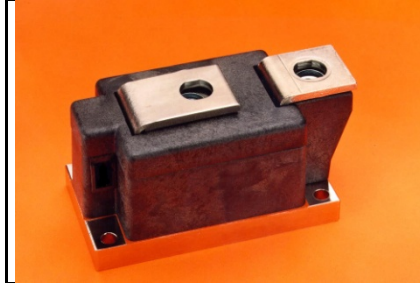
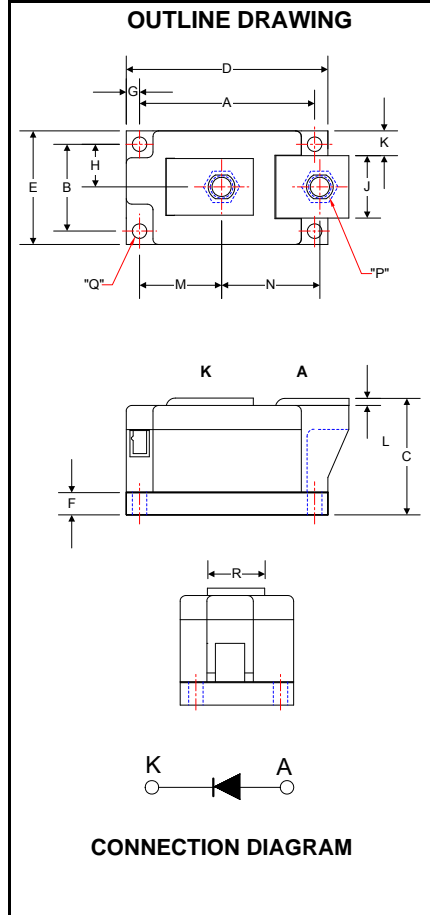


**POW-R-BLOK™**  
**Single Diode Isolated Module**  
**450 Amperes / Up to 4000 Volts**



**LS81\_\_45**  
**Single Diode**  
**POW-R-BLOK™ Module**  
450 Amperes / Up to 4000 Volts

**LS81 Outline Dimensions**

Dimension	Inches	Millimeters
A	3.15	80.0
B	1.50	38.0
C	2.05	52.1
D	3.62	92.0
E	1.97	50.0
F	0.39	9.9
G	0.24	6.1
H	0.75	19.0
J	0.99	25.1
K	0.48	12.2
L	0.12	3.1
M	1.45	36.8
N	1.76	44.7
P	M10 Metric	M10
Q	0.250 Dia.	6.35 Dia.
R	0.99	25.1

Note: Dimensions are for reference only.

**Ordering Information:**

Select the complete eight-digit module part number from the table below.

Example: LS814045 is a 4000V, 450 Ampere Single Diode Isolated POW-R-BLOK™ Module.

Type	Voltage Volts (x100)	Current Amperes (x10)
LS81	40	45
	38	
	36	
	34	
	32	

**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. POW-R-BLOK™ has been tested and recognized by the Underwriters Laboratories.

**Features:**

- Electrically Isolated Heatsinking
- Aluminum Nitride Isolator
- Compression Bonded Elements
- Metal Baseplate
- Low Thermal Impedance for Improved Current Capability
- UL Recognized

**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

**Absolute Maximum Ratings**

Characteristics	Conditions	Symbol		Units
Repetitive Peak Reverse Blocking Voltage		$V_{RRM}$	up to 4000	V
Non-Repetitive Peak Reverse Blocking Voltage (t < 5 msec)		$V_{RSM}$	$V_{RRM} + 100$	V
RMS Forward Current	180° Conduction, $T_C=107^\circ\text{C}$	$I_{F(RMS)}$	710	A
	180° Conduction, $T_C=88^\circ\text{C}$	$I_{F(RMS)}$	900	A
Average Forward Current	180° Conduction, $T_C=107^\circ\text{C}$	$I_{F(AV)}$	450	A
	180° Conduction, $T_C=88^\circ\text{C}$	$I_{F(AV)}$	575	A
Peak One Cycle Surge Current, Non-Repetitive	60 Hz, $T_J=125^\circ\text{C}$ , 100% $V_{RRM}$ reapplied	$I_{FSM}$	11,000	A
	60 Hz, $T_J=25^\circ\text{C}$ , No $V_{RRM}$ reapplied	$I_{FSM}$	19,140	A
	50 Hz, $T_J=125^\circ\text{C}$ , 100% $V_{RRM}$ reapplied	$I_{FSM}$	10,040	A
	50 Hz, $T_J=125^\circ\text{C}$ , No $V_{RRM}$ reapplied	$I_{FSM}$	15,050	A
	50 Hz, $T_J=25^\circ\text{C}$ , No $V_{RRM}$ reapplied	$I_{FSM}$	17,450	A
Peak Three Cycle Surge Current, Non-Repetitive	60 Hz, $T_J=125^\circ\text{C}$ , 100% $V_{RRM}$ reapplied	$I_{FSM}$	8,830	A
Peak Ten Cycle Surge Current, Non-Repetitive	60 Hz, $T_J=125^\circ\text{C}$ , 100% $V_{RRM}$ reapplied	$I_{FSM}$	6,940	A
$I^2t$ for Fusing for One Cycle	60 Hz, $T_J=125^\circ\text{C}$ , 100% $V_{RRM}$ reapplied	$I^2t$	504,000	$\text{A}^2\text{sec}$
	60 Hz, $T_J=25^\circ\text{C}$ , No $V_{RRM}$ reapplied	$I^2t$	$1.53 \times 10^6$	$\text{A}^2\text{sec}$
	50 Hz, $T_J=125^\circ\text{C}$ , 100% $V_{RRM}$ reapplied	$I^2t$	504,000	$\text{A}^2\text{sec}$
	50 Hz, $T_J=125^\circ\text{C}$ , No $V_{RRM}$ reapplied	$I^2t$	$1.13 \times 10^6$	$\text{A}^2\text{sec}$
	50 Hz, $T_J=25^\circ\text{C}$ , No $V_{RRM}$ reapplied	$I^2t$	$1.52 \times 10^6$	$\text{A}^2\text{sec}$
Operating Temperature		$T_J$	-40 to +150	$^\circ\text{C}$
Storage Temperature		$T_{stg}$	-40 to +150	$^\circ\text{C}$
Max. Mounting Torque, M6 Mounting Screw			55	in. – Lb.
			6	Nm
Max. Mounting Torque, M10 Terminal Screw			110	in. – Lb.
			12	Nm
Module Weight, Typical			816	g
			1.80	lb
V Isolation @ 25C	t = 1 minute	$V_{rms}$	3600	V

Information presented is based upon manufacturers testing and projected capabilities.  
 This information is subject to change without notice.  
 The manufacturer makes no claim as to the suitability of use, reliability, capability,  
 or future availability of this product.

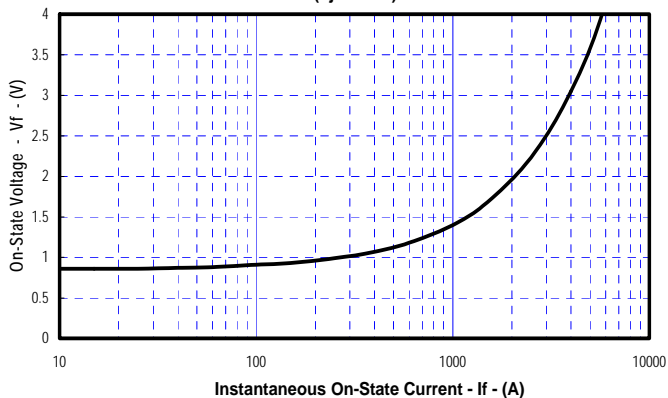
**Electrical Characteristics, T<sub>J</sub>=25°C unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Max.	Units
Repetitive Peak Reverse Leakage Current	I <sub>RRM</sub>	Up to 4000V, T <sub>J</sub> =150°C		50	mA
Peak On-State Voltage	V <sub>FM</sub>	T <sub>J</sub> = 150°C, I <sub>FM</sub> = 1800 A		1.90	V
Threshold Voltage, Low-level	V <sub>(TO)1</sub>	T <sub>J</sub> = 150°C, I = 15%I <sub>F(AV)</sub> to πI <sub>F(AV)</sub>		0.85	V
Slope Resistance, Low-level	r <sub>T1</sub>			0.55	mΩ
Threshold Voltage, High-level	V <sub>(TO)2</sub>	T <sub>J</sub> = 150°C, I = πI <sub>F(AV)</sub> to I <sub>FSM</sub>		0.85	V
Slope Resistance, High-level	r <sub>T2</sub>			0.55	mΩ
V <sub>TM</sub> Coefficients, Full Range		T <sub>J</sub> = 150°C, I = 15%I <sub>F(AV)</sub> to I <sub>FSM</sub>	A =	0.85	
		V <sub>TM</sub> = A+ B Ln I +C I + D Sqrt I	B =	-1.517E-05	
			C =	5.500E-04	
			D =	1.702E-06	

