

**FEATURES**

- $T_J = 175\text{ }^\circ\text{C}$  capability suitable for high reliability and automotive requirement.
- Available in 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 3, per J-STD-020, LF maximum peak of  $245\text{ }^\circ\text{C}$
- AEC-Q101 qualified
- 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 and JESD 22-B102

PRIMARY CHARACTERISTICS	
$V_{RWM}$	33 V
$V_{BR}$	36.7 ~ 40.6
$V_{CL\ max.}$	32V
$P_{PPM}\ (10/1000\ \mu s)$	11 000 W <sup>(1)</sup>
$P_{PPM}\ (10/10\ 000\ \mu s)$	7000 W <sup>(2)</sup>
$T_J\ max.$	175 °C
Polarity	Bidirectional
Package	DO-218AB

**Note**

<sup>(1)</sup> Equivalent  $I_{PPM}$  with conventional 11 kW TVS

<sup>(2)</sup> Equivalent  $I_{PPM}$  with conventional 7000 W TVS

MAXIMUM RATINGS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL		UNIT
Device marking code		10 33CA	
Peak pulse power dissipation	with 10/1000 $\mu s$ waveform	$P_{PPM}$	11 000 <sup>(1)</sup> W
	with 10/10 000 $\mu s$ waveform		7000 <sup>(1)</sup> W
Peak pulse current with a 10/10 000 $\mu s$ waveform, fig.4	$I_{PPM}\ ^{(2)}$	180	A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175	°C

**Note**

<sup>(1)</sup> The peak pulse power at equivalent  $I_{PPM}$  with conventional TVS

<sup>(2)</sup> Non-repetitive current pulse and derated above  $T_A = 25\text{ }^\circ\text{C}$

ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)								
DEVICE TYPE	BREAKDOWN VOLTAGE V <sub>BR</sub> (V) AT I <sub>T</sub>		TEST CURRENT I <sub>T</sub> (mA)	STAND-OFF VOLTAGE V <sub>RWM</sub> (V)	MAX. REVERSE LEAKAGE AT V <sub>RWM</sub> I <sub>R</sub> (μA)	MAX. PEAK PULSE CURRENT AT 10/1000 μs WAVEFORM (A)	CLAMPING VOLTAGE AT I <sub>PPM</sub> V <sub>C</sub> (V)	
	MIN.	MAX.					MIN.	MAX.
LM10S33CAT	36.7	40.6	5	33	5	310	31	32

①. For all types maximum V<sub>F</sub> = 1.8 V at I<sub>F</sub> = 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: 10/1000μs

V<sub>RWM</sub>: Stand-off Voltage -- Maximum voltage that can be applied

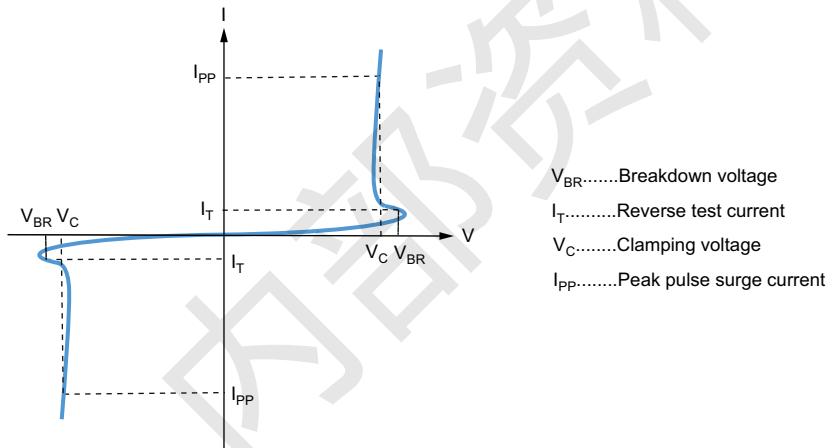
V<sub>BR</sub>: Breakdown Voltage

V<sub>C</sub>: Clamping Voltage -- Peak voltage measured across the suppressor at a specified I<sub>pp</sub>

I<sub>R</sub>: Reverse Leakage Current

I<sub>T</sub>: Test current

### I - V CURVE CHARACTERISTICS



### LOAD DUMP RATINGS

Parameter	ISO7637-2 P5a	ISO16750-2 Test A
U <sub>S</sub>	65V~87V	79V~174V
R <sub>j</sub>	0.5~4 ohm	0.5~4 ohm
t <sub>D</sub>	40~400 ms	40~400 ms

\* Load dump ratings test according with ISO7637-2 P5A and ISO16750-2 pulse A.

