DUAL BREAKOVER DIODES

A range of monolithic dual bidirectional breakover diodes with ±12% tolerance of breakover voltage. These diodes feature controlled voltage breakover across and between diodes with good peak current handling capability. Typical applications include transient overvoltage protection across lines and line to earth in telephony equipment, data transmission and remote instrumentation lines.

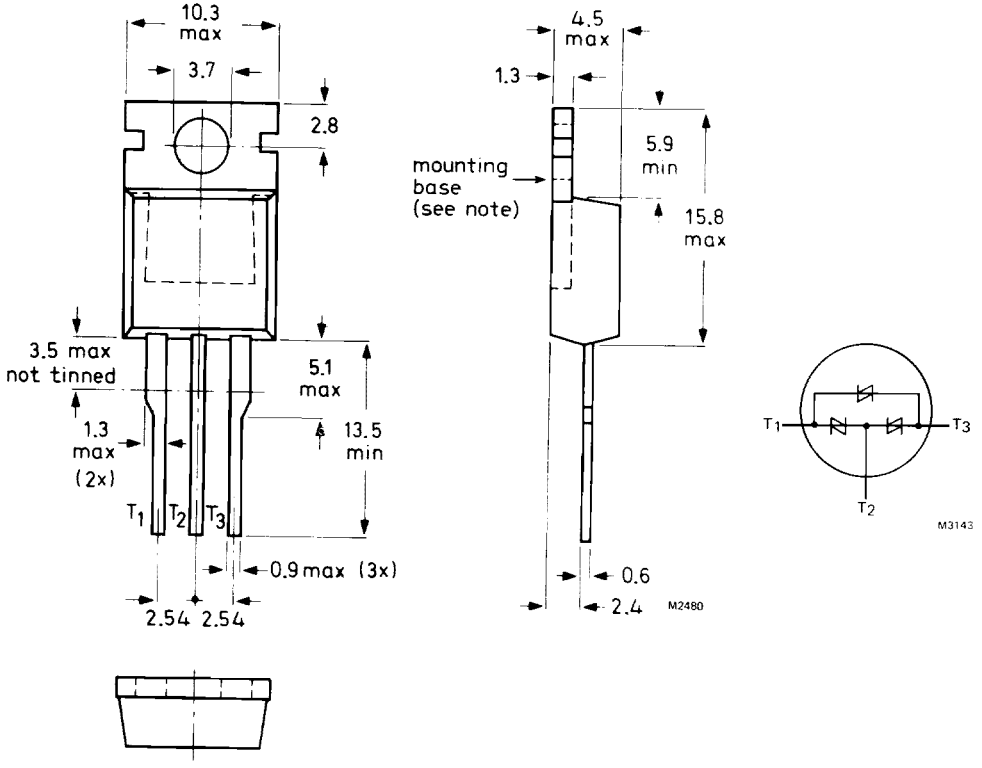
QUICK REFERENCE DATA

			BR213 – 100 to 280	
Breakover voltage per line	$V_{(BO)}$	nom.	100 to 280	V
Holding current	I_H	>	150	mA
Transient peak current (10/320 μs impulse)	I_{TSM}	max.	40	A

MECHANICAL DATA

Dimensions in mm

Fig.1 TO-220AB



Net mass: 2 g

Note: The exposed metal mounting base is directly connected to terminal T_2.

Accessories supplied on request: see data sheet Mounting instructions and accessories for TO-220 envelopes.

RATINGS

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

Voltages (either direction, between any two leads)

		BR213 – 100 to 280		
Continuous voltages	V_D	max. 75% of nom. voltage		
Currents				
(Individually for each line to centre lead in either direction)				
Transient peak current (8/20 μs impulse)	I_{TSM1}	max.	150	A
Transient peak current (10/320 μs impulse) equivalent to 10/700 μs 1.6 kV voltage impulse (CCITT K17); (see Fig.3)	I_{TSM2}	max.	40	A
Average on-state current (averaged over any 20 ms period); up to T_{mb} = 75 °C	$I_{T(AV)}$	max.	5	A
RMS AC on-state current	$I_{T(RMS)}$	max.	8	A
Non-repetitive peak on-state current; T_j = 100 °C prior to surge; t = 10 ms; half sinewave	I_{TSM3}	max.	30	A
I^2t for fusing (t = 10 ms)	I^2t	max.	4.5	A^2s
Rate of rise of on-state current after $V_{(BO)}$ turn-on (t_p = 10 μs)	dI/dt	max.	50	A/μs
Power dissipation				
Continuous dissipation; one line dissipating, unidirectional operation, device mounted on infinite heatsink	P_{tot}	max.	40	W
Peak dissipation; t = 1 ms, free-air mounting	P_{TM}	max.	400	W
Temperatures				
Storage temperature	T_{stg}		–40 to +150	°C
Operating temperature (off-state)	T_j	max.	125	°C
Overload temperature (on-state)	T_{vj}	max.	150	°C

DEVELOPMENT DATA

CHARACTERISTICS

T_j = 25 °C unless otherwise stated

Each line to centre lead and between lines

Avalanche voltage $V_{(BR)}$; ($I_{(BR)}$ = 10mA), and
Breakover voltage $V_{(BO)}$; ($I \leqslant I_S$):
(100 μs pulsed)

	$V_{(BR)}$ min.	$V_{(BO)}$ max.	$V_{(BO)}$ max. (line-line)	
BR213 –100	88	112	125	V
–120	105	135	150	V
–140	123	157	175	V
–160	140	180	200	V
–240	211	269	300	V
–260	228	292	325	V
–280	246	314	350	V

Temperature coefficient of $V_{(BR)}$	$S_{(br)}$	typ.	+0.1	%/K
Off-state current; V_D = 85% $V_{(BR)min}$ (note 4)				
T_j = 70 °C	I_D	<	50	μA
T_j = 125 °C	I_D	<	250	μA
Linear rate of rise of off-state voltage that will not trigger any device; T_j = 70 °C; V_{DM} = 85% $V_{(BR)min}$	dV_D/dt	<	2000	V/μs
Off-state capacitance V_D = 0; f = 1 kHz to 1 MHz	C_j	<	300	pF

Each line to centre lead only

Voltages and currents (in either direction)

On-state voltage (note 1) I_{TM} = 5 A	V_{TM}	<	2.5	V
Holding current (note 2)				
T_j = 25 °C	I_H	>	150	mA
T_j = 70 °C	I_H	>	100	mA
Switching current (note 3)	I_S	>	10	mA
(100 μs pulsed)	I_S	typ.	200	mA
	I_S	<	1000	mA

Notes:

1. Measured under pulsed conditions to avoid excessive dissipation.
2. The minimum current at which the BOD will remain in the on-state.
3. The avalanche current required to switch the BOD to the on-state.
4. I.e., at maximum recommended continuous voltage.

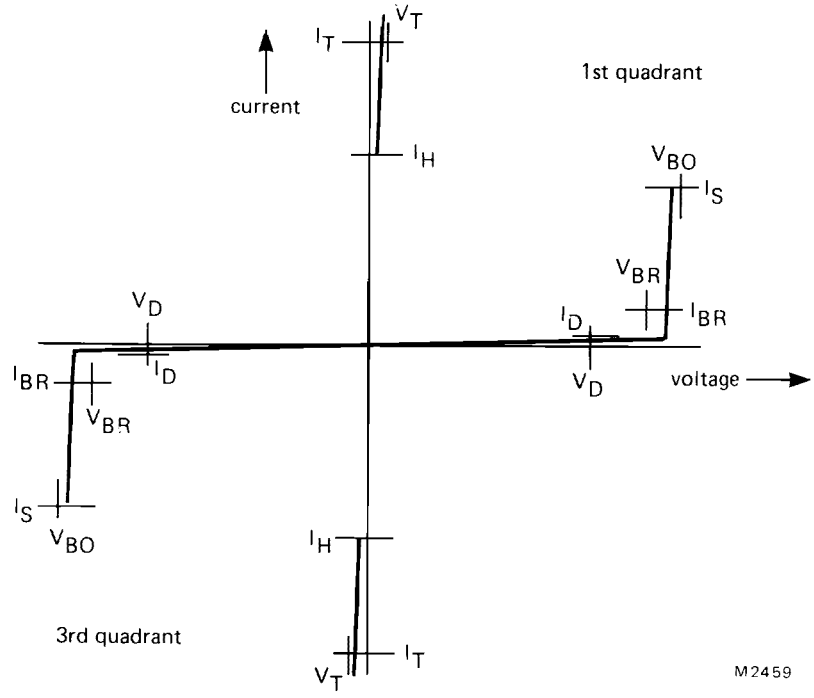


Fig.2 Breakover diode characteristics.

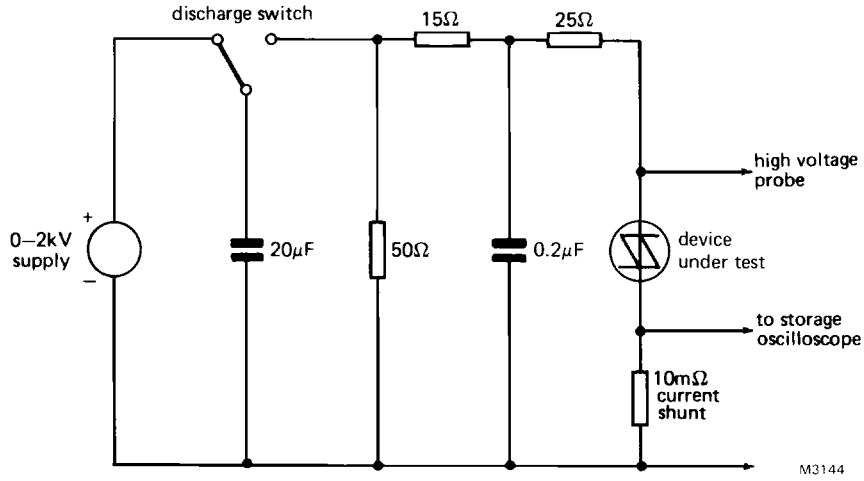


Fig.3 Test circuit for high voltage impulse (I_{TSM2}) (according to CCITT vol IX-Rec. K17).

Notes:
The 10/700 μs Impulse Waveform is defined for the voltage across the test fixture when the device under test is replaced with an open circuit. Clearly, once a breakover device has switched on to a low voltage, the current waveform will have a shorter fall-time, since the 15 Ω + 25 Ω output impedance becomes effectively in parallel with the 50 Ω.