

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max      | I <sub>D</sub> Max<br>T <sub>c</sub> = +25°C |
|-------------------|------------------------------|--|
| 150V              | 97mΩ @ V <sub>GS</sub> = 10V | 18A  |
|                   | 110mΩ @ V <sub>GS</sub> = 6V | 17A  |

## Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Power managements
- Driving solenoids
- Motor controls

## Features and Benefits

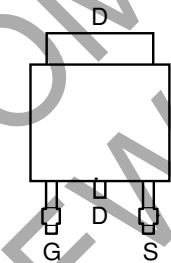
- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-Resistance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

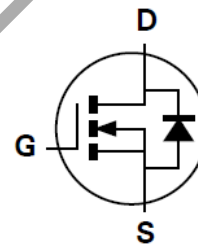
- Package: TO252
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 Ⓜ3
- Terminal Connections: See Diagram
- Weight: 0.33 grams (Approximate)



Top View



Pin Out Top View



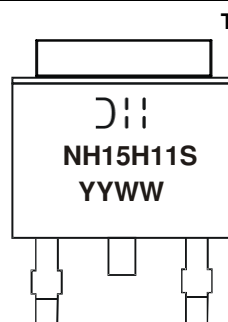
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number      | Package      | Packing |             |
|------------------|--------------|---------|-------------|
|                  |              | Qty.    | Carrier     |
| DMNH15H110SK3-13 | TO252 (DPAK) | 2,500   | Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



TO252 (DPAK)

= Manufacturer's Marking  
 NH15H11S = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 22 = 2022)  
 WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic  | Symbol           | Value                   | Unit |
|---|------------------|-------------------------|------|
| Drain-Source Voltage  | V <sub>DSS</sub> | 150                     | V    |
| Gate-Source Voltage   | V <sub>GSS</sub> | ±20                     | V    |
| Continuous Drain Current (Note 7) V <sub>GS</sub> = 10V         | I <sub>D</sub>   | T <sub>C</sub> = +25°C  | 18   |
|   |                  | T <sub>C</sub> = +100°C | 12   |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)              | I <sub>DM</sub>  | 72                      | A    |
| Maximum Continuous Body Diode Forward Current (Note 7)          | I <sub>S</sub>   | 18                      | A    |
| Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%) | I <sub>SM</sub>  | 72                      | A    |
| Avalanche Current, L = 3mH                                      | I <sub>AS</sub>  | 9                       | A    |
| Avalanche Energy, L = 3mH                                       | E <sub>AS</sub>  | 121.5                   | mJ   |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 2.0         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 74          | °C/W |
| Total Power Dissipation (Note 6)                 | P <sub>D</sub>                    | 3.6         | W    |
|  |                                   |             |      |
| Thermal Resistance, Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | 42          | °C/W |
| Total Power Dissipation (Note 7)                 | P <sub>D</sub>                    | 88          | W    |
|  |                                   |             |      |
| Thermal Resistance, Junction to Case (Note 7)    | R <sub>θJC</sub>                  | 1.7         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                            | Symbol              | Min | Typ  | Max  | Unit | Test Condition   |
|---|---------------------|-----|------|------|------|--|
| <b>OFF CHARACTERISTICS (Note 8)</b>       |                     |     |      |      |      |  |
| Drain-Source Breakdown Voltage            | BV <sub>DSS</sub>   | 150 | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA   |
| Zero Gate Voltage Drain Current           | I <sub>DSS</sub>    | —   | —    | 1    | µA   | V <sub>DS</sub> = 120V, V <sub>GS</sub> = 0V   |
| Gate-Source Leakage                       | I <sub>GSS</sub>    | —   | —    | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V   |
| <b>ON CHARACTERISTICS (Note 8)</b>        |                     |     |      |      |      |  |
| Gate Threshold Voltage                    | V <sub>GS(TH)</sub> | 2   | —    | 4    | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                                 |
| Static Drain-Source On-Resistance         | R <sub>DS(ON)</sub> | —   | 70   | 97   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 2A   |
|   |                     | —   | 78   | 110  |      | V <sub>GS</sub> = 6V, I <sub>D</sub> = 2A  |
| Diode Forward Voltage                     | V <sub>SD</sub>     | —   | 0.7  | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 2A  |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>   |                     |     |      |      |      |  |
| Input Capacitance                         | C <sub>iss</sub>    | —   | 987  | —    | pF   | V <sub>DS</sub> = 75V, V <sub>GS</sub> = 0V,<br>f = 1MHz                                   |
| Output Capacitance                        | C <sub>oss</sub>    | —   | 63   | —    | pF   |  |
| Reverse Transfer Capacitance              | C <sub>rss</sub>    | —   | 34   | —    | pF   |  |
| Gate Resistance                           | R <sub>g</sub>      | —   | 1.3  | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                       |
| Total Gate Charge (V <sub>GS</sub> = 10V) | Q <sub>g</sub>      | —   | 25.5 | —    | nC   | V <sub>DS</sub> = 75V, I <sub>D</sub> = 4A   |
| Total Gate Charge (V <sub>GS</sub> = 6V)  | Q <sub>g</sub>      | —   | 17.8 | —    | nC   |  |
| Gate-Source Charge                        | Q <sub>gs</sub>     | —   | 4    | —    | nC   |  |
| Gate-Drain Charge                         | Q <sub>gd</sub>     | —   | 10   | —    | nC   |  |
| Turn-On Delay Time                        | t <sub>D(ON)</sub>  | —   | 18.1 | —    | ns   |  |
| Turn-On Rise Time                         | t <sub>r</sub>      | —   | 46   | —    | ns   | V <sub>DD</sub> = 75V, V <sub>GS</sub> = 10V,<br>R <sub>g</sub> = 24Ω, I <sub>D</sub> = 4A |
| Turn-Off Delay Time                       | t <sub>D(OFF)</sub> | —   | 76.1 | —    | ns   |  |
| Turn-Off Fall Time                        | t <sub>f</sub>      | —   | 58.7 | —    | ns   |  |
| Reverse Recovery Time                     | t <sub>RR</sub>     | —   | 41.6 | —    | ns   | I <sub>F</sub> = 4A, di/dt = 100A/µs   |
| Reverse Recovery Charge                   | Q <sub>RR</sub>     | —   | 65.6 | —    | nC   |  |

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1 inch square copper plate.
  - Thermal resistance from junction to soldering point (on the exposed drain pad).
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

