

NXH80B120H2Q0

Q0 - Dual Boost Power Module

The NXH80B120H2Q0 is a high-density, integrated power module combines high-performance IGBTs with rugged anti-parallel diodes including on-board thermistor.

Features

- Dual Boost 40 A / 1200 V IGBT + SiC Rectifier Hybrid Module
- 1200 V FSII IGBT $V_{CE(SAT)} = 2.2\text{ V}$
- 1200 V SiC Diode $V_F = 1.4\text{ V}$
- Low Inductive Layout
- Solderable Pins
- Thermistor
- Bare Copper and Nickel-Plated DBC Options

Typical Applications

- Solar Inverter
- Uninterruptible Power Supplies
- Energy Storage Systems

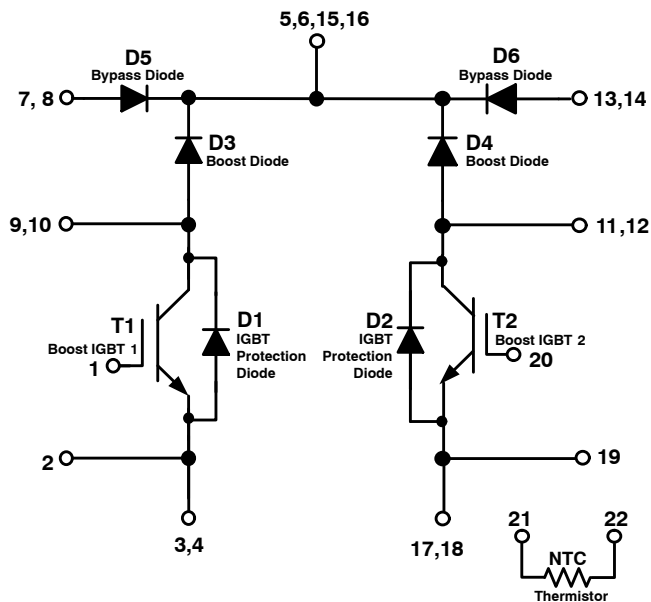
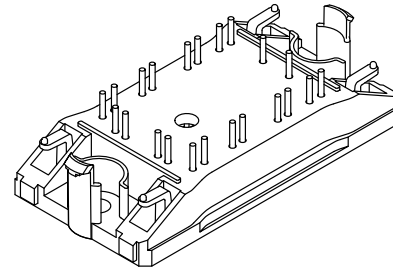


Figure 1. NXH80B120H2Q0SG Schematic Diagram



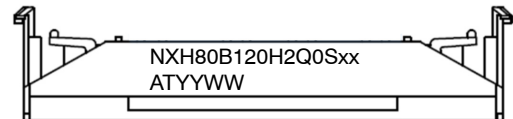
ON Semiconductor®

www.onsemi.com



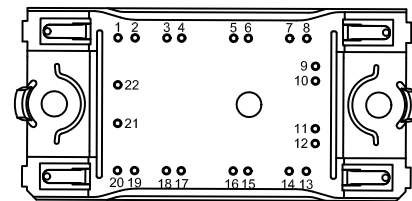
**Q0BOOST
CASE 180AJ**

MARKING DIAGRAM



NXH80B120H2Q0Sxx = Device Code
AT = Assembly & Test Site Code
YYWW = Year and Work Week Code

PIN CONNECTIONS



ORDERING INFORMATION

See detailed ordering, marking and shipping information on page 4 of this data sheet.

NXH80B120H2Q0

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

| Rating | Symbol | Value | Unit |
|--|--------------|----------|------------------|
| BOOST 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 | 41 | A |
| Pulsed Collector Current ($T_J = 175^\circ\text{C}$) | I_{Cpulse} | 123 | A |
| Maximum Power Dissipation @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | P_{tot} | 103 | 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 | $^\circ\text{C}$ |

| | | | |
|---|------------|------|----------------------|
| BOOST 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 | 28 | A |
| Repetitive Peak Forward Current (limited by T_J , duty cycle = 10%) | I_{FRM} | 75 | A |
| Maximum Power Dissipation @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | P_{tot} | 79 | W |
| Surge Forward Current (60 Hz single half-sine wave) ($T_J = 25^\circ\text{C}$) | I_{FSM} | 69 | A |
| I^2t - value (60 Hz single half-sine wave) ($T_J = 150^\circ\text{C}$) | I^2t | 19 | A^2s |
| Minimum Operating Junction Temperature | T_{JMIN} | -40 | $^\circ\text{C}$ |
| Maximum Operating Junction Temperature | T_{JMAX} | 150 | $^\circ\text{C}$ |

| | | | |
|---|------------|------|------------------|
| BYPASS DIODE / IGBT PROTECTION DIODE | | | |
| Peak Repetitive Reverse Voltage | V_{RRM} | 1600 | V |
| Continuous Forward Current @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | I_F | 46 | A |
| Repetitive Peak Forward Current ($T_J = 175^\circ\text{C}$, t_p limited by T_{Jmax}) | I_{FRM} | 130 | A |
| Power Dissipation Per Diode @ $T_h = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$) | P_{tot} | 66 | W |
| Minimum Operating Junction Temperature | T_{JMIN} | -40 | $^\circ\text{C}$ |
| 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, $t = 1\text{ sec}$, 60 Hz | 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.

