

## Product Summary

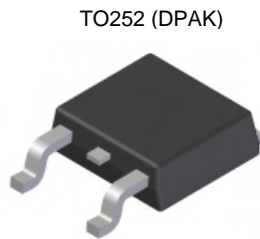
| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max      | I <sub>D</sub> Max<br>T <sub>C</sub> = +25°C |
|-------------------|------------------------------|--|
| 100V              | 14mΩ @ V <sub>GS</sub> = 10V | 59A  |
|                   | 20mΩ @ V <sub>GS</sub> = 6V  | 50A  |

## Description

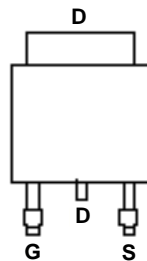
This new generation MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power-management applications.

## Applications

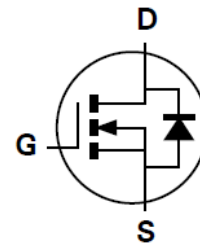
- Power-management functions
- DC-DC converters
- Backlightings



Top View



Pin Out Top View



Equivalent Circuit

## Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low R<sub>DS(ON)</sub> – Minimizes Power Losses
- Low Q<sub>g</sub> – Minimizes Switching Losses
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.**  
<https://www.diodes.com/quality/product-definitions/>
- **An automotive-compliant part is available under separate datasheet ([DMTH10H015SK3Q](#))**

## Mechanical Data

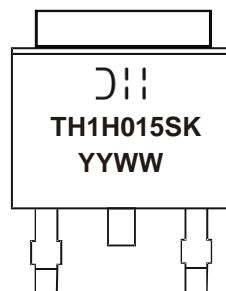
- Package: TO252
- Package Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208③
- Weight: 0.33 grams (Approximate)

## Ordering Information (Note 4)

| Part Number      | Package      | Packing |             |
|------------------|--------------|---------|-------------|
|                  |              | Qty.    | Carrier     |
| DMTH10H015SK3-13 | TO252 (DPAK) | 2500    | 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



Ⓜ = Manufacturer's Marking  
 TH1H015SK = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 23 = 2023)  
 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> | 100                     | V    |
| Gate-Source Voltage   | V <sub>GSS</sub> | ±20                     | V    |
| Continuous Drain Current, V <sub>GS</sub> = 10V (Note 9)                                | I <sub>D</sub>   | T <sub>C</sub> = +25°C  | 59   |
|   |                  | T <sub>C</sub> = +100°C | 42   |
| Pulsed Drain Current (10µs Pulse, T <sub>C</sub> = +25°C, Package Limited)              | I <sub>DM</sub>  | 235                     | A    |
| Maximum Continuous Body Diode Forward Current (Note 9)                                  | I <sub>S</sub>   | 59                      | A    |
| Pulsed Body Diode Forward Current (10µs Pulse, T <sub>C</sub> = +25°C, Package Limited) | I <sub>SM</sub>  | 235                     | A    |
| Avalanche Current, L = 0.1mH  | I <sub>AS</sub>  | 15.8                    | A    |
| Avalanche Energy, L = 0.1mH   | E <sub>AS</sub>  | 12.5                    | mJ   |
| Avalanche Current, L = 3mH (Note 8)   | I <sub>AS</sub>  | 7.5                     | A    |
| Avalanche Energy, L = 3mH (Note 8)  | E <sub>AS</sub>  | 85                      | 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           | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 75          | °C/W |
| Total Power Dissipation (Note 6)                 | P <sub>D</sub>                    | 3.7         | W    |
| Thermal Resistance, Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | 40          | °C/W |
| Total Power Dissipation (Note 9)                 | P <sub>D</sub>                    | 75          | W    |
| Thermal Resistance, Junction to Case (Note 9)    | R <sub>θJC</sub>                  | 2           | °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 7)</b>     |                     |     |      |      |      |  |
| Drain-Source Breakdown Voltage          | BV <sub>DSS</sub>   | 100 | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA   |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | —   | —    | 1    | µA   | V <sub>DS</sub> = 80V, 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 7)</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> | —   | 11.1 | 14   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A  |
|   |                     | —   | 14.7 | 20   |      | V <sub>GS</sub> = 6V, I <sub>D</sub> = 20A   |
| Diode Forward Voltage                   | V <sub>SD</sub>     | —   | 0.86 | 1.3  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A   |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b> |                     |     |      |      |      |  |
| Input Capacitance                       | C <sub>iss</sub>    | —   | 2343 | —    | pF   | V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V<br>f = 1MHz                                    |
| Output Capacitance                      | C <sub>oss</sub>    | —   | 487  | —    |      |  |
| Reverse Transfer Capacitance            | C <sub>rss</sub>    | —   | 26   | —    |      |  |
| Gate Resistance                         | R <sub>g</sub>      | —   | 0.69 | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                       |
| Total Gate Charge                       | Q <sub>g</sub>      | —   | 30.1 | —    | nC   | V <sub>DD</sub> = 50V, I <sub>D</sub> = 10A,<br>V <sub>GS</sub> = 10V                      |
| Gate-Source Charge                      | Q <sub>gs</sub>     | —   | 7.5  | —    |      |  |
| Gate-Drain Charge                       | Q <sub>gd</sub>     | —   | 6.5  | —    |      |  |
| Turn-On Delay Time                      | t <sub>d(ON)</sub>  | —   | 9.8  | —    | ns   | V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V,<br>I <sub>D</sub> = 10A, R <sub>g</sub> = 6Ω |
| Turn-On Rise Time                       | t <sub>r</sub>      | —   | 7.8  | —    |      |  |
| Turn-Off Delay Time                     | t <sub>d(OFF)</sub> | —   | 22.5 | —    |      |  |
| Turn-Off Fall Time                      | t <sub>f</sub>      | —   | 9.6  | —    |      |  |
| Reverse Recovery Time                   | t <sub>RR</sub>     | —   | 43   | —    | ns   | I <sub>F</sub> = 10A, di/dt = 100A/µs  |
| Reverse Recovery Charge                 | Q <sub>RR</sub>     | —   | 65.1 | —    | nC   |  |

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

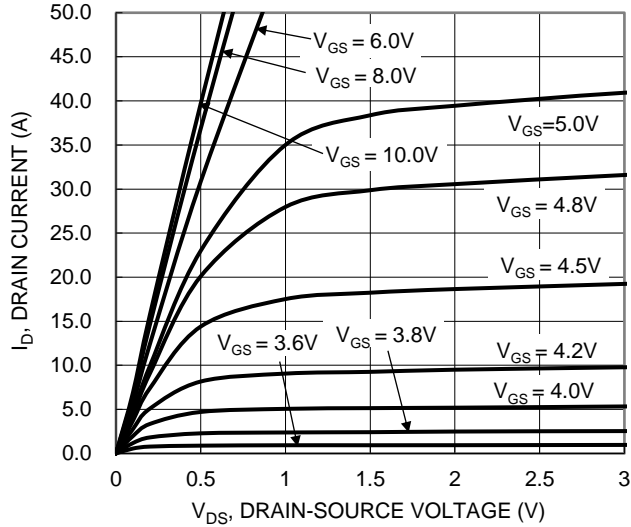


Figure 1. Typical Output Characteristic

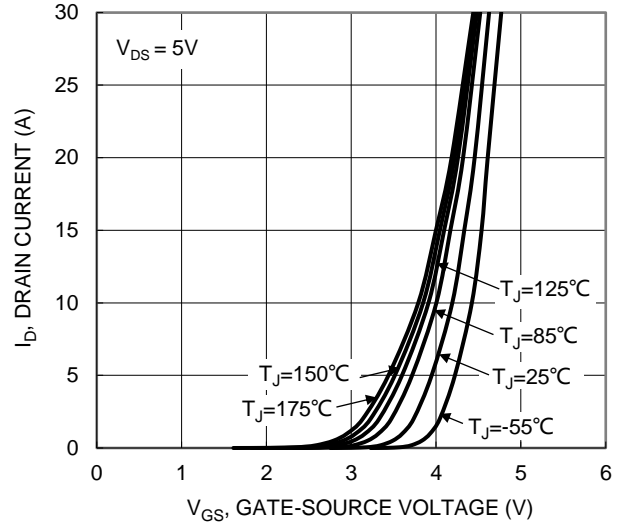


Figure 2. Typical Transfer Characteristic

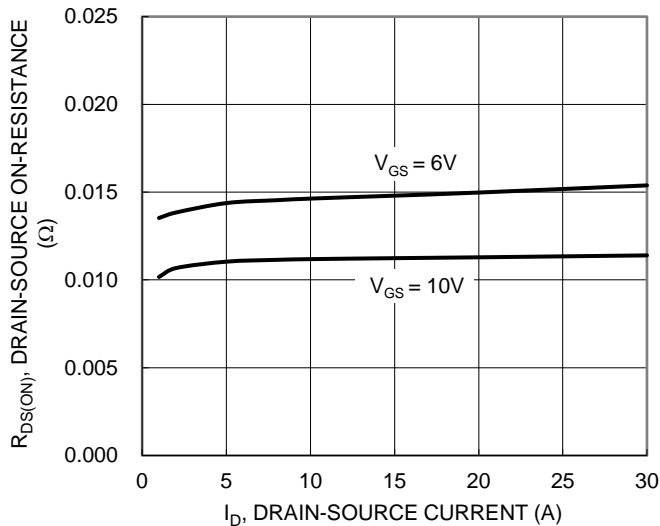


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

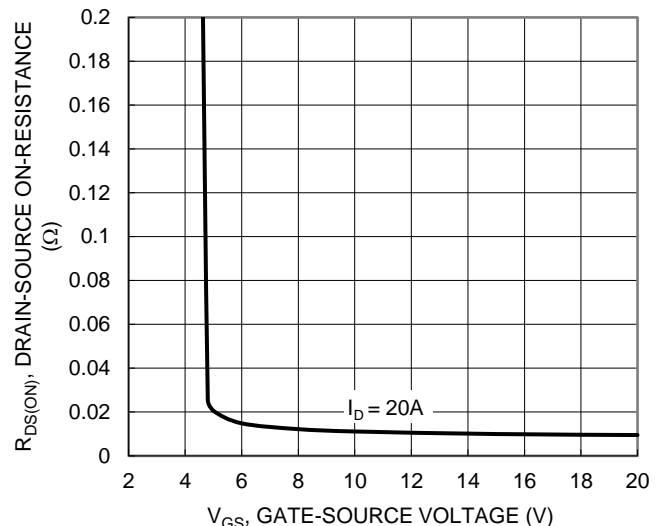