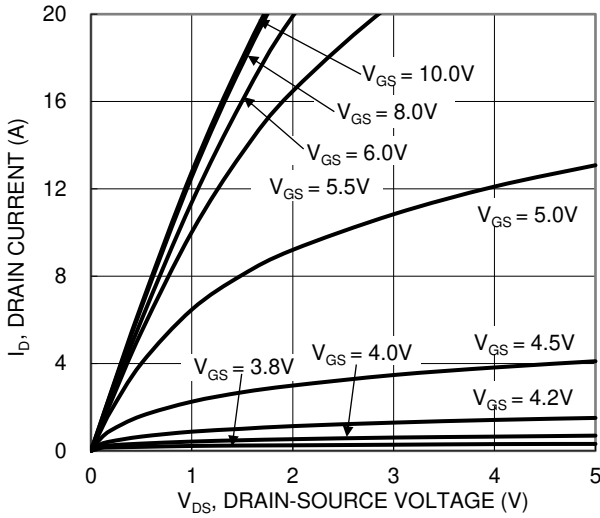


Figure 1. Typical Output Characteristic

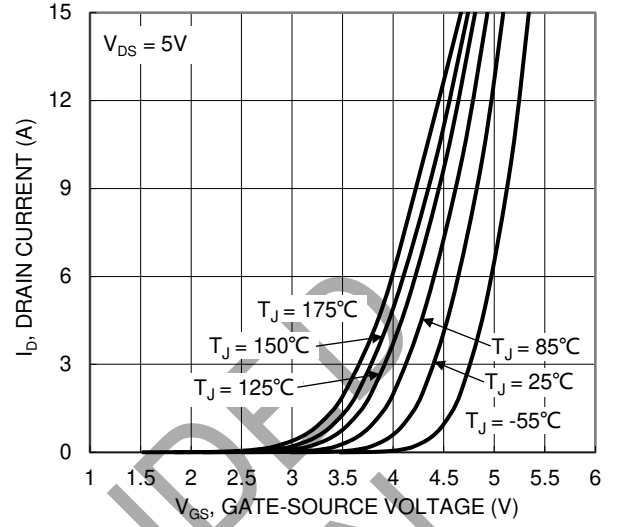


Figure 2. Typical Transfer Characteristic

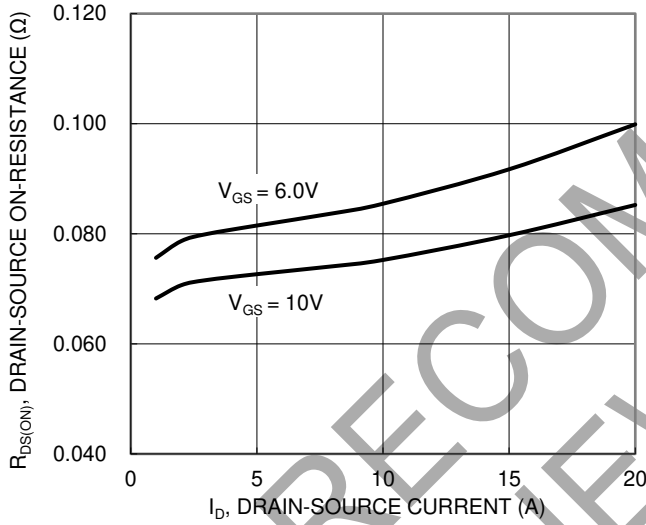


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