NXH80B120H2Q0

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

| Parameter | Test Conditions | Symbol | Min | Typ | Max | Unit |
|---------------------------------------|--|---------------|------|------|-----|--------------------|
| BOOST IGBT CHARACTERISTICS | | | | | | |
| Collector-Emitter Cutoff Current | $V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}$ | I_{CES} | – | – | 200 | μA |
| Collector-Emitter Saturation Voltage | $V_{GE} = 15\text{ V}, I_C = 40\text{ A}, T_J = 25^\circ\text{C}$ | $V_{CE(sat)}$ | – | 2.20 | 2.5 | V |
| | $V_{GE} = 15\text{ V}, I_C = 40\text{ A}, T_J = 150^\circ\text{C}$ | | – | 2.16 | – | |
| Gate-Emitter Threshold Voltage | $V_{GE} = V_{CE}, I_C = 1.5\text{ mA}$ | $V_{GE(TH)}$ | – | 5.45 | 6.4 | V |
| Gate Leakage Current | $V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$ | I_{GES} | – | – | 200 | nA |
| Turn-on Delay Time | $T_J = 25^\circ\text{C}$ $V_{CE} = 700\text{ V}, I_C = 40\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | $t_{d(on)}$ | – | 27 | – | ns |
| Rise Time | | t_r | – | 19 | – | |
| Turn-off Delay Time | | $t_{d(off)}$ | – | 94 | – | |
| Fall Time | | t_f | – | 78 | – | |
| Turn-on Switching Loss per Pulse | | E_{on} | – | 540 | – | |
| Turn-off Switching Loss per Pulse | E_{off} | – | 1640 | – | | |
| Turn-on Delay Time | $T_J = 125^\circ\text{C}$ $V_{CE} = 700\text{ V}, I_C = 40\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | $t_{d(on)}$ | – | 27 | – | ns |
| Rise Time | | t_r | – | 20 | – | |
| Turn-off Delay Time | | $t_{d(off)}$ | – | 110 | – | |
| Fall Time | | t_f | – | 189 | – | |
| Turn-on Switching Loss per Pulse | | E_{on} | – | 620 | – | |
| Turn-off Switching Loss per Pulse | E_{off} | – | 3590 | – | | |
| Input Capacitance | $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 10\text{ kHz}$ | C_{ies} | – | 9700 | – | pF |
| Output Capacitance | | C_{oes} | – | 200 | – | |
| Reverse Transfer Capacitance | | C_{res} | – | 170 | – | |
| Total Gate Charge | $V_{CE} = 600\text{ V}, I_C = 40\text{ A}, V_{GE} = 15\text{ V}$ | Q_g | – | 400 | – | nC |
| Thermal Resistance – chip-to-heatsink | Thermal grease, Thickness < 100 μm , $\lambda = 0.84\text{ W/mK}$ | R_{thJH} | – | 0.92 | – | $^\circ\text{C/W}$ |

BOOST DIODE CHARACTERISTICS

| | | | | | | |
|---------------------------------------|--|------------|---|------|-----|------------------------|
| Diode Reverse Leakage Current | $V_R = 1200\text{ V}$ | I_R | – | – | 300 | μA |
| Diode Forward Voltage | $I_F = 15\text{ A}, T_J = 25^\circ\text{C}$ | V_F | – | 1.42 | 1.7 | V |
| | $I_F = 15\text{ A}, T_J = 150^\circ\text{C}$ | | – | 1.95 | – | |
| Reverse Recovery Time | $T_J = 25^\circ\text{C}$ $V_{CE} = 700\text{ V}, I_C = 40\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | t_{rr} | – | 27 | – | ns |
| Reverse Recovery Charge | | Q_{rr} | – | 280 | – | nC |
| Peak Reverse Recovery Current | | I_{RRM} | – | 16 | – | A |
| Peak Rate of Fall of Recovery Current | | di/dt | – | 1080 | – | $\text{A}/\mu\text{s}$ |
| Reverse Recovery Energy | | E_{rr} | – | 130 | – | μJ |
| Reverse Recovery Time | $T_J = 125^\circ\text{C}$ $V_{CE} = 700\text{ V}, I_C = 40\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 4\ \Omega$ | t_{rr} | – | 28 | – | ns |
| Reverse Recovery Charge | | Q_{rr} | – | 250 | – | nC |
| Peak Reverse Recovery Current | | I_{RRM} | – | 15 | – | A |
| Peak Rate of Fall of Recovery Current | | di/dt | – | 940 | – | $\text{A}/\mu\text{s}$ |
| Reverse Recovery Energy | | E_{rr} | – | 110 | – | μJ |
| Thermal Resistance – chip-to-heatsink | Thermal grease, Thickness < 100 μm , $\lambda = 0.84\text{ W/mK}$ | R_{thJH} | – | 1.21 | – | $^\circ\text{C/W}$ |

BYPASS DIODE/IGBT PROTECTION DIODE CHARACTERISTICS

| | | | | | | |
|-------------------------------|---|-------|---|---|-----|---------------|
| Diode Reverse Leakage Current | $V_R = 1600\text{ V}, T_J = 25^\circ\text{C}$ | I_R | – | – | 100 | μA |
|-------------------------------|---|-------|---|---|-----|---------------|

NXH80B120H2Q0

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

| Parameter | Test Conditions | Symbol | Min | Typ | Max | Unit |
|---|---|------------|-----|------|-----|--------------------|
| BYPASS DIODE/IGBT PROTECTION DIODE CHARACTERISTICS | | | | | | |
| Diode Forward Voltage | $I_F = 25\text{ A}, T_J = 25^\circ\text{C}$ | V_F | – | 1.0 | 1.4 | V |
| | $I_F = 25\text{ A}, T_J = 150^\circ\text{C}$ | | – | 0.90 | – | |
| Thermal Resistance – chip-to-heatsink | Thermal grease, Thickness < 100 μm , $\lambda = 0.84\text{ W/mK}$ | R_{thJH} | – | 1.44 | – | $^\circ\text{C/W}$ |

THERMISTOR CHARACTERISTICS

| | | | | | | |
|----------------------------|--------------------------------|--------------|----|------|---|------------------|
| Nominal resistance | | R_{25} | – | 22 | – | $\text{k}\Omega$ |
| Nominal resistance | $T = 100^\circ\text{C}$ | R_{100} | – | 1486 | – | Ω |
| Deviation of R25 | | $\Delta R/R$ | –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 |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

ORDERING INFORMATION

| Orderable Part Number | Marking | Package | Shipping |
|-----------------------|------------------|---|-------------------------|
| NXH80B120H2Q0SG | NXH80B120H2Q0SG | Q0BOOST – Case 180AJ Bare Copper DBC, Solder Pins (Pb-Free and Halide-Free) | 24 Units / Blister Tray |
| NXH80B120H2Q0SNG | NXH80B120H2Q0SNG | Q0BOOST – Case 180AJ Nickel-Plated DBC, Solder Pins (Pb-Free and Halide-Free) | 24 Units / Blister Tray |

