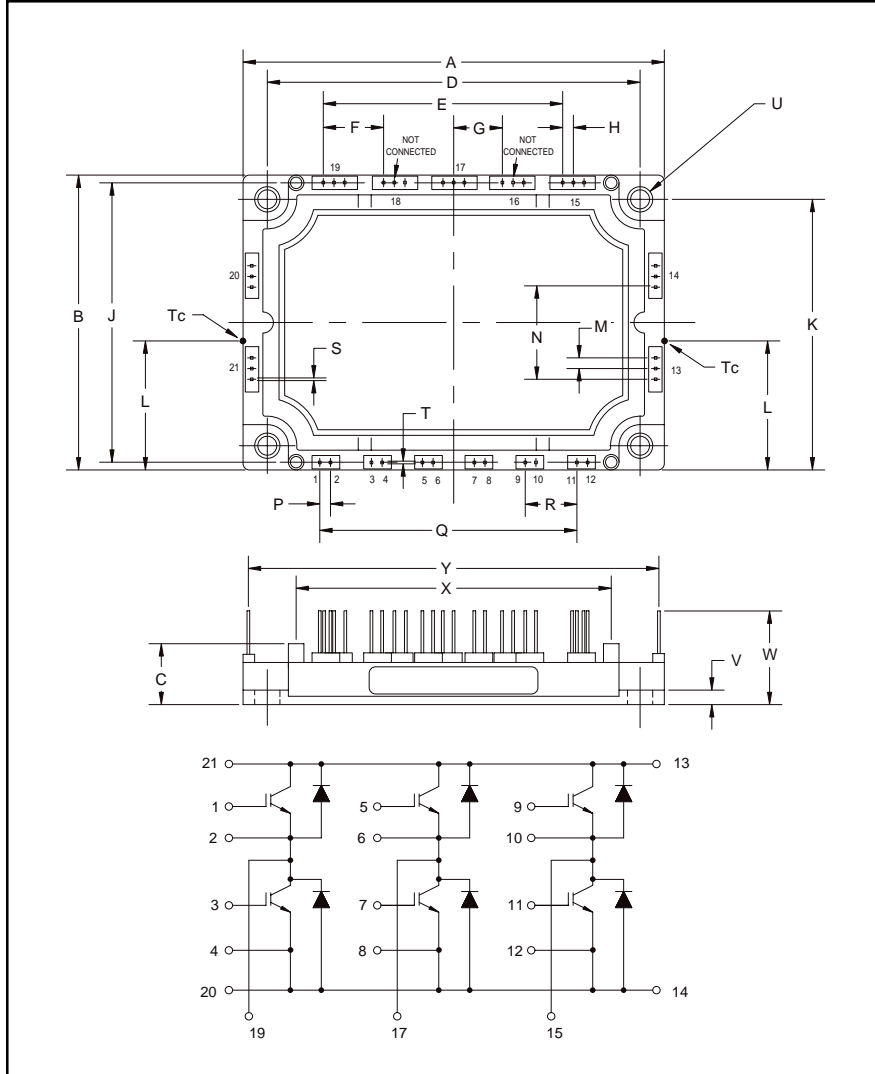


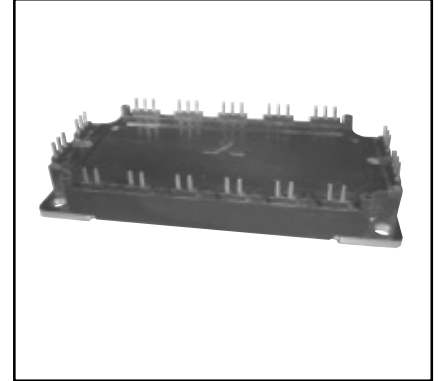
### Trench Gate Design Six IGBTMOD™ 50 Amperes/1200 Volts



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. CM50TJ-24F is a 1200V ( $V_{CES}$ ), 50 Ampere Six-IGBT IGBTMOD™ Power Module.

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



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

**CM50TJ-24F**  
**Trench Gate Design Six IGBTMOD™**  
 50 Amperes/1200 Volts

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

Ratings	Symbol	CM50TJ-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 ( $T_c = 25\text{ °C}$ )	$I_C$	50	Amperes
Peak Collector Current ( $T_j \leq 150\text{ °C}$ )	$I_{CM}$	100*	Amperes
Emitter Current ( $T_c = 25\text{ °C}$ )**	$I_E$	50	Amperes
Peak Emitter Current**	$I_{EM}$	100*	Amperes
Maximum Collector Dissipation ( $T_j < 150\text{ °C}$ ) ( $T_c = 25\text{ °C}$ )	$P_C$	219	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,  $T_j = 25\text{ °C}$  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 Current	$I_{GES}$	$V_{GE} = V_{GES}, V_{CE} = 0V$	–	–	20	µA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 5mA, V_{CE} = 10V$	5	6	7	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 50A, V_{GE} = 15V, T_j = 25\text{ °C}$	–	1.8	2.4	Volts
		$I_C = 50A, V_{GE} = 15V, T_j = 125\text{ °C}$	–	1.9	–	Volts
Total Gate Charge	$Q_G$	$V_{CC} = 600V, I_C = 50A, V_{GE} = 15V$	–	550	–	nC
Emitter-Collector Voltage**	$V_{EC}$	$I_E = 50A, V_{GE} = 0V$	–	–	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).

**CM50TJ-24F**  
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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	$C_{ies}$		–	–	20	nf	
Output Capacitance	$C_{oes}$	$V_{CE} = 10V, V_{GE} = 0V, f = 1MHz$	–	–	0.85	nf	
Reverse Transfer Capacitance	$C_{res}$		–	–	0.80	nf	
Inductive Load	Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600V,$	–	–	100	ns
	Rise Time	$t_r$	$I_C = 50A,$	–	–	50	ns
Switch Times	Turn-off Delay Time	$t_{d(off)}$	$V_{GE1} = V_{GE2} = 15V,$	–	–	300	ns
	Fall Time	$t_f$	$R_G = 6.3\Omega,$	–	–	300	ns
Diode Reverse Recovery Time**	$t_{rr}$	Inductive Load		–	–	150	ns
Diode Reverse Recovery Charge**	$Q_{rr}$	Switching Operation		–	2.1	–	$\mu C$

**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	–	–	0.57	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per FWDi 1/6 Module, $T_C$ Reference Point per Outline drawing	–	–	0.96	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)'Q}$	Per IGBT 1/6 Module, $T_C$ Reference Point Under Chip	–	0.34	–	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per FWDi 1/6 Module, $T_C$ Reference Point Under Chip	–	0.45	–	$^\circ\text{C/W}$
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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