

Surface Mount Transient Voltage Suppressors (TVS)

SM5S Series
10 To 43 V
3600W
DO-218AB

Description

The SM5S series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

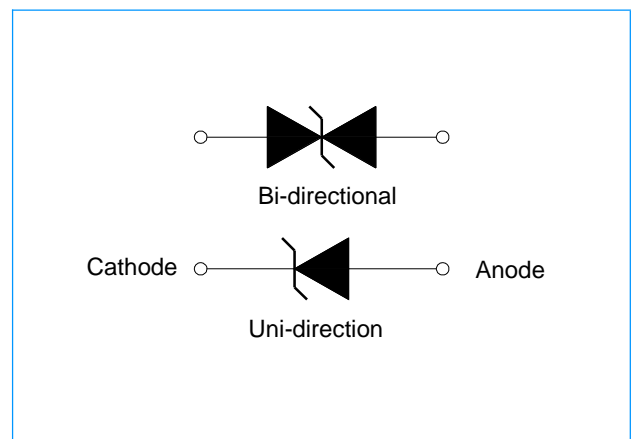
- u Optimized glass passivated chip
- u $T_J=175^{\circ}\text{C}$ capability suitable for high reliability and automotive requirement
- u 3600W peak pulse power capability with a 10/1000 μs waveform, repetitive rate (duty cycle):0.01 %
- u Meet ISO7637-2 5a/5b and ISO 16750 load dump test (varied by test condition)
- u Meet AEC-Q101 qualified
- u Low leakage current
- u Low forward voltage drop
- u Excellent clamping capability
- u Very fast response time
- u RoHS compliant

Mechanical Data

- u Case: DO-218AB
- u Molding compound: UL94V-0 flammability



Functional Diagram



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

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation with a 10/1000 μs waveform ①	P_{PP}	3600	W
Peak Pulse Current with a 10/1000 μs waveform ①	I_{PP}	See Next Table	A
Power Dissipation on Infinite Heatsink at $T_L=25^{\circ}\text{C}$	P_D	5.0	W
Operating junction and Storage Temperature Range	T_J, T_{STG}	- 55 to + 175	$^{\circ}\text{C}$
Peak Forward Surge Current 8.3ms Single Half Sine-wave	I_{FSM}	500	A

Notes:

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

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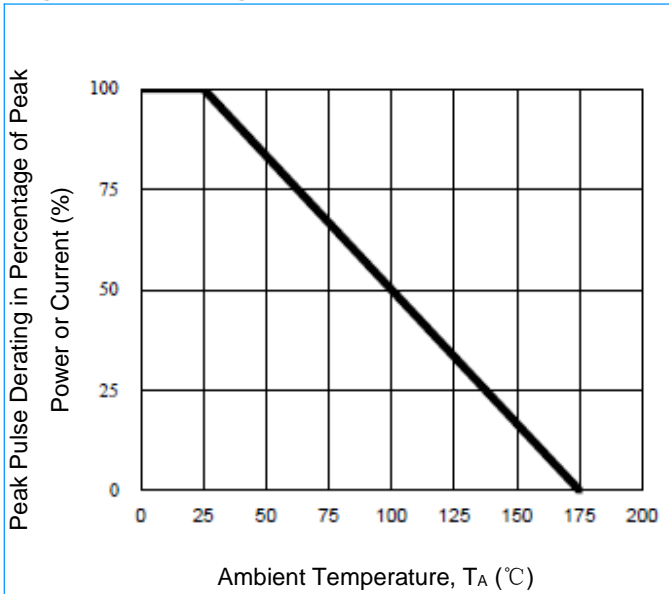
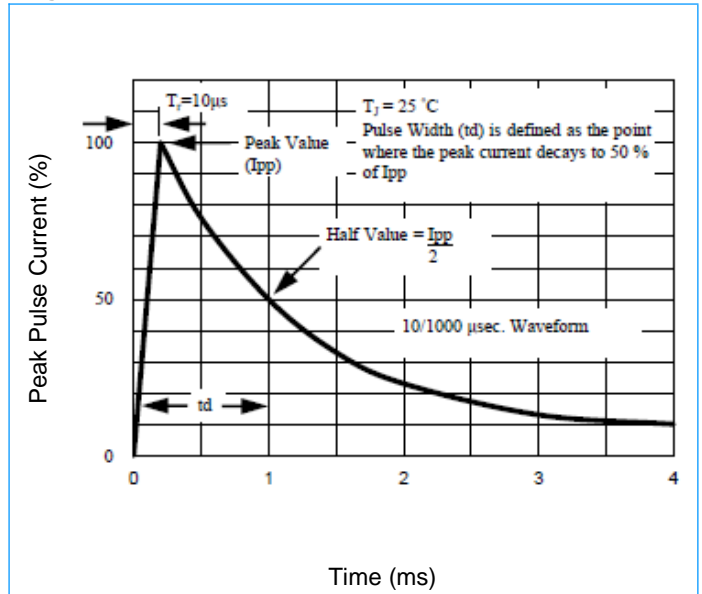
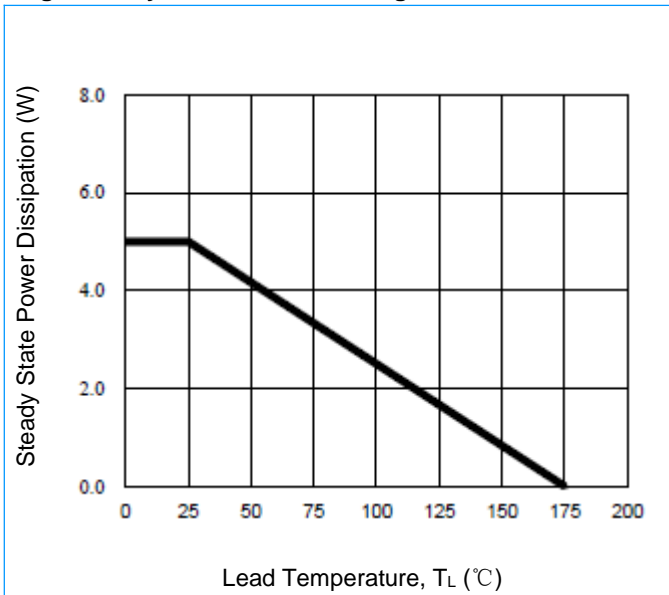
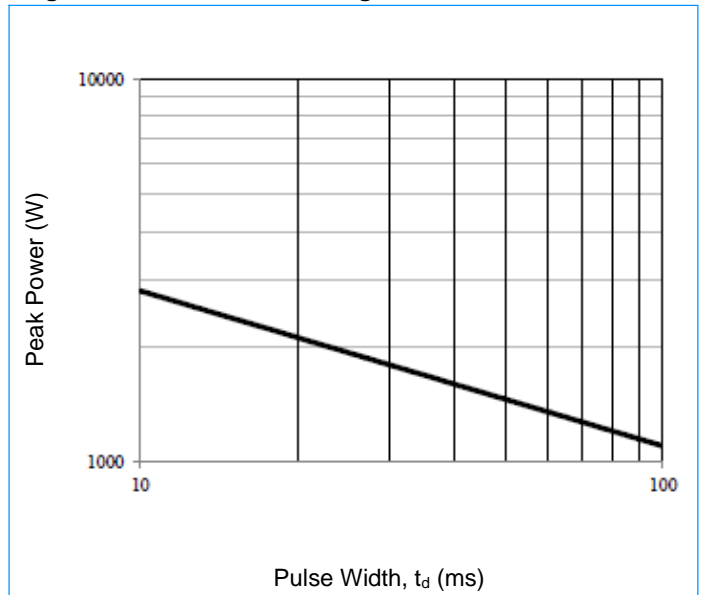
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Electrical Characteristics (T_A=25°C unless otherwise noted)

Part Number		Working Peak Reverse Voltage V _{RWM} (V)	Breakdown Voltage V _{BR} (V)		Test Current I _T (mA)	Maximum Reverse Leakage I _R @ V _{RWM} (μA)	Maximum I _R @ V _{RWM} T _J =175°C (μA)	Maximum Reverse Surge Current I _{PP} (A) ①	Maximum Clamping Voltage V _C @ I _{PP} (V)
Uni	Bi		Min.	Max.					
SM5S10AD	SM5S10CAD	10.0	11.1	12.3	5.0	15	250	212	17.0
SM5S11AD	SM5S11CAD	11.0	12.2	13.5	5.0	10	150	198	18.2
SM5S12AD	SM5S12CAD	12.0	13.3	14.7	5.0	10	150	181	19.9
SM5S13AD	SM5S13CAD	13.0	14.4	15.9	5.0	10	150	167	21.5
SM5S14AD	SM5S14CAD	14.0	15.6	17.2	5.0	10	150	155	23.2
SM5S15AD	SM5S15CAD	15.0	16.7	18.5	5.0	10	150	148	24.4
SM5S16AD	SM5S16CAD	16.0	17.8	19.7	5.0	10	150	138	26.0
SM5S17AD	SM5S17CAD	17.0	18.9	20.9	5.0	10	150	130	27.6
SM5S18AD	SM5S18CAD	18.0	20.0	22.1	5.0	10	150	123	29.2
SM5S20AD	SM5S20CAD	20.0	22.2	24.5	5.0	10	150	111	32.4
SM5S22AD	SM5S22CAD	22.0	24.4	26.9	5.0	10	150	101	35.5
SM5S24AD	SM5S24CAD	24.0	26.7	29.5	5.0	10	150	93	38.9
SM5S26AD	SM5S26CAD	26.0	28.9	31.9	5.0	10	150	86	42.1
SM5S28AD	SM5S28CAD	28.0	31.1	34.4	5.0	10	150	79	45.4
SM5S30AD	SM5S30CAD	30.0	33.3	36.8	5.0	10	150	74	48.4
SM5S33AD	SM5S33CAD	33.0	36.7	40.6	5.0	10	150	68	53.3
SM5S36AD	SM5S36CAD	36.0	40.0	44.2	5.0	10	150	62	58.1
SM5S40AD	SM5S40CAD	40.0	44.4	49.1	5.0	10	150	56	64.5
SM5S43AD	SM5S43CAD	43.0	47.8	52.8	5.0	10	150	52	69.4

Notes:

- Surge current waveform is defined at 10/1000μS waveform.
- For all types maximum V_F = 2.0 V at I_F = 100 A measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum.

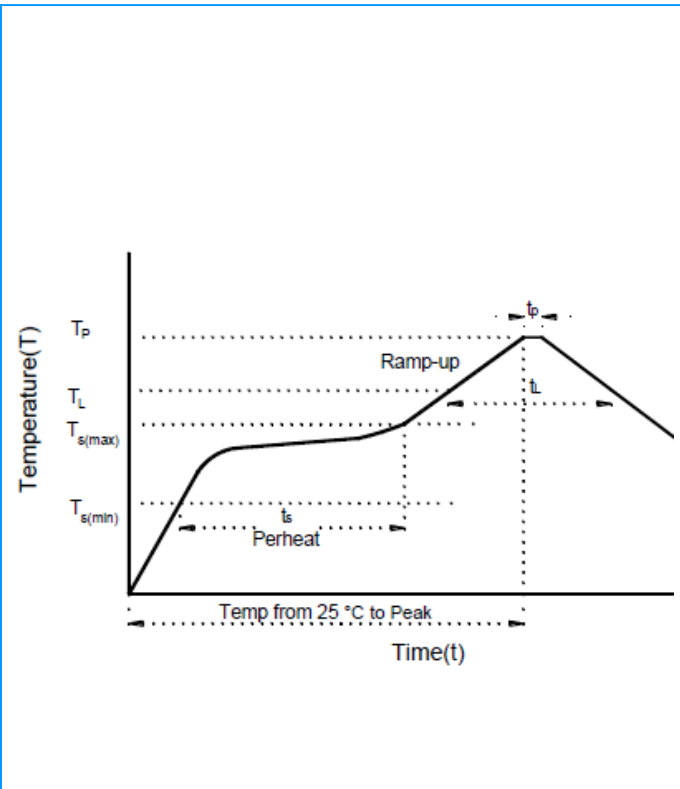
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Ratings and Characteristics Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)
Fig1. Pulse Derating Curve

Fig2. Pulse Waveform

Fig3. Steady State Power Derating Curve

Fig4. Peak Pulse Power Rating Curve


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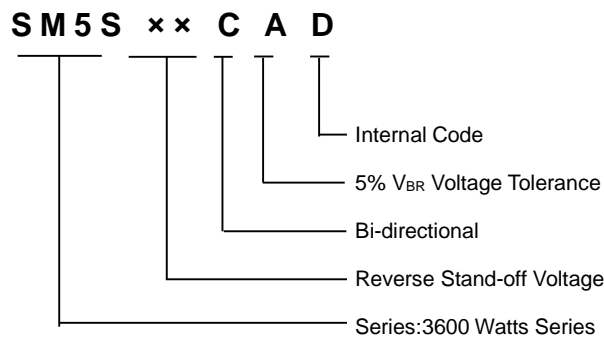
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Recommended Soldering Parameters



IR - Reflow Condition		Pb-Free assembly
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max ($T_{s(max)}$)	+200°C
	- Time (Min to Max) (T_s)	60 -180 secs.
Average ramp up rate (Liquid μs Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate (220 - 200°C)		3°C/sec. Max
Reflow	- Temperature (T_L) (Liquid μ s)	>220°C
	- Time (t_L)	60 -150 secs.
Peak Temperature (T_P)		+245°C
Time within 5°C of actual peak Temperature (t_p)		10 - 30 secs.
Ramp-down Rate		5°C/sec. Max
Time 25°C to Peak Temperature (T_P)		6 min. Max
Do not exceed		+280°C

Part Numbering



Packaging

Part Number	Component Package	Quantity	Packaging Option
SM5S Series	DO-218AB	500 PCS	13" diameter plastic tape and reel, anode towards the sprocket hole

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Package Outline Dimensions (Unit: millimeters)
