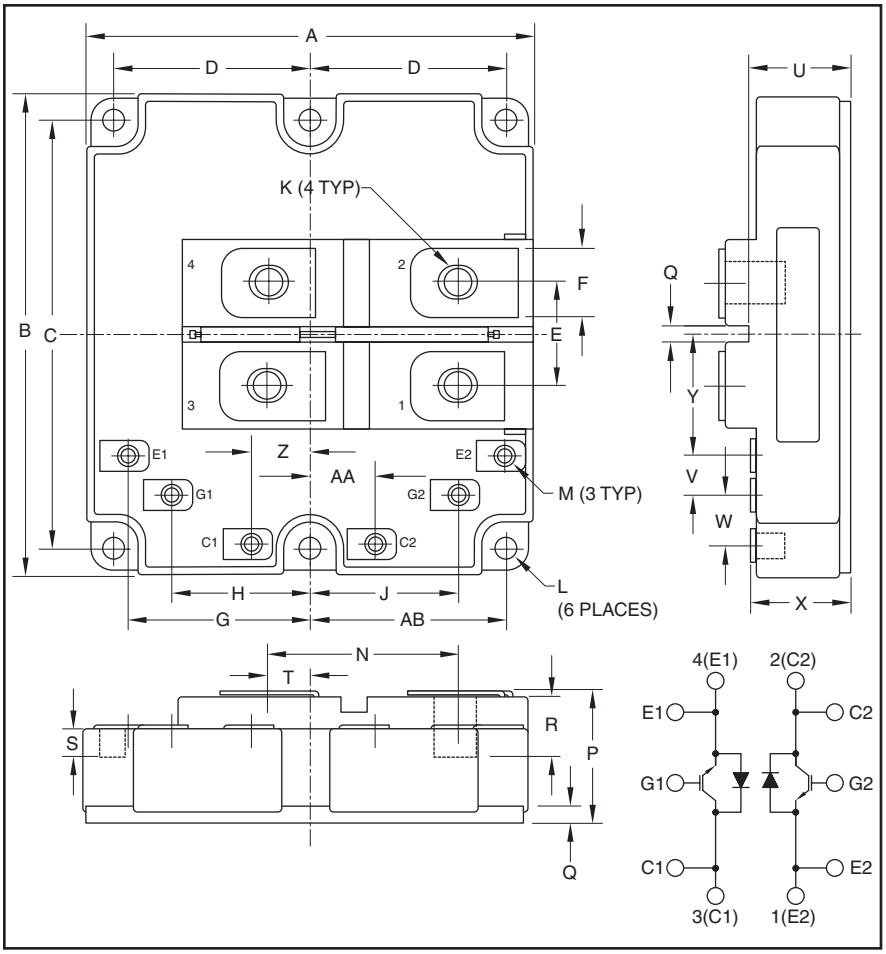
Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272
www.pwrx.com

CM1200DC-34N

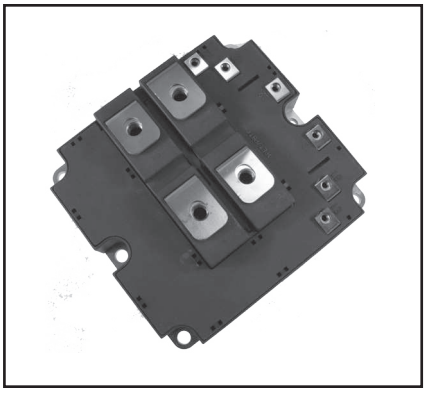
Dual IGBTMOD™ HVIGBT Module
1200 Amperes/1700 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	5.12±0.02	130.0±0.5
B	5.51±0.02	140.0±0.5
C	4.88±0.01	124.0±0.25
D	2.24±0.01	57.0±0.25
E	1.18±0.008	30.0±0.2
F	0.79±0.004	20.0±0.1
G	2.09±0.008	53.0±0.2
H	1.57±0.008	40.0±0.2
J	1.73±0.008	44.0±0.2
K	M8 Metric	M8
L	0.28 Dia.	7.0 Dia.
M	M4 Metric	M4
N	2.17±0.01	55.2±0.3

