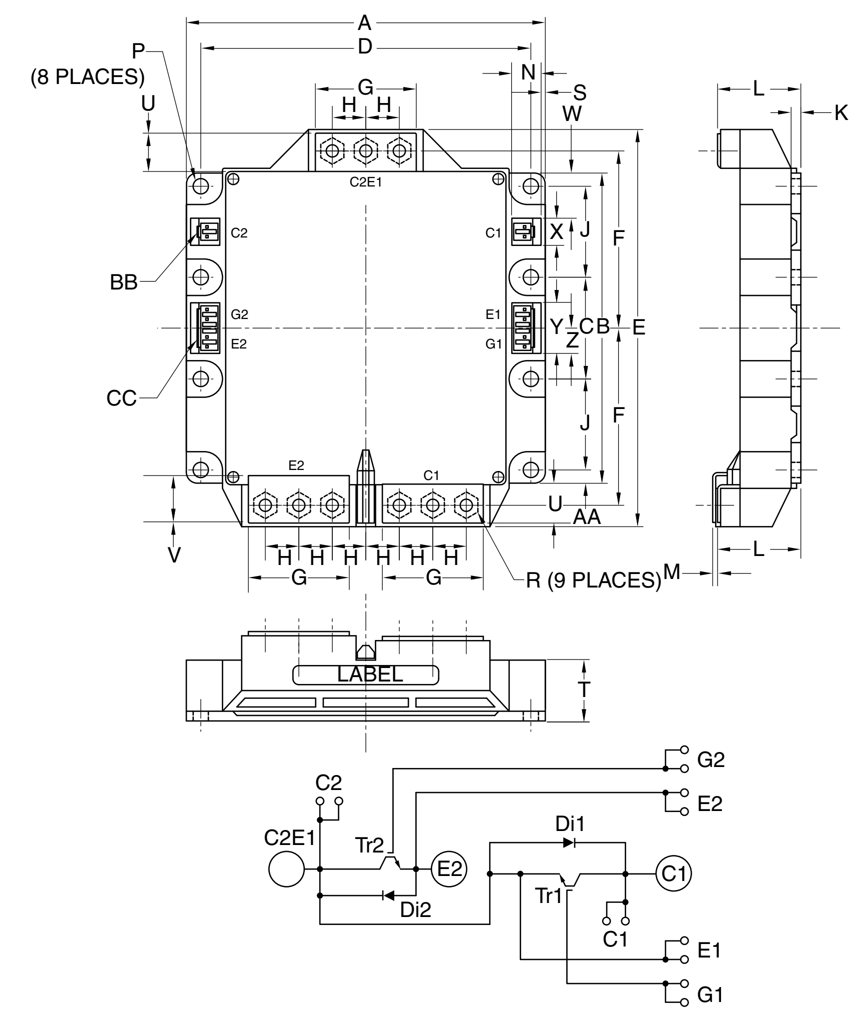
POWEREX

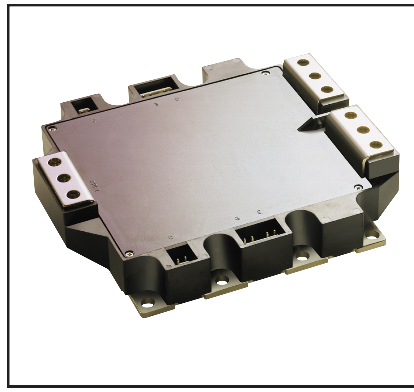
CM900DUC-24NF

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

Mega Power Dual IGBTMOD™
900 Amperes/1200 Volts



Outline Drawing and Circuit Diagram



Dimensions	Inches	Millimeters
A	5.91	150.0
B	5.10	129.5
C	1.67±0.01	42.5±0.25
D	5.41±0.01	137.5±0.25
E	6.54	166.0
F	2.91±0.01	74.0±0.25
G	1.65	42.0
H	0.55	14.0
J	1.50±0.01	38.0±0.25
K	0.16	4.0
L	1.36 +0.04/-0.02	34.6 +1.0/-0.5

Housing Type (J.S.T. MFG. CO. LTD)
BB = VHR-2N
CC = VHR-5N

Dimensions	Inches	Millimeters
M	0.075±0.008	1.9±0.2
N	0.47	12.0
P	0.26	6.5
R	M6 Metric	M6
S	0.08	2.0
T	0.99	25.1
U	0.62	15.7
V	0.71	18.0
W	0.75	19.0
X	0.43	11.0
Y	0.83	21.0
Z	0.41	10.5
AA	0.22	5.5

Description:
Powerex Mega Power Dual (MPD) Modules are designed for use in switching applications. Each module consists of two IGBT Transistors 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 Heatsinking
- ☐ RoHS Compliant

Applications:
- ☐ High Power DC Power Supply
- ☐ Large DC Motor Drives
- ☐ Utility Interface Inverters

Ordering Information:
Example: Select the complete module number you desire from the table - i.e. CM900DUC-24NF is a 1200V (V_{CES}), 900 Ampere Dual IGBTMOD Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	900	24

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

Ratings	Symbol	CM900DUC-24NF	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}	1200	Volts
Gate-Emitter Voltage (C-E SHORT)	V_{GES}	±20	Volts
Collector Current DC (T_C = 96°C)*1	I_C	900	Amperes
Peak Collector Current (Pulse, $T_j \leq$ 150°C)*4	I_{CM}	1800	Amperes
Emitter Current (T_C = 25°C)	I_E *3	900	Amperes
Peak Emitter Current (Pulse)*4	I_{EM} *3	1800	Amperes
Maximum Collector Dissipation (T_j < 150°C, T_C = 25°C)*1	P_C	5900	Watts
Mounting Torque, M6 Mounting Screws	–	40	in-lb (max.)
Mounting Torque, M6 Main Terminal Screw	–	40	in-lb (max.)
Weight (Typical)	–	1450	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{iso}	2500	Volts

*1 Case temperature T_C and heatsink temperature (T_f) measured point is just under the chips.
*3 I_E, I_{EM}, V_{EC}, I_{FSM}, I^2t, t_{rr}, Q_{rr} represent ratings and characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).
*4 Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.

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	mA
Gate-Emitter Threshold Voltage		$V_{GE(th)}$	I_C = 90mA, V_{CE} = 10V	6	7	8	Volts
Gate Leakage Current		I_{GES}	$V_{GE} = V_{GES}$, V_{CE} = 0V	–	–	1.0	μA
Collector-Emitter Saturation Voltage (Chip)		$V_{CE(sat)}$	I_C = 900A, V_{GE} = 15V, T_j = 25°C*6	–	1.8	2.5	Volts
(Without Lead Resistance)			I_C = 900A, V_{GE} = 15V, T_j = 125°C*6	–	2.0	–	Volts
Module Lead Resistance		$R_{(lead)}$	I_C = 900A, Terminal-Chip	–	0.286	–	mΩ
Input Capacitance		C_{ies}		–	–	140	nF
Output Capacitance		C_{oes}	V_{CE} = 10V, V_{GE} = 0V	–	–	16	nF
Reverse Transfer Capacitance		C_{res}		–	–	3	nF
Total Gate Charge		Q_G	V_{CC} = 600V, I_C = 900A, V_{GE} = 15V	–	4800	–	nC
Inductive	Turn-on Delay Time	$t_{d(on)}$	V_{CC} = 600V, I_C = 900A,	–	–	600	ns
Load	Rise Time	t_r	$V_{GE1} = V_{GE2}$ = 15V,	–	–	200	ns
Switch	Turn-off Delay Time	$t_{d(off)}$	R_G = 0.35Ω, Inductive Load	–	–	800	ns
Times	Fall Time	t_f	Switching Operation	–	–	300	ns
Reverse Recovery Time		t_{rr}*3	I_E = 900A	–	–	500	ns
Reverse Recovery Charge		Q_{rr}*3		–	50	–	μC
Emitter-Collector Voltage (Chip) (Without Lead resistance)		V_{EC}*3	I_E = 900A, V_{GE} = 0V*6	–	–	3.2	Volts
External Gate Resistance		R_G		0.35	–	2.2	Ω

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case*1	$R_{th(j-c)}Q$	Per IGBT (1/2 Module)	–	–	0.021	°C/W
Thermal Resistance, Junction to Case*1	$R_{th(j-c)}D$	Per Clamp Diode (1/2 Module)	–	–	0.034	°C/W
Contact Thermal Resistance*1	$R_{th(c-f)}$	Thermal Grease Applied (1/2 Module)	–	0.012	–	°C/W

*1 Case temperatureT_C and heatsink temperature (T_f) measured point is just under the chips.
*3 I_E, I_{EM}, V_{EC}, I_{FSM}, I^2t, t_{rr}, Q_{rr} represent ratings and characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).
*6 Pulse width and repetition rate should be such as to cause negligible teperature rise.

