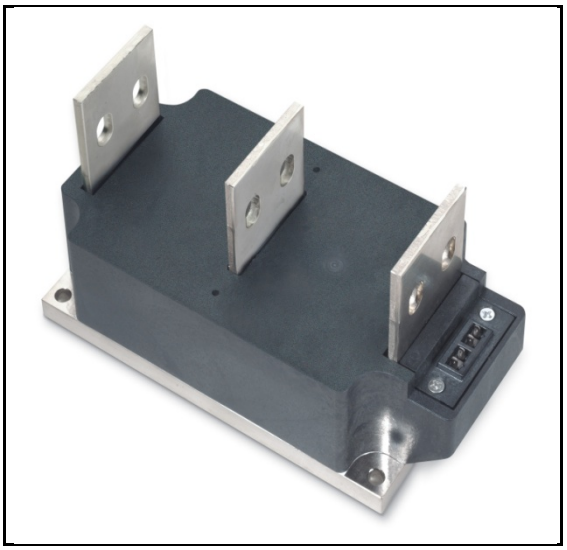
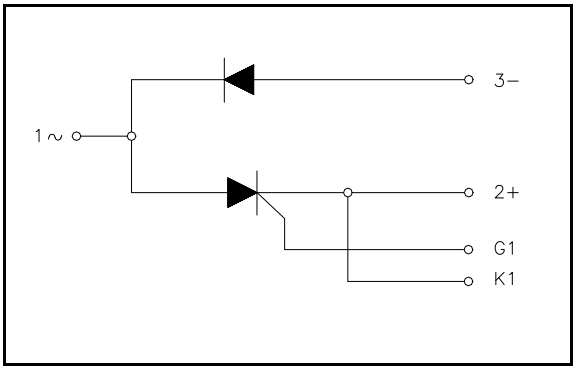
Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

POW-R-BLOK™
Dual SCR / Diode Isolated Module
600 Amperes, Up to 2400 Volts





Ordering Information:
Select the complete eight-digit module part number from the table below.
Example: PD422406 is a 2400 Volt, 600A Average SCR/Diode Isolated *POW-R-BLOK™* Module

Type	Voltage Volts (x100)	Current Amperes (x100)
PD42	20 22 24	06

Description:
Powerex Dual SCR/Diode Modules are designed for use in applications requiring phase control and isolated packaging. The modules are isolated for easy mounting with other components on a common heatsink.

Features:
- Electrically Isolated Heatsinking
- Compression Bonded Elements
- Metal Baseplate
- Low Thermal Impedance for Improved Current Capability
- UL Recognition Pending

Benefits:
- No Additional Insulation Components Required
- Easy Installation
- No Clamping Components Required
- Reduce Engineering Time

Applications:
- Bridge Circuits
- AC & DC Motor Drives
- Motor Soft Starters
- Battery Supplies
- Power Supplies
- Large IGBT Circuit Front Ends

