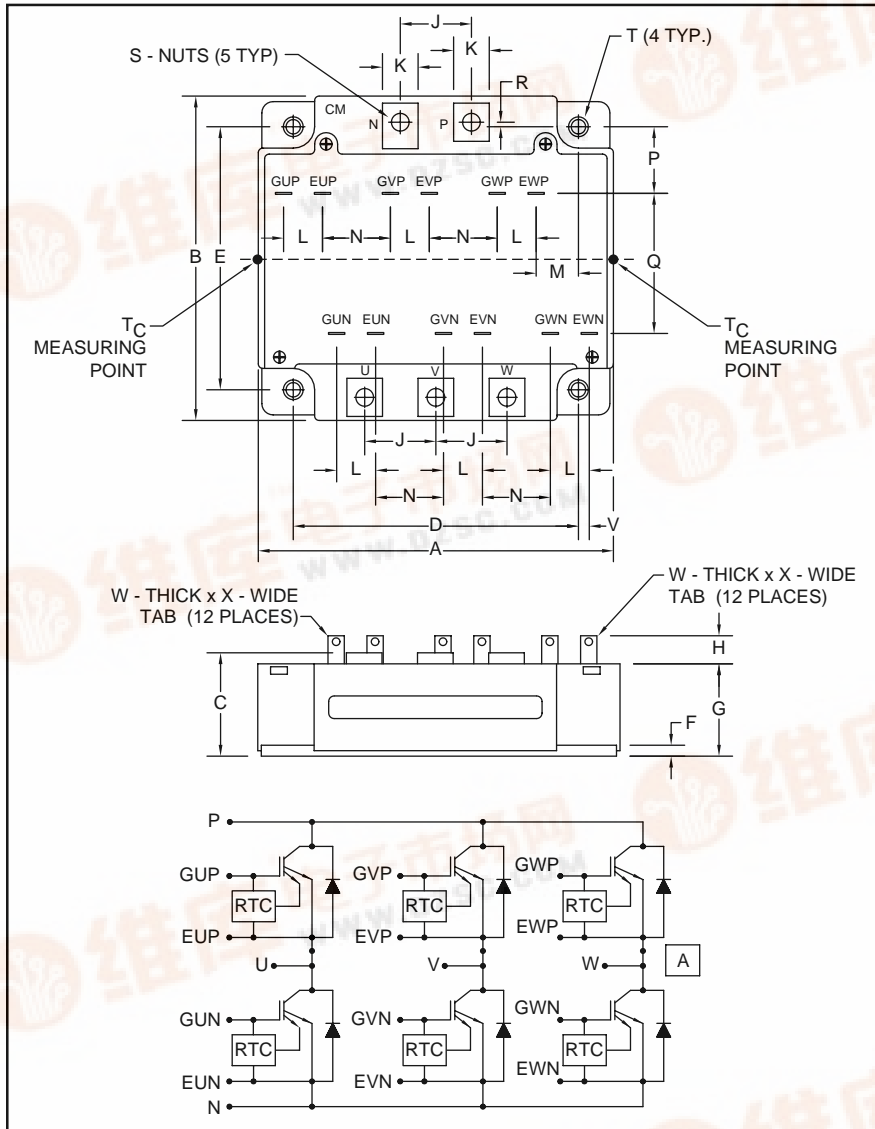




Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

CM200TU-12F

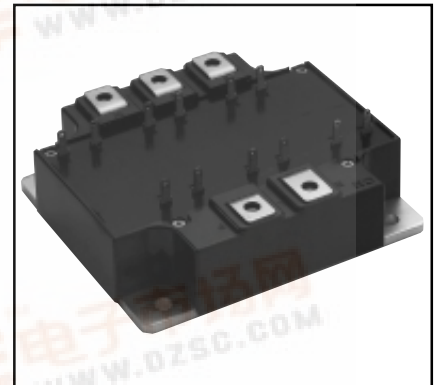
Trench Gate Design Six IGBTMOD™ 200 Amperes/600 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.21	107.0
B	4.02	102.0
C	1.14 +0.04/-0.02	29.0 +1.0/-0.5
D	3.54±0.01	90.0±0.25
E	3.15±0.01	80.0±0.25
F	0.16	4.0
G	1.02	26.0
H	0.31	8.1
J	0.91	23.0
K	0.47	12.0
L	0.43	11.0

Dimensions	Inches	Millimeters
M	0.57	14.4
N	0.85	21.7
P	0.67	17.0
Q	1.91	48.5
R	0.15	3.75
S	M5	M5
T	0.22 Dia.	5.5 Dia.
V	0.03	0.8
W	0.02	0.5
X	0.110	2.79



Description:

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of six IGBT Transistors in a three phase 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 Drive Power
- Low $V_{CE(sat)}$
- Discrete Super-Fast Recovery Free-Wheel Diode
- Isolated Baseplate for Easy Heat Sinking

Applications:

- AC Motor Control
- UPS
- Battery Powered Supplies

Ordering Information:

Example: Select the complete module number you desire from the table - i.e. CM200TU-12F is a 600V (V_{CES}), 200 Ampere Six-IGBT IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	200	12





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CM200TU-12F
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Absolute Maximum Ratings, $T_j = 25\text{ °C}$ unless otherwise specified

Ratings	Symbol	CM200TU-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 ($T_c = 25\text{ °C}$)	I_C	200	Amperes
Peak Collector Current ($T_j \leq 150\text{ °C}$)	I_{CM}	400*	Amperes
Emitter Current**	I_E	200	Amperes
Peak Emitter Current**	I_{EM}	400*	Amperes
Maximum Collector Dissipation ($T_j < 150\text{ °C}$)	P_c	590	Watts
Mounting Torque, M5 Main Terminal	–	31	in-lb
Mounting Torque, M5 Mounting	–	31	in-lb
Weight	–	680	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{iso}	2500	Volts

Static Electrical Characteristics, $T_j = 25\text{ °C}$ 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 Voltage	I_{GES}	$V_{GE} = V_{CES}, V_{CE} = 0V$	–	–	20	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 20mA, V_{CE} = 10V$	5	6	7	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 200A, V_{GE} = 15V, T_j = 25\text{ °C}$	–	1.6	2.2	Volts
		$I_C = 200A, V_{GE} = 15V, T_j = 125\text{ °C}$	–	1.6	–	Volts
Total Gate Charge	Q_G	$V_{CC} = 300V, I_C = 200A, V_{GE} = 15V$	–	1240	–	nC
Emitter-Collector Voltage**	V_{EC}	$I_E = 200A, V_{GE} = 0V$	–	–	2.6	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).



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CM200TU-12F
Trench Gate Design Six IGBTMOD™
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Dynamic Electrical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	C_{ies}		–	–	54	nf
Output Capacitance	C_{oes}	$V_{CE} = 10V, V_{GE} = 0V$	–	–	3.6	nf
Reverse Transfer Capacitance	C_{res}		–	–	2	nf
Inductive	Turn-on Delay Time	$V_{CC} = 300V, I_C = 200A,$ $V_{GE1} = V_{GE2} = 15V,$ $R_G = 3.1\Omega,$	–	–	120	ns
Load	Rise Time		$t_{d(on)}$	–	–	100
Switch	Turn-off Delay Time	Inductive Load	–	–	350	ns
Times	Fall Time		$t_{d(off)}$	–	–	250
Diode Reverse Recovery Time**		Switching Operation	–	–	150	ns
Diode Reverse Recovery Charge**		$I_E = 200A$	–	3.8	–	μC

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)Q}$	Per IGBT 1/6 Module, T_C Reference Point per Outline Drawing	–	–	0.21	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per FWDi 1/6 Module, T_C Reference Point per Outline Drawing	–	–	0.35	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)'Q}$	Per IGBT 1/6 Module, T_C Reference Point Under Chip	–	0.13	–	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	–	0.015	–	$^\circ\text{C/W}$

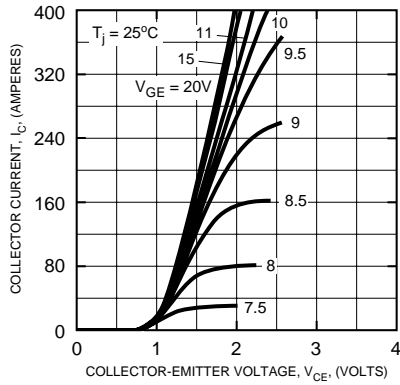
** Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).



