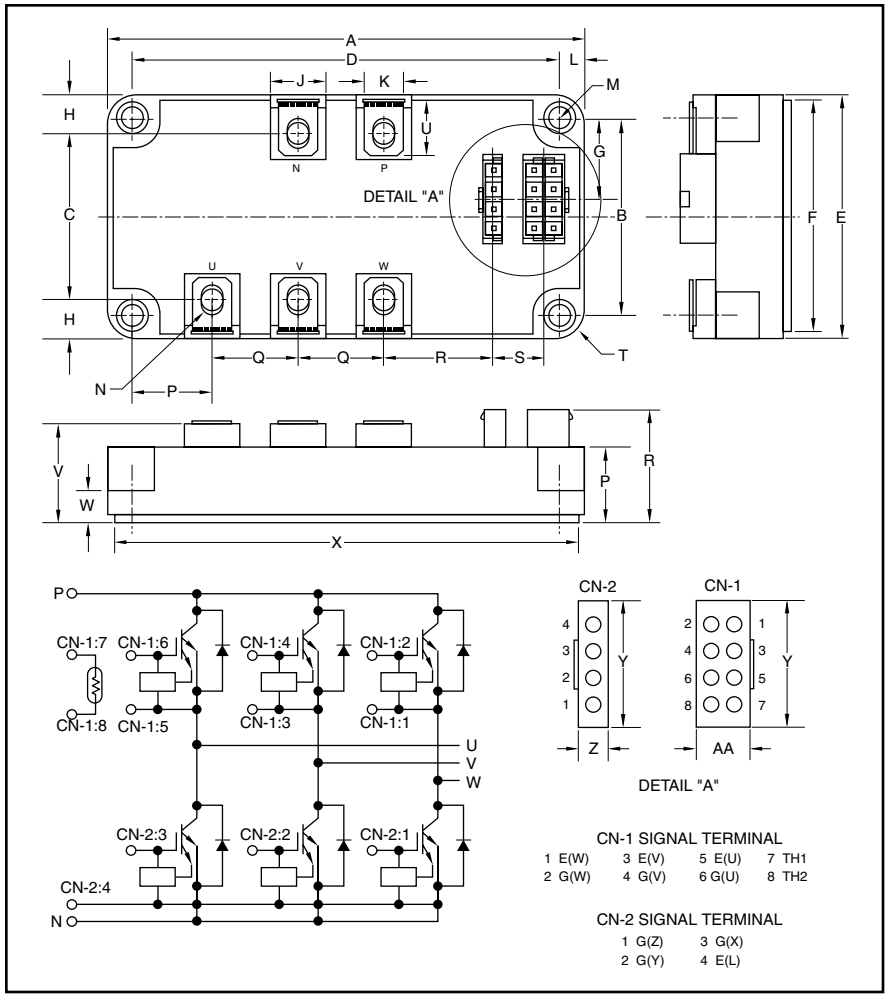
Powerex, Inc., 200 E. Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

Six IGBTMOD™ Compact IGBT Series Module

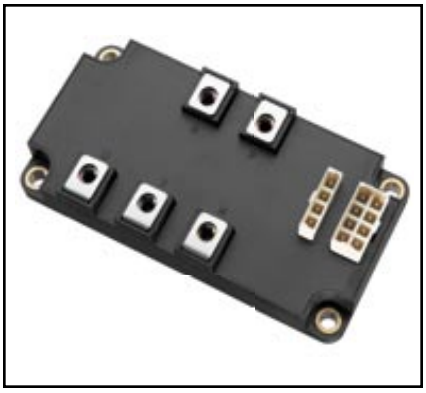
200 Amperes/600 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.80±0.04	122.0±1.0
B	1.97±0.01	50.0±0.3
C	1.61±0.03	42.0±0.8
D	4.33±0.01	110.0±0.3
E	2.44±0.04	62.0±1.0
F	2.32±0.02	59.0±0.5
G	0.81±0.03	20.5±0.8
H	0.39±0.03	10.0±0.8
J	0.55	14.0
K	0.39	10.0
L	0.24	6.0
M	0.22 Dia.	5.5 Dia.
N	M5	M5

Dimensions	Inches	Millimeters
P	0.79±0.03	20.0±0.8
Q	0.86±0.03	22.0±0.8
R	1.12±0.03	28.5±0.8
S	0.55±0.03	13.9±0.8
T	0.24 Rad.	6.0 Rad.
U	0.53	13.6
V	1.02 -0.01/+0.04	26.0-0.3/+1.0
W	0.32	8.2
X	4.69±0.02	119.0±0.5
Y	0.88	22.5
Z	0.21	5.35
AA	0.42	10.7



Description:
Powerex Six IGBTMOD™ Compact IGBT Series Modules are designed for use in switching applications. Each module consists of two IGBT Transistors in a half-bridge configuration, with each transistor having a reverse-connected super-fast recovery free-wheel diode. All components and interconnects are isolated from the heat sinking baseplate, offering simplified system assembly and thermal management.

Features:
- ☐ Integrated Thermistor
- ☐ Low $V_{CE(sat)}$
- ☐ Isolated Baseplate for Easy Heat Sinking

Applications:
- ☐ AC Motor Control
- ☐ Motion/Servo Control
- ☐ UPS
- ☐ Welding Power Supplies
- ☐ Laser Power Supplies

Ordering Information:
Example: Select the complete part number from the table below -i.e. MG200J6ES61 is a 600V (V_{CES}), 200 Ampere Six IGBTMOD™ Compact IGBT Series Module.

Type	Current Rating Amperes	V_{CES} Volts (x 10)
MG	200	60

MG200J6ES61
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Absolute Maximum Ratings, T_j = 25°C unless otherwise specified

Characteristics	Symbol	MG200J6ES61	Units
Power Device Junction Temperature	T_j	-20 to 150	°C
Storage Temperature	T_{stg}	-40 to 125	°C
Mounting Torque, M5 Mounting Screws	—	31	in-lb
Mounting Torque, M5 Main Terminal Screws	—	31	in-lb
Module Weight (Typical)	—	375	Grams
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	V_{ISO}	2500	Volts

IGBT Inverter Sector

Collector-Emitter Voltage (V_D = 15V, V_{CIN} = 15V)	V_{CES}	600	Volts
Gate-Emitter Voltage	V_{GES}	±20	Volts
Collector Current (T_C = 25°C)	I_C	200	Amperes
Peak Collector Current (T_C = 25°C)	I_{CP}	400	Amperes
Emitter Current (T_C = 25°C)	I_E	200	Amperes
Peak Emitter Current (T_C = 25°C)	I_{EM}	400	Amperes
Collector Dissipation (T_C = 25°C)	P_C	1000	Watts

Electrical and Mechanical Characteristics, T_j = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
IGBT Inverter Sector						
Gate Leakage Current	I_{GES}	V_{GE} = 20V, V_{CE} = 0V	—	—	±500	nA
Collector-Emitter Cutoff Current	I_{CES}	V_{GE} = 0V, V_{CE} = 600V	—	—	1.0	mA
Gate-Emitter Cutoff Voltage	$V_{GE(off)}$	V_{CE} = 5V, I_C = 200mA	5.0	6.5	8.0	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE} = 15V, I_C = 200A, T_j = 25°C	—	2.0	2.4	Volts
		V_{GE} = 15V, I_C = 200A, T_j = 125°C	—	—	2.6	Volts
Input Capacitance	C_{ies}	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz	—	40,000	—	pF
Inductive Load	$t_{d(on)}$	V_{CC} = 300V, I_C = 200A, V_{GE} = ±15V, R_G = 10Ω	—	—	1.0	µs
Switching	t_{off}		—	—	1.2	µs
Times	t_f		—	—	0.5	µs
Reverse Recovery Time	t_{rr}		—	—	0.3	µs
Emitter-Collector Voltage	V_{EC}	I_E = 200A	—	2.2	2.6	Volts

Thermal Characteristics

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Units
Zero Power Resistance	R25	I_{TM} = 0.2mA		100	—	kΩ
B Value	B25/85	T_C = 25°C/T_C = 85°C	—	4390	—	K
Junction to Case Thermal Resistance	$R_{th(j-c)Q}$	IGBT (Per 1/6 Module)	—	—	0.125	°C/Watt
	$R_{th(j-c)D}$	FWDi (Per 1/6 Module)	—	—	0.195	°C/Watt
Contact Thermal Resistance	$R_{th(c-f)}$	—	—	0.05	—	°C/Watt

Recommended Conditions for Use

Characteristic	Symbol	Condition	Value	Units
Supply Voltage	V_{CC}	Applied across P-N Terminals	≤400	Volts
Gate Voltage	V_{GE}	—	13.5 ~ 16.5	Volts
Switching Frequency	f_C	—	0 ~ 20	kHz