Dimensions	Inches	Millimeters
P	1.50+0.04/-0.0	38.0+1.0/-0.0
Q	0.2±0.008	5.0±0.2
R	0.65 Min.	16.5 Min.
S	0.30 Min.	7.7 Min.
T	0.47±0.008	11.85±0.2
U	1.16±0.02	29.5±0.5
V	0.45±0.008	11.5±0.2
W	0.55±0.008	14.0±0.2
X	1.10+0.04/-0.0	28.0+1.0/-0.0
Y	1.38±0.008	35.0±0.2
Z	0.63±0.008	16.0±0.2
AA	0.71±0.008	18.0±0.2
AB	2.24±0.008	57.0±0.2



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 $V_{CE(sat)}$
- ☐ Super-Fast Recovery Free-Wheel Diode
- ☐ Isolated Baseplate for Easy Heat Sinking

Applications:

- ☐ Traction
- ☐ Medium Voltage Drives
- ☐ High Voltage Power Supplies

Ordering Information:

Example: Select the complete part module number you desire from the table below -i.e. CM1200DC-34N is a 1700V (V_{CES}), 1200 Ampere Dual IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	1200	34

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

Ratings	Symbol	CM1200DC-34N	Units
Junction Temperature	T_j	-40 to 150	°C
Storage Temperature	T_{stg}	-40 to 125	°C
Operating Temperature	T_{opr}	-40 to 125	°C
Collector-Emitter Voltage (V_{GE} = 0V)	V_{CES}	1700	Volts
Gate-Emitter Voltage (V_{CE} = 0V)	V_{GES}	±20	Volts
Collector Current (DC, T_c = 75°C)	I_C	1200	Amperes
Peak Collector Current (Pulse)	I_{CM}*1	2400	Amperes
Emitter Current (T_c = 25°C)*2	I_E	1200	Amperes
Emitter Surge Current (Pulse)*2	I_{EM}*1	2400	Amperes
Maximum Power Dissipation (T_c = 25°C, IGBT Part)*3	P_C	6500	Watts
Max. Mounting Torque M8 Main Terminal Screws	–	177	in-lb
Max. Mounting Torque M6 Mounting Screws	–	53	in-lb
Max. Mounting Torque M4 Auxiliary Terminal Screws	–	27	in-lb
Module Weight (Typical)	–	0.8	kg
Isolation Voltage (RMS, Sinusoidal, f = 60Hz, t = 1 min.)	V_{iso}	4000	Volts
Maximum Short Circuit Pulse Width (V_{CC} = 1200V, V_{CES} ≤ 1700V, V_{GE} = 15V, T_j = 125°C)	t_{psc}	10	µs

*1 Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{opr(max)}$ rating (125°C).
*2 Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).
*3 Junction temperature (T_j) should not exceed $T_{j(max)}$ rating (150°C).

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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	–	–	4	mA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C = 120mA, V_{CE} = 10V	6.0	7.0	8.0	Volts
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}$, V_{CE} = 0V	–	–	0.5	µA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 1200A, V_{GE} = 15V, T_j = 25°C*4	–	2.15	2.80	Volts
		I_C = 1200A, V_{GE} = 15V, T_j = 125°C*4	–	2.40	–	Volts
Input Capacitance	C_{ies}	V_{CE} = 10V, f = 100kHz, V_{GE} = 0V	–	176	–	nF
Output Capacitance	C_{oes}		–	9.6	–	nF
Reverse Transfer Capacitance	C_{res}		–	2.8	–	nF
Total Gate Charge	Q_G	V_{CC} = 850V, I_C = 1200A, V_{GE} = 15V	–	6.8	–	µC
Emitter-Collector Voltage	V_{EC}*2	I_E = 1200A, V_{GE} = 0V, T_j = 25°C*4	–	2.60	3.30	Volts
		I_E = 1200A, V_{GE} = 0V, T_j = 125°C*4	–	2.30	–	Volts
Turn-On Delay Time	$t_{d(on)}$	V_{CC} = 850V, I_C = 1200A,	–	1.00	–	µs
Turn-On Rise Time	t_r	V_{GE} = ±15V, $R_{G(on)}$ = 1.3Ω,	–	0.40	–	µs
Turn-On Switching Energy	E_{on}	T_j = 125°C, L_s = 150nH, Inductive Load	–	380	–	mJ/P
Turn-Off Delay Time	$t_{d(off)}$	V_{CC} = 850V, I_C = 1200A,	–	1.20	–	µs
Turn-Off Fall Time	t_f	V_{GE} = ±15V, $R_{G(off)}$ = 3.3Ω,	–	0.30	–	µs
Turn-Off Switching Energy	E_{off}	T_j = 125°C, L_s = 150nH, Inductive Load	–	360	–	mJ/P
Reverse Recovery Time	t_{rr}*2	V_{CC} = 850V, I_C = 1200A,	–	1.00	–	µs
Reverse Recovery Current	I_{rr}*2	V_{GE} = ±15V, $R_{G(on)}$ = 1.3Ω,	–	560	–	Amperes
Reverse Recovery Charge	Q_{rr}*2	T_j = 125°C, L_s = 150nH,	–	300	–	µC
Reverse Recovery Energy	E_{rec}*2	Inductive Load	–	220	–	mJ/P

*2 Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).
*4 Pulse width and repetition rate should be such as to cause negligible temperature rise.

Thermal 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	IGBT Part, 1/2 Module	–	–	0.019	°C/W
Thermal Resistance, Junction to Case	$R_{th(j-c)}$ D	FWDi Part, 1/2 Module	–	–	0.042	°C/W
Contact Thermal Resistance, Case to Fin	$R_{th(c-f)}$	λ_{grease} = 1W/m•K, 1/2 Module	–	0.016	–	°C/W

Mechanical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Comparative Tracking Index	CTI	–	600	–	–	–
Clearance Distance in Air	d_a	–	9.5	–	–	mm
Creepage Distance Along Surface	d_s	–	15.0	–	–	mm
Internal Inductance	$L_{C-E(int)}$	IGBT Part	–	30	–	nH
Internal Lead Resistance	$R_{C-E(int)}$	T_C = 25°C	–	0.28	–	mΩ

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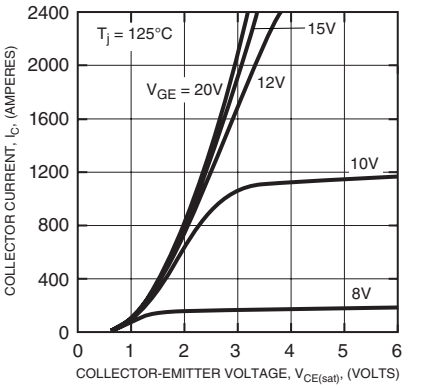
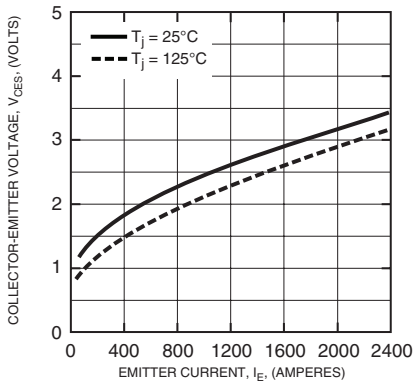
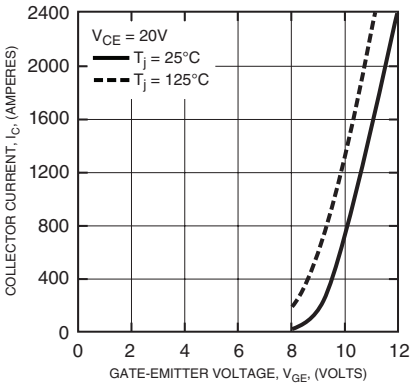
OUTPUT CHARACTERISTICS (TYPICAL)



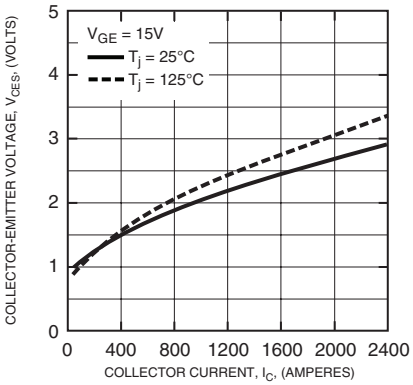
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



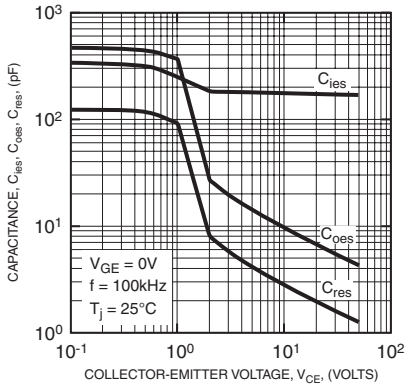
TRANSFER CHARACTERISTICS (TYPICAL)



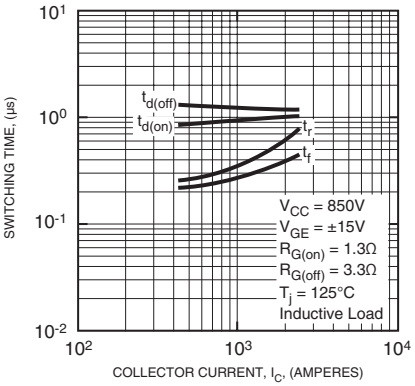
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



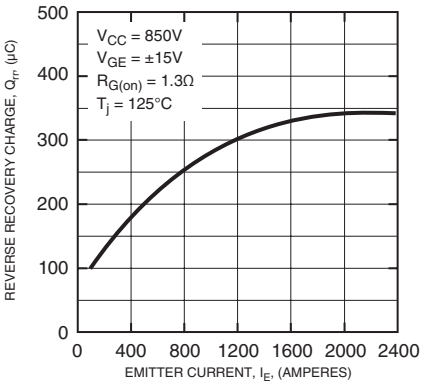
CAPACITANCE VS. COLLECTOR-EMITTER VOLTAGE (TYPICAL)



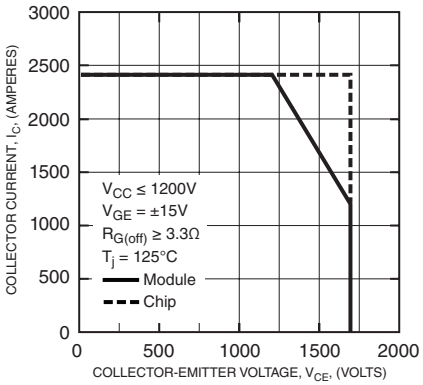
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



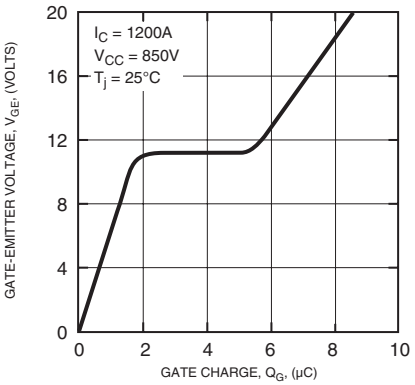
FREE-WHEEL DIODE REVERSE RECOVERY CHARGE CHARACTERISTICS (TYPICAL)



REVERSE BIAS SAFE OPERATING AREA (RBSOA)



GATE CHARGE, V_{GE}



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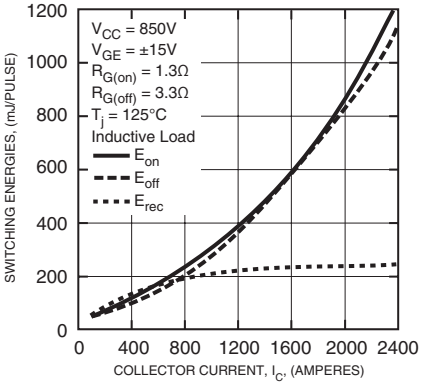
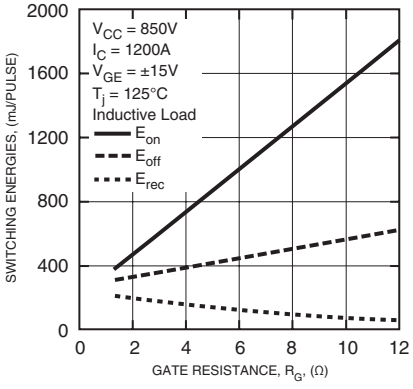
HALF-BRIDGE SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



HALF-BRIDGE SWITCHING ENERGY CHARACTERISTICS (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDi)