Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
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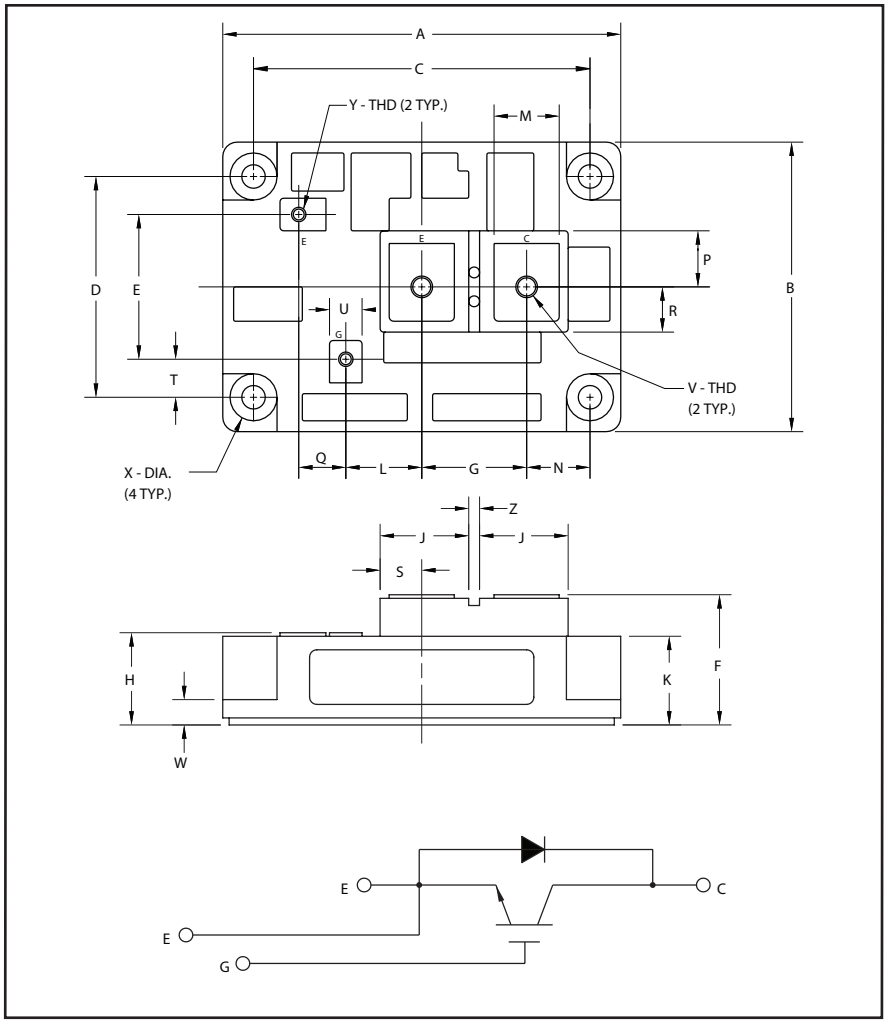
Single IGBTMOD™ A-Series Module
600 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.33	110.0
B	3.15	80.0
C	3.66±0.008	93.0±0.25
D	2.44±0.008	62.0±0.25
E	1.57	40.0
F	1.42 Max.	36.0 Max.
G	1.14	29.0
H	1.00 Max.	25.5 Max
J	0.94	24.5
K	0.94	24.5
L	0.83	21.0
M	0.71	18.0

Dimensions	Inches	Millimeters
N	0.69	17.5
P	0.61	15.5
Q	0.51	13.0
R	0.49	12.5
S	0.45	11.5
T	0.43	11.0
U	0.35	9.0
V	M8 Metric	M8
W	0.28	7.0
X	0.256 Dia.	6.50 Dia.
Y	M4 Metric	M4
Z	0.12	3.04

Description:
Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of one IGBT Transistor in a single configuration with 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:
- ☐ Low Drive Power
- ☐ Low $V_{CE(sat)}$
- ☐ Discrete Super-Fast Recovery Free-Wheel Diode
- ☐ Isolated Baseplate for Easy Heat Sinking

Applications:
- ☐ DC Chopper
- ☐ Inverter
- ☐ UPS
- ☐ Forklift

Ordering Information:
Example: Select the complete part module number you desire from the table below -i.e. CM600HB-24A is a 1200V (V_{CES}), 600 Ampere Single IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	600	24

CM600HB-24A
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Absolute Maximum Ratings, T_j = 25°C unless otherwise specified

Ratings	Symbol	CM600HB-24A	Units
Junction Temperature	T_j	–40 to 150	°C
Storage Temperature	T_{stg}	–40 to 125	°C
Collector-Emitter Voltage (G-E Short)	V_{CES}	1200	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	±20	Volts
Collector Current (DC, T_C = 80°C)*4	I_C	600	Amperes
Peak Collector Current (Pulse, Repetitive)*2	I_{CM}	1200	Amperes
Maximum Collector Dissipation (T_C = 25°C)*2,*4	P_C	3670	Watts
Emitter Current (T_C = 25°C)	I_E*1	600	Amperes
Peak Emitter Current (Pulse, Repetitive)*2	I_{EM}*1	1200	Amperes
Mounting Torque, M8 Main Terminal	—	95	in-lb
Mounting Torque, M6 Mounting	—	26	in-lb
Mounting Torque, M4 G(E) Terminal	—	13	in-lb
Weight	—	560	Grams
Isolation Voltage (Main Terminal to Baseplate, f = 60Hz, AC 1 min.)	V_{ISO}	2500	Volts

Static Electrical Characteristics, T_j = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{CE} = V_{CES}$, V_{GE} = 0V	—	—	1.0	mA
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}$, V_{CE} = 0V	—	—	1.5	µA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C = 60mA, V_{CE} = 10V	6.0	7.0	8.0	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 600A, V_{GE} = 15V, T_j = 25°C*3	—	2.1	3.0	Volts
		I_C = 600A, V_{GE} = 15V, T_j = 125°C*3	—	2.4	—	Volts
Total Gate Charge	Q_G	V_{CC} = 600V, I_C = 600A, V_{GE} = 15V	—	3000	—	nC
Emitter-Collector Voltage	V_{EC}*1	I_E = 600A, V_{GE} = 0V*3	—	—	3.8	Volts

Dynamic Electrical Characteristics, T_j = 25°C unless otherwise specified

Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance		C_{ies}	V_{CE} = 10V, V_{GE} = 0V	—	—	105	nf
Output Capacitance		C_{oes}		—	—	9	nf
Reverse Transfer Capacitance		C_{res}		—	—	2.0	nf
Inductive	Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 600A, $V_{GE1} = V_{GE2}$ = 15V, R_G = 0.52Ω, Inductive Load Switching Operation, I_E = 600A	—	—	660	ns
Load	Rise Time	t_r		—	—	190	ns
Switch	Turn-off Delay Time	$t_{d(off)}$		—	—	700	ns
Time	Fall Time	t_f		—	—	350	ns
Diode Reverse Recovery Time		t_{rr}*1		—	—	250	ns
Diode Reverse Recovery Charge		Q_{rr}*1		—	19.0	—	µC

*1 Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).
*2 Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.
*3 Pulse width and repetition rate should be such as to cause negligible temperature rise.
*4 Case temperature (T_C), and heatsink temperature (T_f) measured point is just under the chips.

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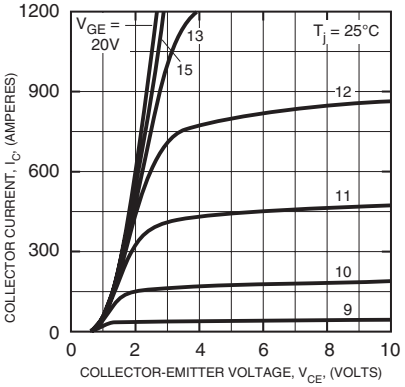
Thermal and Mechanical Characteristics, T_j = 25°C unless otherwise specified

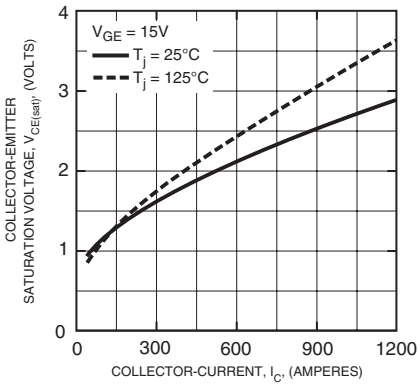
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}Q$	Per IGBT*4	—	—	0.034	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}D$	Per FWDi*4	—	—	0.053	°C/W
Contact Thermal Resistance	$R_{th(c-f)}$	Thermal Grease Applied*4,*5	—	0.02	—	°C/W
External Gate Resistance	R_G		0.52	—	7.8	Ω

*4 Case temperature (T_C), and heatsink temperature (T_f) measured point is just under the chips.
*5 Typical value is measured by using thermally conductive grease of λ = 0.9 [W/(m • K)].

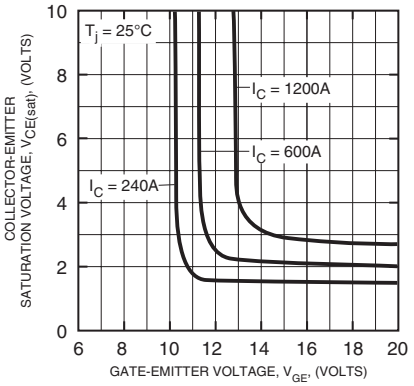
OUTPUT CHARACTERISTICS (TYPICAL)



