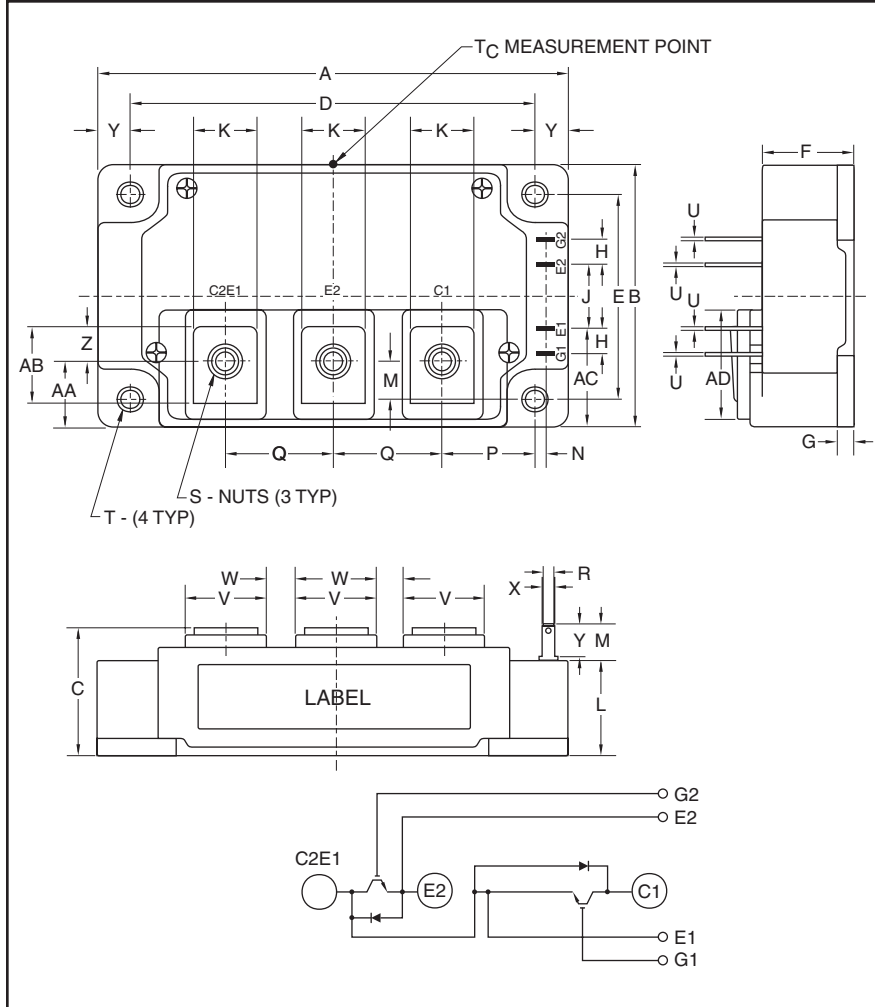


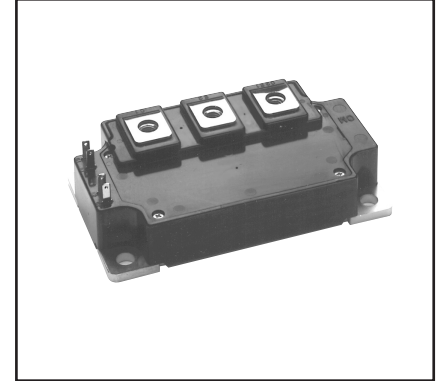
Dual IGBTMOD™ NFH-Series Module 300 Amperes/600 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.25	108.0
B	2.44	62.0
C	1.14+0.04/-0.01	29.0+1.0/-0.5
D	3.66±0.01	93.0±0.25
E	1.88±0.01	48.0±0.25
F	0.67	17.0
G	0.16	4.0
H	0.24	6.0
J	0.59	15.0
K	0.55	14.0
L	0.87	22.0
M	0.33	8.5
N	0.10	2.5
P	0.85	21.5

