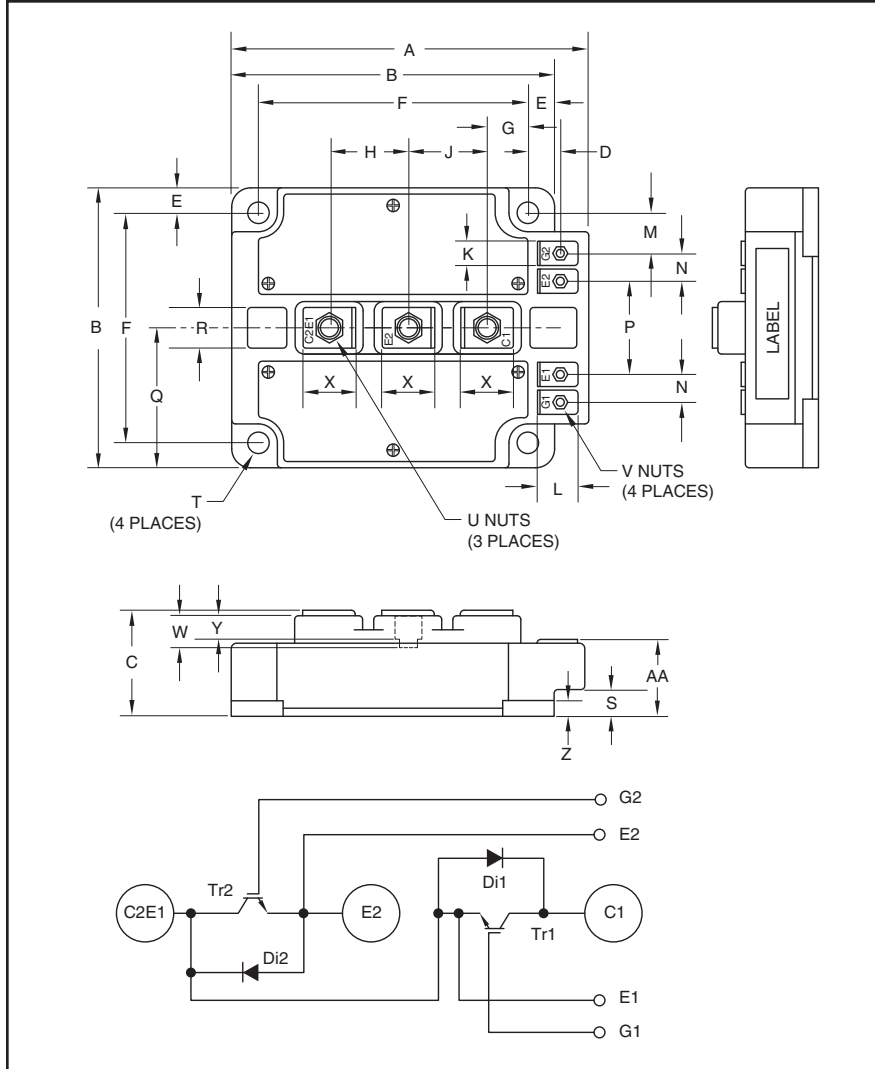


Dual IGBTMOD™ S-Series Module 800 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	5.51	140.0
B	5.12	130.0
C	1.38±0.04/-0.02	35.0+1.0/-0.5
D	0.45	11.5
E	0.39	10.0
F	4.33±0.001	110.0±0.25
G	0.54	13.8
H	1.42	36.0
J	1.72	43.8
K	0.35	9.0
L	0.59	15.0
M	0.80	20.4
N	0.57	14.5

Dimensions	Inches	Millimeters
P	1.57	40.0
Q	2.56	65.0
R	0.79	20.0
S	0.32	8.0
T	0.26 Dia.	6.5 Dia.
U	M8 Metric	M8
V	M4 Metric	M4
W	0.43	11.1
X	1.02	26.0
Y	0.29	7.3
Z	0.16	4.0
AA	0.96±0.04/-0.02	24.5+1.0/-0.5



Description:

Powerex Dual 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
- Motion/Servo Control
- UPS
- Welding Power Supplies
- Laser Power Supplies

Ordering Information:

Example: Select the complete module number you desire from the table - i.e. CM800DY-24S is a 1200V (V_{CES}), 800 Ampere Dual IGBTMOD™ Power Module.

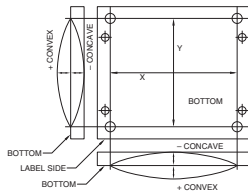
Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	800	24

CM800DY-24S
Dual IGBTMOD™ S-Series Module
 800 Amperes/1200 Volts

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

Ratings	Symbol	CM800DY-24S	Units
Maximum Junction Temperature	$T_{j(max)}$	+175	$^\circ\text{C}$
Operating Junction Temperature	$T_{j(op)}$	-40 ~ +150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 ~ +125	$^\circ\text{C}$
Case Temperature ^{*2}	T_C	-40 ~ +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, $T_C = 117^\circ\text{C}$) ^{*2,*8}	I_C	790	Amperes
Peak Collector Current (Pulse, Repetitive) ^{*3}	I_{CRM}	1600	Amperes
Total Power Dissipation ($T_C = 25^\circ\text{C}$) ^{*2,*4}	P_{tot}	5355	Watts
Emitter Current (FWDi Current, $T_C = 25^\circ\text{C}$) ^{*2,*4,*8}	I_E^{*1}	790	Amperes
Peak Emitter Current (FWDi Current, Pulse, Repetitive) ^{*3}	I_{ERM}^{*1}	1600	Amperes
Mounting Torque, M8 Main Terminals	–	95	in-lb
Mounting Torque, M4 Auxiliary Terminals	–	15	in-lb
Mounting Torque, M6 Mounting to Heatsink	–	40	in-lb
Creepage Distance (Terminal to Terminal)	d_s	–	mm
Creepage Distance (Terminal to Baseplate)	d_s	–	mm
Clearance (Terminal to Terminal)	d_a	–	mm
Clearance (Terminal to Baseplate)	d_a	–	mm
Weight	–	1200	Grams
Flatness of Baseplate (On the Centerline X, Y) ^{*7}	e_c	-100 ~ +100	μm
Isolation Voltage (Terminals to Baseplate, RMS, f = 60Hz, AC 1 min.)	V_{iso}	2500	Volts

*1 Represent ratings and characteristics of the anti-parallel, emitter-to-collector free wheeling diode (FWDi).
 *2 Case temperature (T_C) and heatsink temperature (T_s) measured point is just under the chips.
 *3 Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.
 *4 Junction temperature (T_j) should not increase beyond maximum junction temperature ($T_{j(max)}$) rating.
 *6 Typical value is measured by using thermally conductive grease of $\lambda = 0.9\text{ W/(m}\cdot\text{K)}$.
 *7 Baseplate flatness measurement point is as in the following figure.



*8 This module has 800A IGBT and FWDi chips. This limitation is based on a package limitation.

CM800DY-24S
Dual IGBTMOD™ S-Series Module
 800 Amperes/1200 Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Emitter Cutoff Current	I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$	–	–	1	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{GE} = V_{GES}, V_{CE} = 0V$	–	–	0.5	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 80\text{mA}, V_{CE} = 10V$	5.4	6.0	6.6	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$ (Terminal)	$I_C = 800A, V_{GE} = 15V, T_j = 25^\circ\text{C}^{*5}$	–	1.95	2.40	Volts
		$I_C = 800A, V_{GE} = 15V, T_j = 125^\circ\text{C}^{*5}$	–	2.25	–	Volts
		$I_C = 800A, V_{GE} = 15V, T_j = 150^\circ\text{C}^{*5}$	–	2.35	–	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$ (Chip)	$I_C = 800A, V_{GE} = 15V, T_j = 25^\circ\text{C}$	–	1.70	2.15	Volts
		$I_C = 800A, V_{GE} = 15V, T_j = 125^\circ\text{C}$	–	1.90	–	Volts
		$I_C = 800A, V_{GE} = 15V, T_j = 150^\circ\text{C}$	–	1.95	–	Volts
Gate Charge	Q_G	$V_{CC} = 600V, I_C = 800A, V_{GE} = 15V$	–	1868	–	nC
Emitter-Collector Voltage	V_{EC}^{*1} (Terminal)	$I_E = 800A, V_{GE} = 0V, T_j = 25^\circ\text{C}^{*5}$	–	1.85	2.30	Volts
		$I_E = 800A, V_{GE} = 0V, T_j = 125^\circ\text{C}^{*5}$	–	1.85	–	Volts
		$I_E = 800A, V_{GE} = 0V, T_j = 150^\circ\text{C}^{*5}$	–	1.85	–	Volts
Emitter-Collector Voltage	V_{EC}^{*1} (Chip)	$I_E = 800A, V_{GE} = 0V, T_j = 25^\circ\text{C}$	–	1.70	2.15	Volts
		$I_E = 800A, V_{GE} = 0V, T_j = 125^\circ\text{C}$	–	1.70	–	Volts
		$I_E = 800A, V_{GE} = 0V, T_j = 150^\circ\text{C}$	–	1.70	–	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}		–	–	80.0	nF
Output Capacitance	C_{oes}	$V_{CE} = 10V, V_{GE} = 0V$	–	–	16.0	nF
Reverse Transfer Capacitance	C_{res}		–	–	1.32	nF
Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 800A,$	–	–	800	ns
Rise Time	t_r	$V_{GE} = 15V,$	–	–	200	ns
Turn-off Delay Time	$t_{d(off)}$	$R_G = 0\Omega,$	–	–	600	ns
Fall Time	t_f	Inductive Load	–	–	300	ns
Reverse Recovery Time	t_{rr}^{*1}	$V_{CC} = 600V, I_E = 800A, V_{GE} = \pm 15V,$	–	–	300	ns
Reverse Recovery Charge	Q_{rr}^{*1}	$R_G = 0\Omega,$ Inductive Load	–	42.8	–	μC
Turn-on switching Energy (Per Pulse)	E_{on}	$V_{CC} = 600V, I_C = I_E = 800A,$	–	107	–	mJ
Turn-off Switching Energy (Per Pulse)	E_{off}	$V_{GE} = \pm 15V, R_G = 0\Omega,$	–	82	–	mJ
Reverse Recovery Energy (Per Pulse)	E_{rr}^{*1}	$T_j = 150^\circ\text{C},$ Inductive Load	–	71	–	mJ
Internal Lead resistance	$R_{CC} + EE'$	Main Terminals-Chip, Per Switch, $T_C = 25^\circ\text{C}^{*2}$	–	–	0.4	m Ω
Internal Gate Resistance	r_g	Per Switch	–	2.45	–	Ω

*1 Represent ratings and characteristics of the anti-parallel, emitter-to-collector free wheeling diode (FWDI).

*2 Case temperature (T_C) and heatsink temperature (T_θ) measured point is just under the chips.

*5 Pulse width and repetition rate should be such as to cause negligible temperature rise.



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

CM800DY-24S
Dual IGBTMOD™ S-Series Module
800 Amperes/1200 Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case ^{*2}	$R_{th(j-c)Q}$	Per IGBT	–	–	0.028	°C/W
Thermal Resistance, Junction to Case ^{*2}	$R_{th(j-c)R}$	Per FWDi	–	–	0.045	°C/W
Contact Thermal Resistance ^{*2}	$R_{th(c-s)}$	Case to Heatsink, Per 1/2 Module, Thermal Grease Applied ^{*6}	–	0.015	–	°C/W

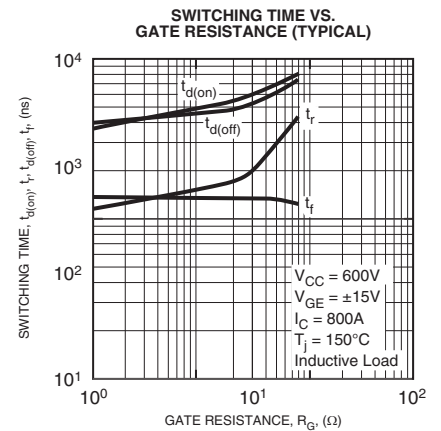
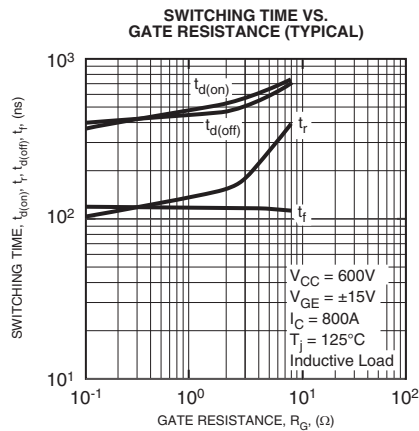
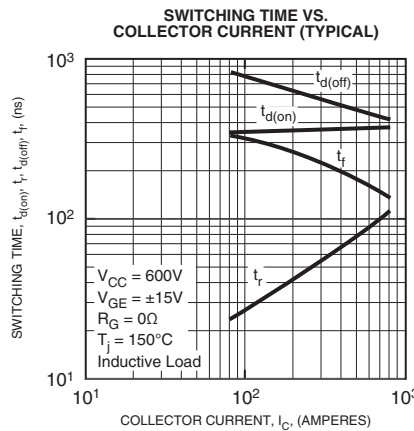
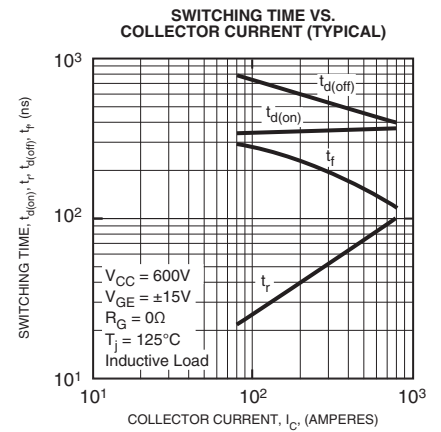