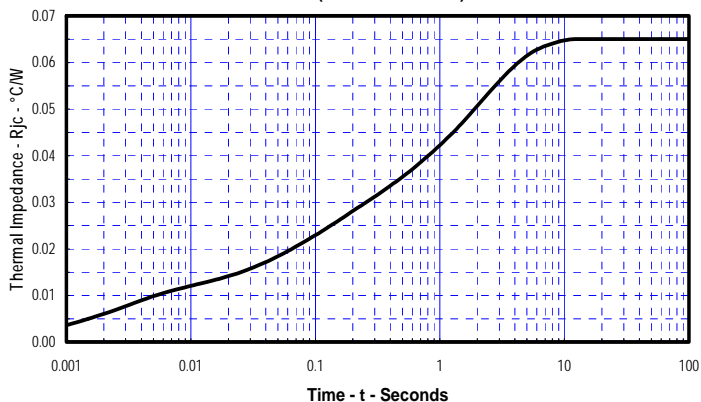
**Thermal Characteristics**

Characteristics	Symbol		Max.	Units
Thermal Resistance, Junction to Case	R <sub>ΘJ-C</sub>	Per Module/Junction	0.0650	°C/W
Thermal Impedance Coefficients	Z <sub>ΘJ-C</sub>	Z <sub>ΘJ-C</sub> = K <sub>1</sub> (1-exp(-t/τ <sub>1</sub> )) + K <sub>2</sub> (1-exp(-t/τ <sub>2</sub> )) + K <sub>3</sub> (1-exp(-t/τ <sub>3</sub> )) + K <sub>4</sub> (1-exp(-t/τ <sub>4</sub> ))	K <sub>1</sub> = 8.03E-04 K <sub>2</sub> = 1.03E-02 K <sub>3</sub> = 1.64E-02 K <sub>4</sub> = 3.75E-02	τ <sub>1</sub> = 3.39E-04 τ <sub>2</sub> = 3.15E-03 τ <sub>3</sub> = 1.06E-01 τ <sub>4</sub> = 2.066
Thermal Resistance, Case to Sink Lubricated	R <sub>ΘC-S</sub>	Per Module	0.02	°C/W

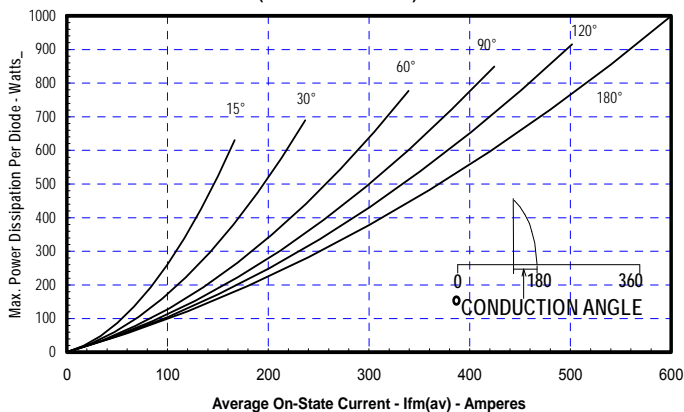
**Maximum On-State Forward Voltage Drop**  
( $T_j = 150^\circ\text{C}$ )



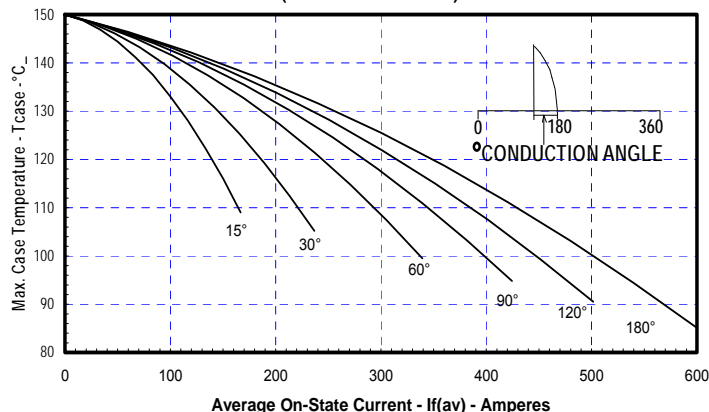
**Maximum Transient Thermal Impedance**  
(Junction To Case)



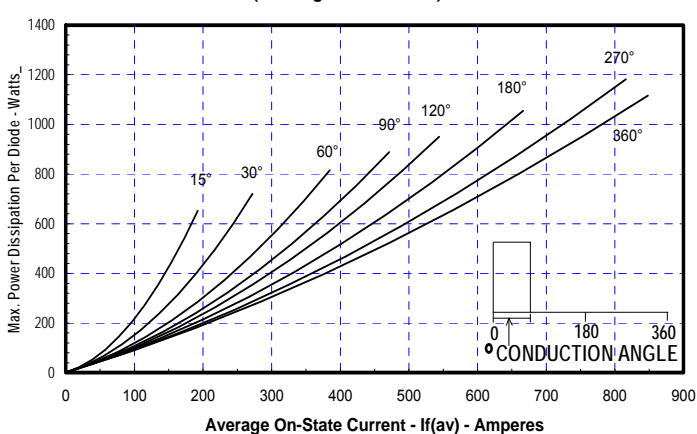
**Maximum On-State Power Dissipation**  
(Sinusoidal Waveform)



**Maximum Allowable Case Temperature**  
(Sinusoidal Waveform)



**Maximum On-State Power Dissipation**  
(Rectangular Waveform)



**Maximum Allowable Case Temperature**  
(Rectangular Waveform)

