


**R A E**
**Runau Electronics(Yangzhou)Manufacturing Co.,Ltd 5500 - 6500 V<sub>DRM</sub>; 1200A AVG**

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## HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS

### Features:

- . All Diffused Structure
- . Interdigitated Amplifying Gate Configuration
- . Blocking capability up to 6500 volts
- . Guaranteed Maximum Turn-Off Time
- . High dV/dt Capability
- . Pressure Assembled Device

### ELECTRICAL CHARACTERISTICS AND RATINGS

#### Blocking - Off State

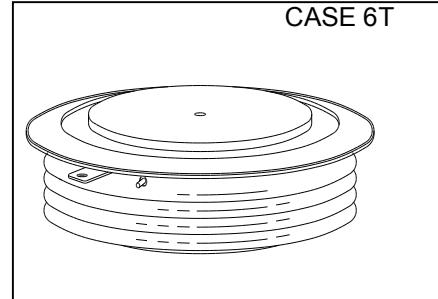
Device Type	V <sub>RRM</sub> (1)	V <sub>DRM</sub> (1)	V <sub>RSM</sub> (1)
YC789EE	5500	5500	5700
YC789ES	5700	5700	5900
YC789EN	5800	5800	6000
YC789ET	5900	5900	6100
YC789FA	6000	6000	6200
YC789FB	6200	6200	6400
YC789FE	6500	6500	6700

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>	10 mA 200 mA (3)
Critical rate of voltage rise	dV/dt (4)	2000 V/ $\mu$ sec



#### 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 thristor under test.

#### Conducting - on state

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	I <sub>T(AV)</sub>		1200		A	Sinewave, 180° conduction, T <sub>c</sub> =70 °C
RMS value of on-state current	I <sub>TRMS</sub>		1884		A	Nominal value
Peak one cycle surge (non repetitive) current	I <sub>TSM</sub>		22500		A	8.3 msec (60Hz), sinusoidal wave- shape, 180° conduction, T <sub>j</sub> = 125 °C
			20000		A	10.0 msec (50Hz), sinusoidal wave- shape, 180° conduction, T <sub>j</sub> = 125 °C
Latching current	I <sub>L</sub>		400		mA	V <sub>D</sub> = 24 V; R <sub>L</sub> = 12 ohms
Holding current	I <sub>H</sub>		100		mA	V <sub>D</sub> = 24 V; I = 2.5 A
Peak on-state voltage	V <sub>TM</sub>		2.3		V	I <sub>TM</sub> = 2000 A; T <sub>j</sub> = 125 °C
Critical rate of rise of on-state current (5, 6)	di/dt		200		A/ $\mu$ s	Switching from V <sub>DRM</sub> ≤ 1500 V, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		75		A/ $\mu$ s	Switching from V <sub>DRM</sub> ≤ 1500 V

**Gating**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	P <sub>GM</sub>		200		W	t <sub>p</sub> = 40 us
Average gate power dissipation	P <sub>G(AV)</sub>		5		W	
Peak gate current	I <sub>GM</sub>		15		A	
Gate current required to trigger all units	I <sub>GT</sub>		300 200 125		mA	V <sub>D</sub> = 6 V; R <sub>L</sub> = 3 ohms; T <sub>j</sub> = -40 °C
					mA	V <sub>D</sub> = 6 V; R <sub>L</sub> = 3 ohms; T <sub>j</sub> = +25 °C
					mA	V <sub>D</sub> = 6 V; R <sub>L</sub> = 3 ohms; T <sub>j</sub> = +125 °C
Gate voltage required to trigger all units	V <sub>GT</sub>		5 4 0.30		V	V <sub>D</sub> = 6 V; R <sub>L</sub> = 3 ohms; T <sub>j</sub> = -40 °C
					V	V <sub>D</sub> = 6 V; R <sub>L</sub> = 3 ohms; T <sub>j</sub> = 0-125 °C
					V	V <sub>D</sub> = Rated V <sub>DRM</sub> ; R <sub>L</sub> = 1000 ohms; T <sub>j</sub> = +125 °C
Peak negative voltage	V <sub>GRM</sub>		15		V	

**Dynamic**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	t <sub>d</sub>		5.0	4.0	μs	I <sub>TM</sub> = 50 A; V <sub>D</sub> = 67% V <sub>DRM</sub> Gate pulse: V <sub>G</sub> = 30 V; R <sub>G</sub> = 10 ohms; t <sub>r</sub> = 0.1 μs; t <sub>p</sub> = 20 μs
Turn-off time (with V <sub>R</sub> = -5 V)	t <sub>q</sub>		800	500	μs	I <sub>TM</sub> > 2000 A; di/dt = 5 A/μs; V <sub>R</sub> ≥ -5 V; Re-applied dV/dt = 20V/μs linear to 1000V <sub>DRM</sub> ; T <sub>j</sub> = 125 °C; Duty cycle ≥ 0.01%
Reverse recovery current	I <sub>rr</sub>				A	I <sub>TM</sub> > 2000 A; di/dt = 25 A/μs; V <sub>R</sub> ≥ -50 V; T <sub>j</sub> = 125 °C

**THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	T <sub>j</sub>	-40	+125		°C	
Storage temperature	T <sub>stg</sub>	-40	+150		°C	
Thermal resistance - junction to case	R <sub>Θ(j-c)</sub>		0.012		°C/W	Double sided cooled
Thermal resistamce - case to sink	R <sub>Θ(c-s)</sub>		0.001		°C/W	Double sided cooled *
Mounting force	P	8000 35.5	10000 44.4		lb. kN	
Weight	W			N/A	Lb.	

\* Mounting surfaces smooth, flat and greased

