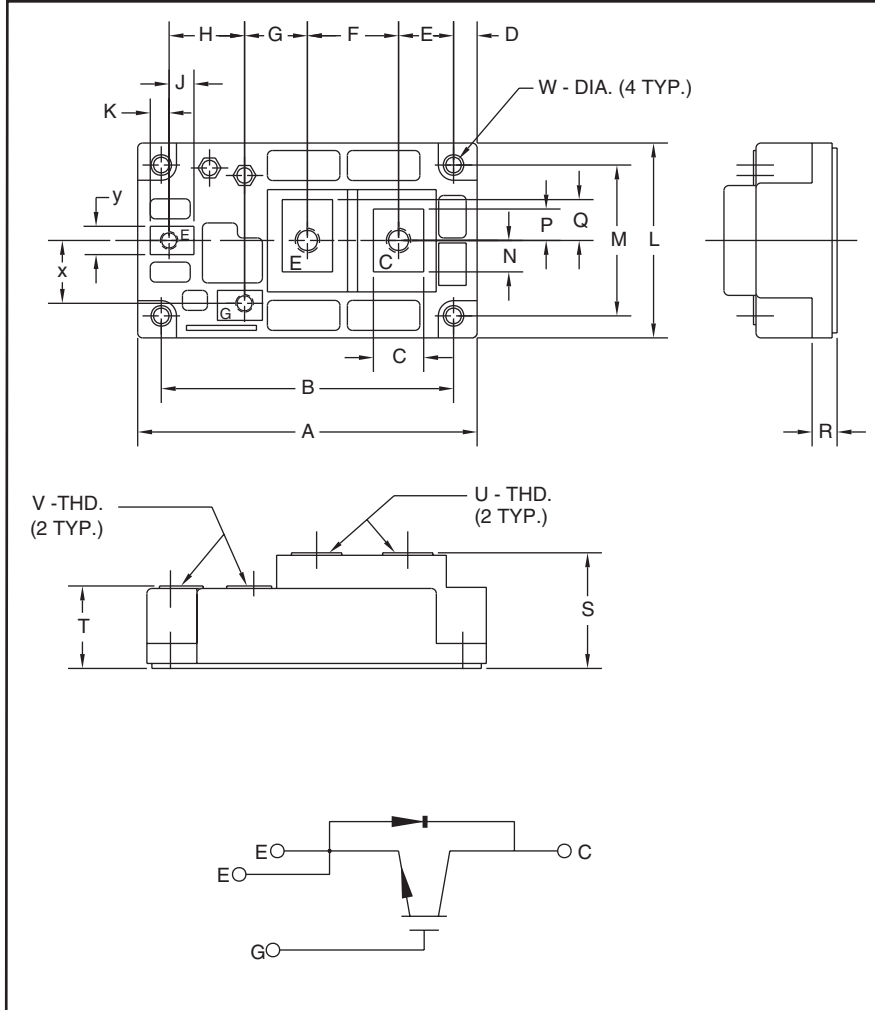


### Single IGBTMOD™ A-Series Module 500 Amperes/1700 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.25	108.0
B	3.66±0.01	93.0±0.25
C	0.63	16.0
D	0.30	7.5
E	0.69	17.5
F	1.14	29.0
G	0.79	20.0
H	0.94	24.0
J	0.31	7.9
K	0.24	6.0
L	2.44	62.0
M	1.89±0.01	48.0±0.25

Dimensions	Inches	Millimeters
N	0.39	10.0
P	0.39	10.0
Q	0.51	13.0
R	0.33	8.5
S	1.42+0.04/-0.02	36.0+1.0/-0.5
T	1.02+0.04/-0.02	25.8+1.0/-0.5
U	M6 Metric	M6
V	M4 Metric	M4
W	0.256	6.5
X	0.79	20.0
Y	0.35	9.0



#### 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 Free-Wheel Diode
- Isolated Baseplate for Easy Heat Sinking

#### Applications:

- DC Chopper
- Inverter
- UPS
- Forklift

#### Ordering Information:

Example: Select the complete part module number you desire from the table below -i.e. CM500HA-34A is a 1700V ( $V_{CES}$ ), 500 Ampere Single IGBTMOD™ Power Module.

Type	Current Rating Amperes	$V_{CES}$ Volts (x 50)
CM	500	34



Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272 www.pwr.com

**CM500HA-34A**  
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**Absolute Maximum Ratings,  $T_j = 25^\circ\text{C}$  unless otherwise specified**

Ratings	Symbol	CM500HA-34A	Units
Junction Temperature	$T_j$	-40 to 150	$^\circ\text{C}$
Storage Temperature	$T_{\text{stg}}$	-40 to 125	$^\circ\text{C}$
Collector-Emitter Voltage (G-E Short)	$V_{\text{CES}}$	1700	Volts
Gate-Emitter Voltage (C-E Short)	$V_{\text{GES}}$	$\pm 20$	Volts
Collector Current (DC, $T_C = 110^\circ\text{C}$ )*4	$I_C$	500	Amperes
Peak Collector Current (Pulse, Repetitive)*2	$I_{\text{CM}}$	1000	Amperes
Emitter Current (DC, $T_C = 25^\circ\text{C}$ )*4	$I_E^{*1}$	500	Amperes
Peak Emitter Current (Pulse, Repetitive)*2	$I_{\text{EM}}^{*1}$	1000	Amperes
Maximum Collector Dissipation ( $T_C = 25^\circ\text{C}$ )*2,*4	$P_C$	5000	Watts
Mounting Torque, M6 Main Terminal	—	26	in-lb
Mounting Torque, M6 Mounting	—	26	in-lb
Mounting Torque, M4 G(E) Terminal	—	13	in-lb
Weight	—	480	Grams
Isolation Voltage (Main Terminal to Baseplate, $f = 60\text{Hz}$ , AC 1 min.)	$V_{\text{ISO}}$	3500	Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	$I_{\text{CES}}$	$V_{\text{CE}} = V_{\text{CES}}, V_{\text{GE}} = 0\text{V}$	—	—	1.0	mA
Gate Leakage Current	$I_{\text{GES}}$	$V_{\text{GE}} = V_{\text{GES}}, V_{\text{CE}} = 0\text{V}$	—	—	3.0	$\mu\text{A}$
Gate-Emitter Threshold Voltage	$V_{\text{GE(th)}}$	$I_C = 50\text{mA}, V_{\text{CE}} = 10\text{V}$	5.5	7.0	8.5	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_C = 500\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 25^\circ\text{C}^{*3}$	—	2.3	3.0	Volts
		$I_C = 500\text{A}, V_{\text{GE}} = 15\text{V}, T_j = 125^\circ\text{C}^{*3}$	—	2.45	—	Volts
Total Gate Charge	$Q_G$	$V_{\text{CC}} = 1000\text{V}, I_C = 500\text{A}, V_{\text{GE}} = 15\text{V}$	—	3300	—	nC
Emitter-Collector Voltage*1	$V_{\text{EC}}$	$I_E = 500\text{A}, V_{\text{GE}} = 0\text{V}^{*3}$	—	—	3.2	Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	$C_{\text{ies}}$	$V_{\text{CE}} = 10\text{V}, V_{\text{GE}} = 0\text{V}$	—	—	120	nf
Output Capacitance	$C_{\text{oes}}$		—	—	14	nf
Reverse Transfer Capacitance	$C_{\text{res}}$		—	—	2.6	nf
Inductive Load	Turn-on Delay Time	$V_{\text{CC}} = 1000\text{V}, I_C = 500\text{A},$	—	—	900	ns
	Rise Time		$t_r$	—	—	500
Switch Time	Turn-off Delay Time	$V_{\text{GE}1} = V_{\text{GE}2} = 15\text{V}, R_G = 3.0\Omega,$	—	—	1200	ns
	Fall Time		$t_f$	—	—	250
Diode Reverse Recovery Time*1	$t_{\text{rr}}$	Switching Operation,	—	—	650	ns
Diode Reverse Recovery Charge*1	$Q_{\text{rr}}$	$I_E = 500\text{A}$	—	50	—	$\mu\text{C}$

\*1 Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDI).  
 \*2 Pulse width and repetition rate should be such that device junction temperature ( $T_j$ ) does not exceed  $T_{j(\text{max})}$  rating.  
 \*3 Pulse width and repetition rate should be such as to cause negligible temperature rise.  
 \*4 Case temperature ( $T_C$ ), and heatsink temperature ( $T_f$ ) measured point is just under the chips.

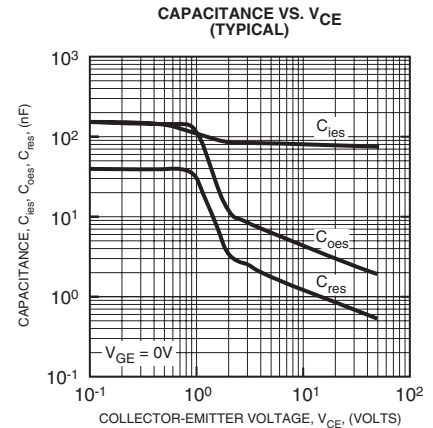
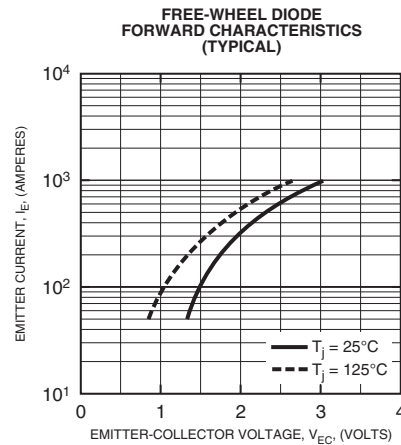
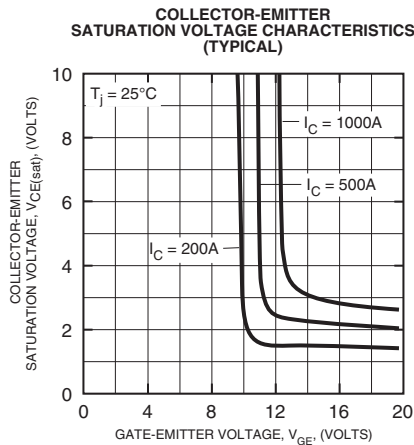
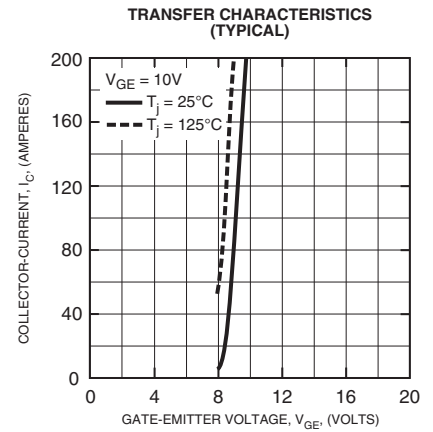
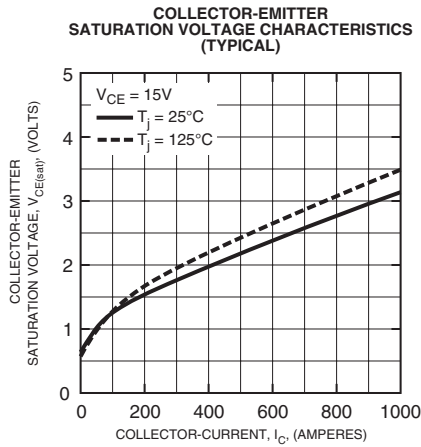
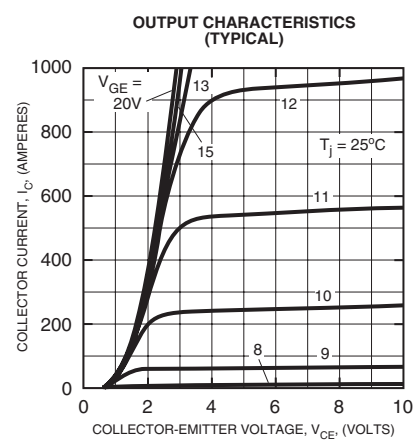
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**Thermal and Mechanical Characteristics,  $T_j = 25^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)Q}$	Per IGBT*4	—	—	0.025	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per FWDI*4	—	—	0.042	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Heatsink, Thermal Grease Applied*4,*5	—	0.015	—	$^\circ\text{C/W}$
External Gate Resistance	$R_G$		3.0	—	10	$\Omega$

\*4 Case temperature ( $T_C$ ), and heatsink temperature ( $T_f$ ) measured point is just under the chips.

\*5 Typical value is measured by using thermally conductive grease of  $\lambda = 0.9$  [W/(m • K)].



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