

Description

The CR range of protectors are based on the proven technology of the T10 thyristor product. Designed for transient voltage protection of telecommunications equipment, it provides higher power handling than a conventional avalanche diode (TVS) and when compared to a GDT offers lower voltage clamping levels and infinite surge life.

Packaged in a transfer moulded DO-214AA surface mount outline designed for high speed pick & place machines used in today's surface mount assembly lines.

Electrical Characteristics

The electrical characteristics of an CRXXXX device is similar to that of a self gated Triac, but the CR is a two terminal device with no gate. The gate function is achieved by an internal current controlled mechanism.

Like the T.V.S. diodes, the CRXXXX has a standoff voltage (V_{rm}) which should be equal to or greater than the operating voltage of the system to be protected. At this voltage (V_{rm}) the current consumption of the CRXXXX is negligible and will not effect the protected system.

When a transient occurs, the voltage across the CRXXXX will increase until the breakdown voltage (V_{br}) is reached. At this point the device will operate in a similar way to a T.V.S. device and is in an avalanche mode.

The voltage of the transient will now be limited and will only increase by a few volts as the device diverts more current. As this transient current rises, a level of current through the device is reached (I_{bo}) which causes the device to switch to a fully conductive state such that the voltage across the device is now only a few volts (V_t). The voltage at which the device switches from the avalanche mode to the fully conductive state (V_t) is

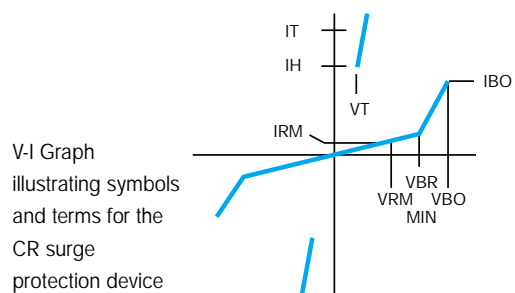
known as the Breakover Voltage (V_{bo}). When the device is in the V_t state, high currents can be diverted without damage to the CRXXXX due to the low voltage across the device, since the limiting factor in such devices is dissipated power ($V \times I$).

Resetting of the device to the non conducting state is controlled by the current flowing through the device. When the current falls below a certain value, known as the Holding Current (I_h), the device resets automatically.

As with the avalanche T.V.S. device, if the CRXXXX is subjected to a surge current which is beyond its maximum rating, then the device will fail in short circuit mode, this ensures that the equipment is ultimately protected.

Selecting A CRXXXX

1. When selecting a CRXXXX device, it is important that the V_{rm} of the device is equal to or greater than the operating voltage of the system.
2. The minimum Holding Current (I_h) must be greater than the current the system is capable of delivering otherwise the device will remain conducting following a transient condition.



The CRXXXX Range Can Be Used To Protect Against Surges As Defined In The Following International Standards.

			SA	SB	SC
FCC Rules Part 68/D	Metallic	10/560 μ s	50A	100A	100A
	Longitudinal	10/160 μ s	100A	150A	200A
Bellcore Specification	TR-NWT-001089	10/1000 μ s	37A	75A	100A
		2/10 μ s	-	-	500A
		100v/ μ s	1KV	1KV	1KV
ITU K-17 (Formerly CCITT)	Voltage Wave Form	10/700 μ s	-	1.5KV	1.5KV
	Current Wave Form	5/310 μ s	-	38A	38A
VDE 0433	Voltage Wave Form	10/700 μ s	-	2KV	4.0KV
	Current Wave Form	5/310 μ s	-	50A	100A
C-NET 131-24	Voltage Wave Form	0.5/700 μ s	1.0KV	1.0KV	4.0KV
	Current Wave Form	0.8/310 μ s	25A	25A	100A
IEC 1000 -4-5 (Discharge through 2 Ω impedance) I		8/20 μ s	-	100A	250A
	Voltage Wave Form	1-2/50 μ s	-	300V	500V
ITU K-20 (Formerly CCITT)	Voltage Wave Form	10/700 μ s	1000V	1000V	4000V
	Current Wave Form	5/310 μ s	25A	25A	100A

Specifications

Electrical Characteristics (T_j = 25°C)

