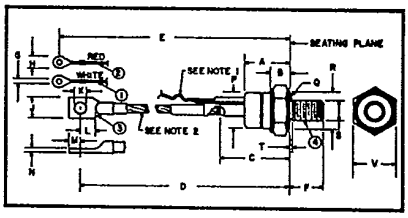
POWEREX

T-25-19

C180

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

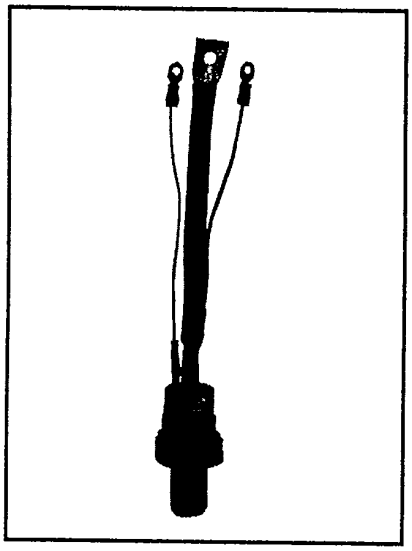
Phase Control SCR
150 Amperes Avg
100-1300 Volts



Conforms to TO-93 Outline Drawing

Dimensions	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	1.450	1.550	36.83	39.37
B	.500	.750	12.70	19.05
C	2.300	2.500	58.42	63.50
D	7.350	8.100	186.69	205.74
E	7.350	8.100	186.69	205.74
F	1.047	1.077	26.59	27.36
G	.140	.150	3.55	3.81
H	.215	.300	5.46	7.62
J	.530	.687	13.46	17.45
K	.322	.333	8.17	8.46
L	.437	—	11.09	—
M	.325	.360	8.25	9.14
N	.093	.125	2.36	3.18
P	1.060	1.100	26.92	27.94
Q	.660	.749	16.76	19.02
T	—	.156	—	3.96
V	1.240	1.250	31.49	31.75

1. Gate and auxiliary cathode leads supplied lightly twisted together.
2. Flexible copper lead.
3. One nut and one lockwasher supplied with each unit. Material of hardware is steel, cad plated.
4. "T" dimensions is area of unthreaded portion. Complete threads are within 2.5 threads of seating plane.
5. Angular orientation of terminals is undefined.



C180
Phase Control SCR
150 Amperes/100-1300 Volts

Description
Powerex Silicon Controlled Rectifiers (SCR) are designed for phase control applications. These are all-diffused, compression bonded encapsulated (CBE) 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. C180M is a 600 Volt, 150 Ampere Phase Control SCR.

Type	Voltage		Current
	V_{DRM} V_{RRM}	Code	I_T (avg)
C180	100	A	150
	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	C180	Units
RMS On-State Current	$I_{T(RMS)}$	235	Amperes
Average On-State Current	$I_{T(av)}$	150	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	150	Amperes/µs
I^2t (for Fusing), 8.3 milliseconds	I^2t	50,800	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 Torque①		250 to 300	In.-lb.
Mounting Torque①		28 to 34	N-M

Electrical and Thermal Characteristics

Characteristics	Symbol	Test Conditions	C180	Units
Voltage—Blocking State Maximums				
Forward Leakage, Peak	I_{DRM}	T_J = 125°C; V_{DRM} = Rated	20	mA
Reverse Leakage, Peak	I_{RRM}	T_J = 125°C; V_{RRM} = Rated	20	mA
Current—Conducting State Maximums				
Peak On-State Voltage	V_{TM}	T_J = 25°C, I_{TM} = 1500A	2.85	Volts
Switching				
Typical Turn-Off Time	t_q	I_T = 150A, T_J = 125°C, di_R/dt = 12.5A/µsec Reapplied dv/dt = 20V/µsec, Linear to 0.8V_{DRM}, V_R = 50V	100	µsec
Typical Delay Time	t_d	I_T = 100A, V_{DRM} = Rated Gate Supply = 10V Open Ckt, 25Ω, 0.1µsec Rise Time	1.0	µsec
Min. Critical dv/dt exponential to V_{DRM}	dv/dt	T_J = 125°C, Gate Open	200	V/µsec
Thermal				
Maximum Thermal Resistance①				
Junction to Case	$R_{\theta JC}$		.14	°C/Watt
Case to Sink, Lubricated	$R_{\theta CS}$		.075	°C/Watt
Gate—Maximum Parameters				
Gate Current to Trigger	I_{GT}	T_C = 25°C: V_D = 6Vdc, R_L = 3Ω	150	mA
Gate Voltage to Trigger	V_{GT}	T_C = −40°C to 125°C, V_D = 6Vdc, R_L = 3Ω	3.0	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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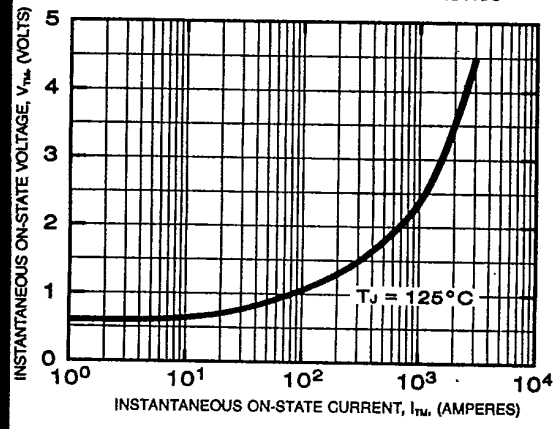
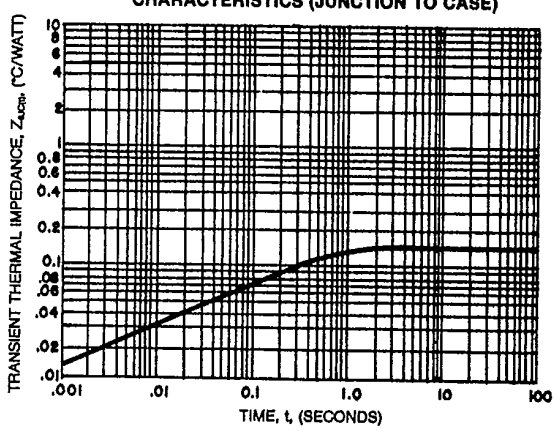
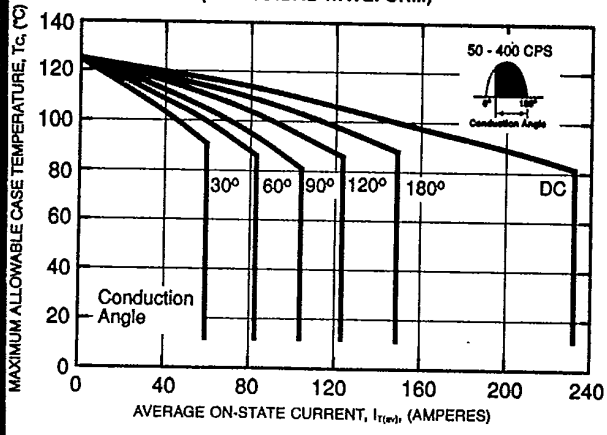
MAXIMUM ON-STATE CHARACTERISTICS



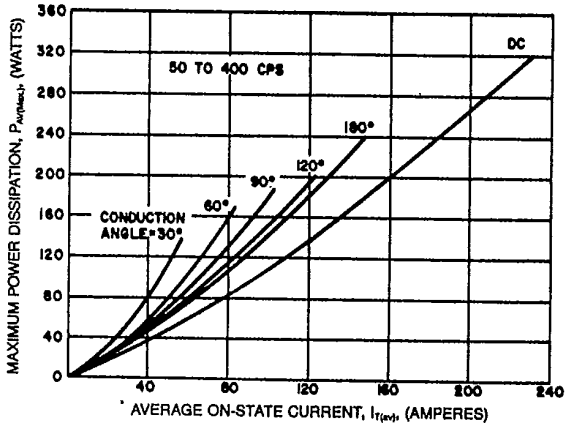
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



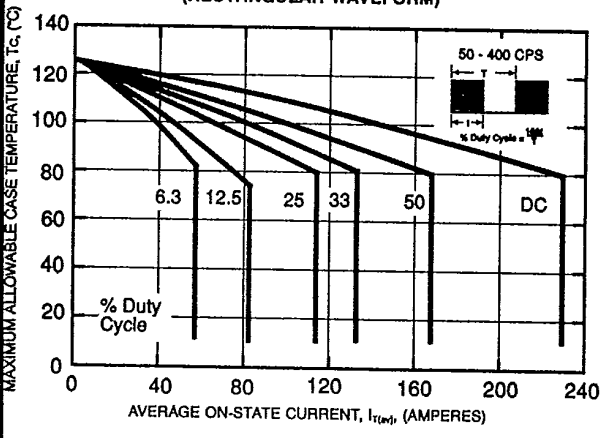
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



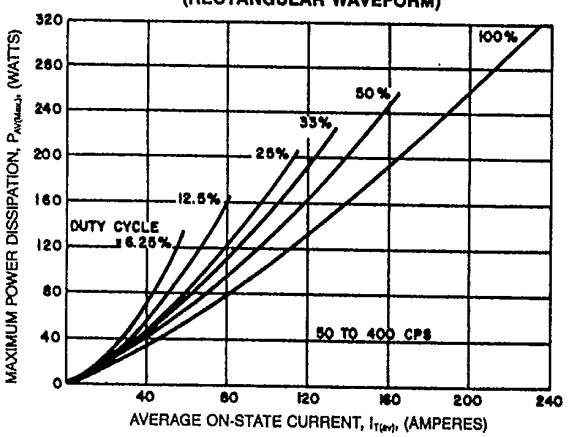
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)



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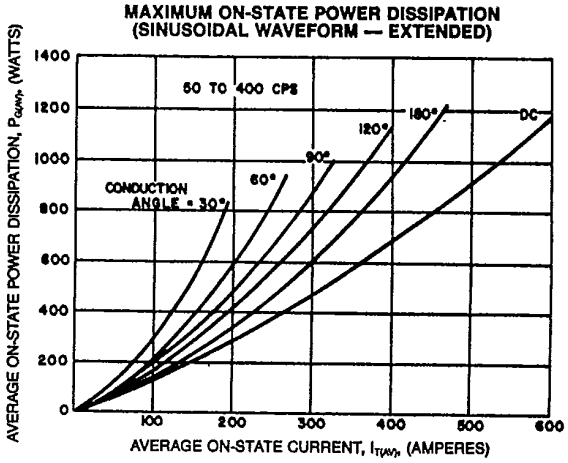
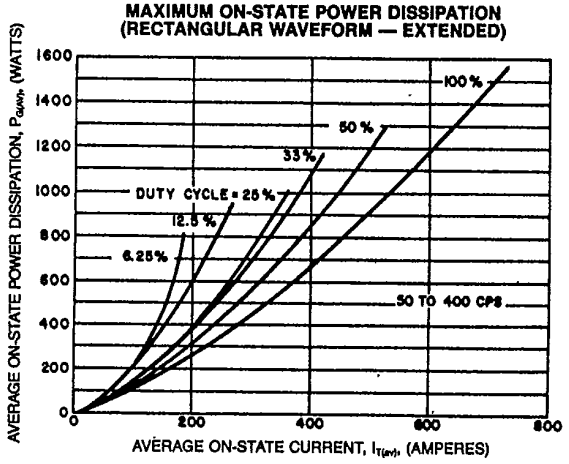
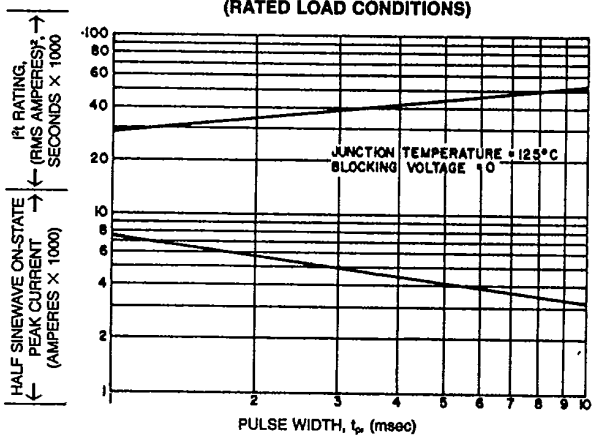
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM — EXTENDED)



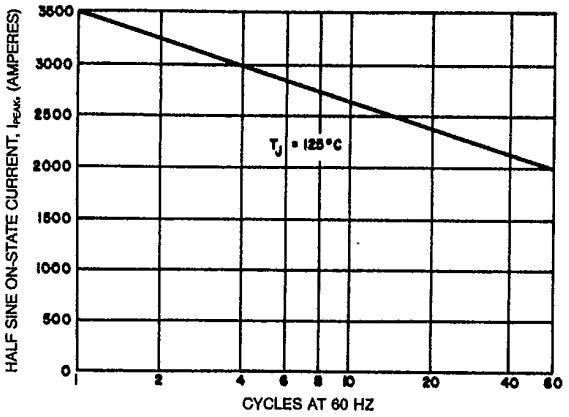
MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM — EXTENDED)



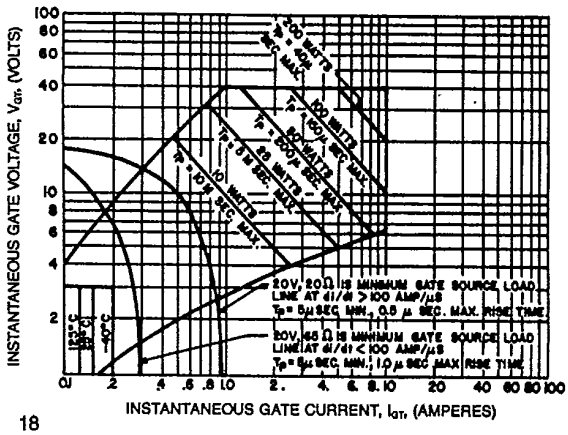
SUB-CYCLE SURGE AND I^2t RATINGS (RATED LOAD CONDITIONS)



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



GATE CHARACTERISTICS



NOTES:
1. Maximum allowable average gate dissipation = 5 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 (5μs min. duration; 1.0μs max. rise time for 20V, 65Ω source).
4. 20V – 20Ω is the minimum gate source load line when rate of circuit current rise > 100 Amp/μs or anode rate of current rise > 200 Amps/μs (t_p = 5μs min., 0.5μs max. rise time).

   Maximum long-term repetitive anode di/dt = 500 Amps/μs with 20V – 20Ω gate source.