

## Surface Mount Transient Voltage Suppressors

High temperature stability and high reliability conditions



DO-218AB



### FEATURES

- Junction passivation optimized design passivated anisotropic rectifier technology.
- $T_J = 175^\circ\text{C}$  capability suitable for high reliability and automotive requirement.
- Available in uni-directional polarity only.
- Low leakage current.
- Low forward voltage drop.
- High surge capability.
- Meets ISO16750-2 surge specification(varied by test condition).
- Meets MSL-1, per J-STD-020, LF maximum peak of  $245^\circ\text{C}$ .
- AEC-Q101 qualified..
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC.

PRIMARY CHARACTERISTICS	
$V_R$	10V to 43V
$P_{PP}$ (10/1000 $\mu\text{s}$ )	6600W
$P_{PP}$ (10/10000 $\mu\text{s}$ )	5200W
$P_D$	8W
$I_{FSM}$	700A
$T_{Jmax}$	$175^\circ\text{C}$
Polarity	Uni-directional
Package	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 94V-0 flammability rating

Base P/NHE3-RoHS-compliant, AEC-Q101 qualified

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

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	$P_{PP}$	6600	Watts
Peak pulse power dissipation on 10/10000 $\mu\text{s}$ waveform		5200	Watts
Power dissipation on infinite heat sink at $T_C=25^\circ\text{C}$	$P_D$	8.0	Watts
Peak pulse current with 10/1000 $\mu\text{s}$ waveform	$I_{PPM}^{(1)}$	See next table	Amps
Peak forward surge current, 8.3ms single half sine-wave	$I_{FSM}$	700	Amps
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	$^\circ\text{C/W}$

**Note:**

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

ELECTRICAL CHARACTERISTICS								
Part Number	$V_R$	$I_T$	$I_R@V_R$		$V_{BR}@I_T$		$V_C@I_{PP}$	$I_{PP}$
Uni-polar	V	mA	$\mu A@25^\circ C$	$\mu A@175^\circ C$	min(V)	max (V)	V	A
SM8S10A	10.0	5	5	250	11.1	12.3	17.0	388
SM8S11A	11.0	5	5	150	12.2	13.5	18.2	363
SM8S12A	12.0	5	5	150	13.3	14.7	19.9	332
SM8S13A	13.0	5	5	150	14.4	15.9	21.5	307
SM8S14A	14.0	5	5	150	15.6	17.2	23.2	284
SM8S15A	15.0	5	5	150	16.7	18.5	24.4	270
SM8S16A	16.0	5	5	150	17.8	19.7	26.0	253
SM8S17A	17.0	5	5	150	18.9	20.9	27.6	239
SM8S18A	18.0	5	5	150	20.0	22.1	29.2	226
SM8S20A	20.0	5	5	150	22.2	24.5	32.4	204
SM8S22A	22.0	5	5	150	24.4	26.9	35.5	186
SM8S24A	24.0	5	5	150	26.7	29.5	38.9	170
SM8S26A	26.0	5	5	150	28.9	31.9	42.1	157
SM8S28A	28.0	5	5	150	31.1	34.4	45.4	145
SM8S30A	30.0	5	5	150	33.3	36.8	48.4	136
SM8S32A	32.0	5	5	150	35.5	39.4	51.4	128.5
SM8S33A	33.0	5	5	150	36.7	40.6	53.3	124
SM8S36A	36.0	5	5	150	40.0	44.2	58.1	114
SM8S40A	40.0	5	5	150	44.4	49.1	64.5	102
SM8S43A	43.0	5	5	150	47.8	52.8	69.4	95.1

**Note:**

①. For all types maximum  $V_F=1.8V$  at  $I_F=100A$  measured on 8.3ms 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

**ORDERING INFORMATION**

<b>SM8S</b> SM8S 6600W Series	<b>XX</b> $V_R$ voltage	<b>A</b> 5% $V_{BR}$ Voltage tolerance
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RATINGS AND CHARACTERISTICS CURVES ( $T_A=25^{\circ}\text{C}$ , unless otherwise noted)

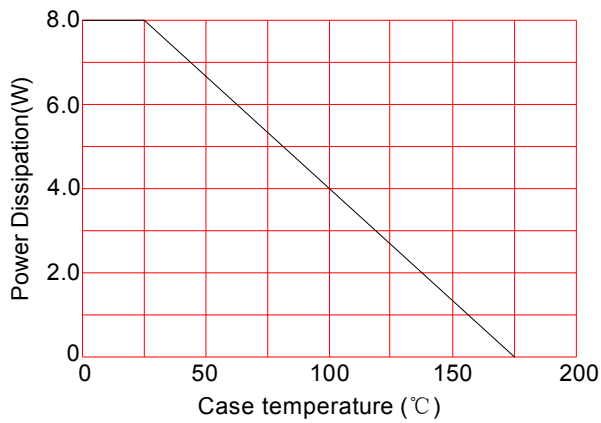


FIG.1: Power derating curve

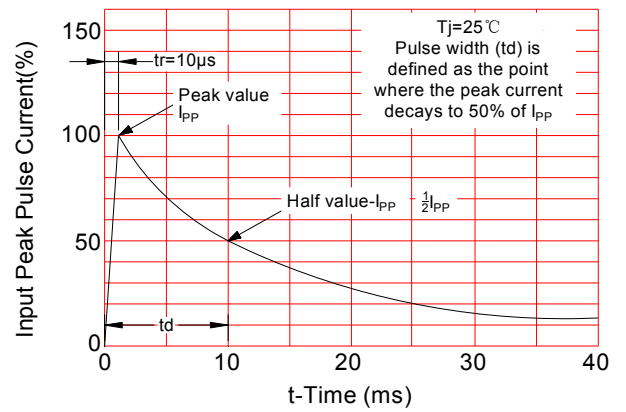


FIG.2: Pulse waveform

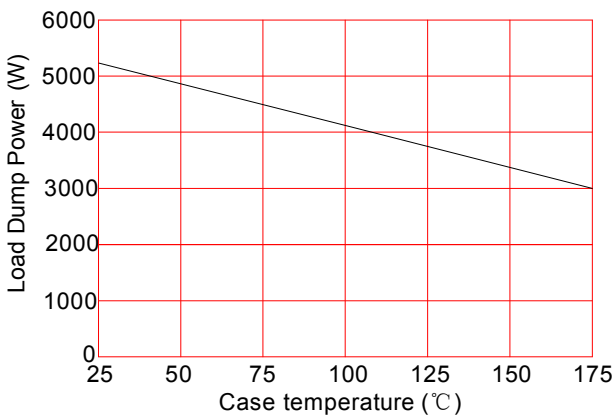


FIG.3: Load dump power characteristics (10ms exponential waveform)

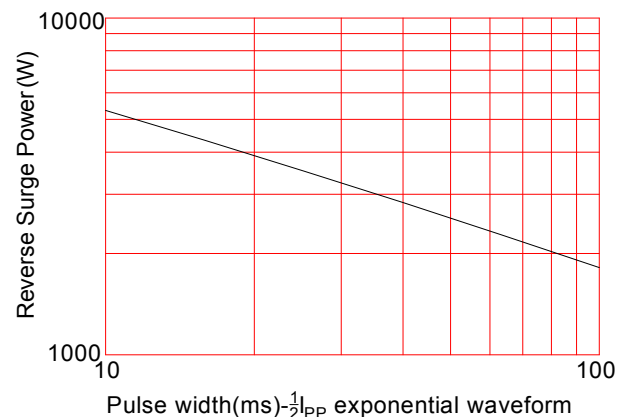


FIG.4: Reverse power capability

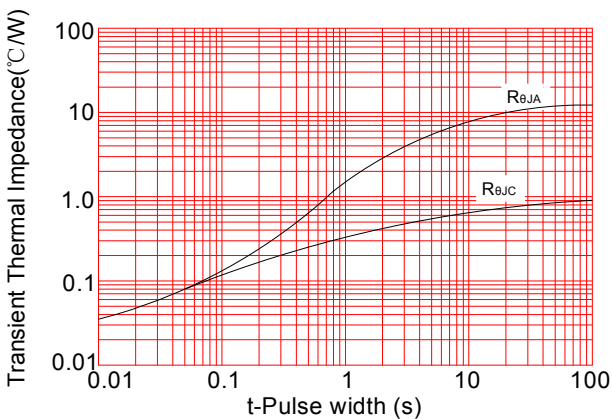


FIG.5: Typical transient thermal impedance

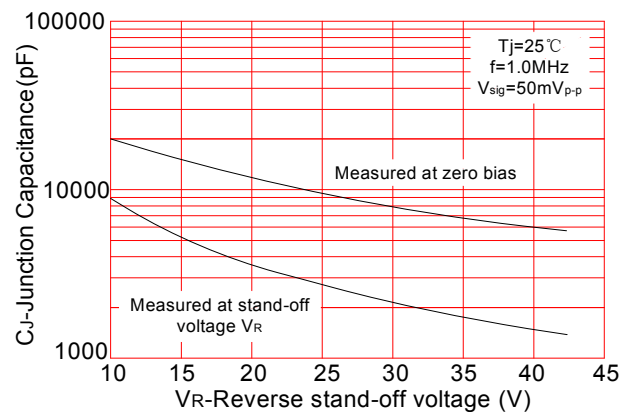
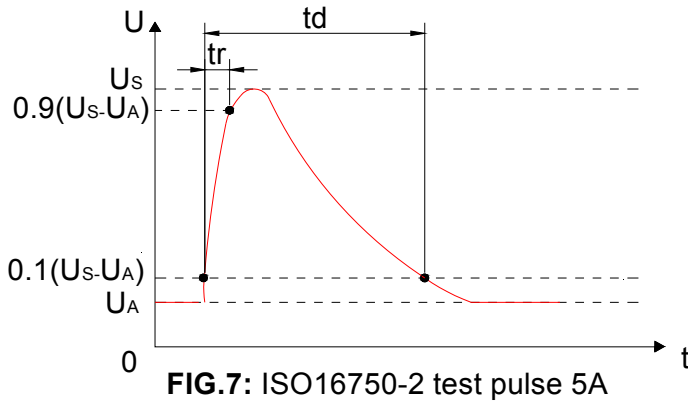
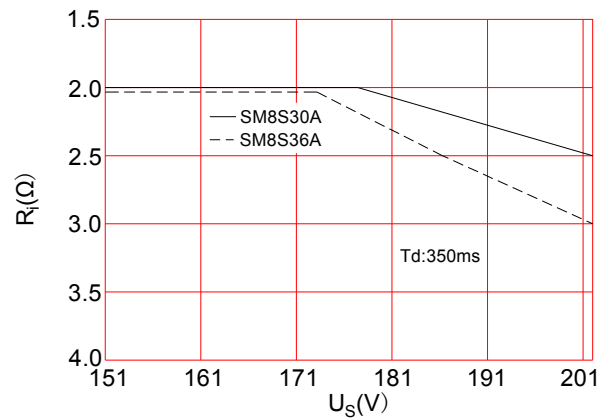
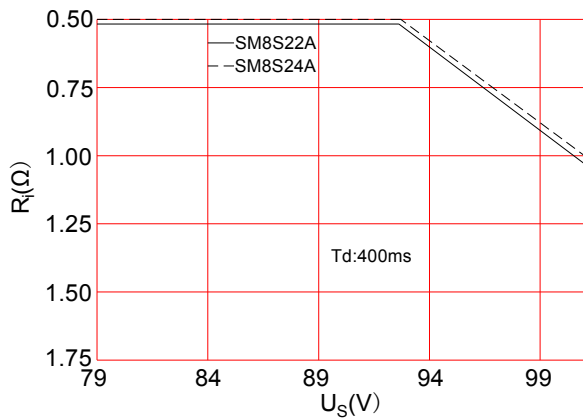


FIG.6: Typical junction capacitance

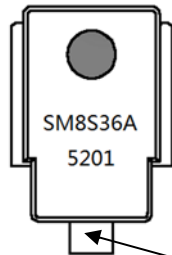


Parameter	12V system	24V system
Us	79~101V	151~202V
Ri	0.5~4Ω	1~8Ω
td	40~400ms	100~350ms
tr	5~10ms	5~10ms

**FIG.8: Parameters for test pulse 5A**



**MARKING**



**SM8S36A:** Device marking code

**5201:** “5” --2015 (year)

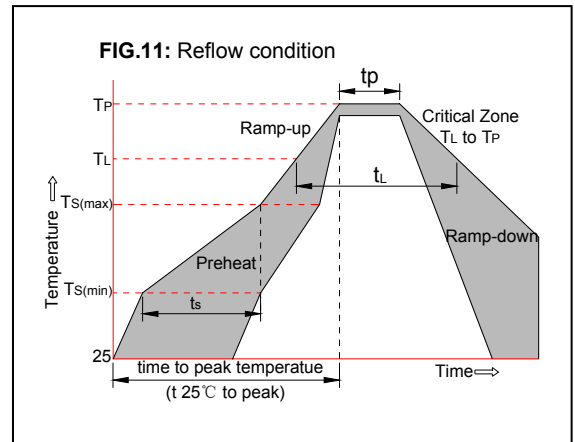
“2” --2 (month)

“01” -- (lot)

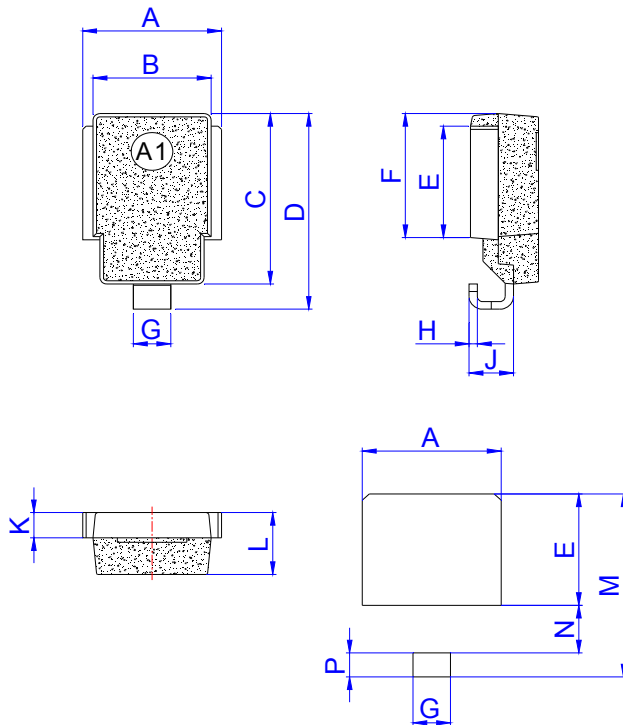
Cathode

**SOLDERING PARAMETERS**

Reflow Condition		Pb-Free assembly (see FIG.11)
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 (Liquidus Temp ( $T_L$ )to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ )(Liquidus)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_p$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		20-40secs.
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_p$ )		8 min. Max
Do not exceed		+260°C



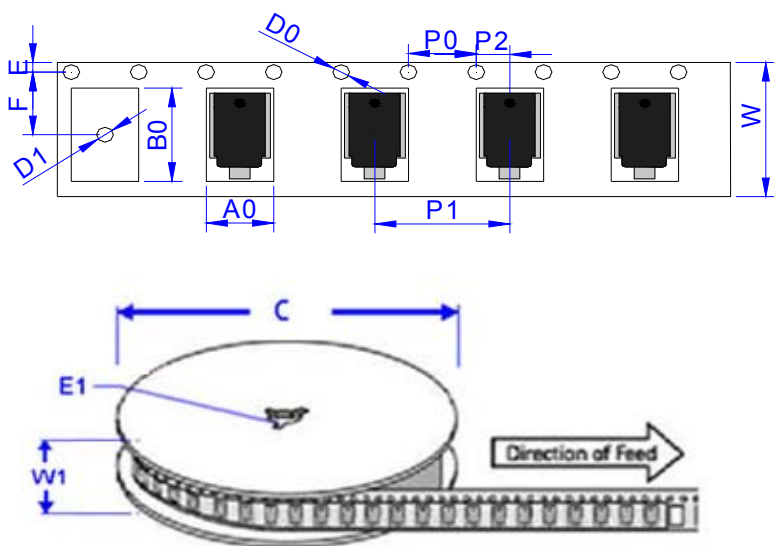
**PACKAGE MECHANICAL DATA**



DO-218AB

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	2.4	3.0	0.094	0.118
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

TAPE AND REEL SPECIFICATION-DO-218AB



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 No.	UNIT WEIGHT (g)typ	REEL (PCS)	PER CARTON (PCS)	DESCRIPTION
SM8SxxA	2.985	750	3000	13 inch reel pack

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