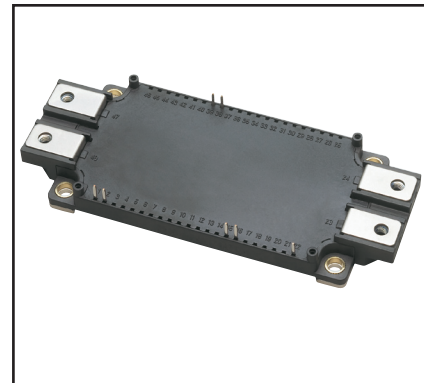
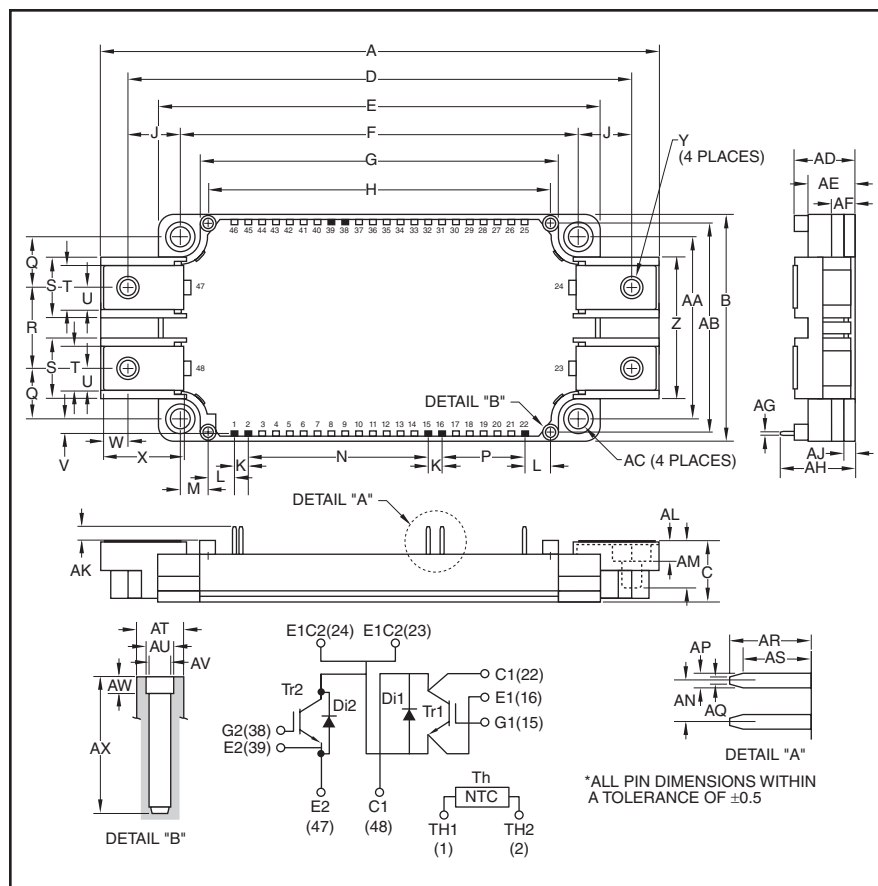


Dual IGBTMOD™ NX-Series Module 400 Amperes/600 Volts



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
- ☐ Motion/Servo Control
- ☐ Photovoltaic/Fuel Cell

Ordering Information:

Example: Select the complete module number you desire from the table below -i.e.
CM400DX-12A is a 600V (V_{CES}), 400 Ampere Dual IGBTMOD™ Power Module.

Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	5.98	152.0
B	2.44	62.0
C	0.67	17.0
D	5.39	137.0
E	4.79	121.7
F	4.33±0.02	110.0±0.5
G	3.89	99.0
H	3.72	94.5
J	0.53	13.5
K	0.15	3.8
L	0.28	7.25
M	0.30	7.75
N	1.95	49.54
P	0.9	22.86
Q	0.55	14.0
R	0.87	22.0
S	0.67	17.0
T	0.48	12.0
U	0.24	6.0
V	0.16	4.2
W	0.37	6.5
X	0.83	21.14
Y	M6	M6

Dimensions	Inches	Millimeters
Z	1.53	39.0
AA	1.97±0.02	50.0±0.5
AB	2.26	57.5
AC	0.22 Dia.	5.5 Dia.
AD	0.67+0.04/-0.02	17.0+1.0/-0.5
AE	0.51	13.0
AF	0.27	7.0
AG	0.03	0.8
AH	0.81	20.5
AJ	0.12	3.0
AK	0.14	3.5
AL	0.21	5.4
AM	0.49	12.5
AN	0.15	3.81
AP	0.05	1.15
AQ	0.025	0.65
AR	0.29	7.4
AS	0.24	6.2
AT	0.17 Dia.	4.3 Dia.
AU	0.10 Dia.	2.5 Dia.
AV	0.08 Dia.	2.1 Dia.
AW	0.06	1.5
AX	0.49	12.5

Type	Current Rating Amperes	V _{CES} Volts (x 50)
CM	400	12

CM400DX-12A

Dual IGBTMOD™ NX-Series Module

400 Amperes/600 Volts

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

Characteristics	Symbol	CM400DX-12A	Units
Power Device Junction Temperature	T_j	-40 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 125	$^\circ\text{C}$
Mounting Torque, M5 Mounting Screws	—	31	in-lb
Mounting Torque, M6 Main Terminal Screws	—	40	in-lb
Module Weight (Typical)	—	330	Grams
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	V_{ISO}	2500	Volts

Inverter Sector

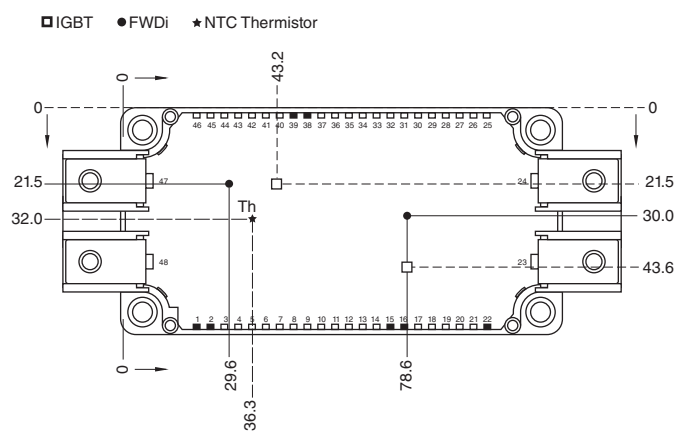
Collector-Emitter Voltage (G-E Short)	V_{CES}	600	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	± 20	Volts
Collector Current ($T_C = 60^\circ\text{C}$)*	I_C	400	Amperes
Peak Collector Current**	I_{CM}	800	Amperes
Emitter Current ($T_C = 25^\circ\text{C}$, $T_j < 150^\circ\text{C}$)*	I_E^{***}	400	Amperes
Peak Emitter Current ($T_j < 150^\circ\text{C}$)**	I_{EM}^{***}	800	Amperes
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$, $T_j < 150^\circ\text{C}$)*	P_C	1340	Watts

* T_C , T_f measured point is just under the chips.

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

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

CHIP LOCATION (TOP VIEW)



Dimensions in mm (Tolerance: $\pm 1\text{mm}$)

CM400DX-12A
Dual IGBTMOD™ NX-Series Module
 400 Amperes/600 Volts

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

Inverter Sector

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector Cutoff Current	I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$	—	—	1.0	mA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 40mA, V_{CE} = 10V$	5	6	7	Volts
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	μA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 400A, V_{GE} = 15V, T_j = 25^\circ\text{C}$	—	1.7	2.1	Volts
		$I_C = 400A, V_{GE} = 15V, T_j = 125^\circ\text{C}$	—	1.9	—	Volts
		$I_C = 400A, V_{GE} = 15V, \text{Chip}$	—	1.6	—	Volts
Input Capacitance	C_{ies}	$V_{CE} = 10V, V_{GE} = 0V$	—	—	50.0	nF
Output Capacitance	C_{oes}		—	—	5.3	nF
Reverse Transfer Capacitance	C_{res}		—	—	1.6	nF
Total Gate Charge	Q_G	$V_{CC} = 300V, I_C = 400A, V_{GE} = 15V$	—	1100	—	nC
Inductive	Turn-on Delay Time	$V_{CC} = 300V, I_C = 400A, V_{GE} = \pm 15V, R_G = 3.6\Omega, I_E = 400A,$	—	—	200	ns
Load	Turn-on Rise Time		—	—	200	ns
Switch	Turn-off Delay Time		—	—	400	ns
Time	Turn-off Fall Time		—	—	600	ns
Reverse Recovery Time*	t_{rr}	Inductive Load Switching Operation	—	—	200	ns
Reverse Recovery Charge*	Q_{rr}		—	11	—	μC
Emitter-Collector Voltage*	V_{EC}	$I_E = 400A, V_{GE} = 0V$	—	2.0	2.8	Volts
		$I_E = 400A, V_{GE} = 0V$	—	1.9	—	Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Module Lead Resistance	R_{lead}	Main Terminals-Chip (Per Switch)	—	1.1	—	m Ω
Thermal Resistance, Junction to Case**	$R_{th(j-c)Q}$	Per IGBT	—	—	0.093	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case**	$R_{th(j-c)D}$	Per FWDi	—	—	0.16	$^\circ\text{C/W}$
Contact Thermal Resistance**	$R_{th(c-f)}$	Thermal Grease Applied	—	0.015	—	$^\circ\text{C/W}$
Internal Gate Resistance	R_{Gint}	$T_C = 25^\circ\text{C}$	—	0	—	Ω
External Gate Resistance	R_G		1.6	—	16	Ω

NTC Thermistor Sector, $T_j = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Zero Power Resistance	R	$T_C = 25^\circ\text{C}$	4.85	5.00	5.15	k Ω
Deviation of Resistance	$\Delta R/R$	$T_C = 100^\circ\text{C}, R_{100} = 493\Omega$	-7.3	—	+7.8	%
B Constant	$B_{(25/50)}$	$B = (\ln R_1 - \ln R_2) / (1/T_1 - 1/T_2)^{***}$	—	3375	—	K
Power Dissipation	P_{25}	$T_C = 25^\circ\text{C}$	—	—	10	mW

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

** T_C, T_f measured point is just under the chips.

*** R_1 : Resistance at Absolute Temperature $T_1(K)$, R_2 : Resistance at Absolute Temperature $T_2(K)$, $T(K) = t(^{\circ}\text{C}) + 273.15$