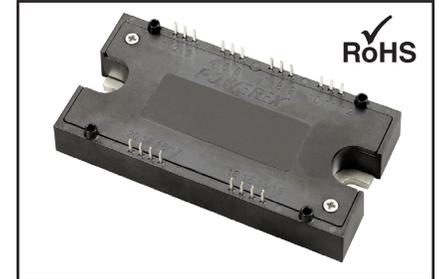
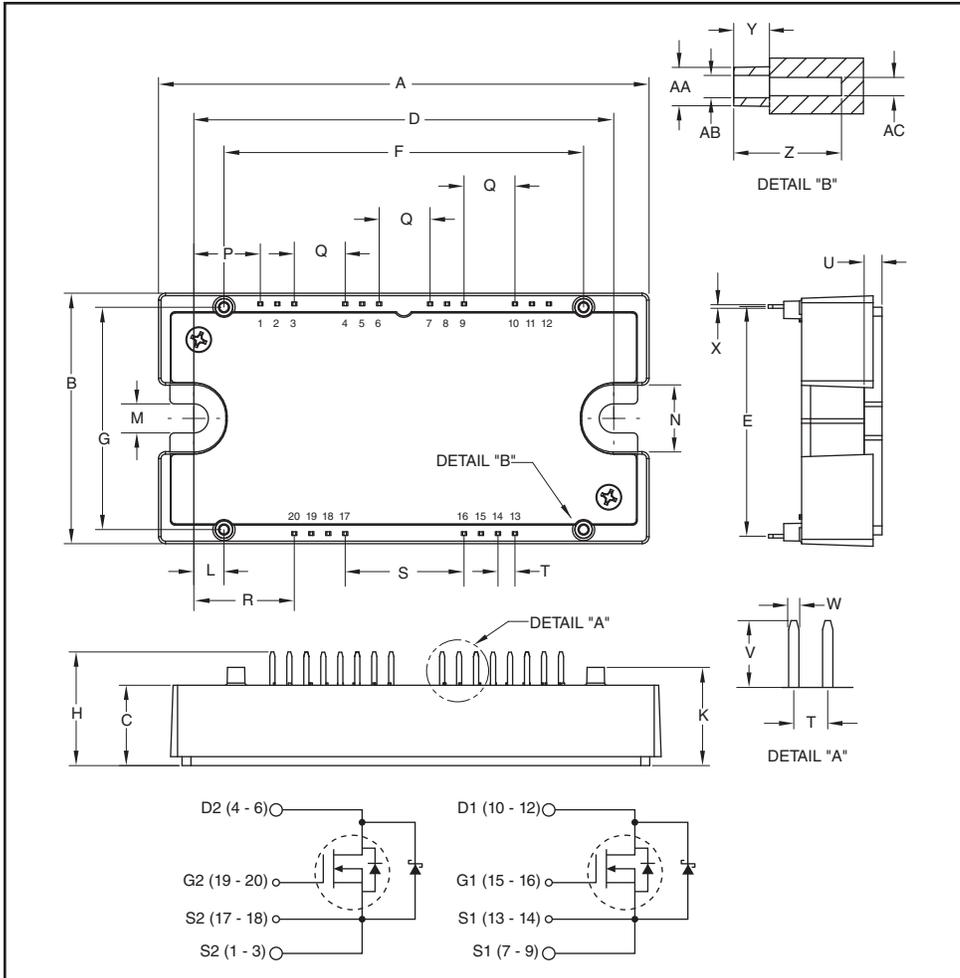


### Split Dual SiC MOSFET Module 100 Amperes/1200 Volts



#### Description:

Powerex Silicon Carbide MOSFET Modules are designed for use in high frequency applications. Each module consists of two MOSFET Silicon Carbide Transistors with each transistor having a reverse connected fast recovery free-wheel silicon carbide Schottky diode. All components and interconnects are isolated from the heat sinking baseplate, offering simplified system assembly and thermal management.

#### Features:

- Silicon Carbide Chips
- Low Internal Inductance
- Industry Leading RDS(on)
- High Speed Switching
- Low Switching Losses
- Low Capacitance
- Low Drive Requirement
- Fast 75A Free Wheeling Schottky Diode
- High Power Density
- Isolated Baseplate
- Aluminum Nitride Isolation
- 2 Individual Switches per Module
- Copper Baseplate
- RoHS Compliant

#### Applications:

- Energy Saving Power Systems such as:  
Fans; Pumps; Consumer Appliances
- High Frequency Type Power Systems such as:  
UPS; High Speed Motor Drives; Induction Heating; Welder; Robotics
- High Temperature Power Systems such as:  
Power Electronics in Electric Vehicle and Aviation Systems

#### Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.32	109.8
B	2.21	56.1
C	0.71	18.0
D	3.70±0.02	94.0±0.5
E	2.026	51.46
F	3.17	80.5
G	1.96	49.8
H	1.00	25.5
K	0.87	22.0
L	0.266	6.75
M	0.26	6.5
N	0.59	15.0
P	0.586	14.89

Dimensions	Inches	Millimeters
Q	0.449	11.40
R	0.885	22.49
S	1.047	26.6
T	0.15	3.80
U	0.16	4.0
V	0.30	7.5
W	0.045	1.15
X	0.03	0.8
Y	0.16	4.0
Z	0.47	12.1
AA	0.17 Dia.	4.3 Dia.
AB	0.10 Dia.	2.5 Dia.
AC	0.08 Dia.	2.1 Dia.

**QJD1210SA1**  
**Split Dual SiC MOSFET Module**  
100 Amperes/1200 Volts

**Absolute Maximum Ratings,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

Ratings	Symbol	QJD1210SA1	Units
Drain-Source Voltage ( $V_{GS} = -10\text{V}$ )	$V_{DSS}$	1200	Volts
Gate-Source Voltage (D-S Short)	$V_{GSS}$	$\pm 20$	Volts
Drain Current (Continuous) at $T_C = 78^\circ\text{C}$	$I_D$	100	Amperes
Drain Current (Pulsed)*1	$I_{D(\text{pulse})}$	200	Amperes
Maximum Power Dissipation ( $T_C = 25^\circ\text{C}$ , $T_j < 150^\circ\text{C}$ )	$P_D$	520	Watts
Junction Temperature	$T_j$	-40 to 150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 to 125	$^\circ\text{C}$
Mounting Torque, M6 Mounting Screws	—	40	in-lb
Module Weight (Typical)	—	270	Grams
V Isolation Voltage	$V_{RMS}$	3000	Volts

\*1 Pulse width and repetition rate should be such that device junction temperature ( $T_j$ ) does not exceed  $T_{j(\text{max})}$  rating.

**QJD1210SA1**  
**Split Dual SiC MOSFET Module**  
 100 Amperes/1200 Volts

**MOSFET Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-Source Leakage Current* <sup>2</sup>	$I_{DSS}$	$V_{GS} = -10V, V_{DS} = 1200V$	—	100	—	$\mu A$
Drain-Source Leakage Current* <sup>2</sup>	$I_{DSS}$	$V_{GS} = -10V, V_{DS} = 1200V, T_j = 150^\circ C$	—	200	—	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{DS} = 0, V_{GS} = \pm 20V$	—	1.0	—	$\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = 10V, I_D = 34mA$	0.4	1.0	1.6	Volts
Drain-Source On Resistance (Chip)	$R_{DS(on)}$	$I_D = 100A, V_{GS} = 15V, T_j = 25^\circ C$	—	17	—	$m\Omega$
		$I_D = 100A, V_{GS} = 15V, T_j = 150^\circ C$	—	29	—	$m\Omega$
Drain-Source On Resistance (Terminal)	$R_{DS(on)}$	$I_D = 100A, V_{GS} = 15V, T_j = 25^\circ C$	—	18	—	$m\Omega$
		$I_D = 100A, V_{GS} = 15V, T_j = 150^\circ C$	—	30	—	$m\Omega$
Total Gate Charge	$Q_G$	$V_{CC} = 600V, I_D = 100A, V_{GS} = 0 \text{ to } 15V$	—	330	—	nC
Input Capacitance	$C_{iss}$		—	8.2	—	nF
Output Capacitance	$C_{oss}$	$V_{GS} = 0, V_{DS} = 10V, f = 100 \text{ kHz}$	—	2.7	—	nF
Reverse Transfer Capacitance	$C_{rss}$		—	180	—	pF
Turn-on Delay Time	$t_{d(on)}$		—	90	—	ns
Rise Time	$t_r$	$V_{DD} = 600V, I_D = 100A,$	—	85	—	ns
Turn-off Delay Time	$t_{d(off)}$	$V_{GS} = \pm 15V,$	—	300	—	ns
Fall Time	$t_f$	$R_G = 18\Omega, T_j = 150^\circ C,$	—	85	—	ns
Turn-on Switching Energy	$E_{on}$	Inductive Load	—	TBD	—	mJ
Turn-off Switching Energy	$E_{off}$		—	TBD	—	mJ

\*2 Total module leakage includes MOSFET leakage plus reverse Schottky diode leakage.

**QJD1210SA1**  
**Split Dual SiC MOSFET Module**  
 100 Amperes/1200 Volts

**Reverse Schottky Diode Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage (Chip)	V <sub>SD</sub>	I <sub>F</sub> = 75A, V <sub>GS</sub> = -15V, T <sub>j</sub> = 25°C	—	1.45	1.75	Volts
		I <sub>F</sub> = 75A, V <sub>GS</sub> = -15V, T <sub>j</sub> = 150°C	—	1.95	2.35	Volts
Diode Forward Voltage (Terminal)	V <sub>SD</sub>	I <sub>F</sub> = 75A, V <sub>GS</sub> = -15V, T <sub>j</sub> = 25°C	—	1.55	1.85	Volts
		I <sub>F</sub> = 75A, V <sub>GS</sub> = -15V, T <sub>j</sub> = 150°C	—	2.05	2.45	Volts
Diode Capacitive Charge	Q <sub>C</sub>	V <sub>R</sub> = 600V, I <sub>F</sub> = 75A, di/dt = 2200A/μs, T <sub>j</sub> = 150°C	—	300	—	nC
Reverse Recovery Time	t <sub>rr</sub>	V <sub>R</sub> = 600V, I <sub>F</sub> = 75A, di/dt = 2200A/μs, T <sub>j</sub> = 150°C	—	35	—	nS

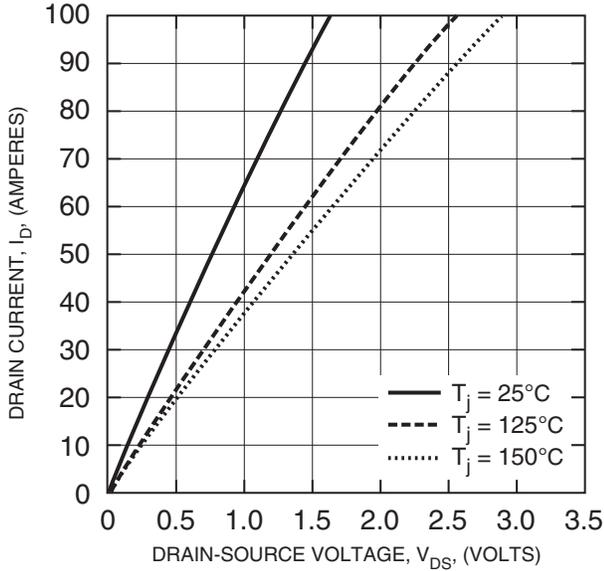
**Thermal and Mechanical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction-to-Case <sup>*3</sup>	R <sub>th(j-c)</sub>	MOSFET Part	—	—	0.24	°C/W
Thermal Resistance, Junction-to-Case <sup>*3</sup>	R <sub>th(j-c)</sub>	Diode Part	—	—	0.39	°C/W
Contact Thermal Resistance	R <sub>th(c-s)</sub>	Per 1/2 Module, Thermal Grease Applied	—	0.04	—	°C/W
Internal Inductance	L <sub>int</sub>	MOSFET Part	—	10	—	nH

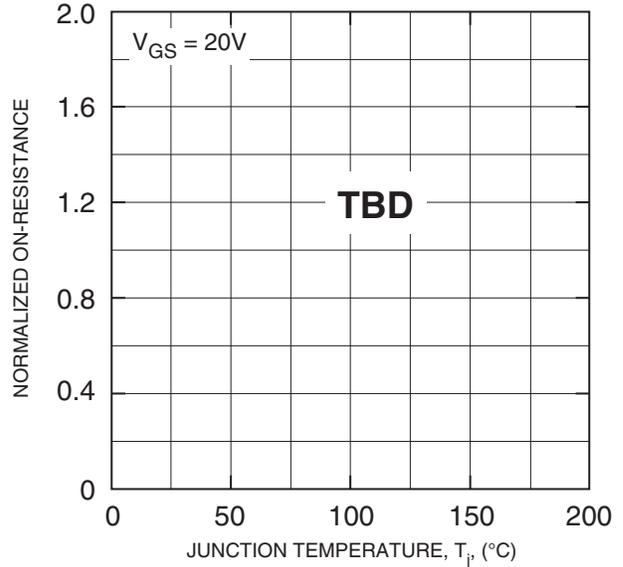
\*3 Case temperature (T<sub>C</sub>) and heatsink (T<sub>S</sub>) are defined on the surface of the baseplate and heatsink at just under the chip.

**QJD1210SA1**  
**Split Dual SiC MOSFET Module**  
 100 Amperes/1200 Volts

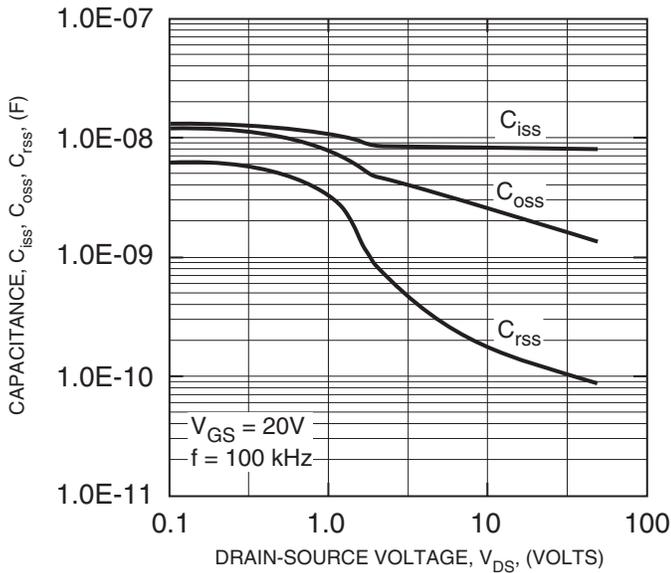
**TYPICAL OUTPUT CHARACTERISTICS (TYPICAL)**



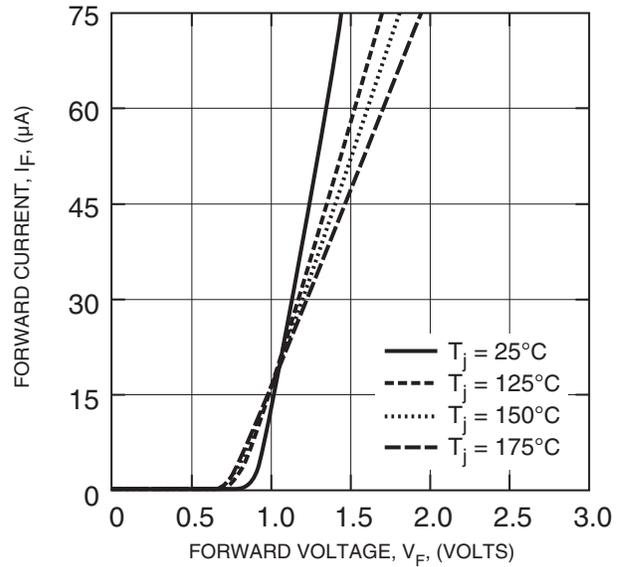
**NORMALIZED ON-RESISTANCE VS. TEMPERATURE**