NXH80B120H2Q0

TYPICAL CHARACTERISTICS – Boost IGBT & Boost Diode

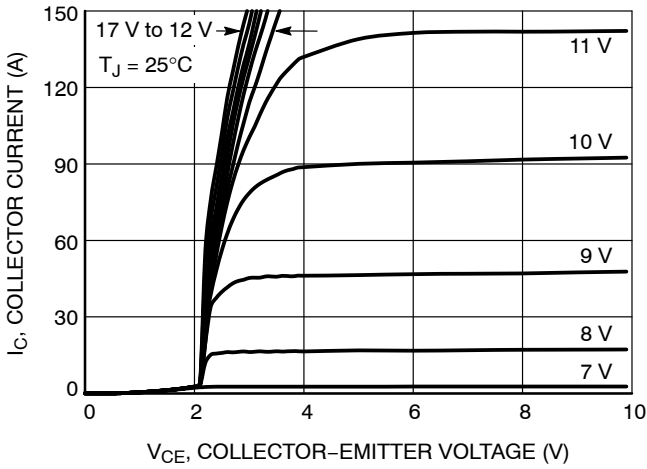


Figure 1. IGBT Typical Output Characteristics

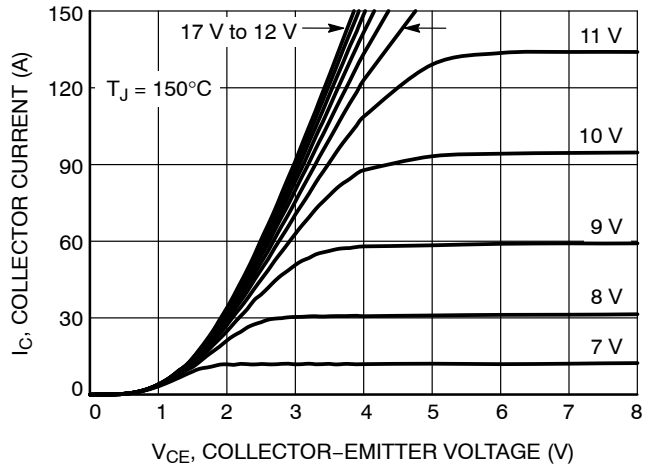


Figure 2. IGBT Typical Output Characteristics

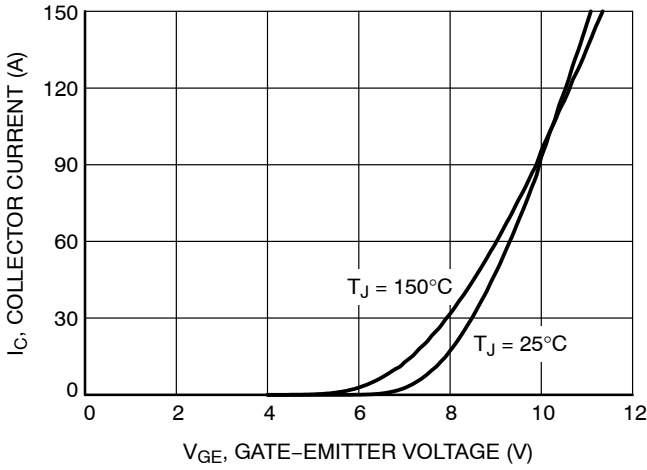


Figure 3. IGBT Typical Transfer Characteristics

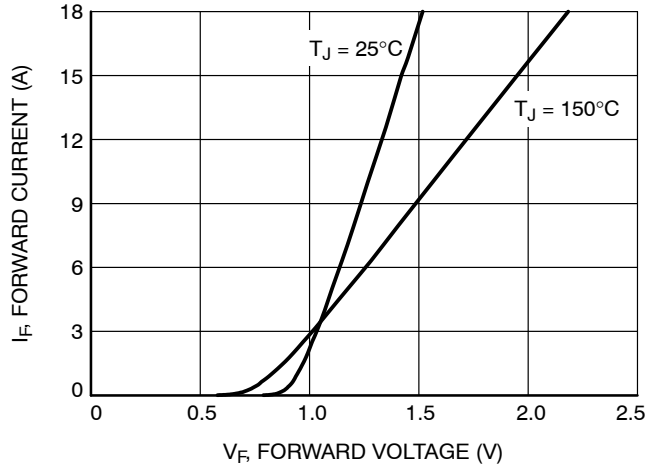


Figure 4. Diode Forward Characteristic

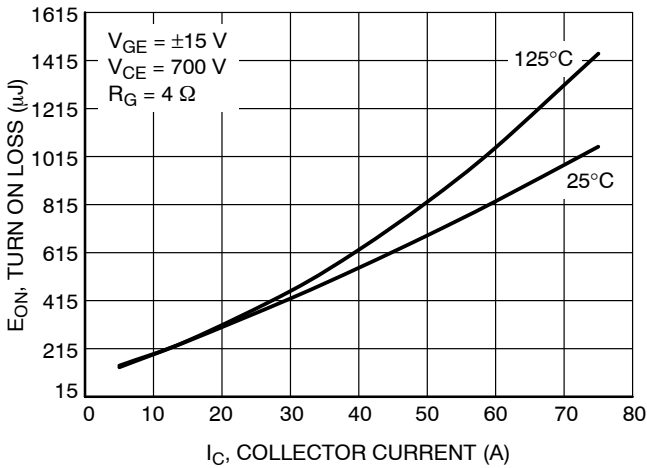


Figure 5. Typical Turn On Loss vs. Ic

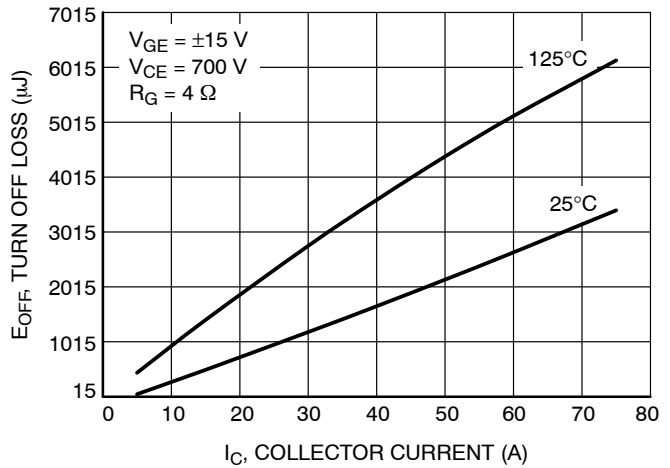


Figure 6. Typical Turn Off Loss vs. Ic

NXH80B120H2Q0

TYPICAL CHARACTERISTICS – Boost IGBT & Boost Diode

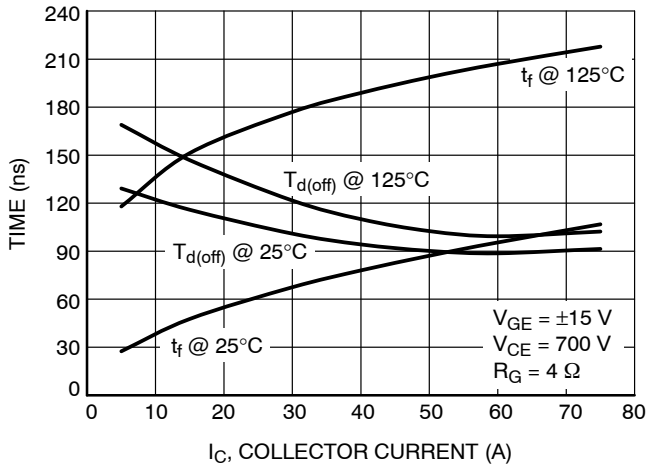


Figure 7. Typical Switching Times vs. I_C

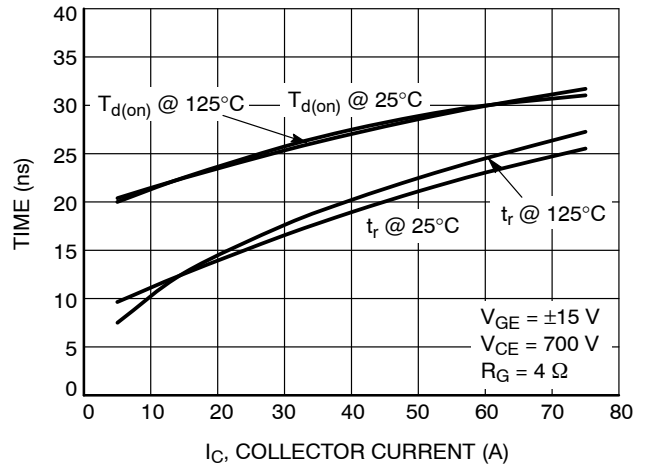


Figure 8. Typical Switching Times vs. I_C

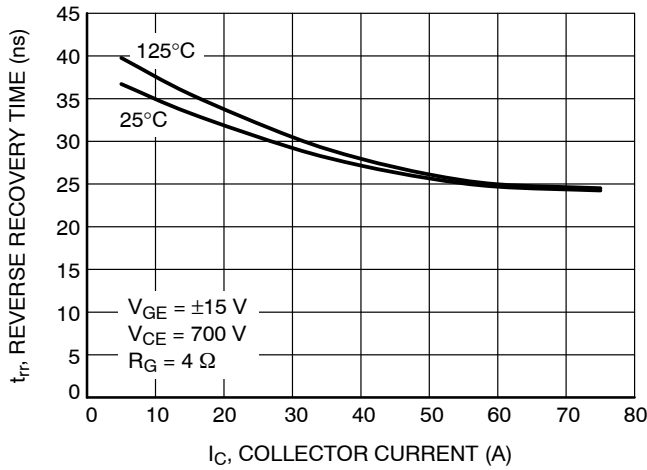


Figure 9. Typical Reverse Recovery Time vs. I_C

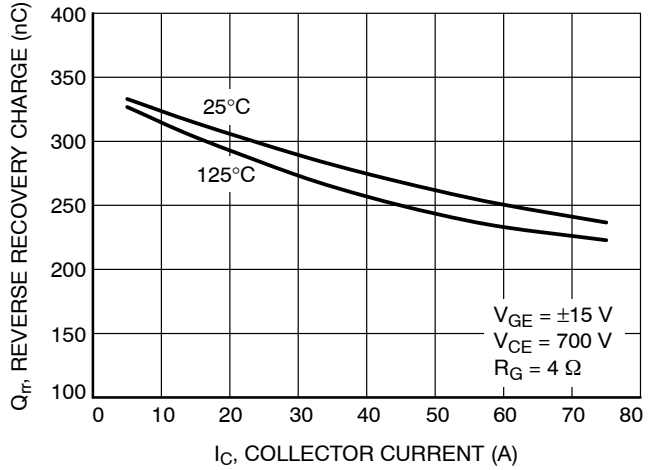


Figure 10. Typical Reverse Recovery Charge vs. I_C

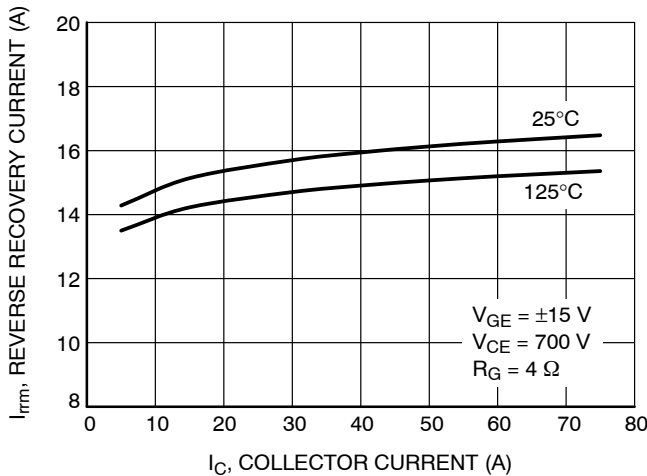


Figure 11. Typical Reverse Recovery Peak Current vs. I_C

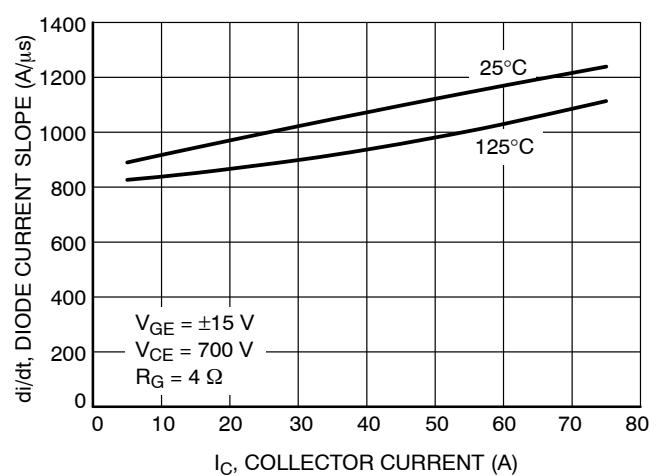


Figure 12. Typical Diode Current Slope vs. I_C

NXH80B120H2Q0

TYPICAL CHARACTERISTICS – Boost IGBT & Boost Diode

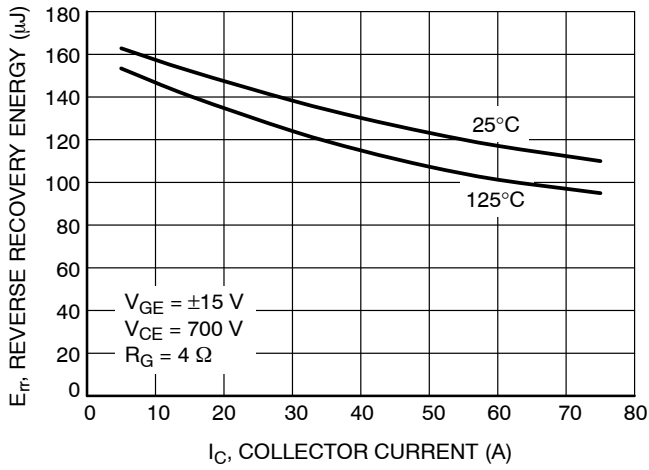


Figure 13. Typical Reverse Recovery Energy vs. I_C

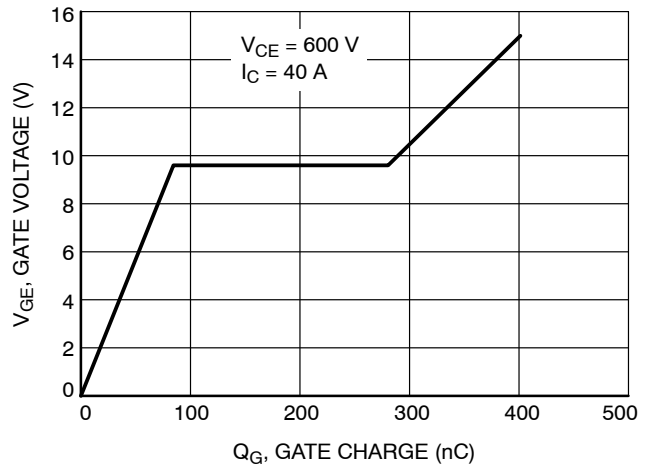


Figure 14. Gate Voltage vs. Gate Charge

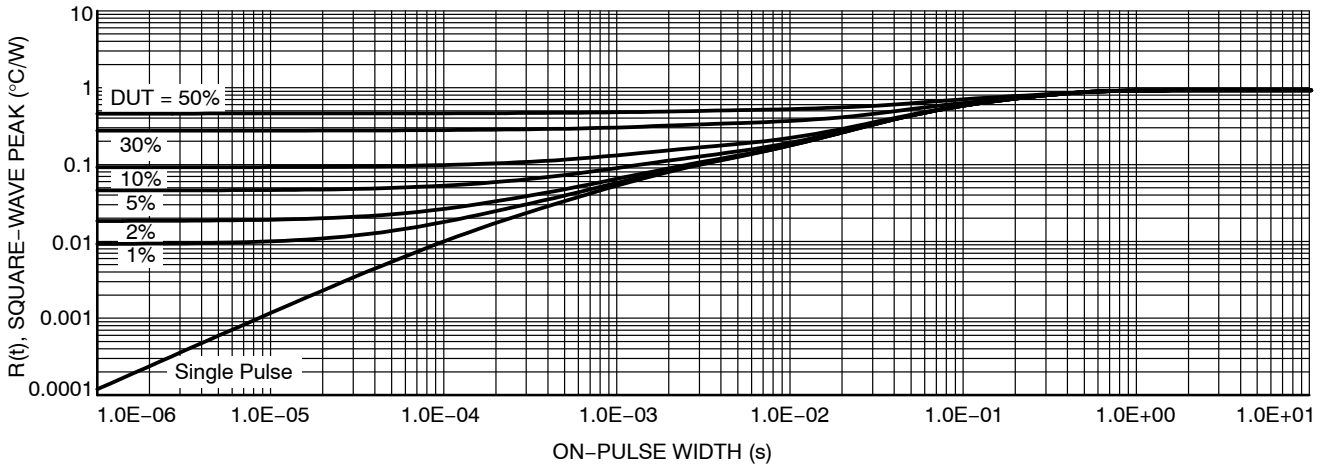


Figure 15. IGBT Transient Thermal Impedance

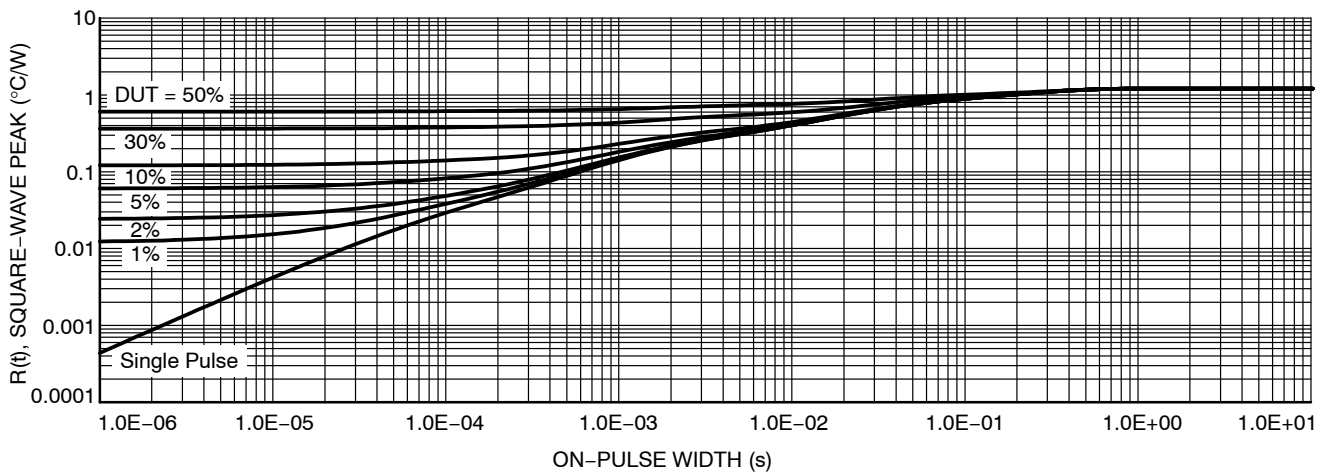


Figure 16. Diode Transient Thermal Impedance Boost Diode

NXH80B120H2Q0

TYPICAL CHARACTERISTICS – Boost IGBT & Boost Diode

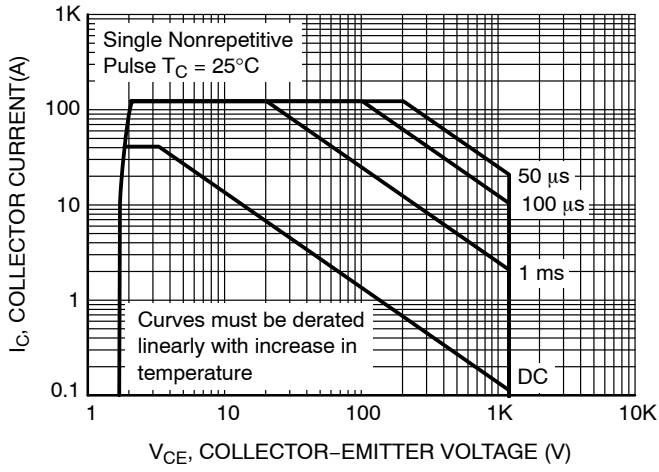


Figure 17. T1 & T2 FBSOA

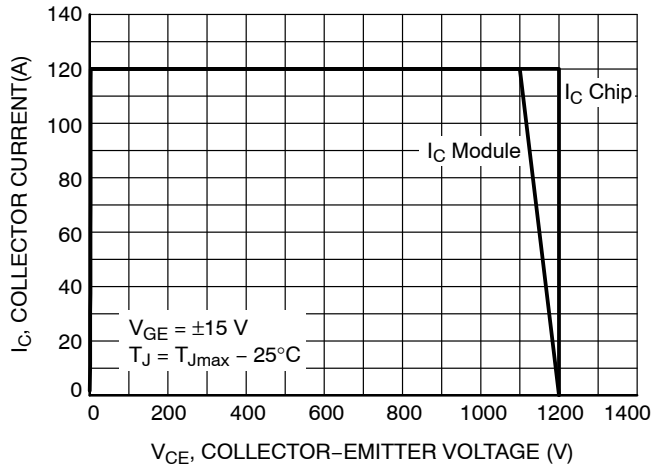


Figure 18. T1 & T2 RBSOA

NXH80B120H2Q0

TYPICAL CHARACTERISTICS – IGBT Protection Diode and Bypass Diode

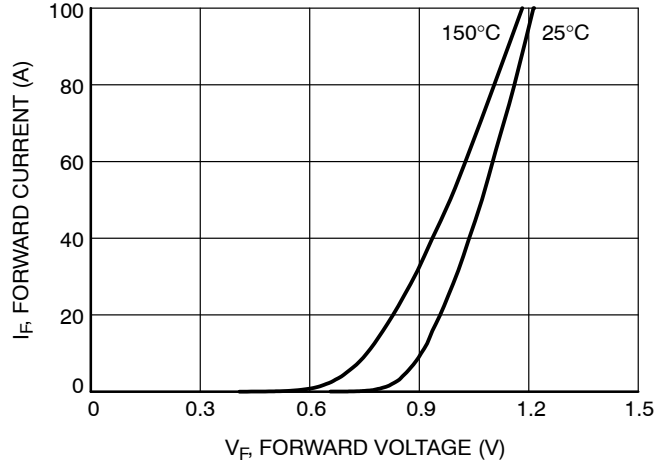


Figure 19. Diode Forward Characteristic

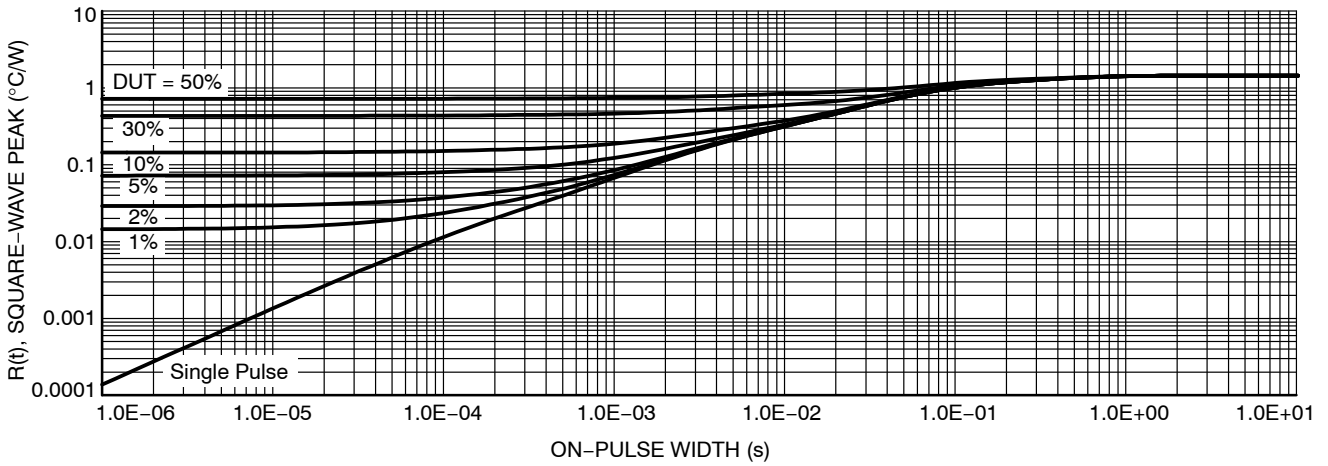


Figure 20. Diode Transient Thermal Impedance Bypass Diode / IGBT Protection Diode

TYPICAL CHARACTERISTICS – Thermistor

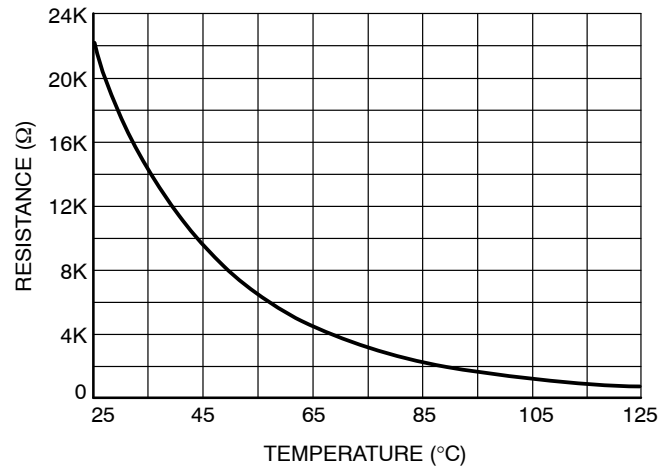
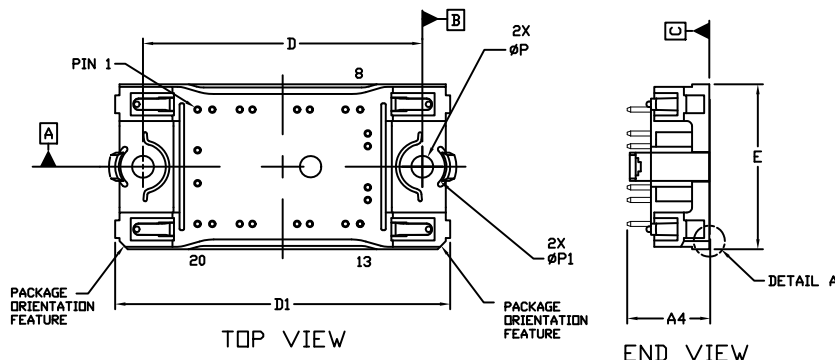


Figure 21. Thermistor Characteristic

NXH80B120H2Q0

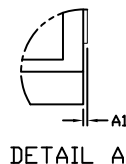
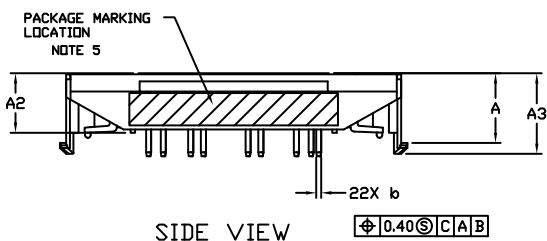
PACKAGE DIMENSIONS

PIM22, 55x32.5 / Q0BOOST CASE 180AJ ISSUE A



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION *b* APPLIES TO THE PLATED TERMINALS AND IS MEASURED BETWEEN 1.00 AND 3.00 FROM THE TERMINAL TIP.
4. 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.
5. PACKAGE MARKING IS LOCATED AS SHOWN ON THE SIDE OPPOSITE THE PACKAGE ORIENTATION FEATURES.



| DIM | MILLIMETERS | |
|----------|-------------|-------|
| | MIN. | NOM. |
| A | 13.50 | 13.90 |
| A1 | 0.10 | 0.30 |
| A2 | 11.50 | 11.90 |
| A3 | 15.65 | 16.05 |
| A4 | 16.35 | REF |
| <i>b</i> | 0.95 | 1.05 |
| D | 54.80 | 55.20 |
| D1 | 65.60 | 66.20 |
| E | 32.20 | 32.80 |
| P | 4.20 | 4.40 |
| P1 | 8.90 | 9.10 |

NOTE 4

| PIN | PIN POSITION | | PIN | PIN POSITION | |
|-----|--------------|-------|-----|--------------|--------|
| | X | Y | | X | Y |
| 1 | -16.75 | 11.25 | 12 | 16.75 | -6.55 |
| 2 | -13.85 | 11.25 | 13 | 15.25 | -11.25 |
| 3 | -8.45 | 11.25 | 14 | 12.35 | -11.25 |
| 4 | -5.95 | 11.25 | 15 | 5.35 | -11.25 |
| 5 | 2.85 | 11.25 | 16 | 2.85 | -11.25 |
| 6 | 5.35 | 11.25 | 17 | -5.95 | -11.25 |
| 7 | 12.35 | 11.25 | 18 | -8.45 | -11.25 |
| 8 | 15.25 | 11.25 | 19 | -13.85 | -11.25 |
| 9 | 16.75 | 6.55 | 20 | -16.75 | -11.25 |
| 10 | 16.75 | 4.05 | 21 | -16.75 | -3.25 |
| 11 | 16.75 | -4.05 | 22 | -16.75 | 3.25 |

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru