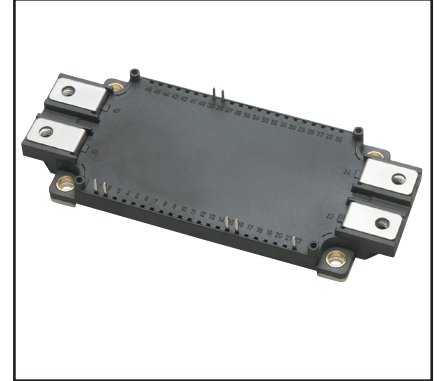
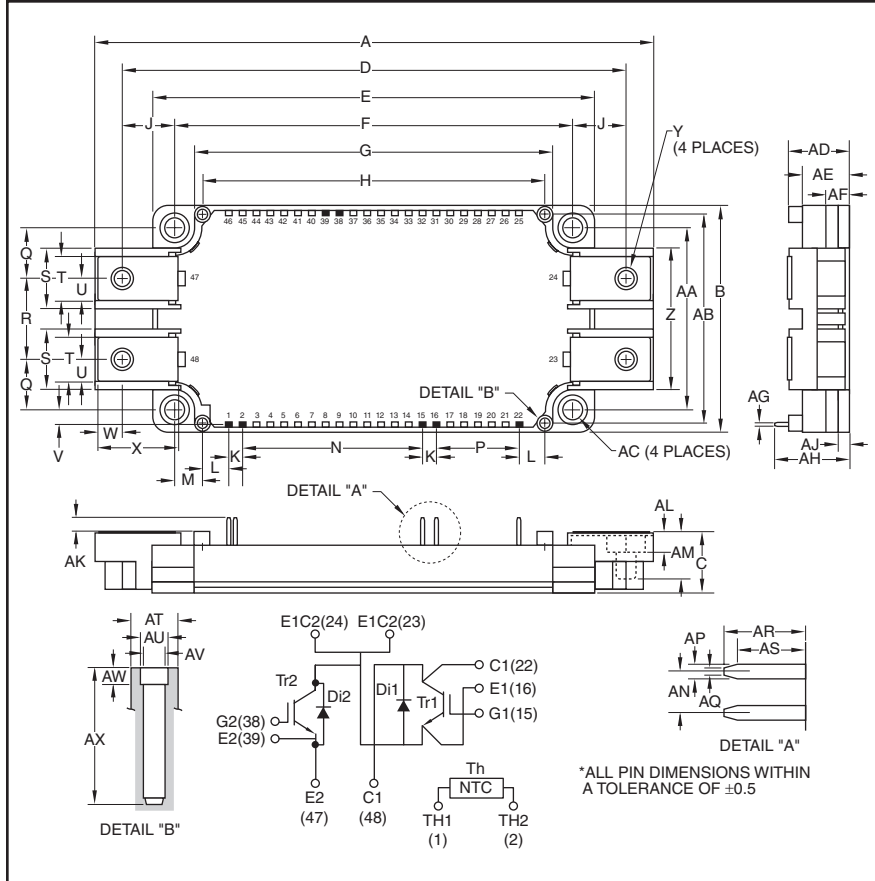


Dual IGBTMOD™ NX-Series Module 300 Amperes/1200 Volts



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:

- AISiC Baseplate
- 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

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

QID1230015
Dual IGBTMOD™ NX-Series Module
 300 Amperes/1200 Volts

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

Characteristics	Symbol	QID1230015	Units
Power Device Junction Temperature	T_j	-40 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to 130	$^\circ\text{C}$
Mounting Torque, M5 Mounting Screws	—	31	in-lb
Mounting Torque, M6 Main Terminal Screws	—	40	in-lb
Module Weight (Typical)	—	220	Grams
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	V_{ISO}	2500	Volts

Inverter Sector

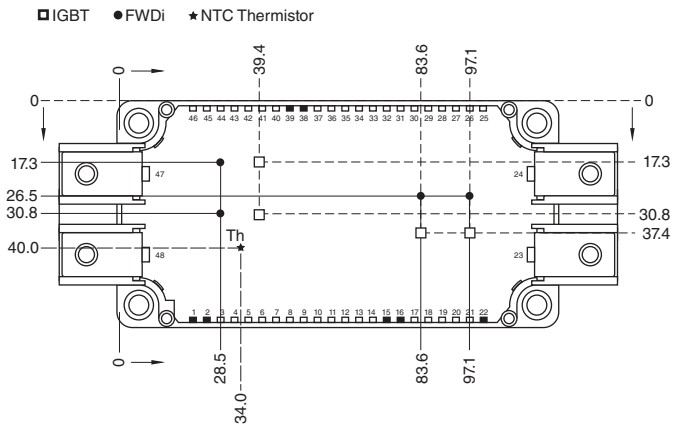
Collector-Emitter Voltage (G-E Short)	V_{CES}	1200	Volts
Gate-Emitter Voltage (C-E Short)	V_{GES}	± 20	Volts
Collector Current ($T_C = 90^\circ\text{C}$)*	I_C	300	Amperes
Peak Collector Current**	I_{CM}	600	Amperes
Emitter Current ($T_C = 25^\circ\text{C}$, $T_j < 150^\circ\text{C}$)*	I_E^{***}	300	Amperes
Peak Emitter Current ($T_j < 150^\circ\text{C}$ **)	I_{EM}^{***}	600	Amperes
Maximum Collector Dissipation ($T_C = 25^\circ\text{C}$, $T_j < 150^\circ\text{C}$)*	P_C	1580	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: $\pm 1\text{mm}$)

QID1230015

Dual IGBTMOD™ NX-Series Module

300 Amperes/1200 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	$V_{GE(th)}$	$I_C = 30mA, V_{CE} = 10V$	6	7	8	Volts
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	μA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 300A, V_{GE} = 15V, T_j = 25^\circ\text{C}$	—	2.0	2.6	Volts
		$I_C = 300A, V_{GE} = 15V, T_j = 125^\circ\text{C}$	—	2.2	—	Volts
		$I_C = 300A, V_{GE} = 15V, \text{Chip}$	—	1.9	—	Volts
Input Capacitance	C_{ies}		—	—	47.0	nF
Output Capacitance	C_{oes}	$V_{CE} = 10V, V_{GE} = 0V$	—	—	4.0	nF
Reverse Transfer Capacitance	C_{res}		—	—	0.9	nF
Total Gate Charge	Q_G	$V_{CC} = 600V, I_C = 300A, V_{GE} = 15V$	—	1350	—	nC
Inductive	Turn-on Delay Time	$t_{d(on)}$	—	—	550	ns
Load	Turn-on Rise Time	t_r	$V_{CC} = 600V, I_C = 300A,$		180	ns
Switch	Turn-off Delay Time	$t_{d(off)}$	$V_{GE} = \pm 15V,$		600	ns
Time	Turn-off Fall Time	t_f	$R_G = 1.0\Omega, I_E = 300A,$		600	ns
Reverse Recovery Time*	t_{rr}	Inductive Load Switching Operation	—	—	250	ns
Reverse Recovery Charge*	Q_{rr}		—	8.0	—	μC
Emitter-Collector Voltage*	V_{EC}	$I_E = 300A, V_{GE} = 0V$	—	2.6	3.4	Volts
		$I_E = 300A, V_{GE} = 0V, \text{Chip}$	—	2.5	—	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)	—	1.2	—	m Ω
Thermal Resistance, Junction to Case**	$R_{th(j-c)Q}$	Per IGBT	—	—	0.079	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case**	$R_{th(j-c)D}$	Per FWDi	—	—	0.144	$^\circ\text{C/W}$
Contact Thermal Resistance**	$R_{th(c-f)}$	Thermal Grease Applied	—	0.015	—	$^\circ\text{C/W}$
Internal Gate Resistance	R_{Gint}	$T_C = 25^\circ\text{C}$	2.1	3.0	3.9	Ω
		$T_C = 125^\circ\text{C}$	4.2	6.0	7.8	Ω
External Gate Resistance	R_G		1.0	—	10	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	$B_{(25/50)}$	$B_{(25/50)} = \ln(R_{25} / R_{50}) / (1/T_{25} - 1/T_{50})^{***}$	—	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).

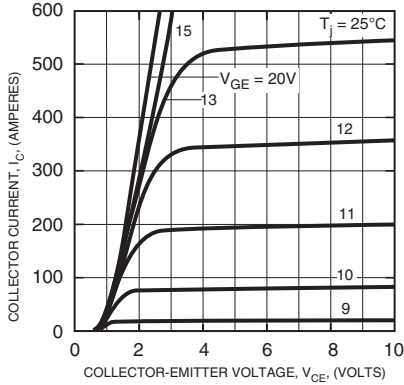
** T_C, T_f measured point is just under the chips.

*** R_{25} : Resistance at Absolute Temperature $T_{25}(K)$, R_{50} : Resistance at Absolute Temperature $T_{50}(K)$,

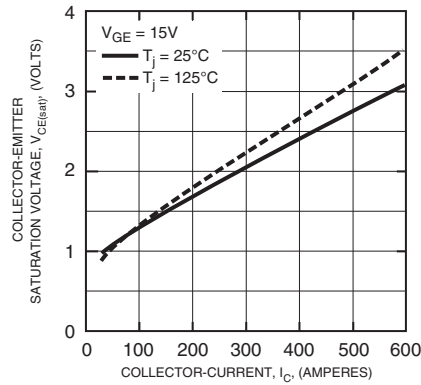
$T_{25} = 25(^\circ\text{C}) + 273.15 = 298.15(K)$, $T_{50} = 50(^\circ\text{C}) + 273.15 = 323.15(K)$

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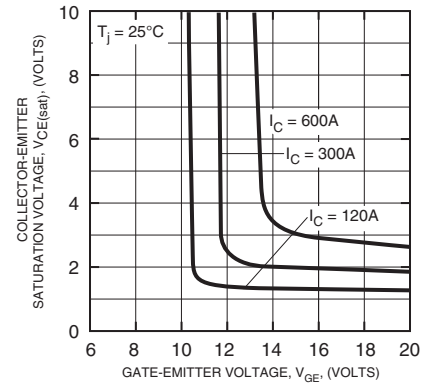
OUTPUT CHARACTERISTICS (INVERTER PART - TYPICAL)



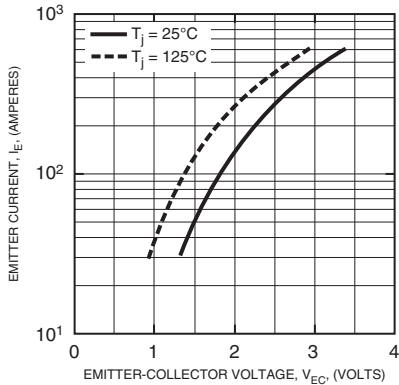
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (INVERTER PART - TYPICAL)



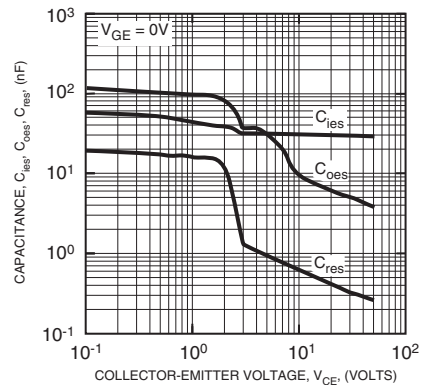
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (INVERTER PART - TYPICAL)



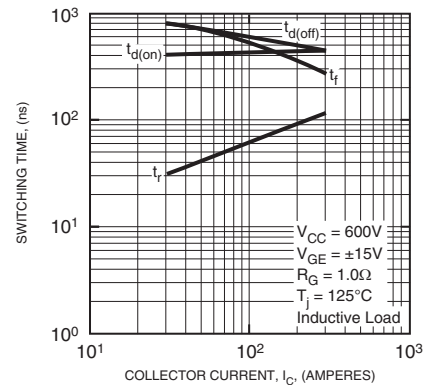
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (INVERTER PART - TYPICAL)



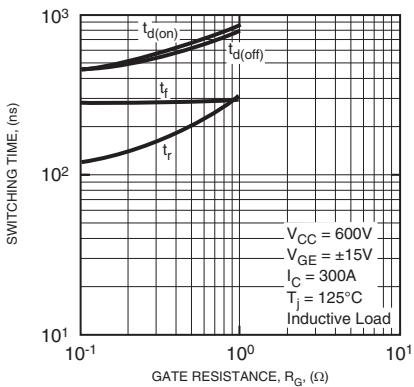
CAPACITANCE VS. VCE (INVERTER PART - TYPICAL)



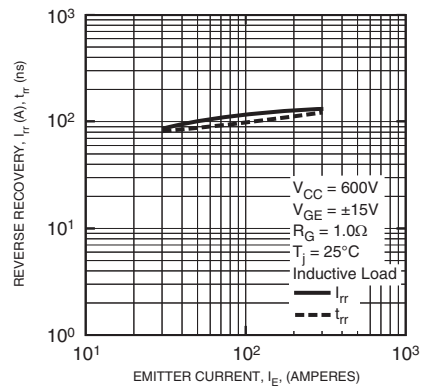
HALF-BRIDGE SWITCHING CHARACTERISTICS (INVERTER PART - TYPICAL)



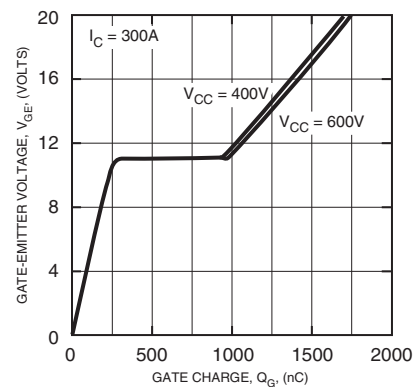
SWITCHING TIME VS. GATE RESISTANCE (INVERTER PART - TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (INVERTER PART - TYPICAL)



GATE CHARGE VS. VGE (INVERTER PART)



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