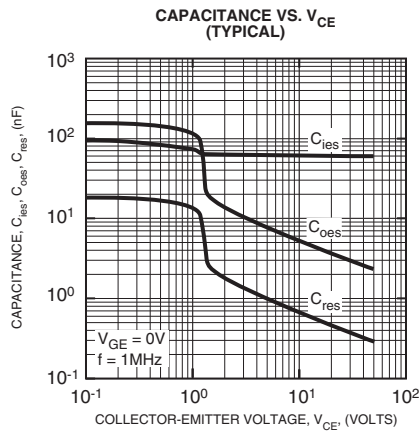
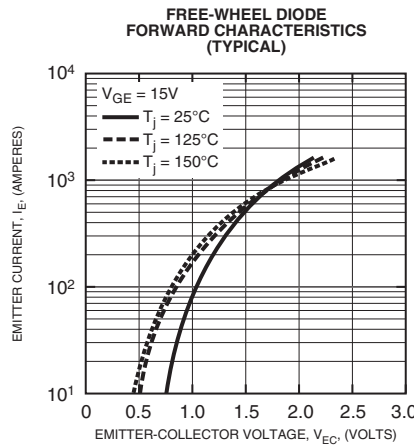
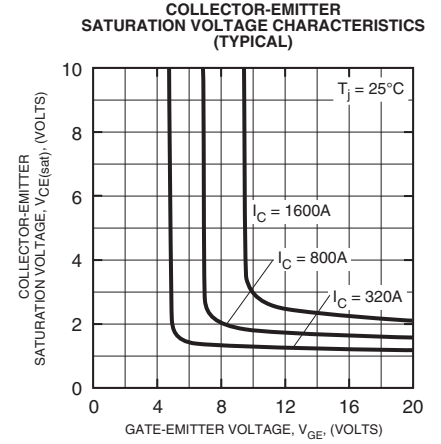
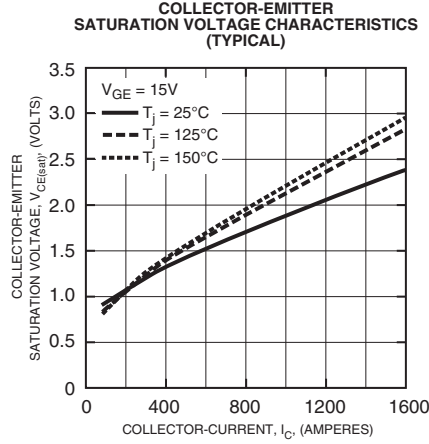
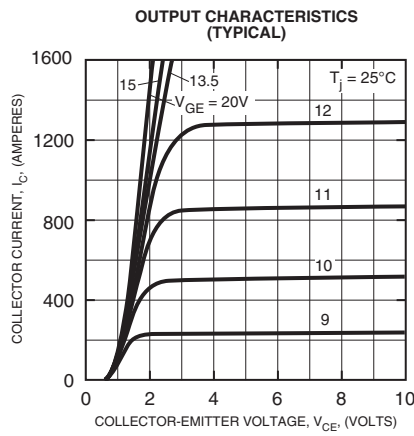
Recommended Operating Conditions, $T_a = 25\text{ °C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
DC Supply Voltage	V_{CC}	Applied Across C1-E2	–	600	850	Volts
Gate (-Emitter Drive) Voltage	$V_{GE(on)}$	Applied Across G1-Es1/G2-Es2	13.5	15.0	16.5	Volts
External Gate Resistance	R_G	Per Switch	0	–	5.1	Ω

^{*2} Case temperature (T_C) and heatsink temperature (T_s) measured point is just under the chips.

^{*6} Typical value is measured by using thermally conductive grease of $\lambda = 0.9\text{ W/(m}\cdot\text{K)}$.

CM800DY-24S
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 800 Amperes/1200 Volts



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