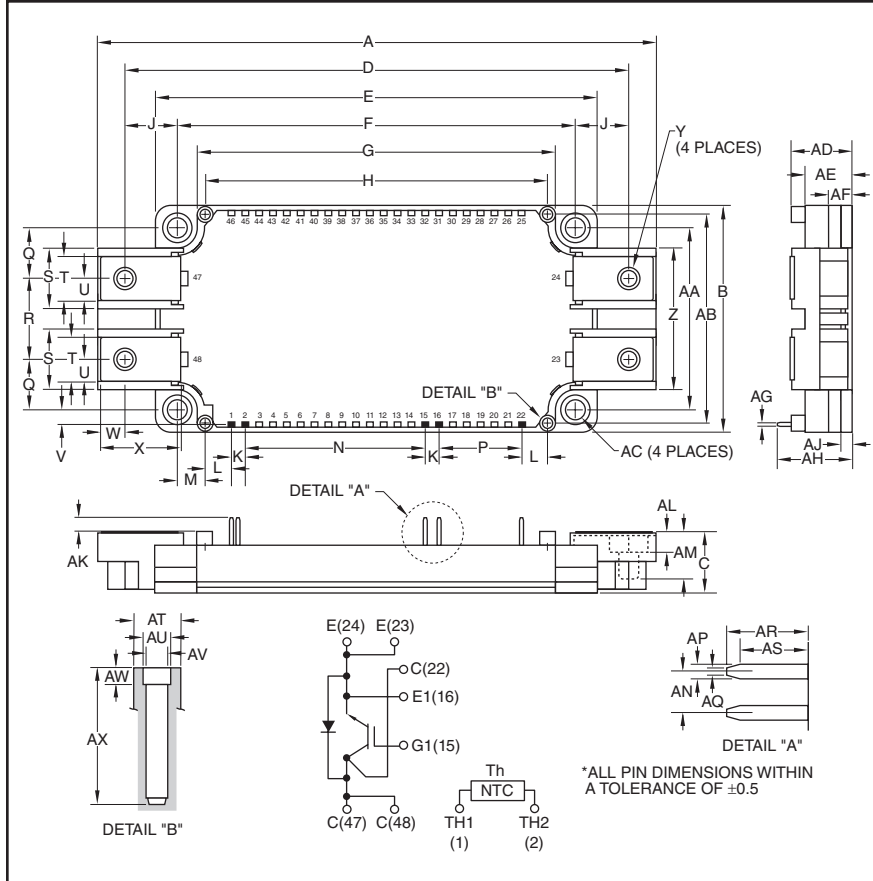


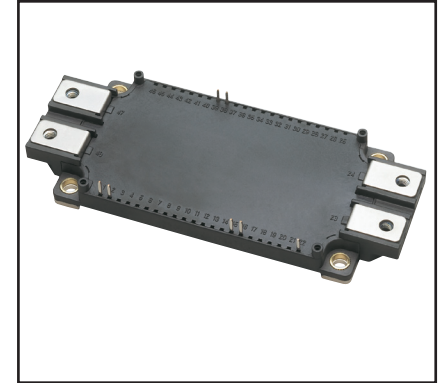
### Single IGBTMOD™ NX-Series Module 600 Amperes/1200 Volts



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



#### Description:

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of one IGBT Transistor in a single configuration with a reverse connected rectifier grade 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  $V_{CE(sat)}$
- Rectifier Grade 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. QIS1260015 is a 1200V ( $V_{CES}$ ), 600 Ampere Single IGBTMOD™ Power Module.

**QIS1260015**  
**Single IGBTMOD™ NX-Series Module**  
 600 Amperes/1200 Volts

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

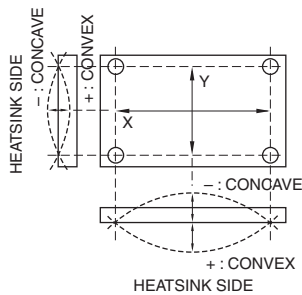
Characteristics	Symbol	QIS1260015	Units
Power Device Junction Temperature	$T_j$	-40 to 150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 to 125	$^\circ\text{C}$
Mounting Torque, M5 Mounting Screws	—	31	in-lb
Mounting Torque, M6 Main Terminal Screws	—	40	in-lb
Module Weight (Typical)	—	330	Grams
Baseplate Flatness, On Centerline X, Y (See Below)	—	$\pm 0 \sim +100$	$\mu\text{m}$
Isolation Voltage (Terminals to Baseplate, $f = 60\text{Hz}$ , AC 1 minute)	$V_{ISO}$	2500	Volts

**Inverter Sector**

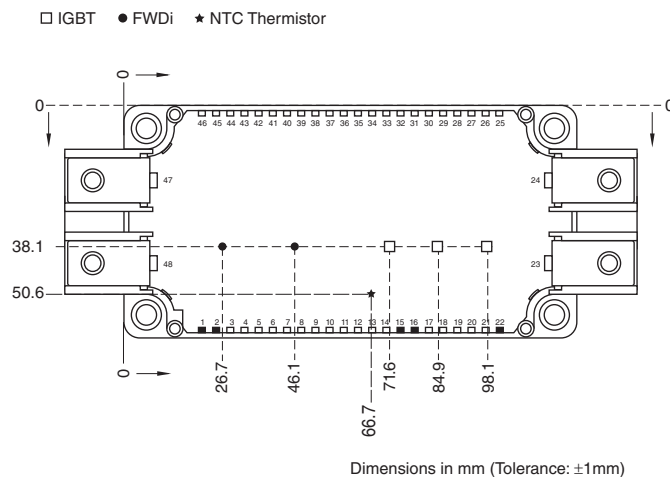
Collector-Emitter Voltage ( $V_{GE} = 0\text{V}$ )	$V_{CES}$	1200	Volts
Gate-Emitter Voltage ( $V_{CE} = 0\text{V}$ )	$V_{GES}$	$\pm 20$	Volts
Collector Current (DC, $T_C = 90^\circ\text{C}$ ) <sup>*1,*5,*9</sup>	$I_C$	600	Amperes
Peak Collector Current (Pulse) <sup>*4</sup>	$I_{CM}$	1200	Amperes
Maximum Collector Dissipation ( $T_C = 25^\circ\text{C}$ ) <sup>*1,*5</sup>	$P_C$	3785	Watts
Emitter Current ( $T_C = 25^\circ\text{C}$ ) <sup>*1,*5,*9</sup>	$I_E^{*3}$	600	Amperes
Peak Emitter Current (Pulse) <sup>*4</sup>	$I_{EM}^{*3}$	1200	Amperes

\*1 Case temperature ( $T_C$ ) and heatsink temperature ( $T_f$ ) measured point is just under the chips.  
 \*3 Represent ratings and characteristics of the anti-parallel, emitter-to-collector free wheeling diode (FWDi).  
 \*4 Pulse width and repetition rate should be such that device junction temperature ( $T_j$ ) does not exceed  $T_{j(max)}$  rating.  
 \*5 Junction temperature ( $T_j$ ) should not increase beyond maximum junction temperature ( $T_{j(max)}$ ) rating.  
 \*9 Use both of each main terminal (collector and emitter) to connect external wiring.

BASEPLATE FLATNESS MEASUREMENT POINT



CHIP LOCATION (TOP VIEW)



**QIS1260015**  
**Single IGBTMOD™ NX-Series Module**  
 600 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	$V_{GE(th)}$	$I_C = 60mA, V_{CE} = 10V$	6	7	8	Volts	
Gate Leakage Current	$I_{GES}$	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	$\mu A$	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 600A, V_{GE} = 15V, T_j = 25^\circ\text{C}^{*6}$	—	2.0	2.6	Volts	
		$I_C = 600A, V_{GE} = 15V, T_j = 125^\circ\text{C}^{*6}$	—	2.2	—	Volts	
		$I_C = 600A, V_{GE} = 15V, T_j = 150^\circ\text{C}^{*6}$	—	1.9	—	Volts	
Input Capacitance	$C_{ies}$		—	—	100	nF	
Output Capacitance	$C_{oes}$	$V_{CE} = 10V, V_{GE} = 0V$	—	—	9.0	nF	
Reverse Transfer Capacitance	$C_{res}$		—	—	2.0	nF	
Total Gate Charge	$Q_G$	$V_{CC} = 600V, I_C = 600A, V_{GE} = 15V$	—	3000	—	nC	
Inductive	Turn-on Delay Time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 600A,$	—	—	660	ns
	Load			Turn-on Rise Time	$t_r$	$V_{GE} = \pm 15V,$	—
Switch	Turn-off Delay Time	$t_{d(off)}$	$R_G = 2.2\Omega, I_E = 600A,$	—	—	700	ns
	Time			Turn-off Fall Time	$t_f$	Inductive Loas Switching Operation	—
Emitter-Collector Voltage	$V_{EC}^{*3}$	$I_E = 600A, V_{GE} = 0V, T_j = 25^\circ\text{C}^{*6}$	—	1.0	1.2	Volts	
		$I_E = 600A, V_{GE} = 0V, T_j = 125^\circ\text{C}^{*6}$	—	0.9	1.1	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)	—	0.6	—	m $\Omega$
Thermal Resistance, Junction to Case <sup>*1</sup>	$R_{th(j-c)Q}$	Per IGBT	—	—	0.033	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case <sup>*1</sup>	$R_{th(j-c)D}$	Per FWDi	—	—	0.028	$^\circ\text{C/W}$
Contact Thermal Resistance <sup>*1</sup> (Case to Heatsink)	$R_{th(c-f)}$	Thermal Grease Applied (Per 1 Module) <sup>*2</sup>	—	0.015	—	$^\circ\text{C/W}$
Internal Gate Resistance	$R_{Gint}$	$T_C = 25^\circ\text{C}$	0.7	1.0	1.3	$\Omega$
		$T_C = 125^\circ\text{C}$	1.4	2.0	2.6	$\Omega$
External Gate Resistance	$R_G$		1.0	—	10	$\Omega$

