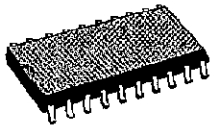
SGS-THOMSON MICROELECTRONICS

ITA6V5B3 / ITA10B3 ITA18B3 / ITA25B3

MONOLITHIC TRANSIL® ARRAY FOR DATA LINE PROTECTION

FEATURES

- HIGH SURGE CAPABILITY TRANSIL ARRAY IPP = 40 A 8/20µs
- UP TO 9 BIDIRECTIONAL TRANSIL FUNCTIONS
- BREAKDOWN VOLTAGE AND MAXIMUM DIFFERENTIAL VOLTAGE BETWEEN TWO INPUT PINS :
  ITA 6V5 = 6,5 V
  ITA10 = 10 V
  ITA18 = 18 V
  ITA25 = 25 V
- AVAILABLE IN SO 20 PACKAGES



SO 20
(Plastic)

DESCRIPTION

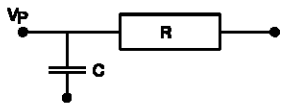
Specially developed for RS 232, RS 423 interface protection, this monolithic chip component offers a high surge capability and a low clamping voltage.

The internal wire bonding, "4 points connection", ensures a reliable protection against very fast transient overvoltages like ESD.

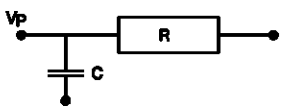
A low clamping voltage is guaranteed,eliminating all spikes due to the perturbation itself and also spikes induced by parasitic inductances created by external wiring.

IN ACCORDANCE WITH :

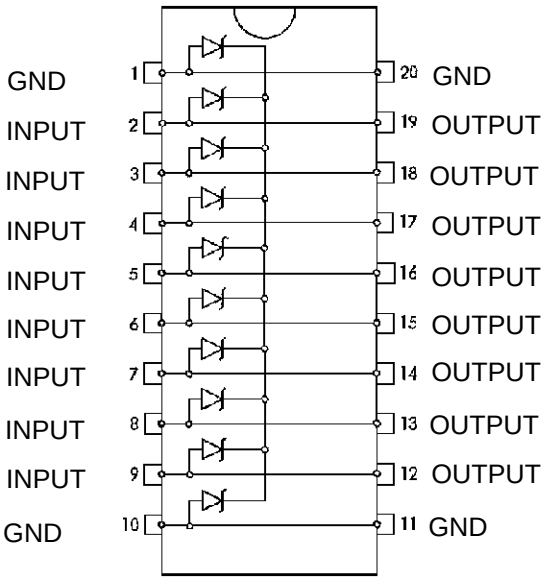
- ESD standard :
  . IEC 801-2 15kV 5ns / 50ns
  . IEC 801-4 40A 5ns / 50ns
  . IEC 801-5 1kV 1.2 / 50µs
  25A 8/20µs
  . MIL STD 883C - Methode 3015-2
  V_P = 25kV
  C = 150pF
  R = 150Ω
  5 s duration



- Human body test :
  V_P = 4kV
  C = 150pF
  R = 150Ω



FUNCTIONAL DIAGRAM

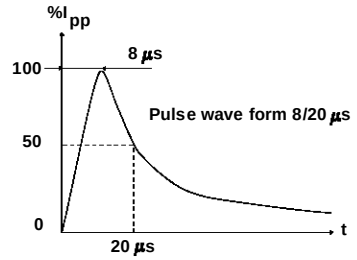


EQUIVALENT TO 8 BIDIRECTIONAL TRANSILS

ABSOLUTE RATINGS (limiting values) (0°C ≤ Tamb ≤ 70°C)

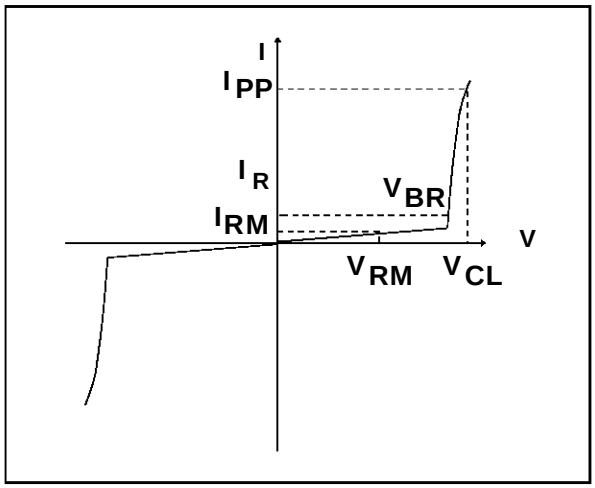
Symbol	Parameter		Value	Unit
Ipp	Peak pulse current for 8/20 µs exponential pulse	See note	40	A
I^2t	Wire I^2t value	See note	0.6	A^2s
T_{stg} T_j	Storage and Junction Temperature Range		- 55 to + 150 125	°C °C

Note : For surges greater than the maximum value specified, the input/output will present first a short circuit to the common bus line and after an open circuit caused by the wire.



ELECTRICAL CHARACTERISTICS

Symbol	Parameter
I_{RM}	Leakage Current @ V_{RM}
V_{RM}	Stand-off Voltage
V_{BR}	Breakdown Voltage
V_{CL}	Clamping Voltage
I_{PP}	Surge Current
C	Input Capacitance



Types	I_{RM} @ V_{RM} max		V_{BR} @ I_R min Note 1		V_{CL} @ I_{PP} max Note 1 8/20µs		V_{CL} max Note 1	I_{pp} 8/20µs	C1 max Note2	C2 max Note3	α_T max
	µA	V	V	mA	V	A	V	A	pf	pf	$10^{-4}/°C$
ITA6V5B3	50	5	6.5	1	9,5	10	11	25	1100	800	4
ITA10B3	10	8	10	1	13	10	17	25	800	360	8
ITA18B3	4	15	18	1	23	10	26	25	500	250	9
ITA25B3	4	24	25	1	31	10	36	25	420	140	12

All parameters tested at 25°C, except where indicated.

Note 1 : Between I/O pin and ground
Note 2 : Between two input Pins at 0 V Bias
Note 3 : Between one input Pin at 0 V and one input Pin at V_{RM}.

Figure 1 : Typical. Peak pulse power versus exponential pluse duration.

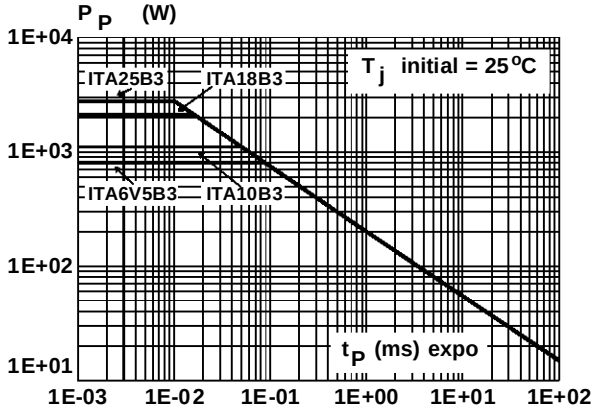


Figure 2 : Clampling voltage versus peak pulse current exponential waveform 8/20 µs.

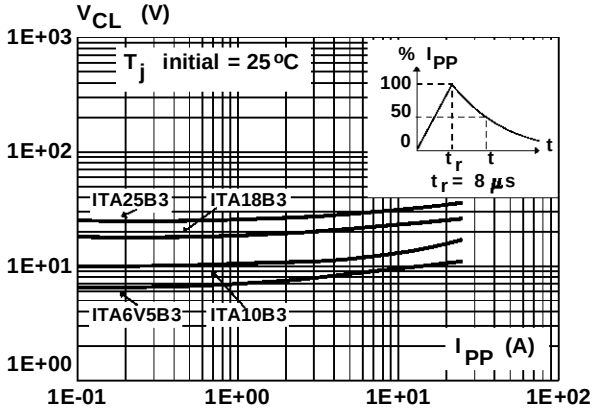


Figure 3 : Peak current I_{PC} inducing open circuit of the wire for one input/output versus pulse duration (typical values).

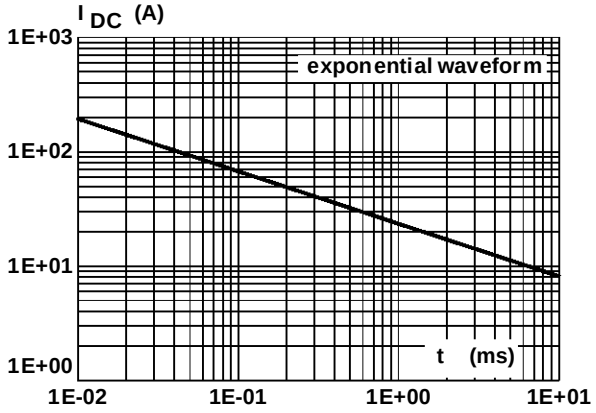
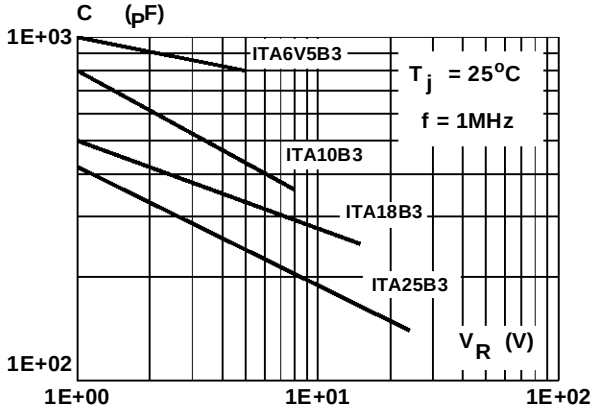


Figure 4 : Junction capacitance versus reverse applied voltage for one input/output (typical values).



Note : The curve of the figure 2 is specified for a junction temperature of 25°C before surge.

APPLICATION NOTICE

TYPES	Maximum differential voltage between two input pins at 25 °C
	V
ITA6V5B	6.5
ITA10B3	10
ITA18B3	18
ITA25B3	25

This monolithic Transil Array is based on 10 Unidirectional Transils with a common cathode and can be configured to offer 8 or 9 bidirectional functions following the customer application.