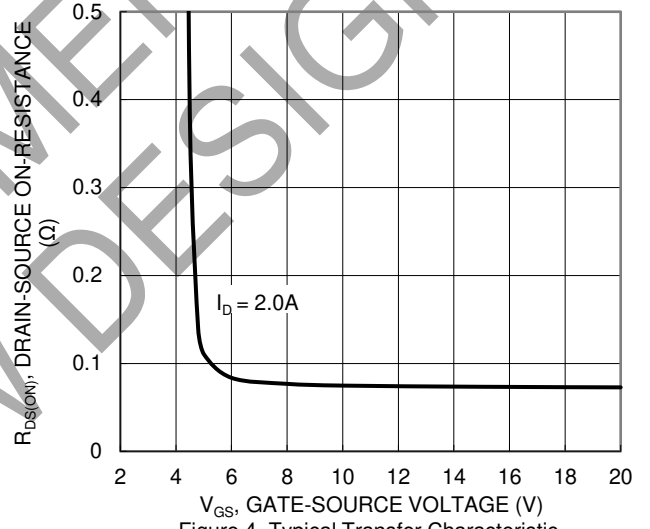


Figure 4. Typical Transfer Characteristic

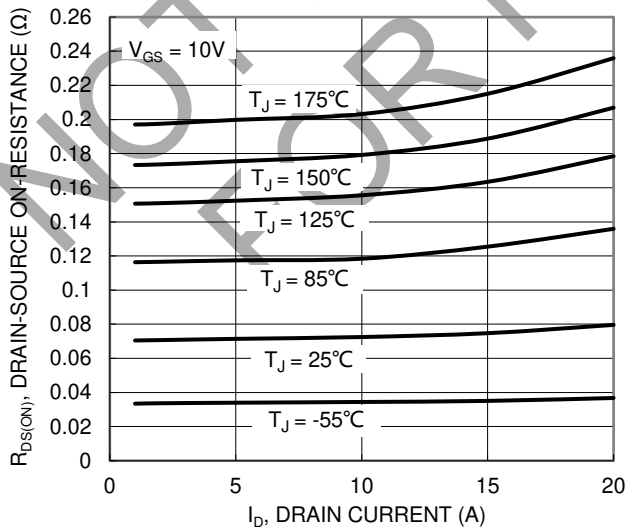


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

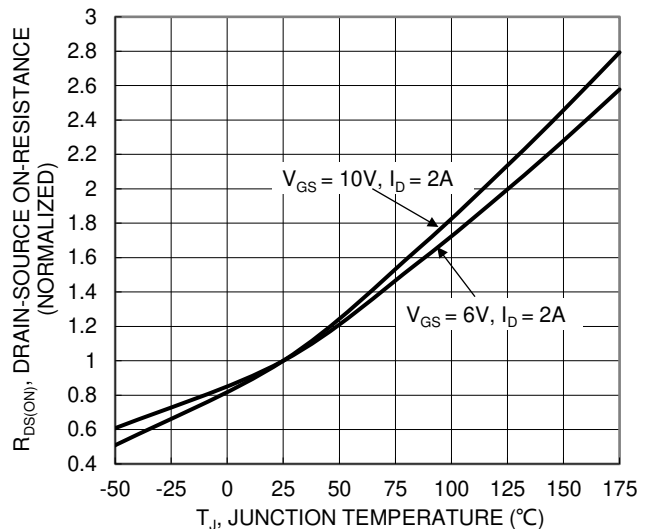


Figure 6. On-Resistance Variation with Junction Temperature

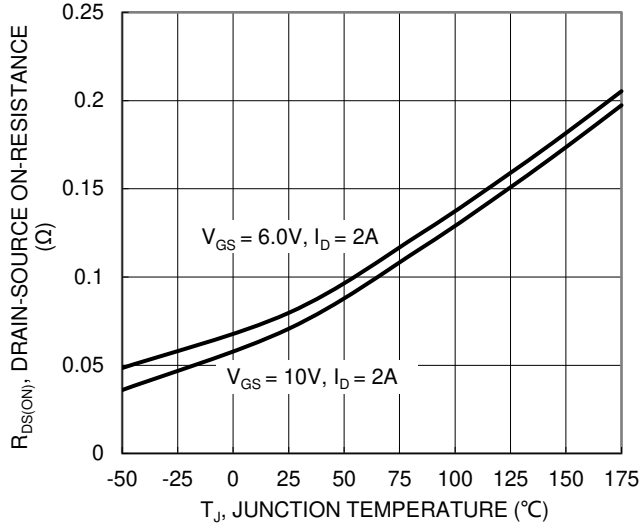


Figure 7. On-Resistance Variation with Junction Temperature

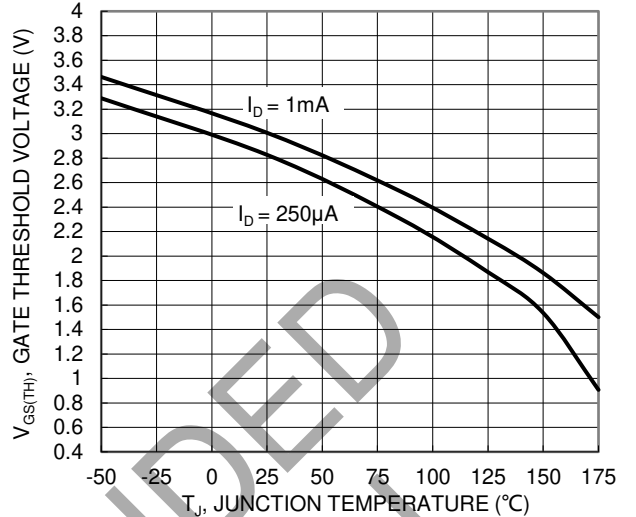


Figure 8. Gate Threshold Variation vs. Junction Temperature

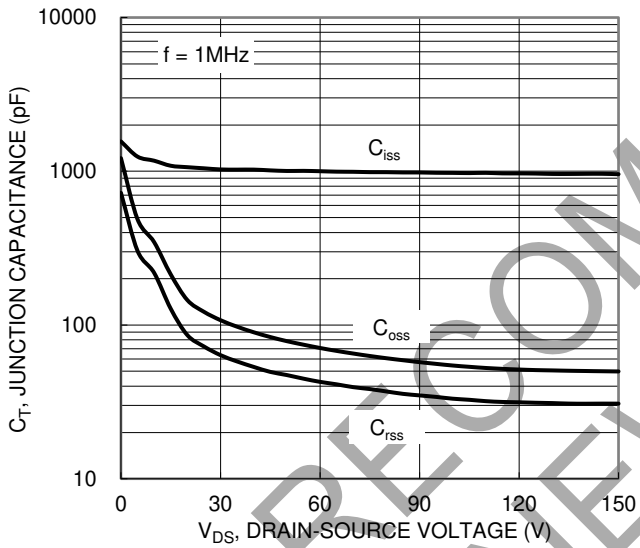