Figure 4. Typical Transfer Characteristic

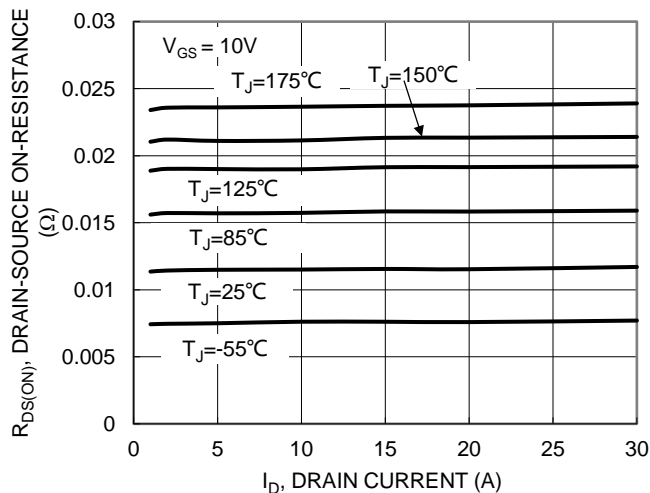


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

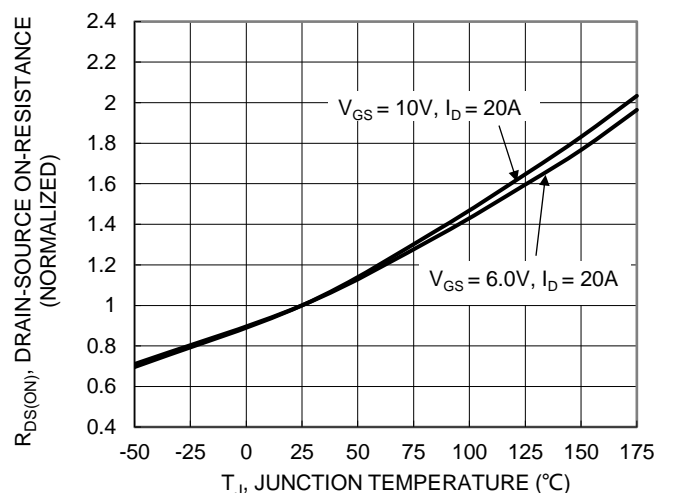


Figure 6. On-Resistance Variation with Temperature

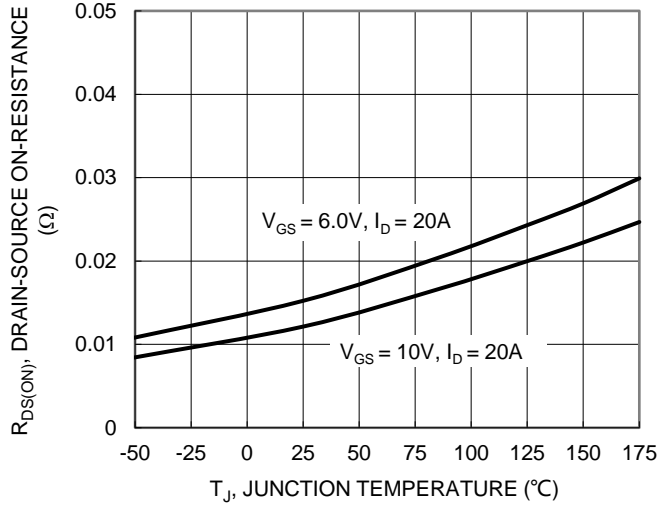


Figure 7. On-Resistance Variation with Temperature

