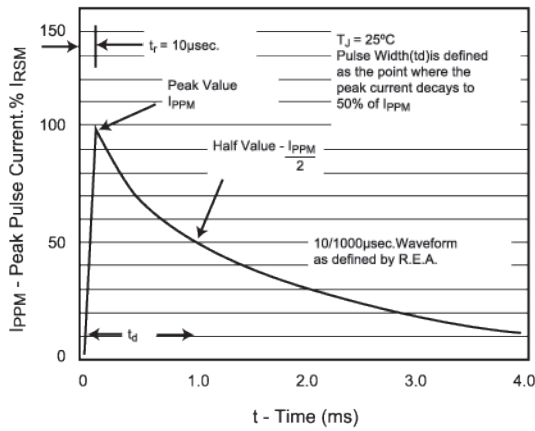


Fig. 4 - Typical Junction Capacitance

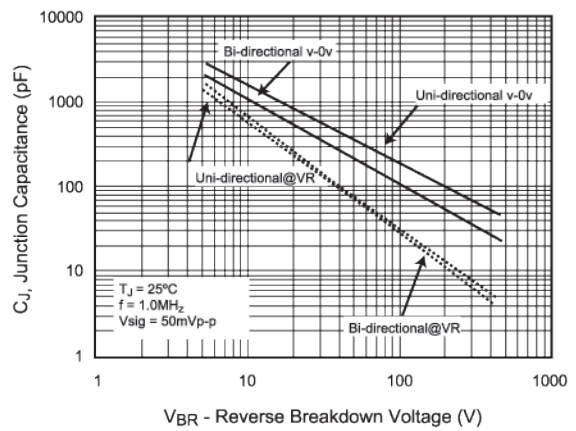


Fig. 5 - Steady State Power Derating Curve

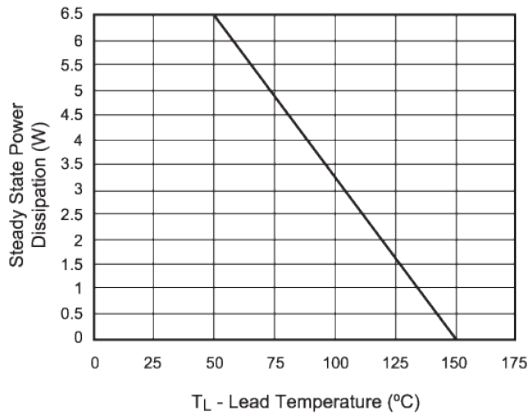
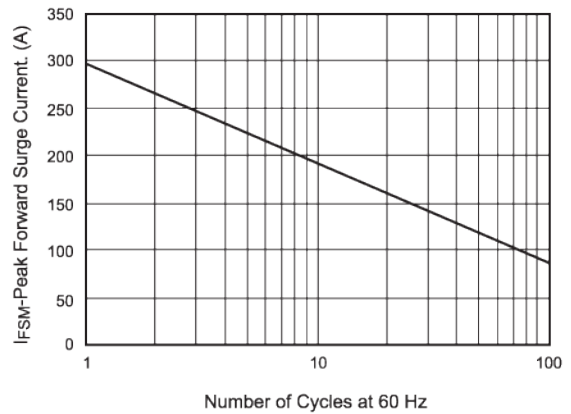
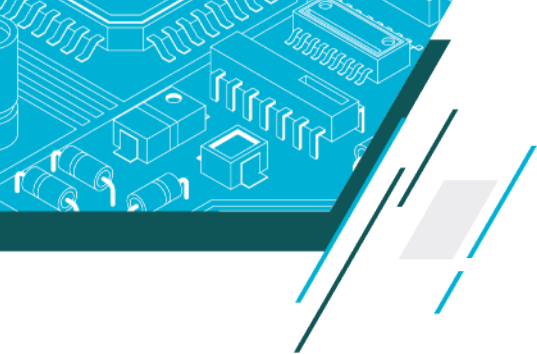
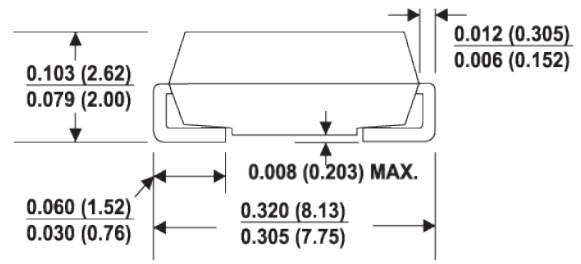
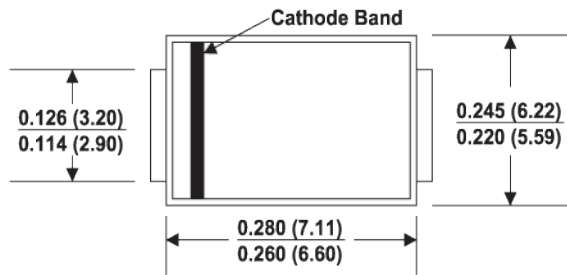


Fig. 6 - Maximum Non-repetitive Forward Surge current uni-directional only



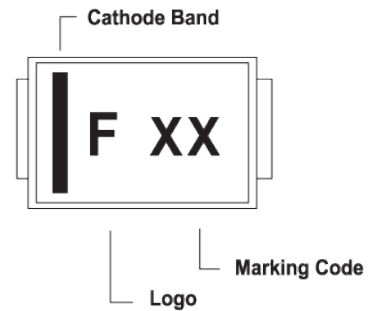
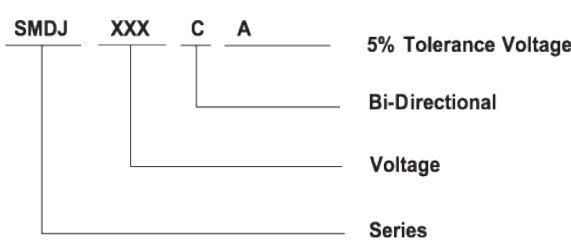


Dimension / DO-214AB (SMC J-Bend)



Dimensions in inches and (millimeters)

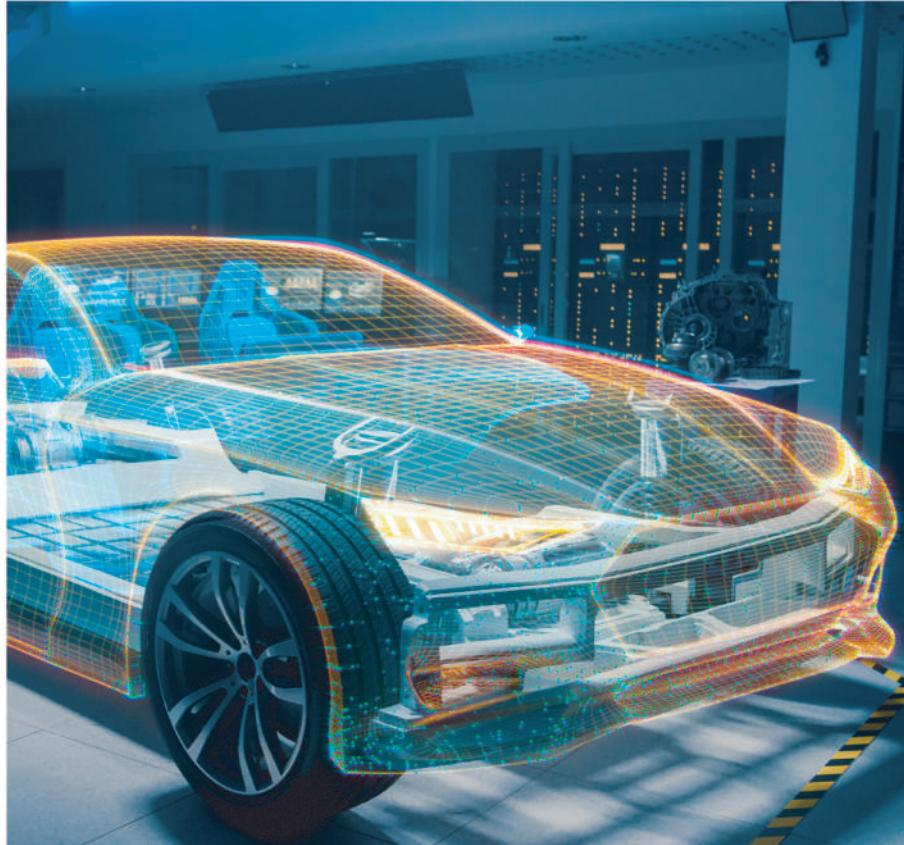
Part Numbering and Marking System



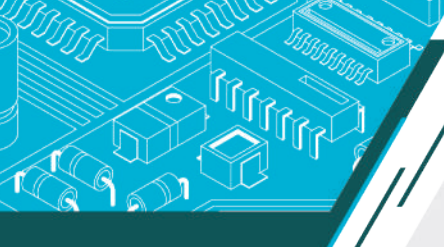
Packaging Specification

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
5.0SMDJxxxXX	DO-214AB	3000	Tape & Reel - 16mm/13" tape	EIA STD RS-481
5.0SMDJxxxXX	DO-214AB	500	Tape & Reel - 16mm/ 7" tape	EIA STD RS-481

Automotive TVS Series



AEC Q-101 qualified TVS diodes, provide high quality automotive transient voltage solutions, protect auto-semiconductors from damage caused by load-dump or power rail transient.



