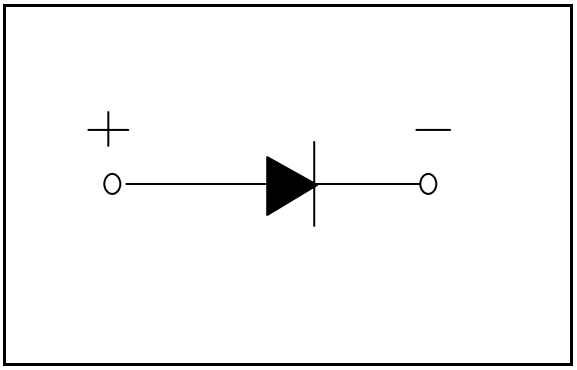
Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272

POW-R-BLOK™
Single Diode Isolated Module
2500 Amperes / Up to 2400 Volts



Ordering Information:
Select the complete eight-digit module part number from the table below.
Example: PS412425 is a 2400 Volt, 2500A Average Dual Diode Isolated *POW-R-BLOK™* Module

Type	Voltage Volts (x100)	Current Amperes (x100)
PS41	18 20 22 24	25

Description:
Powerex Single 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
- UL Recognized (E78240)

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

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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=90°C**	$I_{F(RMS)}$	**3925**	A
(180 ^{O} Conduction)	180° Conduction, T_C=92°C	$I_{F(RMS)}$	3768	A
	180° Conduction, T_C=98°C	$I_{F(RMS)}$	3454	A
	180° Conduction, T_C=104°C	$I_{F(RMS)}$	3140	A
Average Forward Current Per Diode	**180° Conduction, T_C=90°C**	$I_{F(AV)}$	**2500**	A
(180 ^{O} Conduction)	180° Conduction, T_C=92°C	$I_{F(AV)}$	2400	A
	180° Conduction, T_C=98°C	$I_{F(AV)}$	2200	A
	180° Conduction, T_C=104°C	$I_{F(AV)}$	2000	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{FSM}	90,000	A
Tj = 25C, Vr = 0	50 Hz	I_{FSM}	83,000	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{FSM}	61,000	A
Tj = 25C, Vr = Vrrm	50 Hz	I_{FSM}	55,600	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{FSM}	79,600	A
Tj = 125C, Vr = 0	50 Hz	I_{FSM}	72,600	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz	I_{FSM}	53,000	A
Tj = 125C, Vr = Vrrm	50 Hz	I_{FSM}	48,400	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{FSM}	42,000	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, Tj = 125C, Vr = Vrrm	I_{FSM}	33,500	A
I^2t for Fusing for One Cycle	8.3 milliseconds	I^2t	11.7×10^6	A^2 sec
Tj = 125C, Vr = Vrrm	10 milliseconds	I^2t	11.7×10^6	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		200	mA
Peak On-State Voltage	V_{FM}	I_{FM}=3000A, T_J=150°C		1.00	V
Threshold Voltage, Low-level	$V_{(TO)1}$	T_J = 150°C, I = 15%$I_{T(AV)}$ to π$I_{T(AV)}$		0.681	V
Slope Resistance, Low-level	r_{T1}			0.051	mΩ
Threshold Voltage, High-level	$V_{(TO)2}$	T_J = 150°C, I = π$I_{T(AV)}$ to I_{TSM}		0.681	V
Slope Resistance, High-level	r_{T2}			0.051	mΩ
V_{FM} Coefficients, Full Range		T_J = 150°C, I = 50A to 10kA	A =	0.6245	
			B =	1.68 E-02	
		V_{FM} = A+ B Ln I +C I + D Sqrt I	C =	6.74 E-05	
			D =	-2.44 E-03	
Typical Reverse Recovery Time	t_{rr}	T_J = 25°C, I_{fm} = 3000A.		22	us
		dI_f/dt = 25 A/us, t_p = 190 us			

Thermal Characteristics

Characteristics	Symbol				Max.	Units
Thermal Resistance, Junction to Case	$R_{ΘJ-C}$	Per Module			0.024	°C/W
Thermal Impedance Coefficients	$Z_{ΘJ-C}$	$Z_{ΘJ-C}$= K_1 (1-exp(-t/$τ_1$))	K_1 = 4.05 E-04	$τ_1$ = 6.24 E-03		
		+ K_2 (1-exp(-t/$τ_2$))	K_2 = 5.19 E-03	$τ_2$ = 2.46 E-01		
		+ K_3 (1-exp(-t/$τ_3$))	K_3 = 1.63 E-02	$τ_3$ = 8.20		
		+ K_4 (1-exp(-t/$τ_4$))	K_4 =2.13 E-03	$τ_4$ = 35.3		
Thermal Resistance, Case to Sink Lubricated	$R_{ΘC-S}$	Per Module			0.009	°C/W

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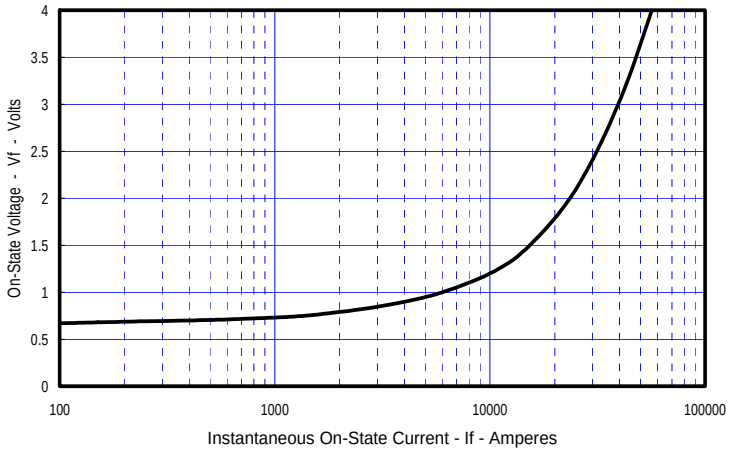
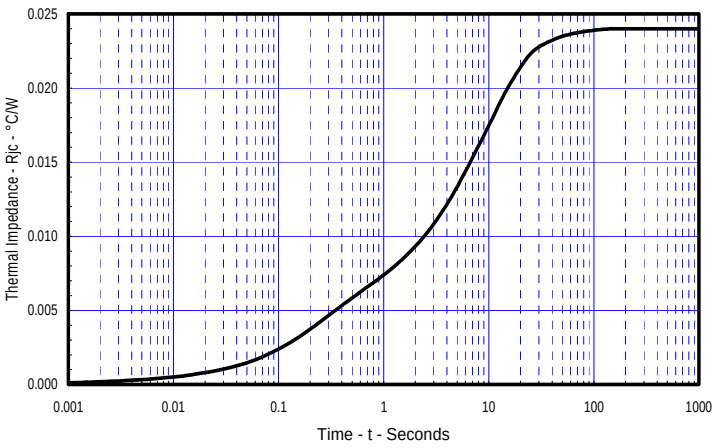
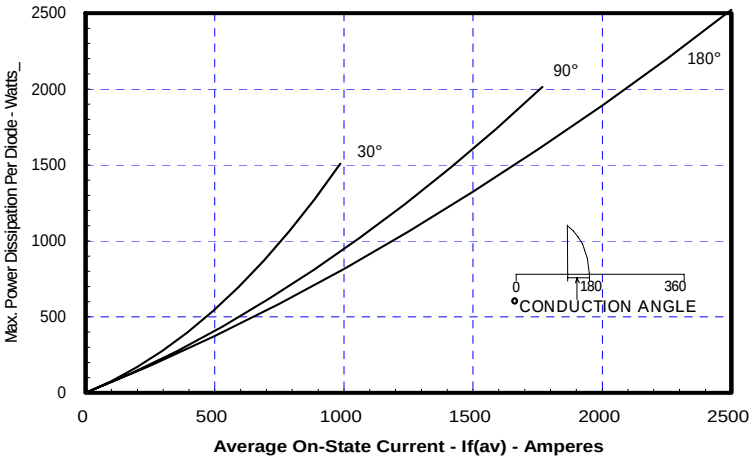
Typical On-State Forward Voltage Drop
(Tj = 150C)



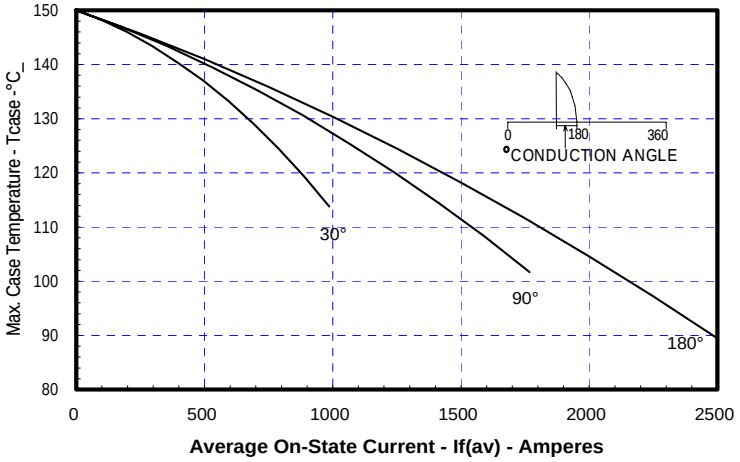
Maximum Transient Thermal Impedance
(Junction To Case)



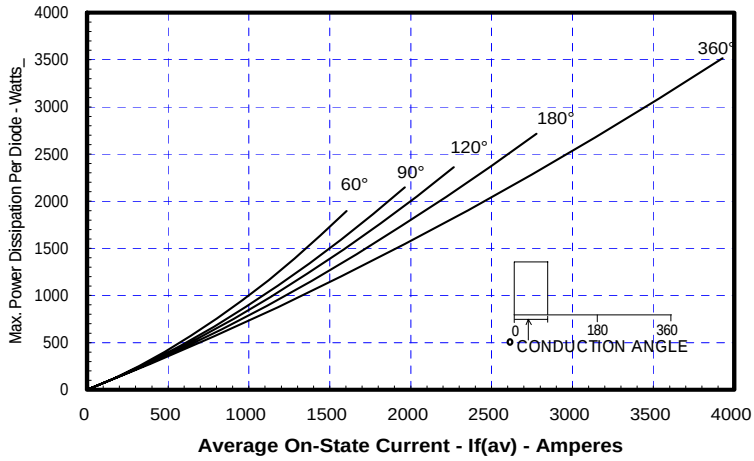
Maximum On-State Power Dissipation
(Sinusoidal Waveform)



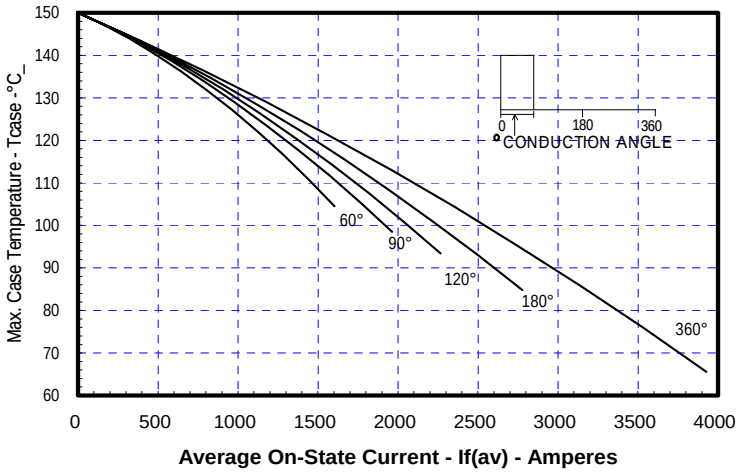
Maximum Allowable Case Temperature
(Sinusoidal Waveform)



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
V	2.54	64.5
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
FF	.66	16.8