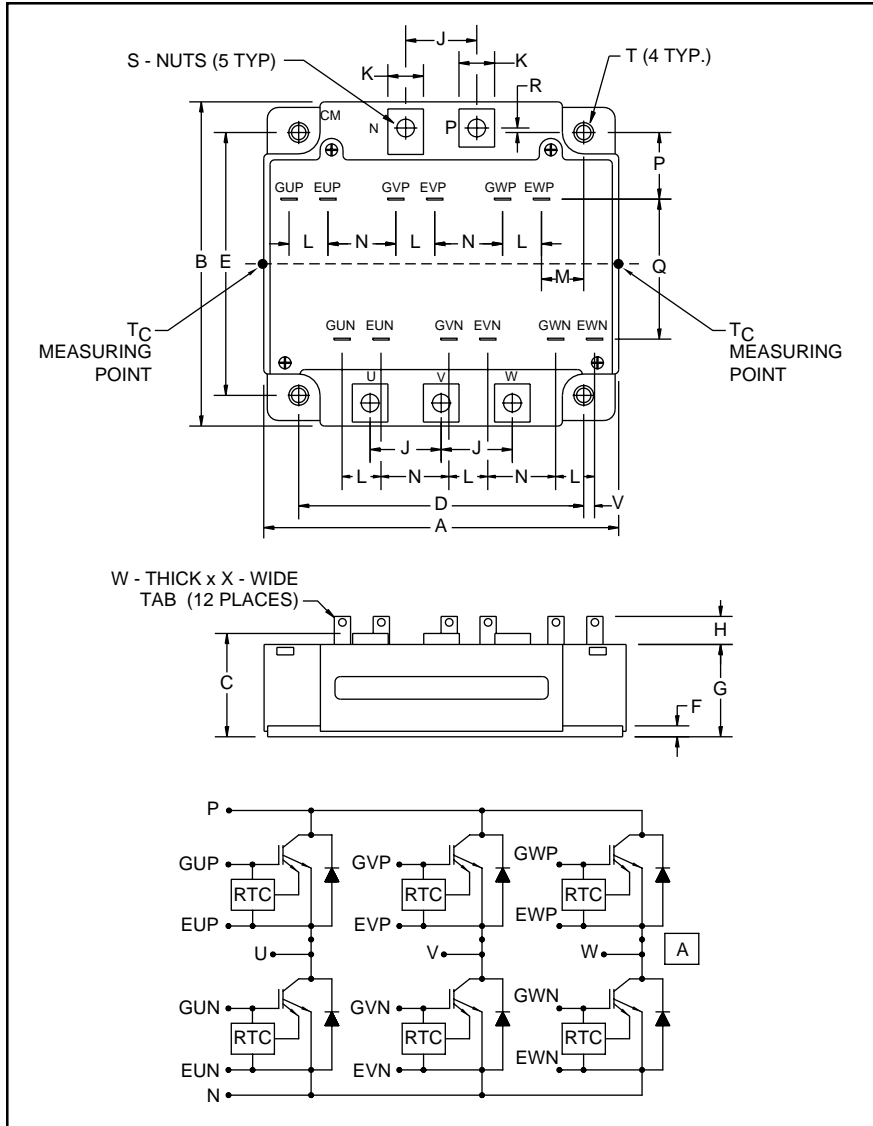


### Trench Gate Design Six IGBTMOD™ 50 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.02	102.0
B	3.58	91.0
C	1.14 +0.04/-0.02	29.0 +1.0/-0.5
D	3.15±0.01	80.0±0.25
E	2.91±0.01	74.0±0.25
F	0.16	4.0
G	1.02	26.0
H	0.31	8.1
J	0.79	20.0
K	0.39	10.0
L	0.43	11.0

Dimensions	Inches	Millimeters
M	0.47	11.85
N	0.75	19.1
P	0.74	18.7
Q	1.55	39.3
R	0.05	1.25
S	M4	M4
T	0.22	5.5
U	0.02	0.5
V	0.12	3.05
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. CM50TU-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

**CM50TU-24F**  
**Trench Gate Design Six IGBTMOD™**  
 50 Amperes/1200 Volts

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

Ratings	Symbol	CM50TU-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**	$I_E$	50	Amperes
Peak Emitter Current**	$I_{EM}$	100*	Amperes
Maximum Collector Dissipation ( $T_j < 150\text{ °C}$ )	$P_c$	320	Watts
Mounting Torque, M4 Main Terminal	–	15	in-lb
Mounting Torque, M5 Mounting	–	31	in-lb
Weight	–	570	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	$I_{GES}$	$V_{GE} = V_{GES}, V_{CE} = 0V$	–	–	20	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 5.0mA, V_{CE} = 10V$	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**	$V_{EC}$	$I_E = 50A, V_{GE} = 0V$	–	–	3.2	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).

**CM50TU-24F**  
**Trench Gate Design Six IGBTMOD™**  
 50 Amperes/1200 Volts

**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	$C_{oes}$	$V_{CE} = 10V, V_{GE} = 0V$	–	–	0.85	nf	
Reverse Transfer Capacitance	$C_{res}$		–	–	0.5	nf	
Inductive	Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 50A,$	–	–	100	ns
Load	Rise Time	$t_r$	$V_{GE1} = V_{GE2} = 15V,$	–	–	50	ns
Switch	Turn-off Delay Time	$t_{d(off)}$	$R_G = 6.3\Omega,$	–	–	300	ns
Times	Fall Time	$t_f$	Inductive Load	–	–	300	ns
Diode Reverse Recovery Time**	$t_{rr}$	Switching Operation		–	–	150	ns
Diode Reverse Recovery Charge**	$Q_{rr}$	$I_E = 50A,$		–	2.1	–	$\mu\text{C}$

**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	–		0.39	$^\circ\text{C/W}$
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	–	0.26		$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	–	0.018	–	$^\circ\text{C/W}$

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