

Transient Voltage Suppressors (TVS) Data Sheet

Features

- Glass passivated junction
- Low zener impedance
- Excellent clamping capability
- 400W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycle):0.01%
- Fast response time
- Typical I_R less than 1μA above 13V.
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020.
- AEC-Q101 Qualified

Mechanical Data

- Case: JEDEC DO-214AC Moulded plastic
- Terminal:solderplated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Mounting Position: Any

Applications

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

Maximum Ratings and Characteristics

Ratings at 25°C ambient temperature unless otherwise specified.

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000μs waveform (Note1, Fig.1)	P_{PPM}	Minimum 400	Watts
Peak pulse current of at 10/1000μs waveform (Note 1, Fig.3)	I_{PPM}	See Table	Amps
Steady state power dissipation at $T_L=75^{\circ}\text{C}$ (Fig.4)	$P_{M(AV)}$	3.3	Watts
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note2)	I_{FSM}	40	Amps
Operating junction and Storage Temperature Range.	T_J, T_{STG}	-55 to +150	°C
Typical thermal resistance junction to lead	$R_{\theta JL}$	30	°C/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	120	°C/W

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above $T_A=25^{\circ}\text{C}$ per Fig.2.

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

Dimensions (DO-214AC/SMA)

Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
L	3.90	4.50	0.154	0.177
D	2.40	2.80	0.094	0.110
D1	1.30	1.70	0.051	0.067
T	4.80	5.30	0.189	0.208
T1	0.76	1.52	0.030	0.060
d	0.10	0.20	0.003	0.008
H	2.00	2.50	0.078	0.098

Electrical Characteristics (T_A=25°C)

Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @I _T	Test Current	Maximum Clamping Voltage@ I _{PP}	Peak Pulse Current	Reverse Leakage @V _{RWM}
Unidirectional	Bidirectional	UNI	BI	V _{RWM} (V)	V _{BR} (V)	I _T (mA)	V _C (V)	I _{PP} (A)	I _R (μA)
SMAJ5.0A-AR	SMAJ5.0CA-AR	AE	WE	5.0	6.4~7.0	10	9.2	43.5	800
SMAJ6.0A-AR	SMAJ6.0CA-AR	AG	WG	6.0	6.7~7.4	10	10.3	38.8	800
SMAJ6.5A-AR	SMAJ6.5CA-AR	AK	WK	6.5	7.2~8.0	10	11.2	35.7	500
SMAJ7.0A-AR	SMAJ7.0CA-AR	AM	WM	7.0	7.8~8.6	10	12.0	33.3	200
SMAJ7.5A-AR	SMAJ7.5CA-AR	AP	WP	7.5	8.3~9.2	1	12.9	31.0	100
SMAJ8.0A-AR	SMAJ8.0CA-AR	AR	WR	8.0	8.9~9.8	1	13.6	29.4	50
SMAJ8.5A-AR	SMAJ8.5CA-AR	AT	WT	8.5	9.4~10.4	1	14.4	27.8	10
SMAJ9.0A-AR	SMAJ9.0CA-AR	AV	WV	9.0	10.0~11.0	1	15.4	26.0	5
SMAJ10A-AR	SMAJ10CA-AR	AX	WX	10.0	11.1~12.3	1	17.0	23.5	5
SMAJ11A-AR	SMAJ11CA-AR	AZ	WZ	11.0	12.2~13.5	1	18.2	22.0	1
SMAJ12A-AR	SMAJ12CA-AR	BE	XE	12.0	13.3~14.7	1	19.9	20.1	1
SMAJ13A-AR	SMAJ13CA-AR	BG	XG	13.0	14.4~15.9	1	21.5	18.6	1
SMAJ14A-AR	SMAJ14CA-AR	BK	XK	14.0	15.6~17.2	1	23.2	17.2	1
SMAJ15A-AR	SMAJ15CA-AR	BM	XM	15.0	16.7~18.5	1	24.4	16.4	1
SMAJ16A-AR	SMAJ16CA-AR	BP	XP	16.0	17.8~19.7	1	26.0	15.4	1
SMAJ17A-AR	SMAJ17CA-AR	BR	XR	17.0	18.9~20.9	1	27.6	14.5	1
SMAJ18A-AR	SMAJ18CA-AR	BT	XT	18.0	20.0~22.1	1	29.2	13.7	1
SMAJ19A-AR	SMAJ19CA-AR	BW	XW	19.0	21.1~23.3	1	30.8	13.0	1
SMAJ20A-AR	SMAJ20CA-AR	BV	XV	20.0	22.2~24.5	1	32.4	12.4	1
SMAJ22A-AR	SMAJ22CA-AR	BX	XX	22.0	24.4~26.9	1	35.5	11.3	1
SMAJ24A-AR	SMAJ24CA-AR	BZ	XZ	24.0	26.7~29.5	1	38.9	10.3	1
SMAJ26A-AR	SMAJ26CA-AR	CE	YE	26.0	28.9~31.9	1	42.1	9.5	1

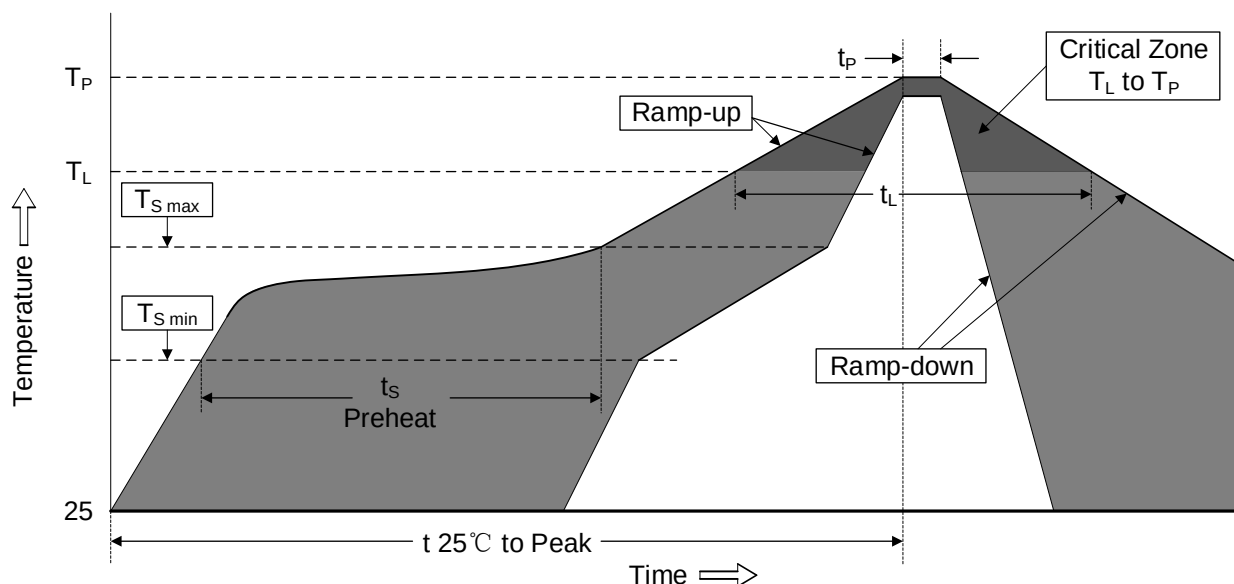
Electrical Characteristics (T_A=25°C)

Part Number		Device Marking Code		Reverse Stand-Off Voltage	Breakdown Voltage @I _T	Test Current	Maximum Clamping Voltage@ I _{PP}	Peak Pulse Current	Reverse Leakage @V _{RWM}
Unidirectional	Bidirectional	UNI	BI	V _{RWM} (V)	V _{BR} (V)	I _T (mA)	V _C (V)	I _{PP} (A)	I _R (μA)
SMAJ28A-AR	SMAJ28CA-AR	CG	YG	28.0	31.1~34.4	1	45.4	8.8	1
SMAJ30A-AR	SMAJ30CA-AR	CK	YK	30.0	33.3~36.8	1	48.4	8.3	1
SMAJ33A-AR	SMAJ33CA-AR	CM	YM	33.0	36.7~40.6	1	53.3	7.5	1
SMAJ36A-AR	SMAJ36CA-AR	CP	YP	36.0	40.0~44.2	1	58.1	6.9	1
SMAJ40A-AR	SMAJ40CA-AR	CR	YR	40.0	44.4~49.1	1	64.5	6.2	1
SMAJ43A-AR	SMAJ43CA-AR	CT	YT	43.0	47.8~52.8	1	69.4	5.8	1
SMAJ45A-AR	SMAJ45CA-AR	CV	YV	45.0	50.0~55.3	1	72.7	5.5	1
SMAJ48A-AR	SMAJ48CA-AR	CX	YX	48.0	53.3~58.9	1	77.4	5.2	1
SMAJ51A-AR	SMAJ51CA-AR	CZ	YZ	51.0	56.7~62.7	1	82.4	4.9	1
SMAJ54A-AR	SMAJ54CA-AR	RE	ZE	54.0	60.0~66.3	1	87.1	4.6	1
SMAJ58A-AR	SMAJ58CA-AR	RG	ZG	58.0	64.4~71.2	1	93.6	4.3	1
SMAJ60A-AR	SMAJ60CA-AR	RK	ZK	60.0	66.7~73.7	1	96.8	4.1	1
SMAJ64A-AR	SMAJ64CA-AR	RM	ZM	64.0	71.1~78.6	1	103.0	3.9	1
SMAJ70A-AR	SMAJ70CA-AR	RP	ZP	70.0	77.8~86.0	1	113.0	3.5	1
SMAJ75A-AR	SMAJ75CA-AR	RR	ZR	75.0	83.3~92.1	1	121.0	3.3	1
SMAJ78A-AR	SMAJ78CA-AR	RT	ZT	78.0	86.7~95.8	1	126.0	3.2	1
SMAJ80A-AR	SMAJ80CA-AR	RW	ZW	80.0	88.8~97.6	1	129.6	3.1	1
SMAJ85A-AR	SMAJ85CA-AR	RV	ZV	85.0	94.4~104	1	137.0	2.9	1
SMAJ90A-AR	SMAJ90CA-AR	RX	ZX	90.0	100~111	1	146.0	2.7	1
SMAJ100A-AR	SMAJ100CA-AR	RZ	ZZ	100.0	111~123	1	162.0	2.5	1
SMAJ110A-AR	SMAJ110CA-AR	SE	VE	110.0	122~135	1	177.0	2.3	1
SMAJ120A-AR	SMAJ120CA-AR	SG	VG	120.0	133~147	1	193.0	2.1	1
SMAJ130A-AR	SMAJ130CA-AR	SK	VK	130.0	144~159	1	209.0	1.9	1
SMAJ140A-AR	SMAJ140CA-AR	SW	VW	140.0	155~171	1	227.0	1.8	1
SMAJ150A-AR	SMAJ150CA-AR	SM	VM	150.0	167~185	1	243.0	1.7	1
SMAJ160A-AR	SMAJ160CA-AR	SP	VP	160.0	178~197	1	259.0	1.6	1
SMAJ170A-AR	SMAJ170CA-AR	SR	VR	170.0	189~209	1	275.0	1.5	1
SMAJ180A-AR	SMAJ180CA-AR	ST	VT	180.0	200~220	1	291.0	1.4	1
SMAJ190A-AR	SMAJ190CA-AR	SU	VU	190.0	211~232	1	308.0	1.3	1
SMAJ200A-AR	SMAJ200CA-AR	SV	VV	200.0	224~247	1	324.0	1.2	1
SMAJ220A-AR	SMAJ220CA-AR	SX	VX	220.0	246~272	1	356.0	1.1	1
SMAJ250A-AR	SMAJ250CA-AR	SZ	VZ	250.0	279~309	1	405.0	1.0	1
SMAJ300A-AR	SMAJ300CA-AR	TE	UE	300.0	335~371	1	486.0	0.8	1
SMAJ350A-AR	SMAJ350CA-AR	TG	UG	350.0	391~432	1	567.0	0.7	1
SMAJ400A-AR	SMAJ400CA-AR	TK	UK	400.0	447~494	1	648.0	0.6	1
SMAJ440A-AR	SMAJ440CA-AR	TM	UM	440.0	492~543	1	713.0	0.6	1

Notes: For bidirectional type having VRWM of 10V and less, the IR limit is double.

Recommended Soldering Conditions

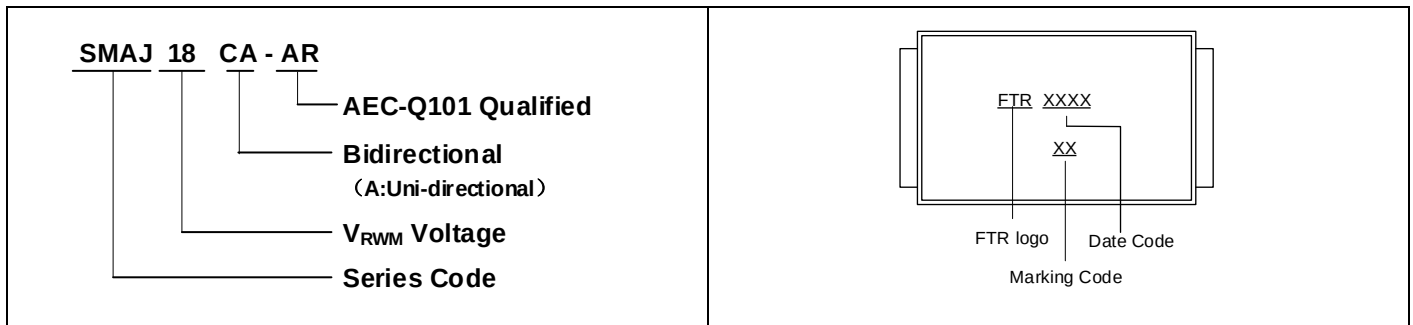
Reflow Soldering



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T _L to T _P)	3°C/second max.
Preheat -Temperature Min (T_{S min}) -Temperature Max (T_{S max}) -Time (min to max)(t_s)	150°C 200°C 60-180 seconds
T _{S max} to T _L -Ramp-up Rate	3°C/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	217°C 60-150 seconds
Peak Temperature (T _P)	260°C
Time within 5°C of actual Peak Temperature (t _p)	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

Partnumbercode



Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

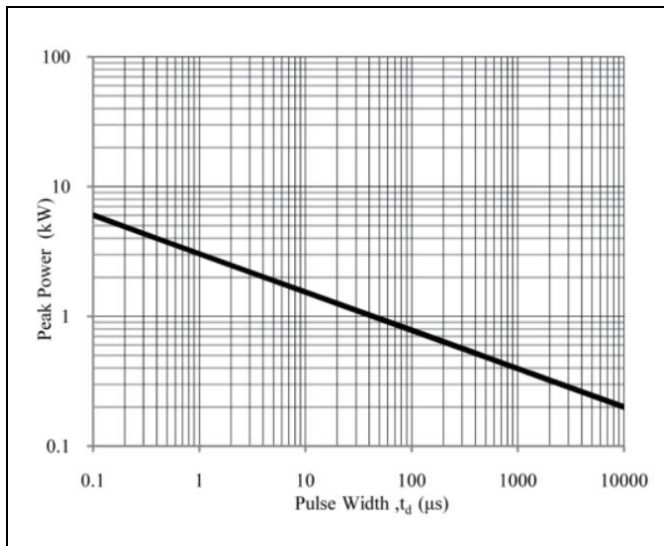


Figure 2. Pulse Derating Curve

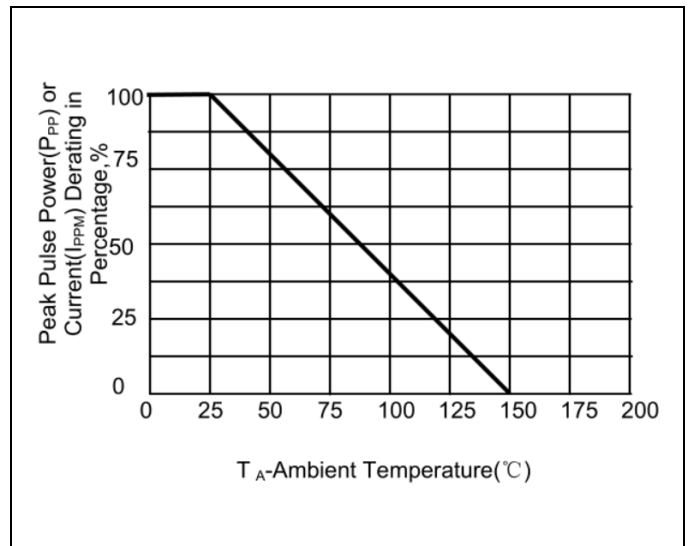


Figure 3. Pulse Waveform

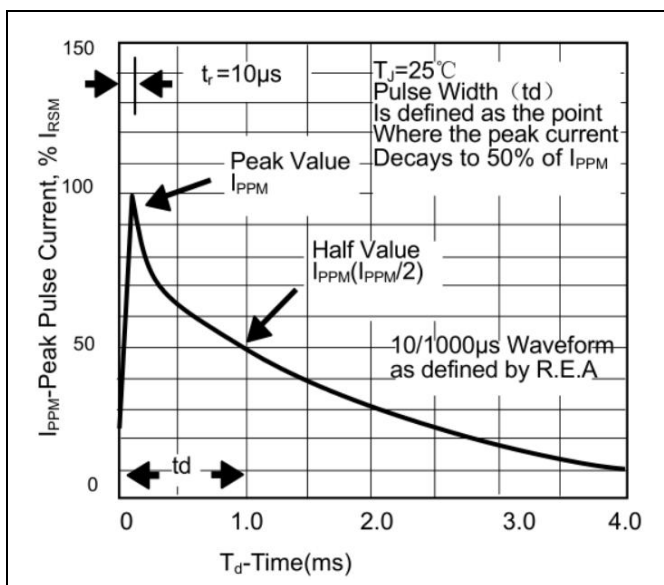
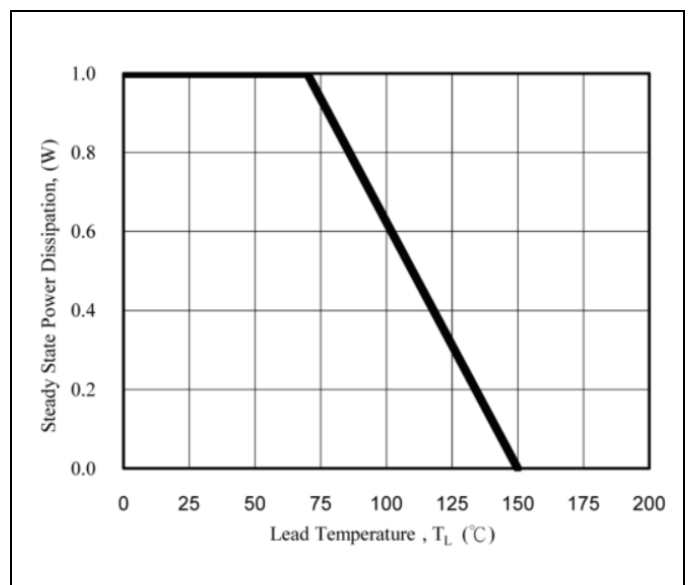


Figure 4. Steady State Power Dissipation Derating Curve



Packaging

Tape	Symbol		Dimension (mm)	
	W		12.00±0.10	
	P0		4.00±0.10	
	P1		4.00±0.10	
	P2		2.00±0.10	
	D0		Φ1.55±0.10	
	E		1.75±0.10	
	F		5.50±0.10	
	A0		2.80±0.1	
	B0		5.30±0.1	
	K0		2.36±0.1	
	T		0.25±0.1	
Reel	D5		Φ330.0±2.0	
	D6		Φ12.0±0.5	
	W2		14.0±2.0	
	Quantity: 5000PCS			