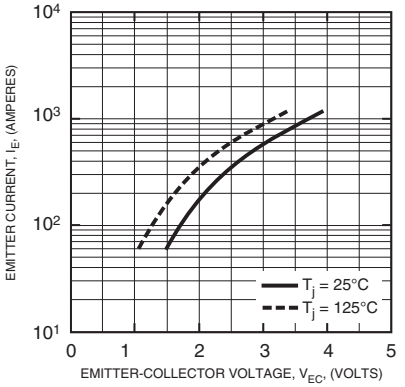
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



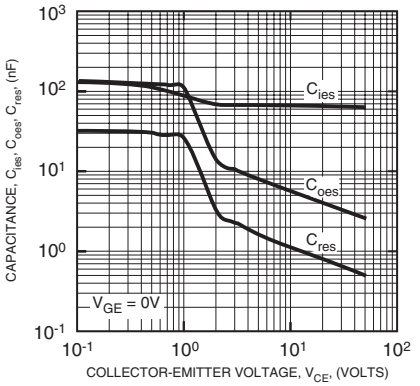
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



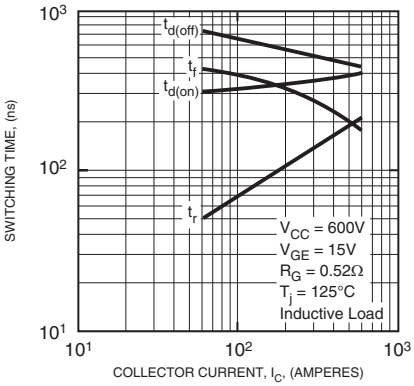
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



CAPACITANCE VS. V_{CE} (TYPICAL)



HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



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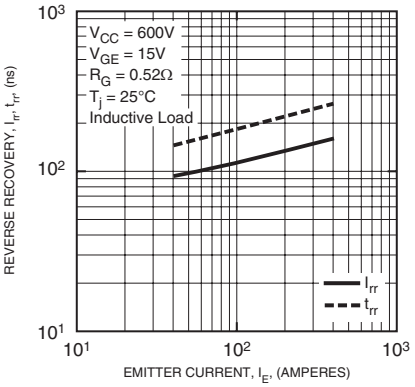
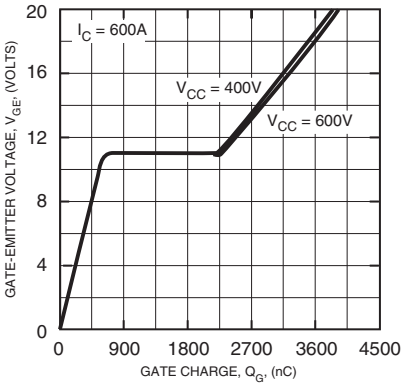
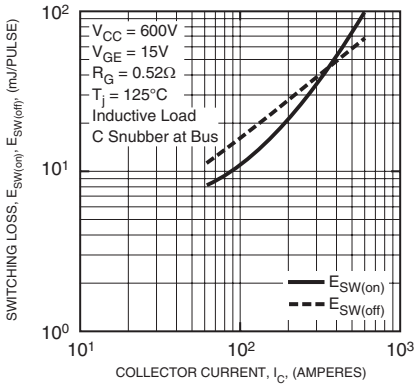
REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



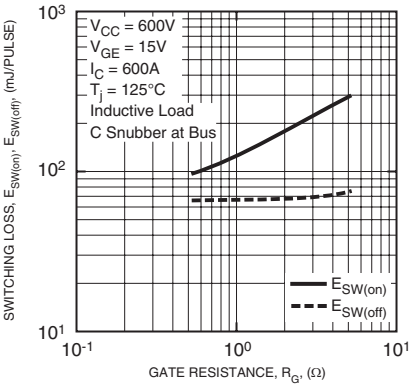
GATE CHARGE VS. V_{GE}



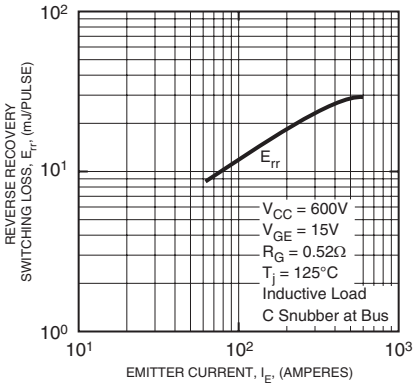
SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)



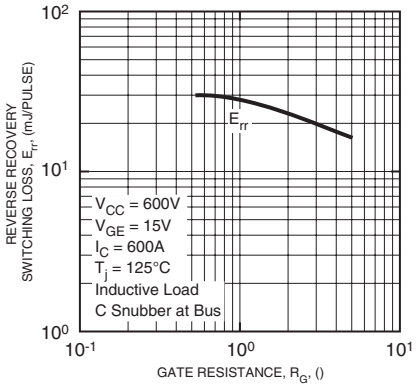
SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



REVERSE RECOVERY SWITCHING LOSS VS. EMITTER CURRENT (TYPICAL)



REVERSE RECOVERY SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDi)