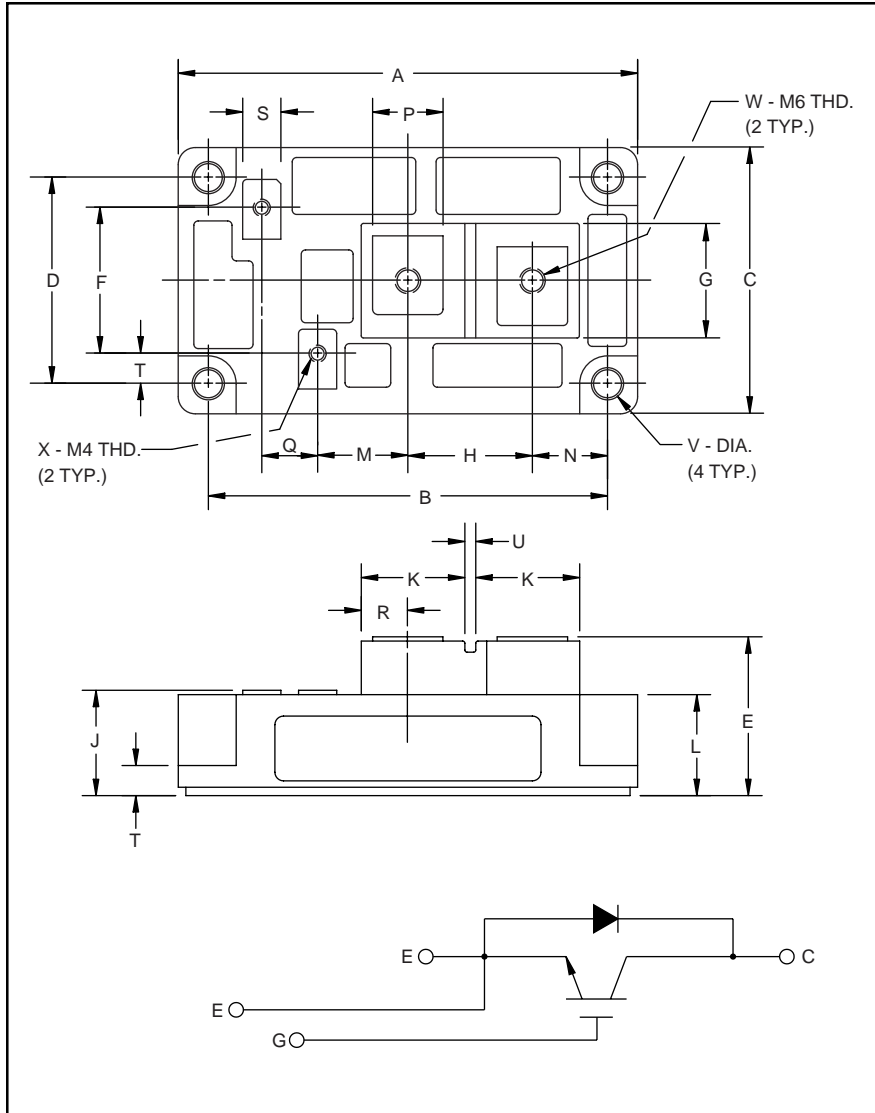


Single IGBTMOD™ H-Series Module 400 Amperes/600 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.21	107.0
B	3.661±0.01	93.0±0.25
C	2.44	62.0
D	1.89±0.01	48.0±0.25
E	1.42 Max.	36.0 Max.
F	1.34	34.0
G	1.18	30.0
H	1.14	29.0
J	0.98 Max.	25.0 Max.
K	0.94	24.0
L	0.93	23.5

Dimensions	Inches	Millimeters
M	0.83	21.0
N	0.69	17.5
P	0.63	16.0
Q	0.51	13.0
R	0.43	11.0
S	0.35	9.0
T	0.28	7.0
U	0.12	3.0
V	0.26 Dia.	Dia. 6.5
W	M6 Metric	M6
X	M4 Metric	M4



Description:

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of one IGBT Transistor in a single configuration with 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 (70ns) Free-Wheel Diode
- High Frequency Operation (20-25kHz)
- 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 part module number you desire from the table below -i.e. CM400HA-12H is a 600V (V_{CES}), 400 Ampere Single IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	400	12

CM400HA-12H
Single IGBTMOD™ H-Series Module
 400 Amperes/600 Volts

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

Ratings	Symbol	CM400HA-12H	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	V_{GES}	± 20	Volts
Collector Current	I_{C}	400	Amperes
Peak Collector Current	I_{CM}	800*	Amperes
Diode Forward Current	I_{F}	400	Amperes
Diode Forward Surge Current	I_{FM}	800*	Amperes
Power Dissipation	P_{d}	1500	Watts
Max. Mounting Torque M6 Terminal Screws	-	26	in-lb
Max. Mounting Torque M6 Mounting Screws	-	26	in-lb
Module Weight (Typical)	-	400	Grams
V Isolation	V_{RMS}	2500	Volts

* Pulse width and repetition rate should be such that device junction temperature does not exceed the device rating.

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}	$V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$	-	-	1.0	mA
Gate Leakage Current	I_{GES}	$V_{\text{GE}} = V_{\text{GES}}, V_{\text{CE}} = 0\text{V}$	-	-	0.5	μA
Gate-Emitter Threshold Voltage	$V_{\text{GE(th)}}$	$I_{\text{C}} = 40\text{mA}, V_{\text{CE}} = 10\text{V}$	4.5	6.0	7.5	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = 400\text{A}, V_{\text{GE}} = 15\text{V}$	-	2.1	2.8**	Volts
		$I_{\text{C}} = 400\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 150\text{ }^\circ\text{C}$	-	2.15	-	Volts
Total Gate Charge	Q_{G}	$V_{\text{CC}} = 400\text{V}, I_{\text{C}} = 400\text{A}, V_{\text{GS}} = 15\text{V}$	-	1200	-	nC
Diode Forward Voltage	V_{FM}	$I_{\text{E}} = 400\text{A}, V_{\text{GS}} = 0\text{V}$	-	-	2.8	Volts

** Pulse width and repetition rate should be such that device junction temperature rise is negligible.

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}		-	-	40	nF	
Output Capacitance	C_{Oes}	$V_{\text{GE}} = 0\text{V}, V_{\text{CE}} = 10\text{V}, f = \text{MHz}$	-	-	14	nF	
Reverse Transfer Capacitance	C_{res}		-	-	8	nF	
Resistive	Turn-on Delay Time	$V_{\text{CC}} = 300\text{V}, I_{\text{C}} = 400\text{A},$ $V_{\text{GE1}} = V_{\text{GE2}} = 15\text{V}, R_{\text{G}} = 1.6\Omega$	-	-	350	ns	
Load	Rise Time		t_{r}	-	-	600	ns
Switching	Turn-off Delay Time		$t_{\text{d(off)}}$	-	-	350	ns
Times	Fall Time		-	-	300	ns	
Diode Reverse Recovery Time	t_{rr}	$I_{\text{E}} = 400\text{A}, di_{\text{E}}/dt = -800\text{A}/\mu\text{s}$	-	-	110	ns	
Diode Reverse Recovery Charge	Q_{rr}	$I_{\text{E}} = 400\text{A}, di_{\text{E}}/dt = -800\text{A}/\mu\text{s}$	-	1.08	-	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	$R_{\text{th(j-c)}}$	Per IGBT	-	-	0.085	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)}}$	Per FWDi	-	-	0.18	$^\circ\text{C}/\text{W}$
Contact Thermal Resistance	$R_{\text{th(c-f)}}$	Per Module, Thermal Grease Applied	-	-	0.040	$^\circ\text{C}/\text{W}$