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NXH160T120L2Q2F2SG

Split T-Type NPC Power Module

1200 V, 160 A IGBT, 600 V, 100 A IGBT

The NXH160T120L2Q2F2SG is a power module containing a split T-type neutral point clamped three-level inverter, consisting of two 160 A / 1200 V Half Bridge IGBTs with inverse diodes, two Neutral Point 120 A / 600 V rectifiers, two 100 A / 600 V Neutral Point IGBTs with inverse diodes, two Half Bridge 60 A / 1200 V rectifiers and a negative temperature coefficient thermistor (NTC).

Features

- Split T-type Neutral Point Clamped Three-level Inverter Module
- 1200 V IGBT Specifications: $V_{CE(SAT)} = 2.15 \text{ V}$, $E_{SW} = 4300 \mu\text{J}$
- 600 V IGBT specifications: $V_{CE(SAT)} = 1.47 \text{ V}$, $E_{SW} = 2560 \mu\text{J}$
- Baseplate
- Solderable Pins
- Thermistor

Typical Applications

- Solar Inverters
- Uninterruptible Power Supplies

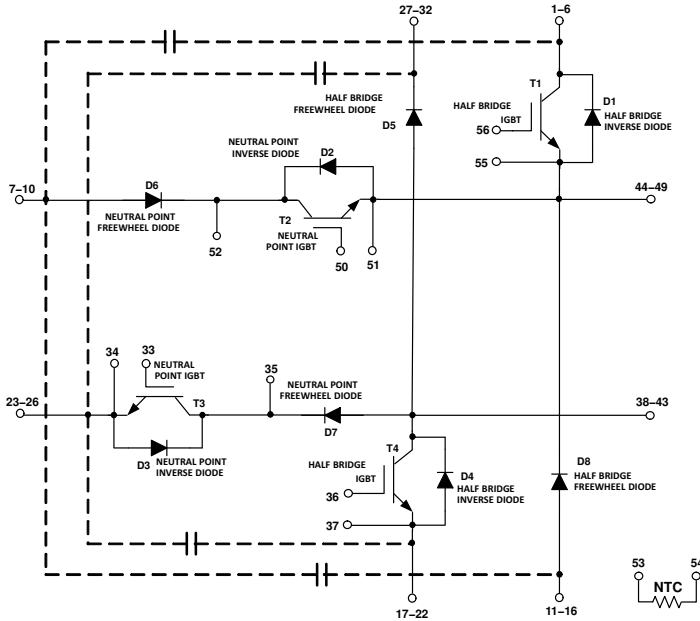
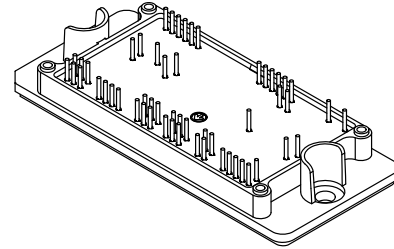


Figure 1. NXH160T120L2Q2F2SG Schematic Diagram



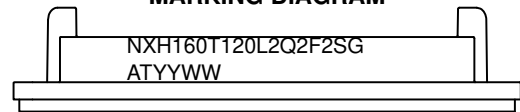
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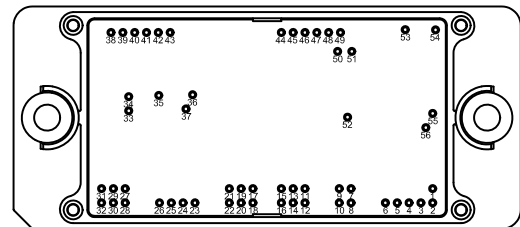
Q2PACK
CASE 180AK

MARKING DIAGRAM



NXH160T120L2Q2F2SG = Device Code
YYWW = Year and Work Week Code
A = Assembly Site Code
T = Test Site Code
G = Pb-Free Package

PIN CONNECTIONS



ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

NXH160T120L2Q2F2SG

Table 1. ABSOLUTE MAXIMUM RATINGS (Note 1) $T_J = 25^\circ\text{C}$ unless otherwise noted

| Rating | Symbol | Value | Unit |
|--|--------------|----------|------------------|
| HALF BRIDGE IGBT | | | |
| Collector–Emitter Voltage | V_{CES} | 1200 | V |
| Gate–Emitter Voltage | V_{GE} | ± 20 | V |
| Continuous Collector Current @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | I_C | 181 | A |
| Pulsed Collector Current ($T_J = 175^\circ\text{C}$) | I_{Cpulse} | 543 | A |
| Maximum Power Dissipation @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | P_{tot} | 500 | W |
| Short Circuit Withstand Time @ $V_{GE} = 15\text{ V}$, $V_{CE} = 600\text{ V}$, $T_J \leq 150^\circ\text{C}$ | T_{sc} | 5 | μs |
| Minimum Operating Junction Temperature | T_{JMIN} | -40 | $^\circ\text{C}$ |
| Maximum Operating Junction Temperature | T_{JMAX} | 150 | $^\circ\text{C}$ |
| NEUTRAL POINT IGBT | | | |
| Collector–Emitter Voltage | V_{CES} | 600 | V |
| Gate–Emitter Voltage | V_{GE} | ± 20 | V |
| Continuous Collector Current @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | I_C | 116 | A |
| Pulsed Collector Current ($T_J = 175^\circ\text{C}$) | I_{Cpulse} | 348 | A |
| Maximum Power Dissipation @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | P_{tot} | 232 | W |
| Short Circuit Withstand Time @ $V_{GE} = 15\text{ V}$, $V_{CE} = 400\text{ V}$, $T_J \leq 150^\circ\text{C}$ | T_{sc} | 5 | μs |
| Minimum Operating Junction Temperature | T_{JMIN} | -40 | $^\circ\text{C}$ |
| Maximum Operating Junction Temperature | T_{JMAX} | 150 | $^\circ\text{C}$ |
| HALF BRIDGE FREEWHEEL DIODE | | | |
| Peak Repetitive Reverse Voltage | V_{RRM} | 1200 | V |
| Continuous Forward Current @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | I_F | 56 | A |
| Repetitive Peak Forward Current ($T_J = 175^\circ\text{C}$, t_p limited by T_{Jmax}) | I_{FRM} | 150 | A |
| Maximum Power Dissipation @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | P_{tot} | 142 | W |
| Minimum Operating Junction Temperature | T_{JMIN} | -40 | $^\circ\text{C}$ |
| Maximum Operating Junction Temperature | T_{JMAX} | 150 | $^\circ\text{C}$ |
| HALF BRIDGE INVERSE DIODE | | | |
| Peak Repetitive Reverse Voltage | V_{RRM} | 1200 | V |
| Continuous Forward Current @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | I_F | 19 | A |
| Repetitive Peak Forward Current ($T_J = 175^\circ\text{C}$, t_p limited by T_{Jmax}) | I_{FRM} | 50 | A |
| Maximum Power Dissipation @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | P_{tot} | 63 | W |
| Minimum Operating Junction Temperature | T_{JMIN} | -40 | $^\circ\text{C}$ |
| Maximum Operating Junction Temperature | T_{JMAX} | 150 | $^\circ\text{C}$ |
| NEUTRAL POINT FREEWHEEL DIODE | | | |
| Peak Repetitive Reverse Voltage | V_{RRM} | 600 | V |
| Continuous Forward Current @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | I_F | 132 | A |
| Repetitive Peak Forward Current ($T_J = 175^\circ\text{C}$, t_p limited by T_{Jmax}) | I_{FRM} | 300 | A |
| Maximum Power Dissipation @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | P_{tot} | 198 | W |
| Minimum Operating Junction Temperature | T_{JMIN} | -40 | $^\circ\text{C}$ |
| Maximum Operating Junction Temperature | T_{JMAX} | 150 | $^\circ\text{C}$ |
| NEUTRAL POINT INVERSE DIODE | | | |
| Peak Repetitive Reverse Voltage | V_{RRM} | 600 | V |
| Continuous Forward Current @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | I_F | 38 | A |
| Repetitive Peak Forward Current ($T_J = 175^\circ\text{C}$, t_p limited by T_{Jmax}) | I_{FRM} | 110 | A |
| Maximum Power Dissipation @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | P_{tot} | 79 | W |
| Minimum Operating Junction Temperature | T_{JMIN} | -40 | $^\circ\text{C}$ |

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Table 1. ABSOLUTE MAXIMUM RATINGS (Note 1) $T_J = 25^\circ\text{C}$ unless otherwise noted

| Rating | Symbol | Value | Unit |
|---|------------|------------|------------------|
| NEUTRAL POINT INVERSE DIODE | | | |
| Maximum Operating Junction Temperature | T_{JMAX} | 150 | $^\circ\text{C}$ |
| THERMAL PROPERTIES | | | |
| Storage Temperature range | T_{stg} | -40 to 125 | $^\circ\text{C}$ |
| INSULATION PROPERTIES | | | |
| Isolation test voltage, $t = 1$ sec, 60Hz | V_{is} | 3000 | V_{RMS} |
| Creepage distance | | 12.7 | mm |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Refer to ELECTRICAL CHARACTERISTICS, RECOMMENDED OPERATING RANGES and/or APPLICATION INFORMATION for Safe Operating parameters.

Table 2. RECOMMENDED OPERATING RANGES

| Rating | Symbol | Min | Max | Unit |
|---------------------------------------|--------|-----|-------------------|------------------|
| Module Operating Junction Temperature | T_J | -40 | $(T_{jmax} - 25)$ | $^\circ\text{C}$ |

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

Table 3. ELECTRICAL CHARACTERISTICS $T_J = 25^\circ\text{C}$ unless otherwise noted

| Parameter | Test Conditions | Symbol | Min | Typ | Max | Unit |
|---|---|---------------|------|-------|-----|--------------------|
| HALF BRIDGE IGBT CHARACTERISTICS | | | | | | |
| Collector-Emitter Cutoff Current | $V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}$ | I_{CES} | - | - | 500 | μA |
| Collector-Emitter Saturation Voltage | $V_{GE} = 15\text{ V}, I_C = 160\text{ A}, T_J = 25^\circ\text{C}$ | $V_{CE(sat)}$ | - | 2.15 | 2.7 | V |
| | $V_{GE} = 15\text{ V}, I_C = 160\text{ A}, T_J = 150^\circ\text{C}$ | | - | 2.08 | - | |
| Gate-Emitter Threshold Voltage | $V_{GE} = V_{CE}, I_C = 6\text{ mA}$ | $V_{GE(TH)}$ | - | 5.53 | 6.4 | V |
| Gate Leakage Current | $V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$ | I_{GES} | - | - | 500 | nA |
| Turn-on Delay Time | $T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 100\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | $t_{d(on)}$ | - | 105 | - | ns |
| Rise Time | | t_r | - | 50 | - | |
| Turn-off Delay Time | | $t_{d(off)}$ | - | 270 | - | |
| Fall Time | | t_f | - | 55 | - | |
| Turn-on Switching Loss per Pulse | | E_{on} | - | 1700 | - | |
| Turn off Switching Loss per Pulse | E_{off} | - | 2600 | - | | |
| Turn-on Delay Time | $T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 100\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | $t_{d(on)}$ | - | 95 | - | ns |
| Rise Time | | t_r | - | 55 | - | |
| Turn-off Delay Time | | $t_{d(off)}$ | - | 285 | - | |
| Fall Time | | t_f | - | 150 | - | |
| Turn-on Switching Loss per Pulse | | E_{on} | - | 2300 | - | |
| Turn off Switching Loss per Pulse | E_{off} | - | 4600 | - | | |
| Input Capacitance | $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 10\text{ kHz}$ | C_{ies} | - | 38800 | - | pF |
| Output Capacitance | | C_{oes} | - | 800 | - | |
| Reverse Transfer Capacitance | | C_{res} | - | 680 | - | |
| Total Gate Charge | $V_{CE} = 600\text{ V}, I_C = 160\text{ A}, V_{GE} = 15\text{ V}$ | Q_g | - | 1600 | - | nC |
| Thermal Resistance – chip-to-heatsink | Thermal grease, Thickness < 100 μm , $\lambda = 0.84\text{ W/mK}$ | R_{thJH} | - | 0.19 | - | $^\circ\text{C/W}$ |

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Table 3. ELECTRICAL CHARACTERISTICS $T_J = 25^\circ\text{C}$ unless otherwise noted

| Parameter | Test Conditions | Symbol | Min | Typ | Max | Unit |
|--|--|---|------------|------|------|------------------------|
| NEUTRAL POINT FREEWHEEL DIODE CHARACTERISTICS | | | | | | |
| Diode Reverse Leakage Current | $V_R = 600\text{ V}$ | I_R | – | – | 100 | μA |
| Diode Forward Voltage | $I_F = 120\text{ A}, T_J = 25^\circ\text{C}$ | V_F | – | 1.24 | 1.5 | V |
| | $I_F = 120\text{ A}, T_J = 150^\circ\text{C}$ | | – | 1.20 | – | |
| Reverse Recovery Time | $T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 100\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | t_{rr} | – | 50 | – | ns |
| Reverse Recovery Charge | | Q_{rr} | – | 1700 | – | nC |
| Peak Reverse Recovery Current | | I_{RRM} | – | 59 | – | A |
| Peak Rate of Fall of Recovery Current | | di/dt | – | 2500 | – | $\text{A}/\mu\text{s}$ |
| Reverse Recovery Energy | | E_{rr} | – | 380 | – | μJ |
| Reverse Recovery Time | | $T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 100\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | t_{rr} | – | 77 | – |
| Reverse Recovery Charge | Q_{rr} | | – | 3600 | – | nC |
| Peak Reverse Recovery Current | I_{RRM} | | – | 77 | – | A |
| Peak Rate of Fall of Recovery Current | di/dt | | – | 1900 | – | $\text{A}/\mu\text{s}$ |
| Reverse Recovery Energy | E_{rr} | | – | 780 | – | μJ |
| Thermal Resistance – chip-to–heatsink | Thermal grease, Thickness < 100 μm , $\lambda = 0.84\text{ W/mK}$ | | R_{thJH} | – | 0.48 | – |

NEUTRAL POINT IGBT CHARACTERISTICS

| | | | | | | | |
|---------------------------------------|---|---------------|---|-------|-----|---------------------------|---------------|
| Collector–Emitter Cutoff Current | $V_{GE} = 0\text{ V}, V_{CE} = 600\text{ V}$ | I_{CES} | – | – | 300 | μA | |
| Collector–Emitter Saturation Voltage | $V_{GE} = 15\text{ V}, I_C = 100\text{ A}, T_J = 25^\circ\text{C}$ | $V_{CE(sat)}$ | – | 1.47 | 1.8 | V | |
| | $V_{GE} = 15\text{ V}, I_C = 100\text{ A}, T_J = 150^\circ\text{C}$ | | – | 1.50 | – | | |
| Gate–Emitter Threshold Voltage | $V_{GE} = V_{CE}, I_C = 1.2\text{ mA}$ | $V_{GE(TH)}$ | – | 5.30 | 6.4 | V | |
| Gate Leakage Current | $V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$ | I_{GES} | – | – | 300 | nA | |
| Turn–on Delay Time | $T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 100\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | $t_{d(on)}$ | – | 50 | – | ns | |
| Rise Time | | t_r | – | 35 | – | | |
| Turn–off Delay Time | | $t_{d(off)}$ | – | 135 | – | | |
| Fall Time | | t_f | – | 40 | – | | |
| Turn–on Switching Loss per Pulse | | E_{on} | – | 870 | – | | μJ |
| Turn off Switching Loss per Pulse | | E_{off} | – | 1690 | – | | |
| Turn–on Delay Time | $T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 100\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | $t_{d(on)}$ | – | 50 | – | ns | |
| Rise Time | | t_r | – | 37 | – | | |
| Turn–off Delay Time | | $t_{d(off)}$ | – | 145 | – | | |
| Fall Time | | t_f | – | 65 | – | | |
| Turn–on Switching Loss per Pulse | | E_{on} | – | 1300 | – | | μJ |
| Turn off Switching Loss per Pulse | | E_{off} | – | 2500 | – | | |
| Input Capacitance | $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 10\text{ kHz}$ | C_{ies} | – | 18800 | – | pF | |
| Output Capacitance | | C_{oes} | – | 560 | – | | |
| Reverse Transfer Capacitance | | C_{res} | – | 500 | – | | |
| Total Gate Charge | $V_{CE} = 480\text{ V}, I_C = 80\text{ A}, V_{GE} = 15\text{ V}$ | Q_g | – | 790 | – | nC | |
| Thermal Resistance – chip-to–heatsink | Thermal grease, Thickness < 100 μm , $\lambda = 0.84\text{ W/mK}$ | R_{thJH} | – | 0.41 | – | $^\circ\text{C}/\text{W}$ | |

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Table 3. ELECTRICAL CHARACTERISTICS $T_J = 25^\circ\text{C}$ unless otherwise noted

| Parameter | Test Conditions | Symbol | Min | Typ | Max | Unit |
|--|--|---|------------|------|------|------------------------|
| HALF BRIDGE FREEWHEEL DIODE CHARACTERISTICS | | | | | | |
| Diode Reverse Leakage Current | $V_R = 1200\text{ V}$ | I_R | – | – | 100 | μA |
| Diode Forward Voltage | $I_F = 60\text{ A}, T_J = 25^\circ\text{C}$ | V_F | – | 2.63 | 3.3 | V |
| | $I_F = 60\text{ A}, T_J = 150^\circ\text{C}$ | | – | 2.12 | – | |
| Reverse Recovery Time | $T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 100\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | t_{rr} | – | 320 | – | ns |
| Reverse Recovery Charge | | Q_{rr} | – | 3700 | – | nC |
| Peak Reverse Recovery Current | | I_{RRM} | – | 68 | – | A |
| Peak Rate of Fall of Recovery Current | | di/dt | – | 3000 | – | $\text{A}/\mu\text{s}$ |
| Reverse Recovery Energy | | E_{rr} | – | 1150 | – | μJ |
| Reverse Recovery Time | | $T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 100\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | t_{rr} | – | 520 | – |
| Reverse Recovery Charge | Q_{rr} | | – | 9000 | – | nC |
| Peak Reverse Recovery Current | I_{RRM} | | – | 102 | – | A |
| Peak Rate of Fall of Recovery Current | di/dt | | – | 2600 | – | $\text{A}/\mu\text{s}$ |
| Reverse Recovery Energy | E_{rr} | | – | 2750 | – | μJ |
| Thermal Resistance – chip-to-heatsink | Thermal grease, Thickness < 100 μm , $\lambda = 0.84\text{ W/mK}$ | | R_{thJH} | – | 0.67 | – |

HALF BRIDGE INVERSE DIODE CHARACTERISTICS

| | | | | | | |
|---------------------------------------|---|------------|---|------|------|--------------------|
| Diode Forward Voltage | $I_F = 7\text{ A}, T_J = 25^\circ\text{C}$ | V_F | – | 1.92 | 2.80 | V |
| | $I_F = 7\text{ A}, T_J = 150^\circ\text{C}$ | | – | 1.37 | – | |
| Thermal Resistance – chip-to-heatsink | Thermal grease, Thickness < 100 μm , $\lambda = 0.84\text{ W/mK}$ | R_{thJH} | – | 1.52 | – | $^\circ\text{C/W}$ |

NEUTRAL POINT INVERSE DIODE CHARACTERISTICS

| | | | | | | |
|---------------------------------------|---|------------|---|------|------|--------------------|
| Diode Forward Voltage | $I_F = 30\text{ A}, T_J = 25^\circ\text{C}$ | V_F | – | 2.24 | 2.75 | V |
| | $I_F = 30\text{ A}, T_J = 150^\circ\text{C}$ | | – | 1.60 | – | |
| Thermal Resistance – chip-to-heatsink | Thermal grease, Thickness 100 μm , $\lambda = 0.84\text{ W/mK}$ | R_{thJH} | – | 1.21 | – | $^\circ\text{C/W}$ |

THERMISTOR CHARACTERISTICS

| | | | | | | |
|----------------------------|-----------------------------------|--------------|----|------|---|------------------|
| Nominal resistance | | R_{25} | – | 22 | – | $\text{k}\Omega$ |
| Nominal resistance | $T = 100^\circ\text{C}$ | R_{100} | – | 1486 | – | Ω |
| Deviation of R_{25} | | $\Delta R/R$ | –5 | – | 5 | % |
| Power dissipation | | P_D | – | 200 | – | mW |
| Power dissipation constant | | | – | 2 | – | mW/K |
| B-value | $B(25/50)$, tolerance $\pm 3\%$ | | – | 3950 | – | K |
| B-value | $B(25/100)$, tolerance $\pm 3\%$ | | – | 3998 | – | K |

ORDERING INFORMATION

| Device | Marking | Package | Shipping |
|------------------------------|--------------------|--|-------------------------|
| NXH160T120L2Q2F2SG Q2PACK | NXH160T120L2Q2F2SG | Q2PACK – Case 180AK (Pb-Free and Halide-Free) | 12 Units / Blister Tray |

NXH160T120L2Q2F2SG

TYPICAL CHARACTERISTICS – Half Bridge IGBT and Neutral Point Diode

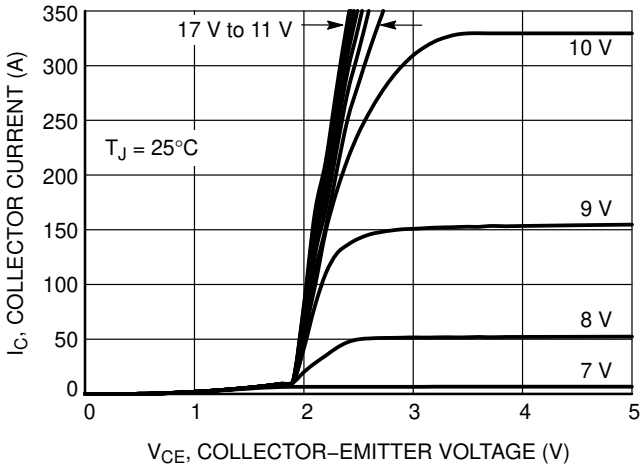


Figure 1. IGBT Typical Output Characteristics

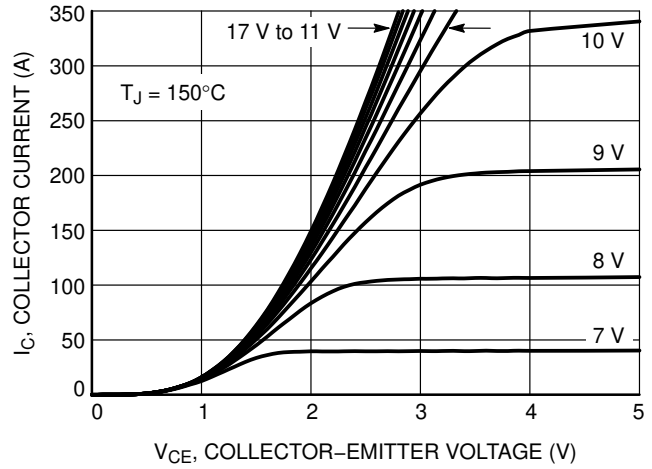


Figure 2. IGBT Typical Output Characteristics

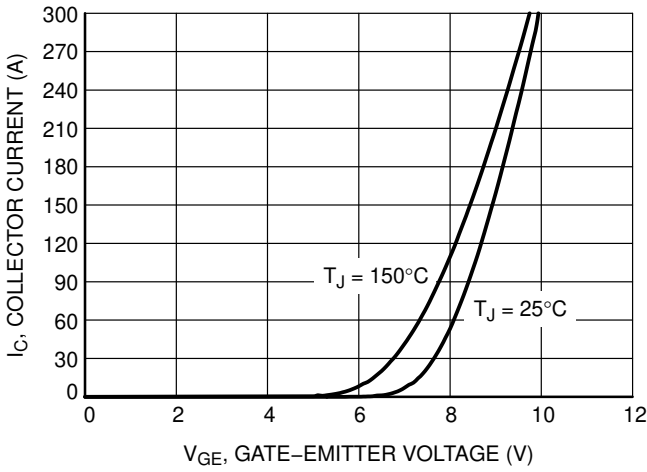


Figure 3. IGBT Typical Transfer Characteristics

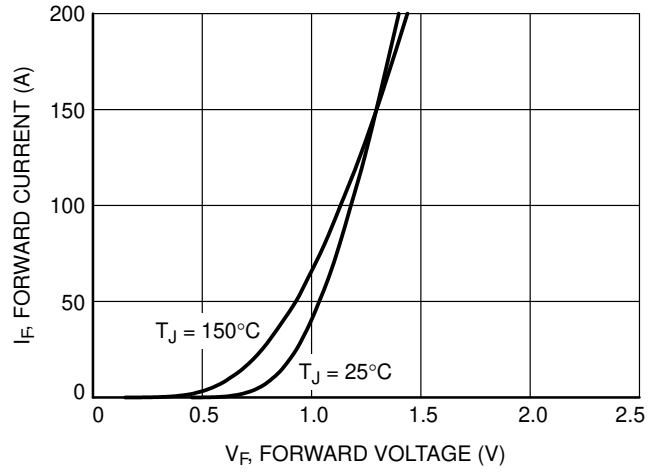


Figure 4. Diode Forward Characteristic

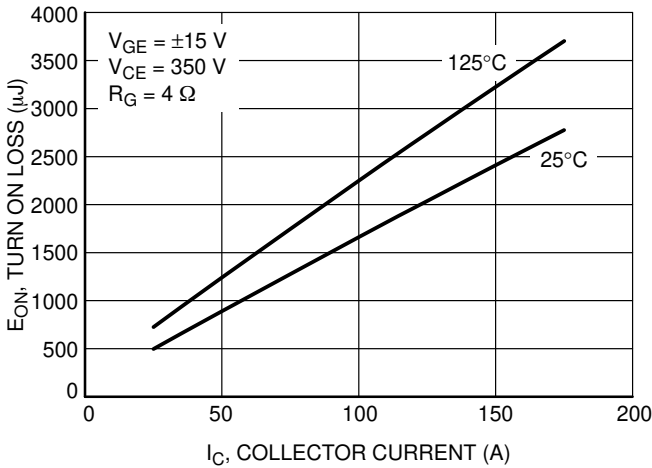


Figure 5. Typical Turn On Loss vs. IC

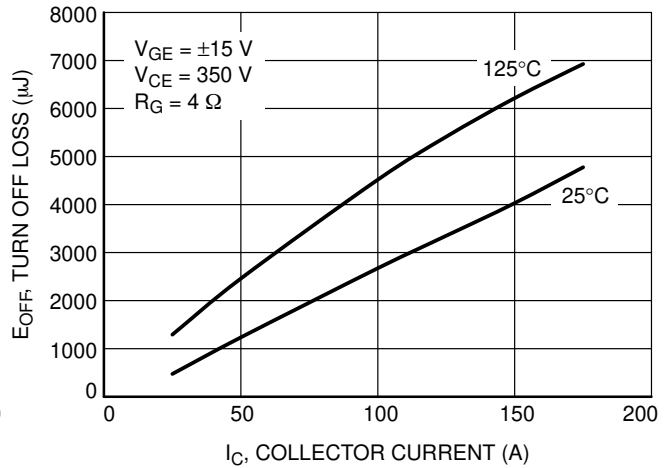


Figure 6. Typical Turn Off Loss vs. IC

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TYPICAL CHARACTERISTICS – Half Bridge IGBT and Neutral Point Diode

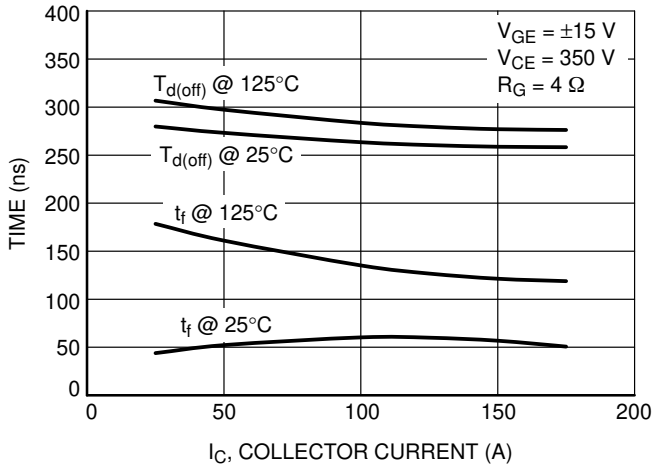


Figure 7. Typical Turn On Loss vs. I_C

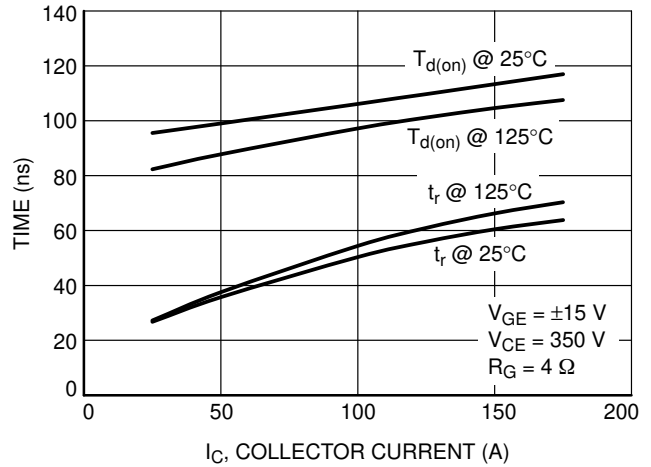


Figure 8. Typical Turn Off Loss vs. I_C

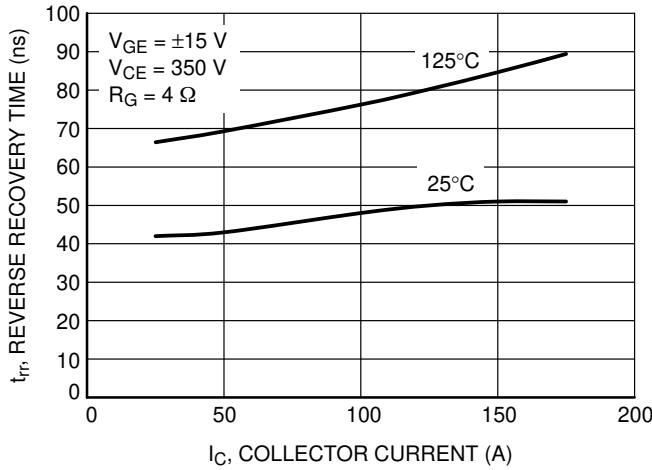


Figure 9. Typical Reverse Recovery Time vs. I_C

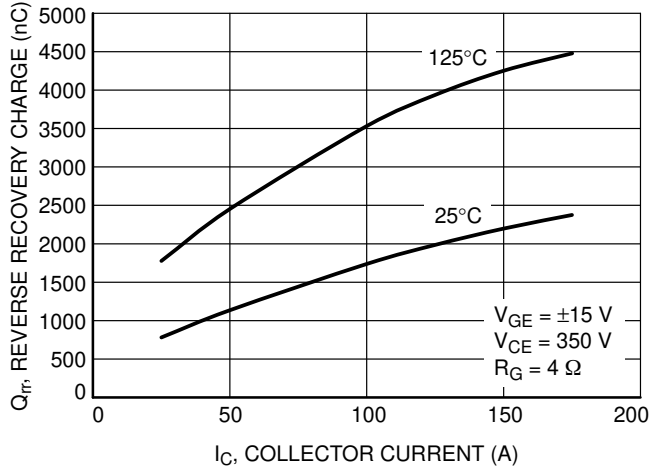


Figure 10. Typical Reverse Recovery Charge vs. I_C

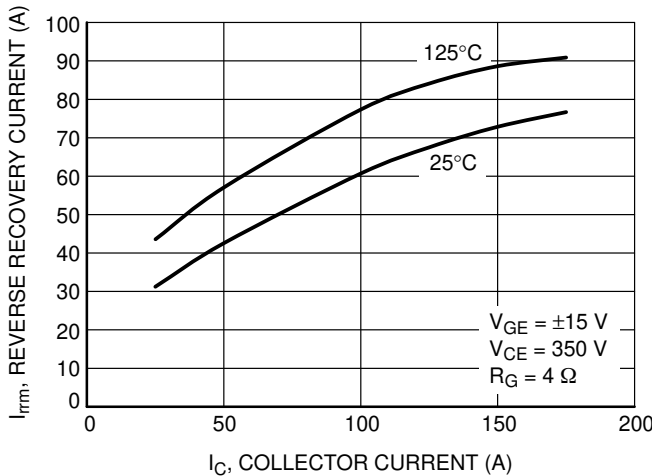


Figure 11. Typical Reverse Recovery Peak Current vs. I_C

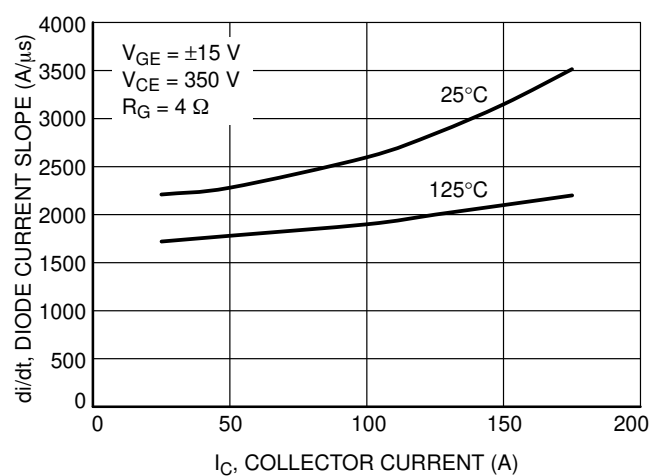


Figure 12. Typical Diode Current Slope vs. I_C

NXH160T120L2Q2F2SG

TYPICAL CHARACTERISTICS – Half Bridge IGBT and Neutral Point Diode

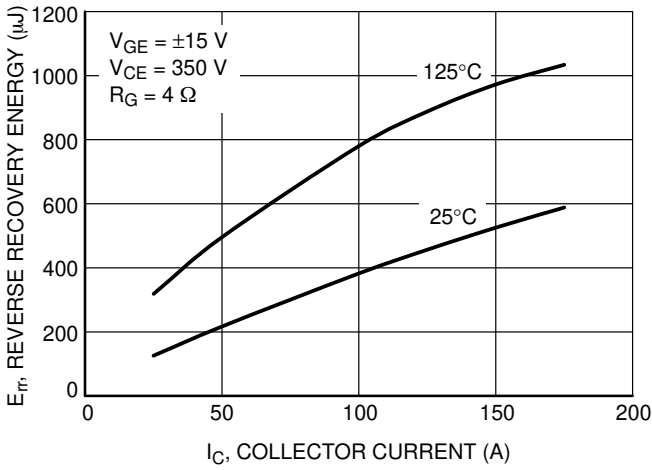


Figure 13. Typical Reverse Recovery Energy vs. I_C

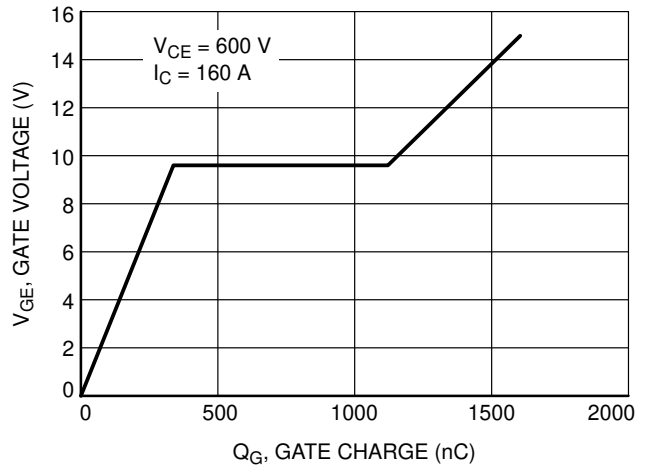


Figure 14. Gate Voltage vs. Gate Charge

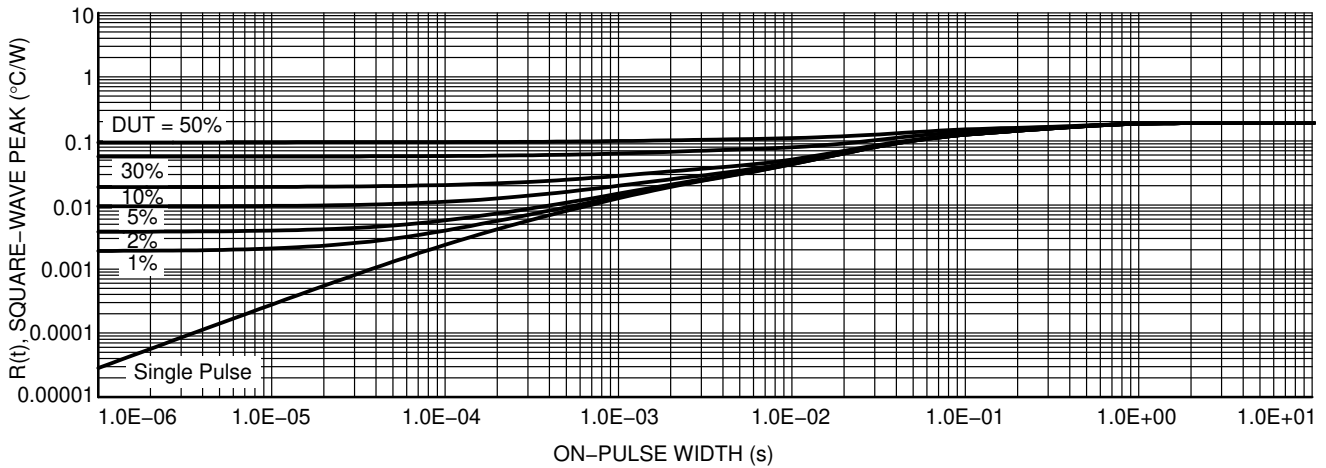


Figure 15. IGBT Transient Thermal Impedance

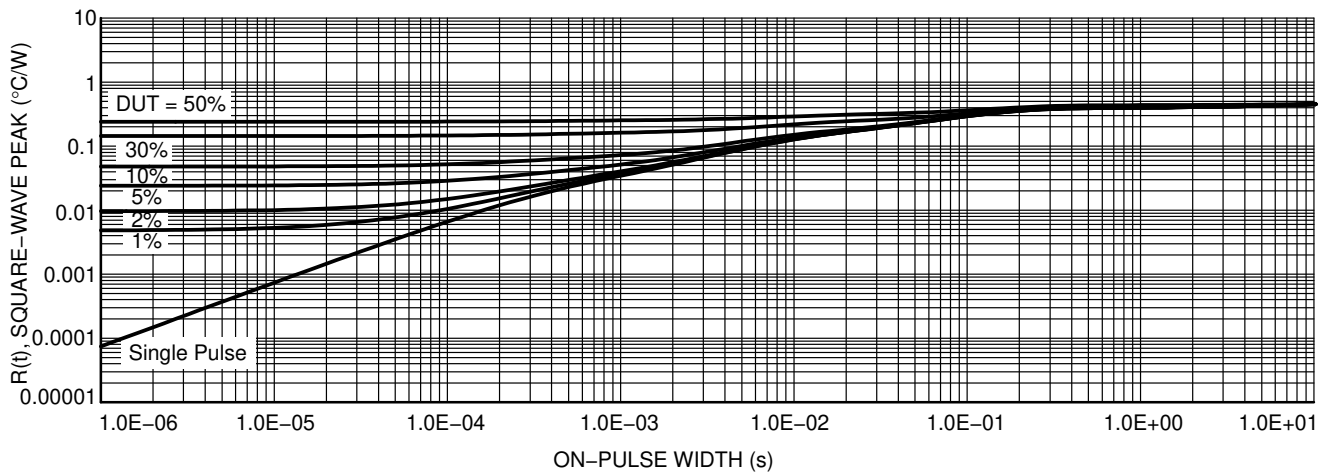


Figure 16. Diode Transient Thermal Impedance

NXH160T120L2Q2F2SG

TYPICAL CHARACTERISTICS – Neutral Point IGBT and Half Bridge Diode

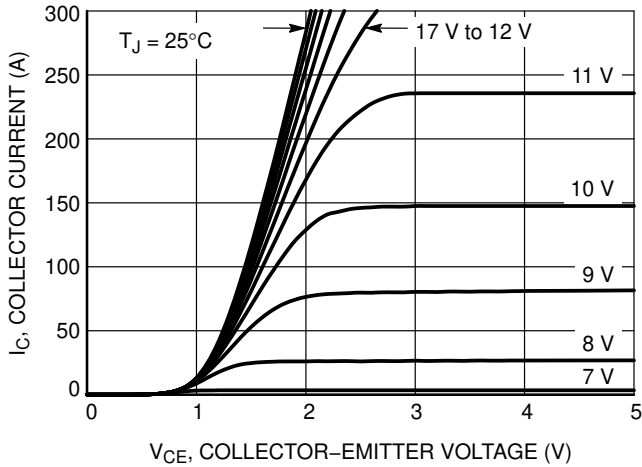


Figure 17. IGBT Typical Output Characteristics

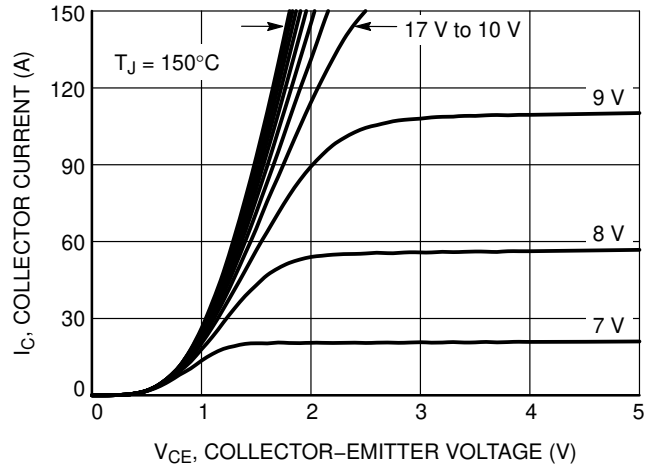


Figure 18. IGBT Typical Output Characteristics

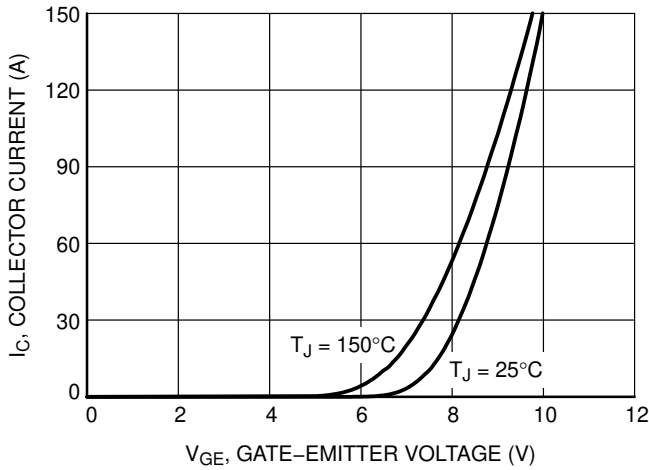


Figure 19. IGBT Typical Transfer Characteristics

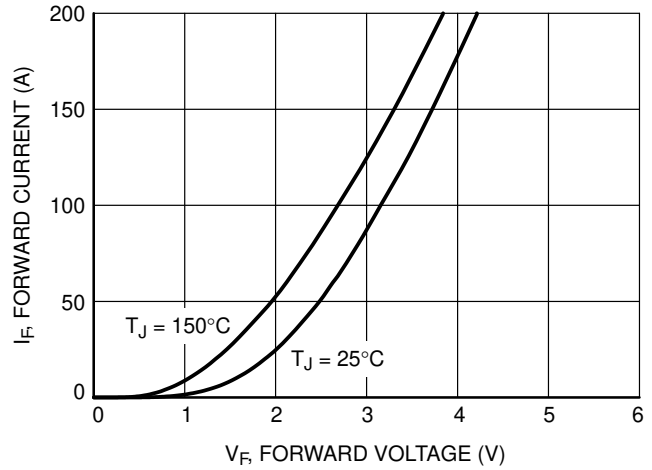


Figure 20. Diode Forward Characteristic

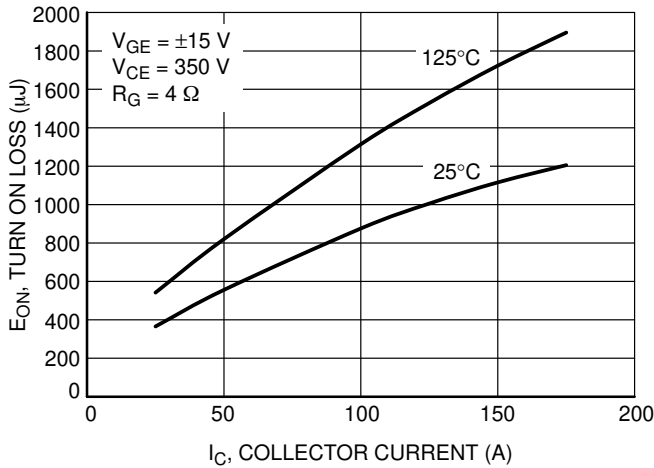


Figure 21. Typical Turn On Loss vs. IC

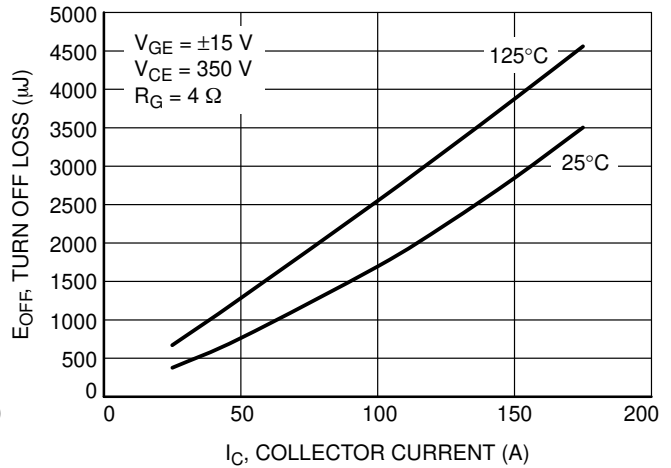


Figure 22. Typical Turn Off Loss vs. IC

NXH160T120L2Q2F2SG

TYPICAL CHARACTERISTICS – Neutral Point IGBT and Half Bridge Diode

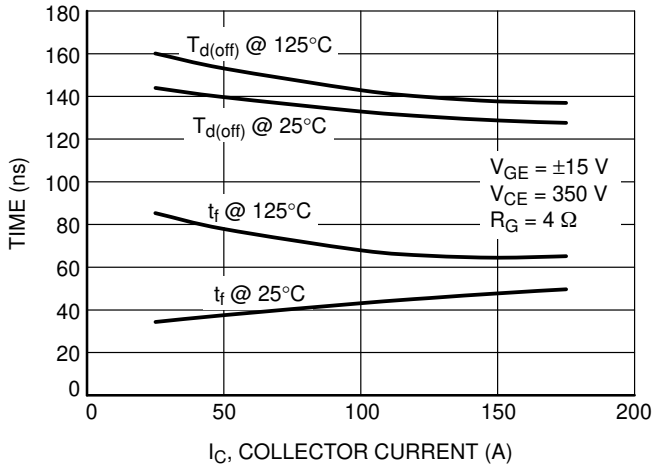


Figure 23. Typical Turn On Loss vs. IC

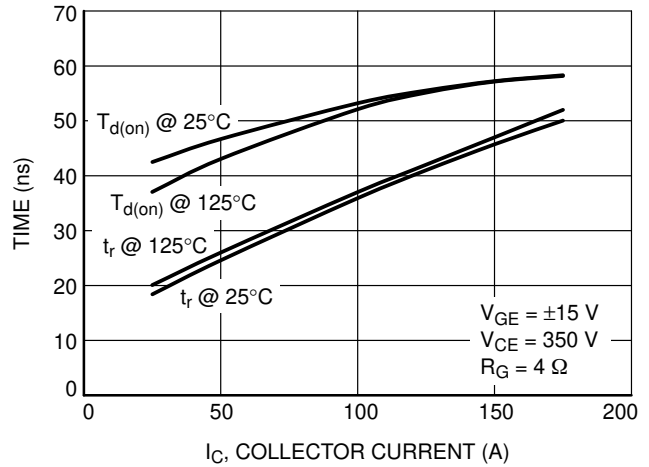


Figure 24. Typical Switching Times vs. IC

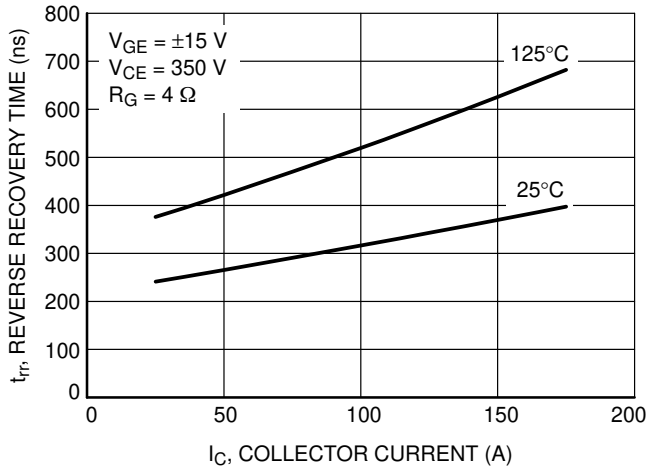


Figure 25. Typical Reverse Recovery Time vs. IC

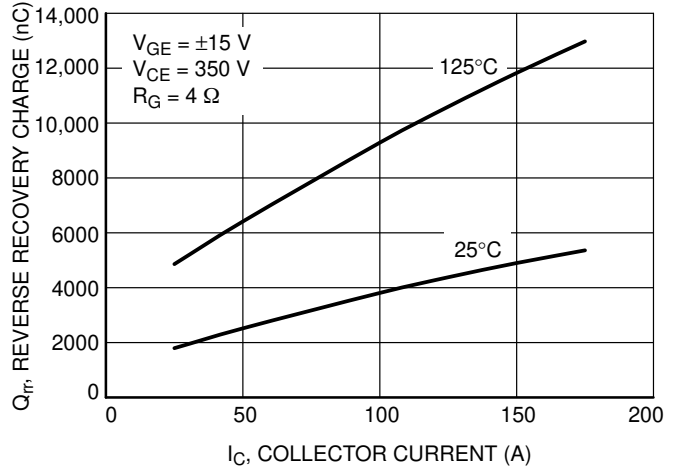


Figure 26. Typical Reverse Recovery Charge vs. IC

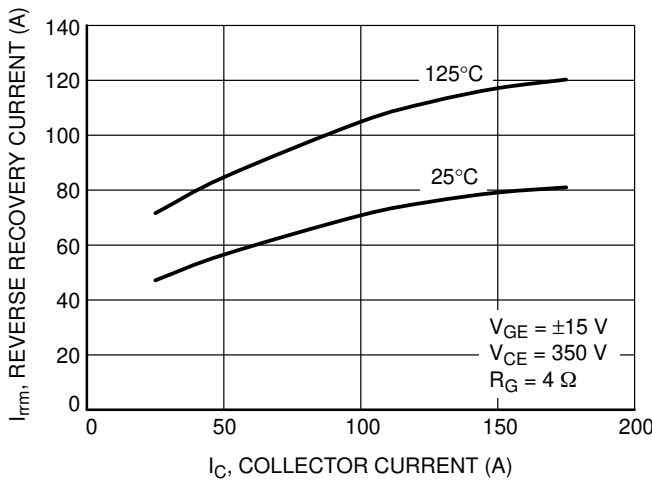


Figure 27. Typical Reverse Recovery Peak Current vs. IC

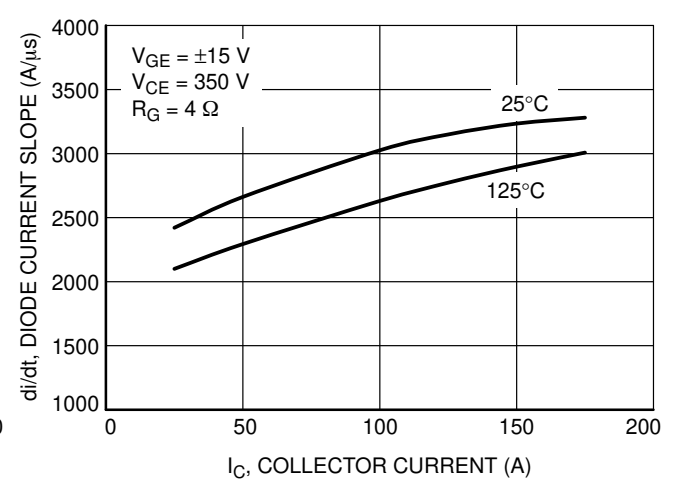


Figure 28. Typical Diode Current Slope vs. IC

NXH160T120L2Q2F2SG

TYPICAL CHARACTERISTICS – Neutral Point IGBT and Half Bridge Diode

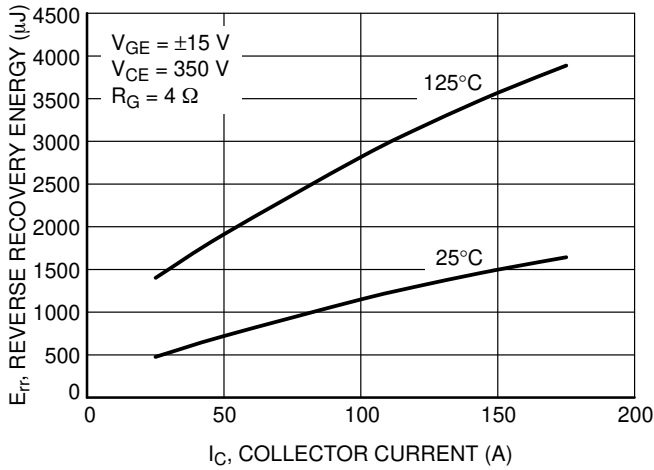


Figure 29. Typical Reverse Recovery Energy vs. I_C

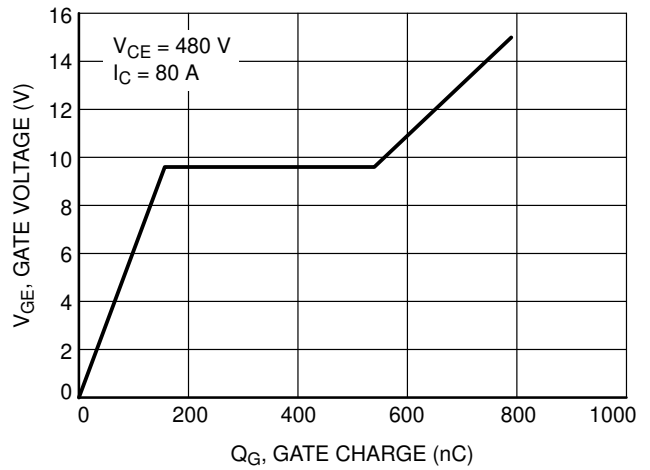


Figure 30. Gate Voltage vs. Gate Charge

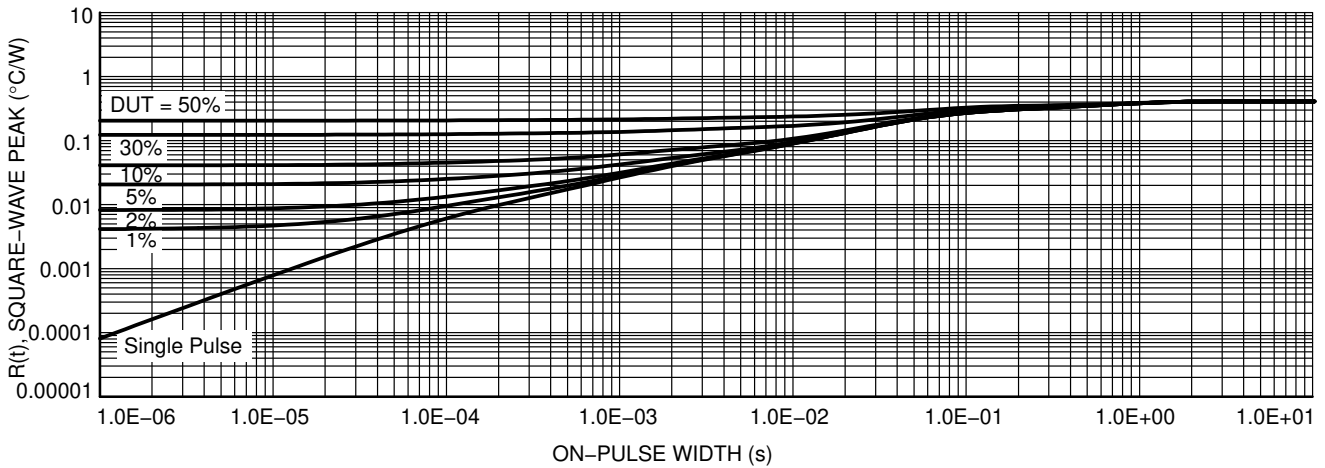


Figure 31. IGBT Transient Thermal Impedance

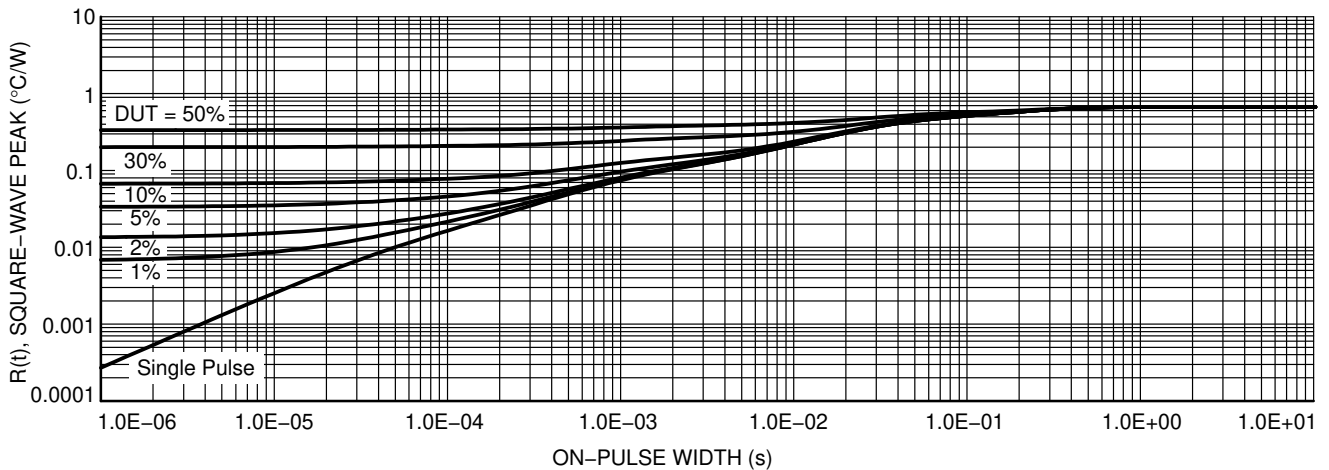


Figure 32. Diode Transient Thermal Impedance

NXH160T120L2Q2F2SG

TYPICAL CHARACTERISTICS – Half Bridge IGBT Protection Diode

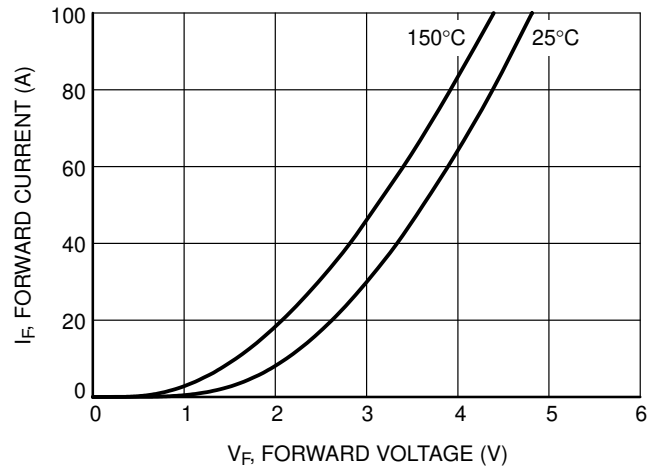


Figure 33. Diode Forward Characteristic

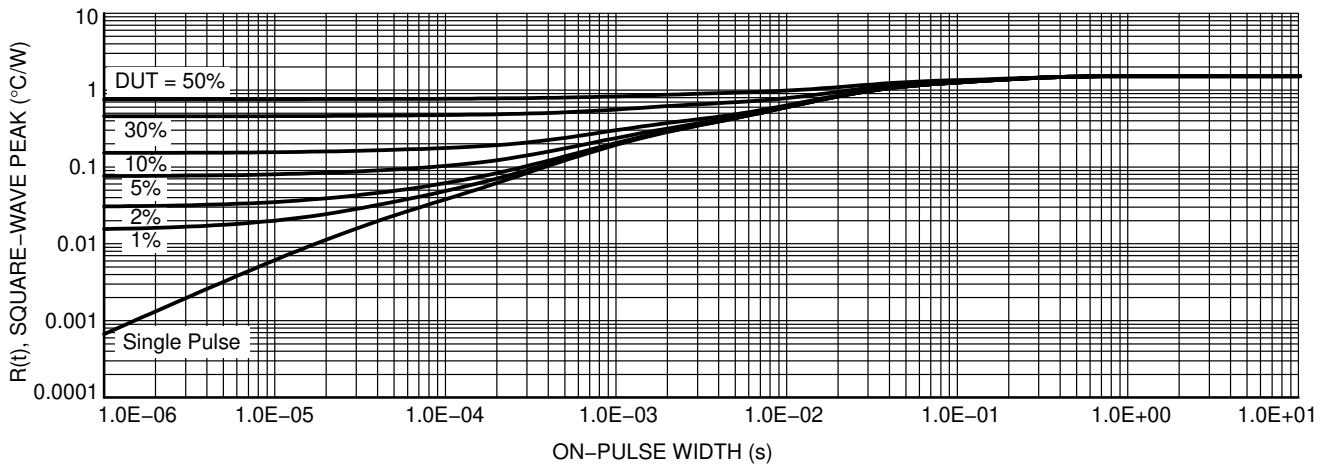


Figure 34. Diode Transient Thermal Impedance

NXH160T120L2Q2F2SG

TYPICAL CHARACTERISTICS – Neutral Point IGBT Protection Diode

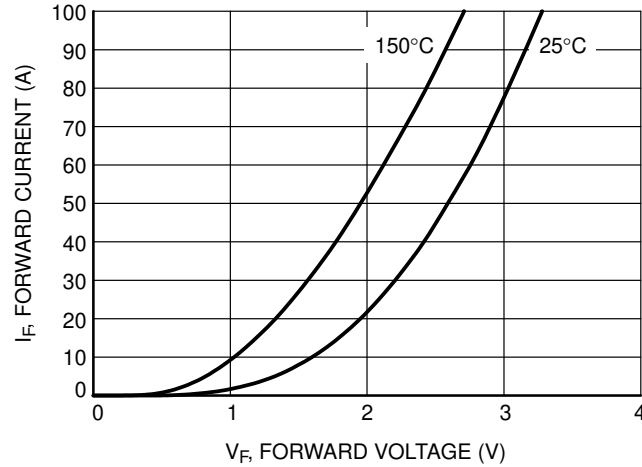


Figure 35. Diode Forward Characteristic

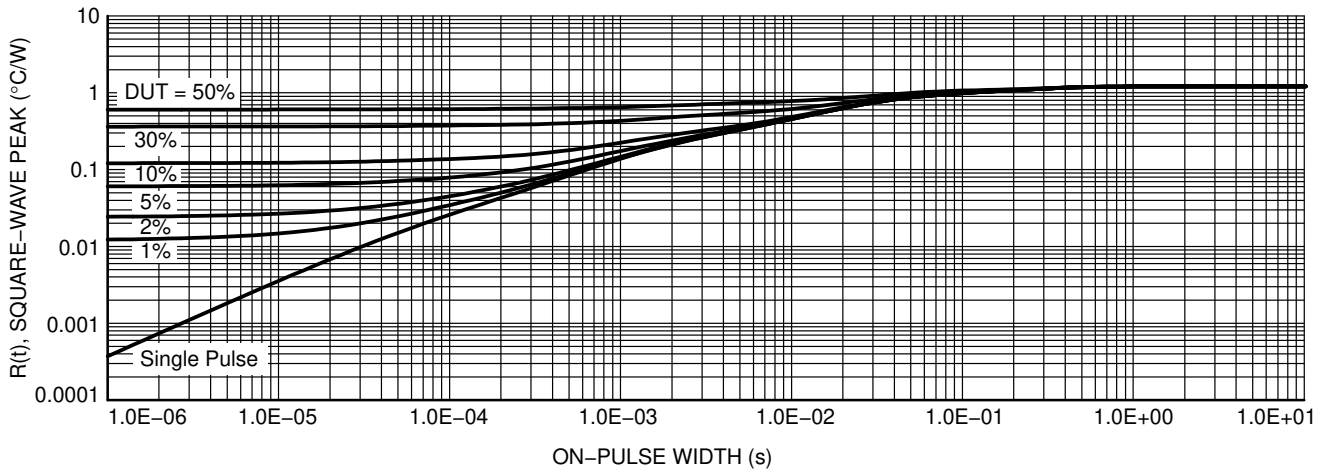


Figure 36. Diode Transient Thermal Impedance

TYPICAL CHARACTERISTICS – Thermistor

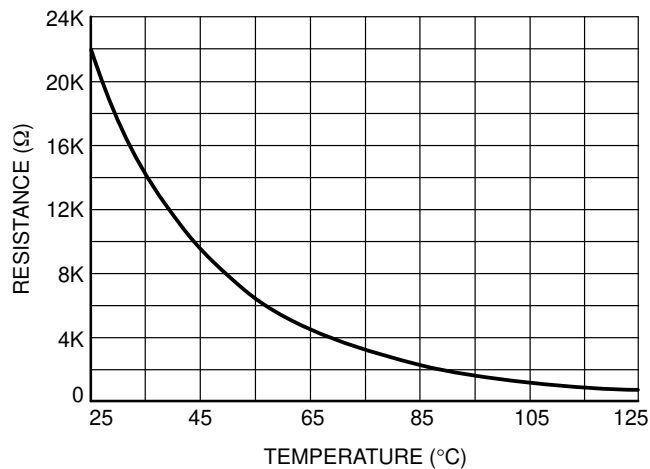
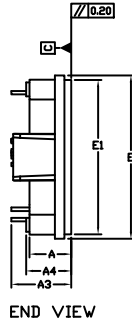
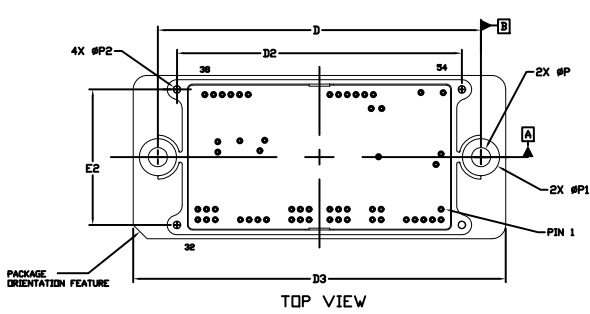


Figure 37. Thermistor Characteristics

NXH160T120L2Q2F2SG

PACKAGE DIMENSIONS

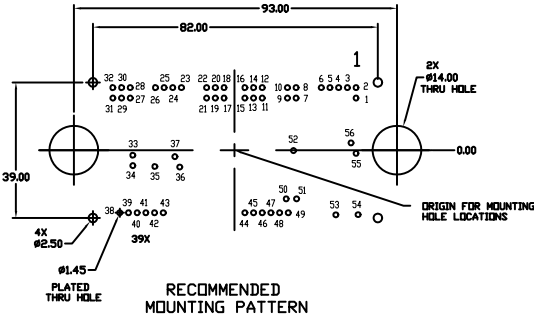
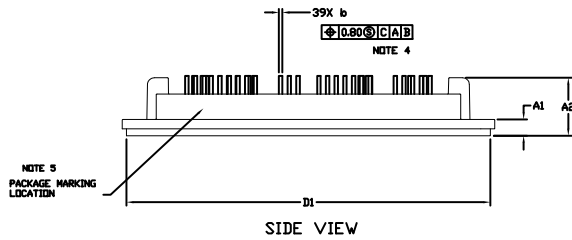
PIM56, 93x47 (SOLDER PIN)
CASE 180AK
ISSUE B



NOTES:

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
- CONTROLLING DIMENSION= MILLIMETERS
- DIMENSIONS b APPLIES TO THE PLATED TERMINALS AND IS MEASURED BETWEEN 1.00 AND 3.00 FROM THE TERMINAL TIP.
- POSITION OF THE CENTER OF THE TERMINALS IS DETERMINED FROM DATUM B THE CENTER OF DIMENSION D, X DIRECTION, AND FROM DATUM A, Y DIRECTION. POSITIONAL TOLERANCE, AS NOTED IN DRAWING, APPLIES TO EACH TERMINAL IN BOTH DIRECTIONS.
- PACKAGE MARKING IS LOCATED AS SHOWN ON THE SIDE WITH THE PACKAGE ORIENTATION FEATURE.

| DIM | MILLIMETERS | |
|-----|-------------|--------|
| | MIN. | MAX. |
| A | 11.80 | 12.20 |
| A1 | 4.50 | 4.90 |
| A2 | 16.50 | 16.90 |
| A3 | 16.70 | 17.70 |
| A4 | 12.80 | 13.20 |
| b | 0.95 | 1.05 |
| D | 92.80 | 93.20 |
| D1 | 104.60 | 104.90 |
| D2 | 81.80 | 82.20 |
| D3 | 106.90 | 107.50 |
| E | 46.75 | 47.25 |
| E1 | 44.30 | 44.50 |
| E2 | 38.80 | 39.20 |
| P | 5.40 | 5.60 |
| P1 | 10.60 | 10.80 |
| P2 | 2.20 | 2.40 |



NOTE 4

| PIN | PIN POSITION | | PIN POSITION | |
|-----|--------------|--------|--------------|---------------|
| | X | Y | X | Y |
| 1 | 35.00 | -15.00 | 29 | -32.50 -15.00 |
| 2 | 35.00 | -18.00 | 30 | -32.50 -18.00 |
| 3 | 32.50 | -18.00 | 31 | -35.00 -15.00 |
| 4 | 30.00 | -18.00 | 32 | -35.00 -18.00 |
| 5 | 27.50 | -18.00 | 33 | -29.25 1.45 |
| 6 | 25.00 | -18.00 | 34 | -29.25 4.45 |
| 7 | 17.75 | -15.00 | 35 | -22.90 4.70 |
| 8 | 17.75 | -18.00 | 36 | -15.75 4.85 |
| 9 | 15.25 | -15.00 | 37 | -17.15 1.85 |
| 10 | 15.25 | -18.00 | 38 | -33.00 18.00 |
| 11 | 8.00 | -15.00 | 39 | -30.50 18.00 |
| 12 | 8.00 | -18.00 | 40 | -28.00 18.00 |
| 13 | 5.50 | -15.00 | 41 | -25.50 18.00 |
| 14 | 5.50 | -18.00 | 42 | -23.00 18.00 |
| 15 | 3.00 | -15.00 | 43 | -20.50 18.00 |
| 16 | 3.00 | -18.00 | 44 | 3.00 18.00 |
| 17 | -3.00 | -15.00 | 45 | 5.50 18.00 |
| 18 | -3.00 | -18.00 | 46 | 8.00 18.00 |
| 19 | -5.50 | -15.00 | 47 | 10.50 18.00 |
| 20 | -5.50 | -18.00 | 48 | 13.00 18.00 |
| 21 | -8.00 | -15.00 | 49 | 15.50 18.00 |
| 22 | -8.00 | -18.00 | 50 | 14.90 14.00 |
| 23 | -15.25 | -18.00 | 51 | 17.90 14.00 |
| 24 | -17.75 | -18.00 | 52 | 17.00 0.10 |
| 25 | -20.25 | -18.00 | 53 | 29.20 18.60 |
| 26 | -22.75 | -18.00 | 54 | 35.60 18.55 |
| 27 | -30.00 | -15.00 | 55 | 35.00 0.90 |
| 28 | -30.00 | -18.00 | 56 | 33.55 -2.10 |

MOUNTING HOLE POSITION

| PIN | PIN POSITION | | PIN POSITION | |
|-----|--------------|-------|--------------|---------------|
| | X | Y | X | Y |
| 1 | 35.00 | 15.00 | 29 | -32.50 15.00 |
| 2 | 35.00 | 18.00 | 30 | -32.50 18.00 |
| 3 | 32.50 | 18.00 | 31 | -35.00 15.00 |
| 4 | 30.00 | 18.00 | 32 | -35.00 18.00 |
| 5 | 27.50 | 18.00 | 33 | -29.25 -1.45 |
| 6 | 25.00 | 18.00 | 34 | -29.25 -4.45 |
| 7 | 17.75 | 15.00 | 35 | -22.90 -4.70 |
| 8 | 17.75 | 18.00 | 36 | -15.75 -4.85 |
| 9 | 15.25 | 15.00 | 37 | -17.15 -1.85 |
| 10 | 15.25 | 18.00 | 38 | -33.00 -18.00 |
| 11 | 8.00 | 15.00 | 39 | -30.50 -18.00 |
| 12 | 8.00 | 18.00 | 40 | -28.00 -18.00 |
| 13 | 5.50 | 15.00 | 41 | -25.50 -18.00 |
| 14 | 5.50 | 18.00 | 42 | -23.00 -18.00 |
| 15 | 3.00 | 15.00 | 43 | -20.50 -18.00 |
| 16 | 3.00 | 18.00 | 44 | 3.00 -18.00 |
| 17 | -3.00 | 15.00 | 45 | 5.50 -18.00 |
| 18 | -3.00 | 18.00 | 46 | 8.00 -18.00 |
| 19 | -5.50 | 15.00 | 47 | 10.50 -18.00 |
| 20 | -5.50 | 18.00 | 48 | 13.00 -18.00 |
| 21 | -8.00 | 15.00 | 49 | 15.50 -18.00 |
| 22 | -8.00 | 18.00 | 50 | 14.90 -14.00 |
| 23 | -15.25 | 18.00 | 51 | 17.90 -14.00 |
| 24 | -17.75 | 18.00 | 52 | 17.00 -0.10 |
| 25 | -20.25 | 18.00 | 53 | 29.20 -18.60 |
| 26 | -22.75 | 18.00 | 54 | 35.60 -18.55 |
| 27 | -30.00 | 15.00 | 55 | 35.00 -0.90 |
| 28 | -30.00 | 18.00 | 56 | 33.55 2.10 |

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