Dimensions	Inches	Millimeters
Q	0.98	25.0
R	0.11	2.8
S	M6 Metric	M6
T	0.26 Dia.	Dia. 6.5
U	0.002	0.5
V	0.71	18.0
W	0.28	7.0
X	0.16	4.0
Y	0.3	7.5
Z	0.325	8.25
AA	0.624	15.85
AB	0.709	18.0
AC	0.69	17.5
AD	1.012	25.7



Description:

Powerex IGBTMOD™ Modules are designed for use in high frequency applications; 30 kHz for hard switching applications and 60 to 70 kHz for soft 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 $V_{CE(sat)}$
- Low $E_{SW(off)}$
- Discrete Super-Fast Recovery Free-Wheel Diode
- Isolated Baseplate for Easy Heat Sinking

Applications:

- Power Supplies
- Induction Heating
- Welders

Ordering Information:

Example: Select the complete part module number you desire from the table below -i.e. CM300DU-12NFH is a 600V (V_{CES}), 300 Ampere Dual IGBTMOD™ Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 50)
CM	300	12

CM300DU-12NFH
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Absolute Maximum Ratings, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

Ratings	Symbol	CM300DU-12NFH	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}	6 00	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	± 20	Volts
Collector Current ($T_C = 25^\circ\text{C}$)	I_C	300*	Amperes
Peak Collector Current	I_{CM}	600*	Amperes
Emitter Current** ($T_C = 25^\circ\text{C}$)	I_E	300*	Amperes
Peak Emitter Current**	I_{EM}	600*	Amperes
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$, $T_j \leq 150^\circ\text{C}$)	P_C	780	Watts
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$, $T_j \leq 150^\circ\text{C}$)	P_C	1250	Watts
Mounting Torque, M6 Main Terminal	—	40	in-lb
Mounting Torque, M6 Mounting	—	40	in-lb
Weight	—	400	Grams
Isolation Voltage (Main Terminal to Baseplate, AC 1 min.)	V_{ISO}	2500	Volts

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}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$	—	—	1.0	mA
Gate Leakage Current I_{GES}	$V_{GE} = V_{GES}$, $V_{CE} = 0V$	—	—	0.5	—	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 30\text{mA}$, $V_{CE} = 10V$	5.0	6.0	7.0	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 300\text{A}$, $V_{GE} = 15V$, $T_j = 25^\circ\text{C}$	—	2.0	2.7	Volts
		$I_C = 300\text{A}$, $V_{GE} = 15V$, $T_j = 125^\circ\text{C}$	—	1.95	—	Volts
Total Gate Charge	Q_G	$V_{CC} = 300V$, $I_C = 300\text{A}$, $V_{GE} = 15V$	—	1860	—	nC
Emitter-Collector Voltage**	V_{EC}	$I_E = 300\text{A}$, $V_{GE} = 0V$	—	—	2.6	Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	C_{ies}		—	—	83	nf
Output Capacitance	C_{oes}	$V_{CE} = 10V$, $V_{GE} = 0V$	—	—	5.4	nf
Reverse Transfer Capacitance	C_{res}		—	—	3.0	nf
Inductive Load	Turn-on Delay Time	$V_{CC} = 300V$, $I_C = 300\text{A}$,	—	—	350	ns
	Rise Time					
Switch Time	Turn-off Delay Time	$V_{GE1} = V_{GE2} = 15V$, $R_G = 4.2\Omega$,	—	—	700	ns
	Fall Time					
Diode Reverse Recovery Time**	t_{rr}	$I_E = 300\text{A}$	—	—	200	ns
Diode Reverse Recovery Charge**	Q_{rr}		—	5.5	—	μC

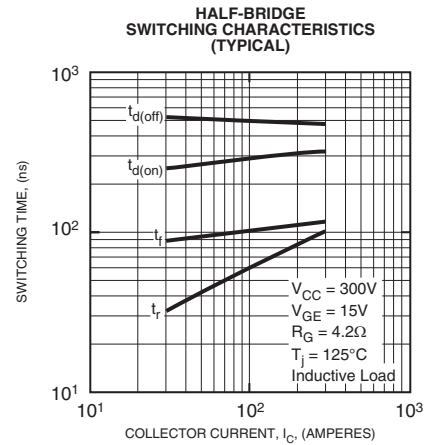
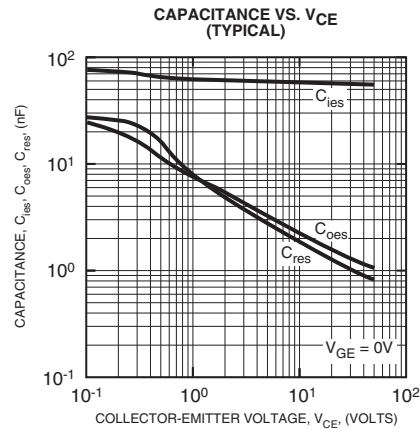
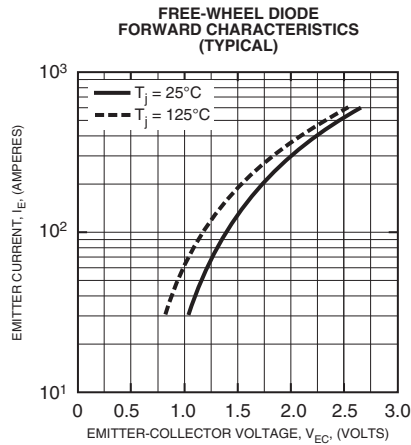
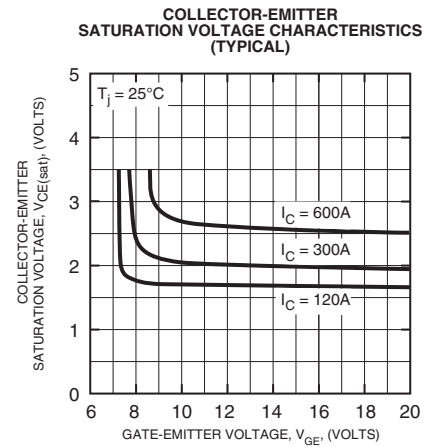
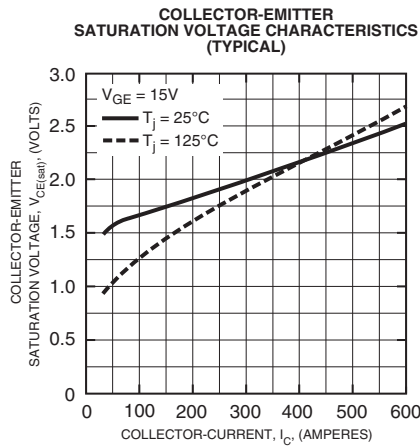
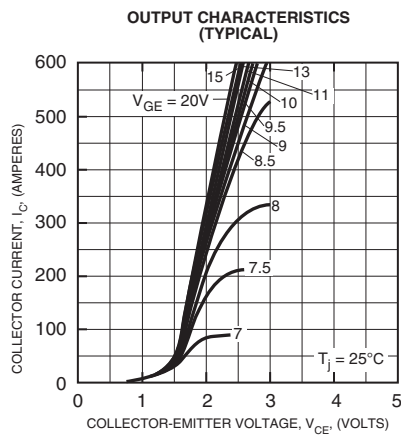
* Pulse width and repetition rate should be such that device junction temperature (T_j) does not exceed $T_{j(max)}$ rating.

