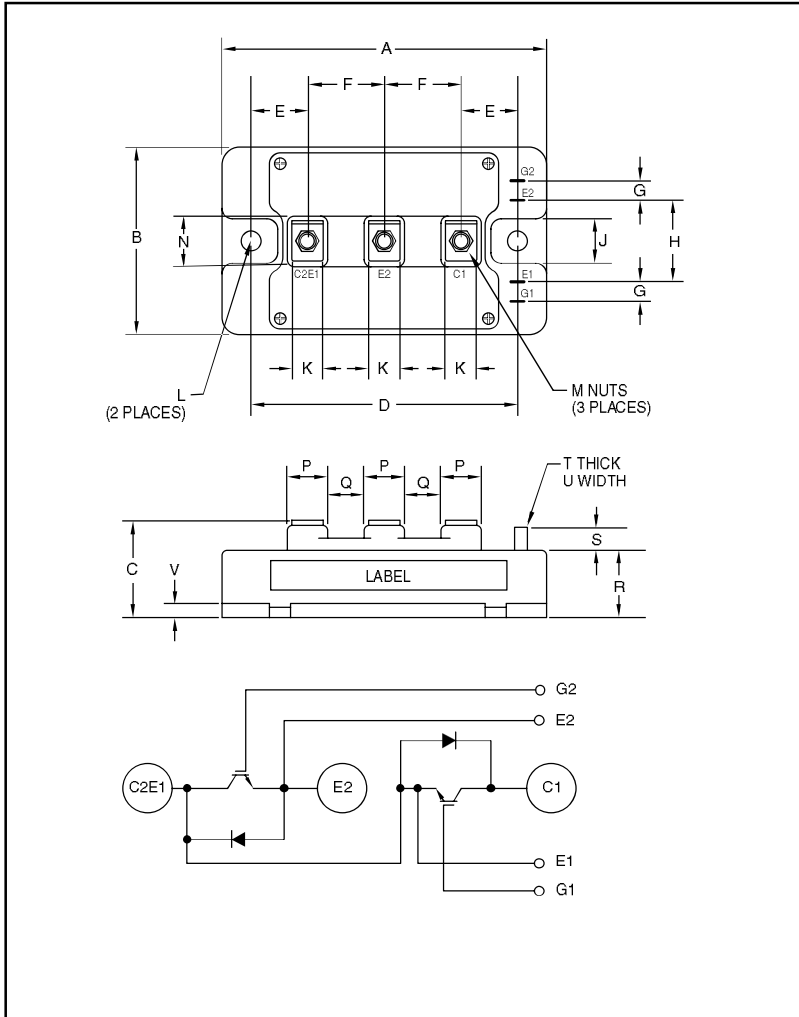




Powerex, Inc., 200 E. Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

CM150DY-24A

Dual IGBTMOD™ A-Series Module 150 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	3.70	94.0
B	1.89	48.0
C	1.14+0.004/-0.02	29.0+0.1/-0.5
D	3.15±0.01	80.0±0.25
E	0.67	17.0
F	0.91	23.0
G	0.16	4.0
H	0.71	18.0
J	0.51	13.0
K	0.47	12.0

Dimensions	Inches	Millimeters
L	0.26 Dia.	Dia. 6.5
M	M5 Metric	M5
N	0.79	20.0
P	0.63	16.0
Q	0.28	7.0
R	0.83	21.2
S	0.30	7.5
T	0.02	0.5
U	0.110	2.8
V	0.16	4.0



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. CM150DY-24A is a 1200V (V_{CES}), 150 Ampere Dual IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	150	24



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

Ratings	Symbol	CM150DY-24A	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}	± 20	Volts
Collector Current (DC, $T_C = 83^\circ\text{C}^*$)	I_C	150	Amperes
Peak Collector Current	I_{CM}	300**	Amperes
Emitter Current*** ($T_C = 25^\circ\text{C}$)	I_E	150	Amperes
Peak Emitter Current***	I_{EM}	300**	Amperes
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}^*$, $T_j \leq 150^\circ\text{C}$)	P_C	960	Watts
Mounting Torque, M5 Main Terminal	—	30	in-lb
Mounting Torque, M6 Mounting	—	40	in-lb
Weight	—	310	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{ISO}	2500	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_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$	—	—	1.0	mA
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}$, $V_{CE} = 0V$	—	—	0.5	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 15\text{mA}$, $V_{CE} = 10V$	6.0	7.0	8.0	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 150A$, $V_{GE} = 15V$, $T_j = 25^\circ\text{C}$	—	2.1	3.0	Volts
		$I_C = 150A$, $V_{GE} = 15V$, $T_j = 125^\circ\text{C}$	—	2.4	—	Volts
Total Gate Charge	Q_G	$V_{CC} = 600V$, $I_C = 150A$, $V_{GE} = 15V$	—	675	—	nC
Emitter-Collector Voltage**	V_{EC}	$I_E = 150A$, $V_{GE} = 0V$	—	—	3.8	Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units	
Input Capacitance	C_{ies}	$V_{CE} = 10V$, $V_{GE} = 0V$	—	—	23	nf	
Output Capacitance	C_{oes}		—	—	2	nf	
Reverse Transfer Capacitance	C_{res}		—	—	0.45	nf	
Inductive	Turn-on Delay Time	$t_{d(on)}$	—	—	130	ns	
	Rise Time						t_r
Switch	Turn-off Delay Time	$t_{d(off)}$	$V_{GE1} = V_{GE2} = 15V$, $R_G = 2.1\Omega$,	—	—	450	
Time	Fall Time	t_f	—	—	350	ns	
Diode Reverse Recovery Time***	t_{rr}	Switching Operation,	—	—	150	ns	
Diode Reverse Recovery Charge***	Q_{rr}	$I_E = 150A$	—	6.0	—	μC	

* T_C , T_f measured point is just under the chips.

**Pulse width and repetition rate should be such that 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).



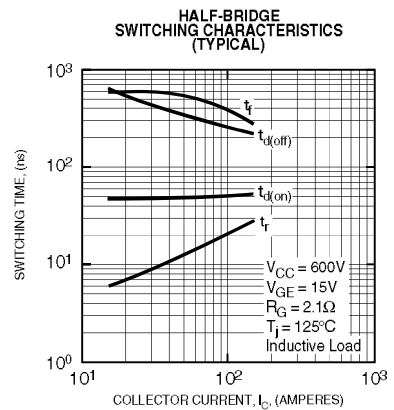
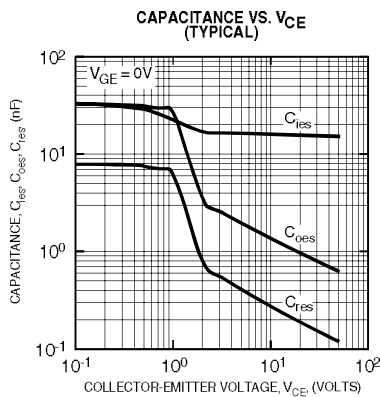
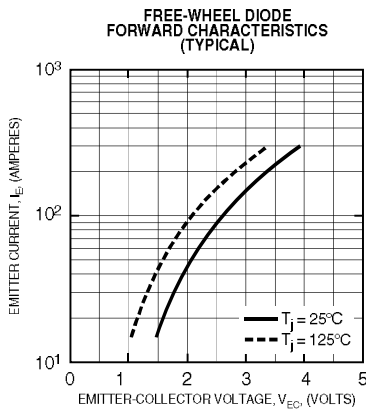
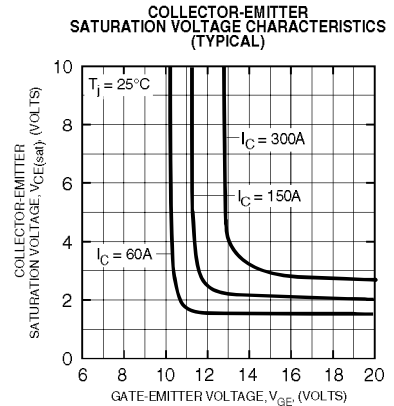
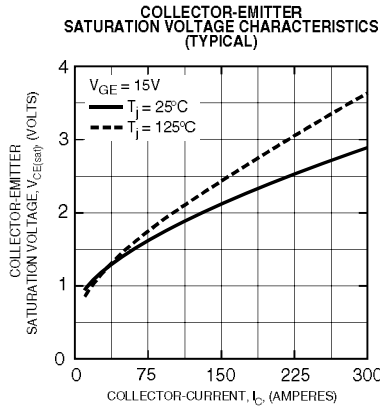
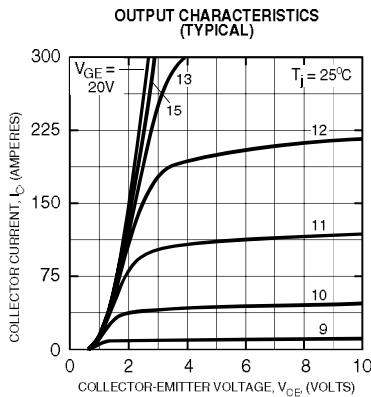
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Thermal and Mechanical Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case*	$R_{th(j-c)Q}$	Per IGBT 1/2 Module	—	—	0.13	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case*	$R_{th(j-c)D}$	Per FWDi 1/2 Module	—	—	0.23	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per 1/2 Module, Thermal Grease Applied	—	0.022	—	$^\circ\text{C/W}$
External Gate Resistance	R_G		2.1	—	31	Ω