Figure 5 : Equivalent to 8 Bidirectional Transils

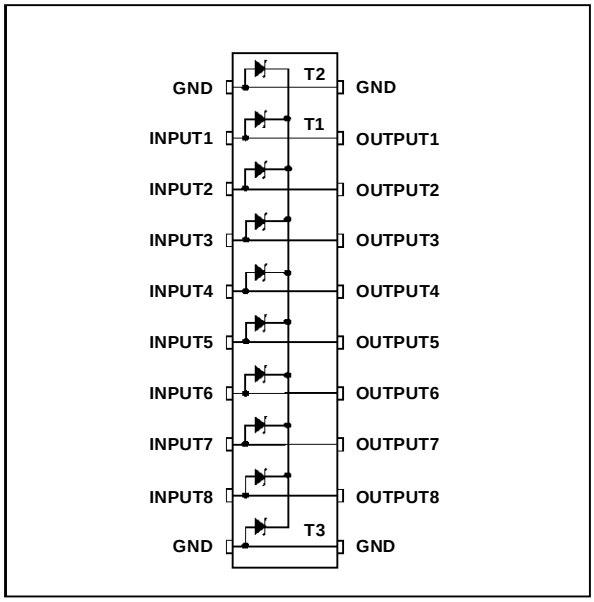
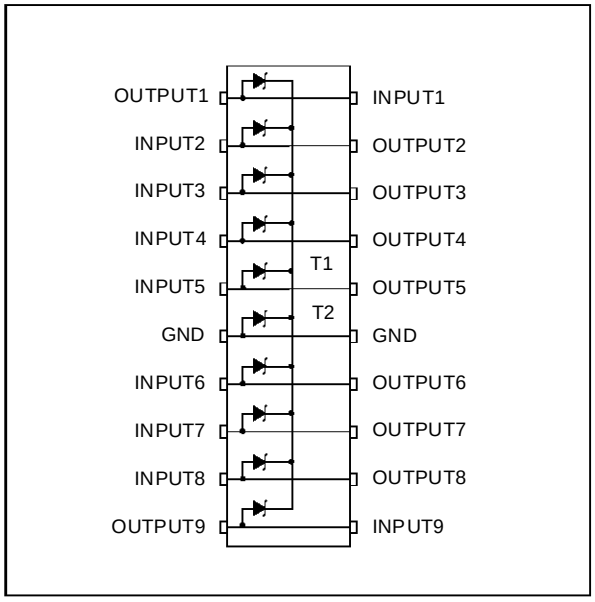


Figure 6 : Equivalent to 9 Bidirectional Transils



UTILIZATION AS OCTAL BIDIRECTIONAL TRANSIL ARRAY.

The main application of this device is to be configured as a 8 bidirectional Transil Array as per the Pin-out of Fig 6.
Pin 1 - 20 and Pin 10 - 11 are connected to ground.
INPUTS are from Pin 2 to Pin 9 and
OUTPUTS are from Pin 12 to Pin 19.

Note : INPUTS and OUTPUTS are symmetrical and can be reversed following application layout requests.
The bidirectional function is made with 2 unidirectional Transils. One (T1) is connected to the INPUT/OUTPUT, the other one (T2) is connected to the ground (see Fig 5).
Ground is connected via 2 diodes T2 and T3. This allows it to withstand 2 specified surges on 2 different lines at the same time.

UTILIZATION AS 9 BIDIRECTIONAL TRANSIL ARRAY.

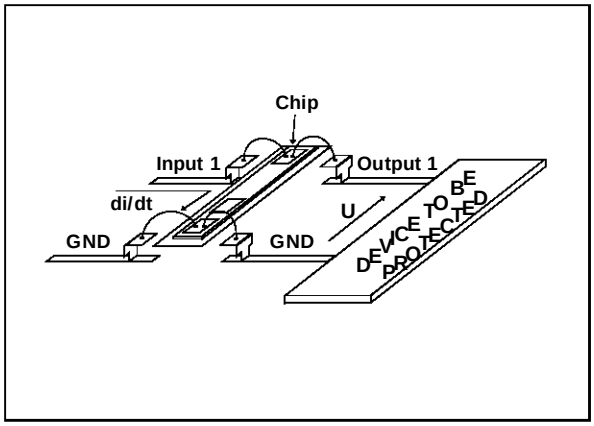
The ITAxxB can be also used as a 9 bidirectional Transil Array.
Ground can be connected to the couple Pin 1 - 20 or 2 - 19 or 3 - 18 or 4 -17 up to 10-11.
The other Pins are used as INPUTS and OUTPUTS.
The bidirectional function is made with 2 unidirectional Transil T1 and T2. One example with ground Pins 6-15 is given Fig 6.
This configuration allows to withstand only one specified surge at the same time.

APPLICATION NOTICE

Design advantage of ITAxxxB3 used with 4 - points Structure.

The ITAxxxB3 has been designed with a 4 - points structure (Isolated Input/output) in order to efficiently protect against disturbances with very high (di/dt) rates, such as ESD.
The purpose is to eliminate the overvoltage introduced by the parasitic inductances of the wiring (L.di/dt).
But efficient protection depends not only on the component itself, but also on the schematic layout.

Figure 7 : 4 Point structure layout



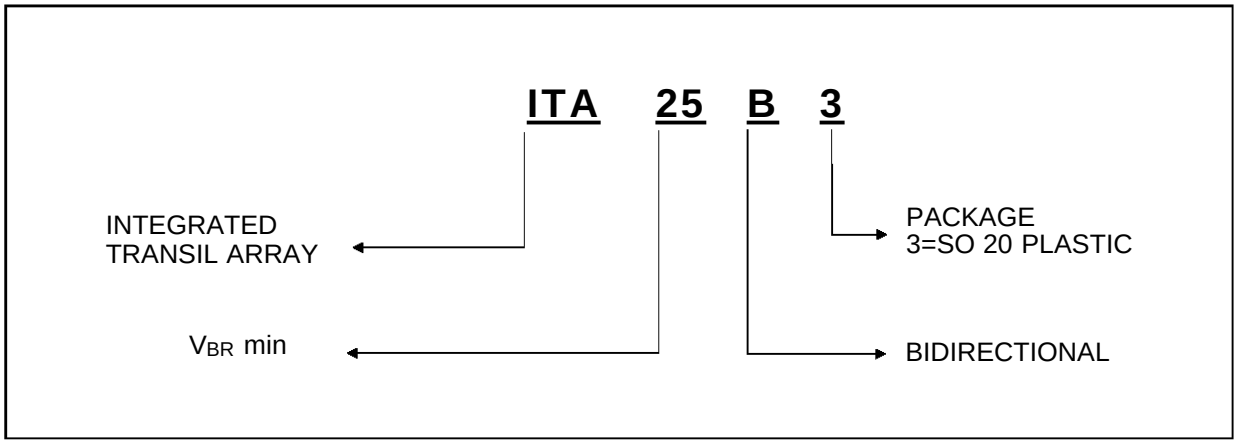
The schema given in fig. 7, shows the lay-out to be used in order to take advantage of the 4 - points structure of the ITAxxxB3.

With this lay-out, each of the lines to be protected passes through the protection device.

In this case, it works as an interface between the data line and the circuit to be protected, guaranteeing an isolation between its inputs and outputs.

The surge currrent is deviated through the input stage of the protection device.
The component to be protected is no longer exposed to any L.di/dt overvoltages.

ORDER CODE

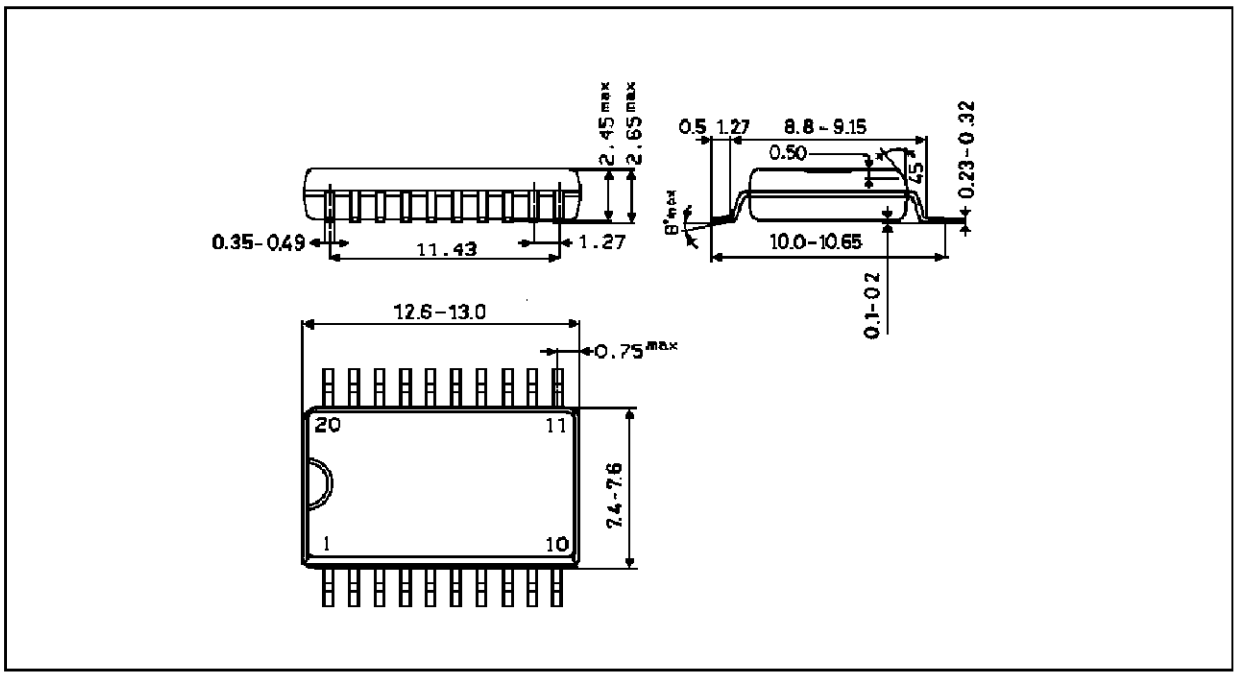


MARKING

TYPE	MARKING
ITA6V5B3	ITA6V5B3
ITA10B3	ITA10B3
ITA18B3	ITA18B3
ITA25B3	ITA25B3

PACKAGE MECHANICAL DATA (in millimeters)

SO 20 Plastic



Packaging : Products supplied in antistatic tubes.

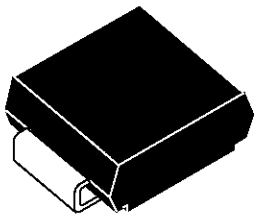
SGS-THOMSON MICROELECTRONICS

SM6T6V8,A/220,A
SM6T6V8C,CA/220C,CA

TRANSIL™

FEATURES

- PEAK PULSE POWER= 600 W @ 1ms
- BREAKDOWN VOLTAGE RANGE : From 6V8 to 220 V.
- UNI AND BIDIRECTIONAL TYPES
- LOW CLAMPING FACTOR
- FAST RESPONSE TIME
- UL RECOGNIZED



SOD 6
(Plastic)

DESCRIPTION

Transil diodes provide high overvoltage protection by clamping action. Their instantaneous response to transients makes them particularly suited to protect voltage sensitive devices such as MOS Technology and low voltage supplied IC's.