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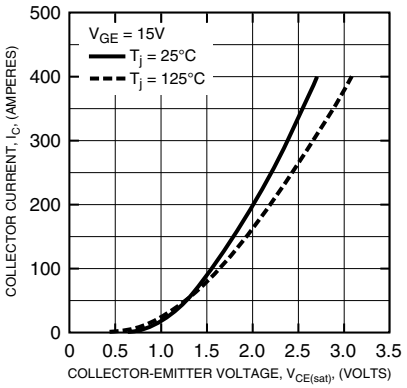
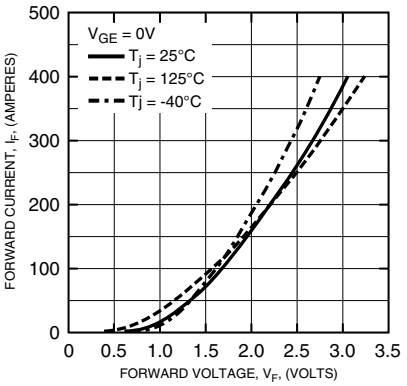
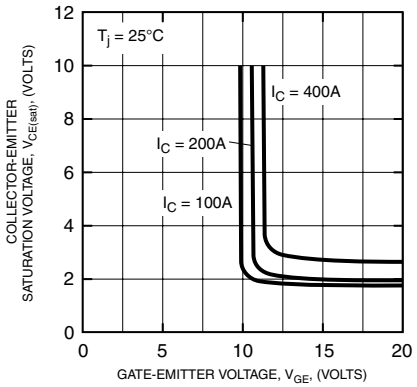
OUTPUT CHARACTERISTICS (TYPICAL)



FREE-WHEEL DIODE CHARACTERISTICS (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



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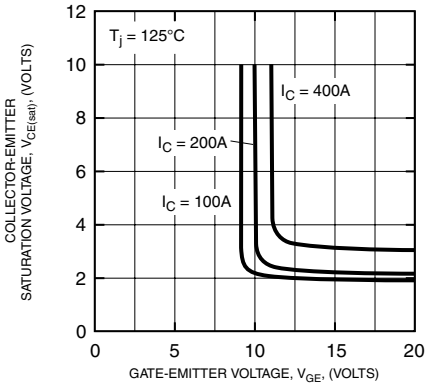
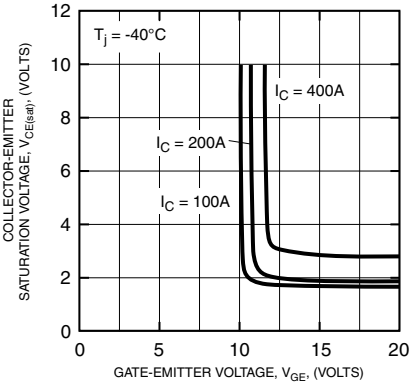
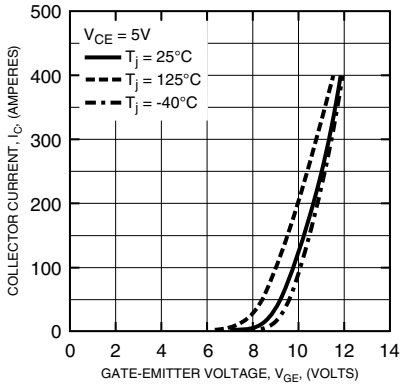


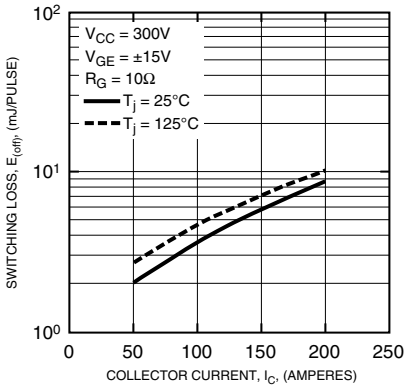
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



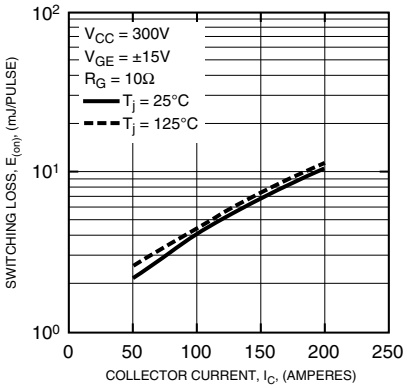
TRANSFER CHARACTERISTICS (TYPICAL)



