

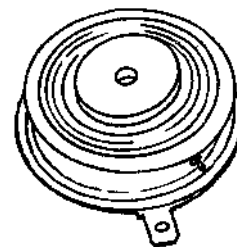
DCR504 – SEMICONDUCTOR DEVICES

CASE 1T

HIGH POWER THYRISTOR PHASE CONTROL APPLICATIONS

Features:

- . All Diffused Structure
- . Circular Amplifying Gate Configuration
- . Blocking capability up to 1200 volts
- . Guaranteed Maximum Turn-Off Time
- . High dV/dt Capability
- . Pressure Assembled Device



ELECTRICAL CHARACTERISTICS AND RATINGS

Blocking - Off State

V_{RRM} (1)	V_{DRM} (1)	V_{RSM} (1)
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	I_{RRM} / I_{DRM}	5 mA 20 mA (3)
Critical rate of voltage rise	dV/dt (4)	500 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	$I_{T(AV)}$		300		A	Sinewave, 180° conduction, $T_c = 65^\circ\text{C}$
RMS value of on-state current	I_{TRMS}		480		A	Nominal value
Peak one cycle surge (non repetitive) current	I_{TSM}		4200		A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, $T_j = 125^\circ\text{C}$
			4400		A	10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, $T_j = 125^\circ\text{C}$
I square t	I^2t		68000		A ² s	8.3 msec
Latching current	I_L			300	mA	$V_D = 24\text{ V}$; $R_L = 12\text{ ohms}$
Holding current	I_H			200	mA	$V_D = 24\text{ V}$; $I = 2.5\text{ A}$
Peak on-state voltage	V_{TM}		2.98		V	$I_{TM} = 1500\text{ A}$; $T_j = 25^\circ\text{C}$
Critical rate of rise of on-state current (5, 6)	di/dt		300		A/μs	Switching from $V_{DRM} \leq 1000\text{ V}$, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		150		A/μs	Switching from $V_{DRM} \leq 1000\text{ V}$



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ELECTRICAL CHARACTERISTICS AND RATINGS (cont'd)

Gating

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	P_{GM}		10		W	$t_p = 40 \mu s$
Average gate power dissipation	$P_{G(AV)}$		2		W	
Peak gate current	I_{GM}		3		A	
Gate current required to trigger all units	I_{GT}		200 150 125		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	3 2.5		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}		5		V	

Dynamic

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	t_d		1.0		μs	$I_{TM} = 100 A; V_D = V_{DRM}$ Gate pulse: $V_G = 10 V; R_G = 25 \text{ ohms}; t_r = 0.1 \mu s; t_p = 20 \mu s$
Turn-off time (with $V_R = -50 V$)	t_q		200		μs	$I_{TM} > 250 A; di/dt = 10 A/\mu s;$ $V_R \geq -50 V; \text{Re-applied } dV/dt = 20 V/\mu s \text{ linear to } V_{DRM};$ $T_j = 125^\circ C; \text{Duty cycle} \geq 0.01\%$
Reverse recovery charge	Q_{rr}		200		μCb	$I_{TM} > 400 A; di/dt = 10 A/\mu s;$

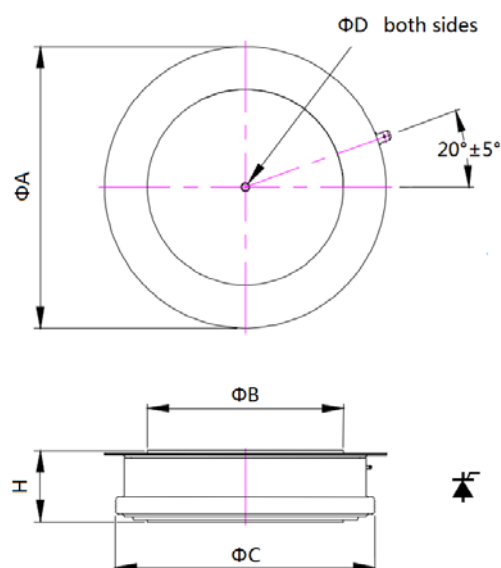
THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS

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	$R_{\theta(j-c)}$		0.095		$^\circ C/W$	Double sided cooled
Thermal resistance - case to sink	$R_{\theta(c-s)}$		0.06		$^\circ C/W$	Double sided cooled *
Mounting force	P	3.2	3.9		kN	
Weight	W			57	g.	

* Mounting surfaces smooth, flat and greased

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

CASE OUTLINE AND DIMENSIONS.



Sym	A	B	C	D	H
mm	41	19	36	3.5×1.8	14±1