Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
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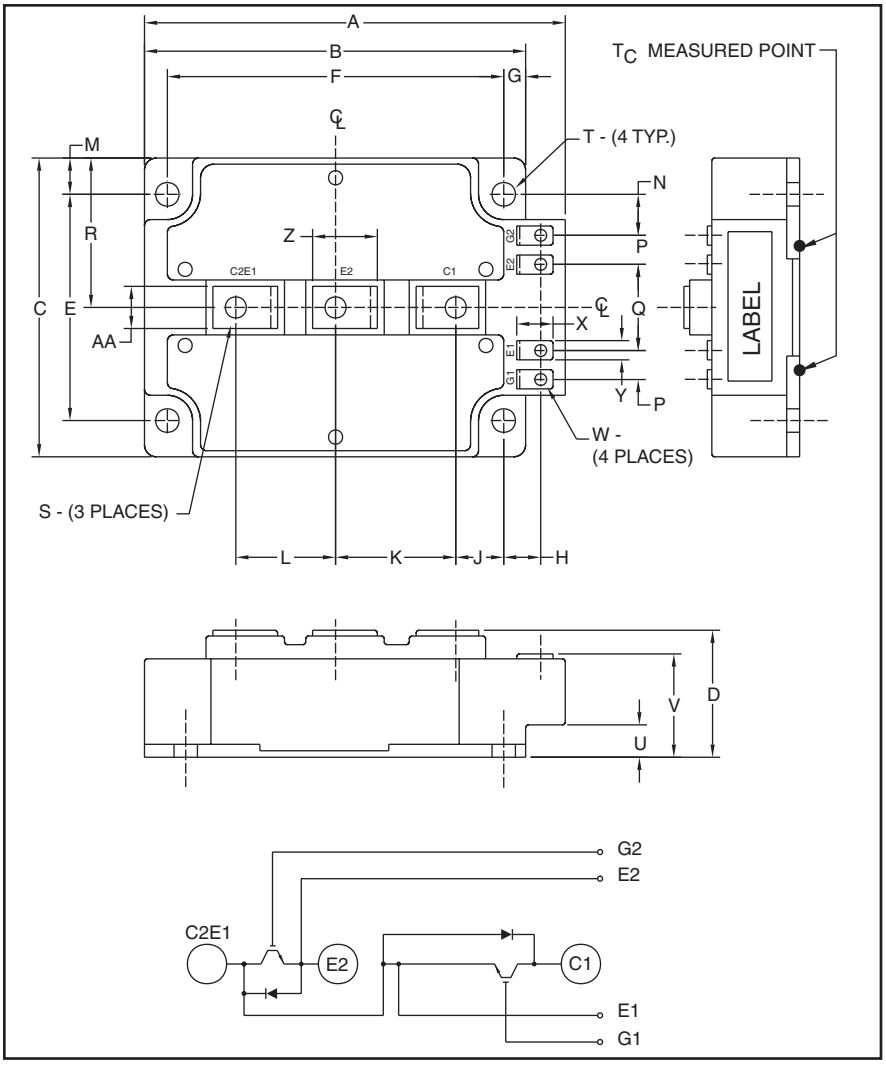
CM400DY-34A

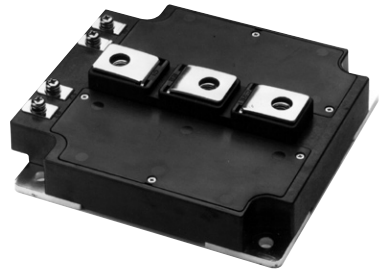
Dual IGBTMOD™ A-Series Module
400 Amperes/1700 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	5.51	140.0
B	5.12	130.0
C	5.12	130.0
D	1.38+0.04/-0.02	35.0+1.0/-0.5
E	4.33+0.04/-0.02	110.0+1.0/-0.5
F	4.33+0.04/-0.02	110.0+1.0/-0.5
G	0.39	10.0
H	0.45	11.5
J	0.54	13.8
K	1.72	43.8
L	1.42	36.0
M	0.39	10.0
N	0.80	20.4

Dimensions	Inches	Millimeters
P	0.57	14.5
Q	1.57	40.0
R	2.56	65.0
S	M8	M8
T	0.26 Dia.	6.5 Dia.
S	0.32	8.0
V	0.97+0.04/-0.02	24.5+1.0/-0.5
W	M4	M4
X	0.59	15.0
Y	0.35	9.0
Z	1.02	26.0
AA	0.79	20.0



Description:
Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of two IGBT Transistors in a half-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 part module number you desire from the table below -i.e. CM400DY-34A is a 1700V (V_{CES}), 400 Ampere Dual IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	400	34

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Absolute Maximum Ratings, T_j = 25°C unless otherwise specified

Ratings	Symbol	CM400DY-34A	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}	1700	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	±20	Volts
Collector Current (DC, T_C = 107°C)*4	I_C	400	Amperes
Peak Collector Current (Pulse Repetition)*2	I_{CM}	800	Amperes
Maximum Collector Dissipation (T_C = 25°C, $T_j \leq$ 150°C)*2,*4	P_C	3780	Watts
Emitter Current (T_C = 25°C)	I_E*1	400	Amperes
Peak Emitter Current (Pulse Repetition)*2	I_{EM}*1	800	Amperes
Mounting Torque, M8 Main Terminal	—	96	in-lb
Mounting Torque, M6 Mounting	—	40	in-lb
Mounting Torque, M4 Mounting	—	15	in-lb
Weight	—	1200	Grams
Isolation Voltage (Main Terminal to Baseplate, f = 60Hz, AC 1 min.)	V_{ISO}	3500	Volts

Static Electrical Characteristics, T_j = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{CE} = V_{CES}$, V_{GE} = 0V	—	—	1.0	mA
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}$, V_{CE} = 0V	—	—	2.0	µA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C = 40mA, V_{CE} = 10V	5.5	7.0	8.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 400A, V_{GE} = 15V, T_j = 25°C*3	—	2.2	2.8	Volts
		I_C = 400A, V_{GE} = 15V, T_j = 125°C*3	—	2.45	—	Volts
Total Gate Charge	Q_G	V_{CC} = 1000V, I_C = 400A, V_{GE} = 15V	—	2670	—	nC
Emitter-Collector Voltage	V_{EC}*1	I_E = 400A, V_{GE} = 0V*3	—	—	3.0	Volts

Dynamic Electrical Characteristics, T_j = 25°C unless otherwise specified

Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance		C_{ies}	V_{CE} = 10V, V_{GE} = 0V	—	—	98.8	nF
Output Capacitance		C_{oes}		—	—	11.2	nF
Reverse Transfer Capacitance		C_{res}		—	—	2.1	nF
Inductive	Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 1000V, I_C = 400A, $V_{GE1} = V_{GE2}$ = 15V, R_G = 1.2Ω, Inductive Load Switching Operation, I_E = 400A	—	—	950	ns
Load	Rise Time	t_r		—	—	300	ns
Switch	Turn-off Delay Time	$t_{d(off)}$		—	—	1000	ns
Time	Fall Time	t_f		—	—	350	ns
Diode Reverse Recovery Time		t_{rr}*1		—	—	450	ns
Diode Reverse Recovery Charge		Q_{rr}*1		—	40	—	µC

*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 $T_{j(max)}$ 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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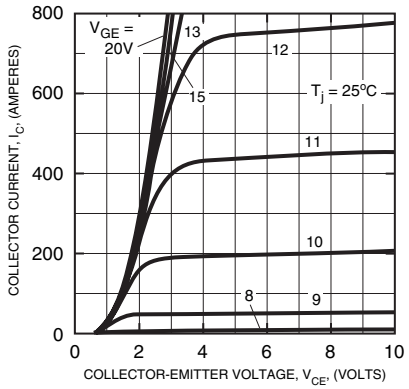
Thermal and Mechanical Characteristics, T_j = 25°C unless otherwise specified

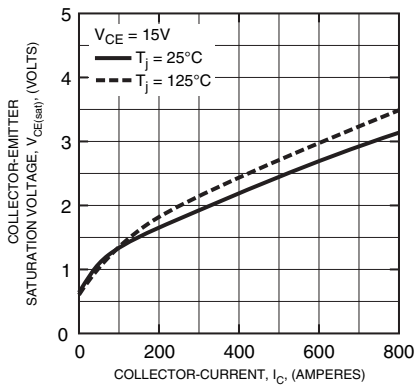
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}Q$	Per IGBT*4	—	—	0.033	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}D$	Per FWDi*4	—	—	0.055	°C/W
Contact Thermal Resistance	$R_{th(c-f)}$	Thermal Grease Applied*4,*5	—	0.019	—	°C/W
External Gate Resistance	R_G		1.2	—	12	Ω

*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 λ = 0.9 [W/(m • K)].

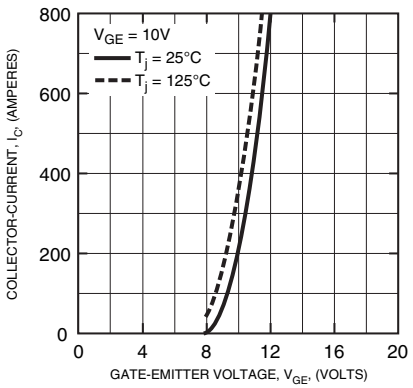
OUTPUT CHARACTERISTICS (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



TRANSFER CHARACTERISTICS (TYPICAL)



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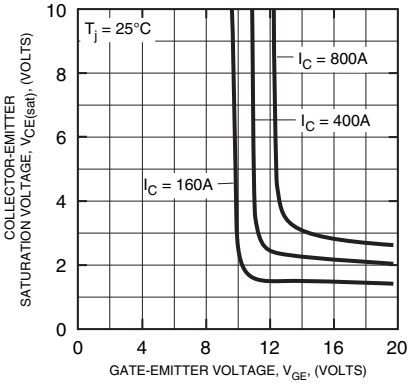
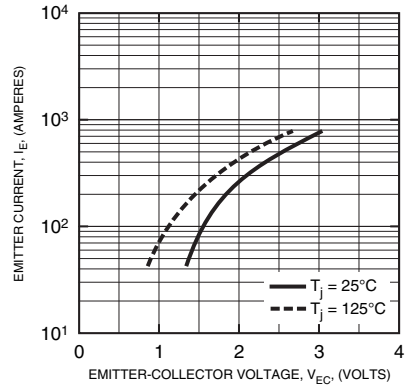
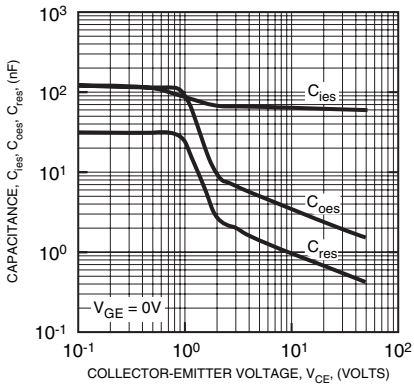


FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



CAPACITANCE VS. V_{CE} (TYPICAL)



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