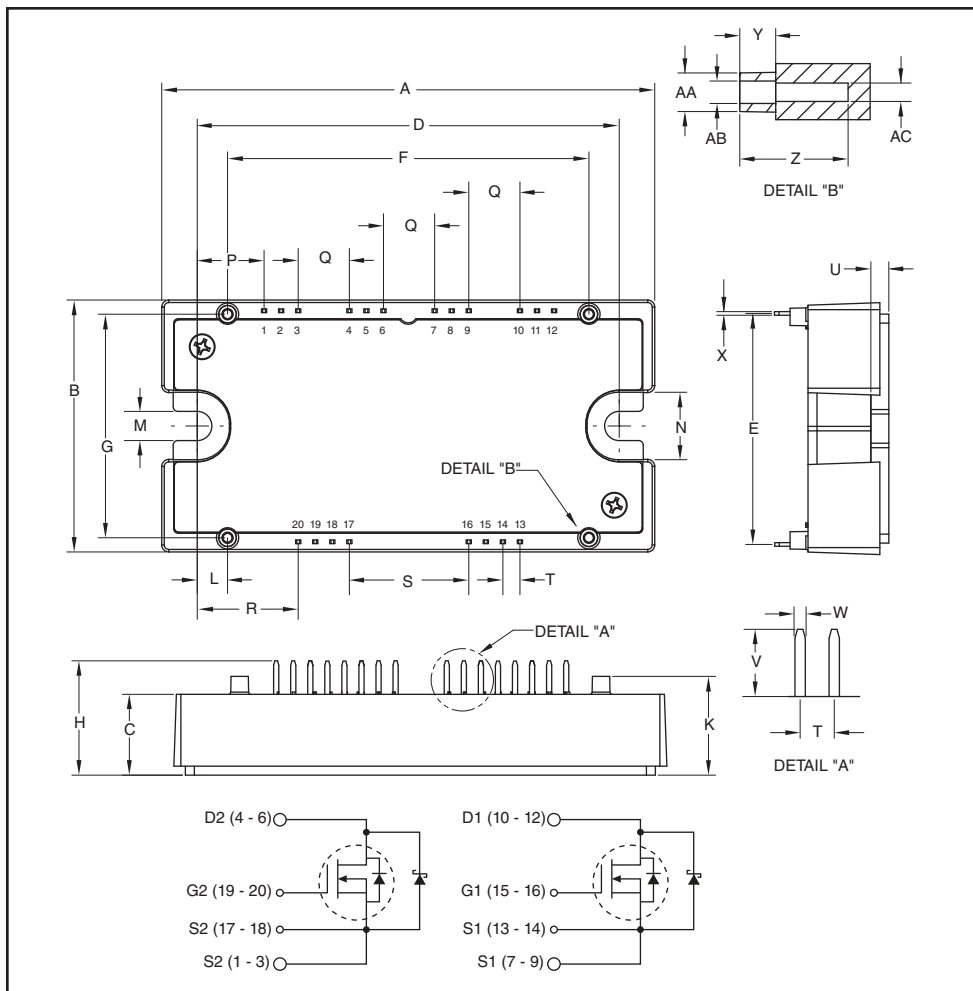


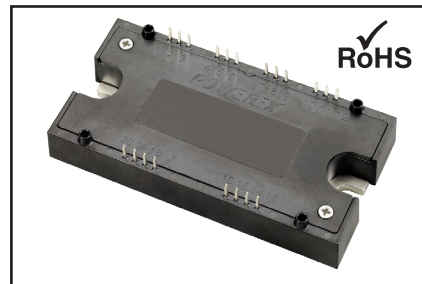
Split Dual SiC MOSFET Module 150 Amperes/1200 Volts



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:

- ☐ Junction Temperature: 175°C
- ☐ Silicon Carbide Chips
- ☐ Low Internal Inductance
- ☐ Industry Leading RDS(on)
- ☐ High Speed Switching
- ☐ Low Switching Losses
- ☐ Low Capacitance
- ☐ Low Drive Requirement
- ☐ Fast 150A 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

QJD1215001
Split Dual SiC MOSFET Module
150 Amperes/1200 Volts

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

Ratings	Symbol	QJD1215001	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 $T_C = 150^\circ\text{C}$	I_D	150	Amperes
Drain Current (Pulsed)*	$I_{D(\text{pulse})}$	300	Amperes
Maximum Power Dissipation ($T_C = 25^\circ\text{C}$, $T_j < 175^\circ\text{C}$)	P_D	1130	Watts
Junction Temperature	T_j	-40 to 175	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 150	$^\circ\text{C}$
Mounting Torque, M6 Mounting Screws	—	40	in-lb
Module Weight (Typical)	—	270	Grams
V Isolation Voltage	V_{RMS}	3000	Volts

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

QJD1215001
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MOSFET Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain-Source Leakage Current**	I_{DSS}	$V_{GS} = -10V, V_{DS} = 1200V$	—	0.15	50	μA
Drain-Source Leakage Current**	I_{DSS}	$V_{GS} = -10V, V_{DS} = 1200V, T_j = 175^\circ\text{C}$	—	0.40	135	μA
Gate Leakage Current	I_{GSS}	$V_{DS} = 0, V_{GS} = \pm 20V$	—	—	5.0	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 15mA$	0.9	1.2	1.7	Volts
Drain-Source On Resistance	$R_{DS(on)}$	$I_D = 150A, V_{GS} = 15V, T_j = 25^\circ\text{C}$	—	11	—	$m\Omega$
		$I_D = 150A, V_{GS} = 15V, T_j = 175^\circ\text{C}$	—	17	—	$m\Omega$
Total Gate Charge	Q_G	$V_{CC} = 600V, I_D = 150A, V_{GS} = 0 \text{ to } 15V$	—	500	—	nC
Input Capacitance	C_{iss}	$V_{GS} = 0, V_{DS} = 10V, f = 100 \text{ kHz}$	—	10.0	—	nF
Output Capacitance	C_{oss}		—	4.5	—	nF
Reverse Transfer Capacitance	C_{rss}		—	0.65	—	nF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 600V, I_D = 150A,$ $V_{GS} = \pm 15V,$	—	83	—	ns
Rise Time	t_r		—	83	—	ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 15\Omega, T_j = 150^\circ\text{C},$ Inductive Load	—	385	—	ns
Fall Time	t_f		—	63	—	ns
Turn-on Switching Energy	E_{on}	Inductive Load	—	9.2	—	mJ
Turn-off Switching Energy	E_{off}		—	4.4	—	mJ

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

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

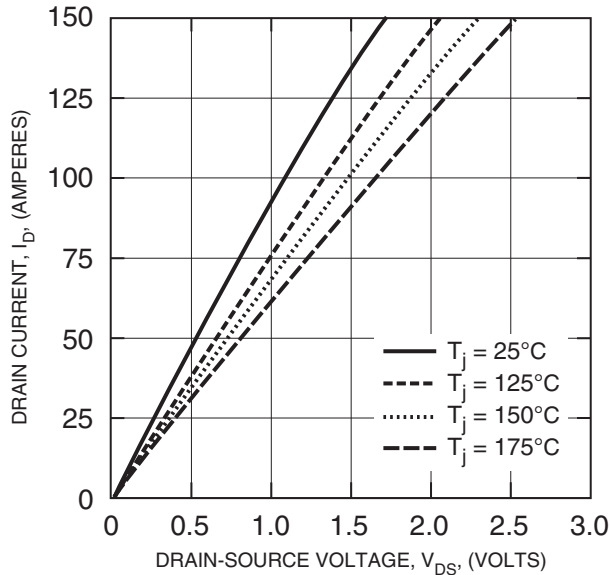
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Diode Forward Voltage	V _{FM}	I _F = 150A, V _{GS} = 0V	—	1.45	1.75	Volts
		I _F = 150A, V _{GS} = -5V, T _j = 175°C	—	1.95	2.35	Volts
Diode Capacitive Charge	Q _C	V _R = 600V, I _F = 150A, di/dt = 2200A/μs, T _j = 175°C	—	550	—	nC

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

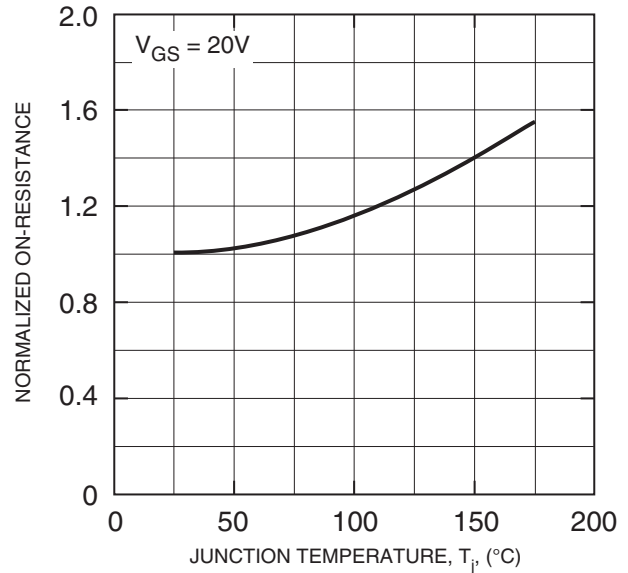
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction-to-Case	R _{th(j-c)}	MOSFET Part	—	—	0.133	°C/W
Thermal Resistance, Junction-to-Case	R _{th(j-c)}	Diode Part	—	—	0.190	°C/W
Contact Thermal Resistance	R _{th(c-s)}	Per 1/2 Module, Thermal Grease Applied	—	0.04	—	°C/W
Internal Inductance	L _{int}	MOSFET Part	—	10	—	nH
Internal Gate Resistance	R _G	MOSFET Part	—	1.2	—	Ω

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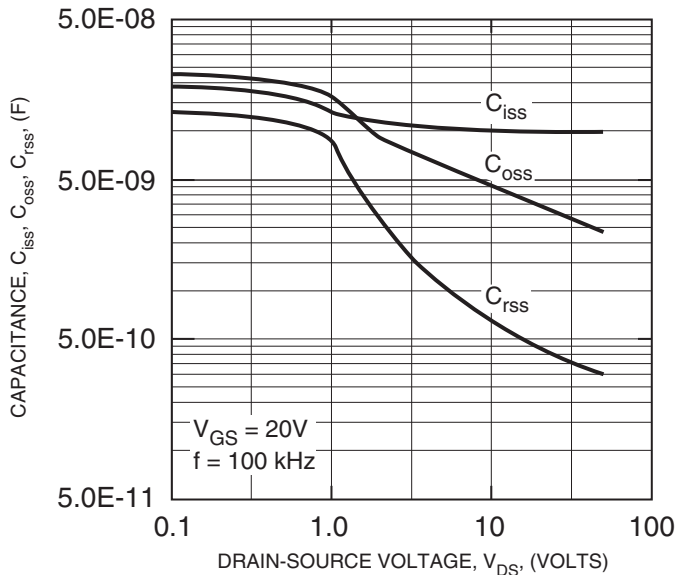
**TYPICAL OUTPUT CHARACTERISTICS
(TYPICAL)**



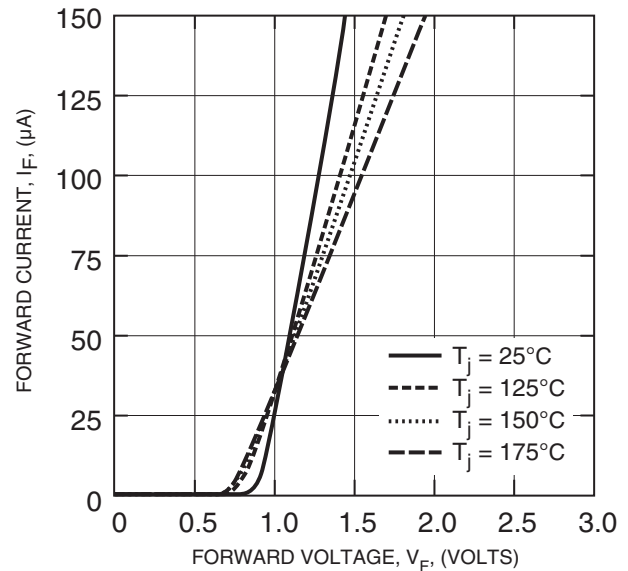
**NORMALIZED ON-RESISTANCE
VS. TEMPERATURE**



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

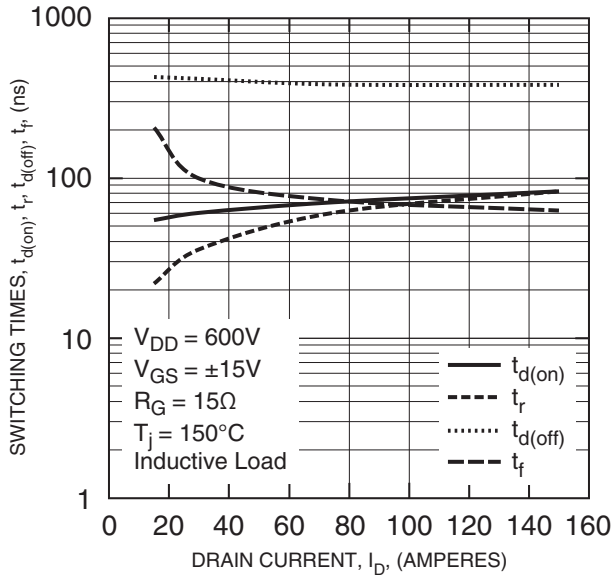


**FREE-WHEEL SCHOTTKY DIODE
FORWARD CHARACTERISTICS
(TYPICAL)**

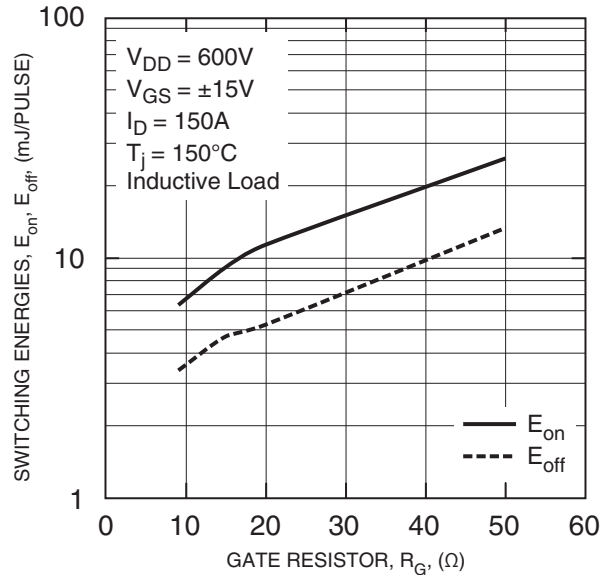


QJD1215001
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 150 Amperes/1200 Volts

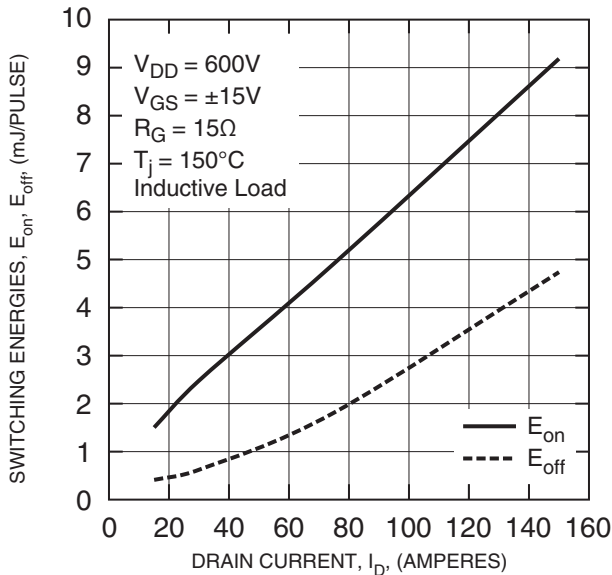
SWITCHING TIME CHARACTERISTICS (TYPICAL)



SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (MAXIMUM)