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

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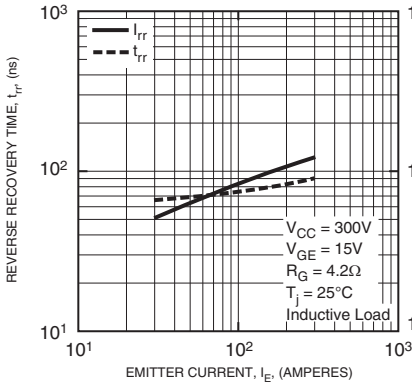
Thermal and Mechanical Characteristics, $T_j = 25^\circ\text{C}$ unless otherwise specified

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	—	—	0.16	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)D}$	Per FWDi 1/2 Module, T_C Reference Point per Outline Drawing	—	—	0.24	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)'Q}$	Per IGBT 1/2 Module, T_C Reference Point Under Chips	—	—	0.10	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per 1/2 Module, Thermal Grease Applied	—	0.04	—	$^\circ\text{C/W}$
External Gate Resistance	R_G		2.1	—	21	Ω

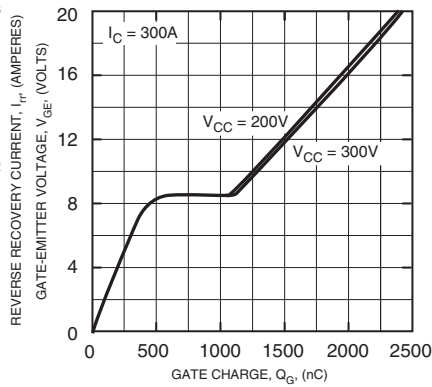


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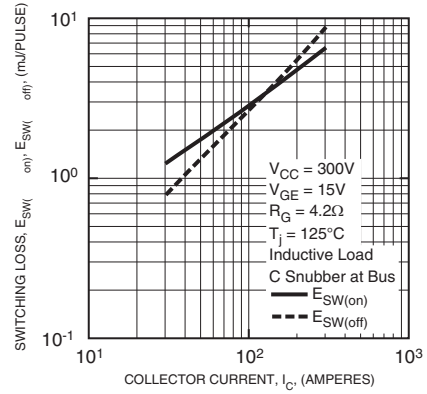
REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



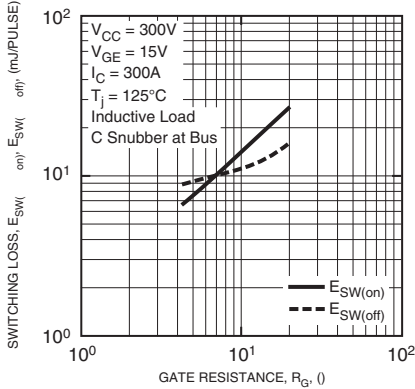
GATE CHARGE VS. V_GE



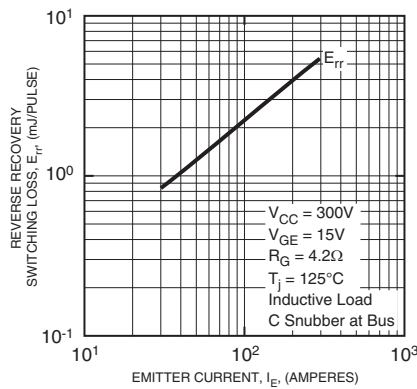
SWITCHING LOSS VS. COLLECTOR CURRENT (TYPICAL)



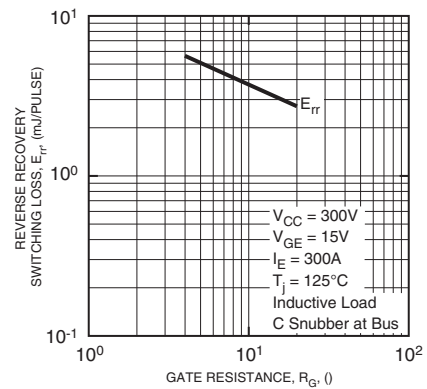
SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



REVERSE RECOVERY SWITCHING LOSS VS. EMITTER CURRENT (TYPICAL)



REVERSE RECOVERY SWITCHING LOSS VS. GATE RESISTANCE (TYPICAL)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (IGBT & FWDI)

