Breakover diodes BR211SM series

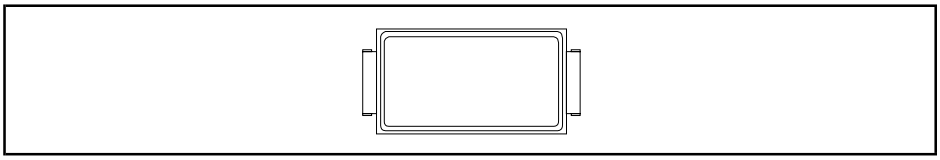
GENERAL DESCRIPTION

A range of bidirectional, breakover diodes in a two terminal, surface mounting, plastic envelope. These devices feature controlled breakover voltage and high holding current together with high peak current handling capability. Typical application is transient overvoltage protection in telecommunications equipment.

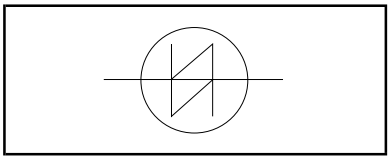
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
	BR211SM-140 to BR211SM-280			
$V_{(BO)}$	Breakover voltage	140	280	V
I_H	Holding current	150	-	mA
I_{TSM}	Non-repetitive peak current	-	40	A

OUTLINE - SOD106



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_D	Continuous voltage		-	75% of $V_{(BO)typ}$	V
I_{TSM1}	Non repetitive peak current	10/320 µs impulse equivalent to 10/700 µs, 1.6 kV voltage impulse (CCITT K17)	-	40	A
I_{TSM2}	Non repetitive on-state current	half sine wave; t = 10 ms; T_j = 70 ˚C prior to surge	-	15	A
I^2t	I^2t for fusing	t_p = 10 ms	-	1.1	A^2s
dI_T/dt	Rate of rise of on-state current after $V_{(BO)}$ turn-on	t_p = 10 µs	-	50	A/µs
P_{tot}	Continuous dissipation	T_a = 25˚C	-	1.2	W
P_{TM}	Peak dissipation	t_p = 1 ms; T_a = 25˚C	-	50	W
T_{stg}	Storage temperature		- 40	150	˚C
T_a	Operating ambient temperature	off-state	-	70	˚C
T_{vj}	Overload junction temperature	on-state	-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}sp}$	Thermal resistance junction to solder point		-	-	12	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	pcb mounted; minimum footprint	-	100	-	K/W
$Z_{th\ j\text{-}a}$	Thermal impedance junction to ambient	t_p = 1 ms	-	2.62	-	K/W

STATIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{TM} [1]	On-state voltage	I_{TM} = 2 A	-	-	2.5	V
$V_{(BR)}$	Avalanche voltage (min)	$I_{(BR)}$ = 10_{mA}				
$V_{(BO)}$	Breakover voltage (max)	$I \leq I_S$, t_p = 100 µs				
		BR211SM-140	123	140	157	V
		BR211SM-160	140	160	180	V
		BR211SM-180	158	180	202	V
		BR211SM-200	176	200	224	V
		BR211SM-220	193	220	247	V
		BR211SM-240	211	240	269	V
		BR211SM-260	228	260	292	V
		BR211SM-280	246	280	314	V
$S_{(br)}$	Temperature coefficient of $V_{(BR)}$		-	+0.1	-	%/K
I_H [2]	Holding current	T_j = 25˚C	150	-	-	mA
		T_j = 70˚C	100	-	-	mA
I_S [3]	Switching current	t_p = 100 µs	10	200	1000	mA
I_D [4]	Off-state current	V_D = 85% $V_{(BR)min}$, T_j = 70˚C	-	-	10	µA

DYNAMIC CHARACTERISTICS

T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
dV_D/dt	Linear rate of rise of off-state voltage that will not trigger any device	$V_{(DM)}$ = 85% $V_{(BR)min}$; T_j = 70 ˚C	-	-	2000	V/µs
C_j	Off-state capacitance	V_D = 0 V; f = 1 kHz to 1 MHz	-	-	100	pF

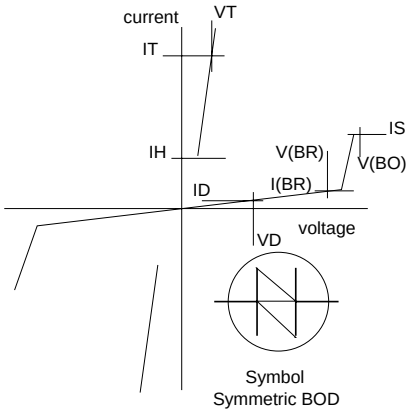


Fig.1. Definition of breakover diode characteristics.

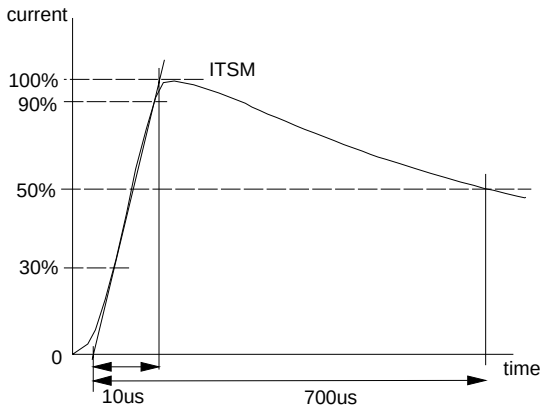


Fig.2. Test waveform for high voltage impulse (I_{TSM1}) according to CCITT vol IX-Rec K17.

1 Measured under pulsed conditions to avoid excessive dissipation

2 The minimum current at which the diode will remain in the on-state

3 The avalanche current required to switch the diode to the on-state

4 Measured at maximum recommended continuous voltage. Relative humidity < 65%.

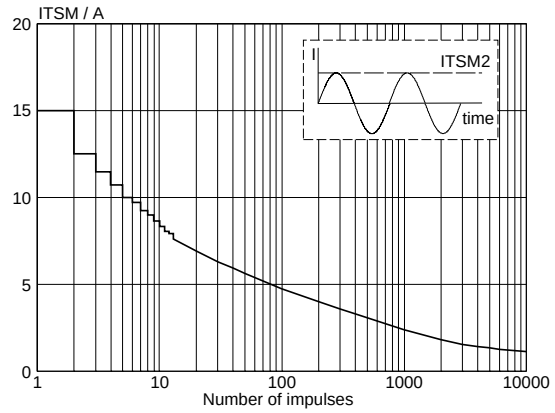


Fig.3. Maximum permissible non-repetitive on-state current based on sinusoidal currents; f = 50 Hz; device triggered at the start of each pulse; T_j = 70˚C prior to surge.

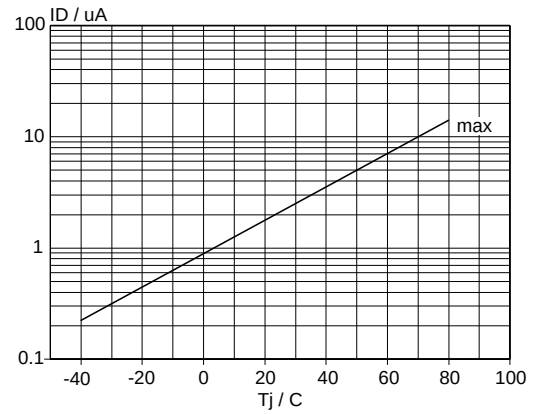


Fig.6. Maximum off-state current as a function of temperature.

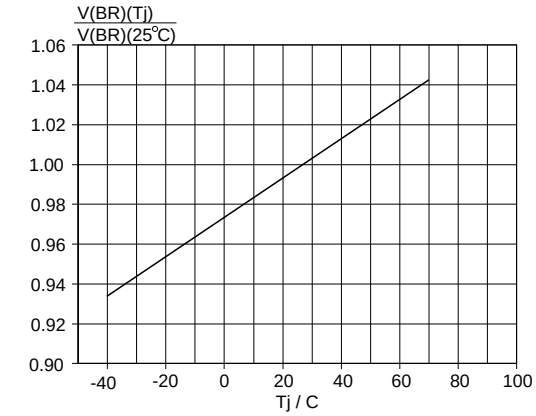


Fig.4. Normalised avalanche breakdown voltage $V_{(BR)}$ and $V_{(BO)}$ as a function of temperature.

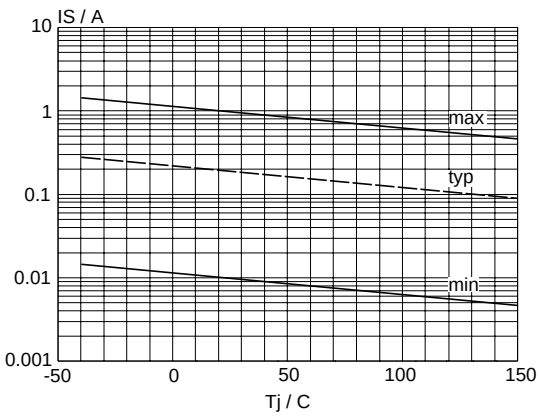


Fig.7. Switching current as a function of junction temperature.

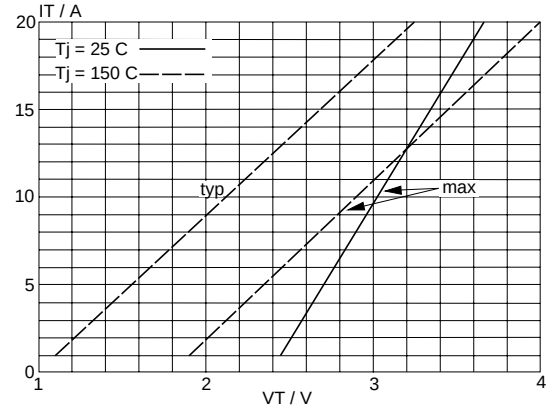


Fig.5. On-state current as a function of on-state voltage; t_p = 200 μs to avoid excessive dissipation.

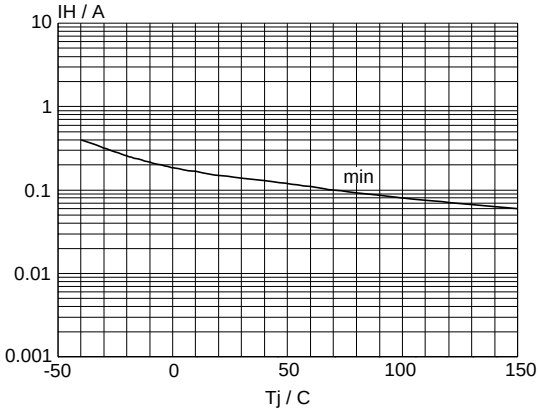


Fig.8. Minimum holding current as a function of temperature.

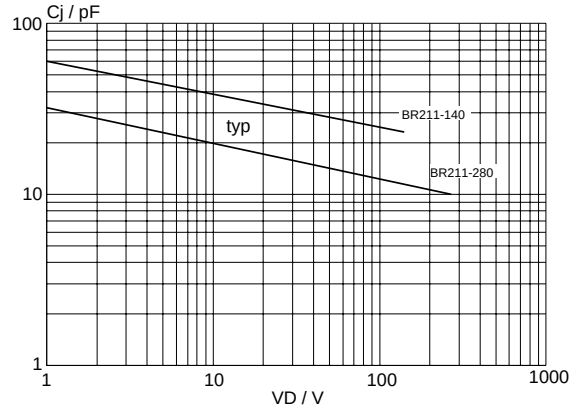


Fig.9. Typical junction capacitance as a function of off-state voltage, f = 1 MHz; T_j = 25˚C.

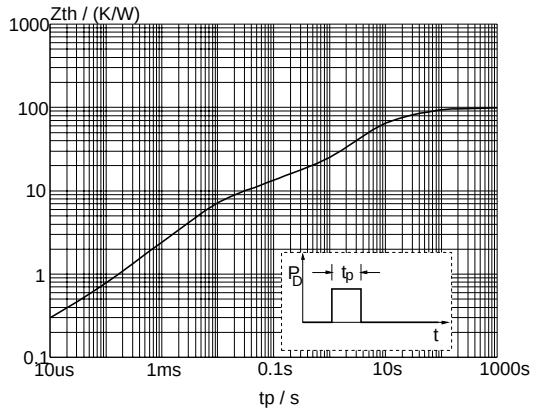


Fig.10. Transient thermal impedance. $Z_{th\ j\text{-}a}$ = f(t_p).

MECHANICAL DATA

Dimensions in mm

Net Mass: 0.2 g

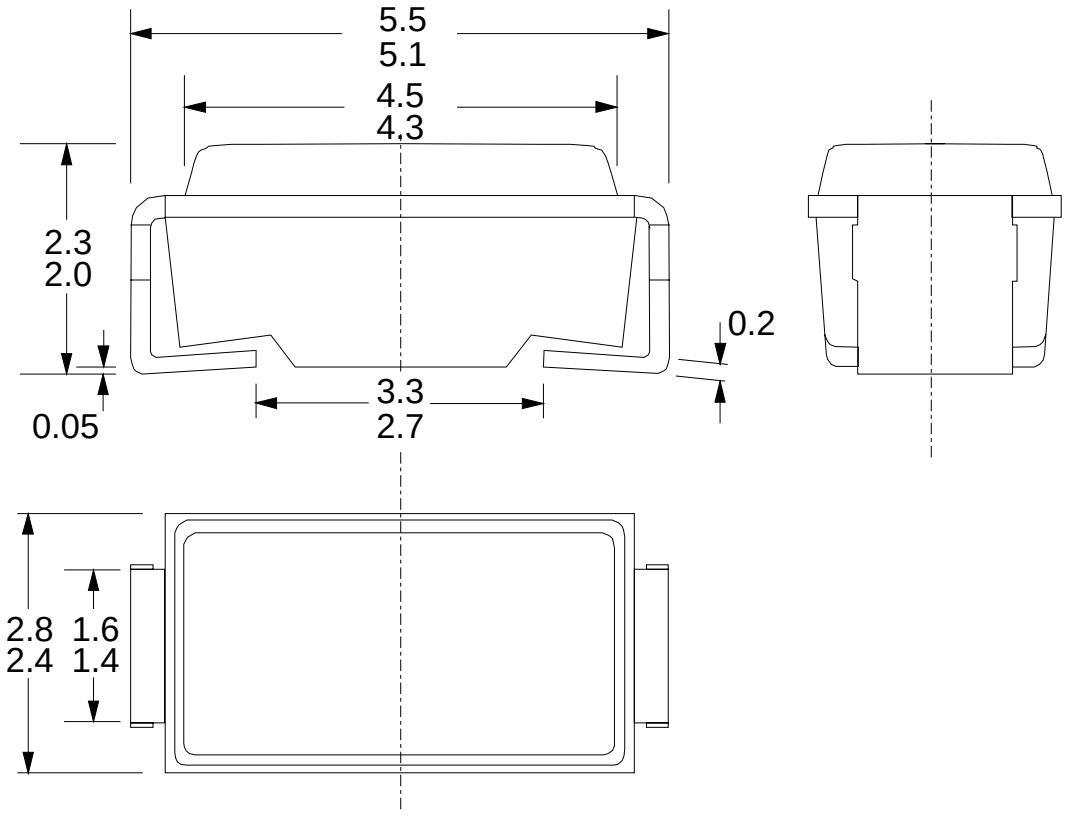


Fig.11. SOD106.

Notes

1. For mounting and soldering instructions refer to publication SC18 "SMD Footprint Design and Soldering Guidelines". Order code:9397 750 00505.

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

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