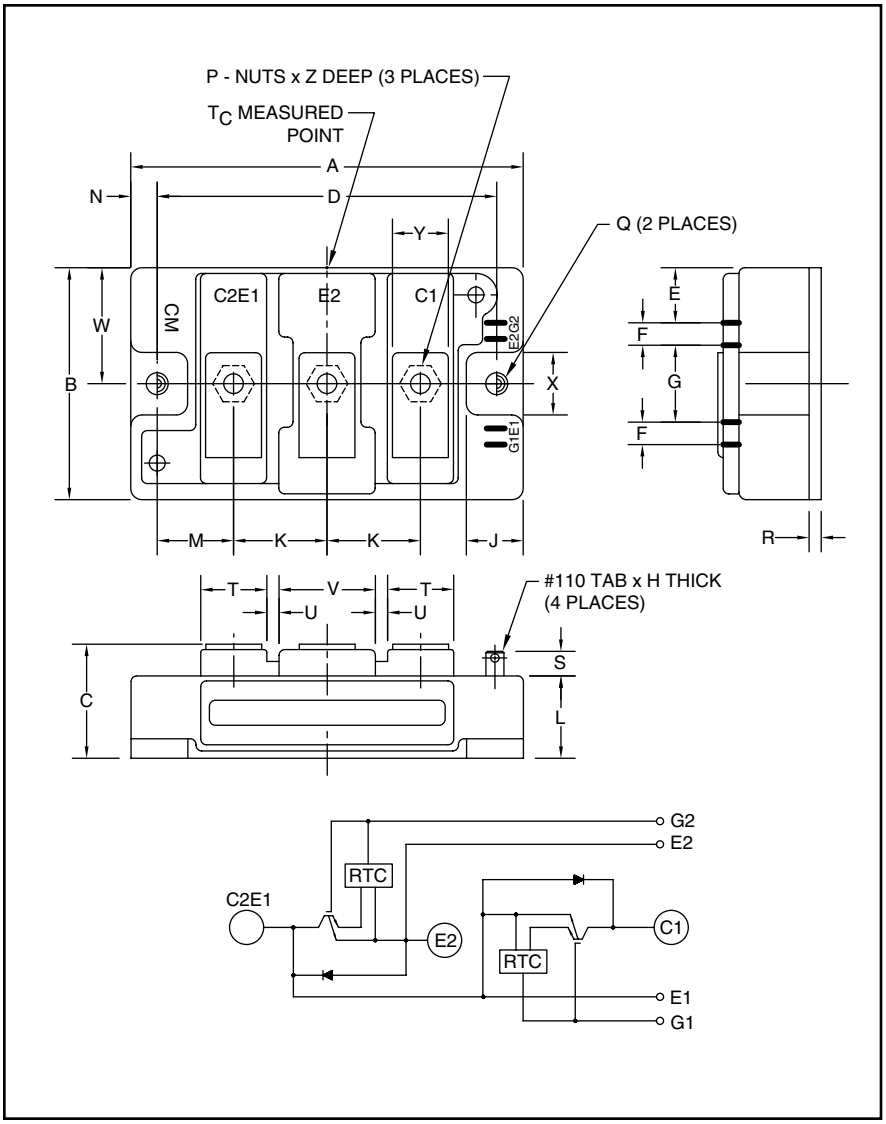
Powerex, Inc., 200 E. Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

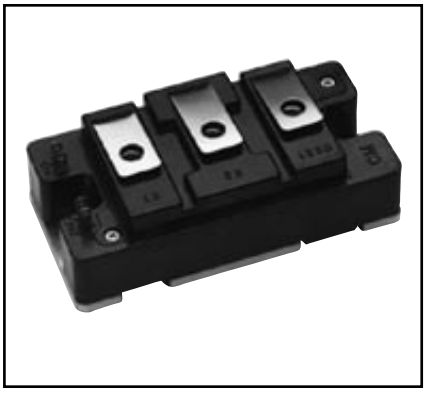
Trench Gate Design Dual IGBTMOD™
100 Amperes/600 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	3.70	94.0
B	1.89	48.0
C	1.18 +0.04/-0.02	30.0 +1.0/-0.5
D	3.15±0.01	80.0±0.25
E	0.43	11.0
F	0.16	4.0
G	0.71	18.0
H	0.02	0.5
J	0.53	13.5
K	0.91	23.0
L	0.83	21.2
M	0.67	17.0

Dimensions	Inches	Millimeters
N	0.28	7.0
P	M6.5	M6.5
Q	0.26 Dia.	6.5 Dia.
R	0.02	4.0
S	0.30	7.5
T	0.63	16.0
U	0.10	2.5
V	1.0	25.0
W	0.94	24.0
X	0.51	13.0
Y	0.47	12.0
Z	0.47	12.0



Description:
Powerex IGBTMOD™ Modules are designed for use in high frequency applications; 30 kHz for hard switching applications and 60 to 70 kHz for soft 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:
- ☐ Low $V_{CE(sat)}$
- ☐ Low $E_{SW(off)}$
- ☐ Discrete Super-Fast Recovery Free-Wheel Diode
- ☐ Isolated Baseplate for Easy Heat Sinking