SYMBOL PARAMETER

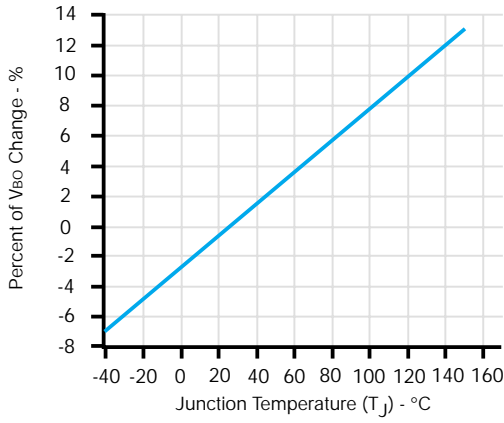
V _{RM}	Stand-off Voltage	I _{RM}	Stand-off Current
V _{BR}	Breakdown Voltage	I _{BO}	Breakover Current
V _{BO}	Breakover Voltage	I _H	Holding Current
V _T	On-State Voltage		

THERMAL DATA

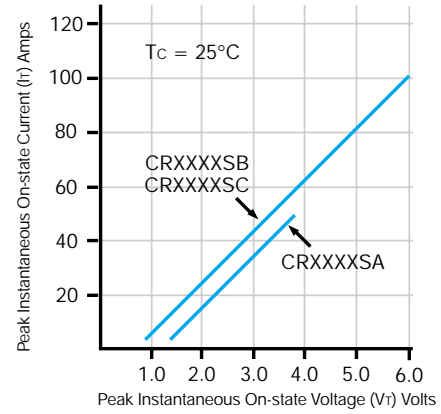
		VALUE	UNIT
T _{stg}	Storage and Operating Junction Temperature Range	-40 to +150	°C
T _j		150	°C
T _L	Maximum Temperature For Soldering (For period of 10 seconds max)	230	°C

	Stock Number	Device Code	Reverse Stand-off Voltage	Maximum Reverse Leakage	Maximum Breakover Voltage	Maximum Breakover Current	Maximum Holding Current	Maximum On-State Voltage	Typical Capacitance
			Voltage	μA	@I _{bo}	mA	mA	@1A	@1MHz 2v bias pF
MAXIMUM RATINGS									
SUFFIX	SA	CR 0300 SA 030A	25	5	40	800	150	5	100
I _{pp} 10x160μs Amps	100	CR 0640 SA 064A	58	5	77	800	150	5	60
I _{pp} 10x560μs Amps	50	CR 0720 SA 072A	65	5	88	800	150	5	60
I _{TSM} 60Hz Amps	20	CR 0800 SA 080A	75	5	98	800	150	5	60
dl/dt Amps/μs	500	CR 1100 SA 110A	90	5	130	800	150	5	60
		CR 1300 SA 130A	120	5	160	800	150	5	40
		CR 1500 SA 150A	140	5	180	800	150	5	40
		CR 1800 SA 180A	160	5	220	800	150	5	40
MAXIMUM RATINGS									
SUFFIX	SB	CR 2300 SA 230A	190	5	260	800	150	5	30
I _{pp} 10x160μs Amps	150	CR 2600 SA 260A	220	5	300	800	150	5	30
I _{pp} 10x560μs Amps	100	CR 3100 SA 310A	275	5	350	800	150	5	30
I _{TSM} 60Hz Amps	30	CR 3500 SA 350A	320	5	400	800	150	5	30
dl/dt Amps/μs	500	CR 0300 SB 030B	25	5	40	800	150	5	100
		CR 0640 SB 064B	58	5	77	800	150	5	60
		CR 0720 SB 072B	65	5	88	800	150	5	60
		CR 0800 SB 080B	75	5	98	800	150	5	60
		CR 1100 SB 110B	90	5	130	800	150	5	60
		CR 1300 SB 130B	120	5	160	800	150	5	40
		CR 1500 SB 150B	140	5	180	800	150	5	40
		CR 1800 SB 180B	160	5	220	800	150	5	40
		CR 2300 SB 230B	190	5	260	800	150	5	30
		CR 2600 SB 260B	220	5	300	800	150	5	30
		CR 3100 SB 310B	275	5	350	800	150	5	30
		CR 3500 SB 350B	320	5	400	800	150	5	30
MAXIMUM RATINGS									
SUFFIX	SC	CR 0300 SC 030C	25	5	40	800	150	5	200
I _{pp} 2x10μs Amps	500	CR 0640 SC 064C	58	5	77	800	150	5	120
I _{pp} 10x160μs Amps	200	CR 0720 SC 072C	65	5	88	800	150	5	120
I _{pp} 10x560μs Amps	100	CR 0800 SC 080C	75	5	98	800	150	5	120
I _{TSM} 60Hz Amps	60	CR 1100 SC 110C	90	5	130	800	150	5	120
dl/dt Amps/μs	500	CR 1300 SC 130C	120	5	160	800	150	5	80
		CR 1500 SC 150C	140	5	180	800	150	5	80
		CR 1800 SC 180C	160	5	220	800	150	5	80
		CR 2300 SC 230C	190	5	260	800	150	5	60
		CR 2600 SC 260C	220	5	300	800	150	5	60
		CR 3100 SC 310C	275	5	350	800	150	5	60
		CR 3500 SC 350C	320	5	400	800	150	5	60

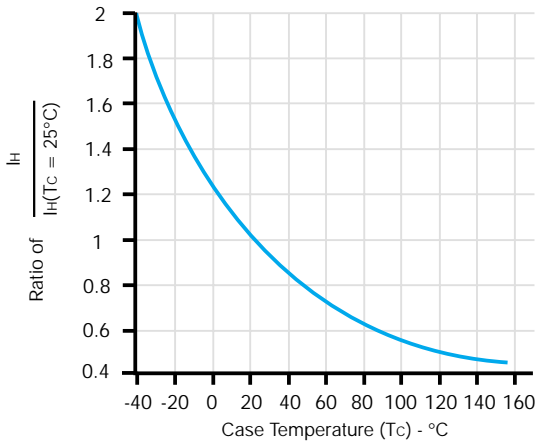
TYPICAL V_{BO} CHANGE VS JUNCTION TEMPERATURE



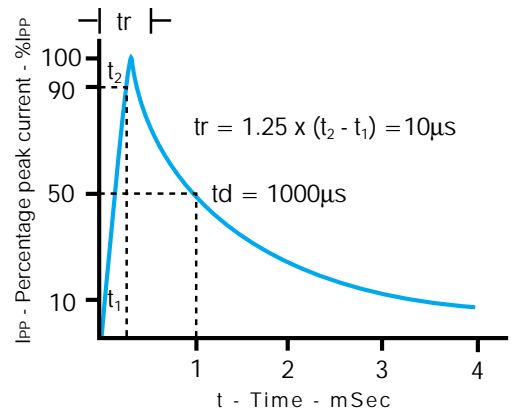
ON-STATE VOLTAGE (V_T) VS ON-STATE CURRENT (I_T)



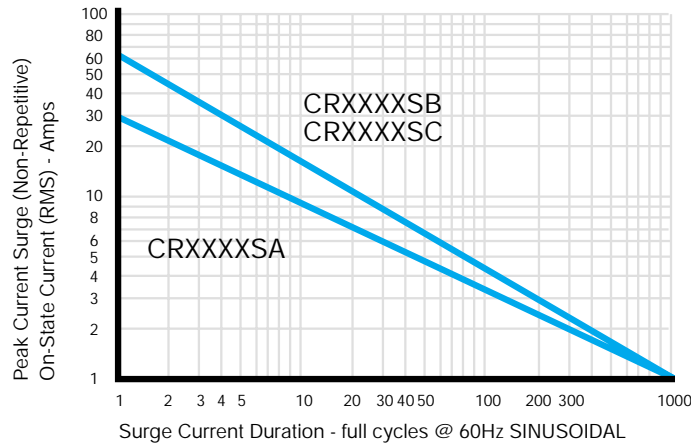
TYPICAL DC HOLDING CURRENT VS CASE TEMPERATURE



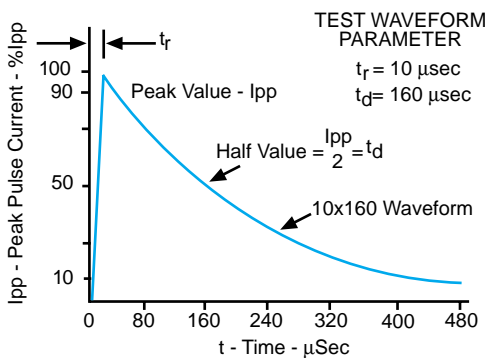
PULSE WAVE FORM (10/1000 μ S)



PEAK SURGE ON-STATE CURRENT VS SURGE CURRENT DURATION



10x160 μ s PULSE WAVE FORM



10x560 μ s PULSE WAVE FORM

