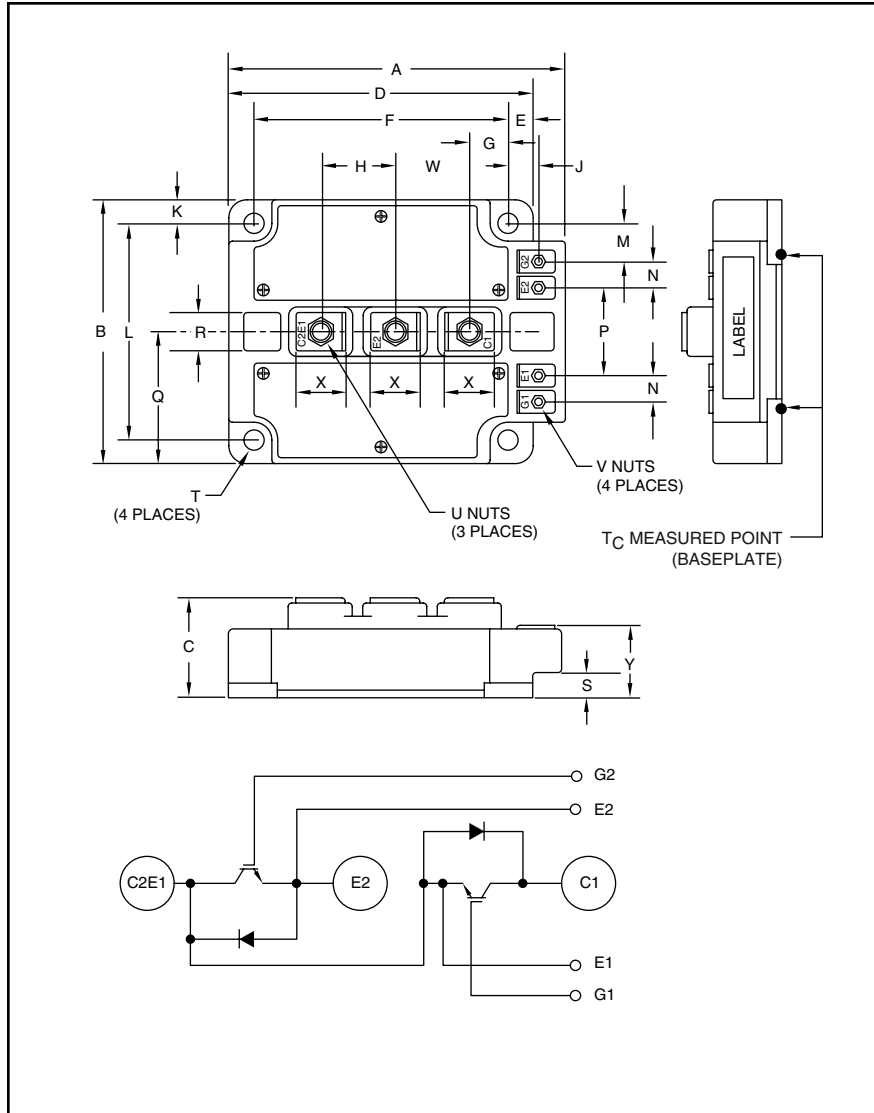


Dual IGBTMOD™ NF-Series Module 600 Amperes/1200 Volts



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	5.12	130.0
E	0.39	10.0
F	4.33±0.01	110.0±0.25
G	0.54	13.8
H	1.42	36.0
J	0.45	11.5
K	0.39	10.0
L	4.33±0.01	110.0±0.25
M	0.80	20.4

Dimensions	Inches	Millimeters
N	0.57	14.5
P	1.57	40.0
Q	2.56	65.0
R	0.79	20.0
S	0.31	8.0
T	0.26 Dia.	Dia.6.5
U	M8 Metric	M8
V	M4 Metric	M4
W	1.72	43.8
X	1.02	26.0
Y	0.96+0.04/-0.02	24.5+1.0/-0.5



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 Free-Wheel Diode
- ☐ Isolated Baseplate for Easy Heat Sinking

Applications:

- ☐ AC Motor Control
- ☐ UPS
- ☐ Battery Powered Supplies

Ordering Information:

Example: Select the complete part module number you desire from the table below -i.e. CM600DU-24NF is a 1200V (V_{CES}), 600 Ampere Dual IGBT-MOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	600	24

