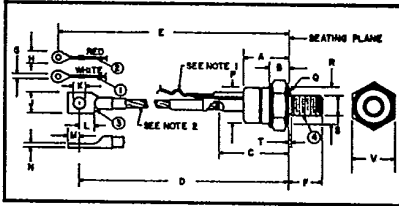




**C180**

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 Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72.75.15

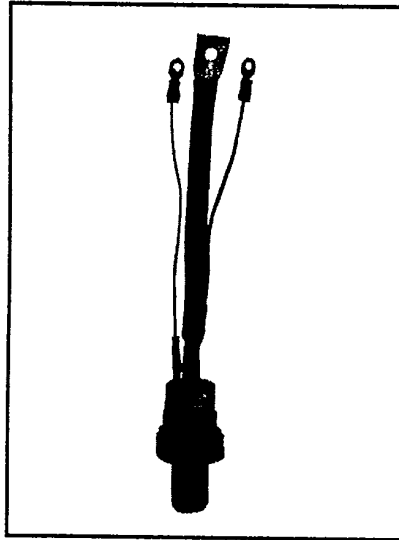
**Phase Control SCR**  
 150 Amperes Avg  
 100-1300 Volts



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<sup>2</sup>t 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 <sub>ORM</sub> V <sub>RRM</sub>	Code	
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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**C180**  
**Phase Control SCR**  
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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/ $\mu$ s
Critical Rate-of-Rise of On-State Current (Repetitive)	$di/dt$	150	Amperes/ $\mu$ s
$I^2t$ (for Fusing), 8.3 milliseconds	$I^2t$	50,800	$A^2$ sec
Peak Gate Power Dissipation	$P_{GM}$	10	Watts
Average Gate Power Dissipation	$P_{G(av)}$	2	Watts
Storage Temperature	$T_{STG}$	-40 to 150	$^{\circ}$ C
Operating Temperature	$T_J$	-40 to 125	$^{\circ}$ C
Mounting Torque <sup>⓪</sup>		250 to 300	In.-lb.
Mounting Torque <sup>⓪</sup>		28 to 34	N-M

### Electrical and Thermal Characteristics

Characteristics	Symbol	Test Conditions	C180	Units
<b>Voltage—Blocking State Maximums</b>				
Forward Leakage, Peak	$I_{DRM}$	$T_J = 125^{\circ}$ C; $V_{DRM} = \text{Rated}$	20	mA
Reverse Leakage, Peak	$I_{RRM}$	$T_J = 125^{\circ}$ C; $V_{RRM} = \text{Rated}$	20	mA
<b>Current—Conducting State Maximums</b>				
Peak On-State Voltage	$V_{TM}$	$T_J = 25^{\circ}$ C, $I_{TM} = 1500$ A	2.85	Volts
<b>Switching</b>				
Typical Turn-Off Time	$t_q$	$I_T = 150$ A, $T_J = 125^{\circ}$ C, $di_R/dt = 12.5$ A/ $\mu$ sec Reapplied $dv/dt = 20$ V/ $\mu$ sec, Linear to $0.8V_{DRM}$ , $V_R = 50$ V	100	$\mu$ sec
Typical Delay Time	$t_d$	$I_T = 100$ A, $V_{DRM} = \text{Rated}$ Gate Supply = 10V Open Ckt, 25 $\Omega$ , 0.1 $\mu$ sec Rise Time	1.0	$\mu$ sec
Min. Critical $dv/dt$ exponential to $V_{DRM}$	$dv/dt$	$T_J = 125^{\circ}$ C, Gate Open	200	V/ $\mu$ sec
<b>Thermal</b>				
Maximum Thermal Resistance <sup>⓪</sup>				
Junction to Case	$R_{\theta JC}$		.14	$^{\circ}$ C/Watt
Case to Sink, Lubricated	$R_{\theta CS}$		.075	$^{\circ}$ C/Watt
<b>Gate—Maximum Parameters</b>				
Gate Current to Trigger	$I_{GT}$	$T_C = 25^{\circ}$ C; $V_D = 6$ Vdc, $R_L = 3\Omega$	150	mA
Gate Voltage to Trigger	$V_{GT}$	$T_C = -40^{\circ}$ C to $125^{\circ}$ C, $V_D = 6$ Vdc, $R_L = 3\Omega$	3.0	Volts
Non-Triggering Gate Voltage	$V_{GDM}$	$T_J = 125^{\circ}$ C, 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

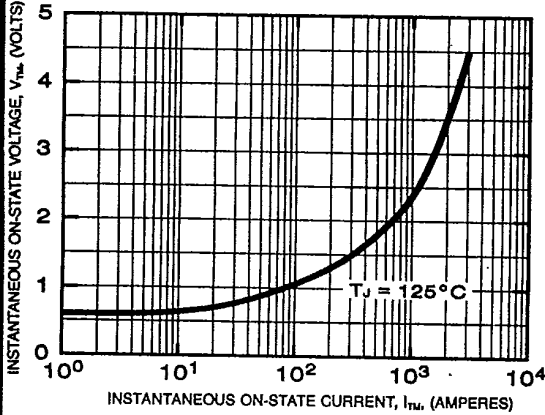
<sup>⓪</sup> Consult recommended mounting procedures.



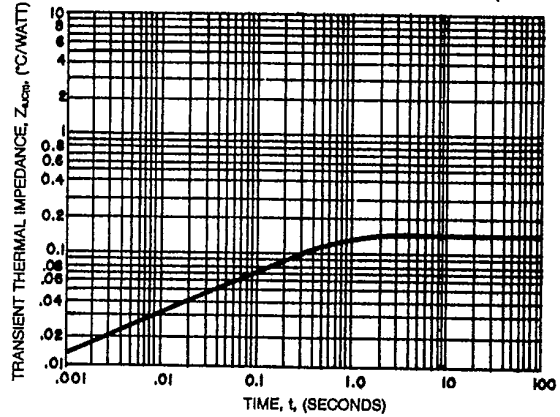
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C180  
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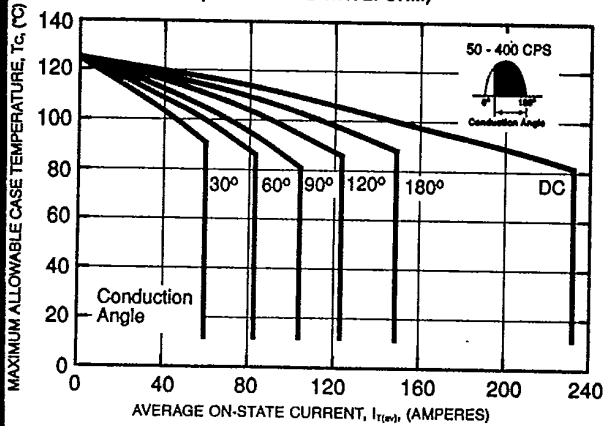
MAXIMUM ON-STATE CHARACTERISTICS



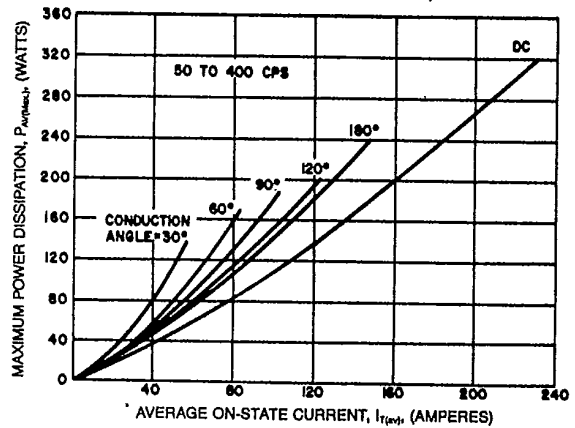
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



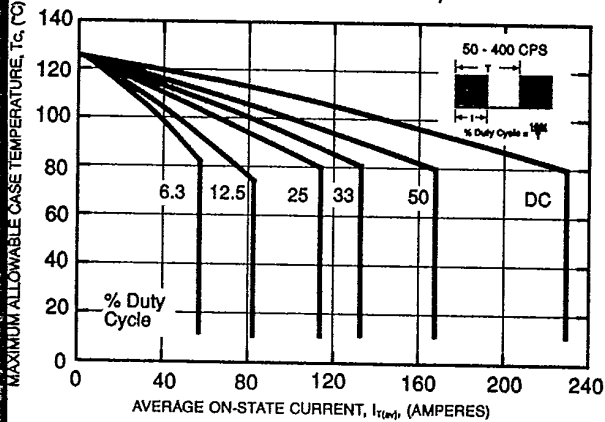
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



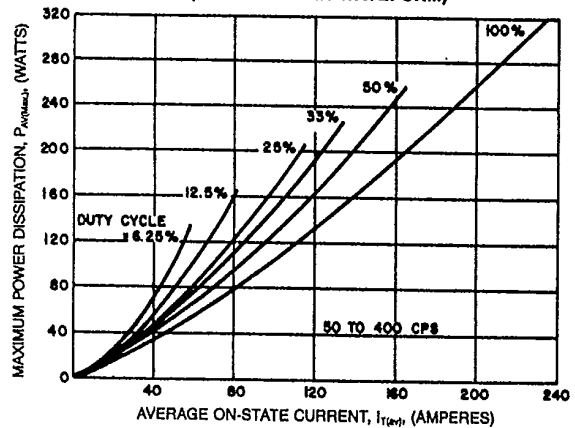
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



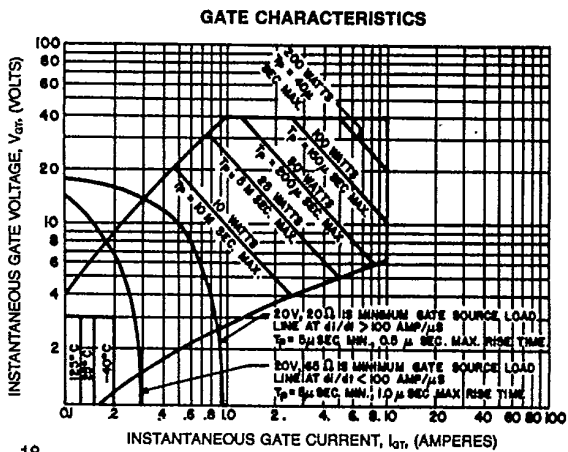
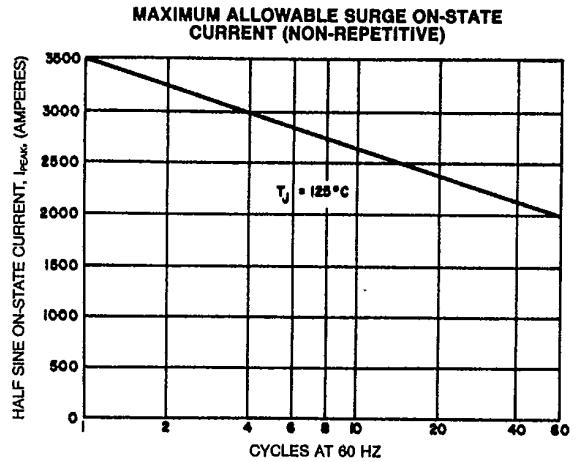
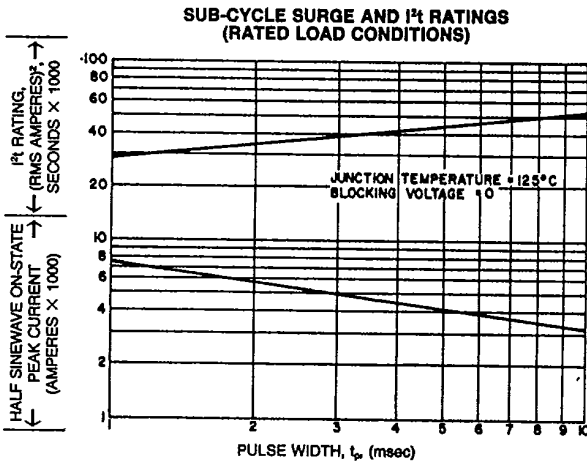
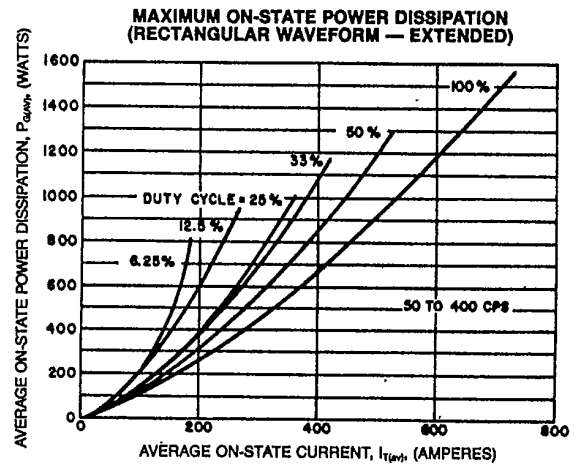
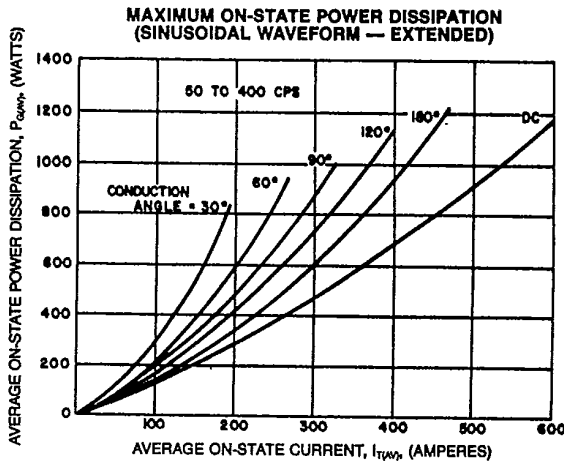
MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)





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- NOTES:
- Maximum allowable average gate dissipation = 5 watts.
  - The locus of possible dc trigger points lie outside the boundaries shown at various case temperatures.
  - $T_p$  = Rectangular gate current pulse width (5μs min. duration; 1.0μs max. rise time for 20V, 85Ω source).
  - 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 ( $t_p = 5\mu s$  min., 0.5μs max. rise time).
- Maximum long-term repetitive anode di/dt = 500 Amps/μs with 20V - 20Ω gate source.