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25°C)

Symbol	Parameter		Value	Unit
P_p	Peak pulse power dissipation		600	W
P	Power dissipation on infinite heatsink	T_{lead} = 50°C	4	W
T_{stg} T_j	Storage temperature range Maximum junction temperature		- 65 to + 175 150	°C °C
T_L	Maximum lead temperature for soldering during 10 s.		260	°C

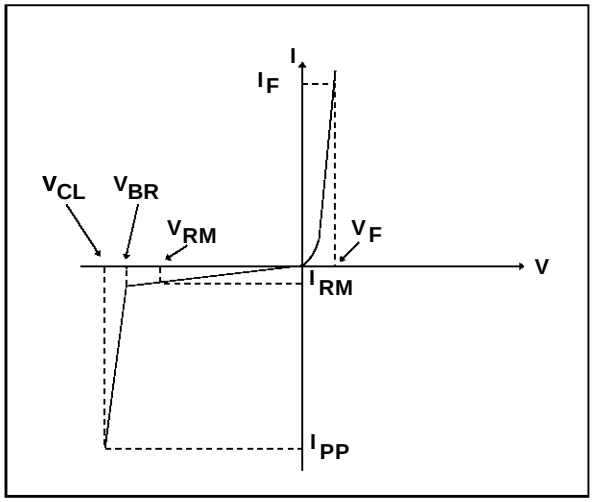
THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction to leads on infinite heatsink	25	°C/W
$R_{th\ (j-a)}$	Junction to ambient on printed circuit.	100	°C/W

ELECTRICAL CHARACTERISTICS

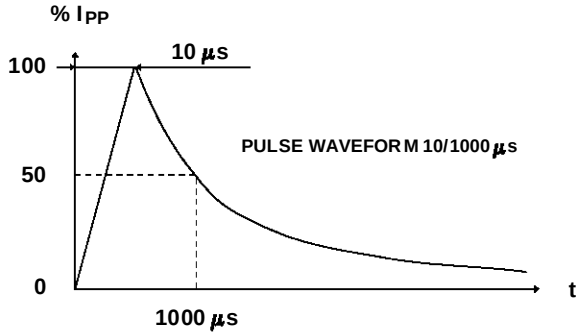
(T_{amb} = 25°C)

Symbol	Parameter
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
V_{CL}	Clamping voltage
I_{RM}	Leakage current @ V_{RM}
I_{PP}	Peak pulse current
αT	Voltage temperature coefficient
V_F	Forward voltage drop V_F < 3.5V @ I_F = 50 A.



Types				I_{RM} @ V_{RM}		V_{BR} @ I_R				V_{CL} @ I_{PP}		V_{CL} @ I_{PP}		αT	C
				max		min	nom	max		max		max		max	typ
						note2				10/1000µs		8/20µs		note3	note4
Uni directional	*	Bi directional	*	µA	V	V	V	V	mA	V	A	V	A	10^{-4}/°C	pF
SM6T6V8	DD	SM6T6V8C	LD	1000	5.8	6.45	6.8	7.48	10	10.5	57	13.4	298	5.7	4000
SM6T6V8A	DE	SM6T6V8CA	LE	1000	5.8	6.45	6.8	7.14	10	10.5	57	13.4	298	5.7	4000
SM6T7V5	DF	SM6T7V5C	LF	500	6.4	7.13	7.5	8.25	10	11.3	53	14.5	276	6.1	3700
SM6T7V5A	DG	SM6T7V5CA	LG	500	6.4	7.13	7.5	7.88	10	11.3	53	14.5	276	6.1	3700
SM6T10	DN	SM6T10C	LN	10	8.55	9.5	10	11	1	14.5	41	18.6	215	7.3	2800
SM6T10A	DP	SM6T10CA	LP	10	8.55	9.5	10	10.5	1	14.5	41	18.6	215	7.3	2800
SM6T12	DS	SM6T12C	LS	5	10.2	11.4	12	13.2	1	16.7	36	21.7	184	7.8	2300
SM6T12A	DT	SM6T12CA	LT	5	10.2	11.4	12	12.6	1	16.7	36	21.7	184	7.8	2300
SM6T15	DW	SM6T15C	LW	5	12.8	14.3	15	16.5	1	21.2	28	27.2	147	8.4	1900
SM6T15A	DX	SM6T15CA	LX	5	12.8	14.3	15	15.8	1	21.2	28	27.2	147	8.4	1900
SM6T18	ED	SM6T18C	MD	5	15.3	17.1	18	19.8	1	25.2	24	32.5	123	8.8	1600
SM6T18A	EE	SM6T18CA	ME	5	15.3	17.1	18	18.9	1	25.2	24	32.5	123	8.8	1600
SM6T22	EH	SM6T22C	MH	5	18.8	20.9	22	24.2	1	30.6	20	39.3	102	9.2	1350
SM6T22A	EK	SM6T22CA	MK	5	18.8	20.9	22	23.1	1	30.6	20	39.3	102	9.2	1350
SM6T24	EL	SM6T24C	ML	5	20.5	22.8	24	26.4	1	33.2	18	42.8	93	9.4	1250
SM6T24A	EM	SM6T24CA	MM	5	20.5	22.8	24	25.2	1	33.2	18	42.8	93	9.4	1250
SM6T27	EN	SM6T27C	MN	5	23.1	25.7	27	29.7	1	37.5	16	48.3	83	9.6	1150
SM6T27A	EP	SM6T27CA	MP	5	23.1	25.7	27	28.4	1	37.5	16	48.3	83	9.6	1150
SM6T30	EQ	SM6T30C	MQ	5	25.6	28.5	30	33	1	41.5	14.5	53.5	75	9.7	1075
SM6T30A	ER	SM6T30CA	MR	5	25.6	28.5	30	31.5	1	41.5	14.5	53.5	75	9.7	1075
SM6T33	ES	SM6T33C	MS	5	28.2	31.4	33	36.3	1	45.7	13.1	59.0	68	9.8	1000
SM6T33A	ET	SM6T33CA	MT	5	28.2	31.4	33	34.7	1	45.7	13.1	59.0	68	9.8	1000
SM6T36	EU	SM6T36C	MU	5	30.8	34.2	36	39.6	1	49.9	12	64.3	62	9.9	950
SM6T36A	EV	SM6T36CA	MV	5	30.8	34.2	36	37.8	1	49.9	12	64.3	62	9.9	950
SM6T39	EW	SM6T39C	MW	5	33.3	37.1	39	42.9	1	53.9	11.1	69.7	57	10.0	900
SM6T39A	EX	SM6T39CA	MX	5	33.3	37.1	39	41.0	1	53.9	11.1	69.7	57	10.0	900
SM6T68	FP	SM6T68C	NP	5	58.1	64.6	68	74.8	1	92	6.5	121	33	10.4	625
SM6T68A	FQ	SM6T68CA	NQ	5	58.1	64.6	68	71.4	1	92	6.5	121	33	10.4	625
SM6T100	FX	SM6T100C	NX	5	85.5	95.0	100	110	1	137	4.4	178	22.5	10.6	500
SM6T100A	FY	SM6T100CA	NY	5	85.5	95.0	100	105	1	137	4.4	178	22.5	10.6	500

