

HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS

Features:

- . All Diffused Structure
- . Interdigitated Amplifying Gate Configuration
- . Guaranteed Maximum Turn-Off Time
- . High dV/dt Capability
- . Pressure Assembled Device

ELECTRICAL CHARACTERISTICS AND RATINGS

Blocking - Off State

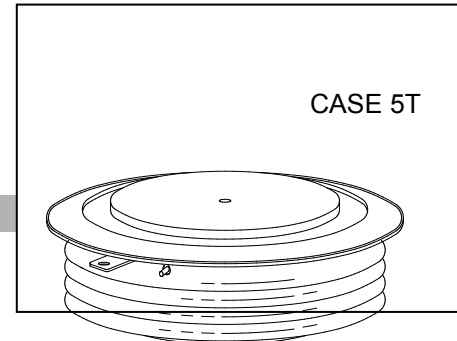
Device Type	V_{RRM} (1)	V_{DRM} (1)	V_{RSM} (1)
R3559TD16K	1600	1600	1700

V_{RRM} = Repetitive peak reverse voltage

V_{DRM} = Repetitive peak off state voltage

V_{RSM} = Non repetitive peak reverse voltage (2)

Repetitive peak reverse leakage and off state leakage	I_{RRM}/I_{DRM}	20 mA 150 mA (3)
Critical rate of voltage rise	dV/dt (4)	1000 V/μsec



Notes:

All ratings are specified for $T_j = 25^\circ\text{C}$ unless otherwise stated.

(1) All voltage ratings are specified for an applied 50Hz/60Hz sinusoidal waveform over the temperature range -40 to $+125^\circ\text{C}$.

(2) 10 msec. max. pulse width

(3) Maximum value for $T_j = 125^\circ\text{C}$.

(4) Minimum value for linear and exponential waveshape to 80% rated V_{DRM} . Gate open. $T_j = 125^\circ\text{C}$.

(5) Non-repetitive value.

(6) The value of di/dt is established in accordance with EIA/NIMA Standard RS-397, Section 5-2-2-6. The value defined would be in addition to that obtained from a snubber circuit, comprising a 0.2 μF capacitor and 20 ohms resistance in parallel with the thyristor under test.

Conducting - on state

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	$I_{T(AV)}$		3500		A	Sinewave, 180° conduction, $T_c = 70^\circ\text{C}$
RMS value of on-state current	I_{TRMS}		7000		A	Nominal value
Peak one cPSTCle surge (non repetitive) current	I_{TSM}		42000 38000		A A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, $T_j = 125^\circ\text{C}$ 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, $T_j = 125^\circ\text{C}$
I square t	I^2t		7.5×10^6		A^2s	8.3 msec
Latching current	I_L		1000		mA	$V_D = 24\text{ V}$; $R_L = 12\text{ ohms}$
Holding current	I_H		500		mA	$V_D = 24\text{ V}$; $I = 2.5\text{ A}$
Peak on-state voltage	V_{TM}		1.95		V	$I_{TM} = 5000\text{ A}$; $T_j = 125^\circ\text{C}$
Critical rate of rise of on-state current (5, 6)	di/dt		800		A/μs	Switching from $V_{DRM} \leq 1000\text{ V}$, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		300		A/μs	Switching from $V_{DRM} \leq 1000\text{ V}$

Gating

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	P_{GM}		200		W	$t_p = 40 \mu s$
Average gate power dissipation	$P_{G(AV)}$		5		W	
Peak gate current	I_{GM}		20		A	
Gate current required to trigger all units	I_{GT}		300 200 125		mA mA mA	$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40^\circ C$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +25^\circ C$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +125^\circ C$
Gate voltage required to trigger all units	V_{GT}	0.30	5 4		V V V	$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40^\circ C$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = 0-125^\circ C$ $V_D = \text{Rated } V_{DRM}; R_L = 1000 \text{ ohms}; T_j = +125^\circ C$
Peak negative voltage	V_{GRM}		20		V	

Dynamic

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	t_d		2.0		μs	$I_{TM} = 50 A; V_D = 67\% V_{DRM}$ Gate pulse: $V_G = 30 V; R_G = 10 \text{ ohms}; t_r = 0.1 \mu s; t_p = 20 \mu s$
Turn-off time (with $V_R = -5 V$)	t_q		70		μs	$I_{TM} > 2000 A; di/dt = 25 A/\mu s;$ $V_R \geq -5 V; \text{Re-applied } dV/dt = 400 V/\mu s \text{ linear to } 67\% V_{DRM};$ $T_j = 125^\circ C; \text{Duty cPSTCLe} \geq 0.01\%$
Reverse recovery current	I_{rr}		200		A	$I_{TM} > 2000 A; di/dt = 25 A/\mu s;$ $V_R \geq -50 V; T_j = 125^\circ C$

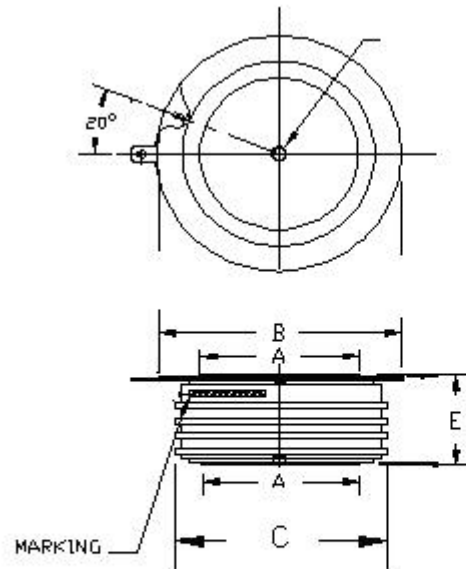
THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	T_j	-40	+125		$^\circ C$	
Storage temperature	T_{stg}	-40	+150		$^\circ C$	
Thermal resistance - junction to case	$R_{\Theta(j-c)}$		0.012		$^\circ C/W$	Double sided cooled Single sided cooled
Thermal resistance - case to sink	$R_{\Theta(c-s)}$		0.002		$^\circ C/W$	Double sided cooled * Single sided cooled *
Mounting force	P	8000 35.5	10000 44.4		lb. kN	
Weight	W			3.5 1.60	Lb. Kg.	

* Mounting surfaces smooth, flat and

greased

Note : for case outline and dimensions, see case outline drawing in page 3 of this Technical Data



A: 73 mm
 B: 109 mm
 C: 98 mm
 E: 35 mm