**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

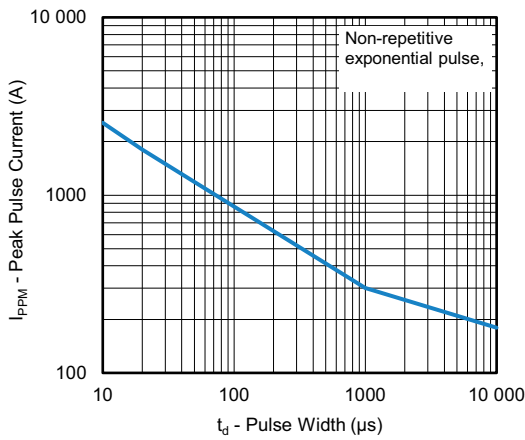


Fig. 1 - Peak Pulse Current Rating Curve

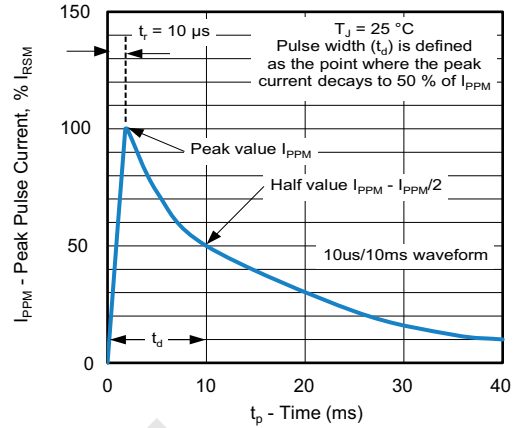


Fig. 4 - Pulse Waveform

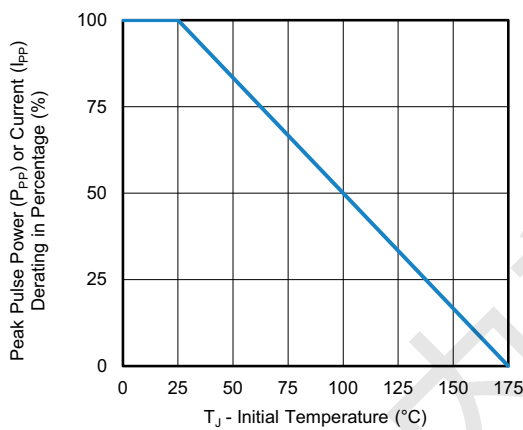


Fig. 2 - Peak Pulse Current vs. Initial Junction Temperature

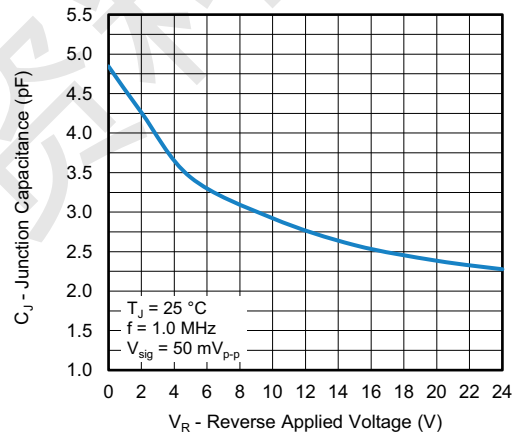


Fig. 5 - Typical Junction Capacitance

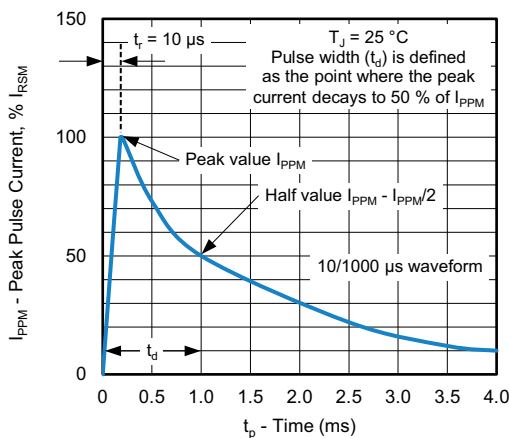


Fig. 3 - Pulse Waveform

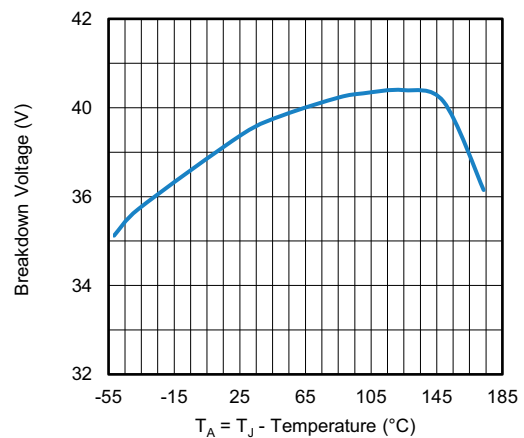
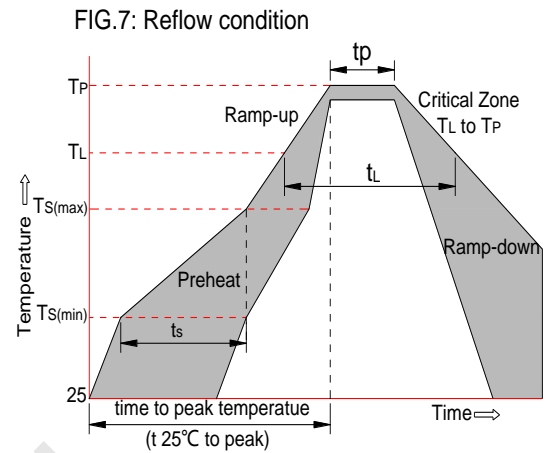


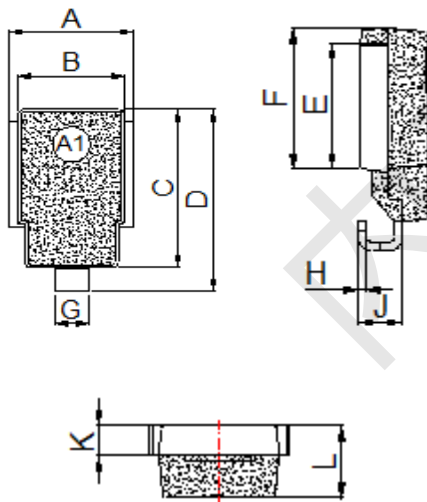
Fig. 6 - Typical Breakdown Voltage vs. Temperature Curve

**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) (ts)	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

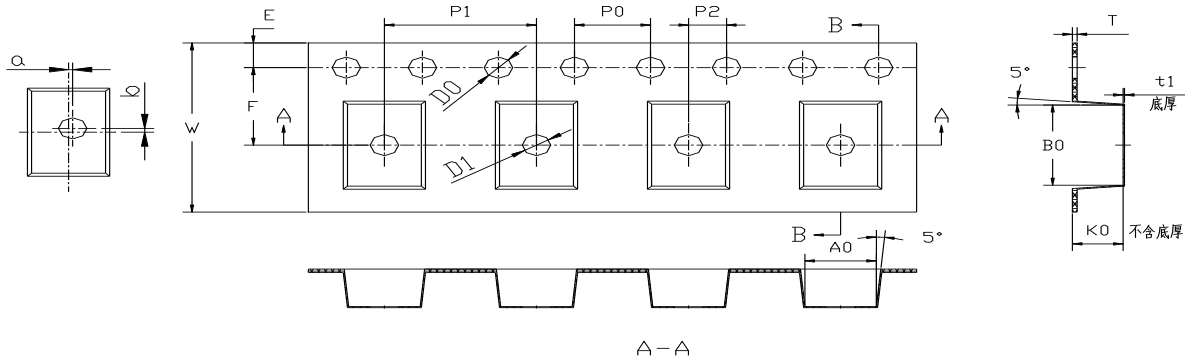


**PACKAGE MECHANICAL DATA**



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

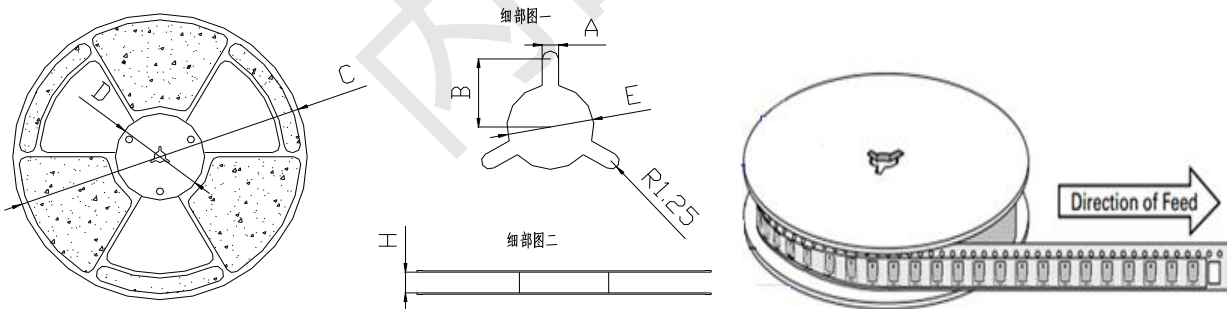
TAPE AND REEL SPECIFICATION-DO-218AB



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 ±0.20mm.
- 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

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