Figure 10. Typical Junction Capacitance

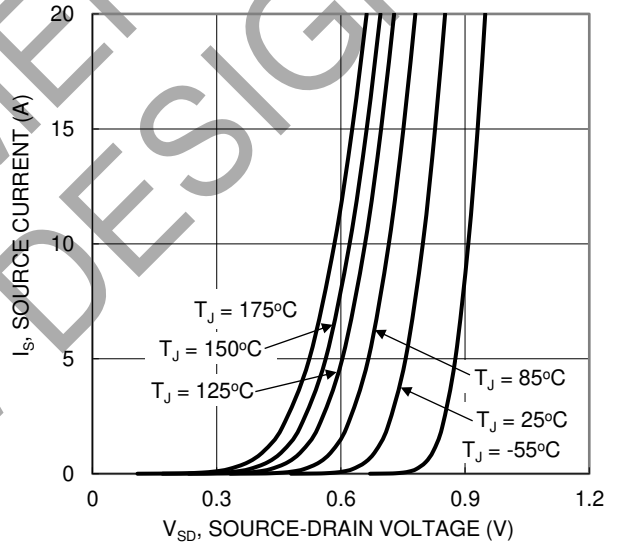


Figure 9. Diode Forward Voltage vs. Current

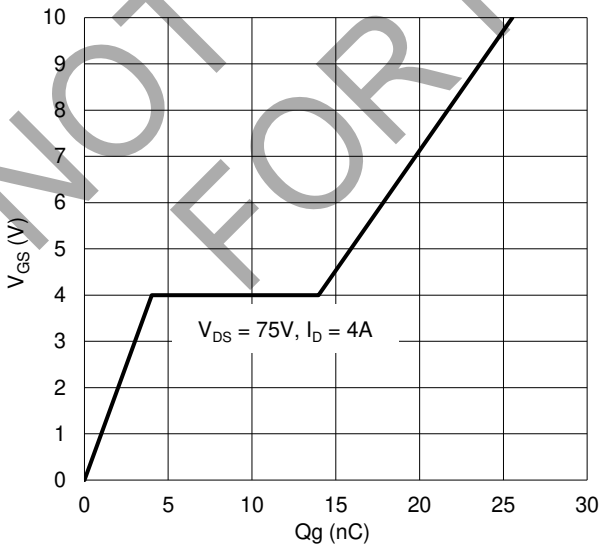


Figure 11. Gate Charge

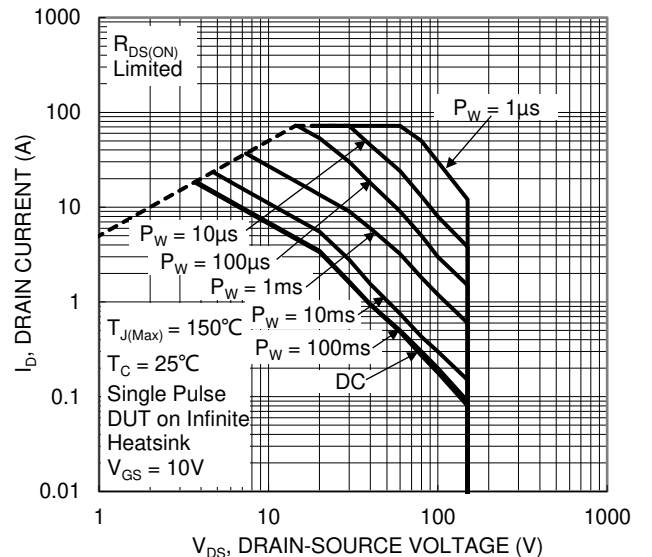
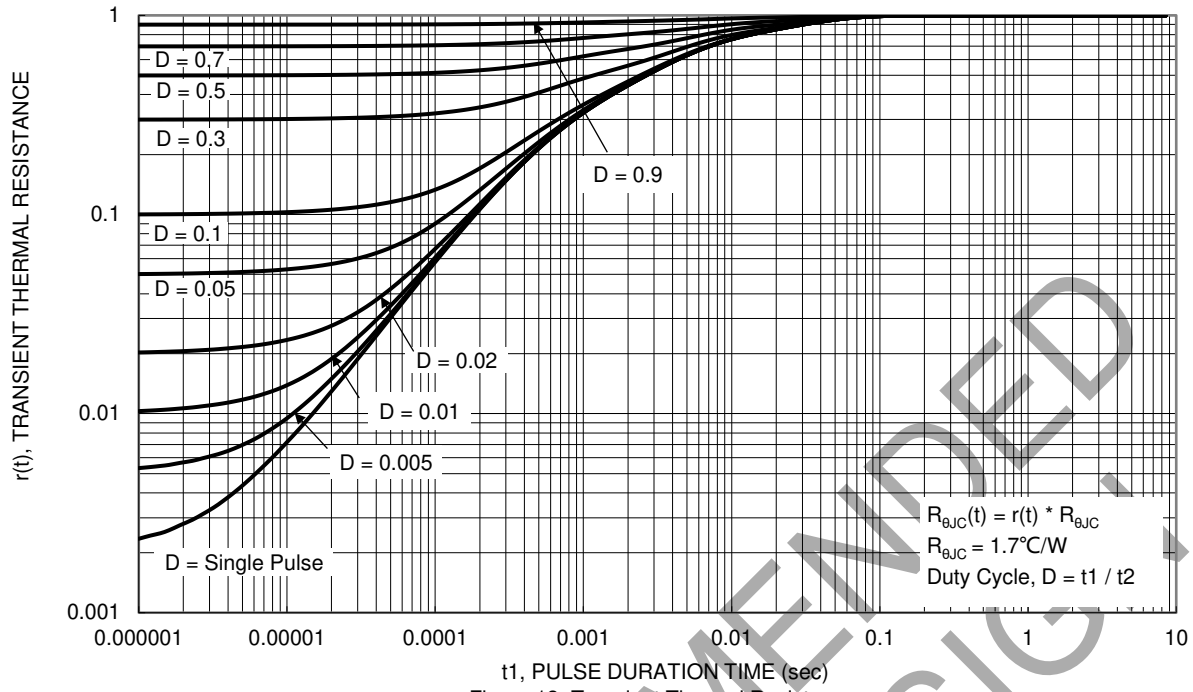