**TYPICAL CAPACITANCE VS. DRAIN-SOURCE VOLTAGE**



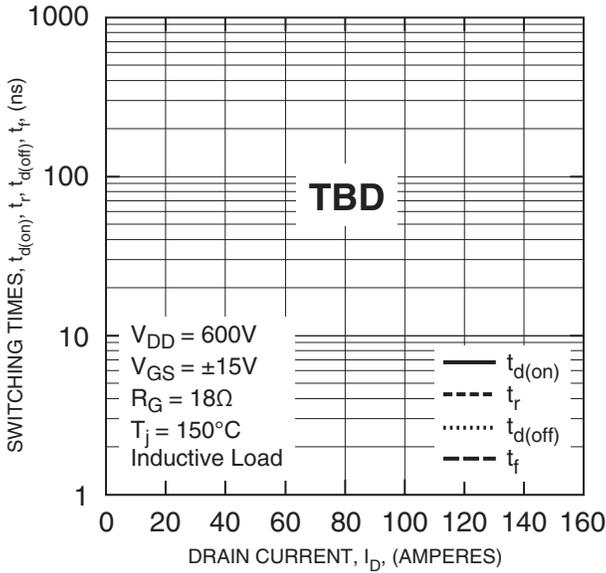
**FREE-WHEEL SCHOTTKY DIODE FORWARD CHARACTERISTICS (TYPICAL)**



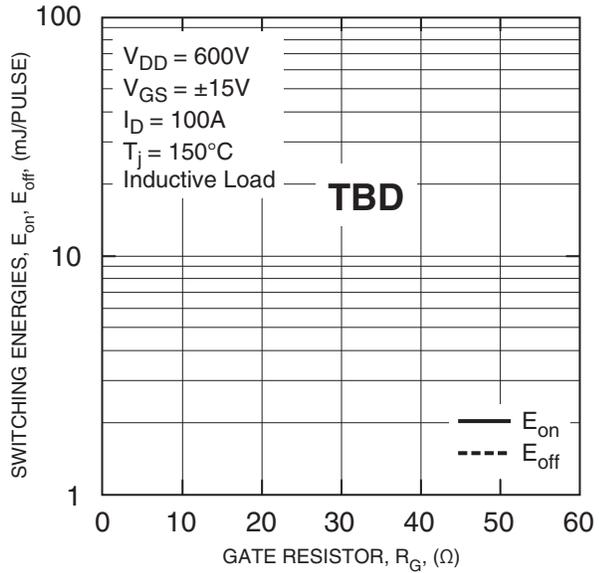
Information presented is based upon manufacturers testing and projected capabilities. This information is subject to change without notice. The manufacturer makes no claim as to the suitability of use, reliability, capability, or future availability of this product.

**QJD1210SA1**  
**Split Dual SiC MOSFET Module**  
 100 Amperes/1200 Volts

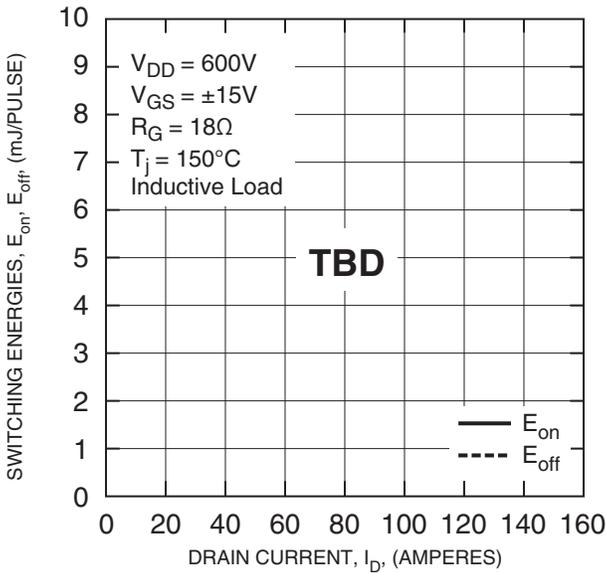
**SWITCHING TIME CHARACTERISTICS (TYPICAL)**



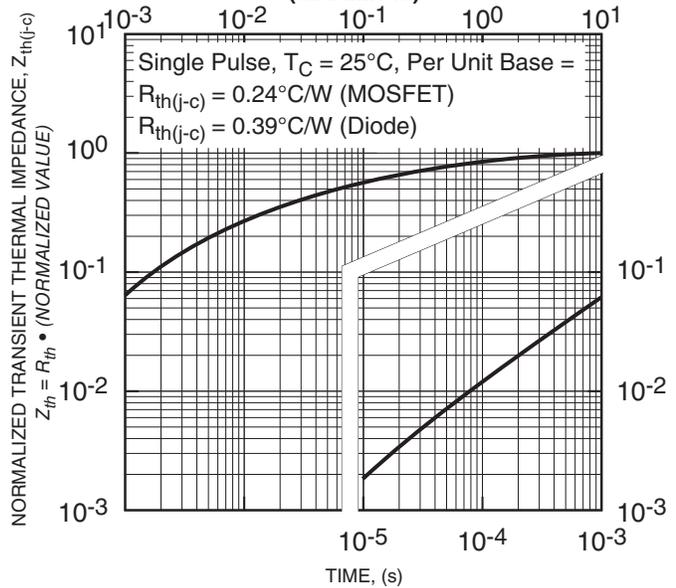
**SWITCHING ENERGY CHARACTERISTICS (TYPICAL)**



**SWITCHING ENERGY CHARACTERISTICS (TYPICAL)**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (MAXIMUM)**



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.