CM600DU-24NF
Dual IGBTMOD™ NF-Series Module
 600 Amperes/1200 Volts

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

Ratings	Symbol	CM600DU-24NF	Units
Junction Temperature	T_j	-40 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 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, $T_C = 109^\circ\text{C}$)	I_C	600	Amperes
Peak Collector Current	I_{CM}	1200*	Amperes
Emitter Current** ($T_C = 25^\circ\text{C}$)	I_E	600	Amperes
Peak Emitter Current**	I_{EM}	1200*	Amperes
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$, $T_j \leq 150^\circ\text{C}$)	P_C	2080	Watts
Mounting Torque, M8 Main Terminal	—	95	in-lb
Mounting Torque, M6 Mounting	—	40	in-lb
Gate Emitter Terminal Torque, M4 Mounting	—	15	in-lb
Weight	—	1200	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{ISO}	2500	Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0\text{V}$	—	—	1.0	mA
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}$, $V_{CE} = 0\text{V}$	—	—	0.5	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 60\text{mA}$, $V_{CE} = 10\text{V}$	6.0	7.0	8.0	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 600\text{A}$, $V_{GE} = 15\text{V}$, $T_j = 25^\circ\text{C}$	—	1.95	2.65	Volts
		$I_C = 600\text{A}$, $V_{GE} = 15\text{V}$, $T_j = 125^\circ\text{C}$	—	2.15	—	Volts
Total Gate Charge	Q_G	$V_{CC} = 600\text{V}$, $I_C = 600\text{A}$, $V_{GE} = 15\text{V}$	—	4000	—	nC
Emitter-Collector Voltage**	V_{EC}	$I_E = 600\text{A}$, $V_{GE} = 0\text{V}$	—	—	3.35	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}	$V_{CE} = 10\text{V}$, $V_{GE} = 0\text{V}$	—	—	140	nF
Output Capacitance	C_{oes}		—	—	12	nF
Reverse Transfer Capacitance	C_{res}		—	—	2.7	nF
Inductive	Turn-on Delay Time	$V_{CC} = 600\text{V}$, $I_C = 600\text{A}$, $V_{GE1} = V_{GE2} = 15\text{V}$, $R_G = 1.0\Omega$, Inductive Load	—	—	800	ns
Load	Rise Time		—	—	180	ns
Switch	Turn-off Delay Time		—	—	900	ns
Time	Fall Time		—	—	350	ns
Diode Reverse Recovery Time**	t_{rr}	Switching Operation,	—	—	300	ns
Diode Reverse Recovery Charge**	Q_{rr}	$I_E = 600\text{A}$	—	28	—	μC

*Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.

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

*** T_C measured point is just under the chips. If this value is used, $R_{th(f-a)}$ should be measured just under the chips.

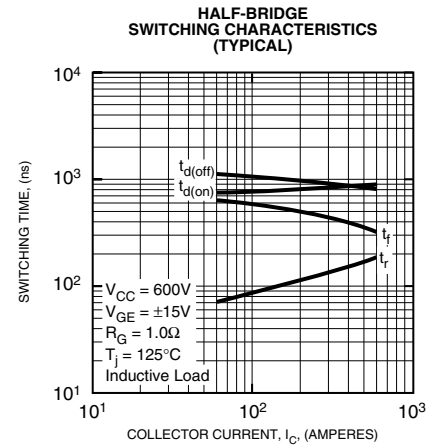
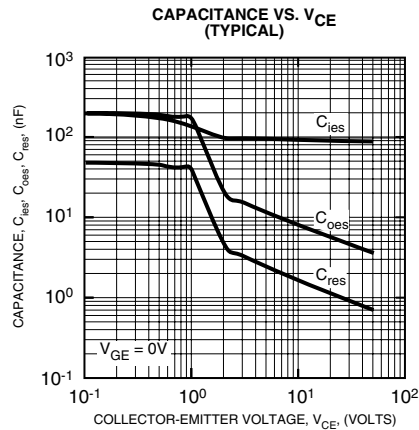
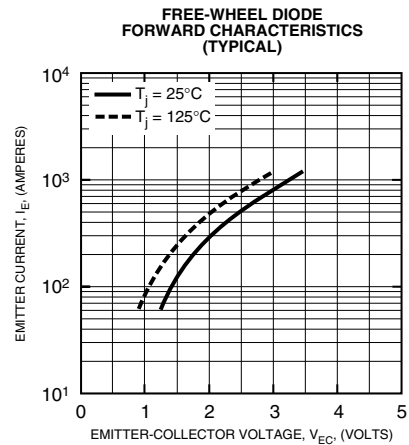
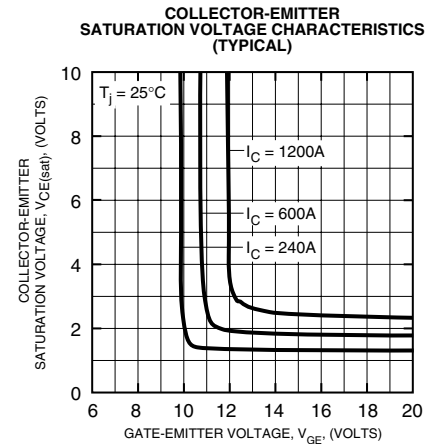
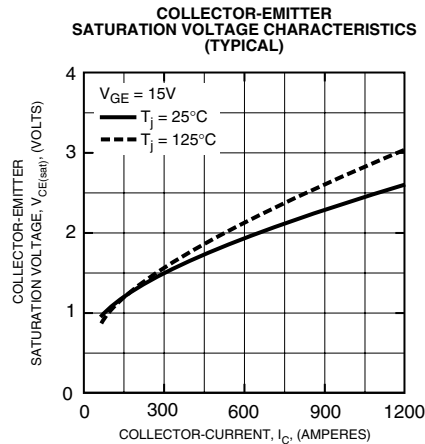
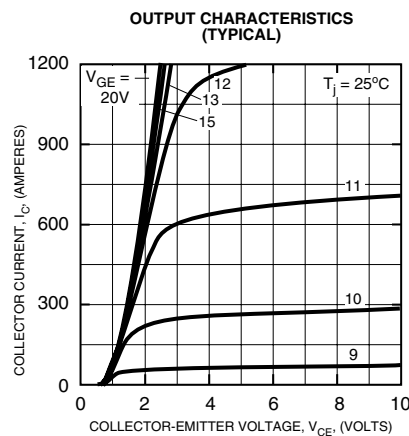
CM600DU-24NF

Dual IGBTMOD™ NF-Series Module

600 Amperes/1200 Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)Q}$	Per IGBT 1/2 Module, T_C Reference Point per Outline Drawing	—	—	0.06	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per FWDi 1/2 Module, T_C Reference Point per Outline Drawing	—	—	0.11	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)Q}$	Per IGBT 1/2 Module, T_C Reference Point Under Chips	—	—	0.023	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per 1/2 Module, Thermal Grease Applied	—	0.019	—	$^\circ\text{C/W}$
External Gate Resistance	R_G		1.0	—	10.0	Ω

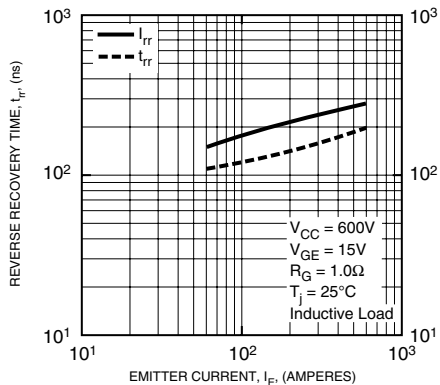


CM600DU-24NF

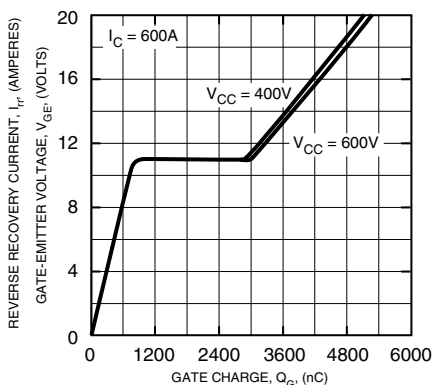
Dual IGBTMOD™ NF-Series Module

600 Amperes/1200 Volts

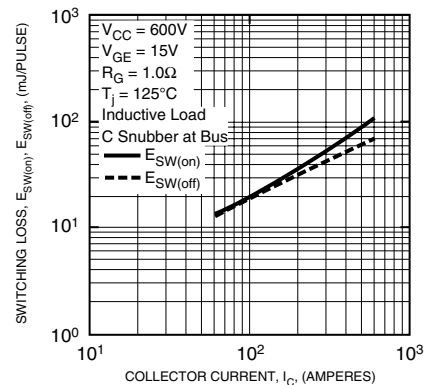
REVERSE RECOVERY CHARACTERISTICS
(TYPICAL)



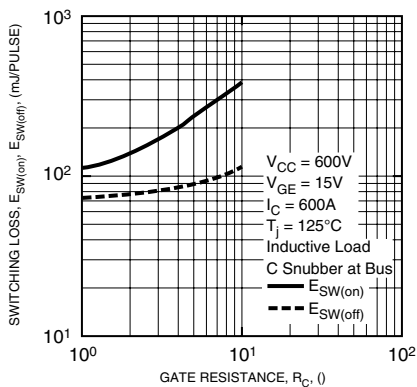
GATE CHARGE VS. V_{GE}



SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)



SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS
(IGBT & FWDI)