SM5Z Series

3600W



Operating Voltage : 10 to 43V
Peak Pulse Power: 3600W

DO-218AB



FUZETEC TVS SM5Z



Features

- Optimized glass passivated chip
- $T_J = 175\text{ }^\circ\text{C}$ capability suitable for high reliability and automotive requirement
- 3600 W peak pulse power capability with a 10/1000 μs waveform, repetitive rate (duty cycle):0.01 %
- Meet ISO 7637-2 5a/5b and ISO 16750 load dump test (varied by test condition)
- AEC-Q101 qualified
- Low leakage current
- Low forward voltage drop
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: DO-218AB
- Molding compound: UL94V-0 flammability
- Polarity: Heatsink is anode



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1,000 μs waveform(1)	P _{PPM}	3600	Watts
Watts Peak Pulse Power Dissipation on 10/10,000 μs waveform	I _{PP}	2800	Amps
Amps Peak pulse current with a 10/1,000 μs waveform(1)	I _{PP}	See Next Table	A
A Power dissipation on infinite heatsink at T _L = 75 °C	P _D	5.0	W
W Peak forward surge current, 8.3 ms single half sine-wave	I _{FSM}	500	C
A Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 175	°C

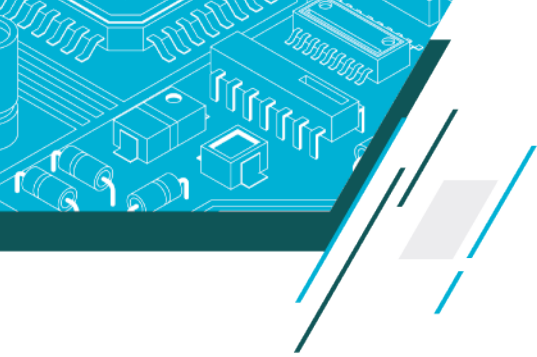
Notes : 1. Non-repetitive current pulse per Fig.2 and derated above T_A= 25 °C per Fig.1



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number (Uni)	Breakdown Voltage V _{BR} @I _T			Maximum Reverse Leakage I _R @ V _{RWM} (µA)	Maximum I _R @V _{RWM} T _J =175 (µA)	Working Peak Reverse Voltage V _{RWM} (V)	Maximum Reverse Surge Current I _{PP} (A) ⁽¹⁾	Maximum Clamping Voltage V _C @I _{PP} (V)
	Min (V)	Max (V)	I _T (mA)					
SM5Z10A	11.1	12.3	5.0	15	250	10	212	17.0
SM5Z11A	12.2	13.5	5.0	10	150	11	198	18.2
SM5Z12A	13.3	14.7	5.0	10	150	12	181	19.9
SM5Z13A	14.4	15.9	5.0	10	150	13	167	21.5
SM5Z14A	15.6	17.2	5.0	10	150	14	155	23.2
SM5Z15A	16.7	18.5	5.0	10	150	15	148	24.4
SM5Z16A	17.8	19.7	5.0	10	150	16	138	26.0
SM5Z17A	18.9	20.9	5.0	10	150	17	130	27.6
SM5Z18A	20.0	22.1	5.0	10	150	18	123	29.2
SM5Z20A	22.2	24.5	5.0	10	150	20	111	32.4
SM5Z22A	24.4	26.9	5.0	10	150	22	101	35.5
SM5Z24A	26.7	29.5	5.0	10	150	24	93	38.9
SM5Z26A	28.9	31.9	5.0	10	150	26	86	42.1
SM5Z28A	31.1	34.4	5.0	10	150	28	79	45.4
SM5Z30A	33.3	36.8	5.0	10	150	30	74	48.4
SM5Z33A	36.7	40.6	5.0	10	150	33	68	53.3
SM5Z36A	40.0	44.2	5.0	10	150	36	62	58.1
SM5Z40A	44.4	49.1	5.0	10	150	40	56	64.5
SM5Z43A	47.8	52.8	5.0	10	150	43	52	69.4

* For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Pulse Derating Curve

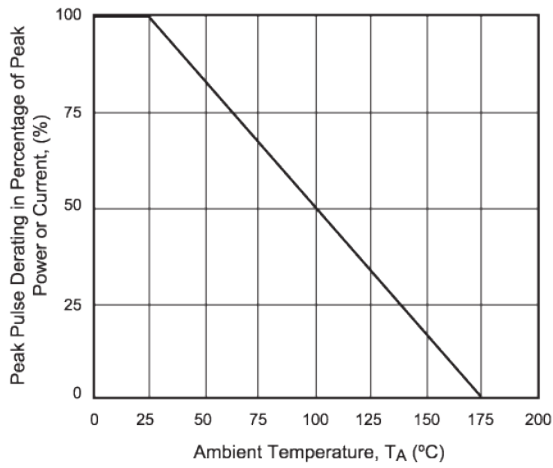


Fig. 2 - Pulse Waveform

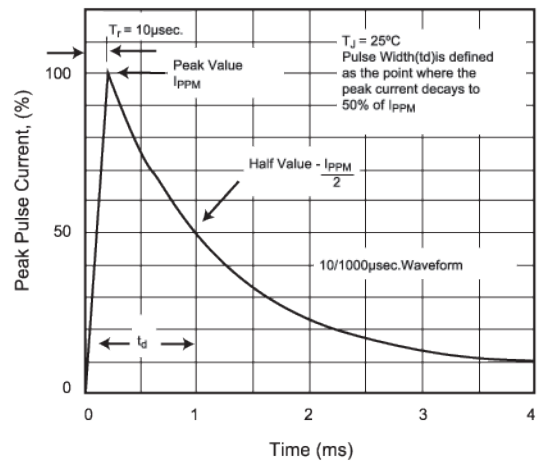


Fig. 3 - Steady State Power Derating Curve

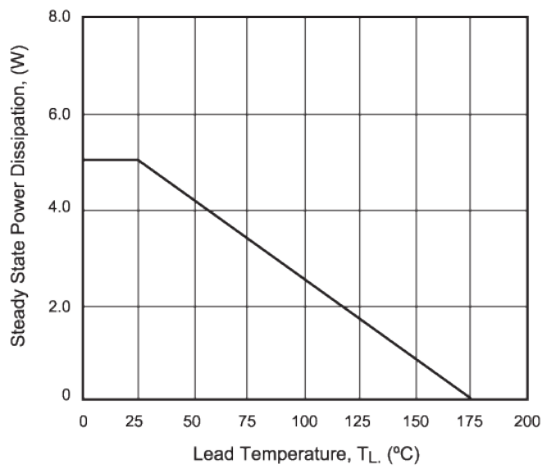
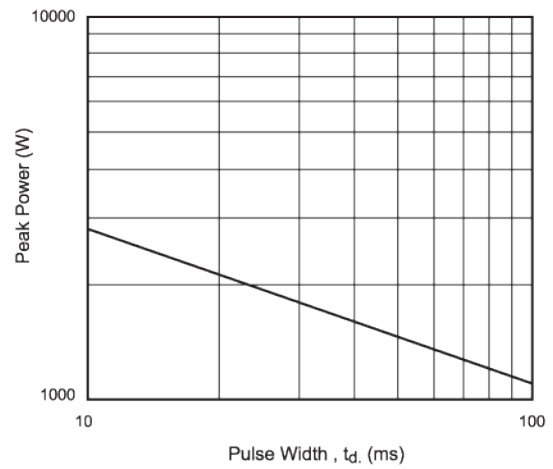
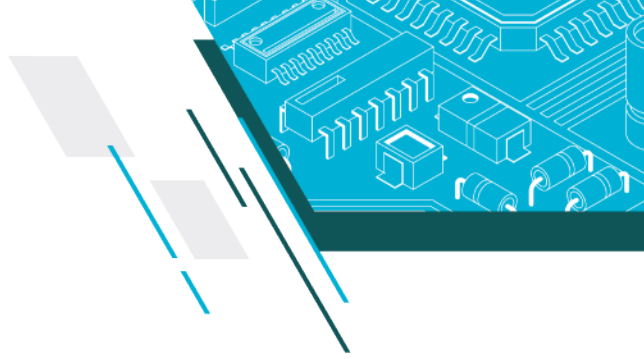
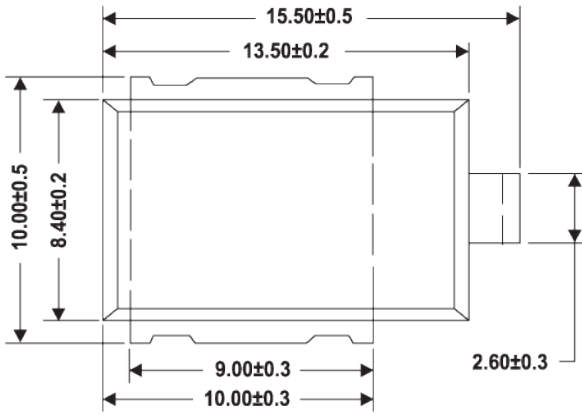


Fig. 4 - Peak Pulse Power Rating Curve

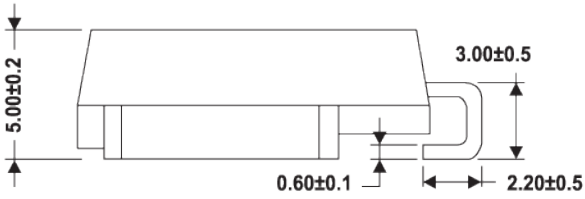
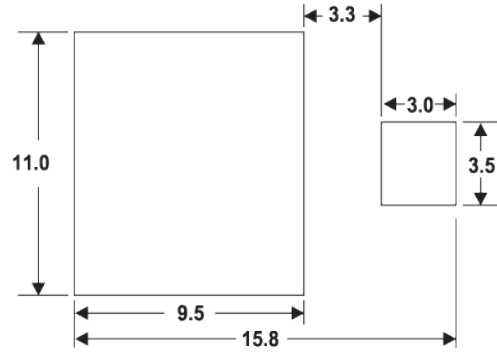




Package Outline Dimensions (millimeters)

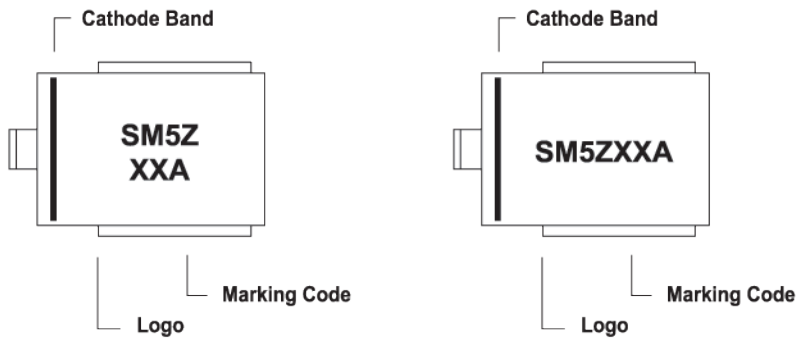


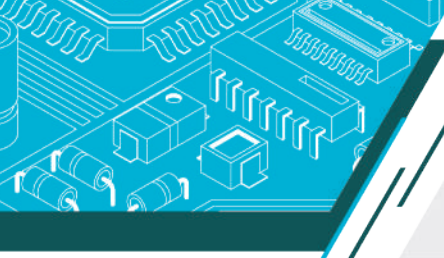
Recommended Mounting Pad Layout.



Product Marking System

Product marking is the same as product series name.





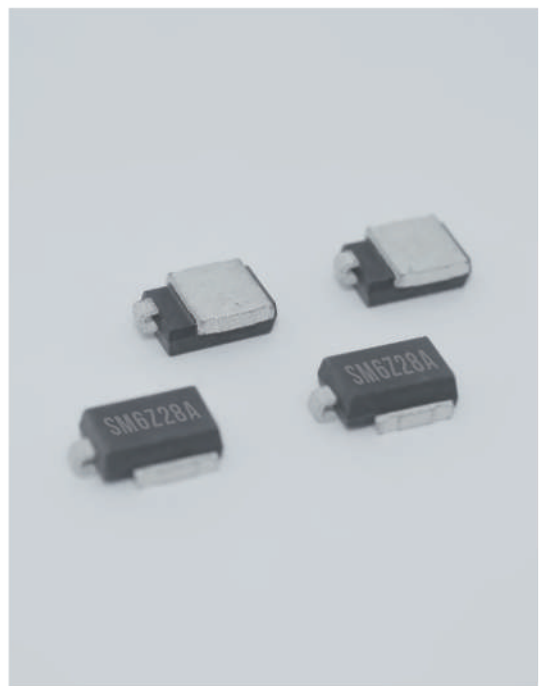
SM6Z Series

4600W



Operating Voltage : 10 to 43V
Peak Pulse Power: 4600W

DO-218AB



FUZETEC TVS SM6Z



Features

- Optimized glass passivated chip
- T_J = 175 °C capability suitable for high reliability and automotive requirement
- 4600 W peak pulse power capability with a 10/1000 μs waveform, repetitive rate (duty cycle):0.01 %
- Meet ISO 7637-2 5a/5b and ISO 16750 load dump test (varied by test condition)
- AEC-Q101 qualified
- Low leakage current
- Low forward voltage drop
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: DO-218AB
- Molding compound: UL94V-0 flammability
- Polarity: Heatsink is anode



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1,000μs waveform(1)	P _{PPM}	4600	Watts
Watts Peak Pulse Power Dissipation on 10/10,000μs waveform	I _{PP}	3600	Amps
Amps Peak pulse current with a 10/1,000μs waveform(1)	I _{PP}	See Next Table	A
A Power dissipation on infinite heatsink at T _L = 75 °C	P _D	6.0	W
W Peak forward surge current, 8.3 ms single half sine-wave	I _{FSM}	600	A
A Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 175	°C

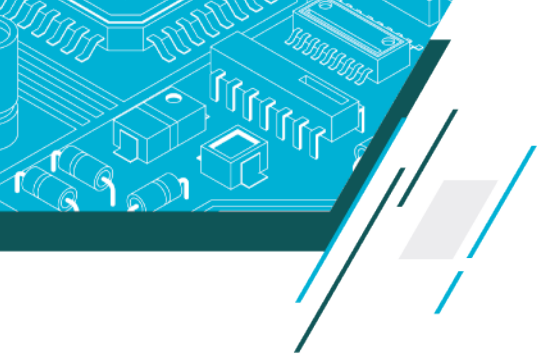
Notes : 1. Non-repetitive current pulse per Fig.2 and derated above TA= 25 °C per Fig.1



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number (Uni)	Breakdown Voltage VBR @IT			Maximum Reverse Leakage IR@VRWM (µA)	Maximum IR @VRWM TJ=175 (µA)	Working Peak Reverse Voltage VRWM (V)	Maximum Reverse Surge Current IPP (A) ⁽¹⁾	Maximum Clamping Voltage VC @IPP (V)
	Min (V)	Max (V)	IT (mA)					
SM6Z10A	11.1	12.3	5.0	15	250	10	271	17.0
SM6Z11A	12.2	13.5	5.0	10	150	11	253	18.2
SM6Z12A	13.3	14.7	5.0	10	150	12	231	19.9
SM6Z13A	14.4	15.9	5.0	10	150	13	214	21.5
SM6Z14A	15.6	17.2	5.0	10	150	14	198	23.2
SM6Z15A	16.7	18.5	5.0	10	150	15	189	24.4
SM6Z16A	17.8	19.7	5.0	10	150	16	177	26.0
SM6Z17A	18.9	20.9	5.0	10	150	17	167	27.6
SM6Z18A	20.0	22.1	5.0	10	150	18	158	29.2
SM6Z20A	22.2	24.5	5.0	10	150	20	142	32.4
SM6Z22A	24.4	26.9	5.0	10	150	22	130	35.5
SM6Z24A	26.7	29.5	5.0	10	150	24	118	38.9
SM6Z26A	28.9	31.9	5.0	10	150	26	109	42.1
SM6Z28A	31.1	34.4	5.0	10	150	28	101	45.4
SM6Z30A	33.3	36.8	5.0	10	150	30	95	48.4
SM6Z33A	36.7	40.6	5.0	10	150	33	86	53.3
SM6Z36A	40.0	44.2	5.0	10	150	36	79	58.1
SM6Z40A	44.4	49.1	5.0	10	150	40	71	64.5
SM6Z43A	47.8	52.8	5.0	10	150	43	66	69.4

* For bidirectional type having Vrwm of 10 volts and less, the IR limit is double.



Ratings and Characteristic Curves(TA=25°C unless otherwise noted)

Fig. 1 - Pulse Derating Curve

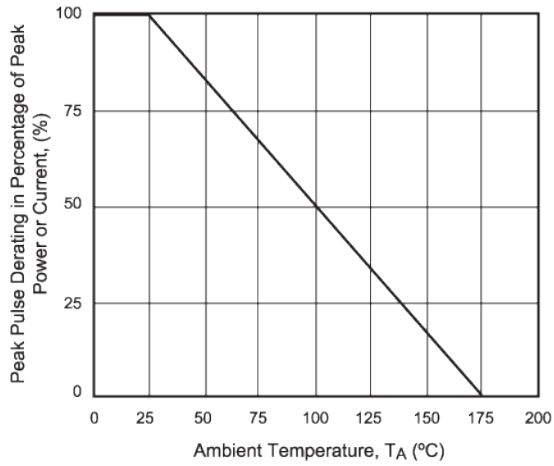


Fig. 2 - Pulse Waveform

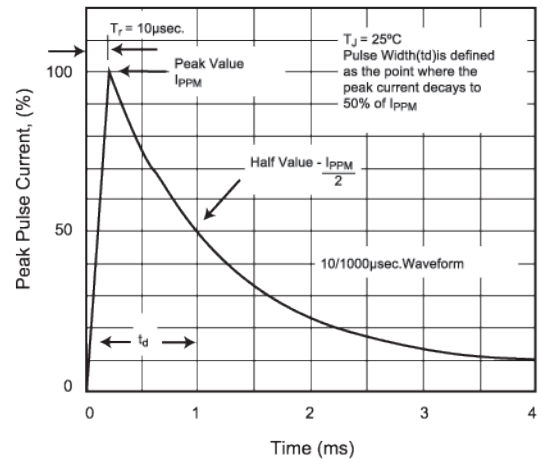


Fig. 3 - Steady State Power Derating Curve

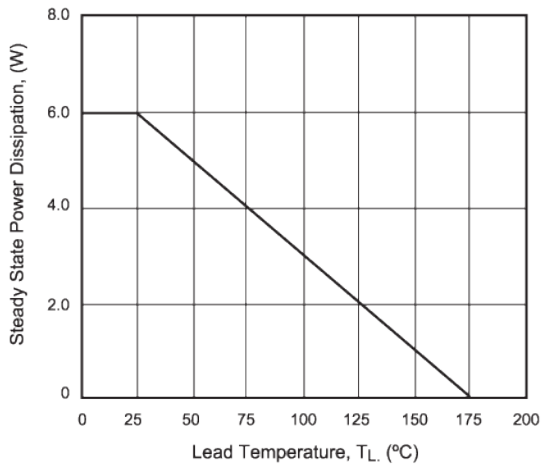
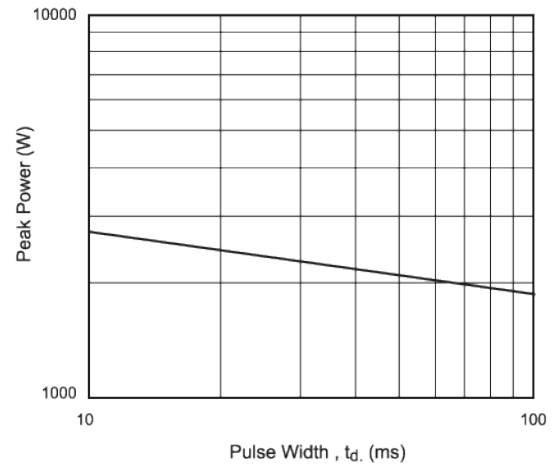
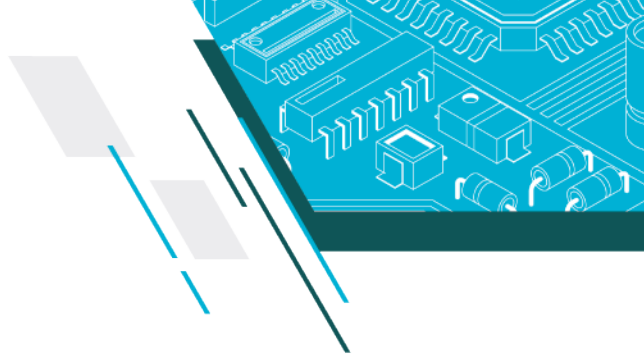
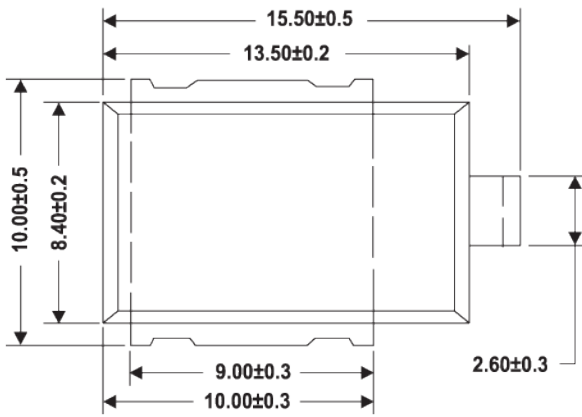


Fig. 4 - Peak Pulse Power Rating Curve

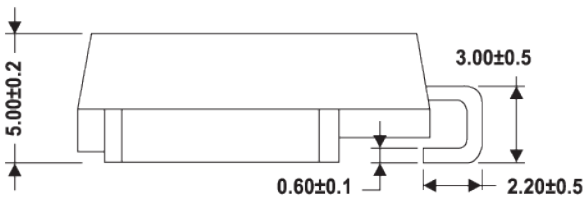
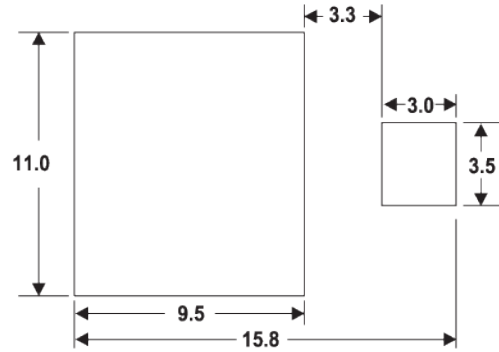




Package Outline Dimensions (millimeters)

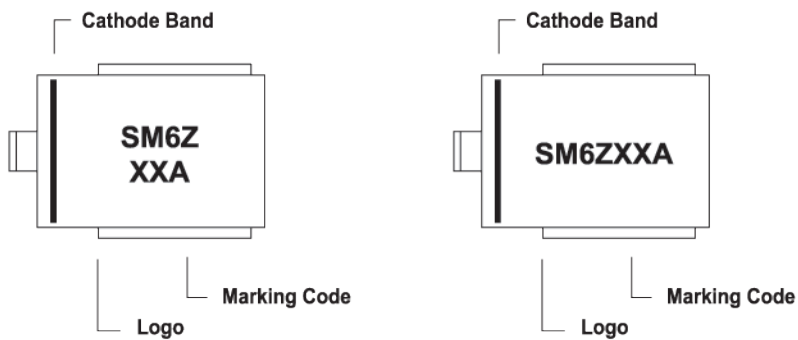


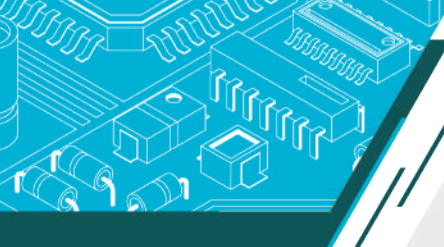
Recommended Mounting Pad Layout.



Product Marking System

Product marking is the same as product series name.





SM8Z Series

6600W



Operating Voltage : 10 to 48V
Peak Pulse Power: 6600W

DO-218AB



FUZETEC TVS SM8Z



Features

- Optimized glass passivated chip
- $T_J = 175\text{ }^\circ\text{C}$ capability suitable for high reliability and automotive requirement
- 6600 W peak pulse power capability with a 10/1000 μs waveform, repetitive rate (duty cycle):0.01 %
- Meet ISO 7637-2 5a/5b and ISO 16750 load dump test (varied by test condition)
- AEC-Q101 qualified
- Low leakage current
- Low forward voltage drop
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: DO-218AB
- Molding compound: UL94V-0 flammability
- Polarity: Heatsink is anode



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1,000 μs waveform(1)	P _{PPM}	6600	Watts
Watts Peak Pulse Power Dissipation on 10/10,000 μs waveform	I _{PP}	5200	Amps
Amps Peak pulse current with a 10/1,000 μs waveform(1)	I _{PP}	See Next Table	A
A Power dissipation on infinite heatsink at T _L = 75 °C	P _D	8.0	W
W Peak forward surge current, 8.3 ms single half sine-wave	I _{FSM}	700	A
A Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 175	°C

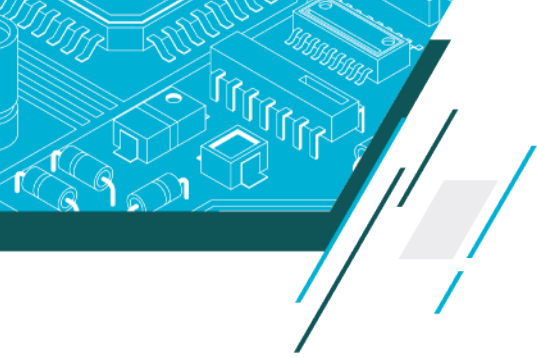
Notes : 1. Non-repetitive current pulse per Fig.2 and derated above T_A= 25 °C per Fig.1



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number (Uni)	Breakdown Voltage VBR @IT			Maximum Reverse Leakage IR@VRWM (μA)	Maximum IR @VRWM TJ=175 (μA)	Working Peak Reverse Voltage VRWM (V)	Maximum Reverse Surge Current IPP (A) ⁽¹⁾	Maximum Clamping Voltage VC @IPP (V)
	Min (V)	Max (V)	IT (mA)					
SM8Z10A	11.1	12.3	5.0	15	250	10	388	17.0
SM8Z11A	12.2	13.5	5.0	10	150	11	363	18.2
SM8Z12A	13.3	14.7	5.0	10	150	12	332	19.9
SM8Z13A	14.4	15.9	5.0	10	150	13	307	21.5
SM8Z14A	15.6	17.2	5.0	10	150	14	284	23.2
SM8Z15A	16.7	18.5	5.0	10	150	15	270	24.4
SM8Z16A	17.8	19.7	5.0	10	150	16	254	26.0
SM8Z17A	18.9	20.9	5.0	10	150	17	239	27.6
SM8Z18A	20.0	22.1	5.0	10	150	18	226	29.2
SM8Z20A	22.2	24.5	5.0	10	150	20	204	32.4
SM8Z22A	24.4	26.9	5.0	10	150	22	186	35.5
SM8Z24A	26.7	29.5	5.0	10	150	24	170	38.9
SM8Z26A	28.9	31.9	5.0	10	150	26	157	42.1
SM8Z28A	31.1	34.4	5.0	10	150	28	145	45.4
SM8Z30A	33.3	36.8	5.0	10	150	30	136	48.4
SM8Z33A	36.7	40.6	5.0	10	150	33	124	53.3
SM8Z36A	40.0	44.2	5.0	10	150	36	114	58.1
SM8Z40A	44.4	49.1	5.0	10	150	40	102	64.5
SM8Z43A	47.8	52.8	5.0	10	150	43	95.1	69.4
SM8Z48A	53.3	58.9	5.0	10	150	48	85.2	77.4

* For bidirectional type having Vrwm of 10 volts and less, the IR limit is double.



Ratings and Characteristic Curves(TA=25°C unless otherwise noted)

Fig. 1 - Pulse Derating Curve

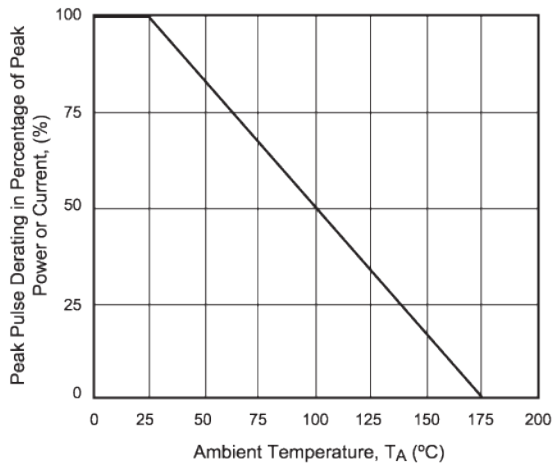


Fig. 2 - Pulse Waveform

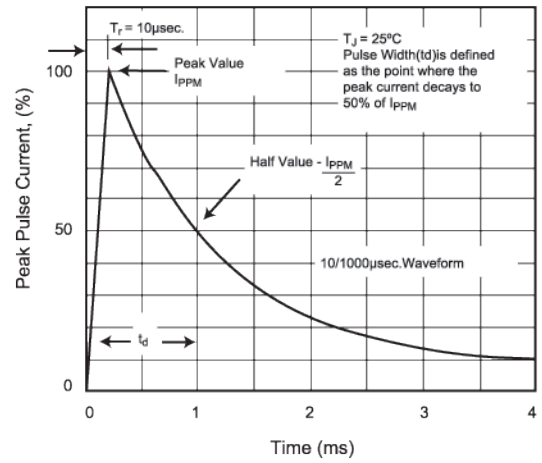


Fig. 3 - Steady State Power Derating Curve

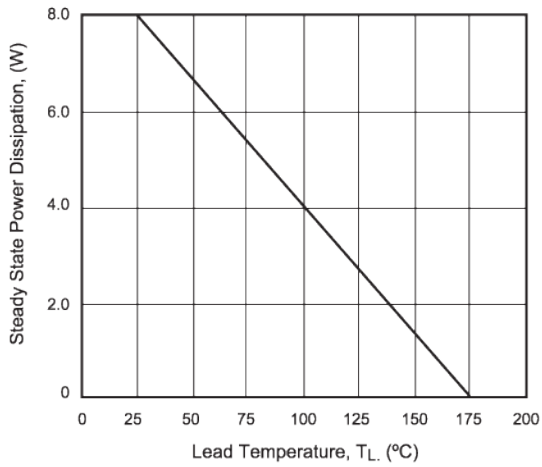
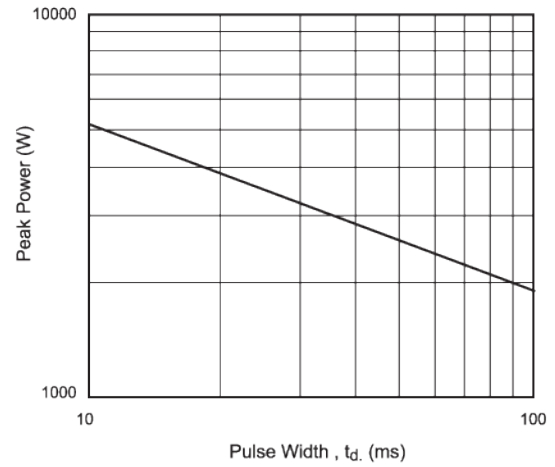
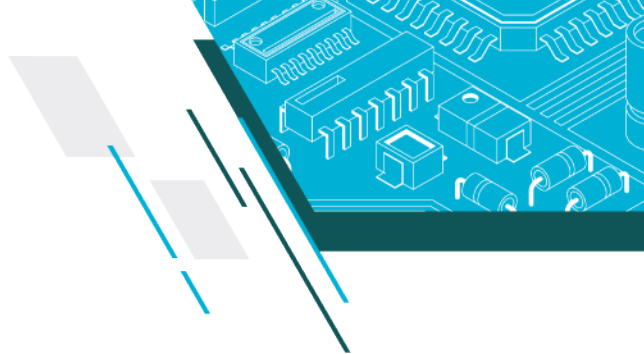
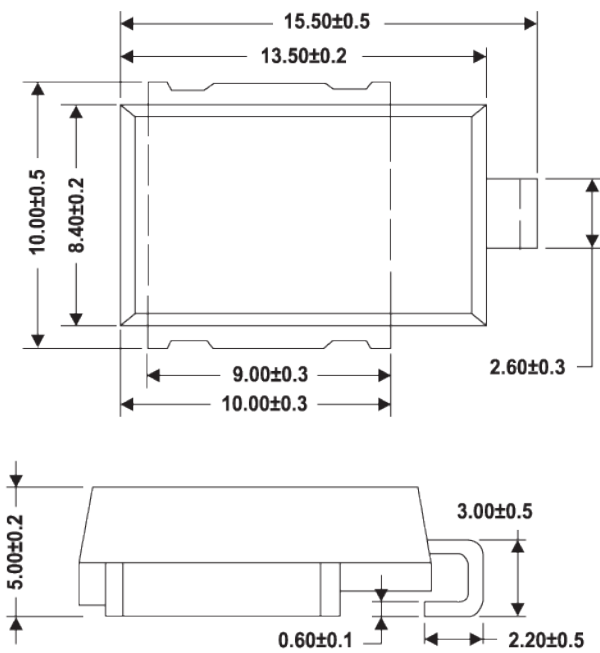


Fig. 4 - Peak Pulse Power Rating Curve

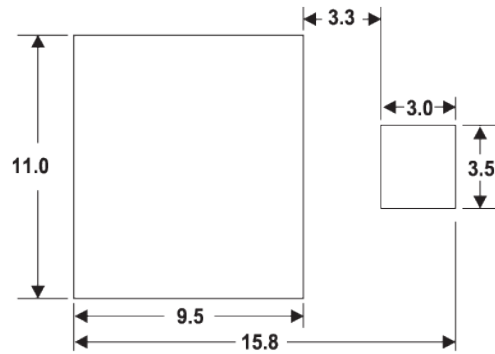




Package Outline Dimensions (millimeters)

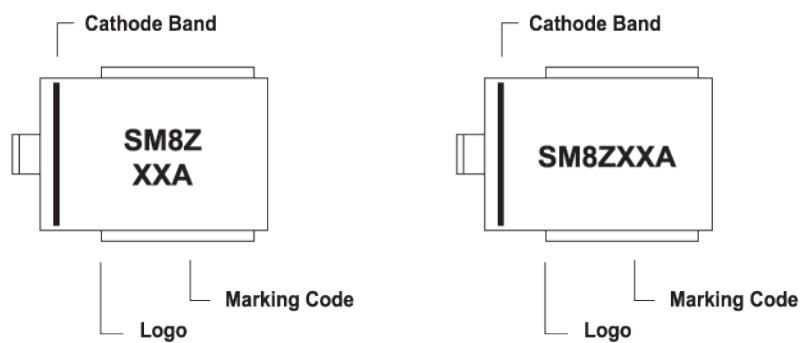


Recommended Mounting Pad Layout.