**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 $\Omega$
Deviation of Resistance	$\Delta R/R$	$T_C = 100^\circ\text{C}, R_{100} = 493\Omega$	-7.3	—	+7.8	%
B Constant	$B_{(25/50)}$	Approximate by Equation <sup>*9</sup>	—	3375	—	K
Power Dissipation	$P_{25}$	$T_C = 25^\circ\text{C}$	—	—	10	mW

<sup>\*1</sup> Case temperature ( $T_C$ ) and heatsink temperature ( $T_H$ ) measured point is just under the chips.

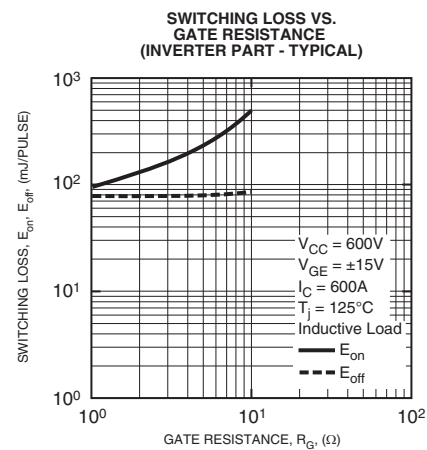
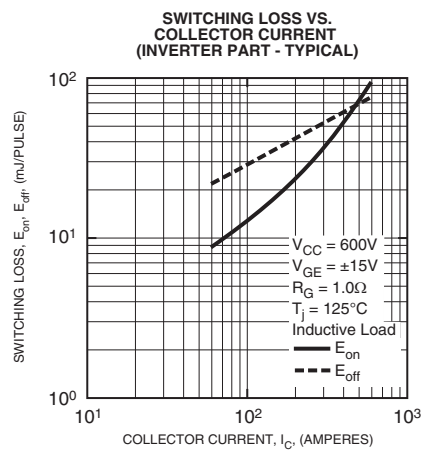
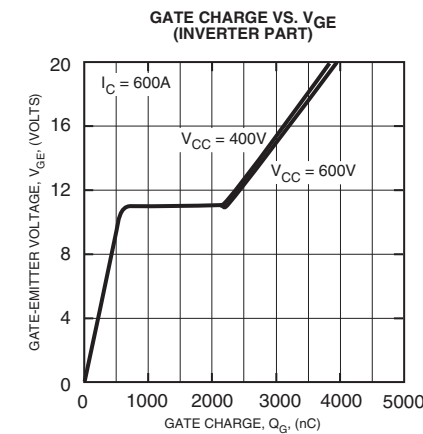
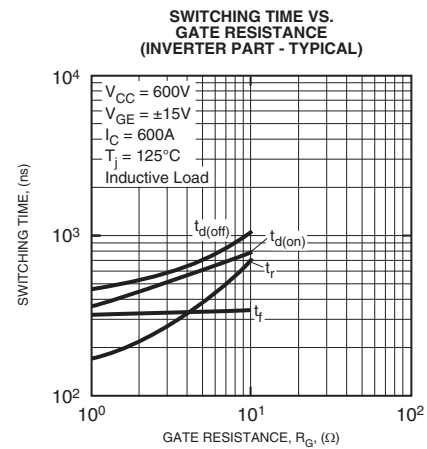
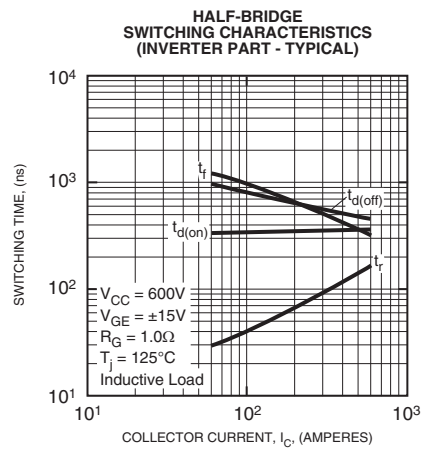
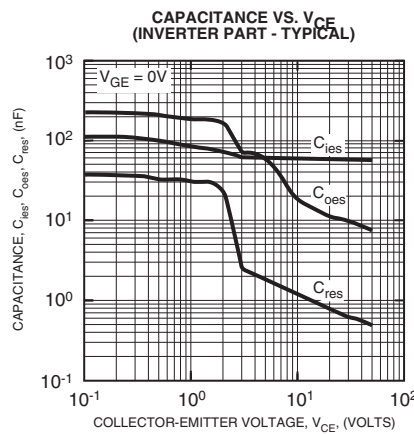
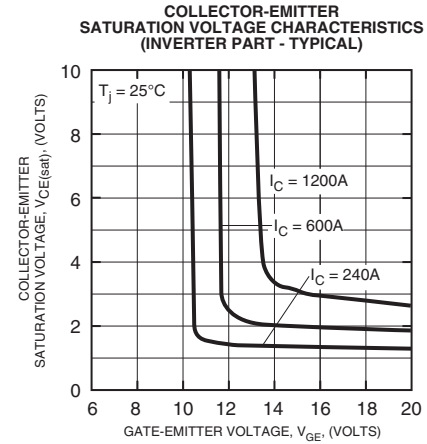
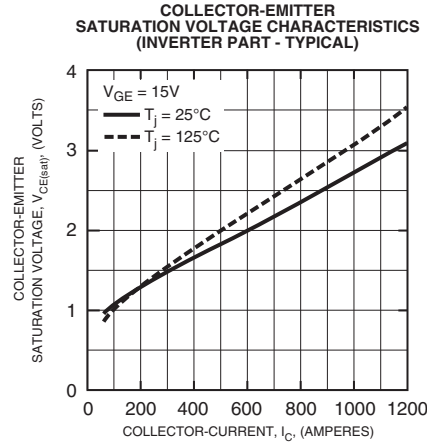
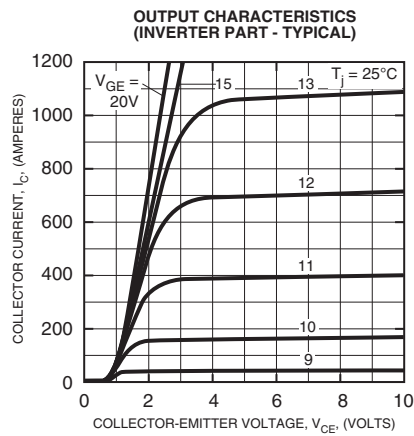
<sup>\*2</sup> Typical value is measured by using thermally conductive grease of  $\lambda = 0.9 \text{ [W/(m} \cdot \text{K)]}$ .

<sup>\*3</sup> Represent ratings and characteristics of the anti-parallel, emitter-to-collector free wheeling diode (FWDi).

<sup>\*6</sup> Pulse width and repetition rate should be such as to cause negligible temperature rise.

<sup>\*9</sup>  $B_{(25/50)} = \ln\left(\frac{R_{25}}{R_{50}}\right) / \left(\frac{1}{T_{25}} - \frac{1}{T_{50}}\right)$   $R_{25}$ : Resistance at Absolute Temperature  $T_{25}$  [K],  $R_{50}$ : resistance at Absolute Temperature  $T_{50}$  [K],  $T_{25} = 25 \text{ [}^\circ\text{C]} + 273.15 = 298.15$  [K],  $T_{50} = 50 \text{ [}^\circ\text{C]} + 273.15 = 323.15$  [K]

**QIS1260015**  
**Single IGBTMOD™ NX-Series Module**  
 600 Amperes/1200 Volts



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