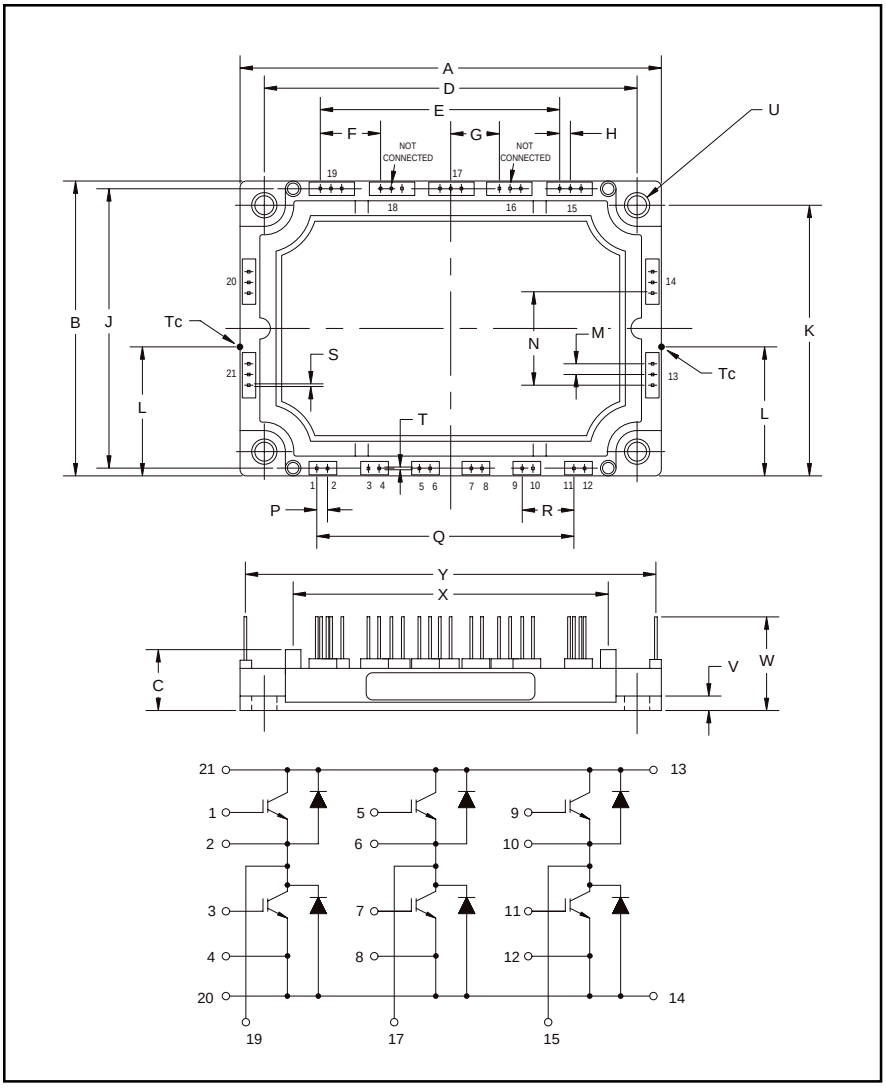
Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

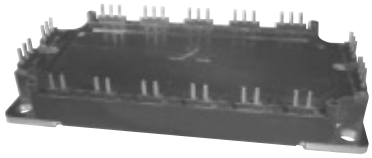
Trench Gate Design Six IGBTMOD™ 100 Amperes/1200 Volts



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-24F is a 1200V (V_{CES}), 100 Ampere Six-IGBT IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	100	24

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

Ratings	Symbol	CM100TJ-24F	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 (T_c = 25°C)	I_C	100	Amperes
Peak Collector Current ($T_j \leq$ 150°C)	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_j < 150°C) (T_c = 25°C)	P_c	390	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 °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	–	1.8	2.4	Volts
		I_C = 100A, V_{GE} = 15V, T_j = 125°C	–	1.9	–	Volts
Total Gate Charge	Q_G	V_{CC} = 600V, I_C = 100A, V_{GE} = 15V	–	1100	–	nC
Emitter-Collector Voltage**	V_{EC}	I_E = 100A, V_{GE} = 0V	–	–	3.3	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).

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

Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance		C_{ies}		–	–	39	nf
Output Capacitance		C_{oes}	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz	–	–	1.7	nf
Reverse Transfer Capacitance		C_{res}		–	–	1.6	nf
Inductive	Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 600V,	–	–	100	ns
Load	Rise Time	t_r	I_C = 100A,	–	–	50	ns
Switch	Turn-off Delay Time	$t_{d(off)}$	V_{GE1} = V_{GE2} = 15V,	–	–	400	ns
Times	Fall Time	t_f	R_G = 3.1Ω,	–	–	300	ns
Diode Reverse Recovery Time**		t_{rr}	Inductive Load	–	–	150	ns
Diode Reverse Recovery Charge**		Q_{rr}	Switching Operation	–	4.1	–	μC

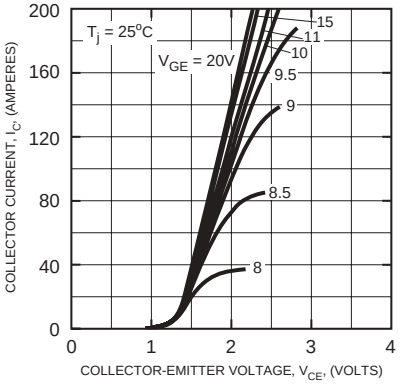
Thermal and Mechanical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}Q$	Per IGBT 1/6 Module, T_c Reference Point per Outline Drawing	–	–	0.32	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}D$	Per FWDi 1/6 Module, T_c Reference Point per Outline drawing	–	–	0.36	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}'Q$	Per IGBT 1/6 Module, T_c Reference Point Under Chip	–	0.18	–	°C/W
Thermal Resistance, Junction to Case	Rth(j-c)'D	Per FWDi 1/6 Module, T_c Reference T_c Reference Point Under Chip	–	0.20	–	°C/W
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	–	0.13	–	°C/W

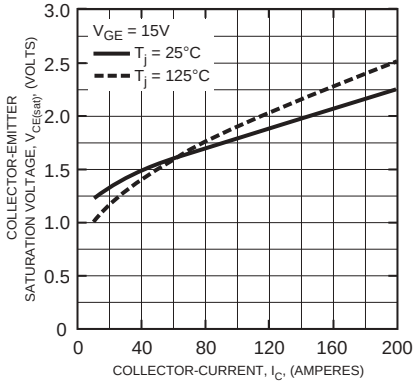
** Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

CM100TJ-24F
Trench Gate Design Six IGBTMOD™
100 Amperes/1200 Volts

OUTPUT CHARACTERISTICS (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



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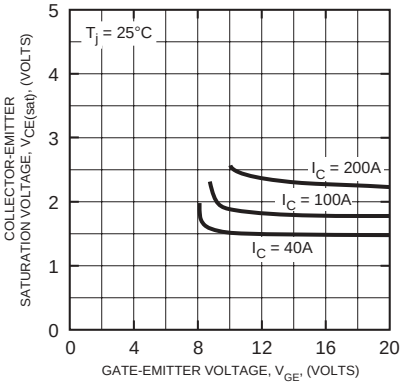
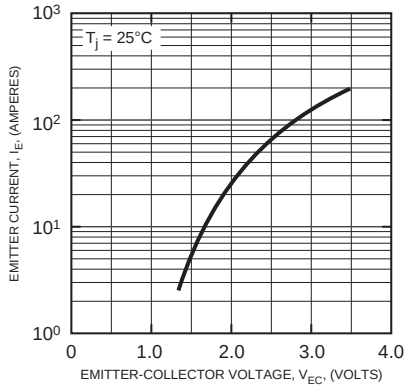
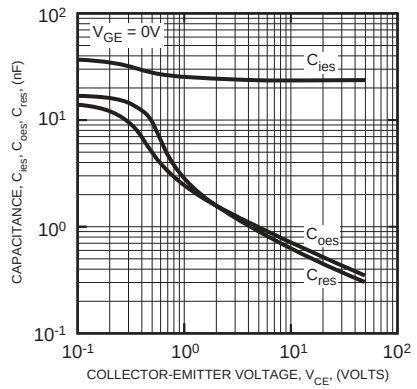


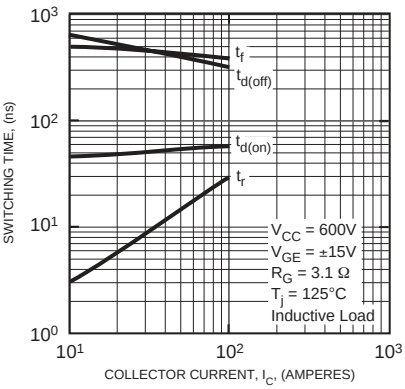
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



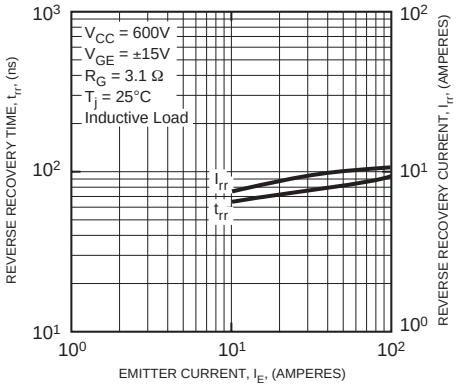
CAPACITANCE VS. V_{CE} (TYPICAL)



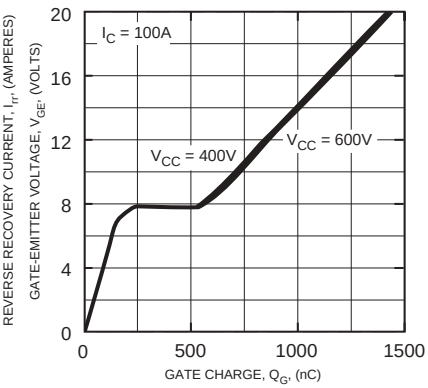
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



GATE CHARGE, V_{GE}



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDi)