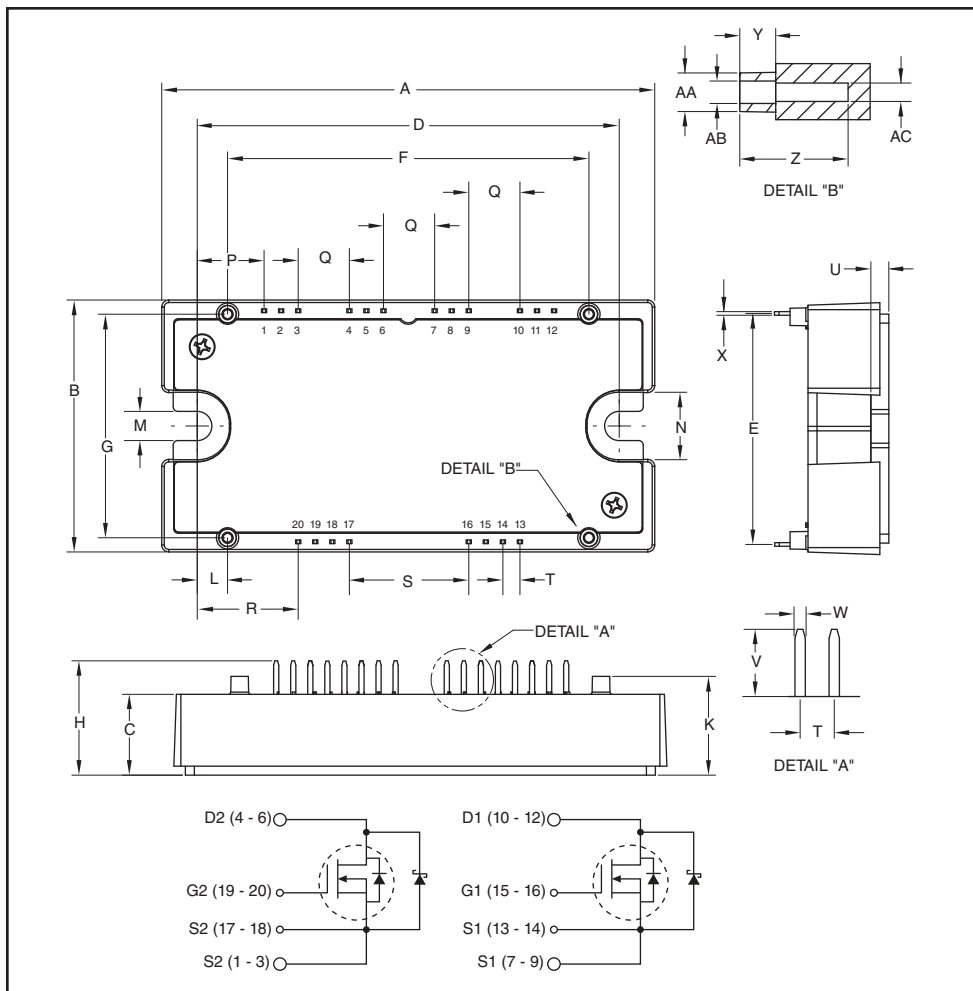


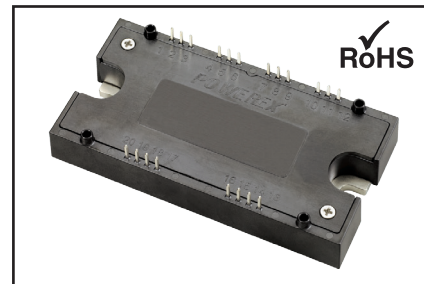
Split Dual SiC MOSFET Module 100 Amperes/1200 Volts



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.



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
- ☐ AlSiC 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

QJD1210SA2
Split Dual SiC MOSFET Module
100 Amperes/1200 Volts

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

Ratings	Symbol	QJD1210SA2	Units
Drain-Source Voltage ($V_{GS} = -10\text{V}$)	V_{DSS}	1200	Volts
Gate-Source Voltage (D-S Short)	V_{GSS}	± 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	415	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)	—	140	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.

QJD1210SA2
Split Dual SiC MOSFET Module
100 Amperes/1200 Volts

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

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

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

QJD1210SA2
Split Dual SiC MOSFET Module
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Reverse Schottky Diode Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

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

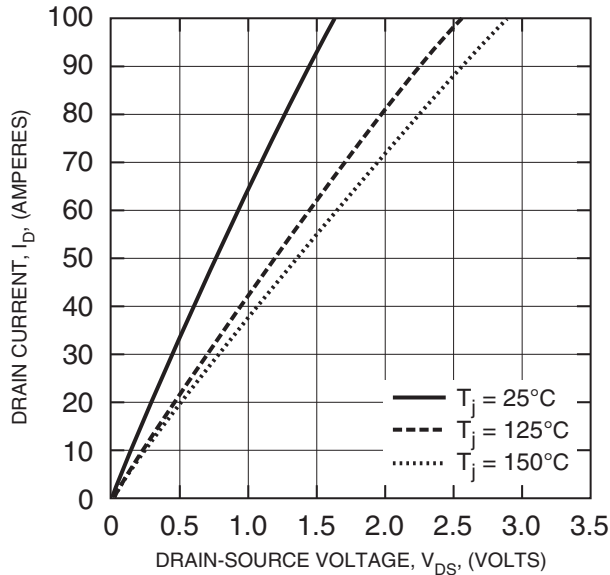
Thermal and Mechanical Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction-to-Case ^{*3}	R _{th(j-c)}	MOSFET Part	—	—	0.29	°C/W
Thermal Resistance, Junction-to-Case ^{*3}	R _{th(j-c)}	Diode Part	—	—	0.47	°C/W
Contact Thermal Resistance	R _{th(c-s)}	Per 1/2 Module, Thermal Grease Applied	—	0.04	—	°C/W
Internal Inductance	L _{int}	MOSFET Part	—	10	—	nH

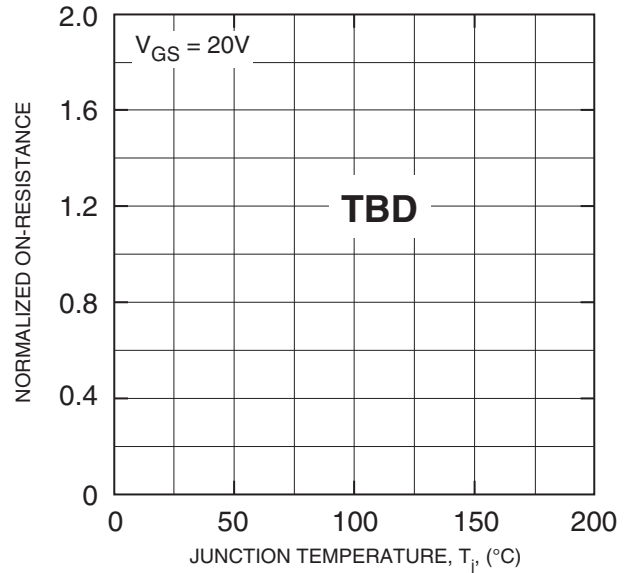
^{*3} Case temperature (T_C) and heatsink (T_S) are defined on the surface of the baseplate and heatsink at just under the chip.

QJD1210SA2
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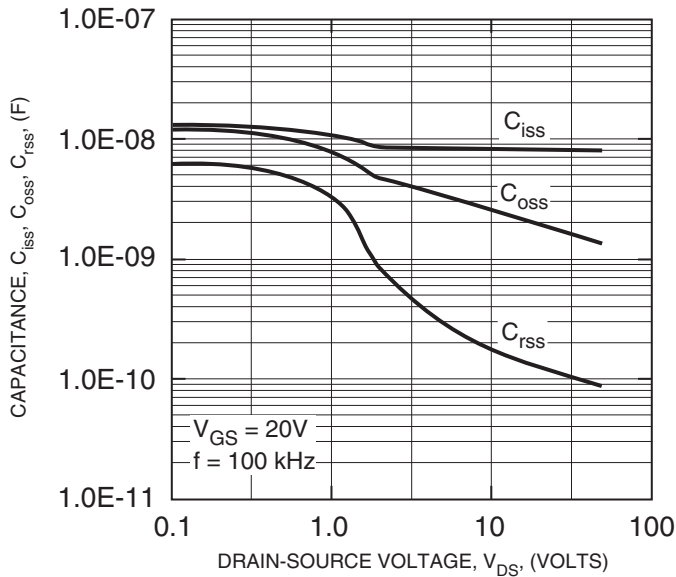
**TYPICAL OUTPUT CHARACTERISTICS
 (TYPICAL)**



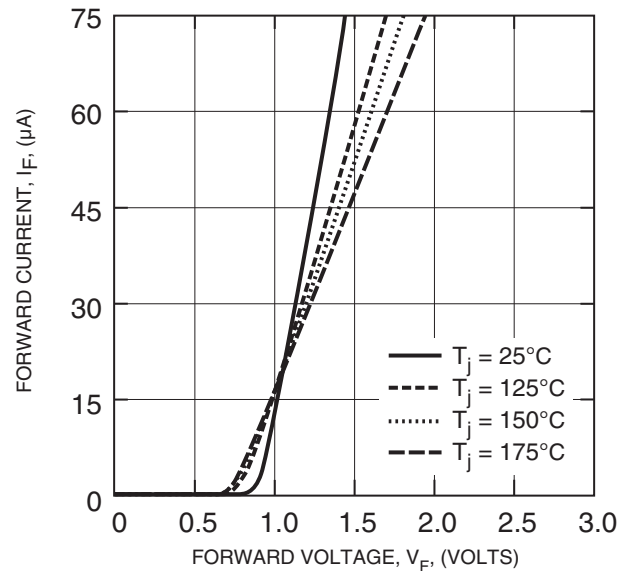
**NORMALIZED ON-RESISTANCE
 VS. TEMPERATURE**



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

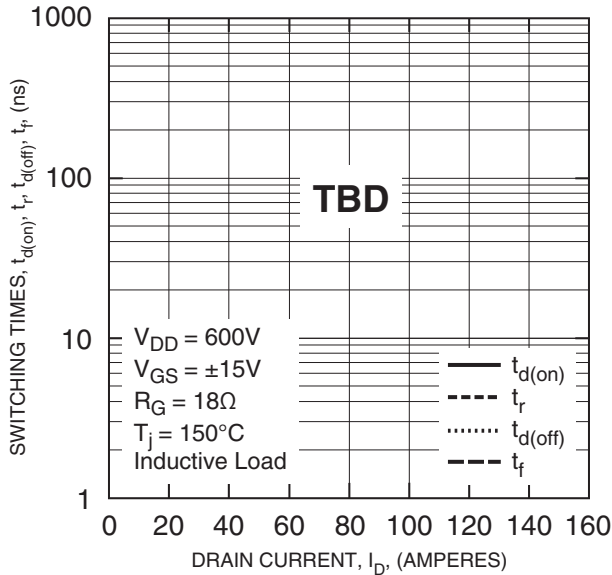


**FREE-WHEEL SCHOTTKY DIODE
 FORWARD CHARACTERISTICS
 (TYPICAL)**

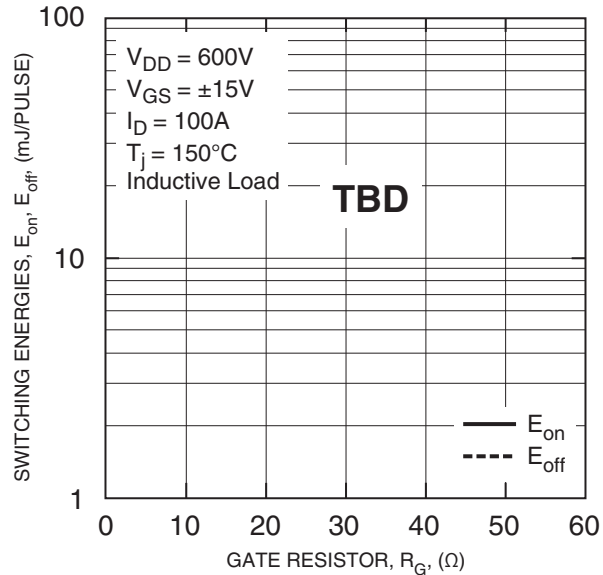


QJD1210SA2
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 100 Amperes/1200 Volts

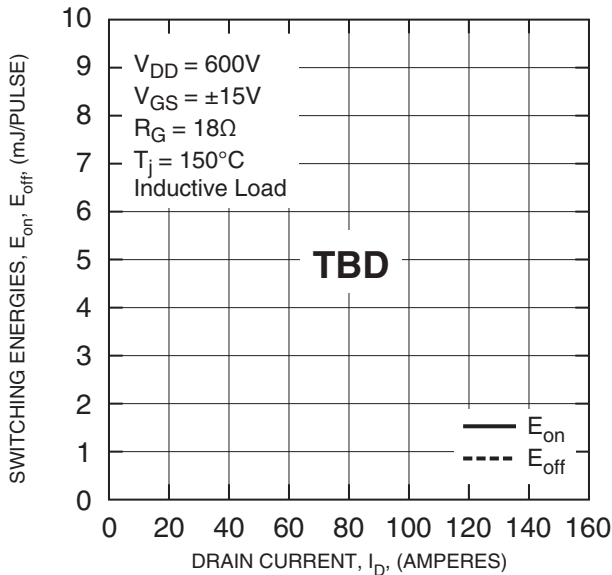
SWITCHING TIME CHARACTERISTICS (TYPICAL)



SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (MAXIMUM)

