

ELECTRO POWER

C431 - Power Thyristor

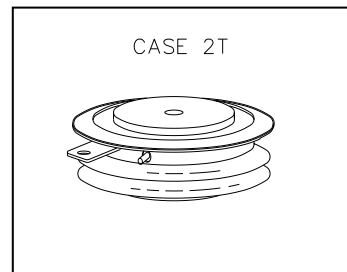
1000 -

2000 V_{DRM} ; 940 A rms

HIGH POWER THYRISTOR FOR PHASE CONTROL APPLICATIONS

Features:

- . All Diffused Structure
- . Center Amplifying Gate Configuration
- . Blocking capability up to 2000 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)
C431P	1000	1000	1100
C431PB	1200	1200	1300
C431PD	1400	1400	1500
C431PM	1600	1600	1700
C431PN	1800	1800	1900
C431L	2000	2000	2000

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 30 mA (3)
Critical rate of voltage rise (4)	dV/dt	200 V/ μ sec

Conducting - on state

Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Average value of on-state current	$I_{T(AV)}$		600		A	Sinewave, 180° conduction, $T_c = 65^\circ C$
RMS value of on-state current	I_{TRMS}		940		A	Nominal value
Peak one cycle surge (non repetitive) current	I_{TSM}		7500 7200		A A	8.3 msec (60Hz), sinusoidal wave-shape, 180° conduction, $T_j = 125^\circ C$ 10.0 msec (50Hz), sinusoidal wave-shape, 180° conduction, $T_j = 125^\circ C$
I square t	I^2t		235000		A^2s	8.3 msec and 10.0 msec
Latching current	I_L		800		mA	$V_D = 24 V$; $R_L = 12$ ohms
Holding current	I_H		400		mA	$V_D = 24 V$; $I = 2.5 A$
Peak on-state voltage	V_{TM}		2.30		V	$I_{TM} = 2000 A$; Duty cycle $\leq 0.01\%$
Critical rate of rise of on-state current (5, 6)	di/dt		400		A/ μs	Switching from $V_{DRM} \leq 1000 V$, non-repetitive
Critical rate of rise of on-state current (6)	di/dt		150		A/ μs	Switching from $V_{DRM} \leq 1000 V$

Notes:

All ratings are specified for $T_j = 25^\circ C$ unless otherwise stated.

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

(2) 10 msec. max. pulse width

(3) Maximum value for $T_j = 125^\circ C$.

(4) Minimum value for linear and exponential waveshape to 80% rated V_{DRM} . Gate open. $T_j = 125^\circ C$.

(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 $0.2 \mu F$ capacitor and 20 ohms resistance in parallel with the thyristor under test.

ELECTRICAL CHARACTERISTICS AND RATINGS (cont'd)

C431 - 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}		10		A	
Gate current required to trigger all units	I_{GT}		300 150 125		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}	0.15	5 3		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		1.5	0.7	μs	$I_{TM} = 50 A; V_D = \text{Rated } V_{DRM}$ Gate pulse: $V_G = 20 V; R_G = 20 \text{ ohms}; t_r = 0.1 \mu s; t_p = 20 \mu s$
Turn-off time (with $V_R = -50 V$)	t_q		200	125	μs	$I_{TM} = 500 A; di/dt = 25 A/\mu s;$ $V_R \geq -50 V; \text{Re-applied } dV/dt = 20 V/\mu s \text{ linear to } 80\% V_{DRM}; V_G = 0;$ $T_j = 125^\circ C; \text{Duty cycle } \geq 0.01\%$
Reverse recovery charge	Q_{rr}		*		μC	$I_{TM} = 500 A; di/dt = 25 A/\mu s;$ $V_R \geq -50 V$

* For guaranteed max. value, contact factory.

THERMAL AND MECHANICAL CHARACTERISTICS AND RATINGS

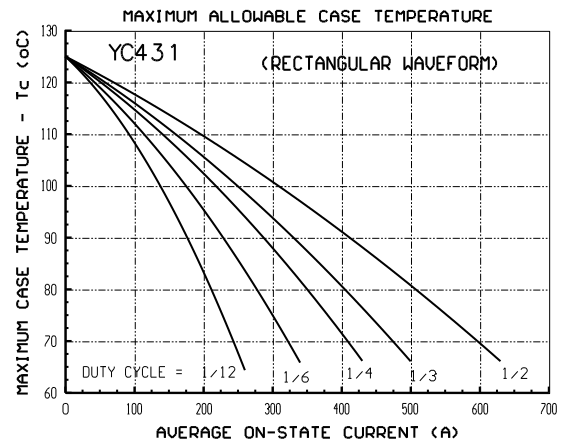
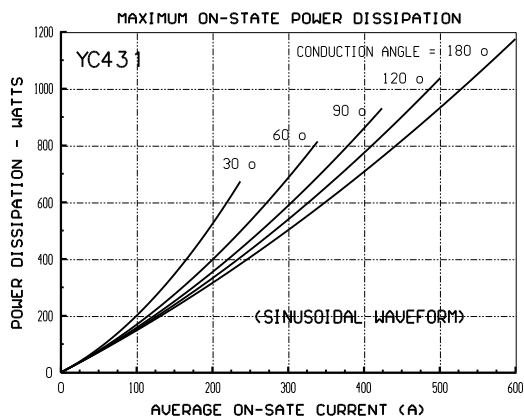
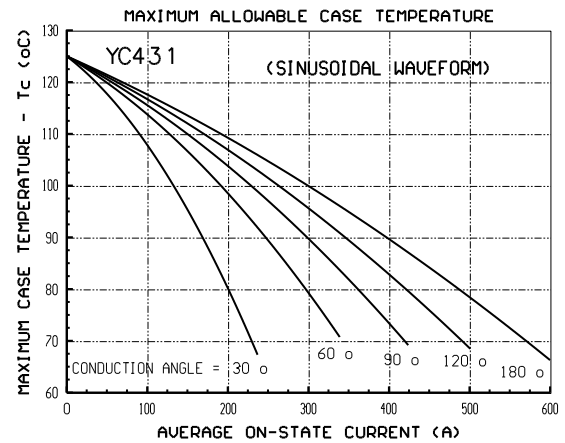
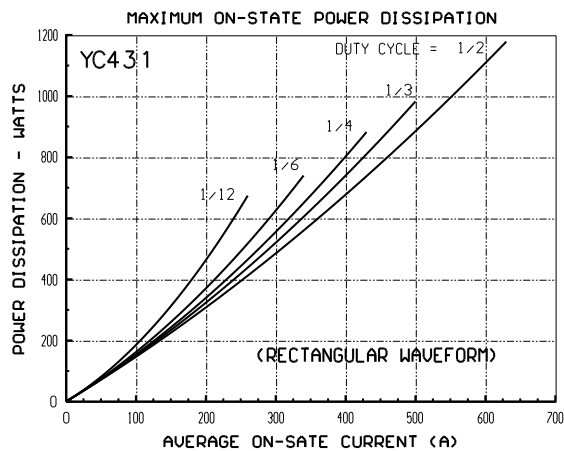
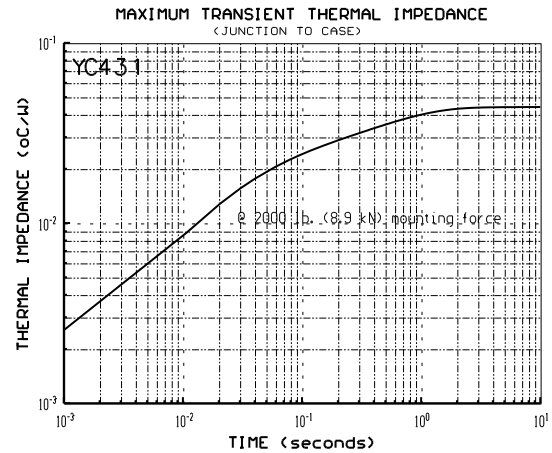
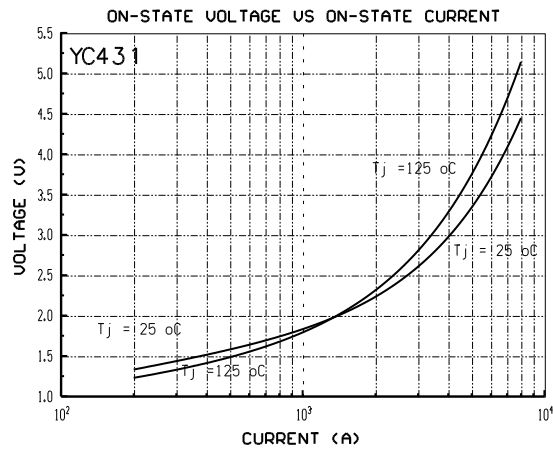
Parameter	Symbol	Min.	Max.	Typ.	Units	Conditions
Operating temperature	T_j	-40	+125		$^\circ C$	
Storage temperature	T_{stg}	-40	+150		$^\circ C$	
Thermal resistance - junction to case	$R_{\theta(j-c)}$	0.045 (1)	0.055 (2)		$^\circ C/W$	Double sided cooled * (1) @ 2000 lb.; (2) @ 800 lb.
Thermal resistance - junction to case	$R_{\theta(j-c)}$	0.090 (1)	0.110 (2)		$^\circ C/W$	Single sided cooled * (1) @ 2000 lb.; (2) @ 800 lb.
Thermal resistance - case to sink	$R_{\theta(c-s)}$		.030 .060		$^\circ C/W$	Double sided cooled * Single sided cooled *
Mounting force	P	800 3.6	2500 11.1		lb. kN	
Weight	W			2.5 70	oz. g	

* Mounting surfaces smooth, flat and greased

Note : for case outline and dimensions, see case outline drawing in page 4 of this Technical Data

ELECTRICAL CHARACTERISTICS AND RATINGS (cont'd)

C431 - Power Thyristor

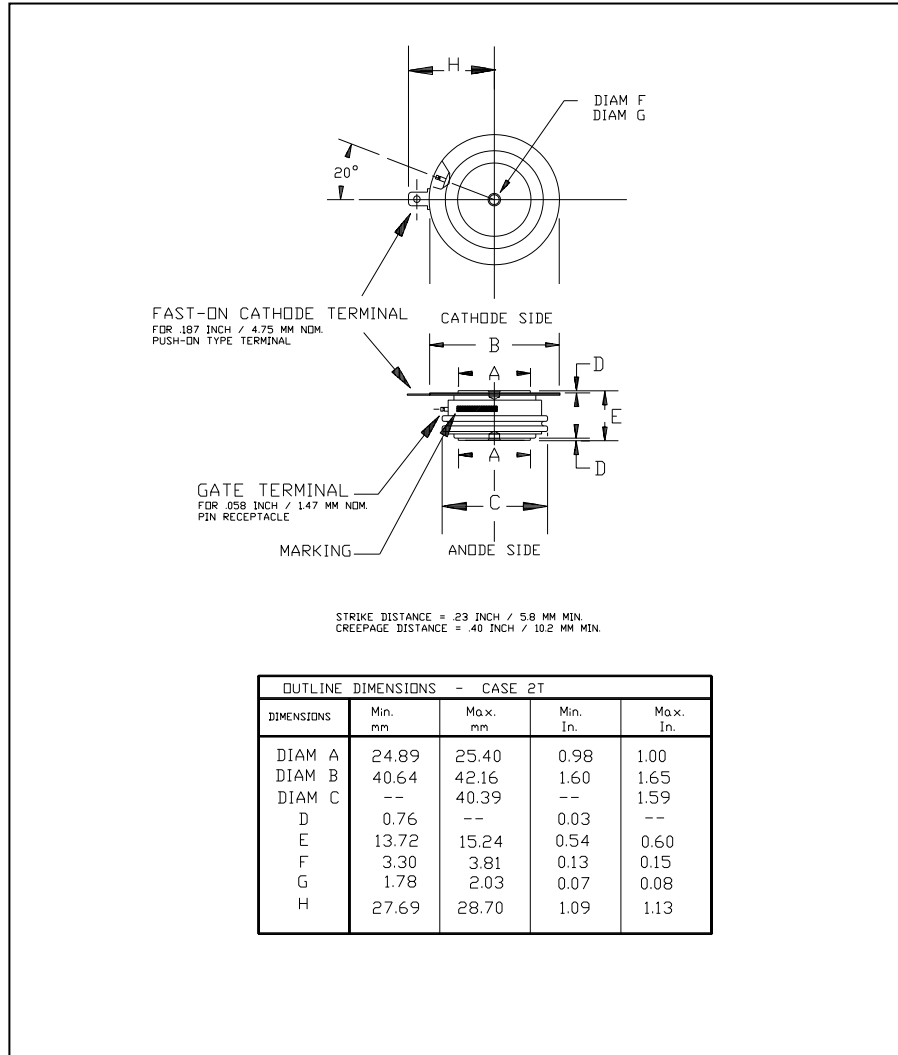


Technical Data : CD-020

Page 4 of 4

CASE OUTLINE AND DIMENSIONS.

C431 - Power Thyristor



* * * * *

ELECTRO POWER

C431 - Power Thyristor