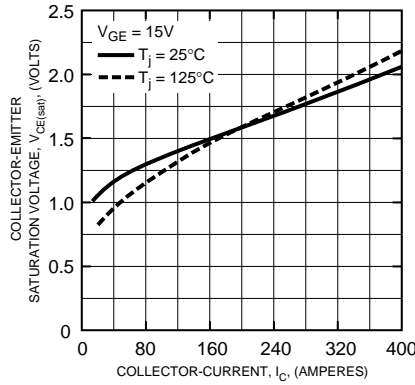
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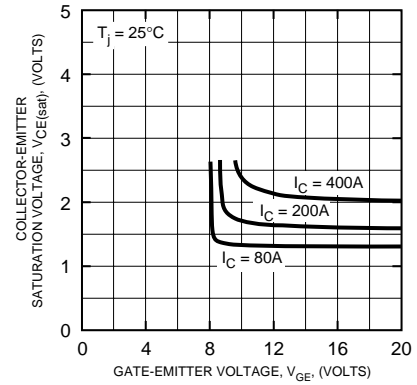
OUTPUT CHARACTERISTICS (TYPICAL)



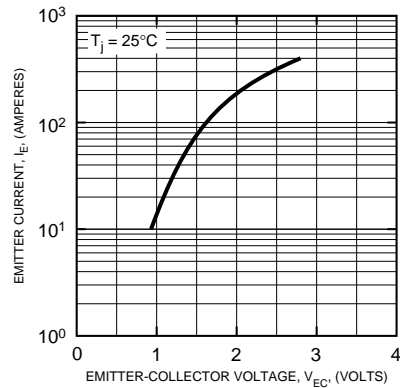
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



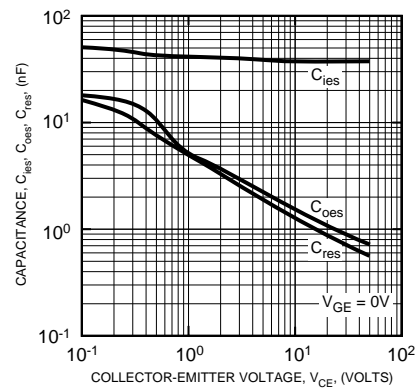
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



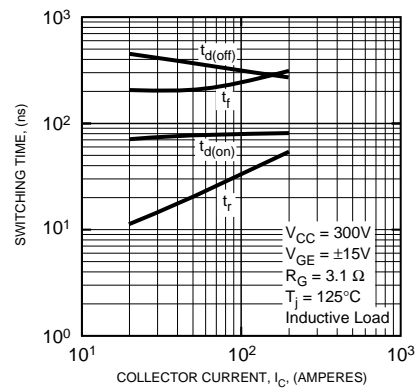
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



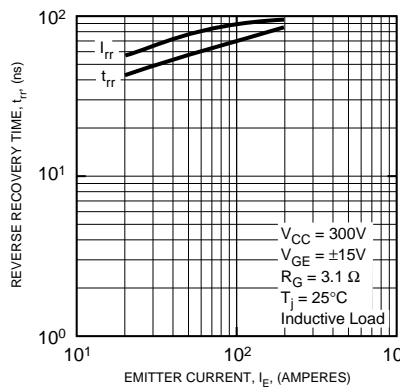
CAPACITANCE VS. V_{CE} (TYPICAL)



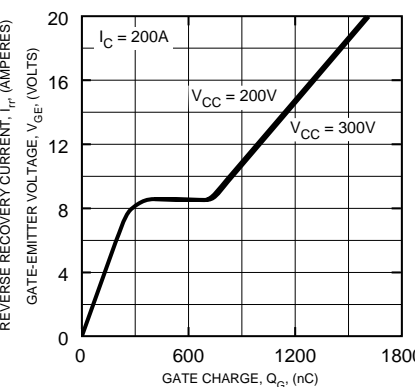
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



GATE CHARGE, V_{GE}



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDi)

