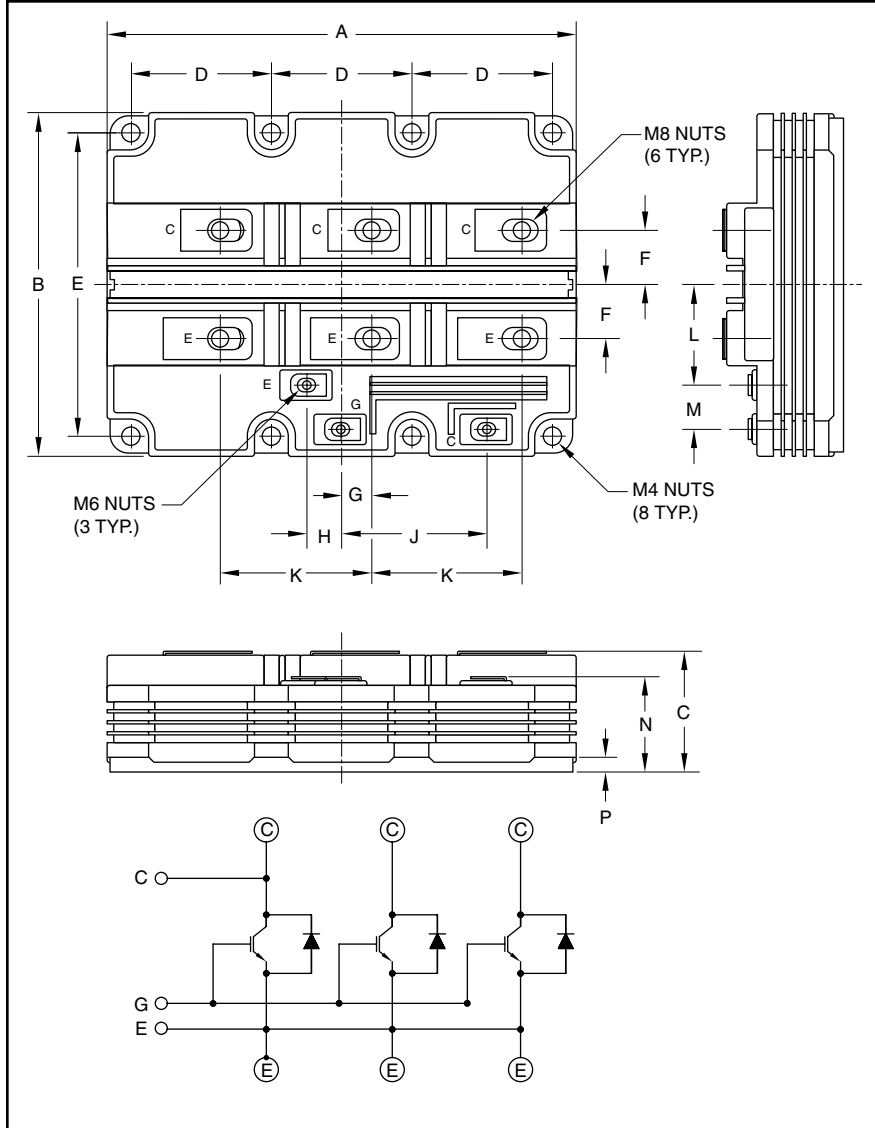


Single IGBTMOD™ HVIGBT Module 600 Amperes/6500 Volts



Description:

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of one IGBT Transistor in 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. CM600HG-130H is a 6500V (V_{CES}), 600 Ampere Single IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	600	130

Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	7.48	190.0
B	5.51	140.0
C	1.89	48.0
D	2.24	57.0
E	4.88	124.0
F	0.87	22.0
G	0.47	12.0

Dimensions	Inches	Millimeters
H	0.55	14.0
J	2.33	59.2
K	2.41	61.2
L	1.61	41.0
M	0.71	18.0
N	1.50	38.0
P	0.20	5.0



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

CM600HG-130H
Single IGBTMOD™ HVIGBT Module
 600 Amperes/6500 Volts

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

Ratings	Symbol	CM600HG-130H	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}	6500	Volts
Gate-Emitter Voltage ($V_{CE} = 0V$)	V_{GES}	±20	Volts
Collector Current (DC, $T_c = 80\text{ °C}$)	I_C	600	Amperes
Peak Collector Current (Pulse)	I_{CM}	1200*	Amperes
Emitter Current** ($T_c = 25\text{ °C}$)	I_E	600	Amperes
Emitter Surge Current** (Pulse)	I_{EM}	1200*	Amperes
Maximum Collector Dissipation ($T_c = 25\text{ °C}$, IGBT Part, $T_{j(max)} \leq 125\text{ °C}$)	P_C	8900	Watts
Partial Discharge ($V_1 = 6900\text{ V}_{rms}$, $V_2 = 5100\text{ V}_{rms}$, 60 Hz (Acc. to IEC 1287))	Q_{pd}	10	pC
Max. Mounting Torque M8 Main Terminal Screws	–	133	in-lb
Max. Mounting Torque M6 Mounting Screws	–	53	in-lb
Max. Mounting Torque M4 Auxiliary Terminal Screws	–	27	in-lb
Module Weight (Typical)	–	1.35	kg
Isolation Voltage (Charged Part to Baseplate, AC 60Hz 1 min.)	V_{iso}	10200	Volts
Maximum Turn-Off Switching Current ($V_{CC} \leq 4500V$, $V_{GE} = \pm 15V$, $T_j = 125\text{ °C}$)	–	1200	Amperes
Short Circuit Capability, Maximum Pulse Width ($V_{CC} \leq 4500V$, $V_{GE} = \pm 15V$, $T_j = 125\text{ °C}$)	–	10	µs
Maximum Reverse Recovery Instantaneous Power ($V_{CC} \leq 4500V$, $di_e/dt \leq 3000A/\mu s$, $T_j = 125\text{ °C}$)	–	3600	kW

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



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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V, T_j = 25^\circ\text{C}$	–	–	10.0	mA
		$V_{CE} = V_{CES}, V_{GE} = 0V, T_j = 125^\circ\text{C}$	–	30	90.0	mA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 60\text{mA}, V_{CE} = 10V$	5.0	6.0	7.0	Volts
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}, V_{CE} = 0V$	–	–	0.5	μA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 600\text{A}, V_{GE} = 15V, T_j = 25^\circ\text{C}$	–	5.1	–	Volts
		$I_C = 600\text{A}, V_{GE} = 15V, T_j = 125^\circ\text{C}$	–	5.0	–	Volts
Input Capacitance	C_{ies}	$V_{CE} = 10V, V_{GE} = 0V,$	–	124	–	nF
Output Capacitance	C_{oes}	$f = 100\text{kHz},$	–	7.6	–	nF
Reverse Transfer Capacitance	C_{res}	$T_j = 25^\circ\text{C}$	–	2.2	–	nF
Total Gate Charge	Q_G	$V_{CC} = 3600V, I_C = 600\text{A}, V_{GE} = 15V$	–	9.9	–	μC
Emitter-Collector Voltage**	V_{EC}	$I_E = 600\text{A}, V_{GE} = 0V, T_j = 25^\circ\text{C}$	–	4.0	–	Volts
		$I_E = 600\text{A}, V_{GE} = 0V, T_j = 125^\circ\text{C}$	–	3.6	–	Volts
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 3600V, I_C = 600\text{A},$	–	1.2	–	μs
Turn-On Rise Time	t_r	$V_{GE1} = -V_{GE2} = 15V, R_{G(on)} = 10\Omega,$	–	0.35	–	μs
Turn-On Switching Energy	E_{on}	$T_j = 125^\circ\text{C}, t_{off} = 60\mu\text{s}$	–	4.5	–	J/P
Turn-Off Delay Time	$t_{d(off)}$	$V_{CC} = 3600V, I_C = 600\text{A},$	–	6.6	–	μs
Turn-Off Fall Time 1	t_{f1}	$V_{GE1} = -V_{GE2} = 15V,$	–	0.5	–	μs
Turn-Off Fall Time 2	t_{f2}	$R_{G(off)} = 24\Omega,$	–	3.3	–	μs
Turn-Off Switching Energy	E_{off}	$T_j = 125^\circ\text{C}, t_{off} = 60\mu\text{s}$	–	3.5	–	J/P
Reverse Recovery Time 1**	t_{rr1}	$V_{CC} = 3600V, I_E = 600\text{A},$	–	1.0	–	μs
Reverse Recovery Time 2**	t_{rr2}	$di_e/dt = -2000\text{A}/\mu\text{s},$	–	2.4	–	μs
Reverse Recovery Charge**	Q_{rr}	$T_j = 125^\circ\text{C},$	–	1100	–	μC
Reverse Recovery Energy**	E_{rec}	$t_{off} = 60\mu\text{s}$	–	2.0	–	J/P

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

**Represents characteristics of the anti-parallel, emitter-to-collector free-wheel diode (FWDi).

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}$ Q	Per IGBT	–	–	14.0	K/kW
Thermal Resistance, Junction to Case	$R_{th(j-c)}$ D	Per FWDi	–	–	22.0	K/kW
Contact Thermal Resistance, Case to Fin	$R_{th(c-f)}$	Per Module, Thermal Grease Applied	–	6.0	–	K/kW

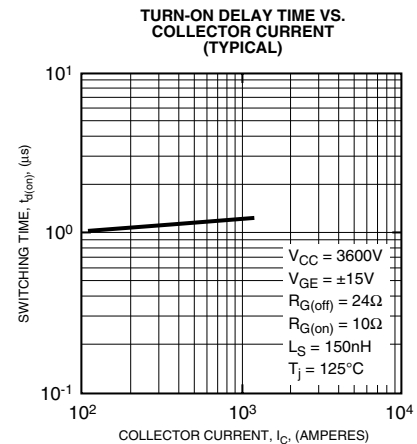
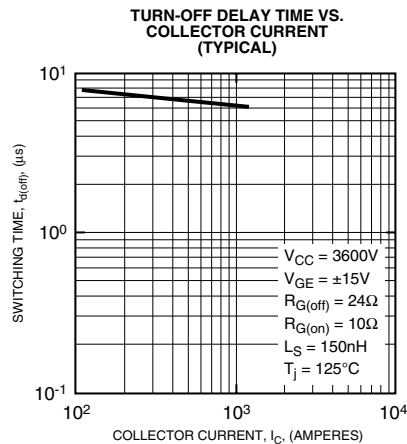
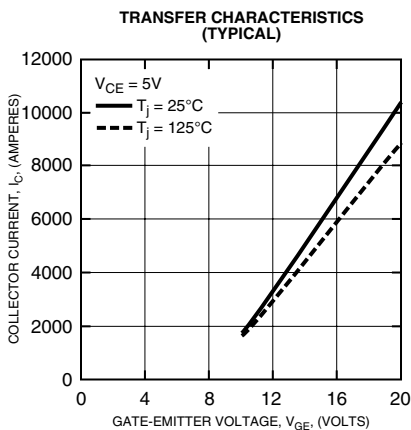
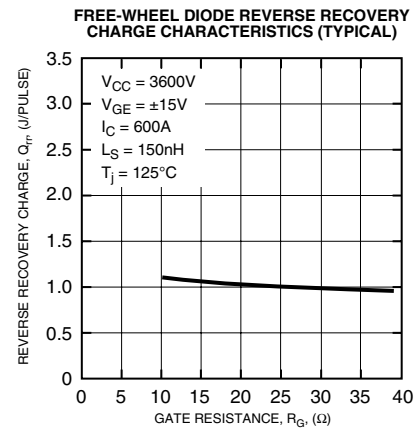
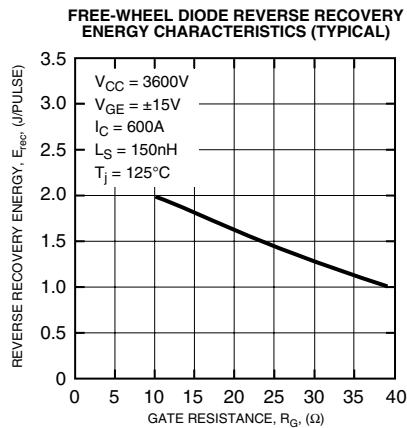
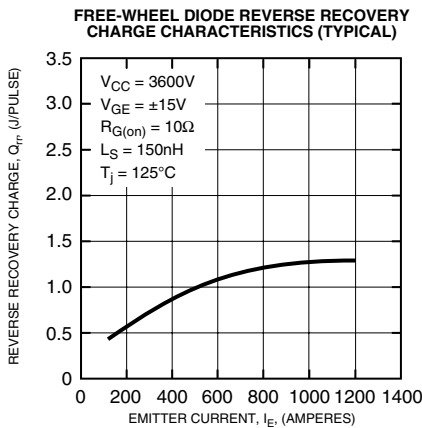
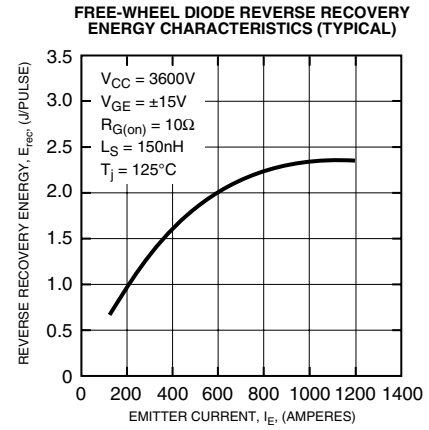
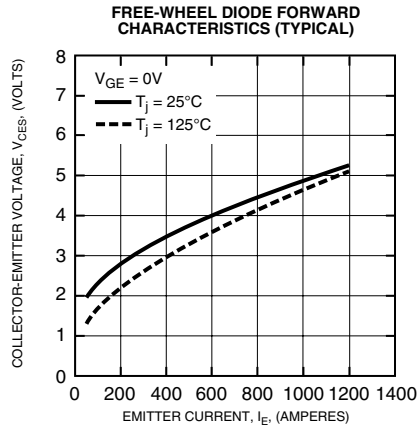
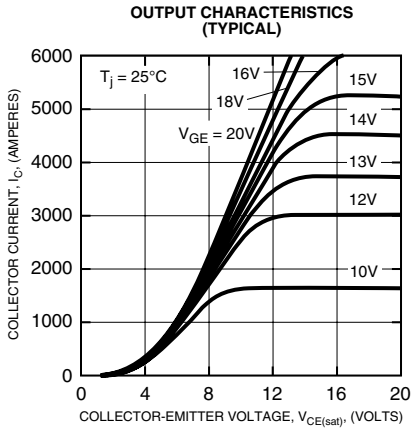
Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Comparative Tracking Index	CTI	–	600	–	–	–
Clearance	–	–	26.0	–	–	mm
Creepage Distance	–	–	56.0	–	–	mm
Internal Inductance	$L_{C-E(int)}$	–	–	18	–	nH
Internal Lead Resistance	$R_{C-E(int)}$	–	–	0.18	–	m Ω



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