

POWEREX INC

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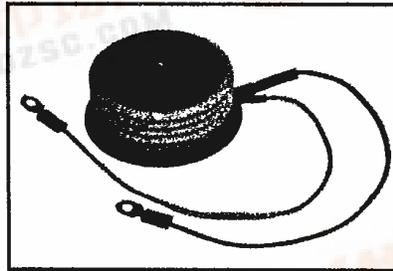
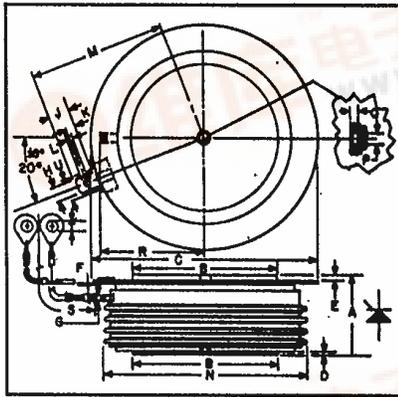
T-25-21

POWEREX

Powerex, Inc. Hills Street, Youngwood, Pennsylvania 15697 (412) 925-7272
 Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72.75.15

C450

Phase Control SCR
 1460-1640 Amperes Avg
 500-1400 Volts



C450
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 1460-1640 Amperes/500-1400 Volts

C450
 Outline Drawing

Dimensions	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	1.020	1.065	25.90	27.05
B	1.845	1.855	46.86	47.12
C	—	2.940	—	74.68
D	.030	—	.76	—
E	.050	—	1.27	—
F	.017	.023	.43	.58
G	.057	.059	1.44	1.50
H	.186	.191	4.72	4.85
J	.245	.255	6.22	6.48
K	.115	.130	2.92	3.30
L	.064	.070	1.62	1.78
M	—	1.800	—	45.72
N	—	2.650	—	67.31
P	.135	.145	3.42	3.66
Q	.070	.100	1.77	2.54
R	—	1.355	—	34.42
S	12.219	12.343	310.36	313.51
T	.137	.153	3.47	3.89

Description

Powerex Silicon Controlled Rectifiers (SCR) are designed for phase control applications. These are all-diffused, Press-Pak (Pow-R-Disc) devices employing the field-proven amplifying (di/namic) gate.

Features:

- Low On-State Voltage
- High di/dt
- High dv/dt
- Hermetic Packaging
- Excellent Surge and I²t Ratings

Applications:

- Power Supplies
- Battery Chargers
- Motor Control
- Light Dimmers
- VAR Generators

Ordering Information

Example: Select the complete six or seven digit part number you desire from the table - i.e. C450P1 is a 1000 Volt, 1640 Ampere Phase Control SCR.

Type	Voltage		Current	
	V _{ORM} V _{RRM}	Code	I _T (avg)	Code
C450	500	E	1460	2
	600	M		
	700	S	1640	1
	800	N		
	900	T		
	1000	P		
	1100	PA		
	1200	PB		
	1300	PC		
	1400	PD		





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Absolute Maximum Ratings

	Symbol	C450-1	C450-2	Units
RMS On-State Current	$I_{T(RMS)}$	2575	2300	Amperes
Average On-State Current	$I_{T(av)}$	1640	1480	Amperes
Peak One-Cycle Surge (Non Repetitive) On-State Current (60Hz)	I_{TSM}	28500	25,000	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz)	I_{TSM}	26,000	22,800	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive)	di/dt	800	800	Amperes/ μ s
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	400	400	Amperes/ μ s
I^2t (for Fusing), One Cycle at 60Hz	I^2t	3.4×10^6	2.6×10^6	A ² sec
Peak Gate Power Dissipation	P_{GM}	200	200	Watts
Average Gate Power Dissipation	$P_{G(av)}$	5	5	Watts
Storage Temperature	T_{STG}	-40 to 150	-40 to 150	°C
Operating Temperature	T_J	-40 to 125	-40 to 125	°C
Mounting Force [Ⓞ]		5500 to 6000	5500 to 6000	lb.
Mounting Force [Ⓞ]		24.5 to 26.7	24.5 to 26.7	kN

Electrical and Thermal Characteristics

Characteristics	Symbol	Test Conditions	C450-1	C450-2	Units
Current—Conducting State Maximums					
Peak On-State Voltage	V_{TM}	$I_{TM} = 3000A$ Peak, $T_J = 25^\circ C$	1.4	1.65	Volts
C450					
Voltage—Blocking State Maximums					
Forward Leakage, Peak	I_{DRM}	$T_J = 125^\circ C, V = V_{DRM}$	45		mA
Reverse Leakage, Peak	I_{RRM}	$T_J = 125^\circ C, V = V_{RRM}$	45		mA
Switching					
Typical Turn-Off Time	t_q	$T_J = 125^\circ C, I_T = 2000A$, Pulse Width = 1000 μ sec; $V_R = 50V$; $dv/dt = 200V/\mu$ sec; Linear to V_{DRM} ; $di_R/dt = 25A/\mu$ sec; $V_G = 0, R_L = 100\Omega$	150		μ sec
Typical Delay Time	t_d	$T_J = 25^\circ C, I_T = 50A$; Gate supply 20V; $R_L = 20\Omega$; 0.1 μ sec Rise Time		.7	μ sec
Min. Critical dv/dt exponential to V_{DRM}	dv/dt	$T_J = 125^\circ C$	400		V/ μ sec
Thermal					
Maximum Thermal Resistance, [Ⓞ] double sided cooling Junction to Case	$R_{\theta JC}$.025	°C/Watt
Case to Sink, Lubricated	$R_{\theta CS}$.0075	°C/Watt
Gate—Maximum Parameters					
Gate Current to Trigger	I_{GT}	$T_J = 25^\circ C, V_D = 20V, R_L = 3\Omega$	200		mA
Gate Voltage to Trigger	V_{GT}	$T_J = -40^\circ$ to $125^\circ C, V_D = 20V, R_L = 3\Omega$	5		Volts
Non-Triggerring Gate Voltage	V_{GDM}	$T_J = 125^\circ C, V_D = \text{rated } V_{DRM}$ $R_L = 1000\Omega$.15		Volts
Peak Forward Gate Current	I_{GTM}		10		Amperes
Peak Reverse Gate Voltage	V_{GRM}		5		Volts

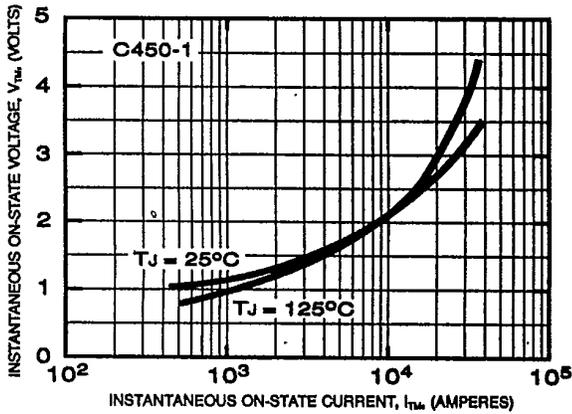
[Ⓞ] Consult recommended mounting procedures.



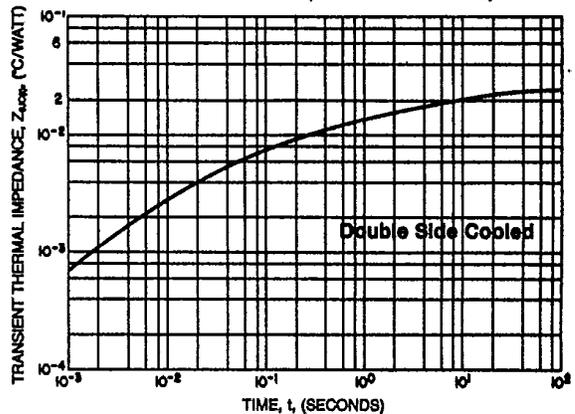
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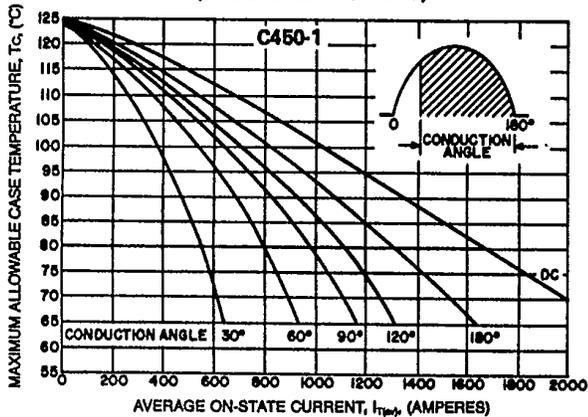
MAXIMUM ON-STATE CHARACTERISTICS



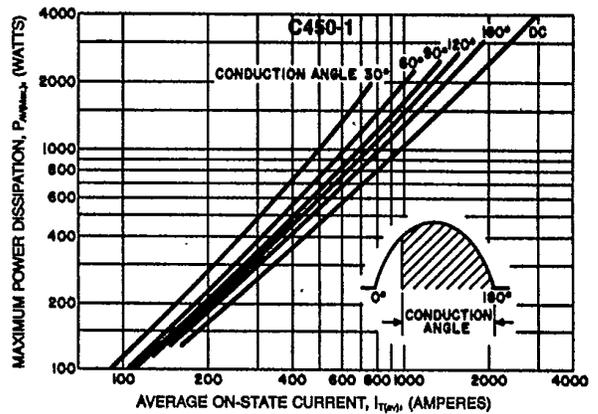
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



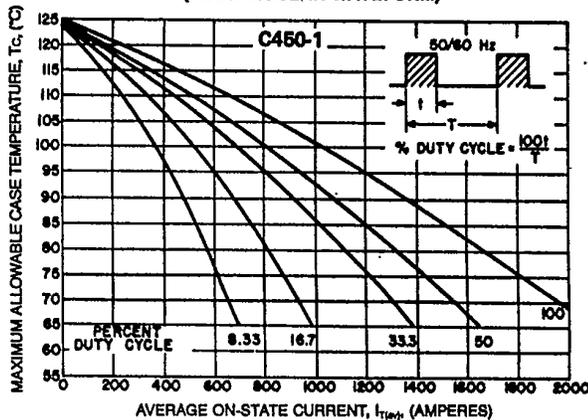
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



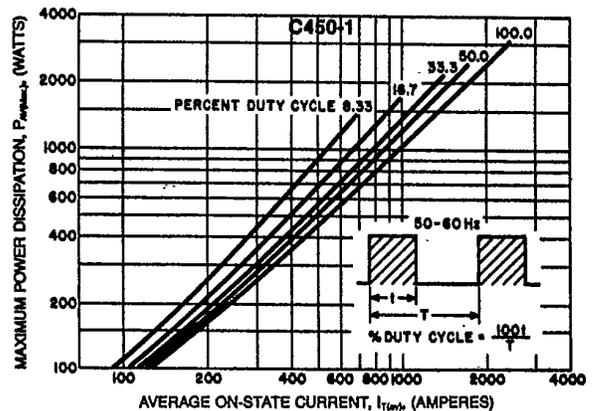
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



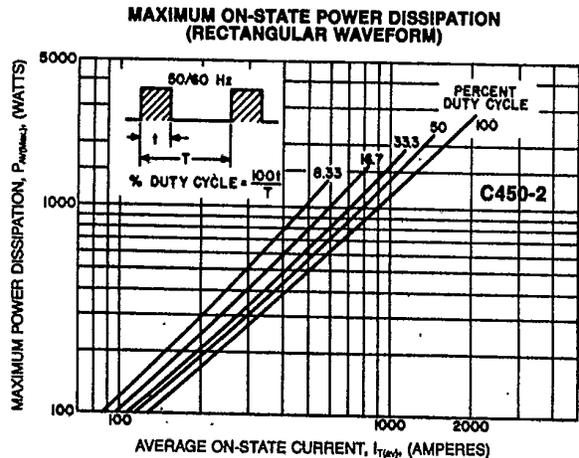
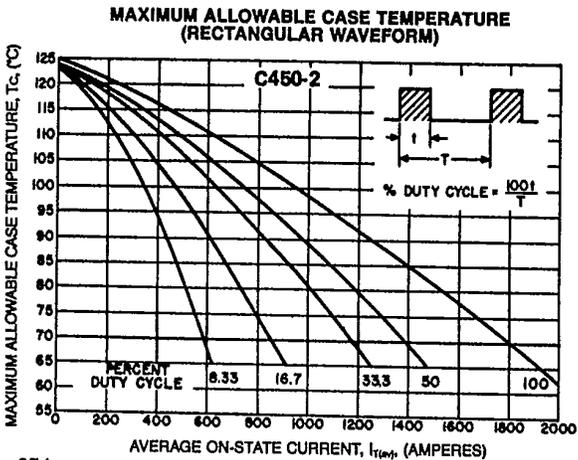
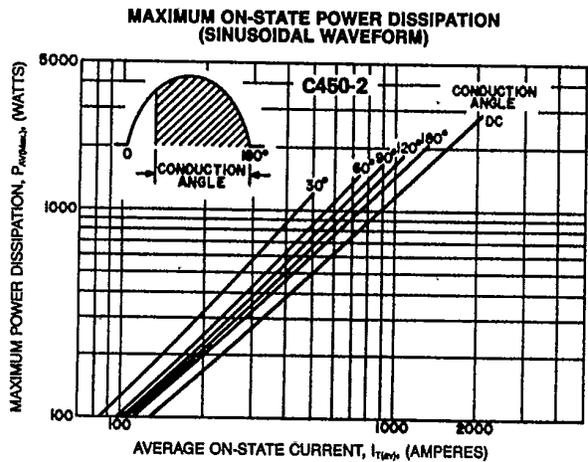
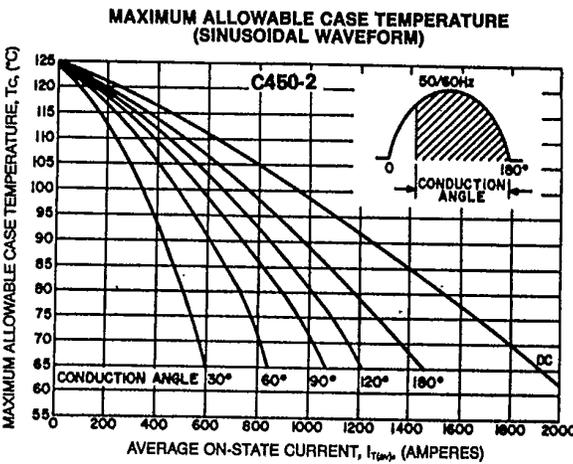
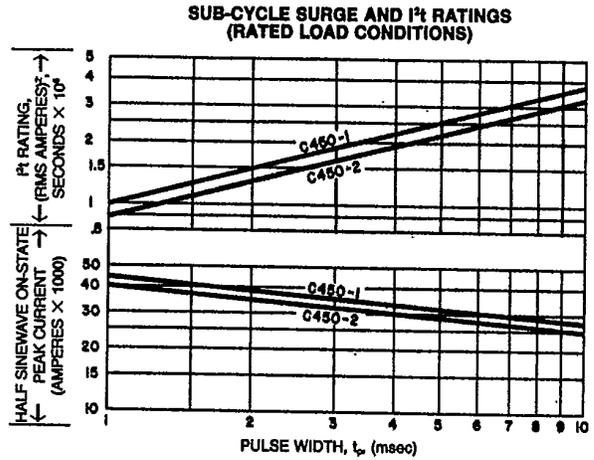
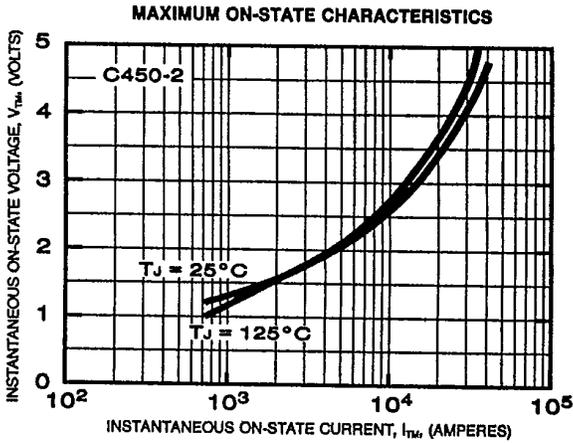
MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)





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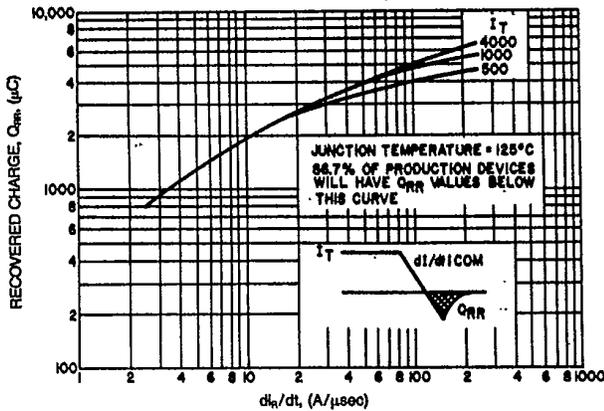




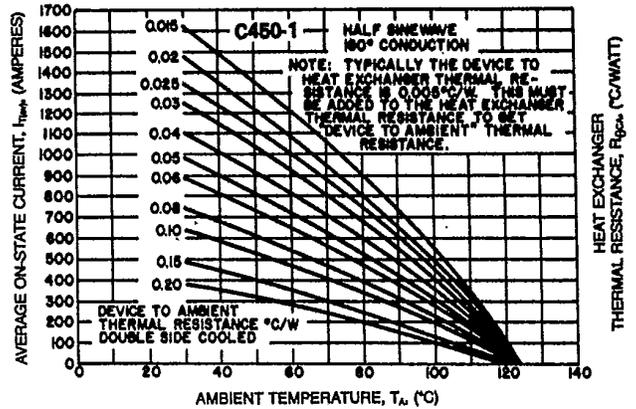
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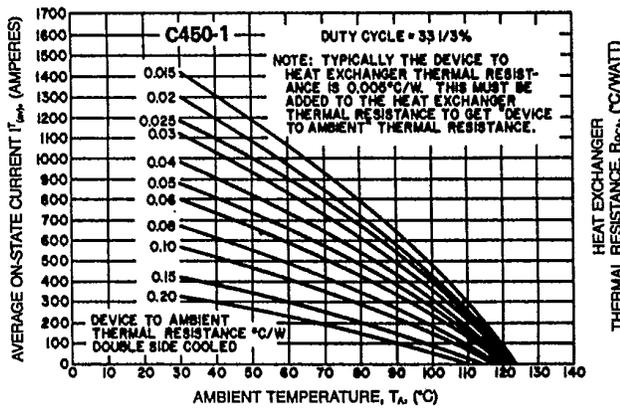
TYPICAL RECOVERED CHARGE



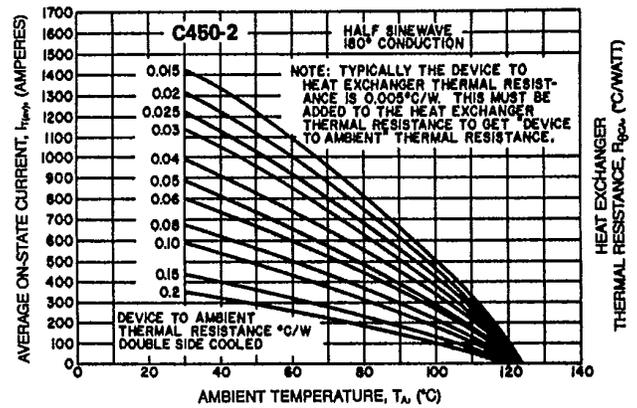
$I_{T(av)}$ vs. T_A (VARIOUS HEAT EXCHANGERS)



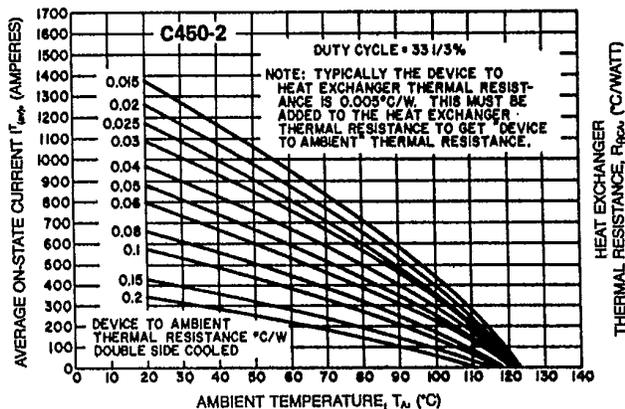
$I_{T(av)}$ vs. T_A (VARIOUS HEAT EXCHANGERS)



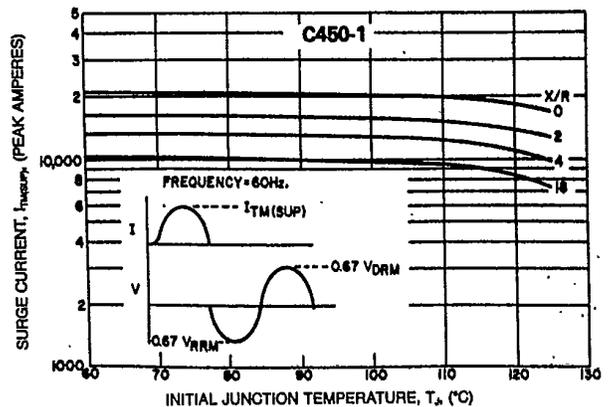
$I_{T(av)}$ vs. T_A (VARIOUS HEAT EXCHANGERS)



$I_{T(av)}$ vs. T_A (VARIOUS HEAT EXCHANGERS)



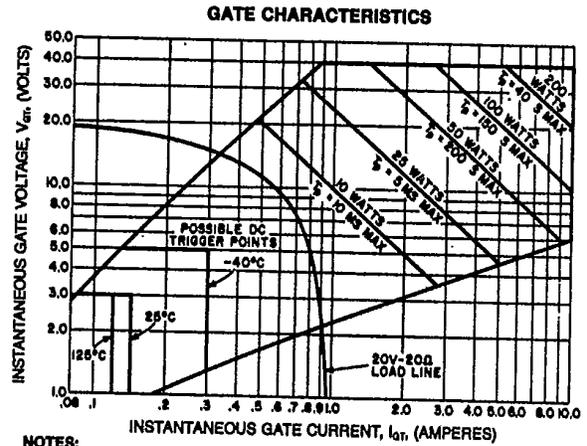
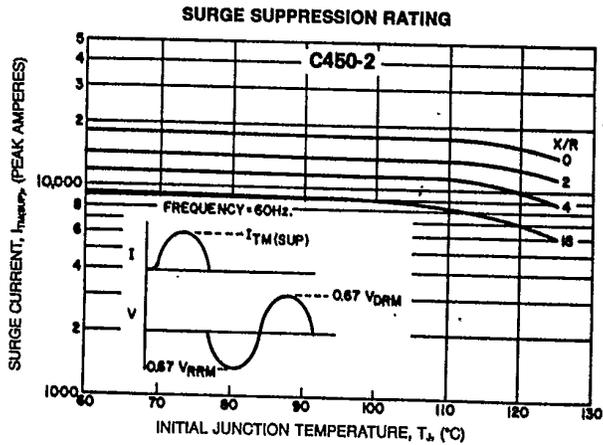
SURGE SUPPRESSION RATING





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- NOTES:**
1. Maximum allowable average gate dissipation = 5 watts.
 2. The locus of possible DC trigger points lies outside the boundaries shown at various case temperatures.
 3. T_p = rectangular gate current pulse width (5μs min. duration, 1.0μs max. rise time).
 4. Maximum long-term, repetitive anode di/dt = 400 Amperes/μs with 20V - 20Ω gate source.