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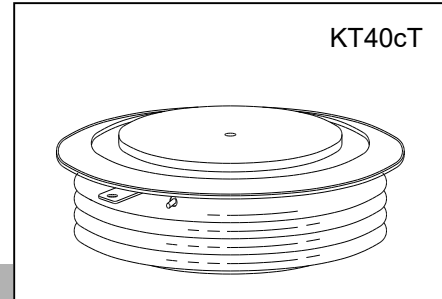
# YC441-Power Thyristor

1400 - 2200 V<sub>DRM</sub>

## HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS

### Features:

- . All Diffused Structure
- . Interdigitated Amplifying Gate Configuration
- . Blocking capability up to 2200 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)
YC441PD	1400	1400	1500
YC441PE	1500	1500	1600
YC441PM	1600	1600	1700
YC441PN	1800	1800	1900
YC441L	2000	2000	2100
YC441LB	2200	2200	2300

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>	15 mA 35 mA (3)
Critical rate of voltage rise	dV/dt (4)	200 V/μsec

### 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.

### Conducting - on state

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	I <sub>T(AV)</sub>		750		A	Sinewave, 180° conduction, T <sub>c</sub> =65°C
RMS value of on-state current	I <sub>TRMS</sub>		1180		A	Nominal value
Peak one cycle surge (non repetitive) current	I <sub>TSM</sub>		11000		A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T <sub>j</sub> = 125 °C
			11500		A	10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T <sub>j</sub> = 125 °C
I square t	I <sup>2</sup> t		500000		A <sup>2</sup> s	8.3 msec
Latching current	I <sub>L</sub>		800		mA	V <sub>D</sub> = 24 V; R <sub>L</sub> = 12 ohms
Holding current	I <sub>H</sub>		400		mA	V <sub>D</sub> = 24 V; I = 2.5 A
Peak on-state voltage	V <sub>TM</sub>		2.0		V	I <sub>TM</sub> = 3000 A;
Critical rate of rise of on-state current (5, 6)	di/dt		400		A/μs	Switching from V <sub>DRM</sub> ≤ 1000 V, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		150		A/μs	Switching from V <sub>DRM</sub> ≤ 1000 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	$I_{GM}$		10		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 3		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	$V_{GRM}$		5		V	

**Dynamic**

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	$t_d$		1.5	0.7	$\mu s$	$I_{TM} = 50 \text{ A}; V_D = 67\% V_{DRM}$ Gate pulse: $V_G = 30 \text{ V}; R_G = 10 \text{ ohms}; t_r = 0.1 \mu s; t_p = 20 \mu s$
Turn-off time (with $V_R = -5 \text{ V}$ )	$t_q$		250	125	$\mu s$	$I_{TM} > 1000 \text{ A}; di/dt = 25 \text{ A}/\mu s;$ $V_R \geq -5 \text{ V}; \text{Re-applied } dV/dt = 200 \text{ V}/\mu s \text{ linear to } 67\% V_{DRM};$ $T_j = 125 \text{ }^\circ\text{C}; \text{Duty cycle } \geq 0.01\%$
Reverse recovery charge	$I_{rr}$				$\mu C$	$I_{TM} > 1000 \text{ A}; di/dt = 25 \text{ A}/\mu s;$ $V_R \geq -50 \text{ V}; T_j = 125 \text{ }^\circ\text{C}$

**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	$R_{\theta(j-c)}$		0.040 0.080		$^\circ\text{C}/\text{W}$	Double sided cooled Single sided cooled
Thermal resistance - case to sink	$R_{\theta(c-s)}$		0.015 0.030		$^\circ\text{C}/\text{W}$	Double sided cooled * Single sided cooled
Mounting force	P	3000 13.4	3500 15.7		lb. kN	
Weight	W			9 255	oz g.	

\* Mounting surfaces smooth, flat and greased