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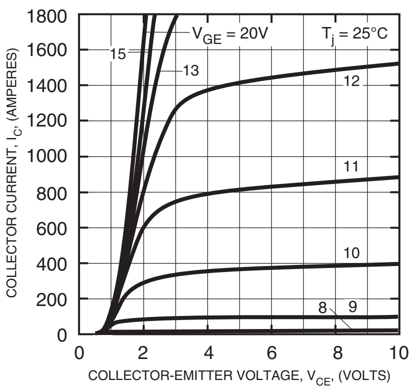
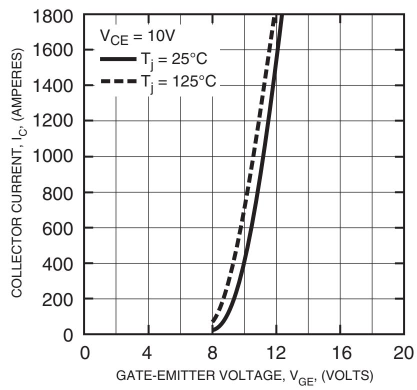
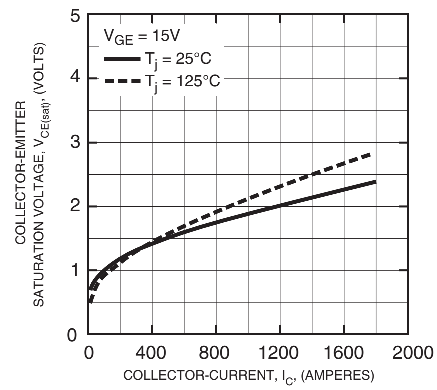
OUTPUT CHARACTERISTICS (TYPICAL)



TRANSFER CHARACTERISTICS (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



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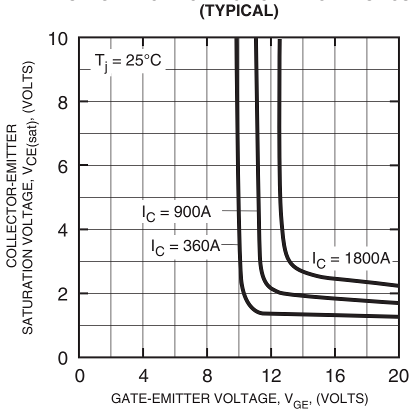
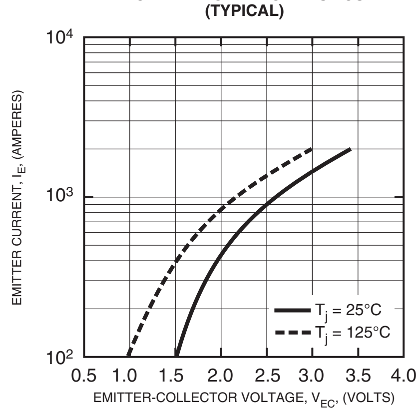
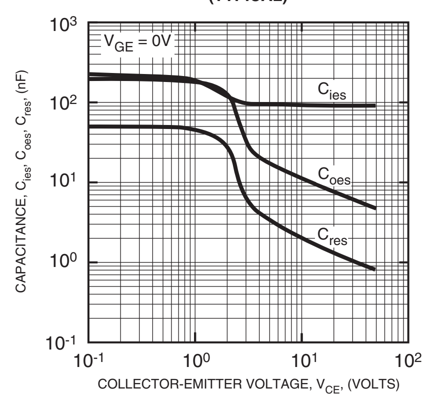


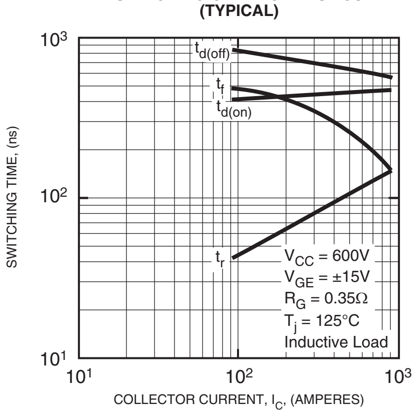
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



CAPACITANCE VS. V_{CE} (TYPICAL)



HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



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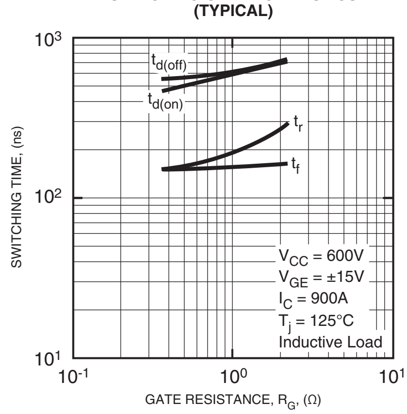
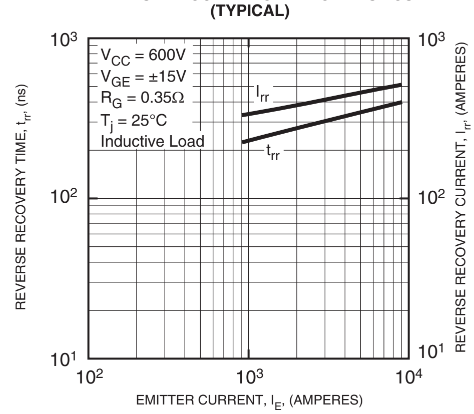


REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



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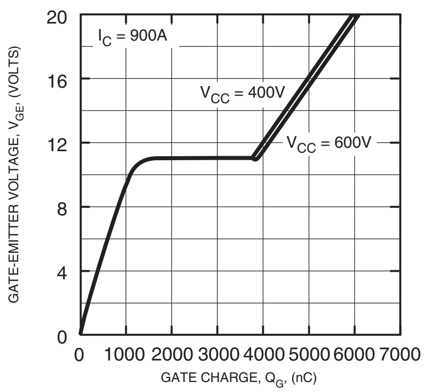
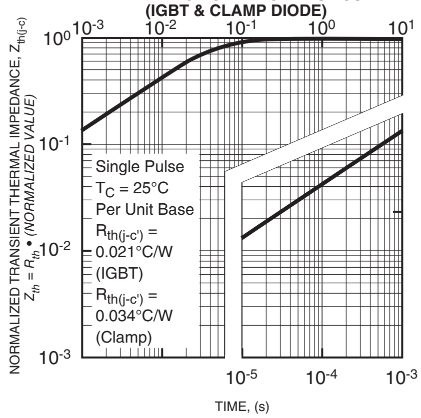
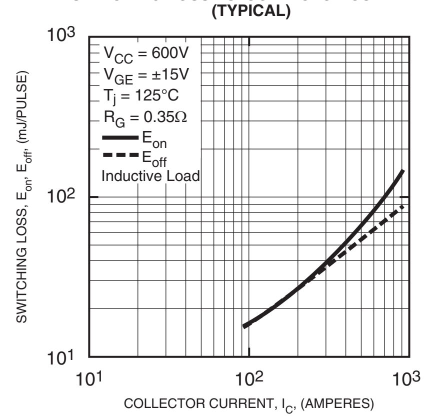
GATE CHARGE, V_{GE}



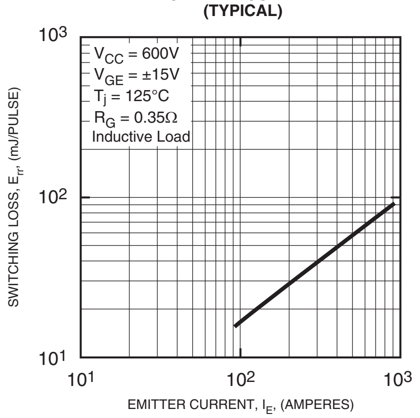
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & CLAMP DIODE)



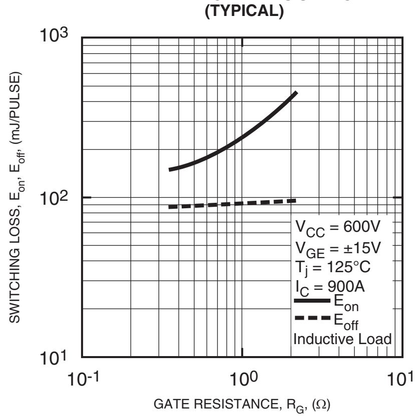
SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)



REVERSE RECOVERY ENERGY VS. FORWARD CURRENT (TYPICAL)



SWITCHING ENERGY VS. EXTERNAL GATE RESISTANCE (TYPICAL)



REVERSE RECOVERY ENERGY VS. EXTERNAL GATE RESISTANCE (TYPICAL)