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Absolute Maximum Ratings

Characteristics	Conditions	Symbol		Units
Repetitive Peak Forward and Reverse Blocking Voltage		V_{DRM} & V_{RRM}	Up to 2400	V
Non-Repetitive Peak Blocking Voltage (t < 5 msec)		V_{RSM}	V_{RRM} + 100V	V
RMS Current AC Switch Configuration (180° Conduction)	180° Conduction, T_C=66°C	$I_{T(RMS)}$	1665	A
	180° Conduction, T_C=71°C	$I_{T(RMS)}$	1550	A
	180° Conduction, T_C=76°C	$I_{T(RMS)}$	1440	A
	180° Conduction, T_C=81°C	$I_{T(RMS)}$	**1330**	A
	180° Conduction, T_C=86°C	$I_{T(RMS)}$	1220	A
	180° Conduction, T_C=90°C	$I_{T(RMS)}$	1110	A
RMS Current Per SCR (180° Conduction)	180° Conduction, T_C=66°C	$I_{T(RMS)}$	1178	A
	180° Conduction, T_C=71°C	$I_{T(RMS)}$	1100	A
	180° Conduction, T_C=76°C	$I_{T(RMS)}$	1020	A
	180° Conduction, T_C=81°C	$I_{T(RMS)}$	**942**	A
	180° Conduction, T_C=86°C	$I_{T(RMS)}$	864	A
	180° Conduction, T_C=90°C	$I_{T(RMS)}$	785	A
Average Forward Current Per SCR (180° Conduction)	180° Conduction, T_C=66°C	$I_{T(AV)}$	750	A
	180° Conduction, T_C=71°C	$I_{T(AV)}$	700	A
	180° Conduction, T_C=76°C	$I_{T(AV)}$	650	A
	180° Conduction, T_C=81°C	$I_{T(AV)}$	**600**	A
	180° Conduction, T_C=86°C	$I_{T(AV)}$	550	A
	180° Conduction, T_C=90°C	$I_{T(AV)}$	500	A
Peak One Cycle Surge Current, Non-Repetitive Tj = 25C, Vr = 0	60 Hz	I_{TSM}	50,890	A
	50 Hz	I_{TSM}	46,400	A
Peak One Cycle Surge Current, Non-Repetitive Tj = 25C, Vr = Vrrm	60 Hz	I_{TSM}	33,925	A
	50 Hz	I_{TSM}	30,935	A
Peak One Cycle Surge Current, Non-Repetitive Tj = 125C, Vr = 0	60 Hz	I_{TSM}	44,250	A
	50 Hz	I_{TSM}	40,350	A
Peak One Cycle Surge Current, Non-Repetitive Tj = 125C, Vr = Vrrm	60 Hz	I_{TSM}	29,500	A
	50 Hz	I_{TSM}	26,900	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{TSM}	23,690	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{TSM}	18,615	A
I^2t for Fusing for One Cycle Tj = 125C, Vr = Vrrm	8.3 milliseconds	I^2t	3.63×10^6	A^2 sec
	10 milliseconds	I^2t	3.62×10^6	A^2 sec
Maximum Rate-of-Rise of On-State Current, (Non-Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	400	A/μs
Maximum Rate-of-Rise of On-State Current, (Repetitive)	Per JEDEC Standard 397 5.2.2.6	di/dt	150	A/μs
Operating Temperature		T_J	-40 to +125	°C
Storage Temperature		T_{stg}	-40 to +150	°C
Max. Mounting Torque, M6 Mounting Screw			132	in. – Lb.
			15	Nm
Max. Mounting Torque, M10 Terminal Screw			106	in. – Lb.
			12	Nm
Module Weight, Typical			5.33	kg
			11.75	lb
V Isolation @ 25C		V_{rms}	3000	V

Information presented is based upon manufacturers testing and projected capabilities.
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Electrical Characteristics, T_J=25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Max.	Units
Repetitive Peak Forward Leakage Current	I_{DRM}	Up to 2400V, T_J=125°C		100	mA
Repetitive Peak Reverse Leakage Current	I_{RRM}	Up to 2400V, T_J=125°C		100	mA
Peak On-State Voltage	V_{TM}	I_{TM}=3000A, T_J=125°C		1.75	V
Threshold Voltage, Low-level Slope Resistance, Low-level	$V_{(TO)1}$ r_{T1}	T_J = 125°C, I = 15%$I_{T(AV)}$ to $\pi I_{T(AV)}$		0.869 0.237	V mΩ
Threshold Voltage, High-level Slope Resistance, High-level	$V_{(TO)2}$ r_{T2}	T_J = 125°C, I = $\pi I_{T(AV)}$ to I_{TSM}		1.055 0.175	V mΩ
SCR V_{TM} Coefficients, Full Range		T_J = 125°C, I = 50A to 6kA V_{TM} = A+ B Ln I +C I + D Sqrt I	A = B = C = D =	0.93159 -4.51 E-02 9.95 E-05 1.29 E-02	
Minimum dV/dt	dV/dt	Exponential to 0.67V_{DRM} T_j=125°C, Gate Open	600		V/μs
Gate Trigger Current	I_{GT}	T_j=25°C, V_D=12V		200	mA
Gate Trigger Voltage	V_{GT}	T_j=25°C, V_D=12V		4.5	Volts
Non-Triggering Gate Voltage	V_{GDM}	T_j=125°C, V_D= ½ V_{DRM}		0.15	Volts
Holding Current	I_H			300	mA
Peak Forward Gate Current	I_{GTM}			4.0	Amp
Peak Reverse Gate Voltage	V_{GRM}			5	Volts
Maximum Average Gate Power Dissipation	$P_{GM\ (AVE)}$			16	Watts
Diode V_{FM} Coefficients, Full Range		T_J = 125°C, I = 50A to 6kA V_{TM} = A+ B Ln I +C I + D Sqrt I	A = B = C = D =	0.6418 1.08 E-02 1.18 E-04 -1.57 E-03	
Diode Typical Reverse Recovery Time	t_{rr}	T_J = 25°C, I_{FM} = 1500A. dI_r/dt = 25 A/μs, t_p = 190 μs		22	μs

