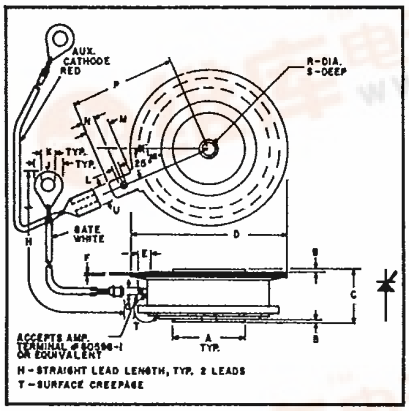
C380

Phase Control SCR

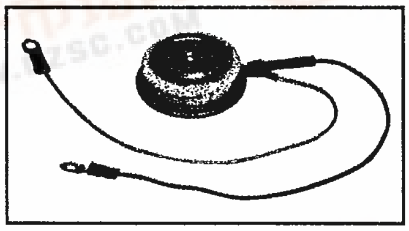
250 Amperes Avg
100-1300 Volts

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



TO-200
Outline Drawing

Dimensions	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	.744	.752	18.897	19.101
B	.030	.060	.762	1.524
C	.515	.565	13.081	14.351
D	1.600	1.656	40.64	42.06
E	.110	—	2.794	—
F	.013	.017	.330	.432
G	.057	.059	1.447	1.449
H	7.980	8.115	202.70	206.11
J	—	.300	—	7.620
K	.137	.153	3.479	3.886
L	.065	.070	1.651	1.778
M	.245	.260	6.223	6.604
N	.120	.140	3.048	3.556
P	1.090	1.125	27.69	28.55
R	.135	.145	3.429	3.683
S	.067	.083	1.701	2.108
T	.340	—	8.636	—
U	.186	.189	4.724	4.801



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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 I^2t Ratings

Applications:
- ☐ Power Supplies
- ☐ Battery Chargers
- ☐ Motor Control
- ☐ Light Dimmers
- ☐ VAR Generators

Ordering Information
Example: Select the complete five or six digit part number you desire from the table – i.e. C380M is a 600 Volt, 250 Ampere Phase Control SCR.

Type	Voltage		Current
	V_{DRM} V_{RRM}	Code	I_T (avg)
C380	100	A	250
	200	B	
	300	C	
	400	D	
	500	E	
	600	M	
	700	S	
	800	N	
	900	T	
	1000	P	
	1100	PA	
	1200	PB	
	1300	PC	

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Absolute Maximum Ratings

	Symbol	C380	Units
RMS On-State Current	$I_{T(RMS)}$	400	Amperes
Average On-State Current	$I_{T(av)}$	250	Amperes
Peak One-Cycle Surge (Non Repetitive) On-State Current (60Hz)	I_{TSM}	3500	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz)	I_{TSM}	3200	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive)	dI/dt	800	Amperes/μs
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	500	Amperes/μs
I^2t (for Fusing), 8.3 milliseconds	I^2t	50,000	A^2sec
Peak Gate Power Dissipation	P_{GM}	10	Watts
Average Gate Power Dissipation	$P_{G(av)}$	2	Watts
Storage Temperature	T_{STG}	−40 to 150	°C
Operating Temperature	T_J	−40 to 125	°C
Mounting Force①		720 to 880	lb.
Mounting Force①		3.2 to 3.92	kN

① Consult recommended mounting procedures.

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Electrical and Thermal Characteristics

Characteristics	Symbol	Test Conditions	C380	Units
Voltage—Blocking State Maximums				
Forward Leakage, Peak	I_{DRM}	T_J = 125°C, V = V_{DRM}	20	mA
Reverse Leakage, Peak	I_{RRM}	T_J = 125°C, V = V_{RRM}	20	mA
Current—Conducting State Maximums				
Peak On-State Voltage	V_{TM}	I_{TM} = 1500A Peak, T_C = 25°C, Duty Cycle ≤0.01%	2.85	Volts
Switching				
Typical Turn-Off Time	t_q	T_J = 120°C, I_{TM} = 250 amps; V_R = 50 Volts Min.; V_{DRM} (Reapplied); Rate-of-Rise of Reapplied Off-State; Voltage = 20 Volts/µsec (Linear); Gate Bias During Turn-Off Interval = 0 Volts, 100 Ohms Duty Cycle ≤0.01%	200	µsec
Typical Delay Time	t_d	T_J = 25°C, I_T = 100 Adc, V_{DRM} = Rated; Gate Supply: 10 Volt Open Circuit, 25 Ohm, 0.1µsec max. rise time	1	µsec
Min. Critical dv/dt exponential to V_{DRM}	dv/dt	T_J = 125°C, Gate Open	200	V/µsec
Thermal				
Maximum Thermal Resistance①, double sided cooling				
Junction to Case	$R_{\theta JC}$		.095	°C/Watt
Case to Sink, Lubricated	$R_{\theta CS}$		.02	°C/Watt
Gate—Maximum Parameters				
Gate Current to Trigger	I_{GT}	V_D = 6V, T_C = 25°C, R_L = 3Ω	150	mA
Gate Voltage to Trigger	V_{GT}	V_D = 6V, T_C = −40 to 125°C, R_L = 3Ω	3	Volts
Non-Triggering Gate Voltage	V_{GDM}	T_J = 125°C, rated V_{DRM}, R_L = 1000Ω	.15	Volts
Peak Forward Gate Current	I_{GTM}		10	Amperes
Peak Reverse Gate Voltage	V_{GRM}		5	Volts

① Consult recommended mounting procedures.

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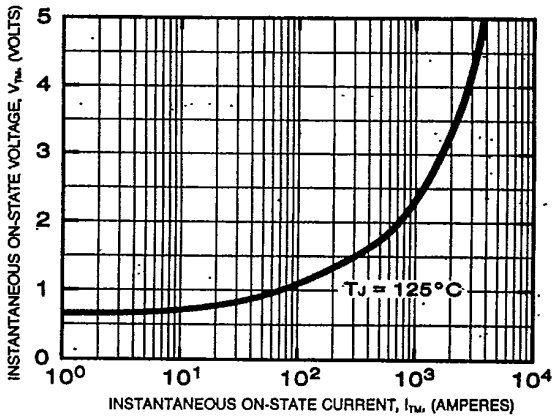
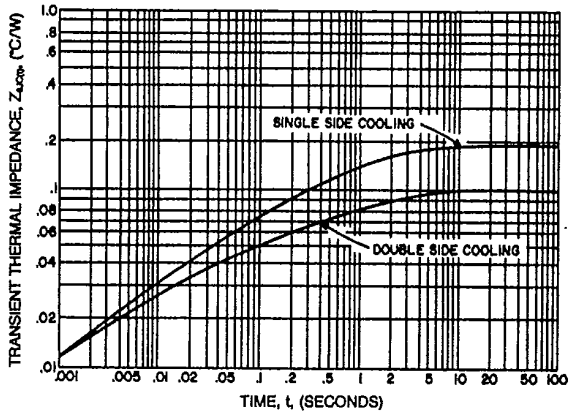
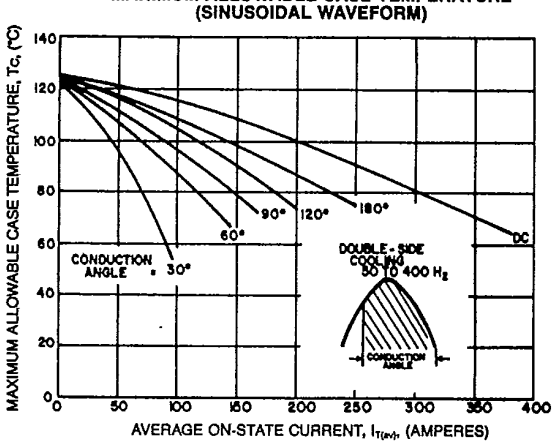
MAXIMUM ON-STATE CHARACTERISTICS



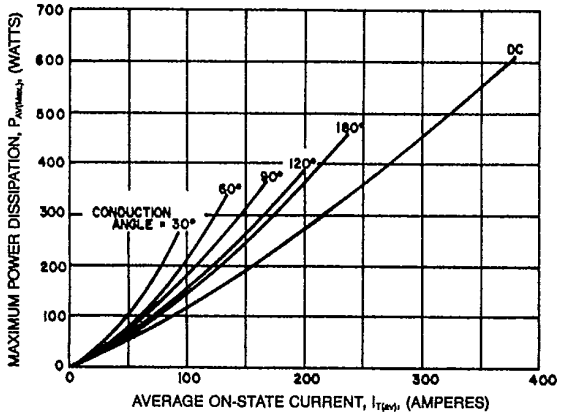
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



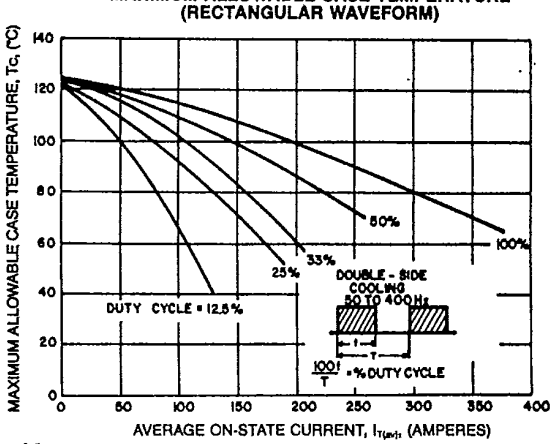
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



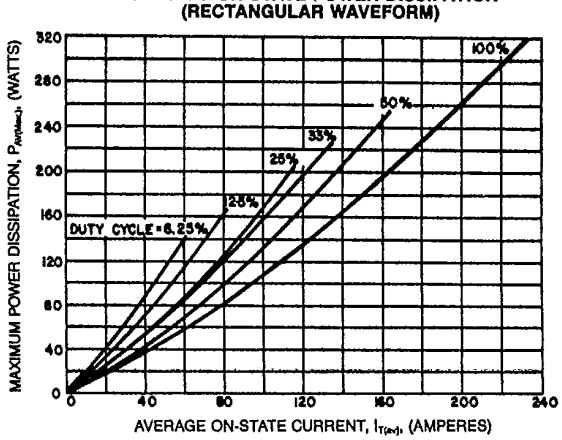
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)



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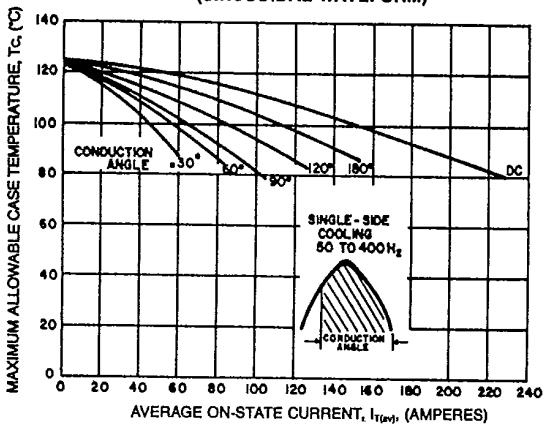
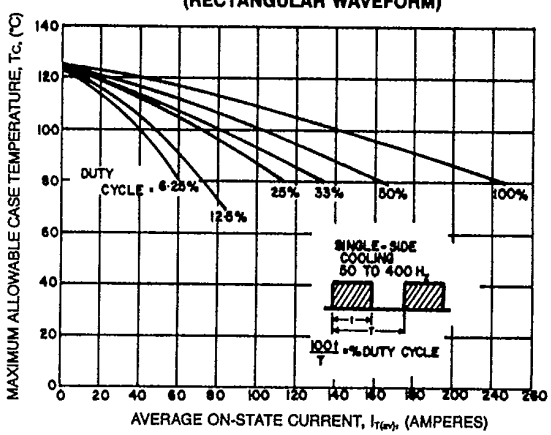
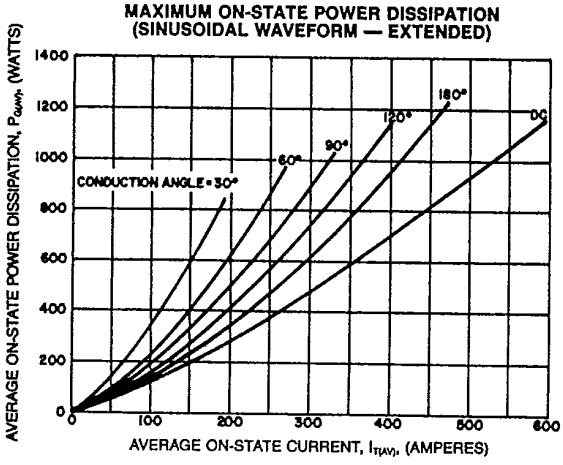


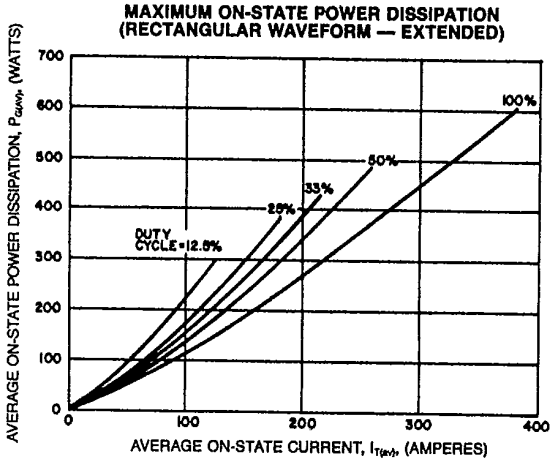
MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



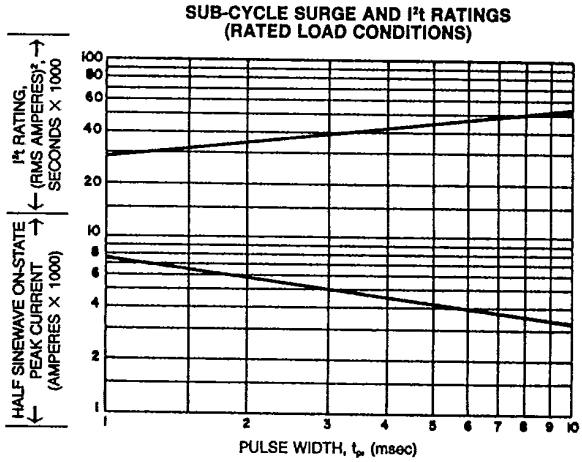
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM — EXTENDED)



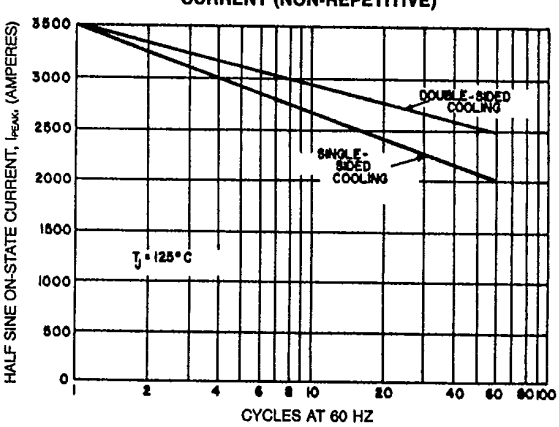
MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM — EXTENDED)



SUB-CYCLE SURGE AND I^2t RATINGS (RATED LOAD CONDITIONS)



MAXIMUM ALLOWABLE SURGE ON-STATE CURRENT (NON-REPETITIVE)



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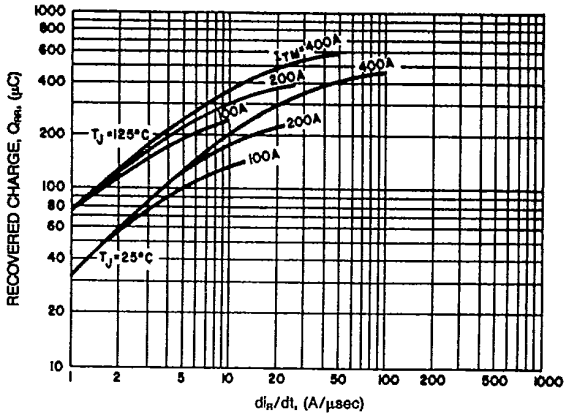
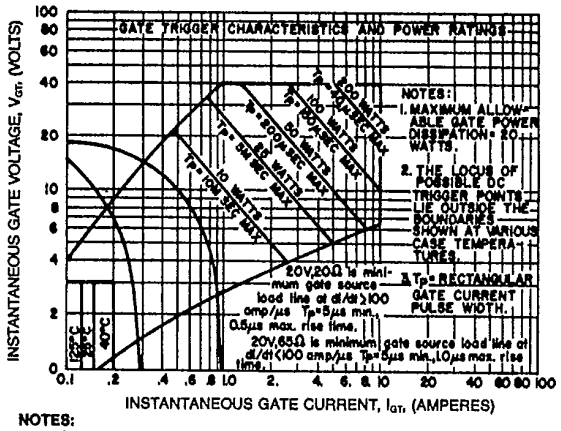
MAXIMUM RECOVERED CHARGE



GATE CHARACTERISTICS



NOTES:
1. Maximum allowable gate power dissipation = 2 watts.
2. The locus of possible DC trigger points lie outside the boundaries shown at various case temperatures.
3. Tp = Rectangular Gate Current Pulse Width.