Types				I_{RM} @ V_{RM}		V_{BR} @ I_R				V_{CL} @ I_{PP}		V_{CL} @ I_{PP}		αT	C
				max		min	nom	max		max		max		max	typ
						note2				10/1000µs		8/20µs		note3	note4
Uni directional	*	Bi directional	*	µA	V	V	V	V	mA	V	A	V	A	10^{-4}/°C	pF
SM6T150	GK	SM6T150C	OK	5	128	143	150	165	1	207	2.9	265	15	10.8	400
SM6T150A	GL	SM6T150CA	OL	5	128	143	150	158	1	207	2.9	265	15	10.8	400
SM6T200	GT	SM6T200C	OT	5	171	190	200	220	1	274	2.2	353	11.3	10.8	350
SM6T200A	GU	SM6T200CA	OU	5	171	190	200	210	1	274	2.2	353	11.3	10.8	350
SM6T220	GV	SM6T220C	OV	5	188	209	220	242	1	328	2	388	10.3	10.8	330
SM6T220A	GW	SM6T220CA	OW	5	188	209	220	231	1	328	2	388	10.3	10.8	330



Note 1 : For surges greater than the maximum values, the diode will present a short-circuit Anode - Cathode.

Note 2 : Pulse test : $t_p < 50$ ms.

Note 3 : $\Delta V_{BR} = \alpha T * (T_{amb} - 25) * V_{BR}(25°C)$.

Note 4 : $V_R = 0$ V, F = 1 MHz. For bidirectional types, capacitance value is divided by 2.

Fig. 1: Power dissipation derating versus ambient temperature

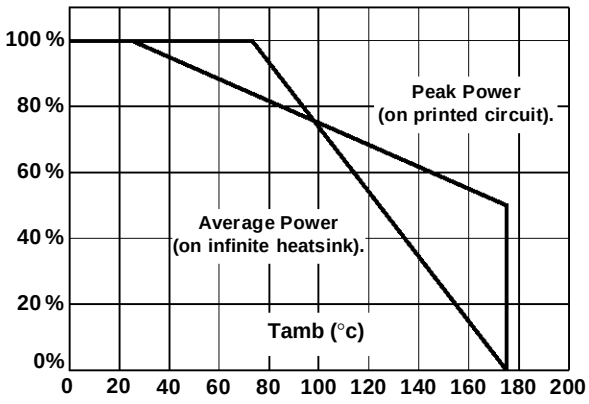


Fig. 2 : Peak pulse power versus exponential pulse duration.

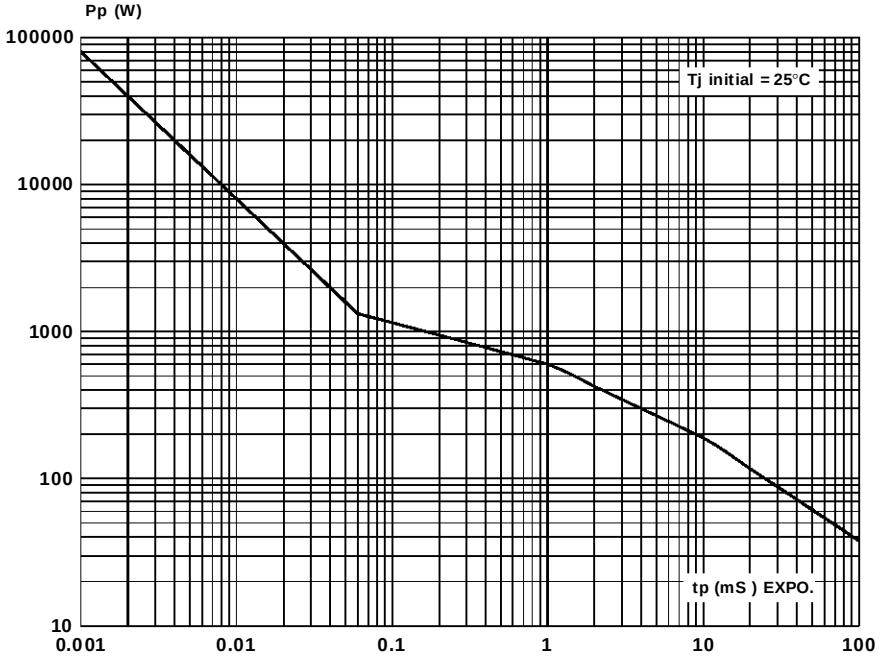
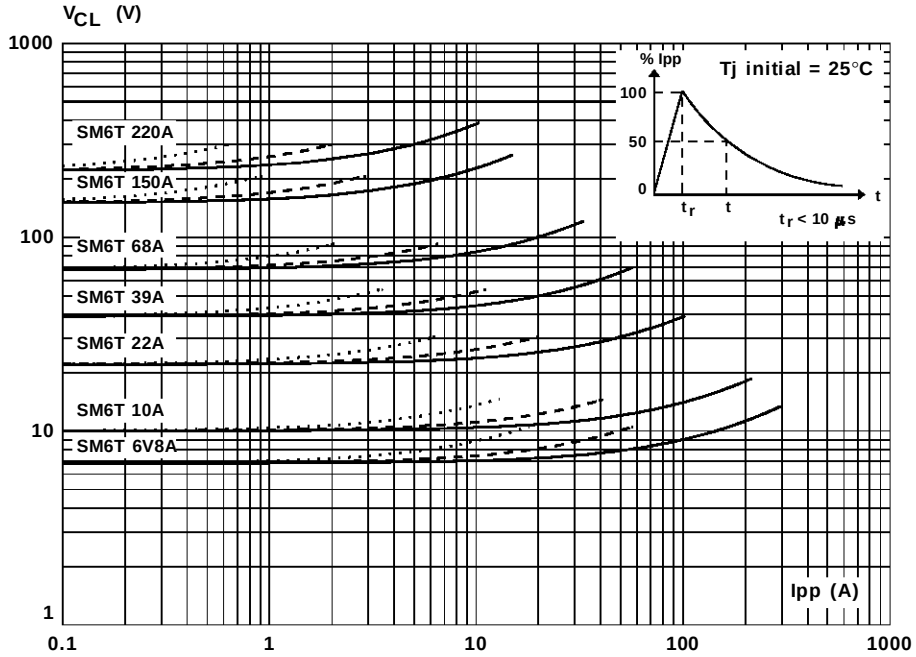


Fig. 3 : Clamping voltage versus peak pulse current.
Exponential waveform t_p = 20 µs _____
t_p = 1 ms ——————-
t_p = 10 ms .....



Note : The curves of the figure 3 are specified for a junction temperature of 25 °C before surge.
The given results may be extrapolated for other junction temperatures by using the following formula :
$\Delta V_{BR} = \alpha T * [T_{amb} - 25] * V_{BR}(25°C)$
For intermediate voltages, extrapolate the given results.

Fig. 4a : Capacitance versus reverse applied voltage for unidirectional types (typical values).

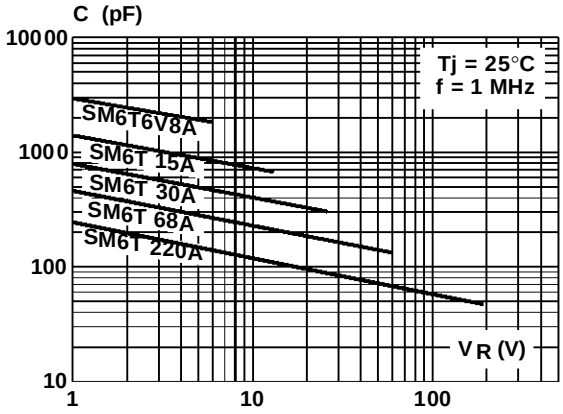


Fig. 4b : Capacitance versus reverse applied voltage for bidirectional types (typical values).

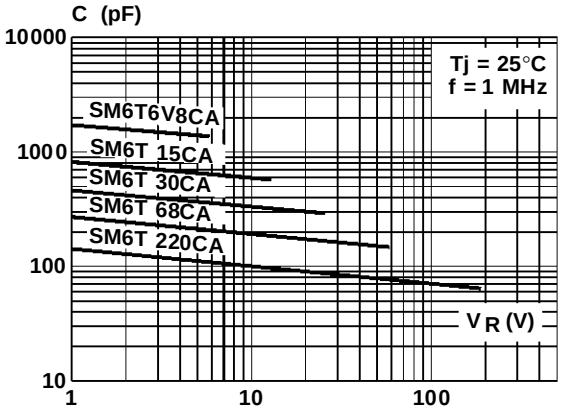


Fig. 5 : Peak forward voltage drop versus peak forward current (typical values for unidirectional types).

