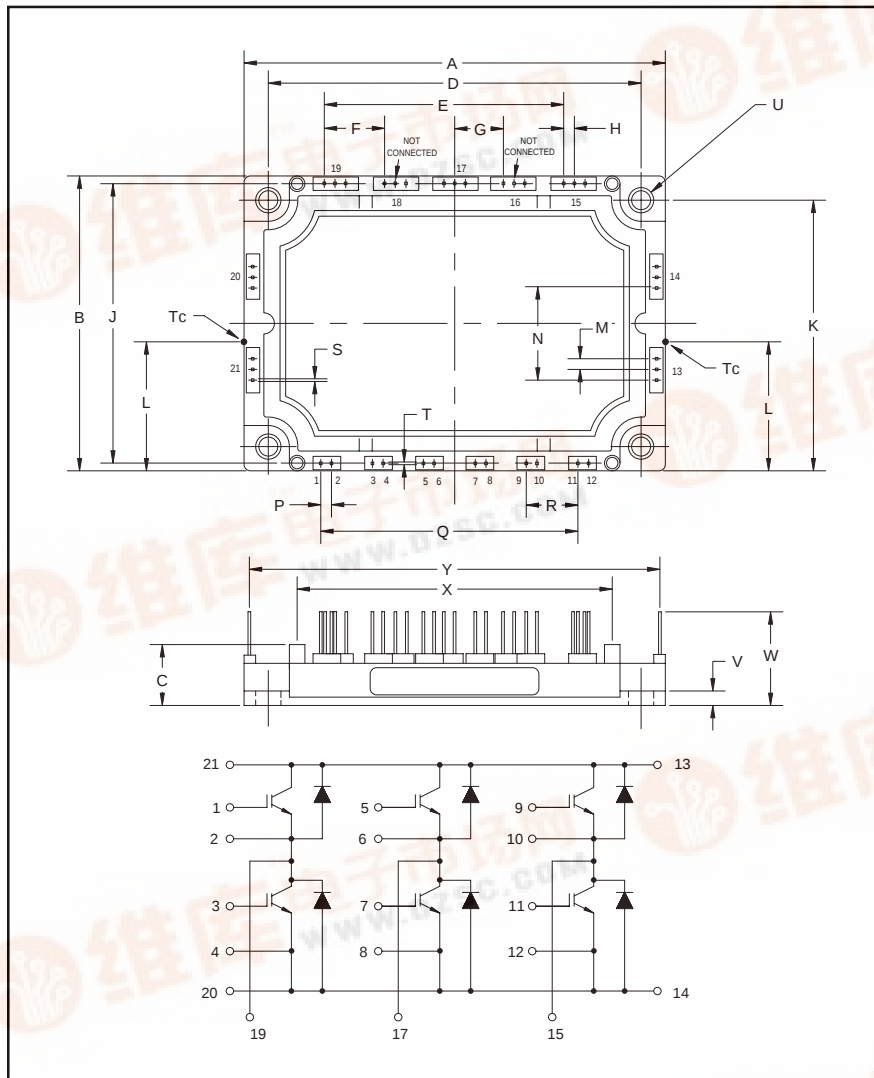




Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

CM100TJ-12F

Trench Gate Design
Six IGBTMOD™
100 Amperes/600 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.78	121.5
B	2.42	61.5
C	0.67	17.0
D	4.33±0.01	110.0±0.25
E	3.00	76.2
F	0.75	19.05
G	0.60	15.24
H	0.15	3.81
J	2.26	57.5
K	1.97±0.01	50.0±0.25
L	1.07	27.0

Dimensions	Inches	Millimeters
M	0.15	3.81
N	0.75	19.05
P	0.15	3.81
Q	3.00	76.2
R	0.60	15.24
S	0.45	1.15
T	0.04	1.0
U	0.22 Dia.	5.5 Dia.
V	0.12	3.0
W	0.81	20.5
X	3.72	94.5
Y	4.62	118.11



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. CM100TJ-12F is a 600V (V_{CES}), 100 Ampere Six-IGBT IGBTMOD™ Power Module.

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





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

Ratings	Symbol	CM100TJ-12F	Units
Junction Temperature	T_j	-40 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 125	$^\circ\text{C}$
Collector-Emitter Voltage (G-E SHORT)	V_{CES}	600	Volts
Gate-Emitter Voltage (C-E SHORT)	V_{GES}	± 20	Volts
Collector Current ($T_c = 25^\circ\text{C}$)	I_c	100	Amperes
Peak Collector Current ($T_j \leq 150^\circ\text{C}$)	I_{CM}	200*	Amperes
Emitter Current ($T_c = 25^\circ\text{C}$)**	I_e	100	Amperes
Peak Emitter Current**	I_{EM}	200*	Amperes
Maximum Collector Dissipation ($T_j < 150^\circ\text{C}$) ($T_c = 25^\circ\text{C}$)	P_c	290	Watts
Mounting Torque, M5 Mounting	—	31	in-lb
Weight	—	300	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{iso}	2500	Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$	—	—	1	mA
Gate Leakage Current	I_{GES}	$V_{\text{GE}} = V_{\text{GES}}, V_{\text{CE}} = 0\text{V}$	—	—	20	μA
Gate-Emitter Threshold Voltage	$V_{\text{GE(th)}}$	$I_c = 10\text{mA}, V_{\text{CE}} = 10\text{V}$	5	6	7	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_c = 100\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 25^\circ\text{C}$	—	1.6	2.2	Volts
		$I_c = 100\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 125^\circ\text{C}$	—	1.6	—	Volts
Total Gate Charge	Q_g	$V_{\text{CC}} = 300\text{V}, I_c = 100\text{A}, V_{\text{GE}} = 15\text{V}$	—	620	—	nC
Emitter-Collector Voltage**	V_{EC}	$I_e = 100\text{A}, V_{\text{GE}} = 0\text{V}$	—	—	2.6	Volts

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

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



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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}	V _{CE} = 10V, V _{GE} = 0V	–	–	27	nf
Output Capacitance		C _{oes}		–	–	1.8	nf
Reverse Transfer Capacitance		C _{res}		–	–	1	nf
Inductive	Turn-on Delay Time	t _{d(on)}	V _{CC} = 300V,	–	–	100	ns
Load	Rise Time	t _r	I _C = 100A,	–	–	80	ns
Switch	Turn-off Delay Time	t _{d(off)}	V _{GE1} = V _{GE2} = 15V,	–	–	300	ns
Times	Fall Time	t _f	R _G = 6.3Ω,	–	–	250	ns
Diode Reverse Recovery Time**		t _{rr}	Inductive Load	–	–	150	ns
Diode Reverse Recovery Charge**		Q _{rr}	Switching Operation	–	1.9	–	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	–	–	0.43	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per FWDi 1/6 Module, T_C Reference Point per Outline drawing	–	–	0.70	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)'Q}$	Per IGBT 1/6 Module, T_C Reference Point Under Chip	–	0.28	–	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)'D}$	Per FWDi 1/6 Module, T_C Reference Point Under Chip	–	0.37	–	$^{\circ}\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	–	0.13	–	$^{\circ}\text{C/W}$

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



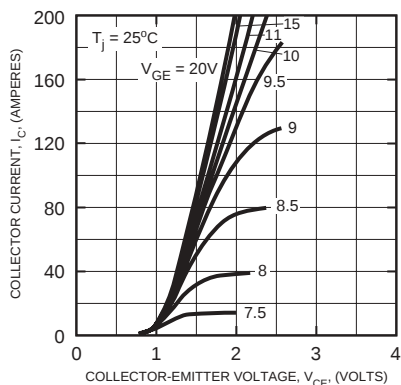
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CM100TJ-12F

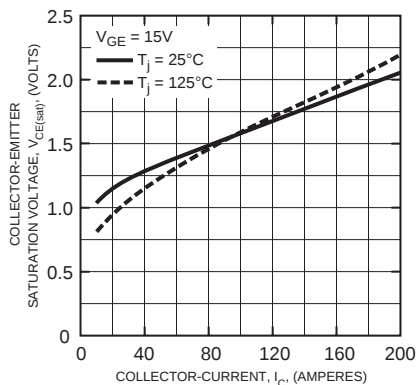
Trench Gate Design Six IGBTMOD™

100 Amperes/600 Volts

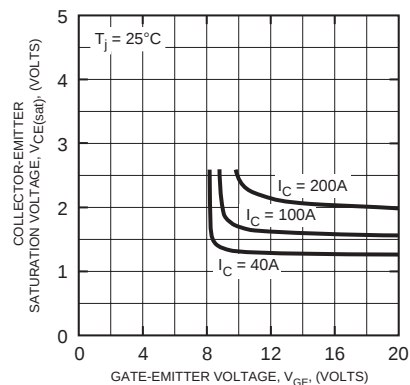
OUTPUT CHARACTERISTICS
(TYPICAL)



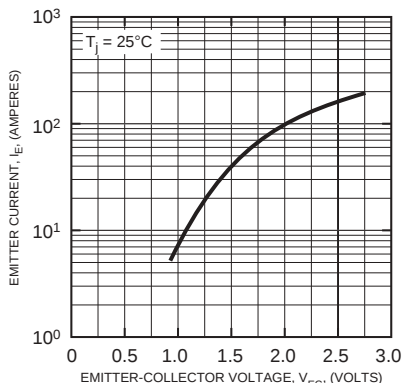
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



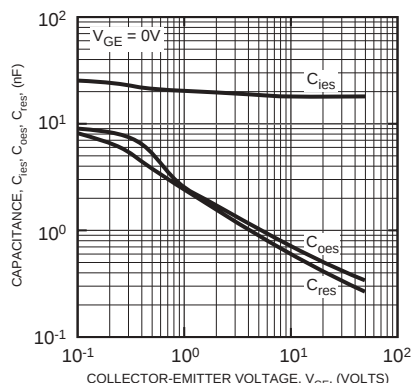
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



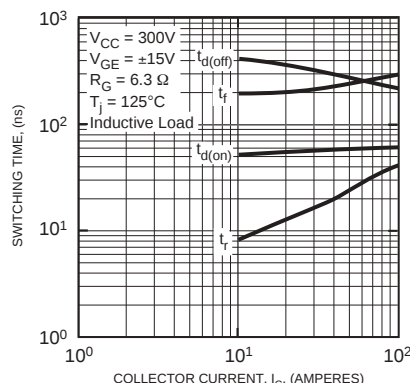
FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



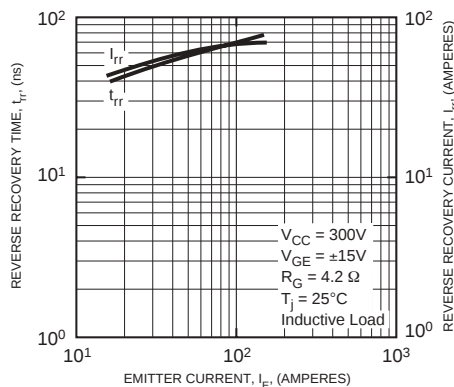
CAPACITANCE VS. V_{CE}
(TYPICAL)



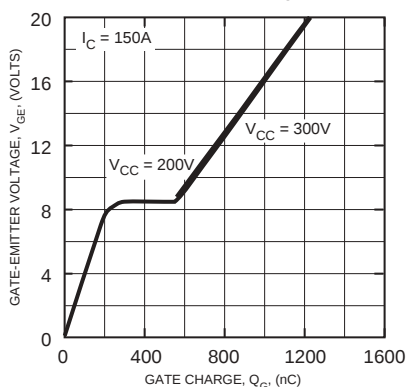
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS
(TYPICAL)



GATE CHARGE, V_{GE}



TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(IGBT & FWDI)

