

# 4600W Transient Voltage Suppressor (TVS)

**SM6S Series**
**10 To 36 V**
**4600W**
**DO-218AB**

## Features

- u Junction passivation optimized design passivated anisotropic rectifier technology
- u  $T_J = 175^{\circ}\text{C}$  capability suitable for high reliability and automotive requirement.
- u Available in uni/bi-directional polarity only
- u Low leakage current
- u Low forward voltage drop
- u High surge capability
- u Meets ISO7637-2 surge specification (varied by test condition)
- u Meets MSL level 1, per J-STD-020, LF maximum peak of  $245^{\circ}\text{C}$
- u AEC-Q101 qualified
- u Compliant to ROHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

**DO-218AB**


## Typical Applications

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting, especially for automotive load dump protection application.

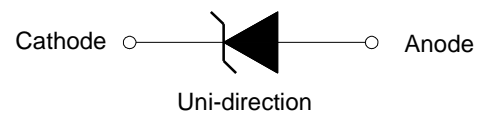
## Mechanical Data

**Case:** DO-218AB

Molding compound meets UL 94 V-0 flammability rating  
 Base P/NHE3 - RoHS-compliant, AEC-Q101 qualified

**Terminals:** Matte tin plated leads, solderable per J-STD-002.

## Functional Diagram



## Maximum Ratings ( $T_C=25^{\circ}\text{C}$ , RH=45%-75%, unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation on 10/1000 $\mu\text{s}$ waveform	$P_{PPM}$	4600	W
Peak pulse power dissipation on 10/10000 $\mu\text{s}$ waveform		3600	W
Peak pulse current with 10/1000 $\mu\text{s}$ waveform	$I_{PPM}^{(1)}$	See Next Table	A
Power dissipation on infinite heat Sink at $T_C=25^{\circ}\text{C}$	$P_D$	6.0	W
Peak forward surge current, 8.3 ms single half sine-wave	$I_{FSM}$	600	A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175	$^{\circ}\text{C}$
Typical thermal resistance, junction to case	$R_{\theta JC}$	0.9	$^{\circ}\text{C}/\text{W}$

**Note:**

(1) Non-repetitive current pulse derated above  $T_A=25^{\circ}\text{C}$ .

## 4600W Transient Voltage Suppressor (TVS)

**SM6S Series**
**10 To 36 V**
**4600W**
**DO-218AB**

### Electrical Characteristics

Part Number	$V_R$	$I_R @ V_R$		$V_{BR} @ I_T$		$I_T$	$V_C @ I_{PP}$	$I_{PP}$
	(V)	$\mu A @ 25^\circ C$	$\mu A @ T_J = 175^\circ C$	min(V)	max(V)	mA	(V)	A
SM6S10AE	10.0	5	250	11.1	12.3	5	17.0	271
SM6S11AE	11.0	5	150	12.2	13.5	5	18.2	253
SM6S12AE	12.0	5	150	13.3	14.7	5	19.9	231
SM6S13AE	13.0	5	150	14.4	15.9	5	21.5	214
SM6S14AE	14.0	5	150	15.6	17.2	5	23.2	198
SM6S15AE	15.0	5	150	16.7	18.5	5	24.4	189
SM6S16AE	16.0	5	150	17.8	19.7	5	26.0	177
SM6S17AE	17.0	5	150	18.9	20.9	5	27.6	167
SM6S18AE	18.0	5	150	20.0	22.1	5	29.2	158
SM6S20AE	20.0	5	150	22.2	24.5	5	32.4	142
SM6S22AE	22.0	5	150	24.4	26.9	5	35.5	130
SM6S24AE	24.0	5	150	26.7	29.5	5	38.9	118
SM6S26AE	26.0	5	150	28.9	31.9	5	42.1	109
SM6S28AE	28.0	5	150	31.1	34.4	5	45.4	101
SM6S30AE	30.0	5	150	33.3	36.8	5	48.4	95
SM6S33AE	33.0	5	150	36.7	40.6	5	53.3	86
SM6S36AE	36.0	5	150	40.0	44.2	5	58.1	79

**Note:**

①. For all types maximum  $V_F = 1.9 V$  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.

②. Surge waveform: 10/1000 $\mu s$

$V_R$ : Stand-off Voltage -- Maximum voltage that can be applied

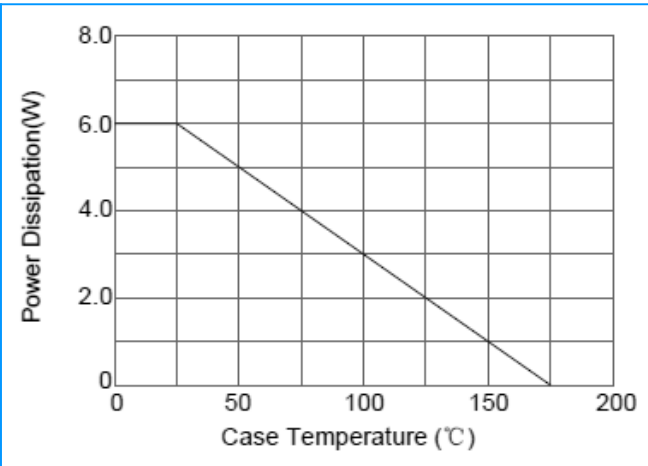
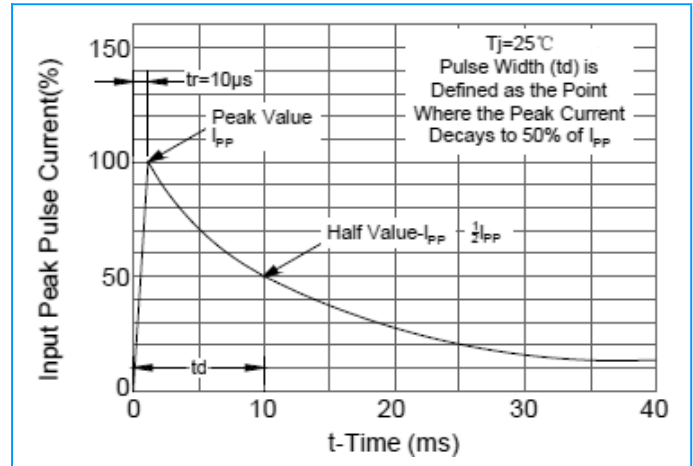
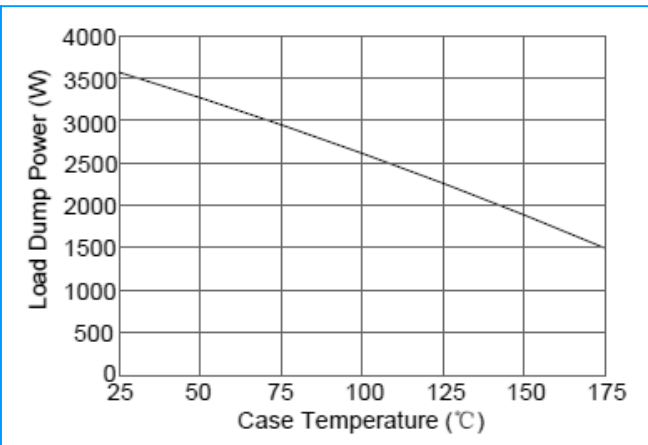
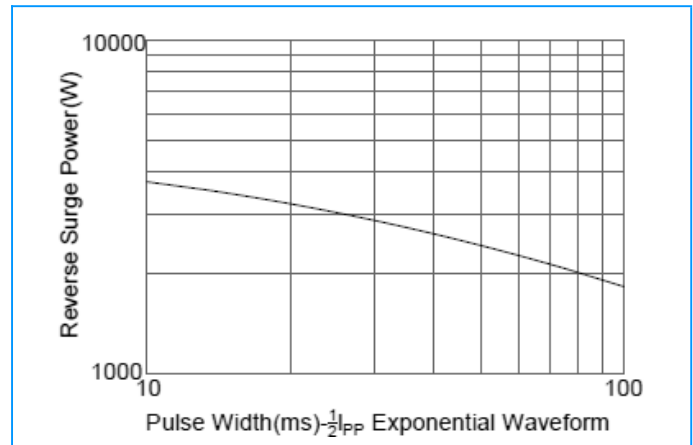
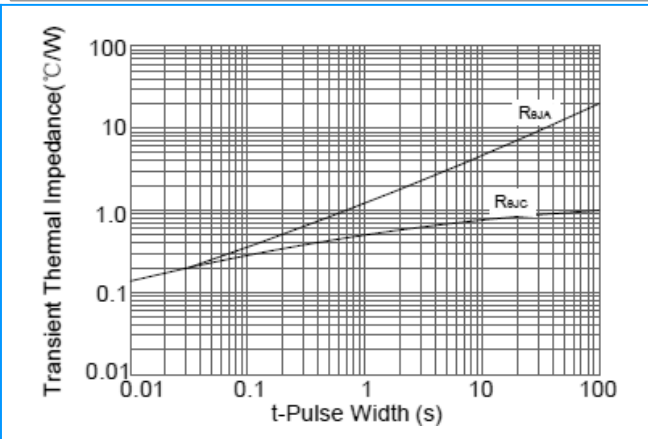
$V_{BR}$ : Breakdown Voltage

$V_C$ : Clamping Voltage -- Peak voltage measured across the suppressor at a specified  $I_{PP}$

$I_R$ : Reverse Leakage Current

$I_T$ : Test current

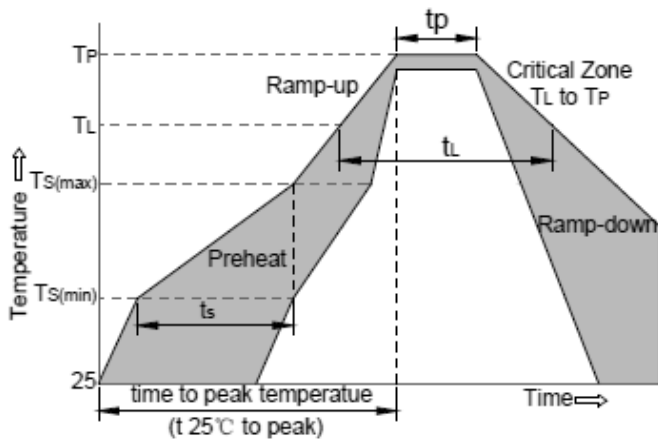
# 4600W Transient Voltage Suppressor (TVS)

**SM6S Series**
**10 To 36 V**
**4600W**
**DO-218AB**
**Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$  unless otherwise noted)**
**Fig.1 : Power Derating Curve**

**Fig.2 : Pulse Waveform**

**Fig.3 : Load Dump Power Characteristics (10 ms Exponential Waveform)**

**Fig.4 : Reverse Power Capability**

**Fig.5 : Typical Transient Thermal Impedance**


# 4600W Transient Voltage Suppressor (TVS)

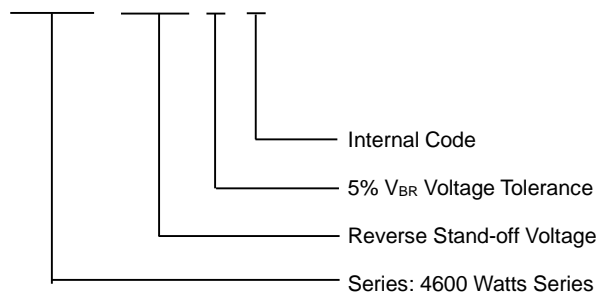
**SM6S Series**
**10 To 36 V**
**4600W**
**DO-218AB**

## Soldering Parameters

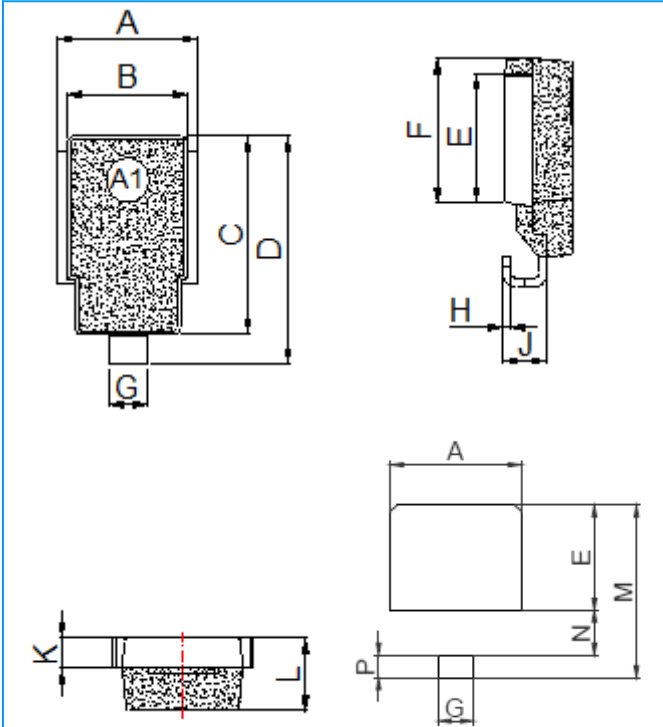
**Fig.6 : Reflow Condition**


<b>Reflow Condition</b>		Pb-Free assembly (see Fig.6)
<b>Pre Heat</b>	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max ( $T_{s(max)}$ )	+200°C
	- Time (Min to Max) ( $T_s$ )	60 -180 secs.
<b>Average ramp up rate (Liquid <math>\mu</math>s Temp (<math>T_L</math>) to peak)</b>		3°C/sec. Max
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		3°C/sec. Max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquid $\mu$ s)	+217°C
	- Time ( $t_L$ )	60 -150 secs.
<b>Peak Temperature (<math>T_P</math>)</b>		+260(+0/-5)°C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		30 secs. Max
<b>Ramp-down Rate</b>		6°C/sec. Max
<b>Time 25°C to Peak Temperature (<math>T_P</math>)</b>		8 min. Max
<b>Do not exceed</b>		+260°C

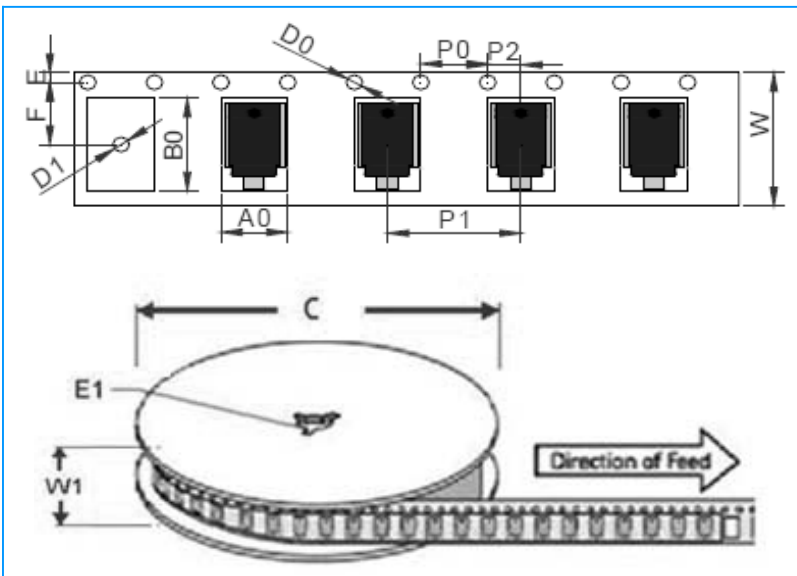
## Part Numbering

**SM6S x x A E**


# 4600W Transient Voltage Suppressor (TVS)

**SM6S Series**
**10 To 36 V**
**4600W**
**DO-218AB**
**DO-218AB Package Mechanical Data**


Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	9.5	10.5	0.374	0.413
B	8.3	8.7	0.327	0.342
C	13.3	13.7	0.524	0.539
D	15.0	16.0	0.592	0.628
E	8.5	9.1	0.335	0.358
F	9.5	10.1	0.374	0.398
G	2.5	3.6	0.098	0.141
H	0.5	0.7	0.020	0.028
J	2.7	3.7	0.106	0.146
K	1.9	2.1	0.075	0.083
L	4.7	5.1	0.185	0.201
M	14.2	14.8	0.559	0.583
N	3.5	4.1	0.138	0.161
P	1.6	2.2	0.063	0.087

**DO-218AB Tape and Reel Specification**


Ref.	Dimensions	
	Millimeters	Inches
A0	10.80 ± 0.3	0.425 ± 0.012
B0	16.13 ± 0.3	0.635 ± 0.012
C	330.0 ± 0.3	13.0 ± 0.012
D0	1.55 ± 0.2	0.061 ± 0.008
D1	1.55 ± 0.2	0.061 ± 0.008
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.30 ± 0.2	0.524 ± 0.008
F	11.50 ± 0.2	0.453 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	16.00 ± 0.2	0.630 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	24.00 ± 0.2	0.945 ± 0.008
W1	25.85 ± 0.2	1.018 ± 0.008

**Ordering Information**

Part Number	Component Package	Quantity	Packaging Option
SM6S Series	DO-218AB	500 PCS	13" diameter plastic tape and reel, anode towards the sprocket hole