Thermal Characteristics

Characteristics	Symbol				Max.	Units
Thermal Resistance, Junction to Case	$R_{\Theta J-C}$	Per Module, both conducting Per Junction, both conducting			0.029 0.058	°C/W °C/W
Thermal Impedance Coefficients	$Z_{\Theta J-C}$	$Z_{\Theta J-C}$= K_1 (1-exp(-t/τ_1)) + K_2 (1-exp(-t/τ_2)) + K_3 (1-exp(-t/τ_3)) + K_4 (1-exp(-t/τ_4))	K_1 = 5.04 E-04 K_2 = 2.31 E-03 K_3 = 2.83 E-03 K_4 =5.24 E-02	τ_1 = 2.47 E-03 τ_2 = 4.42 E-02 τ_3 = 1.370 τ_4 = 9.668		
Thermal Resistance, Case to Sink Lubricated	$R_{\Theta C-S}$	Per Module			0.009	°C/W

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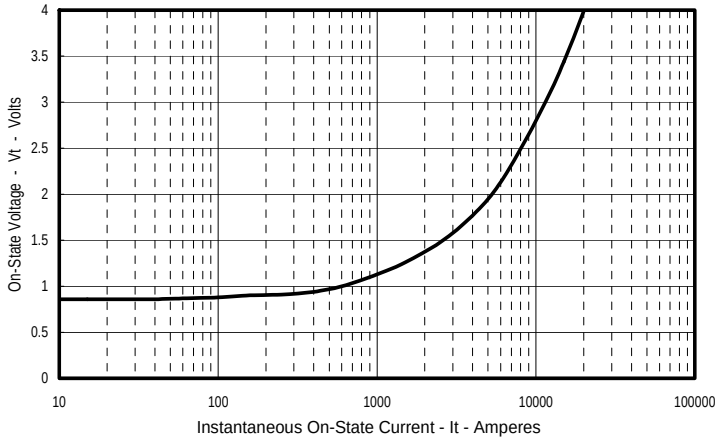
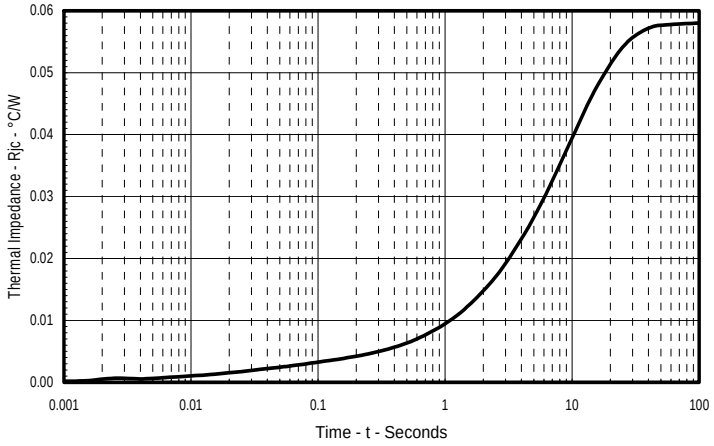
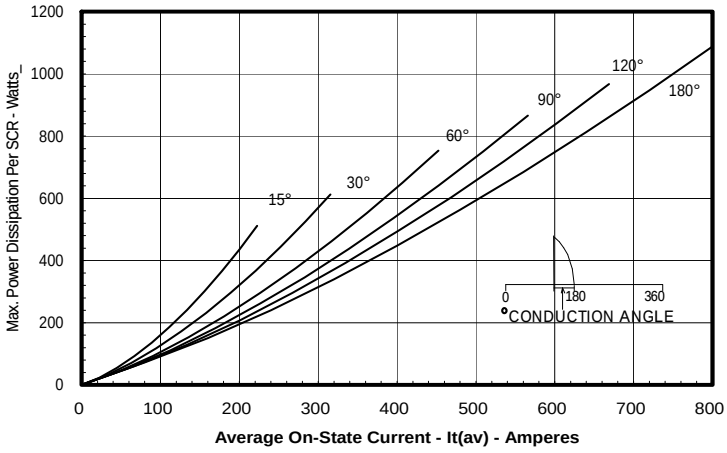
Typical On-State Forward Voltage Drop
(Tj = 125C)



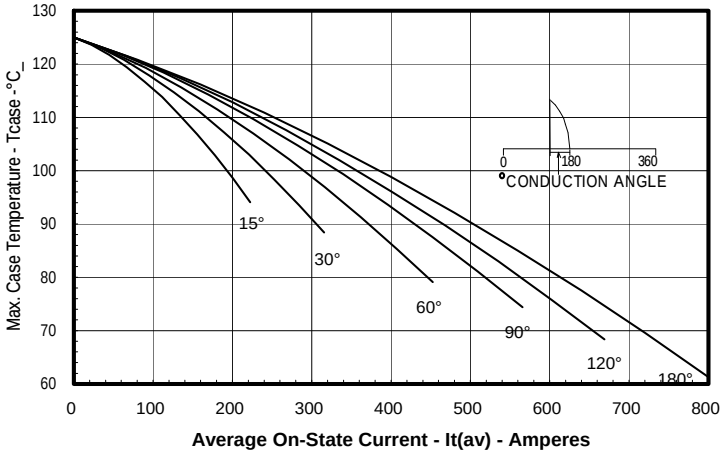
Maximum Transient Thermal Impedance
(Junction To Case)



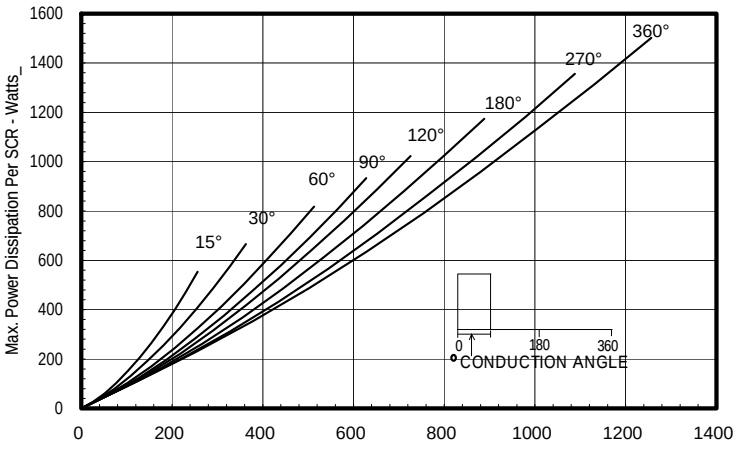
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



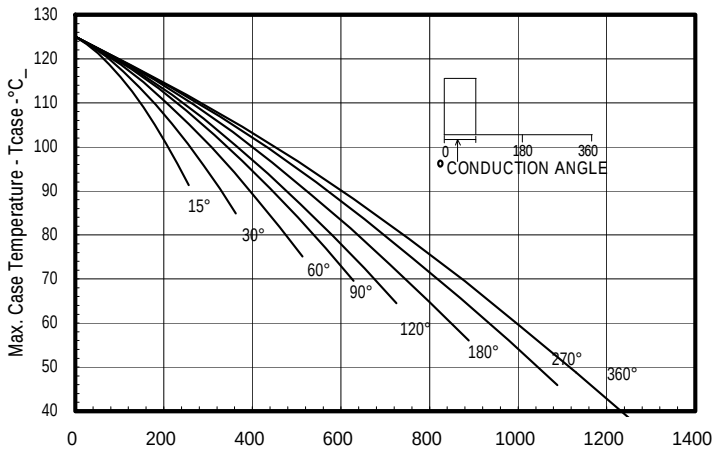
Maximum Allowable Case Temperature
(Sinusoidal Waveform)



Maximum On-State Power Dissipation
(Rectangular Waveform)



Maximum Allowable Case Temperature
(Rectangular Waveform)



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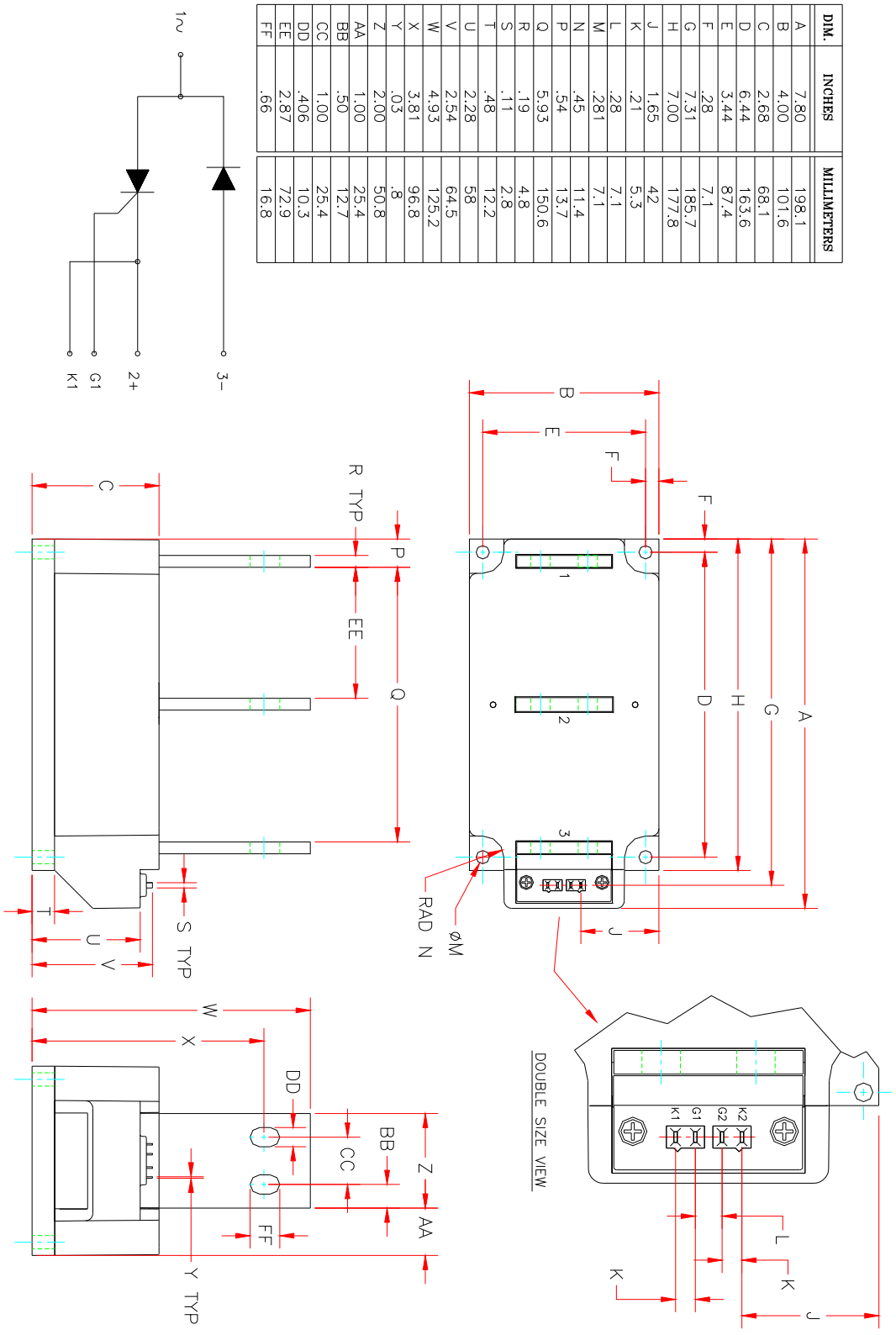
DIM.	INCHES	MILLIMETERS
A	7.80	198.1
B	4.00	101.6
C	2.68	68.1
D	6.44	163.6
E	3.44	87.4
F	.28	7.1
G	7.31	185.7
H	7.00	177.8
J	1.65	42
K	.21	5.3
L	.28	7.1
M	.281	7.1
N	.45	11.4
P	.54	13.7
Q	5.93	150.6
R	.19	4.8
S	.11	2.8
T	.48	12.2
U	2.28	58
V	2.54	64.5
W	4.93	125.2
X	3.81	96.8
Y	.03	.8
Z	2.00	50.8
AA	1.00	25.4
BB	.50	12.7
CC	1.00	25.4
DD	.406	10.3
EE	2.87	72.9
FF	.66	16.8



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