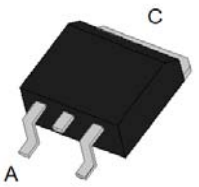
SM6D Series

Rev.1.0

DESCRIPTION:

SM6D series TVS diodes have been designed to protect automotive sensitive circuits against surges defined in ISO 7637-2 and ISO 16750 tests A and B also called load-dump.



TO-263

Uni-direction

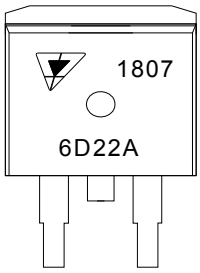
FEATURES:

- Stand-off voltage range: from 18 to 70V.
- Low leakage current: 1μA at 25 °C.
- Operating $T_{J(max)}$: 175 °C.
- High power capability at $T_{J(max)}$
- RoHS and halogen free.
- Resin meets UL 94V -0.
- AEC-Q101 compliant
- ISO 7637-2
  - Pulse 1: V_S=-150 V
  - Pulse 2a: V_S=+112 V
  - Pulse 3a: Vs=-220 V
  - Pulse 3b: Vs=+150 V
  - Formerly pulses 5a and 5b

ABSOLUTE MAXIMUM RATINGS (T_A=25ºC, RH=45%-75%, unless otherwise noted)

Parameter		Symbol	Value	Unit
Peak pulse voltage	ISO 10605 (C=330pF, R=330Ω) -contact discharge -air discharge IEC 61000-4-2 -contact discharge -air discharge	V_{PP}	 30 30 30 30	kV
Peak pulse power dissipation on 10/1000μs waveform		P_{PP}	5000	W
Operating junction and storage temperature range		T_J ,T_{STG}	-55 to +175	℃
Typical thermal resistance, junction to case		$R_{\theta JC}$	0.75	℃/W

MARKING



6D22A:Device Marking Code
1807:In seventh week,2018

ELECTRICAL CHARACTERISTICS

Part Number	Marking	Breakdown voltage V_{BR} @ I_T(V)		Test current I_T (mA)	Standoff voltage V_R (V)	I_R@V_R(μA)		V_C@I_{PP} (V)	I_{PP} ① (A)
		Min	Max			25℃	175℃		
SM6D18A	6D18A	20.0	22.1	5	18	1	100	29.2	172.0
SM6D20A	6D20A	22.2	24.5	5	20	1	100	32.4	155.0
SM6D22A	6D22A	24.4	27.0	5	22	1	100	36.0	140
SM6D24A	6D24A	26.7	29.5	5	24	1	100	40.0	120
SM6D26A	6D26A	28.9	31.9	5	26	1	100	40.0	125
SM6D28A	6D28A	31.1	34.4	5	28	1	100	43.5	110
SM6D30A	6D30A	33.3	36.8	5	30	1	100	45.5	95
SM6D33A	6D33A	36.7	40.6	5	33	1	100	51.5	85
SM6D36A	6D36A	40.0	44.2	5	36	1	100	57	77
SM6D40A	6D40A	44.4	49.1	5	40	1	100	63	65
SM6D43A	6D43A	47.8	52.8	5	43	1	100	68	55
SM6D48A	6D48A	53.3	58.9	5	48	1	100	76	48
SM6D58A	6D58A	64.4	71.2	5	58	1	100	92	42
SM6D70A	6D70A	77.8	86.0	5	70	1	100	113	35

Note：Typical V_F=1.9V at I_F=100A measured on a 300μs square pulse width.

①Surge 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_T: Test current

MECHANICAL DATA

Case: TO-263 molding compound meets UL 94V-0 flammability rating base P/NHE3-RoHS-compliant, AEC-Q101 qualified.

Terminals: Matte tin plated leads, solder able per J-STD-002 and JESD 22-B102, HE3 suffix meets JESD 201 class 2 whisker tests.

