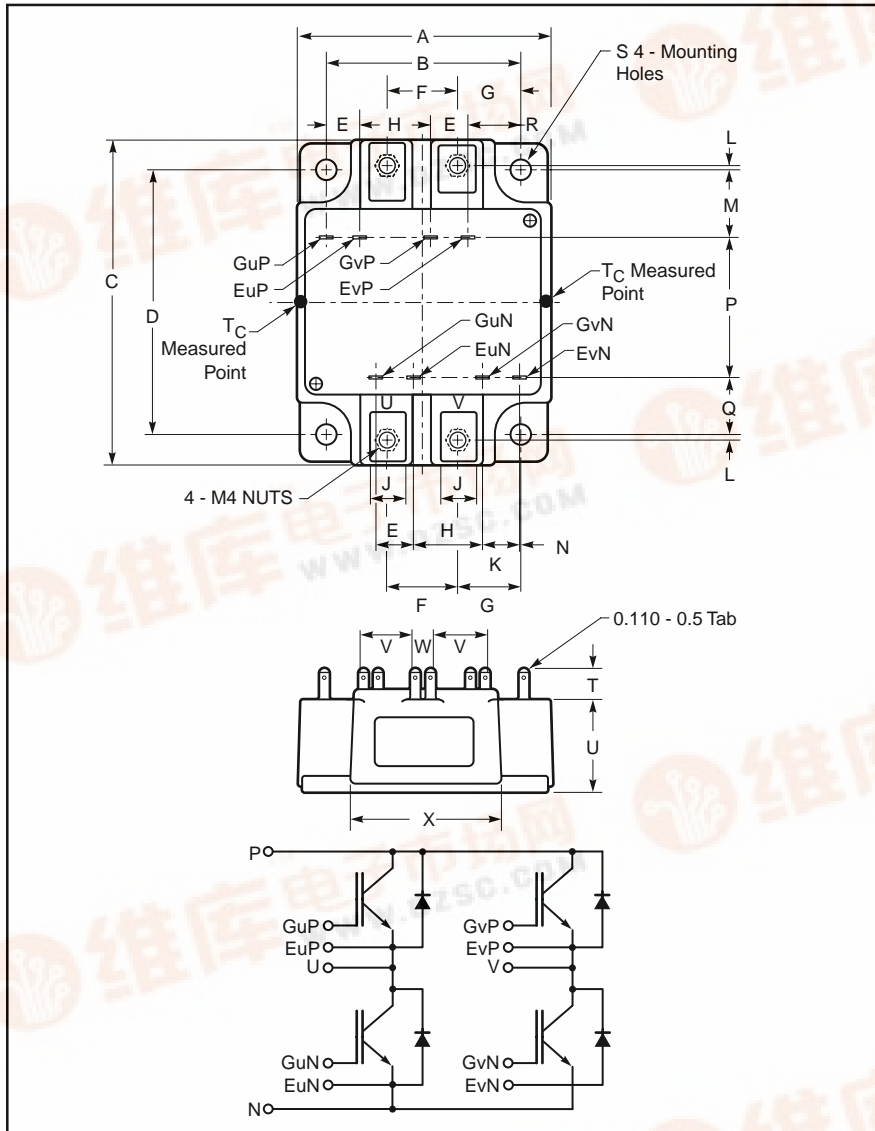




Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

## CM50BU-24H

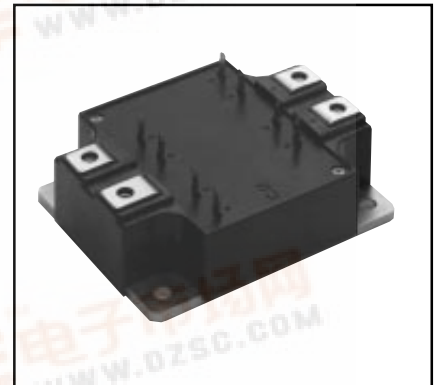
### Four IGBTMOD™ U-Series Module 50 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	2.83	72.0
B	2.17±0.01	55±0.25
C	3.58	91.0
D	2.91±0.01	74.0±0.25
E	0.43	11.0
F	0.79	20.0
G	0.69	17.5
H	0.75	19.1
J	0.39	10.0
K	0.41	10.5
L	0.05	1.25

Dimensions	Inches	Millimeters
M	0.74	18.7
N	0.02	0.5
P	1.55	39.3
Q	0.63	16.0
R	0.57	14.4
S	0.22 Dia.	5.5 Dia.
T	0.32	8.1
U	1.02	26.0
V	0.59	15.0
W	0.20	5.0
X	1.61	41.0



#### Description:

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of four IGBT Transistors in an H-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
- Motion/Servo Control
- UPS
- Welding Power Supplies
- Laser Power Supplies

#### Ordering Information:

Example: Select the complete module number you desire from the table - i.e. CM50BU-24H is a 1200V ( $V_{CES}$ ), 50 Ampere Four-IGBT IGBTMOD™ Power Module.

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





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

Ratings	Symbol	CM50BU-24H	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)	$V_{CES}$	1200	Volts
Gate-Emitter Voltage (C-E SHORT)	$V_{GES}$	$\pm 20$	Volts
Collector Current ( $T_c = 25^\circ\text{C}$ )	$I_C$	50	Amperes
Peak Collector Current ( $T_j \leq 150^\circ\text{C}$ )	$I_{CM}$	100*	Amperes
Emitter Current** ( $T_c = 25^\circ\text{C}$ )	$I_E$	50	Amperes
Peak Emitter Current**	$I_{EM}$	100*	Amperes
Maximum Collector Dissipation ( $T_c = 25^\circ\text{C}$ )	$P_C$	400	Watts
Mounting Torque, M4 Main Terminal	–	15	in-lb
Mounting Torque, M5 Mounting	–	31	in-lb
Weight	–	390	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	$V_{iso}$	2500	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).

**Static Electrical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  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	$I_{GES}$	$V_{GE} = V_{GES}, V_{CE} = 0V$	–	–	0.5	$\mu\text{A}$
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 5.0\text{mA}, V_{CE} = 10V$	4.5	6	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 50A, V_{GE} = 15V, T_j = 25^\circ\text{C}$	–	2.9	3.7	Volts
		$I_C = 50A, V_{GE} = 15V, T_j = 125^\circ\text{C}$	–	2.85	–	Volts
Total Gate Charge	$Q_G$	$V_{CC} = 600V, I_C = 50A, V_{GE} = 15V$	–	187	–	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.

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units	
Input Capacitance	$C_{ies}$		–	–	7.5	nf	
Output Capacitance	$C_{oes}$	$V_{CE} = 10V, V_{GE} = 0V$	–	–	2.6	nf	
Reverse Transfer Capacitance	$C_{res}$		–	–	1.5	nf	
Resistive	Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 50A,$	–	–	80	ns
Load	Rise Time	$t_r$	$V_{GE1} = V_{GE2} = 15V,$	–	–	200	ns
Switch	Turn-off Delay Time	$t_{d(off)}$	$R_G = 6.3\Omega, \text{Resistive}$	–	–	150	ns
Times	Fall Time	$t_f$	Load Switching Operation	–	–	350	ns
Diode Reverse Recovery Time	$t_{rr}$	$I_E = 50A, di_E/dt = -100A/\mu\text{s}$	–	–	300	ns	
Diode Reverse Recovery Charge	$Q_{rr}$	$I_E = 50A, di_E/dt = -100A/\mu\text{s}$	–	0.28	–	$\mu\text{C}$	

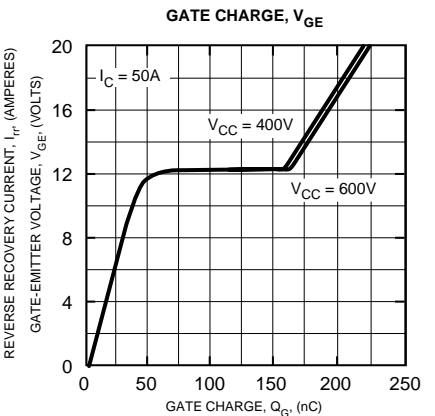
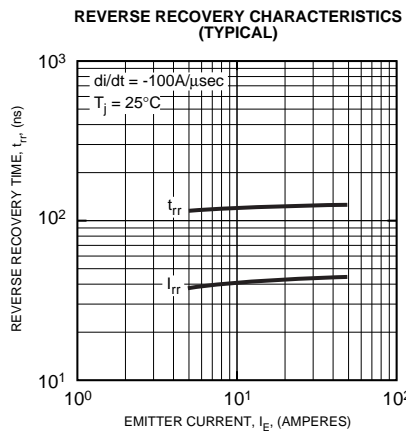
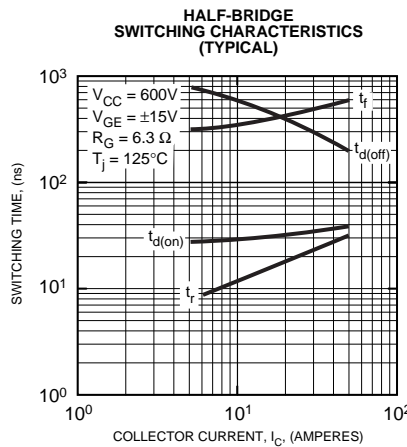
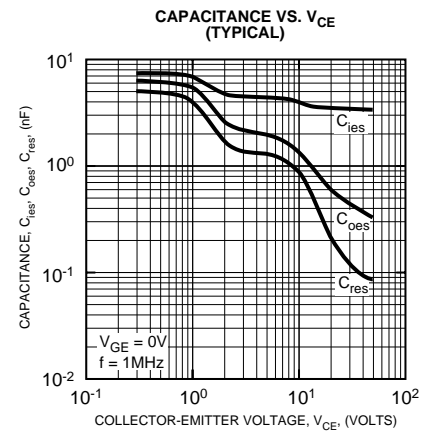
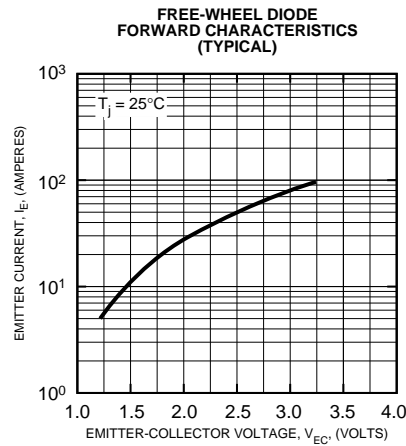
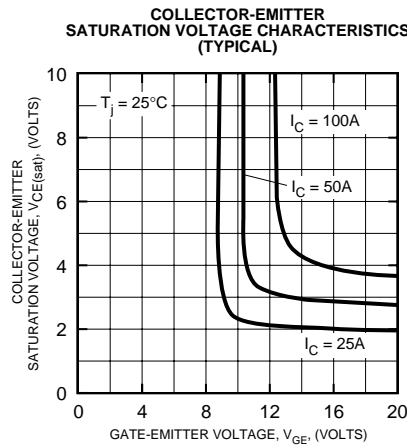
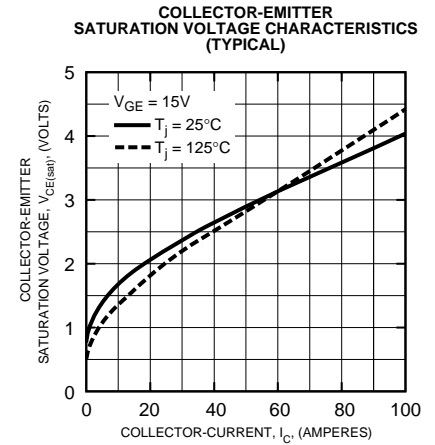
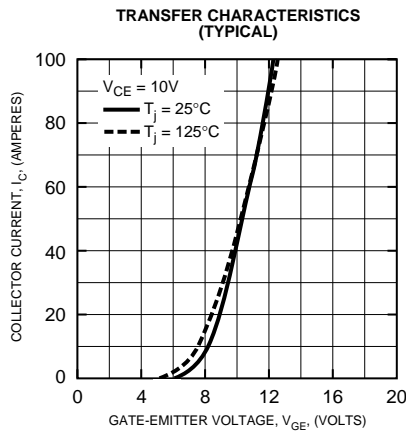
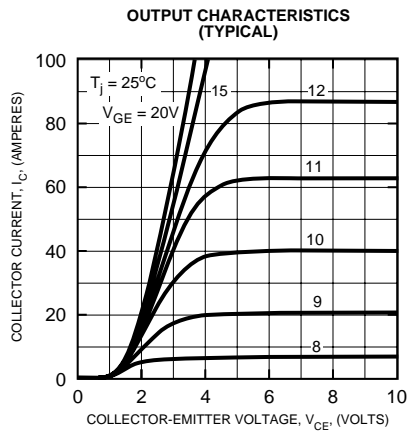
**Thermal and Mechanical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)Q}$	Per IGBT 1/4 Module	–	–	0.31	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per FWDi 1/4 Module	–	–	0.7	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(j-c)C}$	Per Module, Thermal Grease Applied	–	0.1	–	$^\circ\text{C/W}$



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