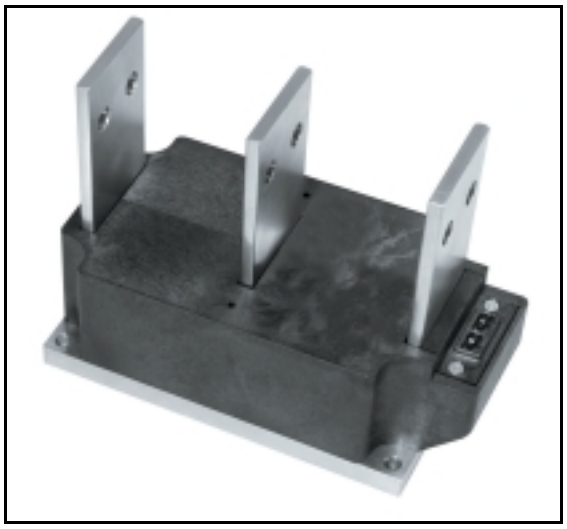
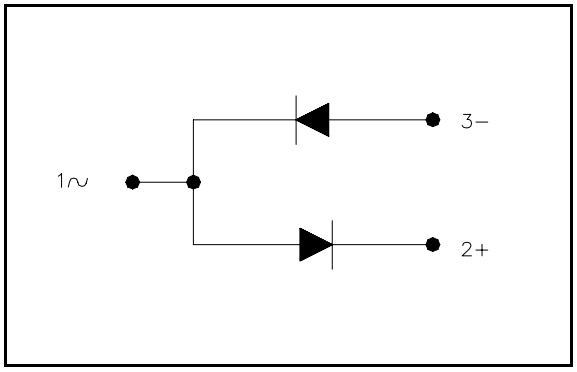
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (724) 925-7272

POW-R-BLOK™
Dual Diode Isolated Module
1100 Amperes / Up to 2400 Volts





Description:
Powerex Dual Diode Modules are designed for use in applications requiring rectification 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

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

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

Ordering Information:
Select the complete eight-digit module part number from the table below.
Example: PD412411 is a 2400 Volt, 1100A Average Dual Diode Isolated *POW-R-BLOK™* Module

Type	Voltage Volts (x100)	Current Amperes (x100)
PD41	18 20 22 24	11

11/06/2002

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Absolute Maximum Ratings

Characteristics	Conditions	Symbol		Units
Repetitive Peak Reverse Blocking Voltage		V_{RRM}	Up to 2400	V
Non-Repetitive Peak Blocking Voltage (t < 5 msec)		V_{RSM}	V_{RRM} + 100V	V
RMS Current Per Diode	180◦ Conduction, T_C=80◦C	$I_{F(RMS)}$	1885	A
(180 ^{O} Conduction)	**180◦ Conduction, T_C=87◦C**	$I_{F(RMS)}$	**1725**	A
	180◦ Conduction, T_C=95◦C	$I_{F(RMS)}$	1570	A
	180◦ Conduction, T_C=98◦C	$I_{F(RMS)}$	1415	A
Average Forward Current Per Diode	180◦ Conduction, T_C=80◦C	$I_{F(AV)}$	1200	A
(180 ^{O} Conduction)	**180◦ Conduction, T_C=87◦C**	$I_{F(AV)}$	**1100**	A
	180◦ Conduction, T_C=95◦C	$I_{F(AV)}$	1000	A
	180◦ Conduction, T_C=98◦C	$I_{F(AV)}$	900	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{FSM}	50,890	A
Tj = 25C, Vr = 0	50 Hz	I_{FSM}	46,400	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{FSM}	33,925	A
Tj = 25C, Vr = Vrrm	50 Hz	I_{FSM}	30,935	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{FSM}	44,250	A
Tj = 125C, Vr = 0	50 Hz	I_{FSM}	40,350	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{FSM}	29,500	A
Tj = 125C, Vr = Vrrm	50 Hz	I_{FSM}	26,900	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{FSM}	23,690	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{FSM}	18,615	A
I^2t for Fusing for One Cycle	8.3 milliseconds	I^2t	3.63×10^6	A^2 sec
Tj = 125C, Vr = Vrrm	10 milliseconds	I^2t	3.62×10^6	A^2 sec
Operating Temperature		T_J	-40 to +150	◦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			455	g
			11.75	lb
V Isolation @ 25C		V_{rms}	3000	V

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Electrical Characteristics, T_J=25◦C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Max.	Units
Repetitive Peak Reverse Leakage Current	I_{RRM}	Up to 2400V, T_J=125◦C		100	mA
Peak On-State Voltage	V_{FM}	I_{FM}=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 π$I_{T(AV)}$		0.869 0.237	V mΩ
Threshold Voltage, High-level Slope Resistance, High-level	$V_{(TO)2}$ r_{T2}	T_J = 125◦C, I = π$I_{T(AV)}$ to I_{TSM}		1.055 0.175	V mΩ
V_{FM} Coefficients, Full Range		T_J = 125◦C, I = 50A to 6kA V_{FM} = 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	
Typical Reverse Recovery Time	t_{rr}	T_J = 25◦C, I_{fm} = 1500A. dI_r/dt = 25 A/us, t_p = 190 us		22	us

Thermal Characteristics

Characteristics	Symbol				Max.	Units
Thermal Resistance, Junction to Case	$R_{ΘJ-C}$	Per Module, both conducting Per Junction, both conducting			0.029 0.058	◦C/W ◦C/W
Thermal Impedance Coefficients	$Z_{ΘJ-C}$	$Z_{ΘJ-C}$= K_1 (1-exp(-t/t_1)) + K_2 (1-exp(-t/t_2)) + K_3 (1-exp(-t/t_3)) + K_4 (1-exp(-t/t_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	t_1 = 2.47 E-03 t_2 = 4.42 E-02 t_3 = 1.370 t_4 = 9.668		
Thermal Resistance, Case to Sink Lubricated	$R_{ΘC-S}$	Per Module			0.009	◦C/W

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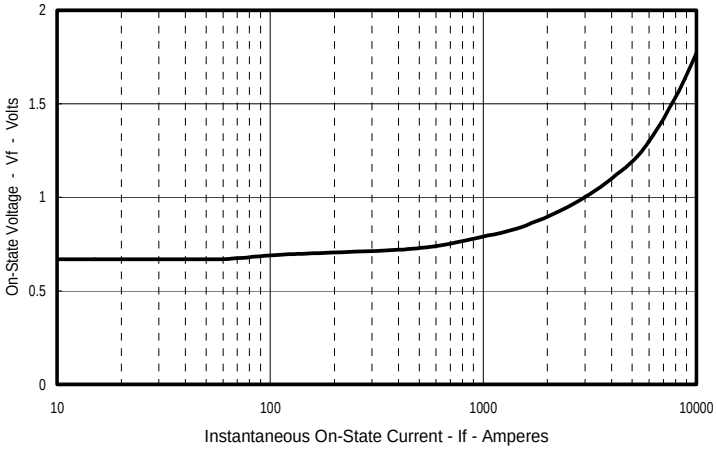
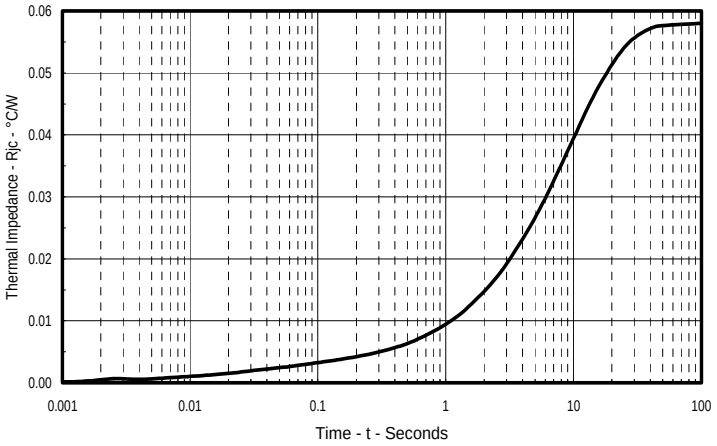
Typical On-State Forward Voltage Drop

(Tj = 150C)



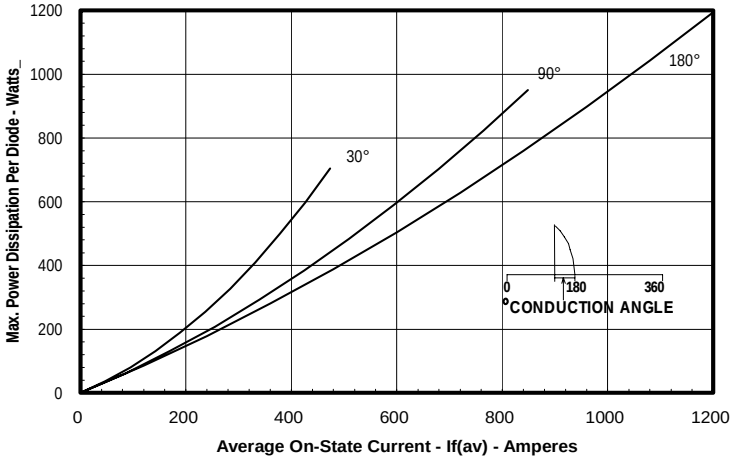
Maximum Transient Thermal Impedance

(Junction To Case)



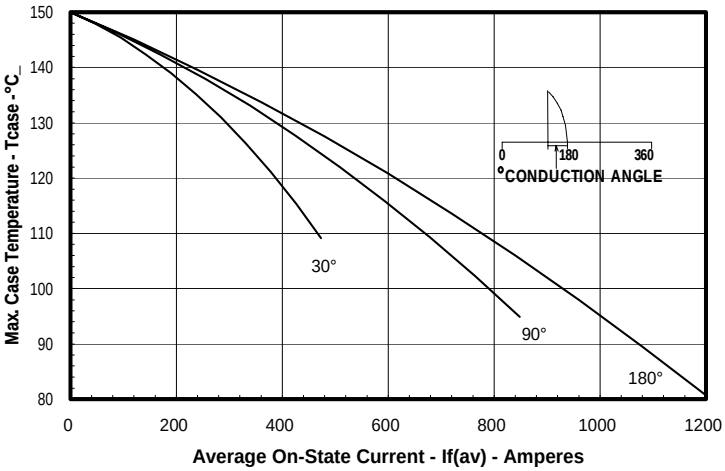
Maximum On-State Power Dissipation

(Sinusoidal Waveform)



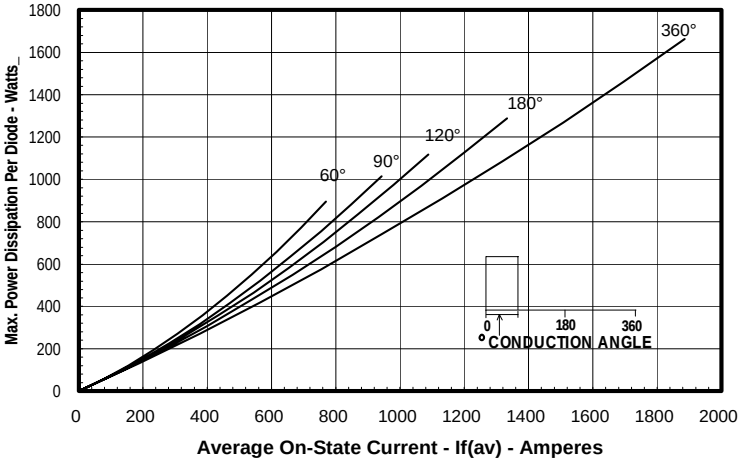
Maximum Allowable Case Temperature

(Sinusoidal Waveform)



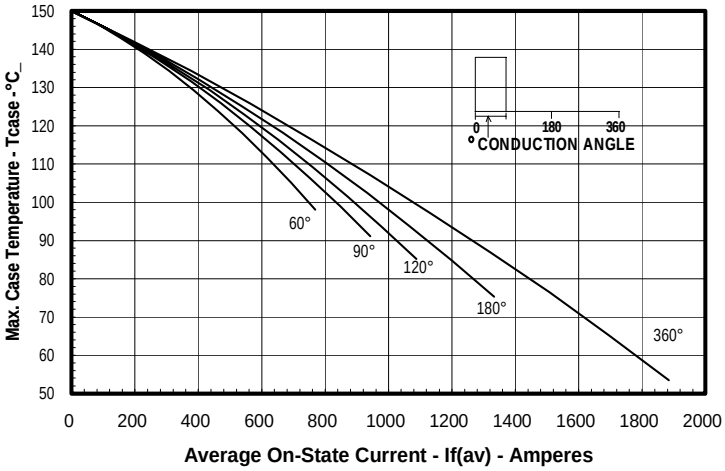
Maximum On-State Power Dissipation

(Rectangular Waveform)



Maximum Allowable Case Temperature

(Rectangular Waveform)



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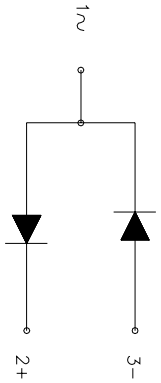

DIM.	INCHES	MILLIMETERS
A	7.80	198.1
B	4.00	101.6
C	2.68	68.1
D	6.44	163.6
E	3.44	87.4
F	.28	7.1
G	7.31	185.7
H	7.00	177.8
M	.281	7.1
N	.45	11.4
P	.54	13.7
Q	5.93	150.6
R	.19	4.8
T	.48	12.2
U	2.28	58
W	4.93	125.2
X	3.81	96.8
Z	2.00	50.8
AA	1.00	25.4
BB	.50	12.7
CC	1.00	25.4
DD	.406	10.3
EE	2.87	72.9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