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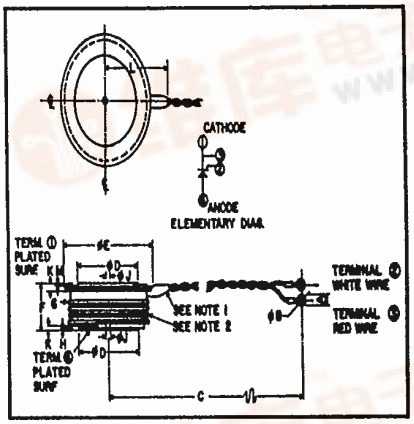
POWEREX

C702

Phase Control SCR

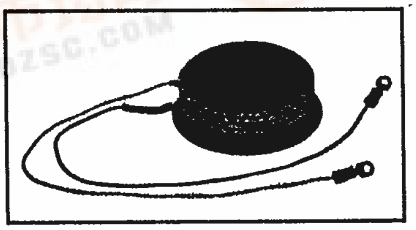
1000 Amperes Avg
2300-3200 Volts

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



C702
Outline Drawing

Dimensions	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A[1]	0.200	0.240	5.08	6.10
ϕB	0.140	—	3.56	—
C	16.000	20.000	406.40	508.00
ϕD	1.700	1.900	43.18	48.26
ϕE	—	2.960	—	75.18
F	1.000	1.070	25.40	27.18
G[2]	—	—	—	—
H	.005	.067	0.13	1.70
ϕJ	0.136	0.146	3.45	3.71
K	.070	—	1.78	—
L	—	2.500	—	63.50
M	.030	—	.076	—



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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 six digit part number you desire from the table – i.e. C702LD is a 2400 Volt, 1000 Ampere Phase Control SCR.

Type	Voltage		Current
	V_{DRM} V_{RRM}	Code	I_T (avg)
C702	2300	LC	1000
	2400	LD	
	2600	LM	
	2800	LN	
	3000	CP	
	3200	CB	

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Absolute Maximum Ratings

	Symbol	C702	Units
RMS On-State Current	$I_{T(RMS)}$	1570	Amperes
Average On-State Current	$I_{T(av)}$	1050	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	I_{TSM}	15,000	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz)	I_{TSM}	14,000	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive)	di/dt	100	Amperes/μs
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	25	Amperes/μs
I^2t (for Fusing), One Cycle at 60Hz	I^2t	933,000	A^2sec
Peak Gate Power Dissipation	P_{GM}	200	Watts
Average Gate Power Dissipation	$P_{G(av)}$	5	Watts
Storage Temperature	T_{STG}	−40 to 125°C	°C
Operating Temperature	T_J	−40 to 125°C	°C
Mounting Force①		5000 to 6000	lb.
Mounting Force①		22.2-26.6	kN

① Consult recommended mounting procedures.

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Electrical and Thermal Characteristics

Characteristics	Symbol	Test Conditions	C702	Units
Voltage—Blocking State Maximums				
Forward Leakage, Peak	I_{DRM}	T_J = 25°C, V = V_{DRM}	15	mA
		T_J = 125°C, V = V_{DRM}	65	mA
Reverse Leakage, Peak	I_{RRM}	T_J = 25°C, V = V_{RRM}	15	mA
		T_J = 125°C, V = V_{RRM}	65	mA
Current—Conducting State Maximums				
Peak On-State Voltage	V_{TM}	T_J = 125°C, I_T = 3000 Amps Peak Duty Cycle ≤ 0.01%	2.26	Volts
Switching				
Typical Delay Time	t_d	Switching from 300V, 20V, 10Ω gate 0.5 µsec Rise Time, T_J = 25°C	1.8	µsec
Min. Critical dv/dt exponential to V_{DRM}	dv/dt	T_J = 125°C, V_{DRM} = .8 Rated, Gate open	200	V/µsec
Thermal				
Maximum Thermal Resistance,① double sided cooling				
Junction to Case	$R_{\theta JC}$		.023	°C/Watt
Case to Sink, Lubricated	$R_{\theta CS}$		.0075	°C/Watt
Gate—Maximum Parameters				
Gate Current to Trigger	I_{GT}	T_J = 25°C, V_D = 10V, R_L = 3Ω	200	mA
Gate Voltage to Trigger	V_{GT}	T_J = 0° to 125°C, V_D = 10V, R_L = 3Ω	4.5	Volts
Non-Triggering Gate Voltage	V_{GDM}	T_J = 125°C, V_D = .5V_{DRM}, R_L = 1000Ω	.3	Volts
Peak Forward Gate Current	I_{GTM}		4	Amperes
Peak Reverse Gate Voltage	V_{GRM}		5	Volts

① Consult recommended mounting procedures.

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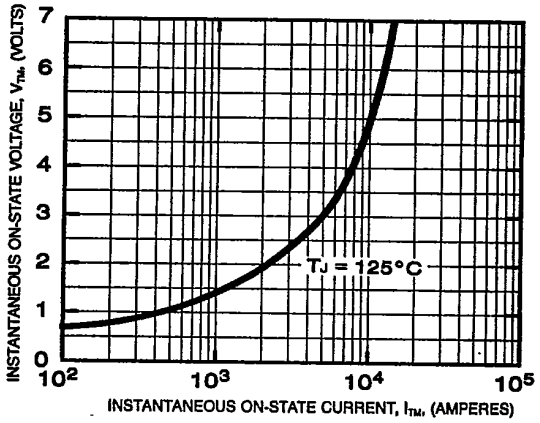
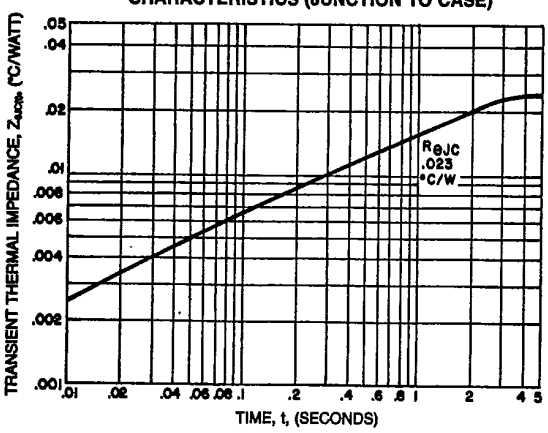
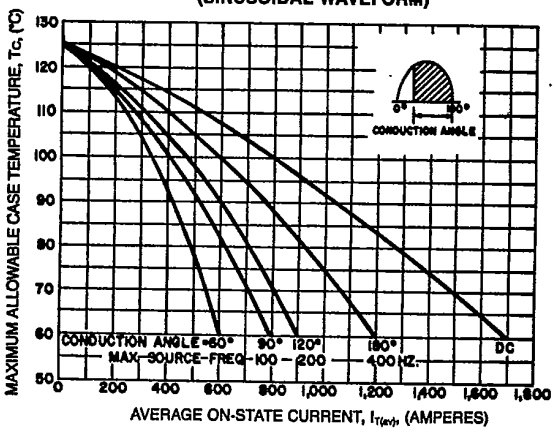
MAXIMUM ON-STATE CHARACTERISTICS



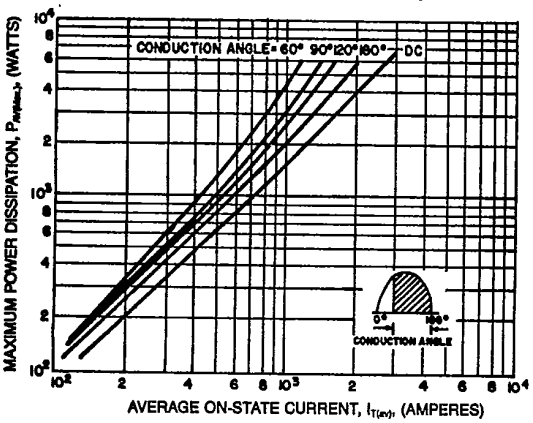
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



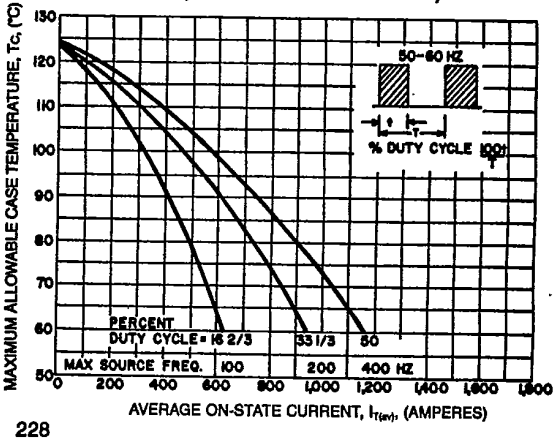
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



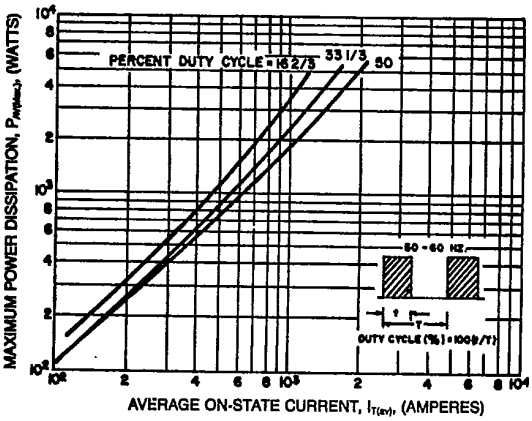
MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)



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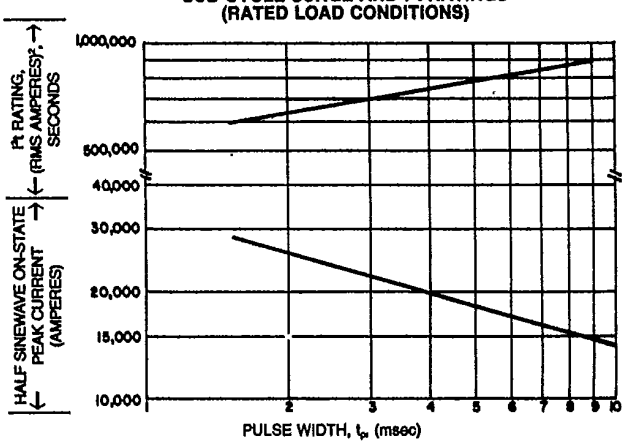
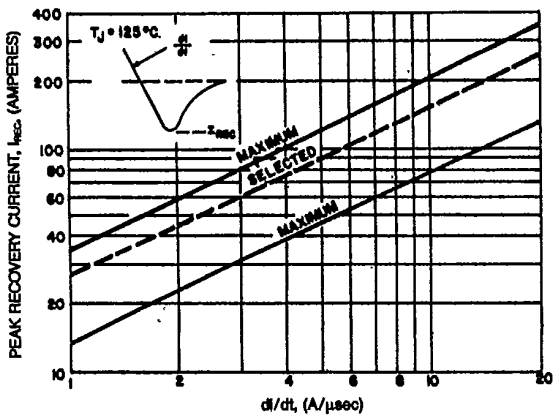
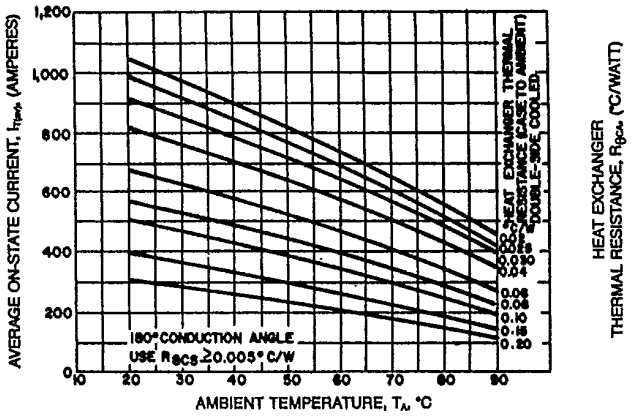
SUB-CYCLE SURGE AND I^2t RATINGS (RATED LOAD CONDITIONS)



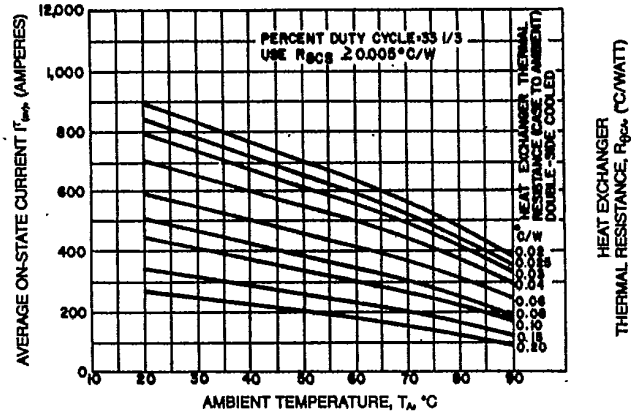
PEAK RECOVERY CURRENT



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



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



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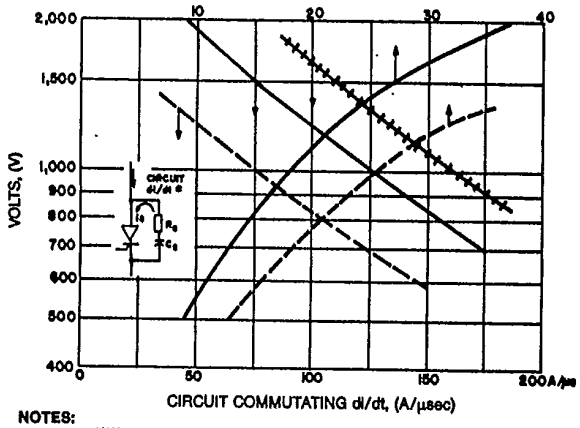
ALLOWABLE dI/dt AND SNUBBER RESISTANCE
Min. Snubber Resistance (ohms)



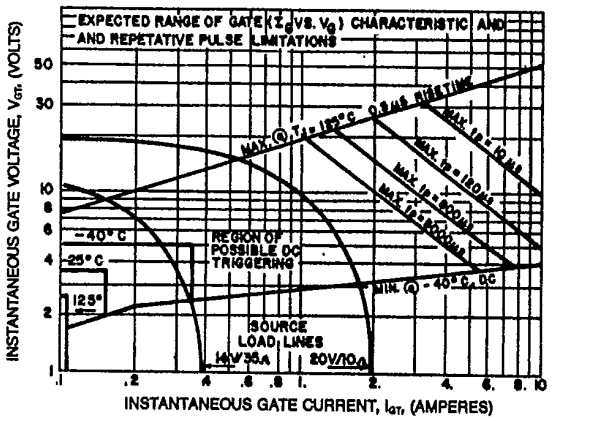
NOTES:
Code:
- Non-Repetitive High Gate Drive
- Repetitive High Gate Drive
- Non-Repetitive Low Gate Drive
- Repetitive Low Gate Drive

	Low Gate Drive	High Gate Drive
Source	14V/35Ω	20V/10Ω
Pulse Width, t_p	≥20 μs	≥10 μs
Current Rise Time, t_r	≤2	≤0.5 μs

*Permissible circuit dI/dt excluding snubber discharge. Repetitive dI/dt is SPCO recommended maximum condition to achieve most industrial requirements for service life. It meets or exceeds the JEDEC test requirements for certification set forth in NEMA Std. Sk. 516 (1972). Non-repetitive dI/dt meets the JEDEC 5 second rating.

**Snubber discharge, I_s, is treated separately using the minimum value of snubber resistance indicated above. This applies for long industrial life (20-30 years) in combination with circuit dI/dt.

GATE CHARACTERISTICS



NOTES:
1. Add .006°C/W to account for both case to dissipator interfaces when properly mounted; e.g. $R_{\theta JS}$ = .029°C/W. See Mounting Instructions.
2. DC Thermal Impedance is based on average full cycle junction temperature. Instantaneous junction temperature may be calculated using the following modifications:
   - •end of conducting portion of cycle
   - —120° sq. wave add .0025°C/W along entire curve
   - —180° sq. wave add .0016°C/W along entire curve
   - —180° sine save add .0010°C/W along entire curve
   - •end of full cycle
   - —any wave, subract .001°C/W along entire curve