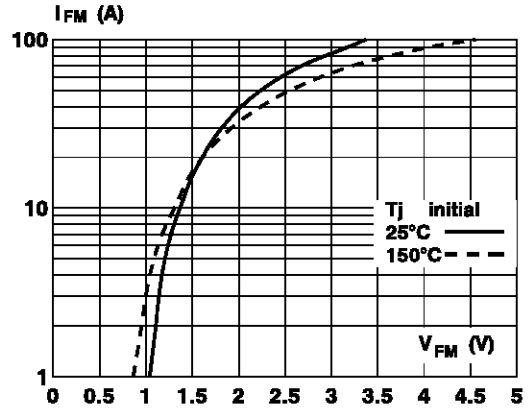
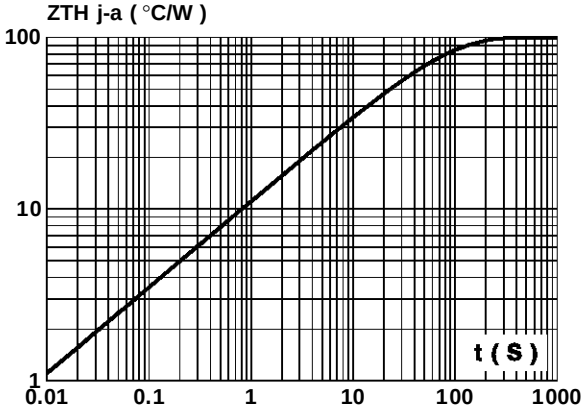
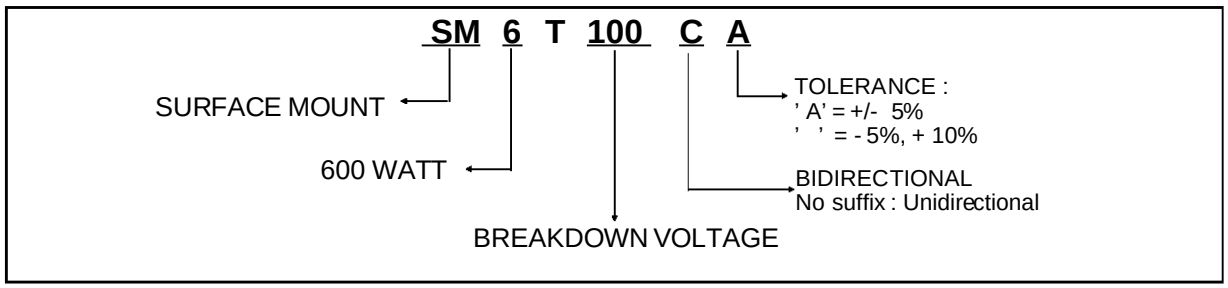


Fig. 6 : Transient thermal impedance junction-ambient versus pulse duration. For a mounting on PC Board with standard footprint dimensions.



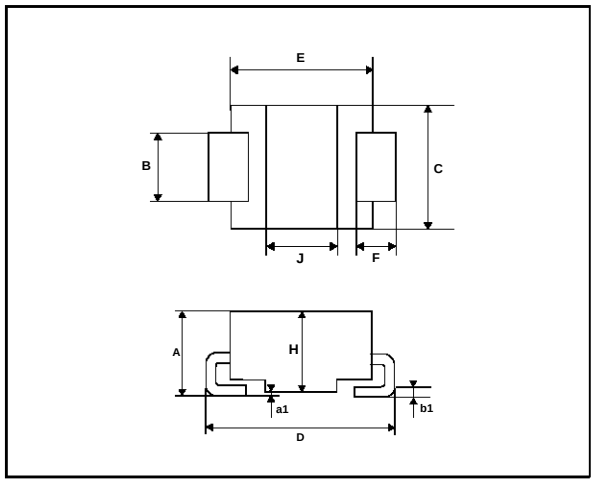
ORDER CODE



MARKING : Logo, Date Code, Type Code, Cathode Band (for unidirectional types only).

PACKAGE MECHANICAL DATA

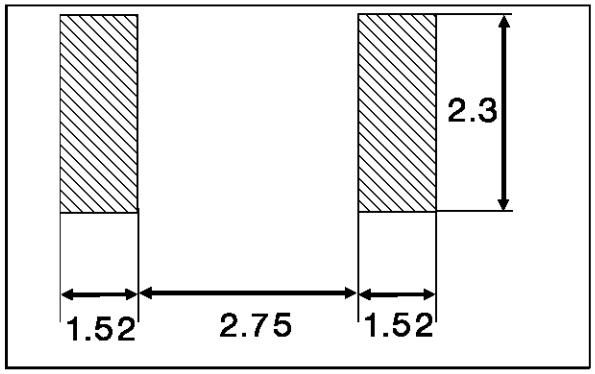
SOD 6 (Plastic)



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.44	2.62	0.096	0.103
a1	0.10	0.20	0.004	0.008
B	1.96	2.11	0.077	0.083
b1	0.25	0.35	0.010	0.014
C	3.65	3.93	0.143	0.155
D	5.39	5.59	0.212	0.220
E	4.15	4.30	0.163	0.170
F	1.00	1.27	0.039	0.050
H	2.33	2.41	0.092	0.095
J	2.05	2.13	0.080	0.084

FOOTPRINT DIMENSIONS (Millimeter)

SOD 6 Plastic.



Packaging : standard packaging is in film.