RATINGS AND CHARACTERISTICS CURVES (T_A=25ºC, unless otherwise noted)

FIG.1:V- I curve characteristics (Uni-directional)

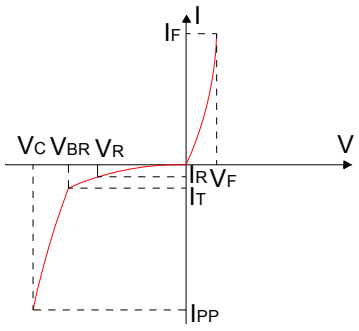


FIG.2: Pulse waveform

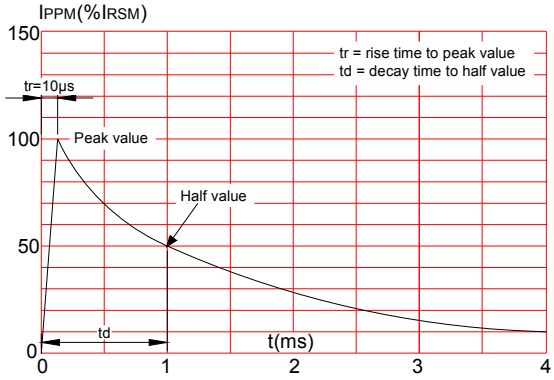


FIG.3: Load dump power characteristics (1ms exponential waveform)

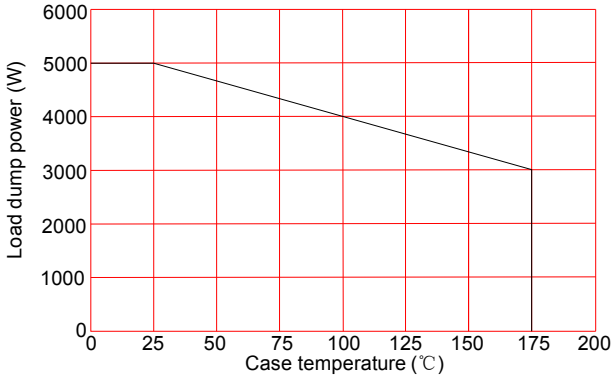


FIG.4: Peak pulse power vs. exponential pulse duration

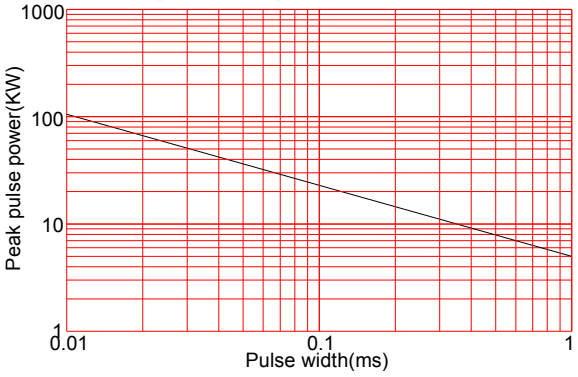


FIG.5: ISO7637-2,pulse 5a definition

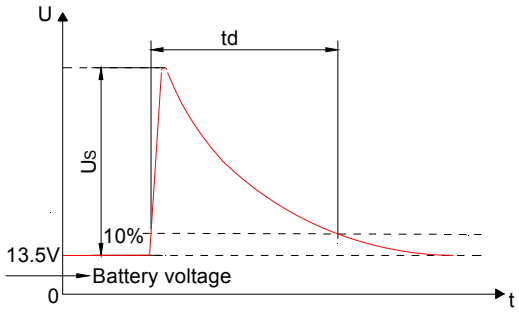


FIG.6: Load dump capability (Us=f(Ri) pulse 5a)

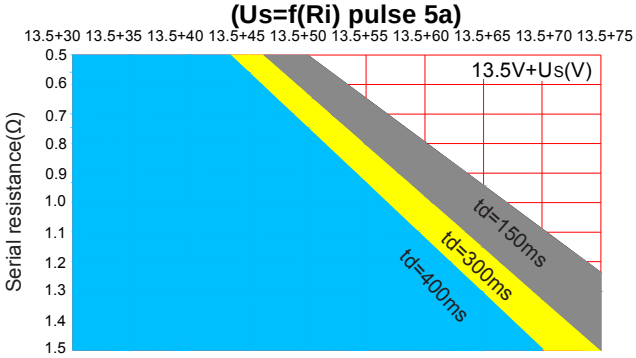


FIG.7: ISO7637-2,pulse 5b definition

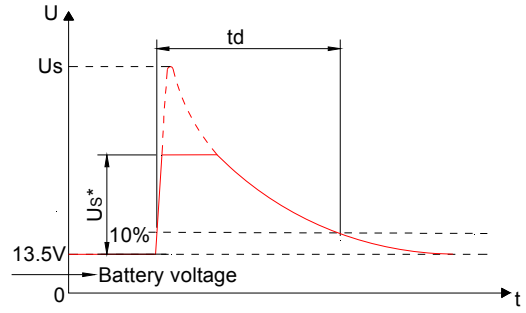


FIG.8: Load dump capability (Us*=f(Ri) pulse 5b,Us=87V)

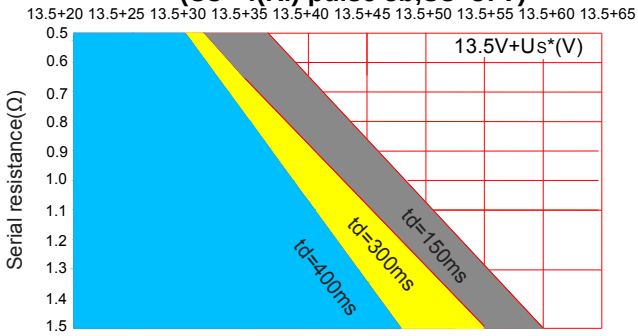


FIG.9: Peak forward voltage vs. peak forward current(typical value)

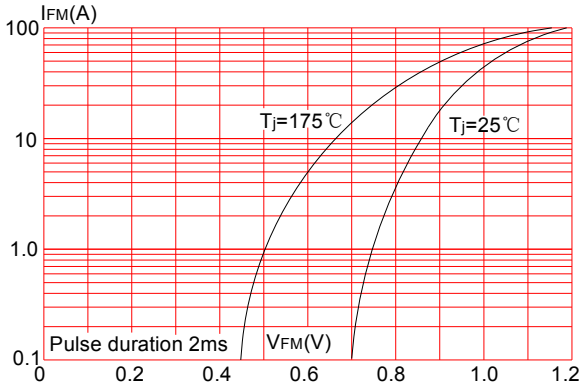
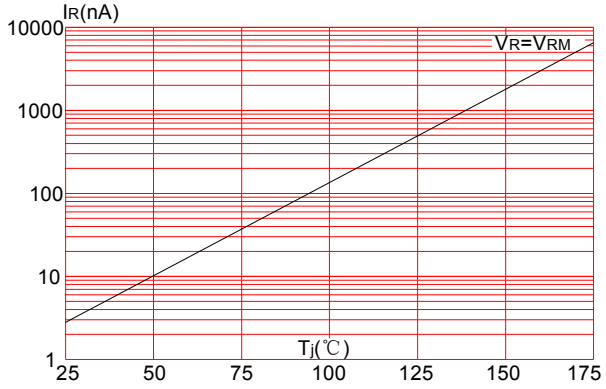
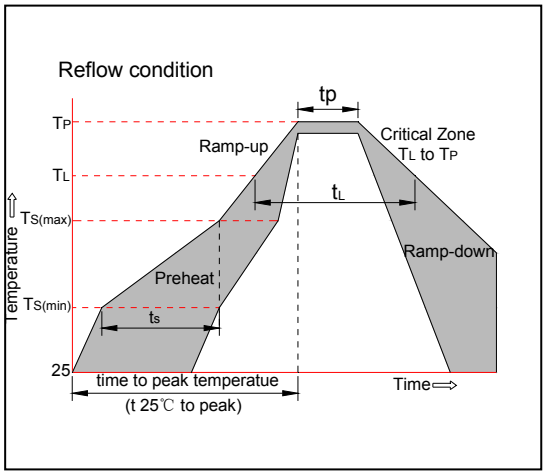


FIG.10: Leakage current vs. junction temperature(typical value)