Figure 12. SOA, Safe Operation Area

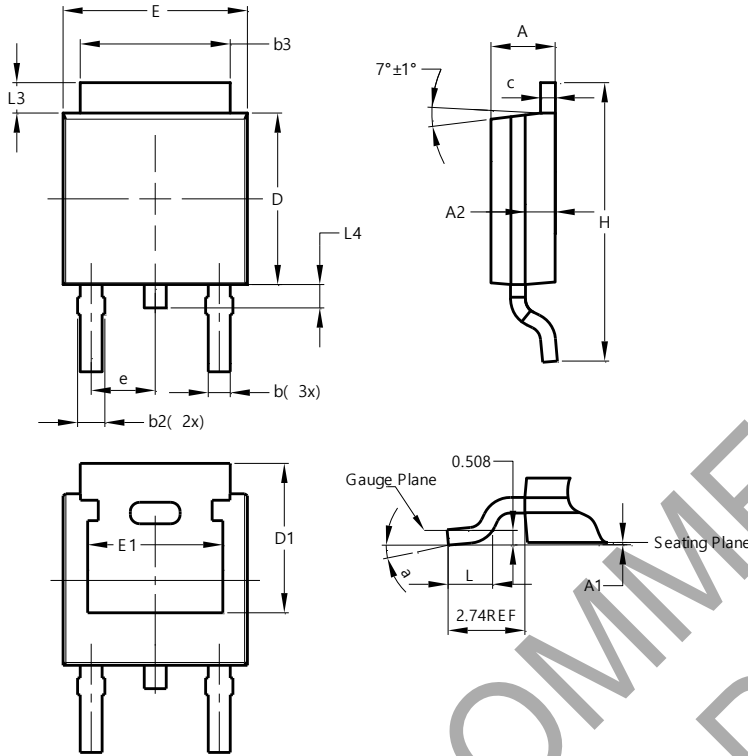


NOT RECOMMENDED FOR NEW DESIGN

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**TO252 (DPAK)**

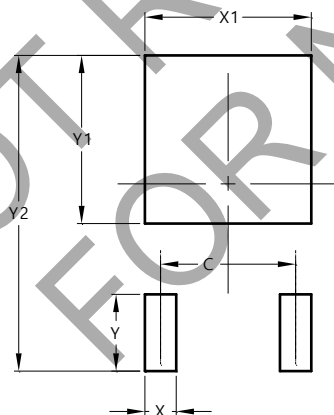


| TO252 (DPAK)                |           |       |       |
|-----------------------------|-----------|-------|-------|
| Dim                         | Min       | Max   | Typ   |
| A                           | 2.19      | 2.39  | 2.29  |
| A1                          | 0.00      | 0.13  | 0.08  |
| A2                          | 0.97      | 1.17  | 1.07  |
| b                           | 0.64      | 0.88  | 0.783 |
| b2                          | 0.76      | 1.14  | 0.95  |
| b3                          | 5.21      | 5.50  | 5.33  |
| c                           | 0.45      | 0.58  | 0.531 |
| D                           | 6.00      | 6.20  | 6.10  |
| D1                          | 5.21      | --    | --    |
| e                           | 2.286 BSC |       |       |
| E                           | 6.45      | 6.70  | 6.58  |
| E1                          | 4.32      | --    | --    |
| H                           | 9.40      | 10.41 | 9.91  |
| L                           | 1.40      | 1.78  | 1.59  |
| L3                          | 0.88      | 1.27  | 1.08  |
| L4                          | 0.64      | 1.02  | 0.83  |
| a                           | 0°        | 10°   | --    |
| <b>All Dimensions in mm</b> |           |       |       |

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**TO252 (DPAK)**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 4.572         |
| X          | 1.060         |
| X1         | 5.632         |
| Y          | 2.600         |
| Y1         | 5.700         |
| Y2         | 10.700        |

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