* T_C , T_f measured point is just under the chips.

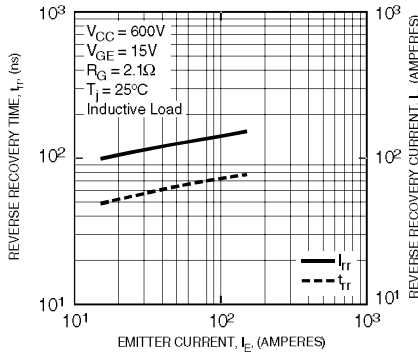




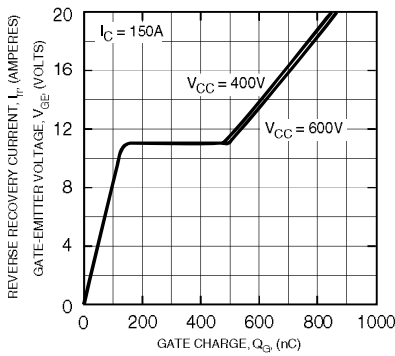
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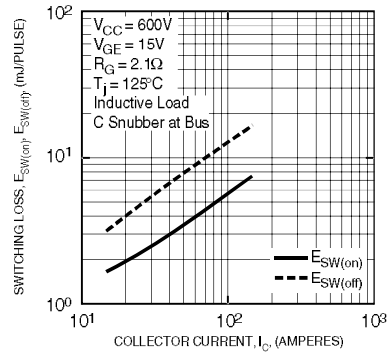
REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



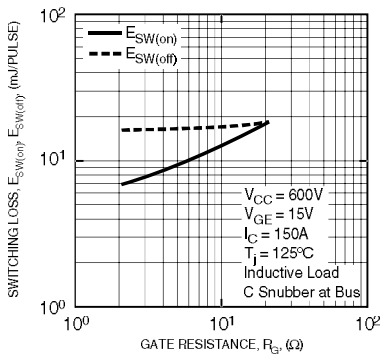
GATE CHARGE VS. V_{GE}



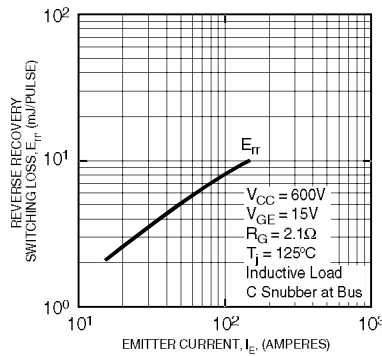
SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)



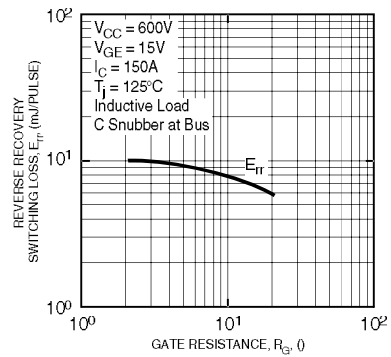
SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



REVERSE RECOVERY SWITCHING LOSS VS. EMITTER CURRENT (TYPICAL)



REVERSE RECOVERY SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDI)