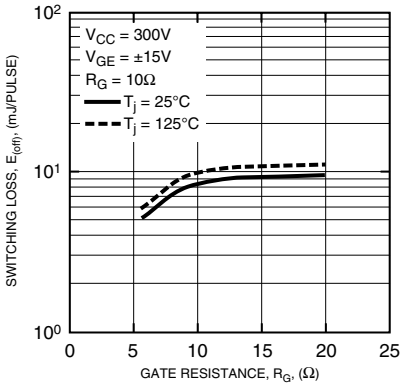
SWITCHING LOSS (OFF) VS. COLLECTOR CURRENT (TYPICAL)



SWITCHING LOSS (ON) VS. COLLECTOR CURRENT (TYPICAL)



SWITCHING LOSS (OFF) VS. GATE RESISTANCE (TYPICAL)



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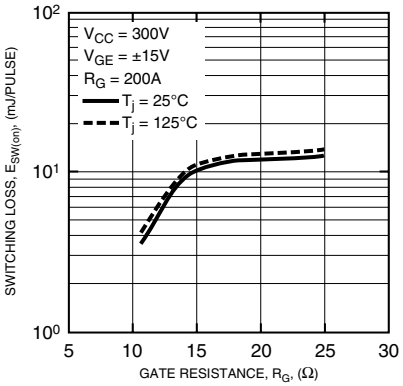
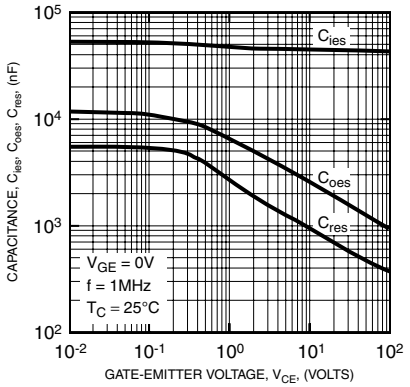
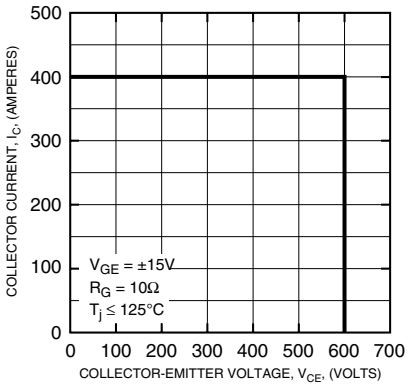
SWITCHING LOSS (ON) VS. GATE RESISTANCE (TYPICAL)



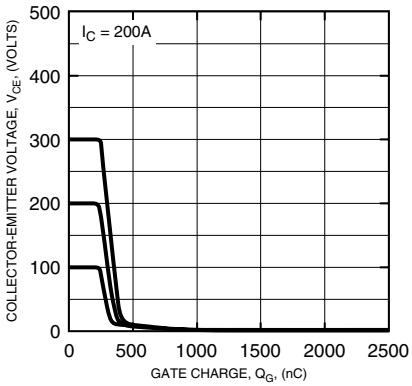
CAPACITANCE VS. COLLECTOR-EMITTER VOLTAGE (TYPICAL)



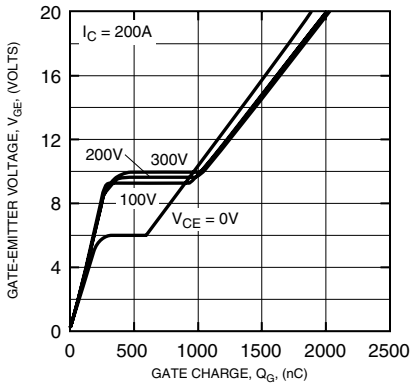
REVERSE BIAS SAFE OPERATION AREA (TYPICAL)



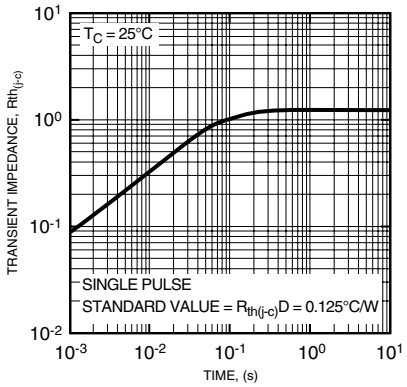
GATE CHARGE VS. COLLECTOR-EMITTER VOLTAGE (TYPICAL)



GATE CHARGE VS. GATE-EMITTER VOLTAGE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi)