

**Power Thyristor R500CH\*\***

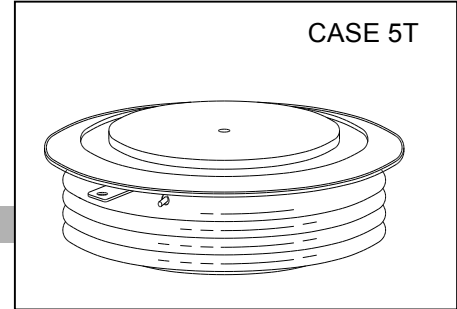
**2000-2800 V<sub>DRM</sub>; 2475A<sub>avg</sub>**

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**HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS**

**Features:**

- . All Diffused Structure
- . Interdigitated Amplifying Gate Configuration
- . Blocking capability up to 1800 volts
- . Guaranteed Maximum Turn-Off Time
- . High dV/dt Capability
- . Pressure Assembled Device



**ELECTRICAL CHARACTERISTICS AND RATINGS**

**Blocking - Off State**

Device Type	V <sub>RRM</sub> (1)	V <sub>DRM</sub> (1)	V <sub>RSM</sub> (1)
R500CH20	2000	2000	2100
R500CH22	2200	2200	2300
R500CH24	2400	2400	2500
R500CH26	2600	2600	2700
R500CH28	2800	2800	2900

V<sub>RRM</sub> = Repetitive peak reverse voltage  
 V<sub>DRM</sub> = Repetitive peak off state voltage  
 V<sub>RSM</sub> = Non repetitive peak reverse voltage (2)

Repetitive peak reverse leakage and off state leakage	I <sub>RRM</sub> / I <sub>DRM</sub>	20 mA 300 mA (3)
Critical rate of voltage rise	dV/dt (4)	200 V/μsec

**Conducting - on state**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	I <sub>T(AV)</sub>		2475		A	Sinewave, 180° conduction, T <sub>c</sub> =55°C
RMS value of on-state current	I <sub>TRMS</sub>		3300		A	Nominal value
Peak one cycle surge (non repetitive) current	I <sub>TSM</sub>		36000		A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T <sub>j</sub> = 125 °C
			31000		A	10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T <sub>j</sub> = 125 °C
I square t	I <sup>2</sup> t		4.81x10 <sup>6</sup>		A <sup>2</sup> s	10.0msec
Latching current	I <sub>L</sub>		1000		mA	V <sub>D</sub> = 24 V; R <sub>L</sub> = 12 ohms
Holding current	I <sub>H</sub>		500		mA	V <sub>D</sub> = 24 V; I = 2.5 A
Peak on-state voltage	V <sub>TM</sub>		2.55		V	I <sub>TM</sub> = 5700 A; T <sub>j</sub> = 125 °C
Critical rate of rise of on-state current (5, 6)	di/dt		800		A/μs	Switching from V <sub>DRM</sub> ≤ 1000 V, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		300		A/μs	Switching from V <sub>DRM</sub> ≤ 1000 V

Notes:

All ratings are specified for T<sub>j</sub>=25 °C unless otherwise stated.

- (1) All voltage ratings are specified for an applied 50Hz/60Hz sinusoidal waveform over the temperature range -40 to +125 °C.
- (2) 10 msec. max. pulse width
- (3) Maximum value for T<sub>j</sub> = 125 °C.
- (4) Minimum value for linear and exponential waveshape to 80% rated V<sub>DRM</sub>. Gate open. T<sub>j</sub> = 125 °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.

**ELECTRICAL CHARACTERISTICS AND RATINGS (cont'd)**

**Power Thyristor**

**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	$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40 \text{ }^\circ\text{C}$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +25 \text{ }^\circ\text{C}$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = +125 \text{ }^\circ\text{C}$
Gate voltage required to trigger all units	$V_{GT}$	0.30	5 4		V V V	$V_D = 6 V; R_L = 3 \text{ ohms}; T_j = -40 \text{ }^\circ\text{C}$ $V_D = 6 V; R_L = 3 \text{ ohms}; T_j = 0-125 \text{ }^\circ\text{C}$ $V_D = \text{Rated } V_{DRM}; R_L = 1000 \text{ ohms}; T_j = +125 \text{ }^\circ\text{C}$
Peak negative voltage	$V_{GRM}$		20		V	

**Dynamic**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	$t_d$		2.0		$\mu s$	$I_{TM} = 50 \text{ A}; V_D = 67\% V_{DRM}$ Gate pulse: $V_G = 30 \text{ V}; R_G = 10 \text{ ohms}; t_r = 0.1 \mu s; t_b = 20 \mu s$
Turn-off time (with $V_R = -5 \text{ V}$ )	$t_q$		60		$\mu s$	$I_{TM} > 2000 \text{ A}; di/dt = 25 \text{ A}/\mu s;$ $V_R \geq -5 \text{ V};$ Re-applied $dV/dt = 20 \text{ V}/\mu s$ linear to $67\% V_{DRM};$ $T_j = 125 \text{ }^\circ\text{C};$ Duty cycle $\geq 0.01\%$
Reverse recovery current	$I_{rr}$		200		A	$I_{TM} > 2000 \text{ A}; di/dt = 25 \text{ A}/\mu s;$ $V_R \geq -50 \text{ V}; T_j = 125 \text{ }^\circ\text{C}$

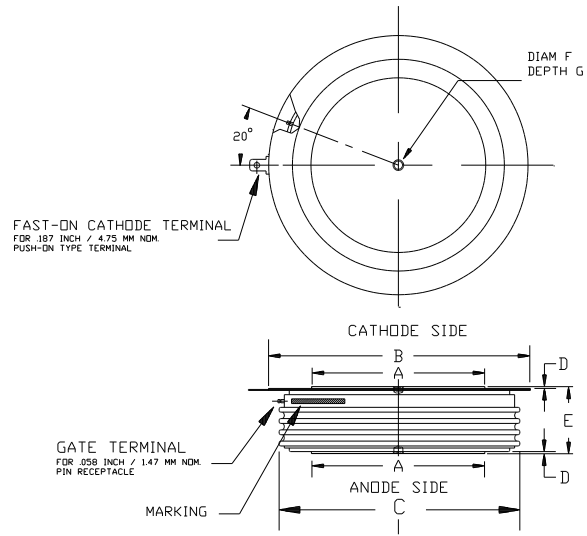
**THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	$T_j$	-40	+125		$^\circ\text{C}$	
Storage temperature	$T_{stg}$	-40	+150		$^\circ\text{C}$	
Thermal resistance - junction to case	$R_{\theta(j-c)}$		0.012		$^\circ\text{C}/\text{W}$	Double sided cooled Single sided cooled
Thermal resistance - case to sink	$R_{\theta(c-s)}$		0.002		$^\circ\text{C}/\text{W}$	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

**POWER THYRISTOR**



**CASE 5T  
NOMINAL OUTLINE DIMENSIONS**

DIMENSIONS	INCH	MM
DIAM. A	2.88	73.2
DIAM. B	4.36	110.7
DIAM. C	3.95	100.3
D	.030	.76
E	1.400 / 1.440	35.56 / 36.58
F	.140	3.56
G	.080	2.03

STRIKE DISTANCE = 1.04 inch / 26.4 mm MIN.  
CREEPAGE DISTANCE = 1.64 inch / 41.6 mm MIN.