SMBJ-Q1 Series

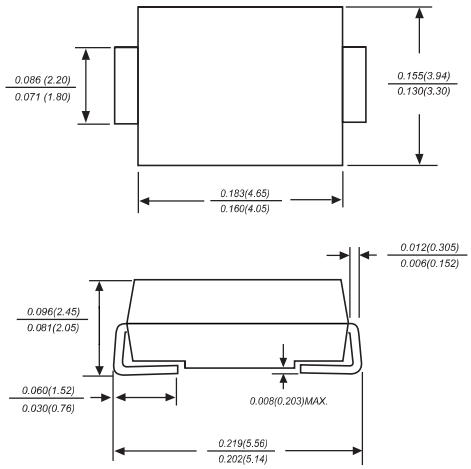
600W Surface Mount Transient Voltage Suppressors- 5.0V- 440V

Features

- 600W peak pulse power capability with a 10/1000 μs waveform, repetition rate (duty cycle): 0.01%.
- Low profile surface mounted application in order to optimize board space.
- Excellent clamping capability.
- Low incremental surge resistance.
- Fast response time from 0V to VBR, typically less than 1 ps for uni-directional & 5 ns for bi-directional types.
- Glass passivated chip junction.
- Lead-free parts meet RoHS requirments.
- Compliant to Halogen-free
- Suffix "-Q1" for AEC-Q101.

Package outline

SMB/DO-214AA



Dimensions in inches and (millimeters)

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, DO-214AA /SMB
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.072 gram

Maximum ratings (AT T_A=25°C unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	Value	UNIT
Peak Power Dissipation	with a 10/1000 μs waveform, Note 1, 2 & Fig. 1	P_{PPM}	600	W
Peak Pulse current	with a 10/1000 μs waveform	I_{PPM}	See Table 1	A
Steady State Power Dissipation	at T_L=75°C, Note 2	$P_{M(AV)}$	5.0	W
Peak Forward Surge Current	8.3ms Single Half Sine-Wave, Note 3	I_{FSM}	100	A
Maximum Instantaneours Forward Voltage	at 50A For Uni-Directional Types Only, Note 4	V_F	3.5/5.0	V
Typical Thermal resistance	Junction to case Junction to ambient	$R_{\theta JC}$ $R_{\theta JA}$	30 50	°C/W
Operating junction temperature range		T_J	-55 ~ +150	°C
Storage temperature range		T_{STG}	-55 ~ +150	°C

Note 1. Non-repetitive current pulse, per Fig. 3 and derated above T_A=25°C per Fig. 2
2. Mounted on copper pad area of 0.2"x0.2" (5.0x5.0 mm) per Fig 5
3. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum
4. V_F<3.5V for V_{BR}< 200V and V_F<5.0V for V_{BR} > 201V.

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600W Surface Mount Transient Voltage Suppressors- 5.0V- 440V

Electrical characteristics (at T_A=25°C unless otherwise noted)

Part No. (Uni)	Part No. (Bi)	Reverse Stand-off Voltage	Breakdown Voltage @I_T		Test Current	Maximum Clamping Voltage @I_{PP}		Maximum Reverse Leakage Current	Marking Code	
		V_{RWM}	$V_{BR\ Min}$	$V_{BR\ Max}$	I_T	V_c	I_{PP}	I_R@V_{RWM}		
		Volts	Volts	Volts	mA	Volts	A	μA	UNI	BI
SMBJ 5.0A-Q1	SMBJ 5.0CA-Q1	5.0	6.40	7.00	10	9.2	65.2	800	KE	AE
SMBJ 6.0A-Q1	SMBJ 6.0CA-Q1	6.0	6.67	7.37	10	10.3	58.3	800	KG	AG
SMBJ 6.5A-Q1	SMBJ 6.5CA-Q1	6.5	7.22	7.98	10	11.2	53.6	500	KK	AK
SMBJ 7.0A-Q1	SMBJ 7.0CA-Q1	7.0	7.78	8.60	10	12.0	50.0	200	KM	AM
SMBJ 7.5A-Q1	SMBJ 7.5CA-Q1	7.5	8.33	9.21	1.0	12.9	46.5	100	KP	AP
SMBJ 8.0A-Q1	SMBJ 8.0CA-Q1	8.0	8.89	9.83	1.0	13.6	44.1	50	KR	AR
SMBJ 8.5A-Q1	SMBJ 8.5CA-Q1	8.5	9.44	10.4	1.0	14.4	41.7	20	KT	AT
SMBJ 9.0A-Q1	SMBJ 9.0CA-Q1	9.0	10.0	11.1	1.0	15.4	39.0	10	KV	AV
SMBJ 10A-Q1	SMBJ 10CA-Q1	10	11.1	12.3	1.0	17.0	35.3	5	KX	AX
SMBJ 11A-Q1	SMBJ 11CA-Q1	11	12.2	13.5	1.0	18.2	33.0	5	KZ	AZ
SMBJ 12A-Q1	SMBJ 12CA-Q1	12	13.3	14.7	1.0	19.9	30.2	5	LE	BE
SMBJ 13A-Q1	SMBJ 13CA-Q1	13	14.4	15.9	1.0	21.5	27.9	5	LG	BG
SMBJ 14A-Q1	SMBJ 14CA-Q1	14	15.6	17.2	1.0	23.2	25.9	5	LK	BK
SMBJ 15A-Q1	SMBJ 15CA-Q1	15	16.7	18.5	1.0	24.4	24.6	5	LM	BM
SMBJ 16A-Q1	SMBJ 16CA-Q1	16	17.8	19.7	1.0	26.0	23.0	5	LP	BP
SMBJ 17A-Q1	SMBJ 17CA-Q1	17	18.9	20.9	1.0	27.6	21.7	5	LR	BR
SMBJ 18A-Q1	SMBJ 18CA-Q1	18	20.0	22.1	1.0	29.2	20.5	5	LT	BT
SMBJ 20A-Q1	SMBJ 20CA-Q1	20	22.2	24.5	1.0	32.4	18.5	5	LV	BV
SMBJ 22A-Q1	SMBJ 22CA-Q1	22	24.4	26.9	1.0	35.5	16.9	5	LX	BX
SMBJ 24A-Q1	SMBJ 24CA-Q1	24	26.7	29.5	1.0	38.9	15.4	5	LZ	BZ
SMBJ 26A-Q1	SMBJ 26CA-Q1	26	28.9	31.9	1.0	42.1	14.3	5	ME	CE
SMBJ 28A-Q1	SMBJ 28CA-Q1	28	31.1	34.4	1.0	45.4	13.2	5	MG	CG
SMBJ 30A-Q1	SMBJ 30CA-Q1	30	33.3	36.8	1.0	48.4	12.4	5	MK	CK
SMBJ 33A-Q1	SMBJ 33CA-Q1	33	36.7	40.6	1.0	53.3	11.3	5	MM	CM
SMBJ 36A-Q1	SMBJ 36CA-Q1	36	40.0	44.2	1.0	58.1	10.3	5	MP	CP
SMBJ 40A-Q1	SMBJ 40CA-Q1	40	44.4	49.1	1.0	64.5	9.3	5	MR	CR
SMBJ 43A-Q1	SMBJ 43CA-Q1	43	47.8	52.8	1.0	69.4	8.6	5	MT	CT
SMBJ 45A-Q1	SMBJ 45CA-Q1	45	50.0	55.3	1.0	72.7	8.3	5	MV	CV
SMBJ 48A-Q1	SMBJ 48CA-Q1	48	53.3	58.9	1.0	77.4	7.8	5	MX	CX
SMBJ 51A-Q1	SMBJ 51CA-Q1	51	56.7	62.7	1.0	82.4	7.3	5	MZ	CZ
SMBJ 54A-Q1	SMBJ 54CA-Q1	54	60.0	66.3	1.0	87.1	6.9	5	NE	DE
SMBJ 58A-Q1	SMBJ 58CA-Q1	58	64.4	71.2	1.0	93.6	6.4	5	NG	DG
SMBJ 60A-Q1	SMBJ 60CA-Q1	60	66.7	73.7	1.0	96.8	6.2	5	NK	DK
SMBJ 64A-Q1	SMBJ 64CA-Q1	64	71.1	78.6	1.0	103.0	5.8	5	NM	DM
SMBJ 70A-Q1	SMBJ 70CA-Q1	70	77.8	86.0	1.0	113.0	5.3	5	NP	DP
SMBJ 75A-Q1	SMBJ 75CA-Q1	75	83.3	92.1	1.0	121.0	5.0	5	NR	DR
SMBJ 78A-Q1	SMBJ 78CA-Q1	78	86.7	95.8	1.0	126.0	4.8	5	NT	DT
SMBJ 85A-Q1	SMBJ 85CA-Q1	85	94.4	104	1.0	137.0	4.4	5	NV	DV

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Part No. (Uni)	Part No. (Bi)	Reverse Stand-off Voltage	Breakdown Voltage @I_T		Test Current	Maximum Clamping Voltage @I_{PP}		Maximum Reverse Leakage Current	Marking Code	
		V_{RWM}	$V_{BR\ Min}$	$V_{BR\ Max}$	I_T	V_C	I_{PP}	I_R@V_{RWM}		
		Volts	Volts	Volts	mA	Volts	A	μA	UNI	BI
SMBJ 90A-Q1	SMBJ 90CA-Q1	90	100	111	1.0	146.0	4.1	5	NX	DX
SMBJ 100A-Q1	SMBJ 100CA-Q1	100	111	123	1.0	162.0	3.7	5	NZ	DZ
SMBJ 110A-Q1	SMBJ 110CA-Q1	110	122	135	1.0	177.0	3.4	5	PE	EE
SMBJ 120A-Q1	SMBJ 120CA-Q1	120	133	147	1.0	193.0	3.1	5	PG	EG
SMBJ 130A-Q1	SMBJ 130CA-Q1	130	144	159	1.0	209.0	2.9	5	PK	EK
SMBJ 150A-Q1	SMBJ 150CA-Q1	150	167	185	1.0	243.0	2.5	5	PM	EM
SMBJ 160A-Q1	SMBJ 160CA-Q1	160	178	197	1.0	259.0	2.3	5	PP	EP
SMBJ 170A-Q1	SMBJ 170CA-Q1	170	189	209	1.0	275.0	2.2	5	PR	ER
SMBJ 180A-Q1	SMBJ 180CA-Q1	180	201	222	1.0	292.0	2.1	5	PT	ET
SMBJ 200A-Q1	SMBJ 200CA-Q1	200	224	247	1.0	324.0	1.9	5	PX	EX
SMBJ 220A-Q1	SMBJ 220CA-Q1	220	246	272	1.0	356.0	1.7	5	PV	EV
SMBJ 250A-Q1	SMBJ 250CA-Q1	250	279	309	1.0	405.0	1.5	5	PZ	EZ
SMBJ 300A-Q1	SMBJ 300CA-Q1	300	335	371	1.0	486.0	1.3	5	QE	FE
SMBJ 350A-Q1	SMBJ 350CA-Q1	350	391	432	1.0	567.0	1.1	5	QG	FG
SMBJ 400A-Q1	SMBJ 400CA-Q1	400	447	494	1.0	648.0	0.9	5	QK	FK
SMBJ 440A-Q1	SMBJ 440CA-Q1	440	492	543	1.0	713.0	0.9	5	QM	FM

Note 1. V_{BR} measured after I_T applied for 300us, I_T=square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derated per Fig. 2
3. For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled
4. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.
5. All terms and symbols are consistent with ANS/IEEE C62.35
6. Transient Voltage Suppressors (TVS) are devices used to protect vulnerable circuits from electrical overstress such as that caused by electrostatic discharge, inductive load switching and induced lightning. Within the TVS, damaging voltage spikes are limited by clamping or avalanche action of a rugged silicon pn junction which reduces the amplitude of the transient to a nondestructive level. See Fig. 7 & Fig. 8

Rating and characteristic curves (SMBJ-Q1 Series)

Fig.1 - Pealk Pulse Power Rating Curve

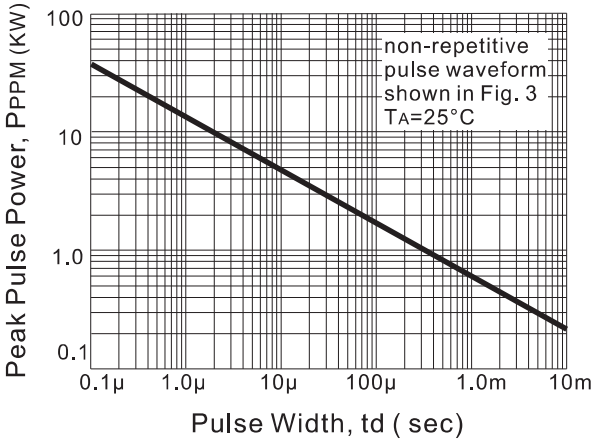
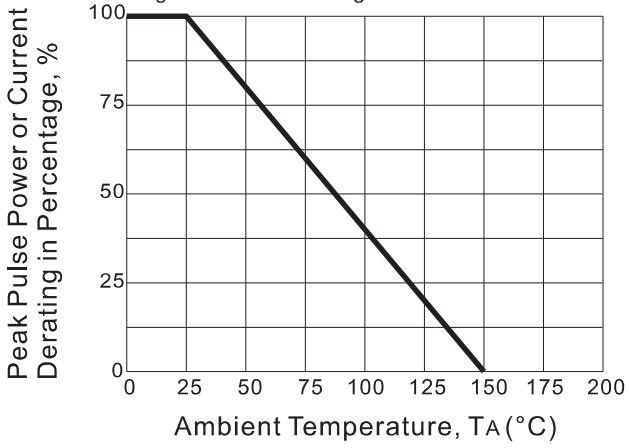


Fig.2 - Pulse Derating Curve



Rating and characteristic curves (SMBJ-Q1 Series)

Fig.3 - Pulse Waveform

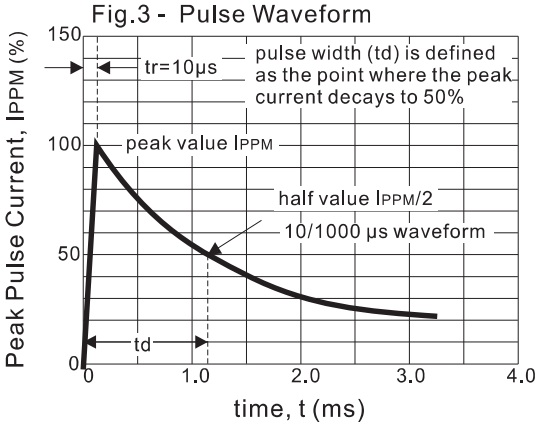


Fig.4 - Typical Junction Capacitance

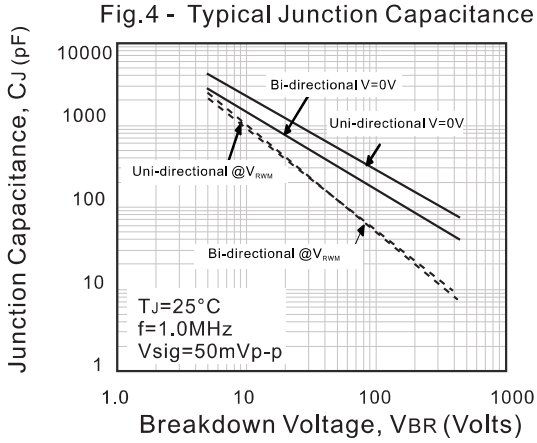


Fig.5 - Steady State Power Derating Curve

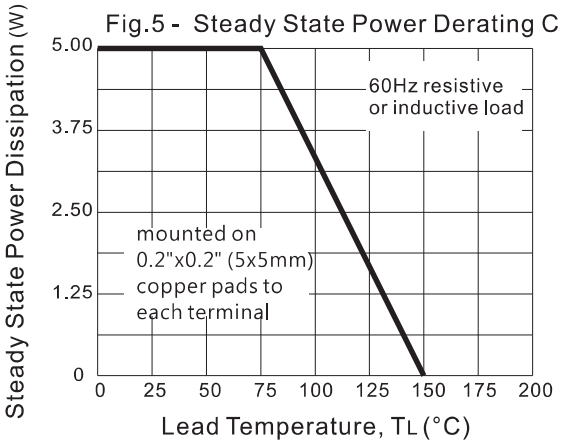
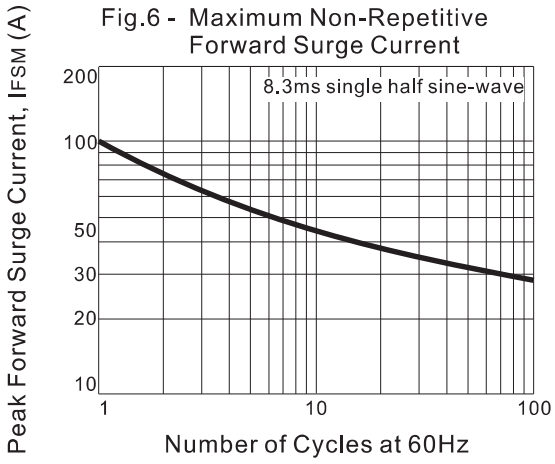


Fig.6 - Maximum Non-Repetitive Forward Surge Current



uni-directional devices only

Fig. 7 - Transients of several thousand volts can be clamped to a safe level by the TVS

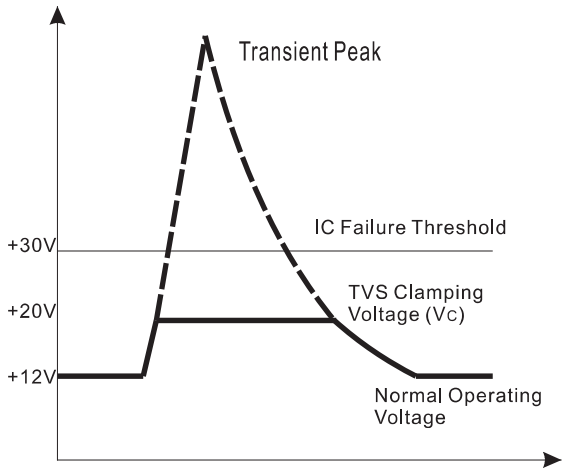
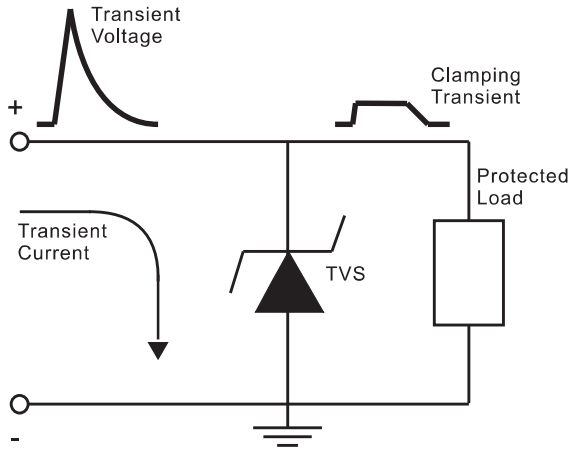


Fig. 8 - Transient current is divered to ground thru TVS; the voltage seen by the protected load is limited to the clamping voltage level



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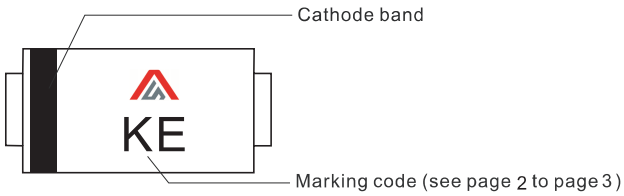
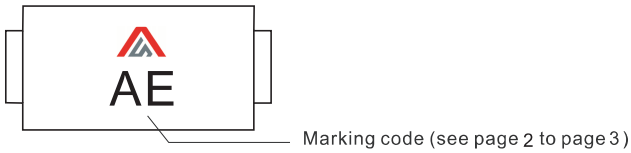
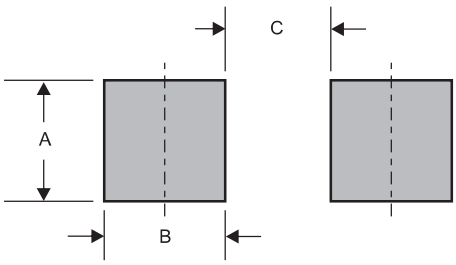
Pinning information

Pin	Simplified outline	Symbol
Uni-Directional Pin1 cathode Pin2 anode		
Bi-Directional		

Marking

Type number	Example
Uni-Directional	
Bi-Directional	

Suggested solder pad layout



Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SMB	0.078 (2.00)	0.059 (1.50)	0.110 (2.80)