

POWEREX INC

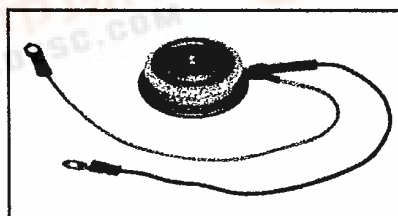
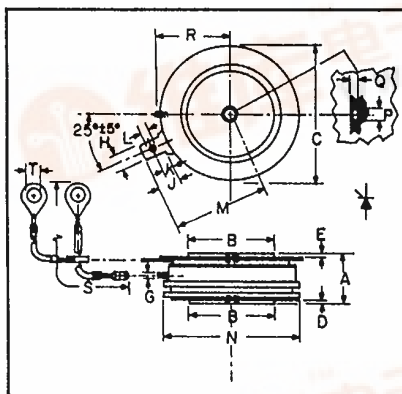
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T-25-20

POWEREX**C430__X500**

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**800 Amperes Avg
100-600 Volts**

C430__X500
Phase Control SCR
800 Amperes/100-600 Volts

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 nine digit part number you desire from the table -- i.e. C430DX500 is a 400 Volt, 800 Ampere Phase Control SCR.

C430__X500
Outline Drawing

Dimensions	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	.560	.605	14.22	15.37
B	.985	.995	25.01	25.27
C	1.600	1.650	40.64	41.91
D	.030	—	.76	—
E	.040	—	1.01	—
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	—	1.120	—	28.45
N	—	1.585	—	40.26
P	.135	.145	3.42	3.68
Q	.070	.084	1.77	2.13
R	—	.875	—	22.23
S	12.219	12.343	310.36	313.51
T	.137	.153	3.47	3.89

Type	Voltage		Current
	V _{DRM} V _{RRM}	Code	
C430__X500	100	A	800
	200	B	
	300	C	
	400	D	
	500	E	
	600	M	



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Absolute Maximum Ratings

	Symbol	C430_X500	Units
RMS On-State Current	$I_{T(RMS)}$	1250	Amperes
Average On-State Current	$I_{T(av)}$	800	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	I_{TSM}	10,000	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz)	I_{TSM}	9125	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive)	di/dt	400	Amperes/ μ s
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	150	Amperes/ μ s
I^2t (for Fusing), One Cycle at 60Hz	I^2t	415,000	A ² sec
Peak Gate Power Dissipation	P_{GM}	200	Watts
Average Gate Power Dissipation	$P_{G(av)}$	5	Watts
Storage Temperature	T_{STG}	-40 to 150	°C
Operating Temperature	T_J	-40 to 125	°C
Mounting Force ^①		800 to 2200	lb.
Mounting Force ^①		3.6 to 11.1	kN

① Consult recommended mounting procedures.



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Electrical and Thermal Characteristics

Characteristics	Symbol	Test Conditions	C430_X500	Units
Voltage—Blocking State Maximums				
Forward Leakage, Peak	I_{DRM}	$T_J = 125^\circ\text{C}$, $V = V_{ORM}$	45	mA
Reverse Leakage, Peak	I_{RRM}	$T_J = 125^\circ\text{C}$, $V = V_{RRM}$	45	mA
Current—Conducting State Maximums				
Peak On-State Voltage	V_{TM}	$I_{TM} = 3000\text{A}$, $T_C = 25^\circ\text{C}$	1.9	Volts
Switching				
Typical Turn-Off Time	t_q	$T_J = 125^\circ\text{C}$, $I_{TM} = 500\text{A}$; $V_R = 50\text{V Min}$; V_{DRM} (Reapplied); Reapplied $dv/dt = 20\text{V}/\mu\text{sec}$ (linear); Commutation $di/dt = 25\text{A}/\mu\text{sec}$; Repetition Rate = 1pps; Gate Bias during Turn-Off Interval = 0V, 100 Ω	100	μsec
Typical Delay Time	t_d	$T_C = 25^\circ\text{C}$, $I_T = 50\text{A}$; Gate Supply: 25 Volts, 20 Ω , 0.1 μsec rise time	0.7	μsec
Min. Critical dv/dt exponential to V_{DRM}	dv/dt	$T_J = 125^\circ\text{C}$, V_{DRM} rated, gate open	200	$\text{V}/\mu\text{sec}$
Thermal				
Maximum Thermal Resistance, [ⓐ] double sided cooling				
Junction to Case (2000 lb. force)	$R_{\theta JC}$		.04	$^\circ\text{C}/\text{Watt}$
Case to Sink, Lubricated (2000 lb. force)	$R_{\theta CS}$		.02	$^\circ\text{C}/\text{Watt}$
Gate—Maximum Parameters				
Gate Current to Trigger	I_{GT}	$V_D = 6\text{Vdc}$, $R_L = 3\Omega$, $T_J = 25^\circ\text{C}$	125	mA
Gate Voltage to Trigger	V_{GT}	$T_J = -40^\circ\text{C}$ to 125°C , $V_D = 6\text{Vdc}$, $R_L = 3\Omega$	5	Volts
Non-Triggering Gate Voltage	V_{GDM}	$T_J = 125^\circ\text{C}$, rated V_{DRM}	.15	Volts
Peak Forward Gate Current	I_{GTM}		4	Amperes
Peak Reverse Gate Voltage	V_{GRM}		5	Volts

[ⓐ] Consult recommended mounting procedures.



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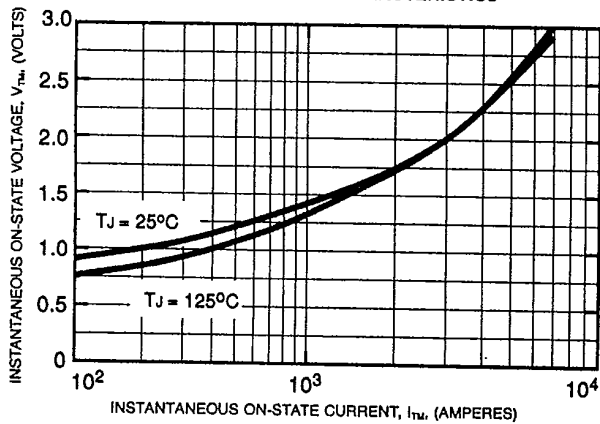
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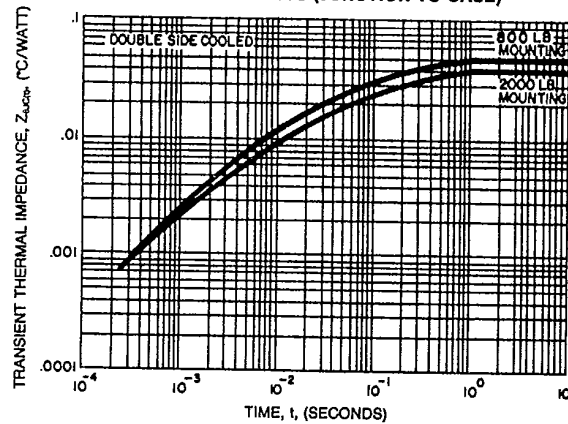
Phase Control SCR

800 Amperes Avg/100-600 Volts

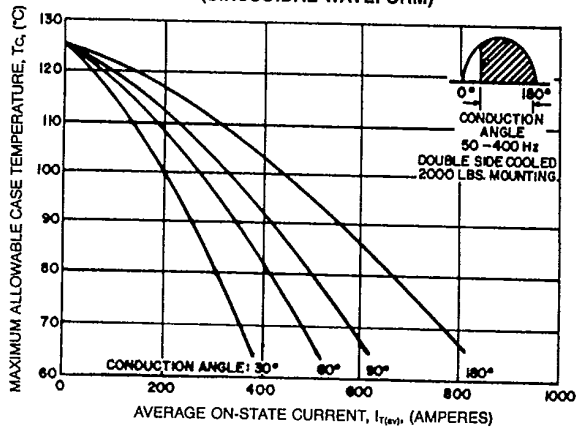
MAXIMUM ON-STATE CHARACTERISTICS



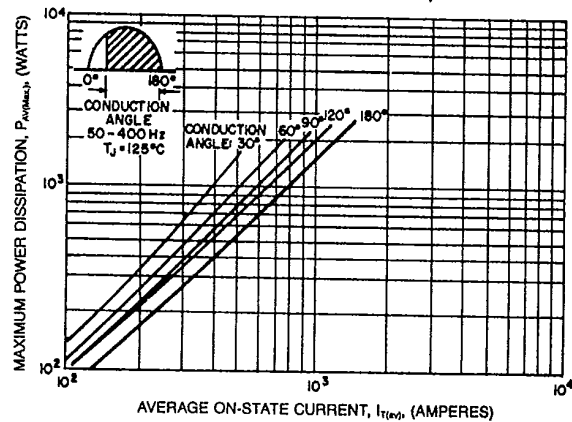
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



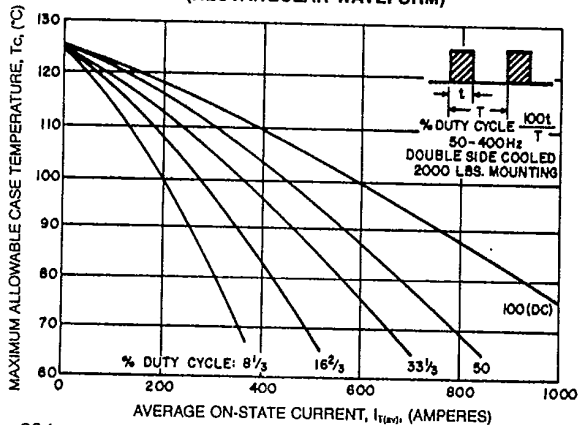
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



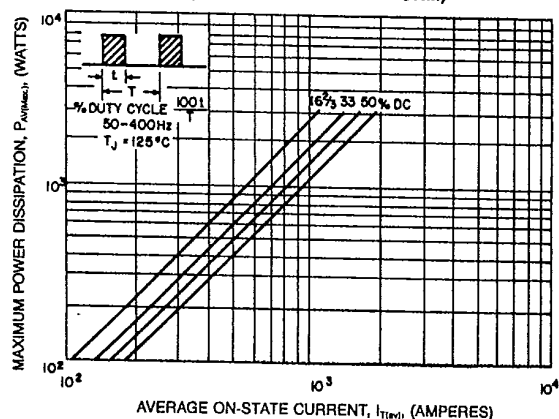
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)



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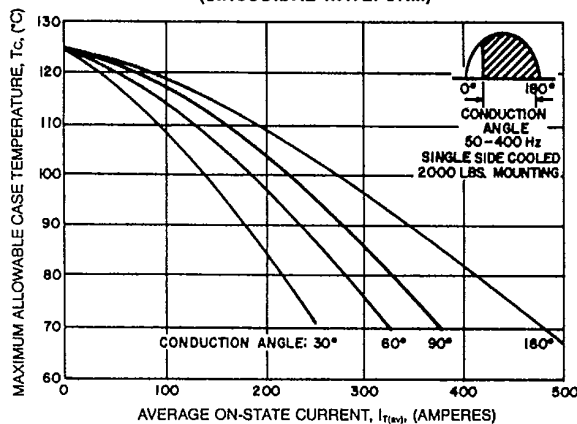
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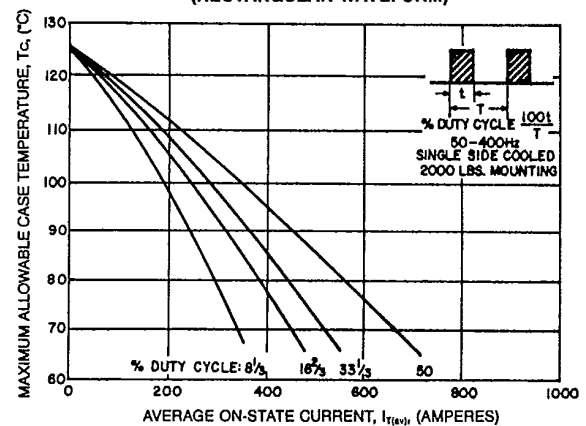
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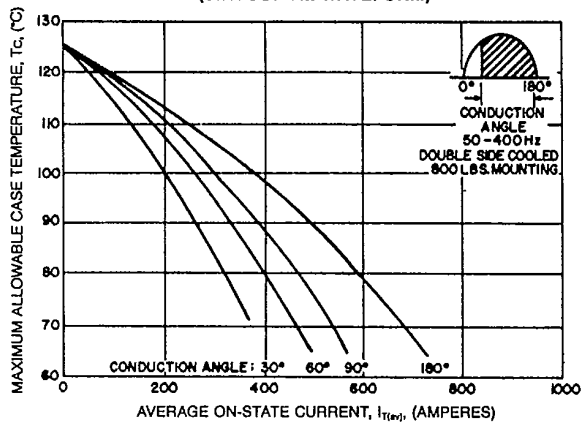
MAXIMUM ALLOWABLE CASE TEMPERATURE
(SINUSOIDAL WAVEFORM)



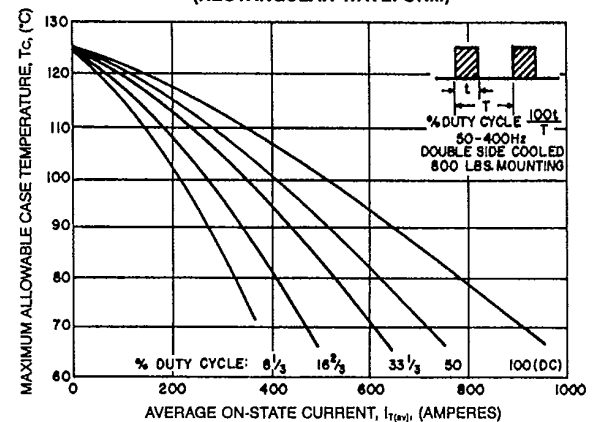
MAXIMUM ALLOWABLE CASE TEMPERATURE
(RECTANGULAR WAVEFORM)



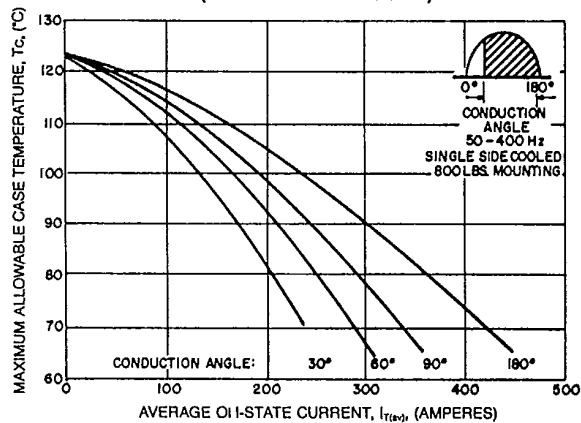
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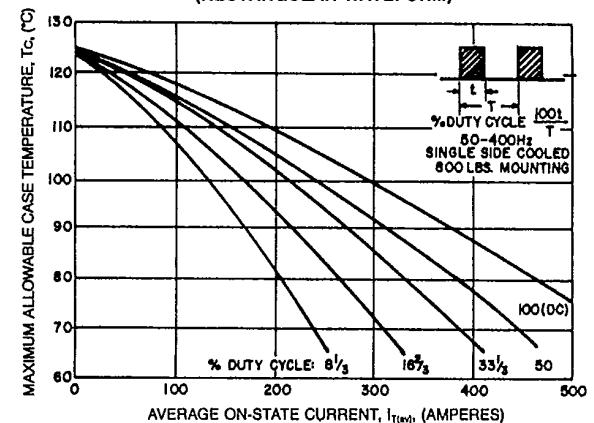
MAXIMUM ALLOWABLE CASE TEMPERATURE
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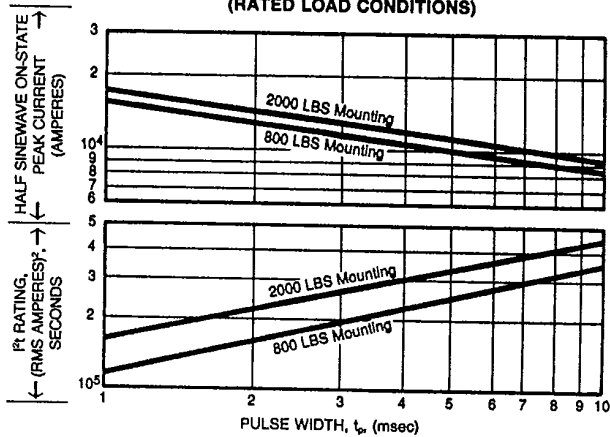
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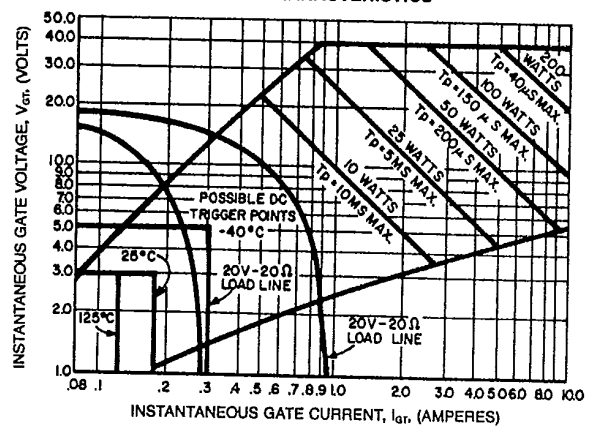
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SUB-CYCLE SURGE AND I^2t RATINGS
(RATED LOAD CONDITIONS)



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. T_p = 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.