Product Marking System

Product marking is the same as product series name.



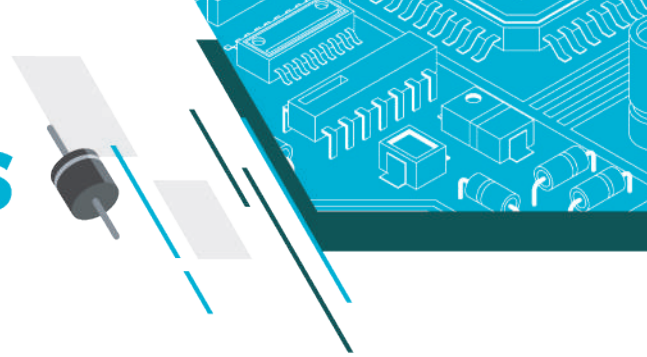
Axial Leaded TVS Series



Axial leaded and custom TVS diodes are the perfect solution for high voltage transients induced by lightning or electromagnetic pulses, ideal for industrial and telecom applications.

15KPA Series

15000W



Operating Voltage : 17 to 280V

Peak Pulse Power: 15000W

R6/P600



Features

- Glass passivated chip
- 15000 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle): 0.01 %
- Low leakage current
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-202, method 208 guaranteed
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



FUZETEC | TVS 15KPA

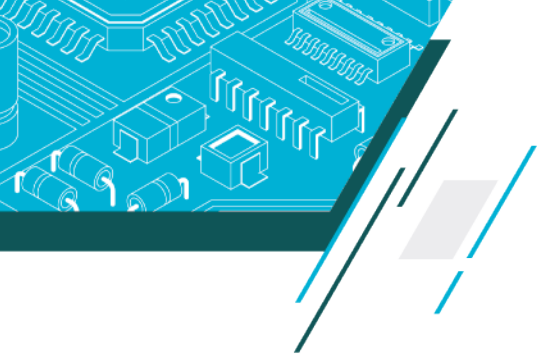


Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1,000 μ s waveform ⁽¹⁾	PPPM	15000	W
Peak Pulse Current with a 10/1,000 μ s waveform ⁽¹⁾	I _{PP}	See Next Table	A
Power dissipation on infinite heatsink at TL = 75 °C	P _D	8.0	W
Peak forward surge current, 8.3 ms single half sine- wave unidirectional only ⁽²⁾	I _{FSM}	500	A
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 175	°C

Notes : 1. Non-repetitive current pulse per Fig.5 and derated above TA = 25 °C per Fig.1

2. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Breakdown Voltage V _{BR} @I _T			Maximum Reverse Leakage I _R @ V _{RWM} (μA)	Working Peak Reverse Voltage V _{RWM} (V)	Maximum Reverse Surge Current I _{PP} (A)	Maximum Clamping Voltage V _C @I _{PP} (V)
(Uni)	(Bi)	Min (V)	Max (V)	I _T (mA)				
15KPA17A	15KPA17CA	18.99	20.79	50	5000	17	515.4	29.3
15KPA18A	15KPA18CA	20.11	22.01	50	5000	18	488.7	30.9
15KPA20A	15KPA20CA	22.34	24.46	20	1500	20	440.2	34.3
15KPA22A	15KPA22CA	24.57	26.91	10	500	22	407.0	37.1
15KPA24A	15KPA24CA	26.81	29.35	5	150	24	371.0	40.7
15KPA26A	15KPA26CA	29.04	31.80	5	50	26	343.2	44.0
15KPA28A	15KPA28CA	31.28	34.24	5	25	28	317.9	47.5
15KPA30A	15KPA30CA	33.51	36.70	5	15	30	297.8	50.7
15KPA33A	15KPA33CA	36.90	40.40	5	2	33	276.1	54.7
15KPA36A	15KPA36CA	40.20	44.00	5	2	36	252.5	59.8
15KPA40A	15KPA40CA	44.70	48.90	5	2	40	229.5	65.8
15KPA43A	15KPA43CA	48.00	52.60	5	2	43	216.3	69.8
15KPA45A	15KPA45CA	50.30	55.00	5	2	45	207.4	72.8
15KPA48A	15KPA48CA	53.60	58.70	5	2	48	194.3	77.7
15KPA51A	15KPA51CA	57.00	62.40	5	2	51	182.1	82.9
15KPA54A	15KPA54CA	60.30	66.00	5	2	54	172.2	87.7
15KPA58A	15KPA58CA	64.80	70.90	5	2	58	161.0	93.8
15KPA60A	15KPA60CA	67.00	73.40	5	2	60	155.0	97.4
15KPA64A	15KPA64CA	71.50	78.30	5	2	64	144.9	104.2
15KPA70A	15KPA70CA	78.20	85.60	5	2	70	132.9	113.6
15KPA75A	15KPA75CA	83.80	91.70	5	2	75	123.8	122.0
15KPA78A	15KPA78CA	87.10	95.40	5	2	78	119.7	126.1
15KPA85A	15KPA85CA	94.90	104.00	5	2	85	109.7	137.6
15KPA90A	15KPA90CA	100.50	110.10	5	2	90	103.7	145.6
15KPA100A	15KPA100CA	111.70	122.30	5	2	100	93.6	161.3
15KPA110A	15KPA110CA	122.90	134.50	5	2	110	84.5	178.6
15KPA120A	15KPA120CA	134.00	146.80	5	2	120	78.5	192.3
15KPA130A	15KPA130CA	145.20	159.00	5	2	130	72.5	208.3
15KPA150A	15KPA150CA	167.60	183.50	5	2	150	62.4	241.9
15KPA160A	15KPA160CA	178.70	195.70	5	2	160	58.4	258.6
15KPA170A	15KPA170CA	189.90	207.90	5	2	170	55.4	272.7
15KPA180A	15KPA180CA	201.10	220.10	5	2	180	52.3	288.5
15KPA200A	15KPA200CA	223.40	244.60	5	2	200	47.3	319.1
15KPA220A	15KPA220CA	245.70	269.10	5	2	220	42.4	356.0
15KPA240A	15KPA240CA	268.10	293.50	5	2	240	39.3	384.6
15KPA260A	15KPA260CA	290.40	318.00	5	2	260	36.2	416.7
15KPA280A	15KPA280CA	312.80	342.40	5	2	280	33.2	454.5

* For Bi-Directional devices having VR of 30 volts and under, the IR limit is double.



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Pulse Derating Curve

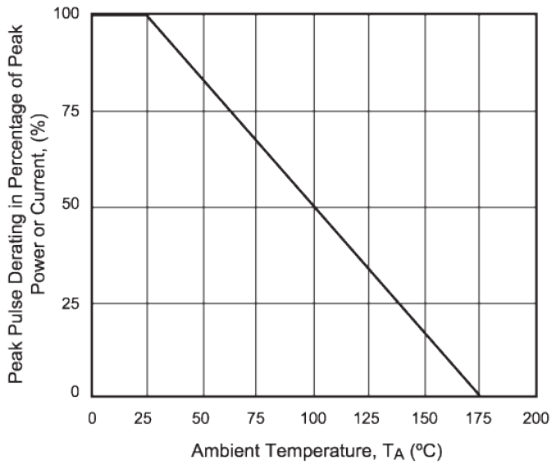


Fig. 2 - Maximum Non-Repetitive Surge Current

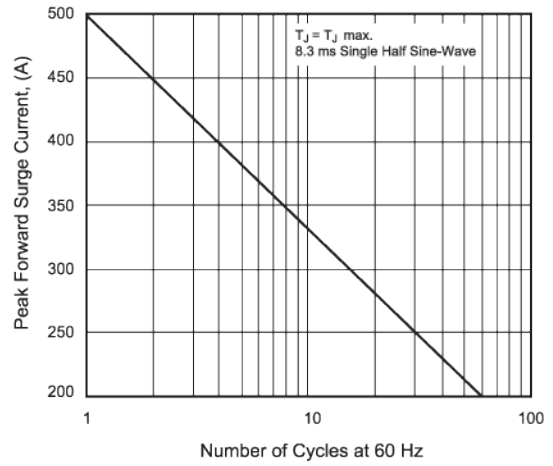


Fig. 3 - Steady State Power Derating Curve

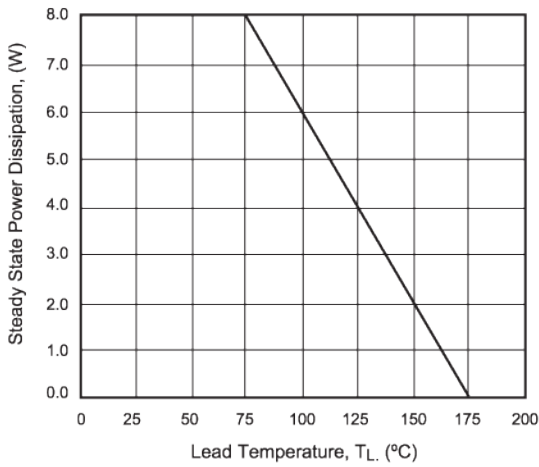


Fig. 4 - Peak Pulse Power Rating Curve

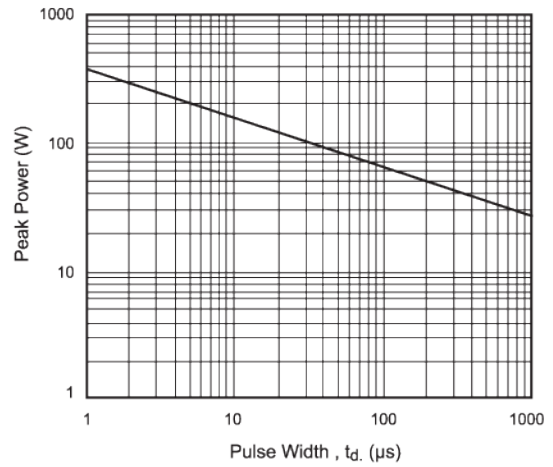


Fig. 5 - Pulse Waveform

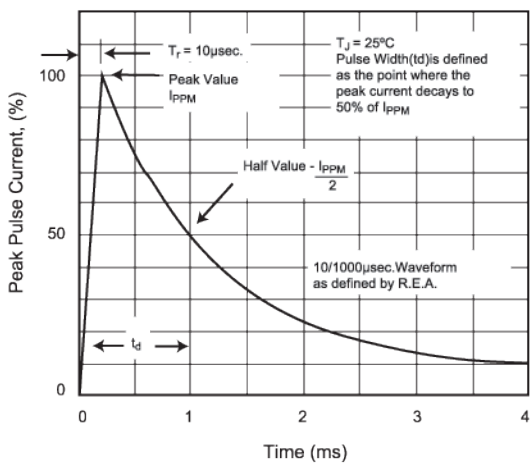
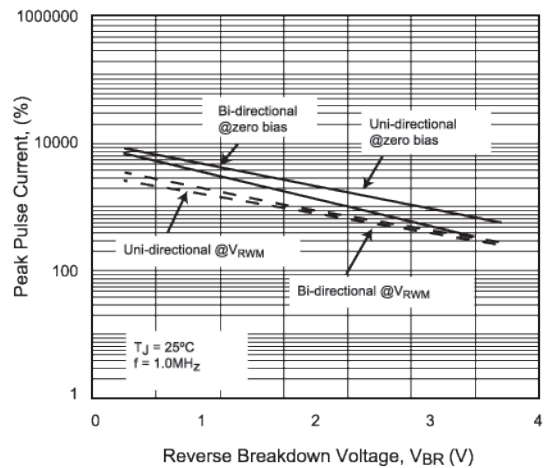
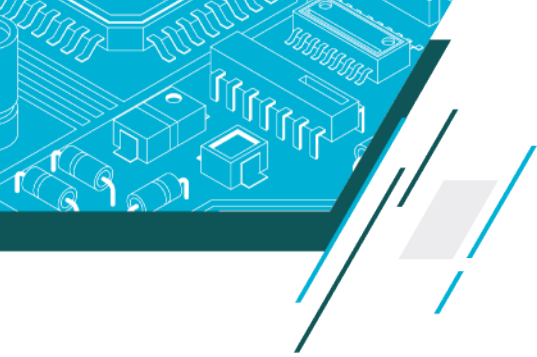


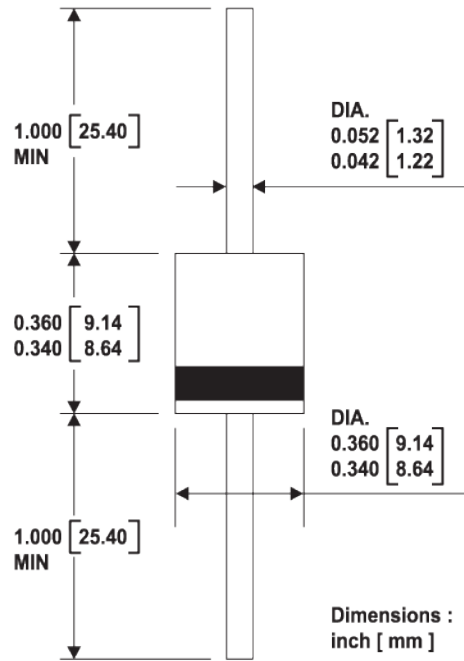
Fig. 6 - Typical Junction Capacitance





Package Outline Dimensions (millimeters)

R-6/P600

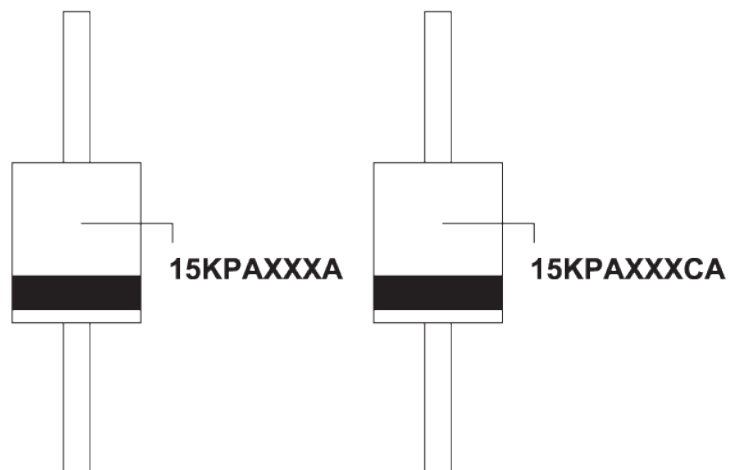


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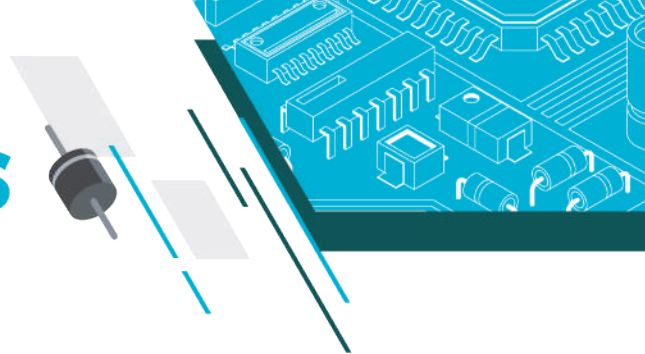
Product Marking System

Product marking is the same as product series name.



30KPA Series

30000W



Operating Voltage : 28 to 320V
 Peak Pulse Power: 30000W
R6/P600



Features

- Glass passivated chip
- 30000 W peak pulse power capability with a 10/1000 μ s waveform, repetitive rate (duty cycle): 0.01 %
- Low leakage current
- Uni and Bidirectional unit
- Excellent clamping capability
- Very fast response time
- RoHS compliant



Mechanical Data

- Case: Molded plastic
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-202, method 208 guaranteed
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position: Any



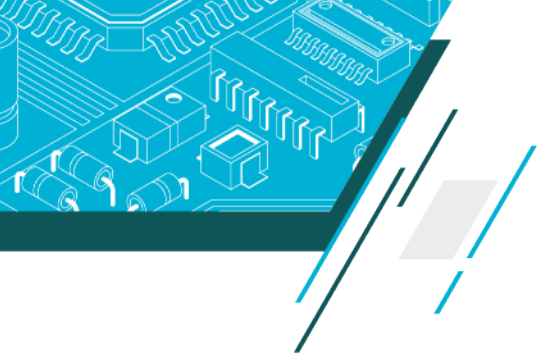
FUZETEC | TVS 30KPA



Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1,000 μ s waveform ⁽¹⁾	PPPM	30000	W
Peak Pulse Current with a 10/1,000 μ s waveform ⁽¹⁾	I _{PP}	See Next Table	A
Power dissipation on infinite heatsink at TL = 75 °C	P _D	8.0	W
Peak forward surge current, 8.3 ms single half sine- wave unidirectional only ⁽²⁾	I _{FSM}	500	A
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 175	°C

Notes : 1. Non-repetitive current pulse per Fig.5 and derated above TA = 25 °C per Fig.1
 2. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Breakdown Voltage VBR @IT			Maximum Reverse Leakage IR@ VRWM (µA)	Working Peak Reverse Voltage VRWM (V)	Maximum Reverse Surge Current IPP (A)	Maximum Clamping Voltage VC @IPP (V)
(Uni)	(Bi)	Min (V)	Max (V)	IT (mA)				
30KPA28A	30KPA28CA	31.28	34.41	50	5000	28	606.0	50.0
30KPA30A	30KPA30CA	33.51	36.86	50	5000	30	548.9	55.2
30KPA33A	30KPA33CA	36.90	40.59	50	5000	33	517.9	58.5
30KPA36A	30KPA36CA	40.20	44.22	50	5000	36	490.3	61.8
30KPA39A	30KPA39CA	43.60	47.96	20	2000	39	450.9	67.2
30KPA42A	30KPA42CA	46.90	51.59	10	1000	42	420.8	72.0
30KPA43A	30KPA43CA	48.00	52.80	10	1000	43	415.1	73.0
30KPA45A	30KPA45CA	50.30	55.33	5	250	45	391.5	77.4
30KPA48A	30KPA48CA	53.60	58.96	5	150	48	371.3	81.6
30KPA51A	30KPA51CA	57.00	62.70	5	50	51	350.7	86.4
30KPA54A	30KPA54CA	60.30	66.33	5	20	54	331.5	91.4
30KPA58A	30KPA58CA	64.80	71.28	5	20	58	327.9	92.4
30KPA60A	30KPA60CA	67.00	73.70	5	15	60	297.1	102.0
30KPA64A	30KPA64CA	71.50	78.65	5	10	64	291.3	104.0
30KPA66A	30KPA66CA	73.70	81.07	5	2	66	283.2	107.0
30KPA70A	30KPA70CA	78.20	86.02	5	2	70	278.0	109.0
30KPA71A	30KPA71CA	79.30	87.23	5	2	71	271.7	111.5
30KPA72A	30KPA72CA	80.40	88.44	5	2	72	265.8	114.0
30KPA75A	30KPA75CA	83.80	92.18	5	2	75	253.8	119.4
30KPA78A	30KPA78CA	87.10	95.81	5	2	78	234.9	129.0
30KPA84A	30KPA84CA	93.80	103.18	5	2	84	217.7	139.2
30KPA90A	30KPA90CA	100.50	110.55	5	2	90	207.0	146.4
30KPA96A	30KPA96CA	107.20	117.92	5	2	96	194.2	156.0
30KPA102A	30KPA102CA	113.90	125.29	5	2	102	183.0	165.6
30KPA108A	30KPA108CA	120.60	132.66	5	2	108	172.9	175.2
30KPA120A	30KPA120CA	134.00	147.40	5	2	120	155.9	194.4
30KPA132A	30KPA132CA	147.40	162.14	5	2	132	142.3	213.0
30KPA144A	30KPA144CA	160.80	176.88	5	2	144	135.8	223.2
30KPA150A	30KPA150CA	167.60	184.36	5	2	150	129.8	233.4
30KPA156A	30KPA156CA	174.30	191.73	5	2	156	123.7	245.0

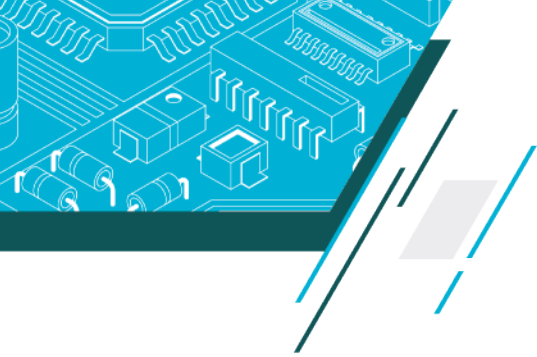
* For Bi-Directional devices having VR of 30 volts and under, the IR limit is double.



Electrical Characteristics (TA=25°C unless otherwise noted)

Part Number		Breakdown Voltage VBR @IT			Maximum Reverse Leakage IR@ VRWM (µA)	Working Peak Reverse Voltage VRWM (V)	Maximum Reverse Surge Current IPP (A)	Maximum Clamping Voltage VC @IPP (V)
(Uni)	(Bi)	Min (V)	Max (V)	IT (mA)				
30KPA160A	30KPA160CA	178.70	196.57	5	2	160	120.0	252.6
30KPA168A	30KPA168CA	187.70	206.47	5	2	168	111.2	272.4
30KPA170A	30KPA170CA	189.90	208.89	5	2	170	110.2	275.0
30KPA180A	30KPA180CA	201.10	221.21	5	2	180	104.3	290.4
30KPA198A	30KPA198CA	221.20	243.32	5	2	198	94.7	319.8
30KPA216A	30KPA216CA	241.30	265.43	5	2	216	86.9	348.6
30KPA240A	30KPA240CA	268.10	294.91	5	2	240	78.3	387.0
30KPA258A	30KPA258CA	288.20	317.02	5	2	258	72.8	416.4
30KPA260A	30KPA260CA	290.40	319.44	5	2	260	72.8	416.0
30KPA270A	30KPA270CA	301.60	331.76	5	2	270	69.5	436.2
30KPA280A	30KPA280CA	312.80	344.08	5	2	280	65.3	464.0
30KPA288A	30KPA288CA	321.70	353.87	5	2	288	64.5	469.9
30KPA300A	30KPA300CA	334.00	367.40	5	2	300	62.0	484.0
30KPA320A	30KPA320CA	356.00	392.00	5	2	320	57.0	530.0

* For Bi-Directional devices having VR of 30 volts and under, the IR limit is double.



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

Fig. 1 - Pulse Derating Curve

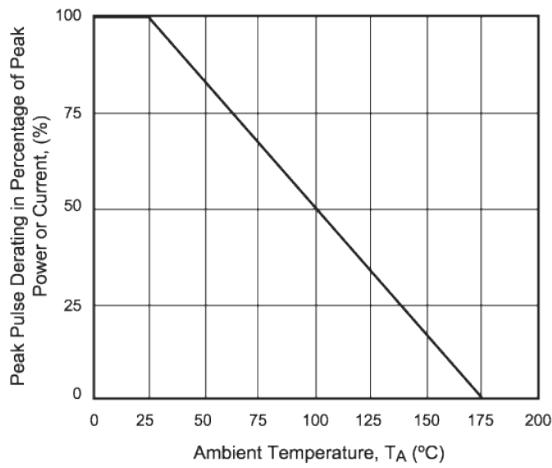


Fig. 2 - Maximum Non-Repetitive Surge Current

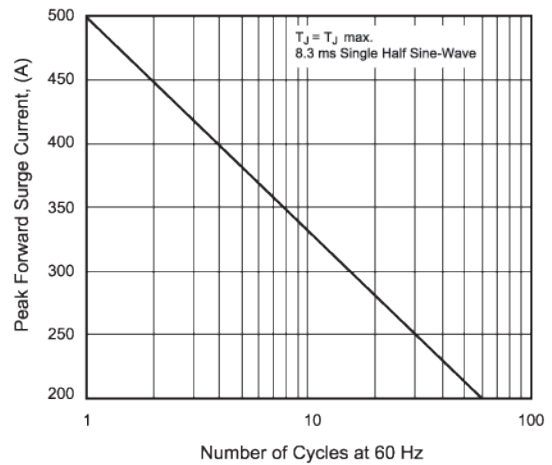


Fig. 3 - Steady State Power Derating Curve

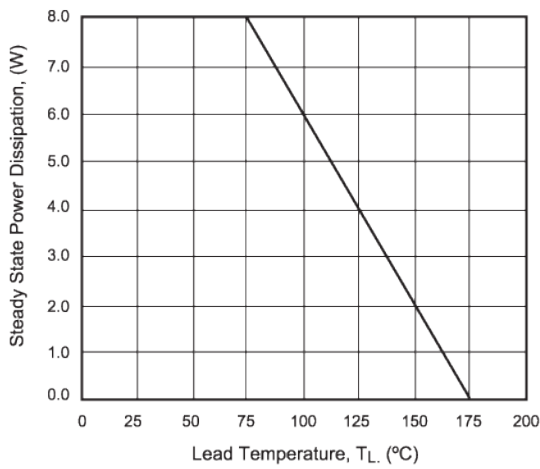


Fig. 4 - Peak Pulse Power Rating Curve

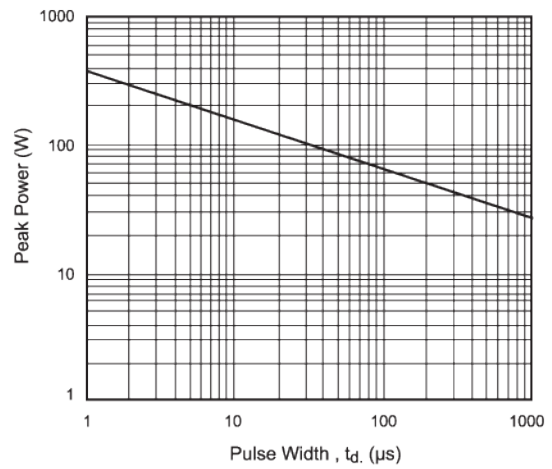


Fig. 5 - Pulse Waveform

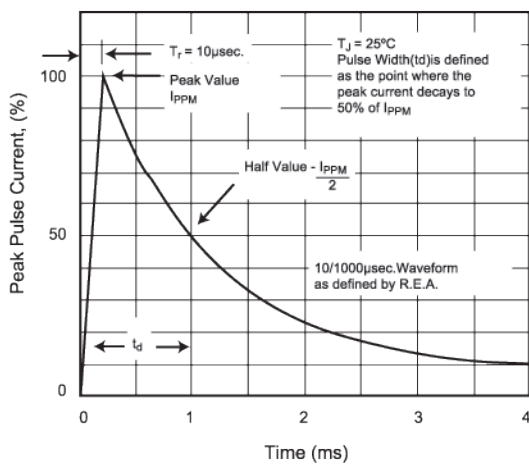
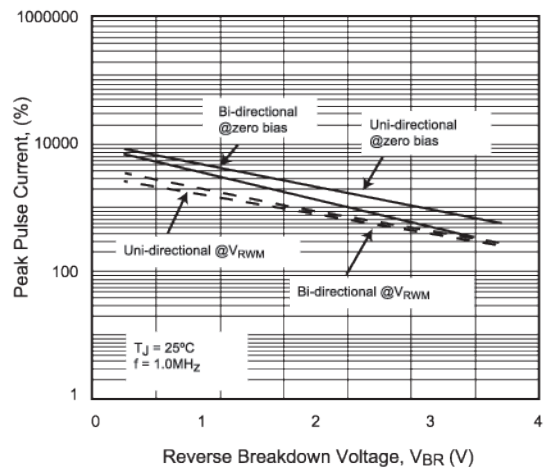


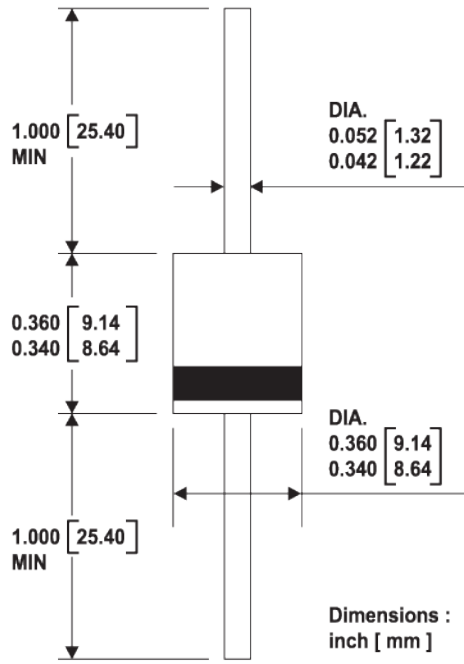
Fig. 6 - Typical Junction Capacitance





Package Outline Dimensions (millimeters)

R-6/P600

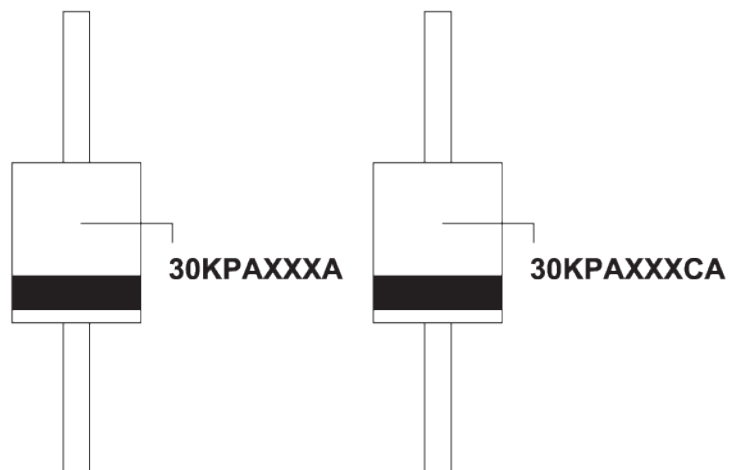


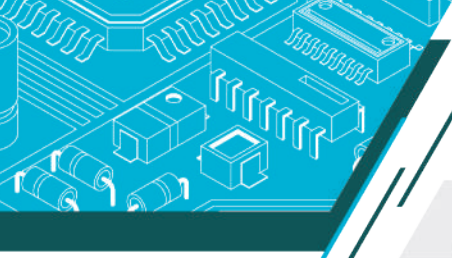
FUZETEC | TVS 30KPA



Product Marking System

Product marking is the same as product series name.





KA Series



Operating Voltage : 12.8 to 380V

Custom Part



Features

- High current transient suppressors
- Excellent Clamping Capability
- Glass passivated chip
- Bidirectional
- Low Slope Resistance
- Hazardous Substances Free
- RoHS Compliant
- High Temperature soldering: 260°C/10 seconds at terminals
- Epoxy Encapsulated
- UL certified

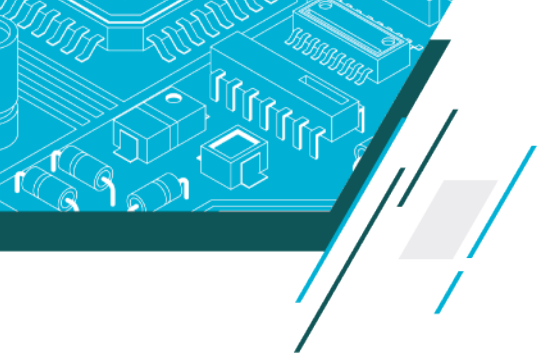


FUZETEC | TVS KA



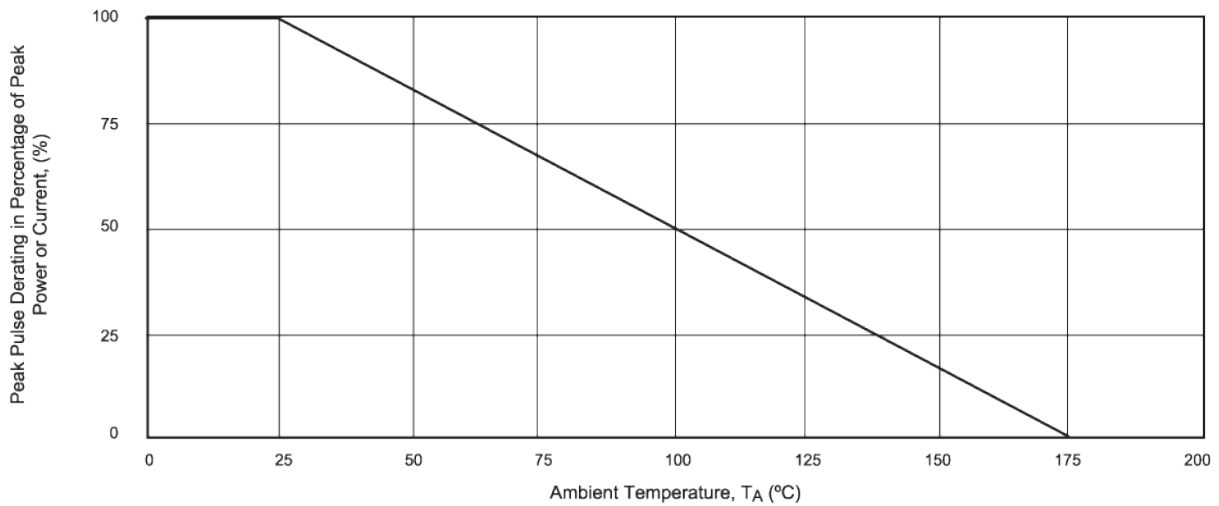
Maximum Ratings and Characteristics (25°C)

Rating	Symbol	Value	Units
Current Rating, Rated IPP measured with 8/20us pulse	IPP	K1	1
		KA	3
		KB	6
		KC	10
		KD	15
Operating junction and Storage Temperature Range	T _J , T _{STG}	-55 to + 175	°C



Ratings and Characteristic Curves (TA=25°C unless otherwise noted)

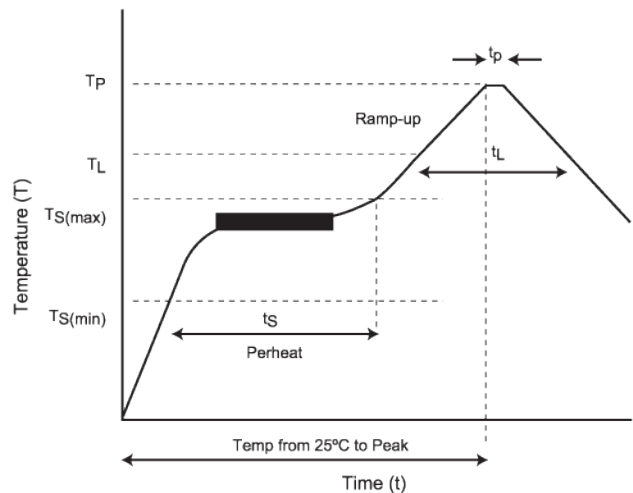
Fig. 1 - Pulse Derating Curve



Soldering Parameters

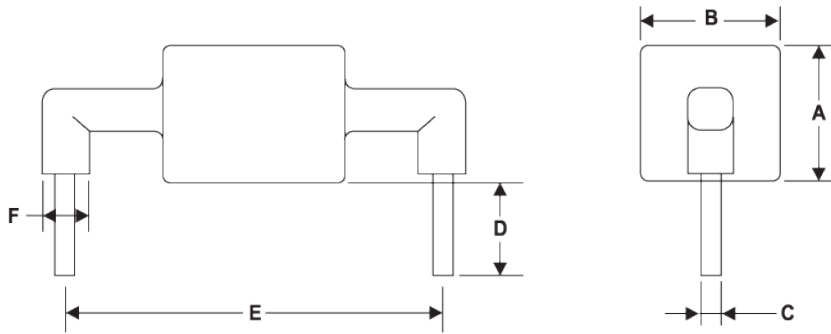
IR-Reflow Condition

Pre Heat	Temp. min	150	°C
	Temp. max	200	°C
	Time (min to max)	60-180	sec
Ramp up rate (150-200°C)		< 3	°C/sec
Reflow	Liquidus Temp.	> 220	°C
	Peak Temp.	255-260	°C
	Time (Liq. to Peak)	60-150	sec
Ramp up rate (220-200°C)		< 3	°C/sec
Time within actual peak temp.		10-30	sec
Ramp down Rate		<	°C/sec
Time (25°C to Peak Temp.)		< 6	min
Do not exceed		280	°C





Package Outline Dimensions (inches & millimeters)



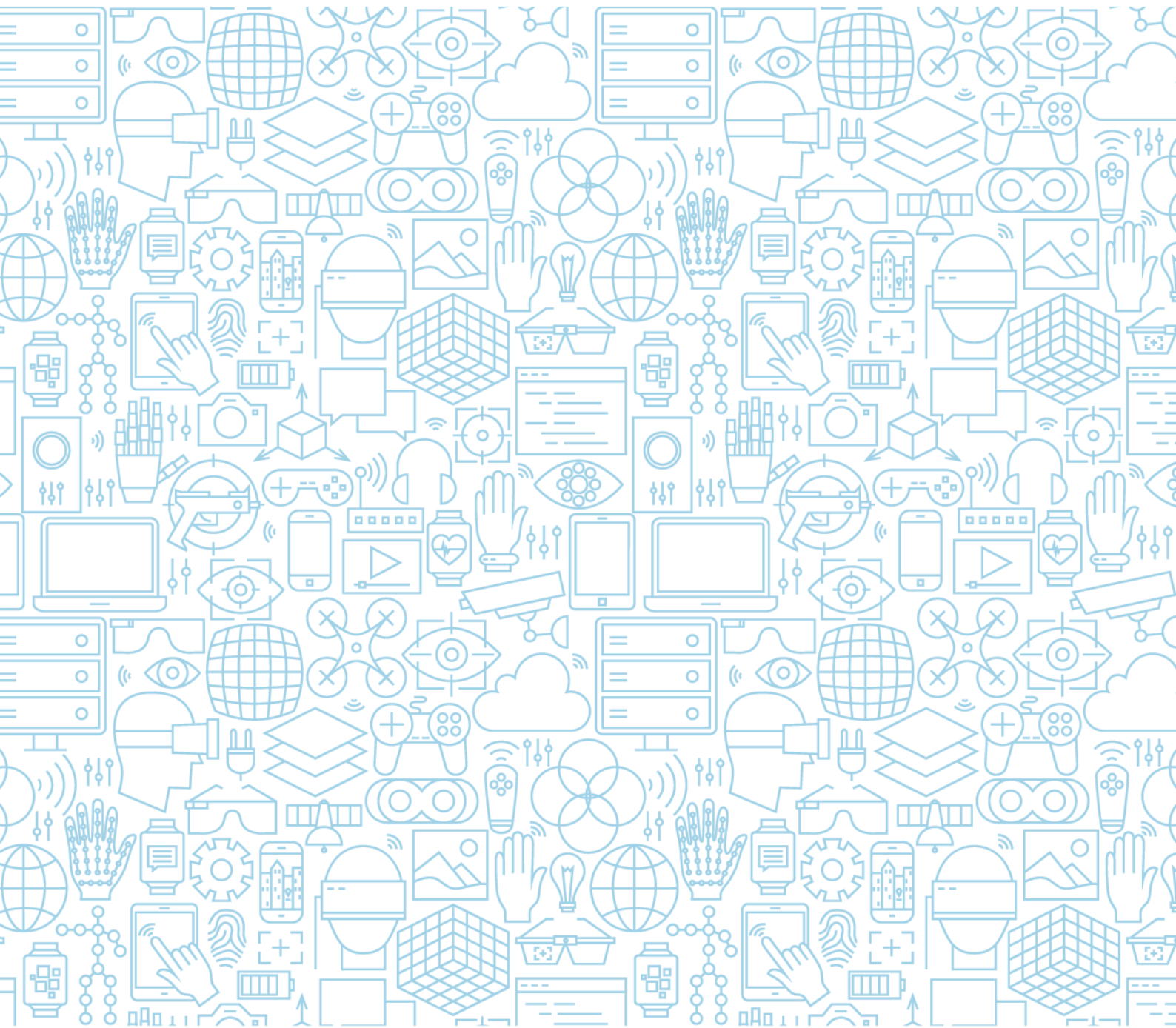
K1 Series		
Dimensions	Inches	Millimeters
A	max 0.571	max 14.5
B	max 0.500	max 12.7
C	0.051 ± 0.004	1.30 ± 0.10
D	0.276 ± 0.019	7.00 ± 0.50
E	0.95 ± 0.028	24.15 ± 0.7
F	max 0.158	max 4

KA Series		
Dimensions	Inches	Millimeters
A	max 0.571	max 14.5
B	max 0.500	max 12.7
C	0.051 ± 0.004	1.30 ± 0.10
D	0.276 ± 0.019	7.00 ± 0.50
E	0.95 ± 0.028	24.15 ± 0.7
F	max 0.158	max 4

KB Series		
Dimensions	Inches	Millimeters
A	max 0.571	max 14.5
B	max 0.500	max 12.7
C	0.051 ± 0.004	1.30 ± 0.10
D	0.276 ± 0.019	7.00 ± 0.50
E	0.95 ± 0.028	24.15 ± 0.7
F	max 0.158	max 4

KC Series		
Dimensions	Inches	Millimeters
A	max 0.630	max 16
B	max 0.571	max 14.5
C	0.051 ± 0.004	1.30 ± 0.10
D	0.276 ± 0.019	7.00 ± 0.50
E	0.95 ± 0.028	24.15 ± 0.7
F	max 0.158	max 4

KD Series		
Dimensions	Inches	Millimeters
A	max 0.685	max 17.40
B	max 0.626	max 15.90
C	0.051 ± 0.004	1.30 ± 0.10
D	0.276 ± 0.019	7.00 ± 0.50
E	0.95 ± 0.028	24.15 ± 0.7
F	max 0.158	max 4



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