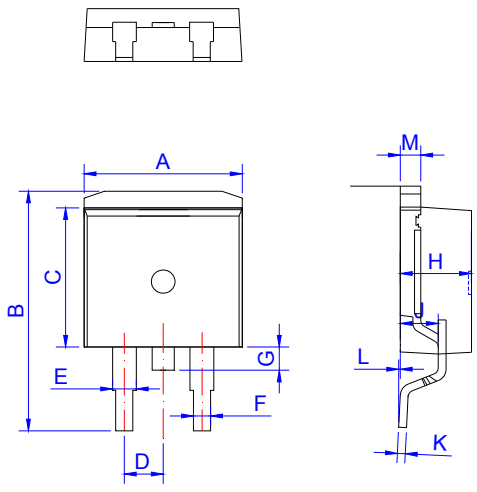


SOLDERING PARAMETERS

Reflow Condition		Pb-Free assembly (see figure at right)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquidus Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquidus)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		20-40 secs.
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃



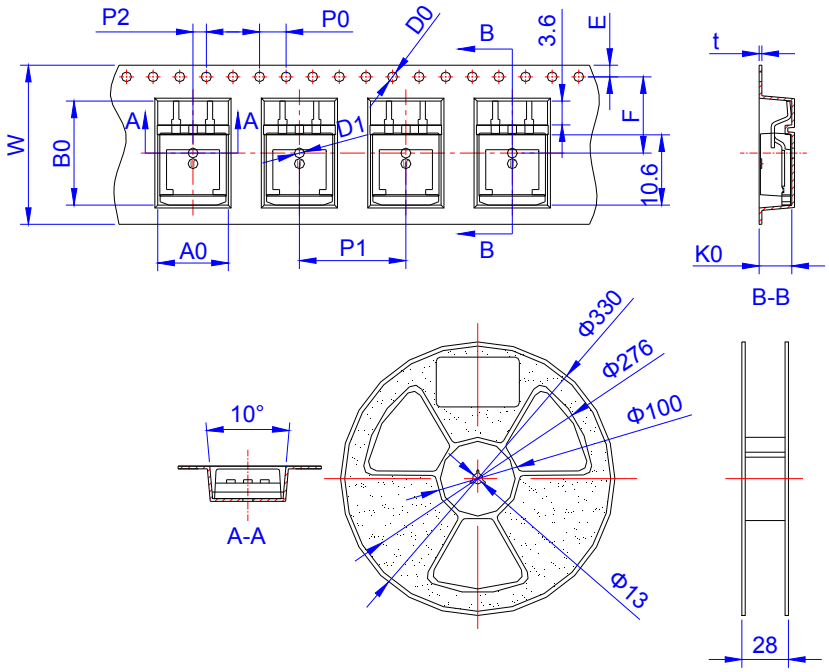
PACKAGE MECHANICAL DATA



TO-263

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.90		10.20	0.390		0.402
B	14.70		15.80	0.579		0.622
C	9.4		9.6	0.37		0.378
D		2.54			0.100	
E	1.20		1.40	0.047		0.055
F	0.75		0.85	0.029		0.033
G			1.75			0.069
H	4.40		4.70	0.173		0.185
J	2.30		2.70	0.091		0.106
K	0.38		0.55	0.015		0.022
L	0	0.10	0.25	0	0.004	0.010
M	1.25		1.35	0.049		0.053

TAPE AND REEL SPECIFICATION-TO-263



Ref.	Dimensions	
	Millimeters	Inches
W	24.00±0.30	0.945±0.012
E	1.75±0.10	0.069±0.004
F	11.50±0.10	0.453±0.004
D0	1.50+0.10	0.059+0.004
D1	1.50+0.10	0.059+0.004
P0	4.00±0.10	0.157±0.004
P1	16.00±0.10	0.630±0.004
P2	2.00±0.10	0.079±0.004
A0	10.90±0.10	0.429±0.004
B0	16.30±0.10	0.642±0.004
K0	4.90±0.10	0.193±0.004
t	0.40±0.05	0.016±0.002

OUTLINE	UNIT WEIGHT (g/PCS) typ.	REEL (PCS)	PER CARTON (PCS)	REEL DIAMETERS (mm)
TAPING	1.598	800	4,000	330