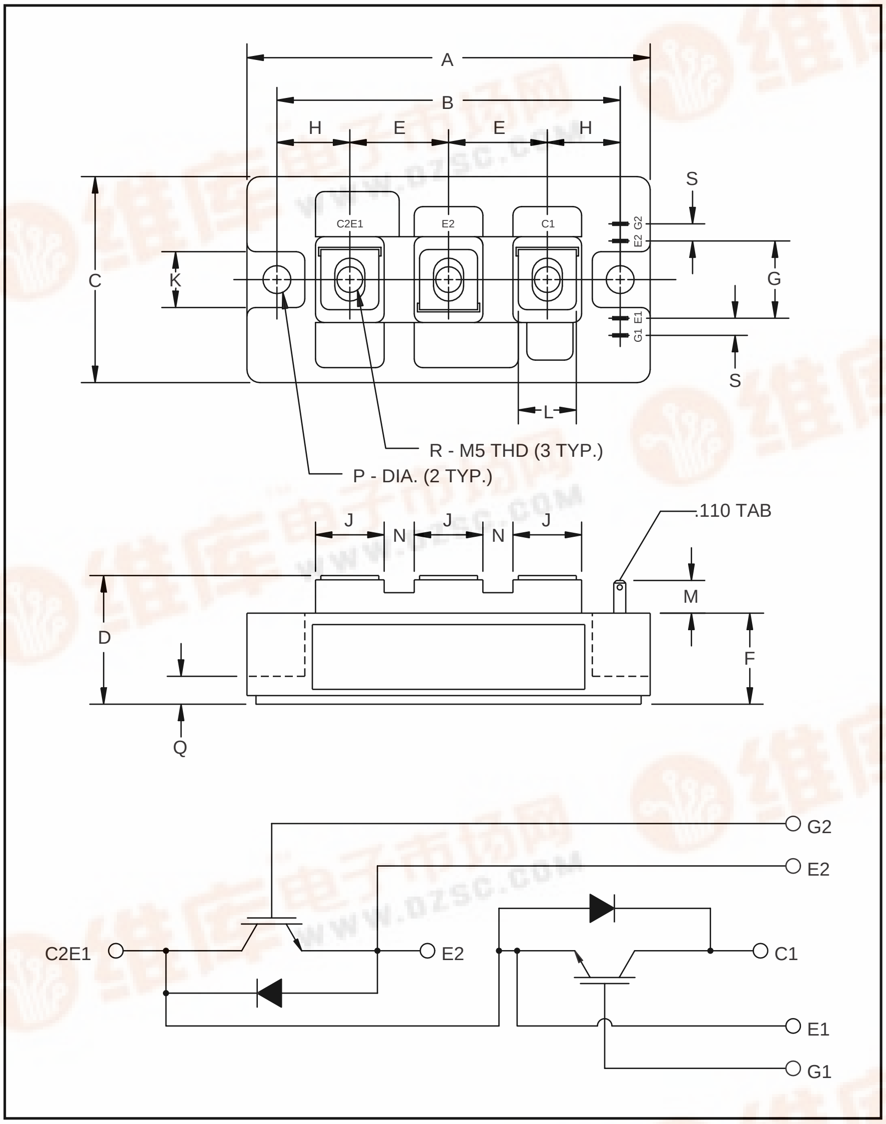
POWEREX

CM150DY-28H

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

Dual IGBTMOD™
H-Series Module
150 Amperes/1400 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	3.70	94.0
B	3.150±0.01	80.0±0.25
C	1.89	48.0
D	1.18 Max.	30.0 Max.
E	0.90	23.0
F	0.83	21.2
G	0.71	18.0
H	0.67	17.0
J	0.63	16.0

Dimensions	Inches	Millimeters
K	0.51	13.0
L	0.47	12.0
M	0.30	7.5
N	0.28	7.0
P	0.256 Dia.	Dia. 6.5
Q	0.26	6.5
R	M5 Metric	M5
S	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 (135ns) 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. CM150DY-28H is a 1400V (V_{CES}), 150 Ampere Dual IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	150	28

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

Ratings	Symbol	CM150DY-28H	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}	1400	Volts
Gate-Emitter Voltage (C-E SHORT)	V_{GES}	±20	Volts
Collector Current	I_C	150	Amperes
Peak Collector Current	I_{CM}	300**	Amperes
Emitter Current	I_E*	150	Amperes
Emitter Current-Pulse	I_{EM}*	300**	Amperes
Maximum Collector Dissipation	P_c	1100***	Watts
Max. Mounting Torque M5 Terminal Screws	–	17	in-lb
Max. Mounting Torque M6 Mounting Screws	–	26	in-lb
Module Weight (Typical)	–	270	Grams
V Isolation	V_{RMS}	2500	Volts

* I_E, V_{EC}, T_{rr}, Q_{rr} & di_E/dt represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWDi).
** Pulse width and repetition rate should be such that the device junction temp. (T_j) does not exceed $T_{j(max)}$ rating.
*** Junction temperature (T_j) should not increase beyond 150°C.

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}	$V_{GE} = V_{GES}$, $V_{CE} = 0V$	–	–	0.5	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 15mA$, $V_{CE} = 10V$	5.0	6.5	8.0	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 150A$, $V_{GE} = 15V$	–	3.1	4.2*	Volts
		$I_C = 150A$, $V_{GE} = 15V$, $T_j = 125°C$	–	2.95	–	Volts
Total Gate Charge	Q_G	$V_{CC} = 800V$, $I_C = 150A$, $V_{GE} = 15V$	–	765	–	nC

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

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

Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance		C_{ies}	$V_{GE} = 0V$, $V_{CE} = 10V$	–	–	30	nF
Output Capacitance		C_{oes}		–	–	10.5	nF
Reverse Transfer Capacitance		C_{res}		–	–	6	nF
Resistive	Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 800V$, $I_C = 150A$, $V_{GE1} = V_{GE2} = 15V$, $R_G = 2.1\Omega$	–	–	250	ns
Load	Rise Time	t_r		–	–	400	ns
Switching	Turn-off Delay Time	$t_{d(off)}$		–	–	300	ns
Times	Fall Time	t_f		–	–	500	ns
Diode Reverse Recovery Time		t_{rr}	$I_E = 150A$, $di_E/dt = –300A/\mu s$	–	–	300	ns
Emitter-Collector Voltage		V_{EC}	$I_E = 150A$, $V_{GE} = 0V$	–	–	3.8	V
Diode Reverse Recovery Charge		Q_{rr}	$I_E = 150A$, $di_E/dt = –300A/\mu s$	–	1.5	–	μC

Thermal and Mechanical Characteristics, $T_j = 25\ °C$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per IGBT	–	–	0.11	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per FWDi	–	–	0.24	°C/W

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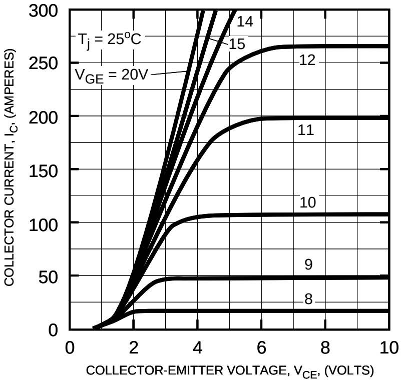
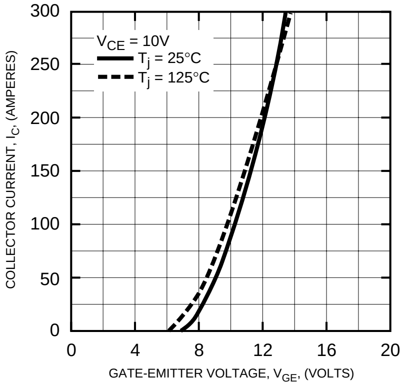
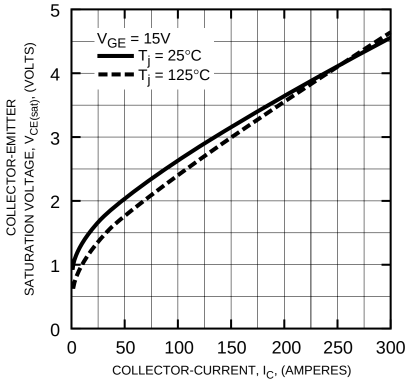
OUTPUT CHARACTERISTICS (TYPICAL)



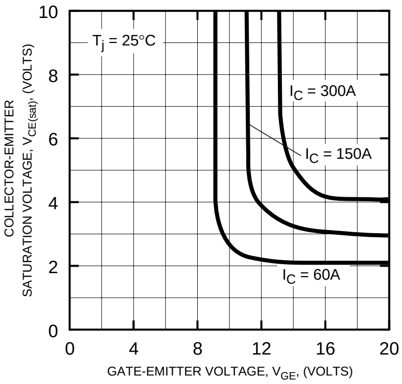
TRANSFER CHARACTERISTICS (TYPICAL)



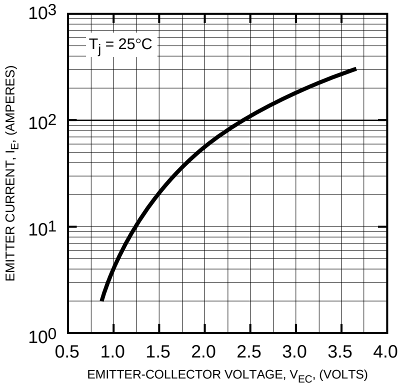
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



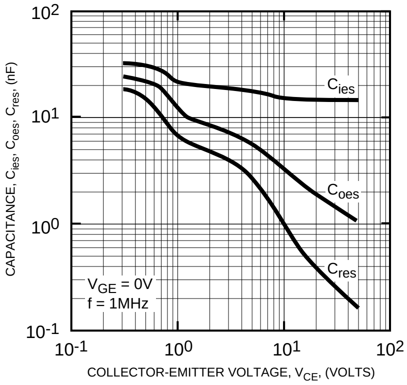
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



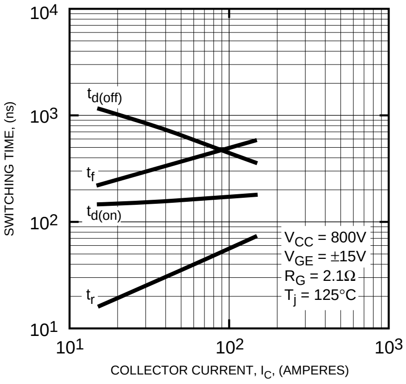
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



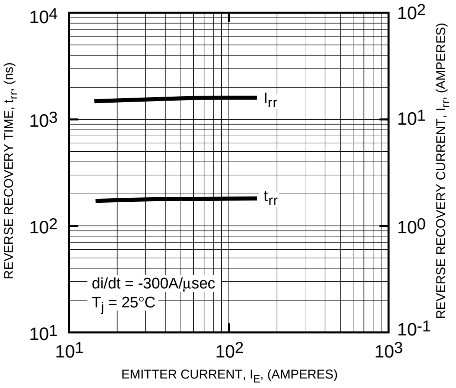
CAPACITANCE VS. V_{CE} (TYPICAL)



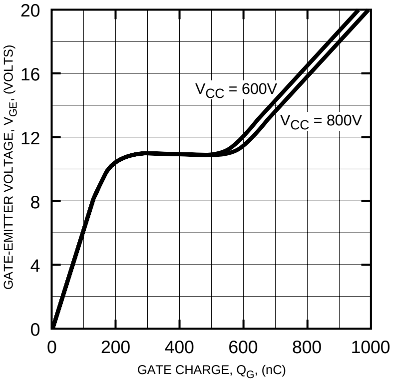
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



GATE CHARGE, V_{GE}



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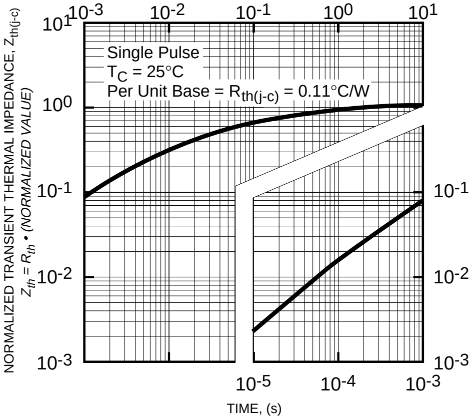
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (FWDi)