R A E

YC458 - Power Thyristor

500 - 1400 V$_{DRM}$; 2000 A rms

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HIGH POWER THYRISTOR FOR INVERTER CONTROL APPLICATIONS

CASE 4T

Features:
. **All Diffused Structure**
. **Interdigitated Amplifying Gate Configuration**
. **Blocking capabilty up to 1400 volts**
. **Guaranteed Maximum Turn-Off Time**
. **High dV/dt Capability**
. **Pressure Assembled Device**
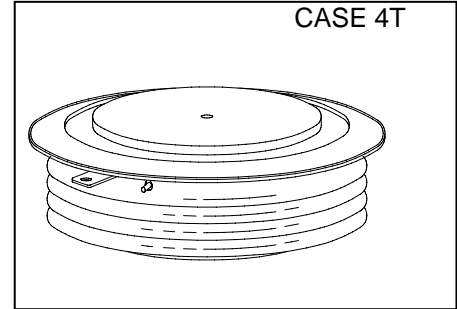
ELECTRICAL CHARACTERISTICS AND RATINGS

Blocking - Off State

Device Type	V$_{RRM}$ (1)	V$_{DRM}$ (1)	V$_{RSM}$ (1)
YC458E	500	500	600
YC458M	600	600	720
YC458N	800	800	960
YC458P	1000	1000	1150
YC458PB	1200	1200	1300
YC458PD	1400	1400	1500

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$_{DRM}$	15 mA 65 mA (3)
Critical rate of voltage rise	dV/dt (4)	500 V/μsec

Notes:

All ratings are specified for Tj=25 °C unless otherwise stated.

(1) All voltage ratings are specified for an applied 50Hz/60zHz sinusoidal waveform over the temperature range   -40 to +125 °C.

(2) 10 msec. max. pulse width

(3) Maximum value for Tj = 125 °C.

(4) Minimum value for linear and exponential waveshape to 80% rated V$_{DRM}$. Gate open. Tj = 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
RMS value of on-state current	I$_{TRMS}$		2000		A	Nominal value
Peak one cycle surge (non repetitive) current	I$_{TSM}$		16000 14600		A A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, T$_j$ = 125 °C 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, T$_j$ = 125 °C
I square t	I^{2}t		1.0x10^6		A^{2}s	8.3 msec
Latching current	I$_L$		1000		mA	V$_D$ = 24 V; R$_L$= 12 ohms
Holding current	I$_H$		500		mA	V$_{D=}$ 24 V; I = 2.5 A
Peak on-state voltage	V$_{TM}$		2.6		V	I$_{TM}$ = 4000 A;
Critical rate of rise of on-state current (5, 6)	di/dt		800		A/μs	Switching from V$_{DRM}$ ≤ 1000 V, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		400		A/μs	Switching from V$_{DRM}$ ≤ 1000 V

ELECTRICAL CHARACTERISTICS AND RATINGS (cont'd)   **YC712 - Power Thyristor**

Gating

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Peak gate power dissipation	P_{GM}		200		W	t_p = 40 us
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 ohms; T_j = -40 ^{o}C V_D = 6 V; R_L = 3 ohms; T_j = +25 ^{o}C V_D = 6 V; R_L = 3 ohms; T_j = +125°C
Gate voltage required to trigger all units	V_{GT}	 0.30	5 3		V V V	V_D = 6 V; R_L = 3 ohms; T_j = -40 ^{o}C V_D = 6 V; R_L = 3 ohms; T_j = 0-125°C V_D = Rated V_{DRM}; R_L = 1000 ohms; T_j = + 125 ^{o}C
Peak negative voltage	V_{GRM}		5		V	

Dynamic

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Delay time	t_d		1.5	0.7	µs	I_{TM} = 50 A; V_D = 67% V_{DRM} Gate pulse: V_G = 30 V; R_G = 10 ohms; t_r = 0.1 µs; t_p = 20 µs
Turn-off time (with V_R = -5 V)	t_q		50		µs	I_{TM} > 1000 A; di/dt = 25 A/µs; $V_R \geq$ -5 V; Re-applied dV/dt = 200 V/µs linear to 67% V_{DRM} ; T_j = 125 ^{o}C; Duty cycle $\geq$ 0.01%
Reverse recovery charge	I_{rr}			400	µC	I_{TM} > 1000 A; di/dt = 25 A/µs; $V_R \geq$ -50 V; T_j = 125 ^{o}C

THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	T_j	-40	+125		^{o}C	
Storage temperature	T_{stg}	-40	+150		^{o}C	
Thermal resistance - junction to case	$R_{\Theta (j-c)}$		0.025 0.050		^{o}C/W	Double sided cooled Single sided cooled
Thermal resistamce - case to sink	$R_{\Theta (c-s)}$		0.010 0.020		^{o}C/W	Double sided cooled * Single sided cooled
Mounting force	P	5500 24.5	6000 26.4		lb. kN	
Weight	W			16 0.46	oz Kg.	

* Mounting surfaces smooth, flat and greased

CASE OUTLINE AND DIMENSIONS

4T

φ47

26±2

φ47

1.0

φ66

2- φ3.5×1.9

4.75

20°±5°

φ73

43