Applications:
- ☐ Power Supplies
- ☐ Induction Heating
- ☐ Welders

Ordering Information:
Example: Select the complete module number you desire from the table - i.e. CM100DUS-12F is a 600V (V_{CES}), 100 Ampere Dual IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	100	12

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

Ratings	Symbol	CM100DUS-12F	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}	600	Volts
Gate-Emitter Voltage (C-E SHORT)	V_{GES}	±20	Volts
Collector Current (T_c = 25°C)	I_C	100	Amperes
Peak Collector Current	I_{CM}	200*	Amperes
Emitter Current** (T_c = 25°C)	I_E	100	Amperes
Peak Emitter Current**	I_{EM}	200*	Amperes
Maximum Collector Dissipation (T_c = 25°C, $T_j \leq$ 150°C)	P_c	350	Watts
Mounting Torque, M5 Main Terminal	–	31	in-lb
Mounting Torque, M6 Mounting	–	40	in-lb
Weight	–	310	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{iso}	2500	Volts

* Pulse width and repetition rate should be such that the device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.
**Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

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	mA
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}$, V_{CE} = 0V	–	–	20	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C = 10mA, V_{CE} = 10V	5	6	7	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 100A, V_{GE} = 15V, T_j = 25°C	1.7	2.0	2.7	Volts
		I_C = 100A, V_{GE} = 15V, T_j = 125°C	–	1.95	–	Volts
Total Gate Charge	Q_G	V_{CC} = 300V, I_C = 100A, V_{GE} = 15V	–	620	–	nC
Emitter-Collector Voltage**	V_{EC}	I_E = 100A, V_{GE} = 0V	–	–	2.6	Volts

**Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

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	–	–	27	nf
Output Capacitance		C_{oes}		–	–	1.8	nf
Reverse Transfer Capacitance		C_{res}		–	–	1	nf
Resistive	Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 300V, I_C = 100A,	–	–	100	ns
Load	Rise Time	t_r	$V_{GE1} = V_{GE2}$ = 15V,	–	–	80	ns
Switch	Turn-off Delay Time	$t_{d(off)}$	R_G = 6.3Ω, Inductive	–	–	300	ns
Times	Fall Time	t_f	Load Switching Operation	–	–	150	ns
Diode Reverse Recovery Time**		t_{rr}	I_E = 100A	–	–	150	ns
Diode Reverse Recovery Charge**		Q_{rr}		–	1.9	–	μC

**Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

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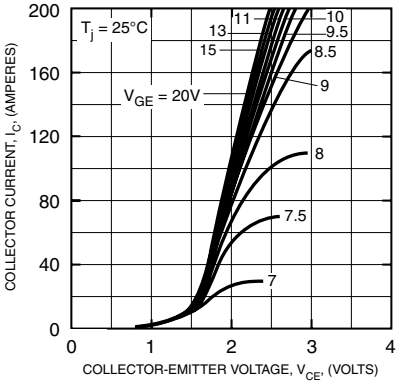
Thermal and Mechanical Characteristics, T_j = 25°C unless otherwise specified

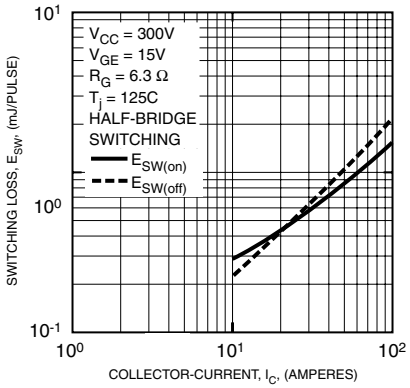
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}Q$	Per IGBT 1/2 Module, T_c Reference Point per Outline Drawing	–		0.35	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}D$	Per FWDi 1/2 Module, T_c Reference Point per Outline Drawing	–	–	0.70	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c')}Q$	Per IGBT 1/2 Module, T_c Reference Point Under Chip	–	0.23**	–	°C/W
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	–	0.07	–	°C/W

** If you use this value, $R_{th(f-a)}$ should be measured just under the chips.

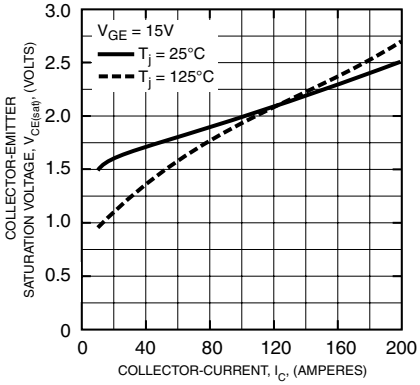
OUTPUT CHARACTERISTICS (TYPICAL)



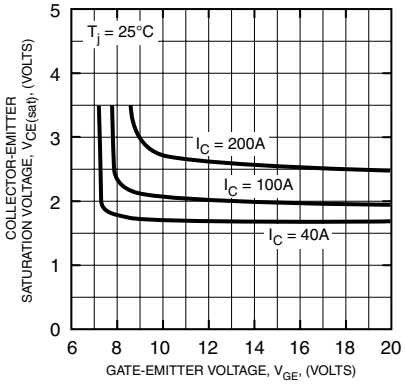
SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)



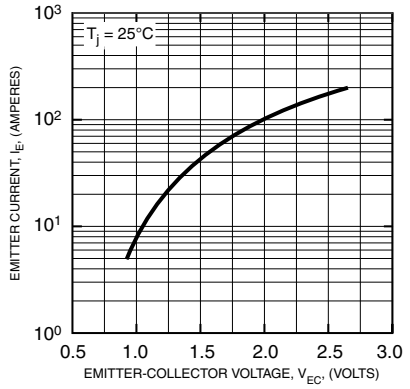
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



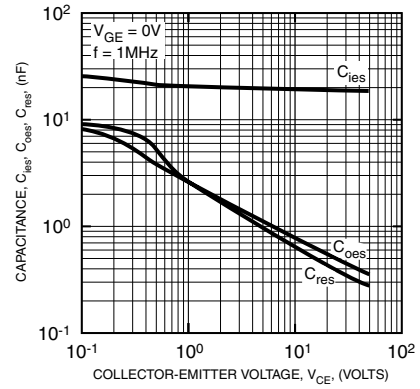
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



CAPACITANCE VS. V_{CE} (TYPICAL)



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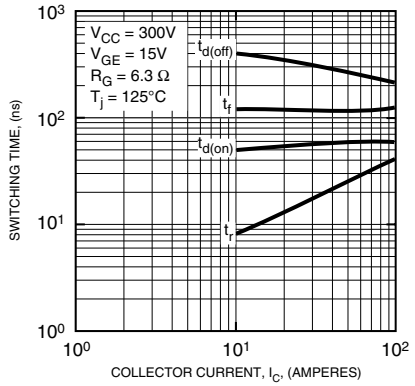
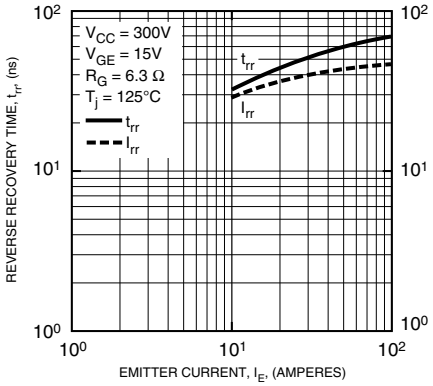
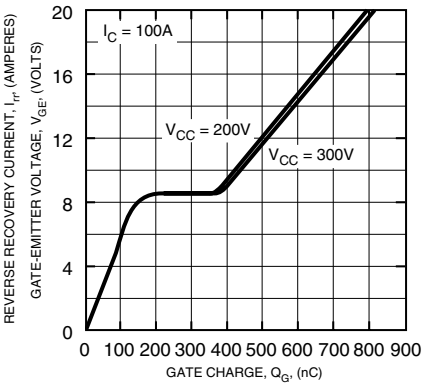
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



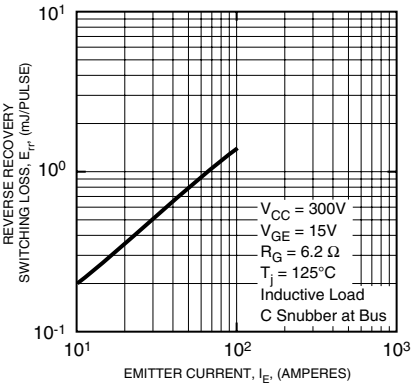
REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



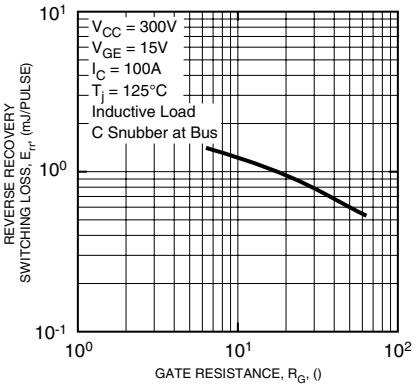
GATE CHARGE, V_{GE}



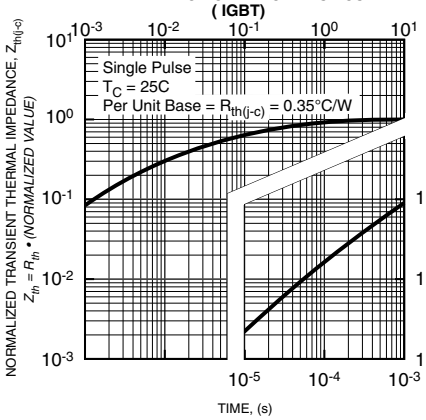
REVERSE RECOVERY SWITCHING LOSS VS. EMITTER CURRENT (TYPICAL)



REVERSE RECOVERY SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi)