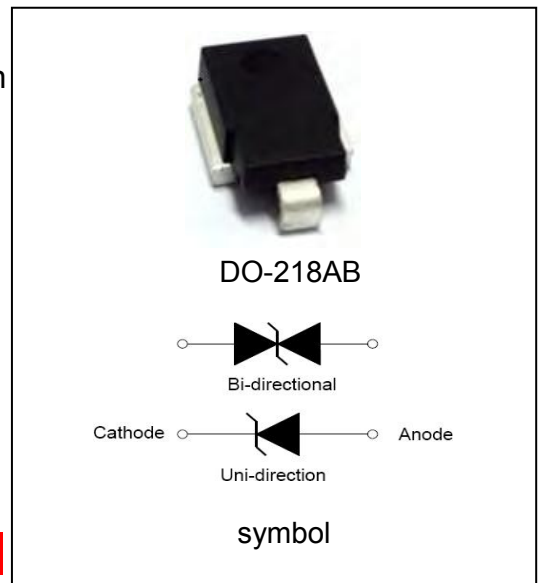


DESCRIPTION:

The SM5S series of high current uni/bi-directional transient suppressors are designed for A.C. line protection and high power DC bus clamping applications. These devices offer uni/bi-directional port protection from 20 volts to 43 volts. They provide a clamping voltage lower than the avalanche voltage. Therefore, any voltage rise due to increased current conduction is contained to a minimum, providing the best possible protection level. They can also be connected in series and/or parallel to create very high capacity protection solutions.



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/bi-directional polarity only.
- ✧ Low leakage current.
- ✧ Low forward voltage drop.
- ✧ High surge capability.
- ✧ Meets ISO7637-2 surge specification (varied by test condition).
- ✧ Meets MSL level 1, per J-STD-020, LF maximum peak of 245°C .
- ✧ AEC-Q101 qualified.
- ✧ Compliant to ROHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC.

IEC COMPATIBILITY:

- ✧ ISO16750-2 P5A 12V system (90V/4 Ω /200ms 10c)
- ✧ ISO16750-2 P5A 24V system (151V/8 Ω /200ms 10c)

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 and JESD 22-B102HE3 suffix meets JESD 201 class 2 whisker test.

TYPICAL APPLICATIONS:

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

MAXIMUM RATINGS (TC=25°C, RH=45%-75%, unless otherwise)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation with 10/1000μs waveform	P _{PPM}	3600	Watts
Peak pulse power dissipation with 10/10000μs waveform		2800	Watts
Power dissipation on infinite heat Sink at TC=25°C	P _D	5.0	Watts
Peak pulse current with 10/1000μs waveform	⁽¹⁾ I _{PPM}	See next table	Amps
Peak forward surge current, 8.3ms single half sine-wave	I _{FSM}	500	Amps
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C
Typical thermal resistance, junction to case	R _{θJC}	0.9	°C/W

Note
⁽¹⁾ Non-repetitive current pulse derated above TA=25°C

PRIMARY CHARACTERISTICS

V _R	10 V to 36 V
P _{PPM} (10/1000μs)	3600W
P _{PPM} (10/10000μs)	2800W
P _D	5 W
I _{FSM}	500A
T _{Jmax}	175°C
Package	DO-218AB

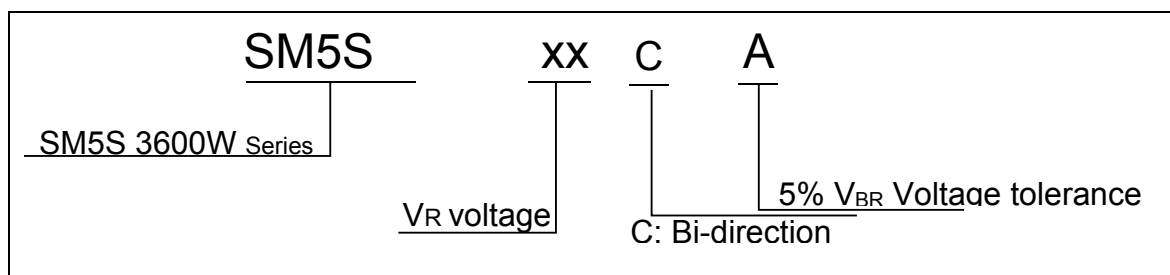
ELECTRICAL CHARACTERISTICS (TA=25°C)

Part Number		V _R	I _r	I _r @V _R		V _{BR} @ I _T		V _C @ I _{PP}	I _{PP}
Uni-polar	Bi-Polar	V	mA	μA@25°C	μA@T _J =175°C	min(V)	max (V)	V	A
SM5S10A	SM5S10CA	10.0	5	5	250	11.1	12.3	17.0	212.0
SM5S11A	SM5S11CA	11.0	5	5	150	12.2	13.5	18.2	198.0
SM5S12A	SM5S12CA	12.0	5	5	150	13.3	14.7	19.9	181.0
SM5S13A	SM5S13CA	13.0	5	5	150	14.4	15.9	21.5	167.0
SM5S14A	SM5S14CA	14.0	5	5	150	15.6	17.2	23.2	155.0
SM5S15A	SM5S15CA	15.0	5	5	150	16.7	18.5	24.4	148.0
SM5S16A	SM5S16CA	16.0	5	5	150	17.8	19.7	26.0	138.0
SM5S17A	SM5S17CA	17.0	5	5	150	18.9	20.9	27.6	130.0
SM5S18A	SM5S18CA	18.0	5	5	150	20.0	22.1	29.2	123.0
SM5S20A	SM5S20CA	20.0	5	5	150	22.2	24.5	32.4	111.0
SM5S22A	SM5S22CA	22.0	5	5	150	24.4	26.9	35.5	101.0
SM5S24A	SM5S24CA	24.0	5	5	150	26.7	29.5	38.9	93.0
SM5S26A	SM5S26CA	26.0	5	5	150	28.9	31.9	42.1	86.0
SM5S28A	SM5S28CA	28.0	5	5	150	31.1	34.4	45.4	79.0
SM5S30A	SM5S30CA	30.0	5	5	150	33.3	36.8	48.4	74.0
SM5S33A	SM5S33CA	33.0	5	5	150	36.7	40.6	53.3	68.0
SM5S36A	SM5S36CA	36.0	5	5	150	40.0	44.2	58.1	62.0

Note:

- For all types maximum V_F = 1.9V 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.
 - Surge waveform: 10/1000μs
- 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



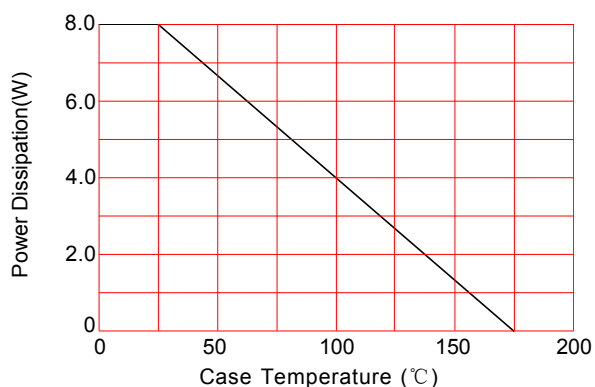
RATINGS and V - I characteristic CURVES (TA=25°C, unless otherwise noted)


FIG.1: Power Derating Curve

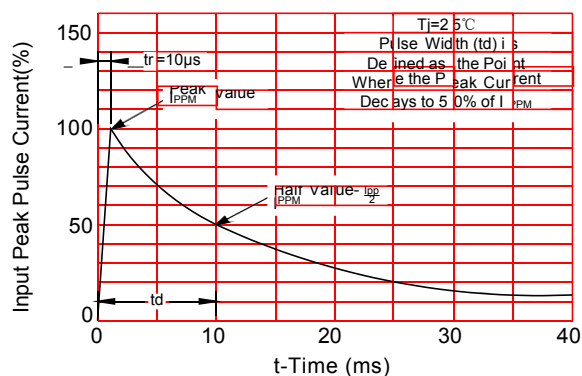


FIG.2: Pulse Waveform

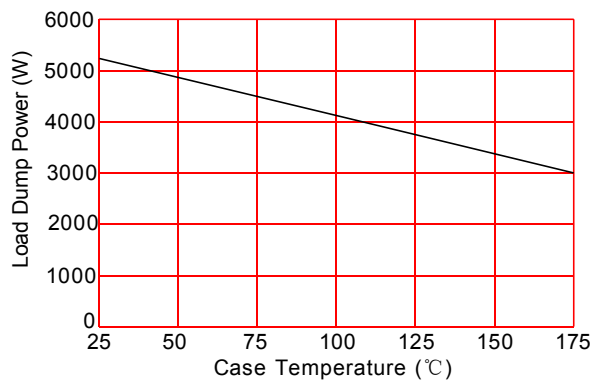
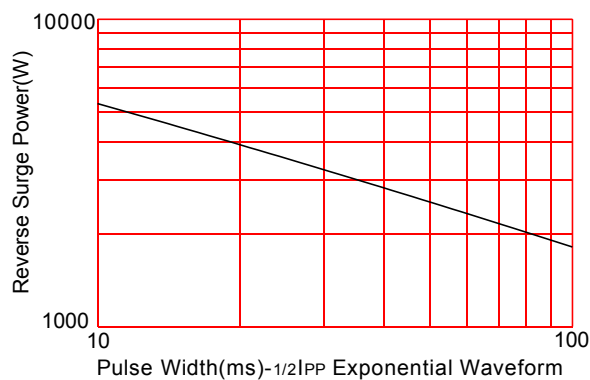

 FIG.3: Load Dump Power Characteristics
(10ms Exponential Waveform)


FIG.4: Reverse Power Capability

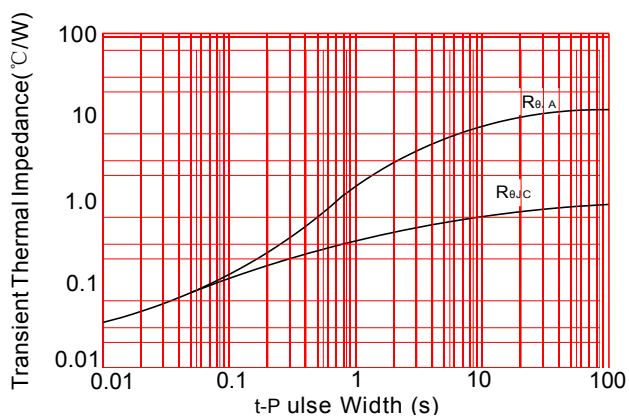


FIG.5: Typical Transient Thermal Impedance

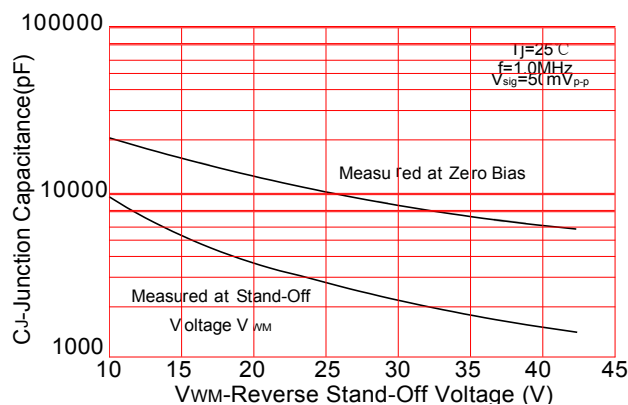
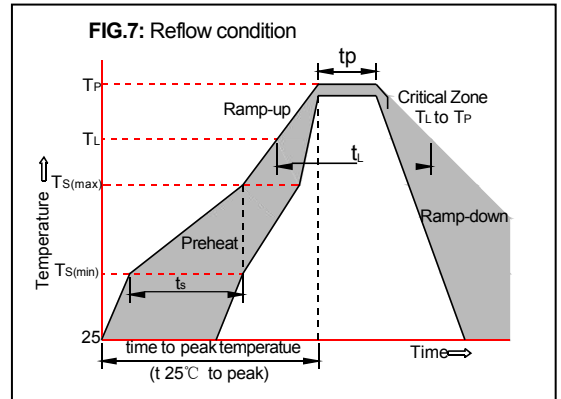


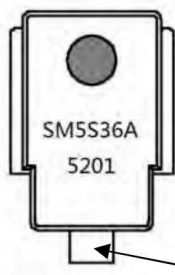
FIG.6: Typical Junction Capacitance

SOLDERING PARAMETERS

Reflow Condition		Pb-Free assembly (see FIG.7)
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 us 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)(Liquid us)	+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)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C



Marking



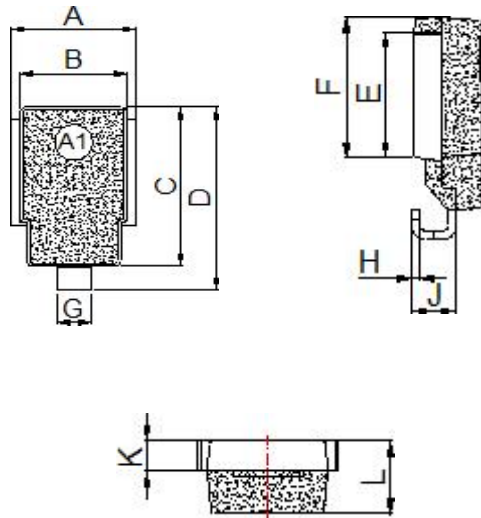
SM5S36A: Part Number

5201: "5" - - 201 (year)

"2" - - 2 (month)

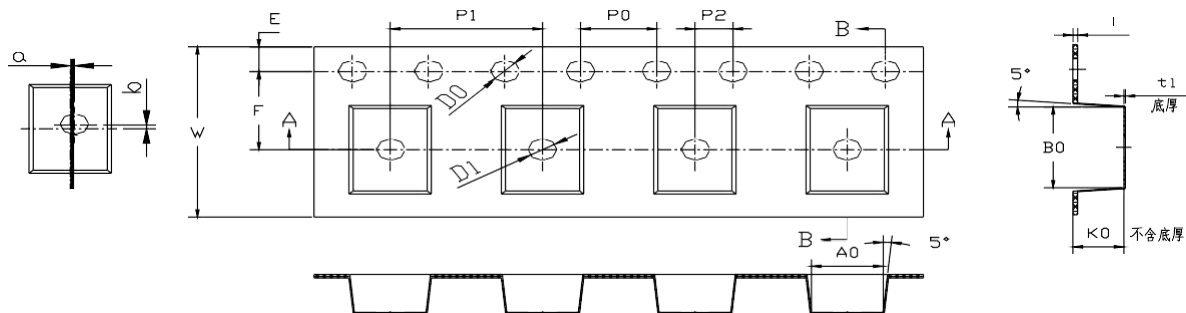
"01" - - (lot)

PACKAGE MECHANICAL DATA



Dimension	Inches		Millimeters	
	Min	Max	Min	Max
A	0.374	0.413	9.5	10.5
B	0.327	0.342	8.3	8.7
C	0.524	0.539	13.3	13.7
D	0.592	0.628	15.0	16.0
E	0.335	0.358	8.5	9.1
F	0.374	0.398	9.5	10.1
G	0.094	0.118	2.4	3.0
H	0.020	0.028	0.5	0.7
J	0.106	0.146	2.7	3.7
K	0.075	0.083	1.9	2.1
L	0.185	0.201	4.7	5.1

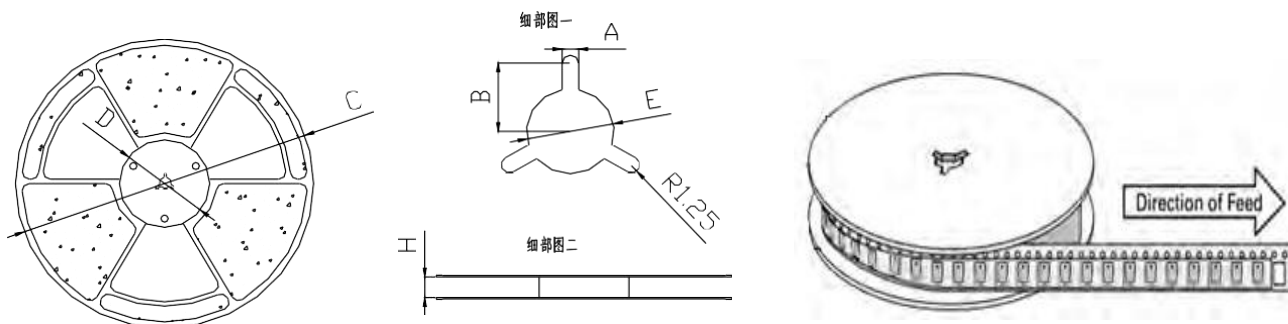
TAPE AND REEL SPECIFICATION-DO-218AB



ITEM	W	A0	B0	K0	P1	E	F	D0	D1	P0	P2	T
DIM	24	10.8	16.13	5.21	16	1.75	11.5	1.55	1.55	4.0	2.0	0.4
TOL	±0.15	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

Note:

- 10 pocket holes pitch cumulative tolerance $\pm 0.20\text{mm}$.
- Carrier camber is 1mm in 100mm.
- A0 and B0 are measured on a plane 0.30mm above the bottom of the pocket.
- K0 is measured from a plane on the inside bottom of the pocket to the top surface of the pocket.
- All dimensions meet EIA-481-2-A requirements.
- Packing length per 22" Reel: 205Meters.



Dimensions	A	B	C	D	E	H
millimeters	2.5 ± 0.2	10.7 ± 0.2	330 ± 0.2	100 ± 0.2	13.3 ± 0.2	24 ± 0.2
inches	0.098 ± 0.008	0.42 ± 0.008	13.0 ± 0.008	3.94 ± 0.008	0.52 ± 0.008	0.94 ± 0.008

ORDERING INFORMATION

PREFERRED P/N	UNIT WEIGHT (g) typ	REEL (PCS)	PER CARTON (PCS)	REEL DIAMETERS (mm)
SM5SxxCA/A	2.970	750	3000	330