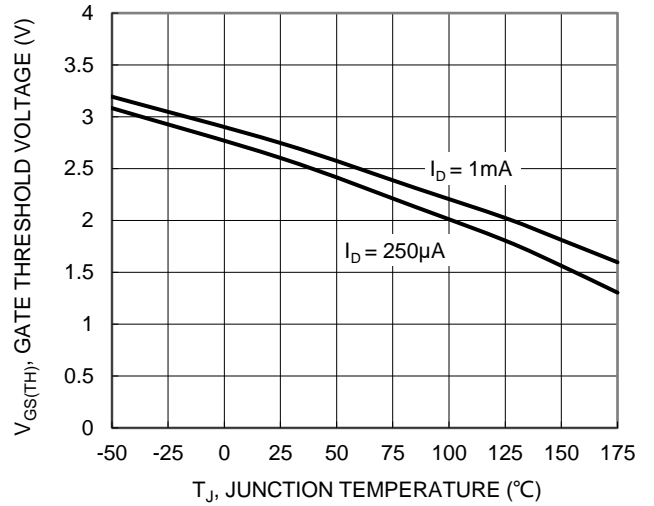


Figure 8. Gate Threshold Variation vs. Junction Temperature

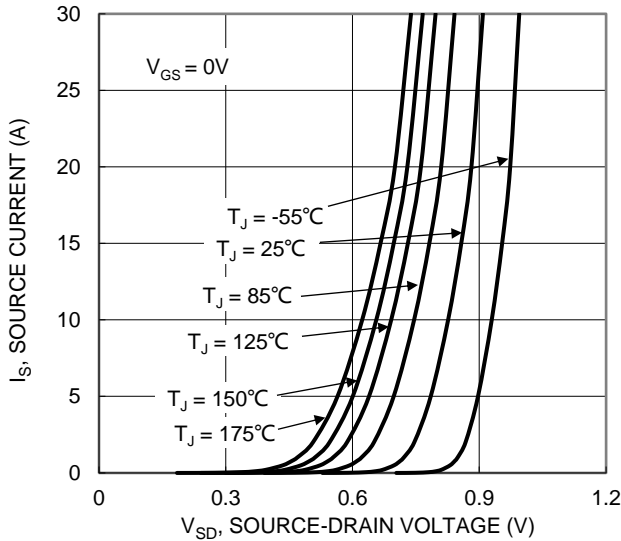


Figure 9. Diode Forward Voltage vs. Current

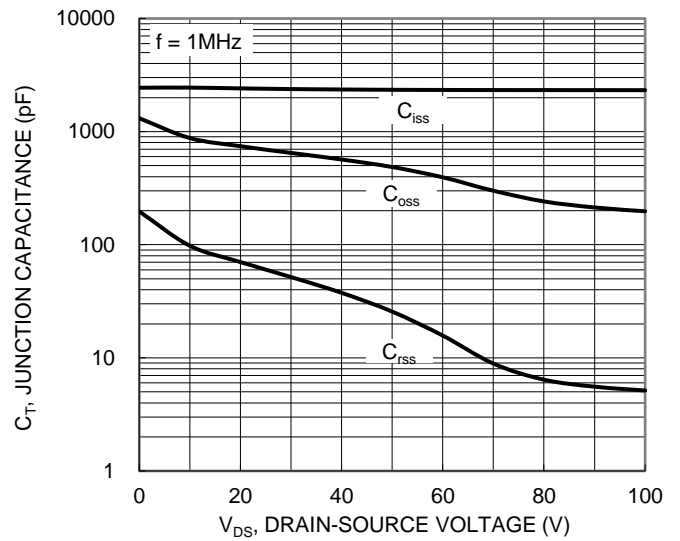


Figure 10. Typical Junction Capacitance

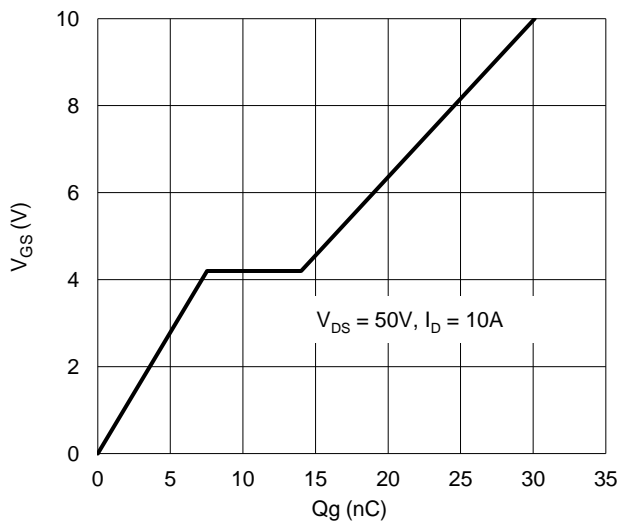


Figure 11. Gate Charge

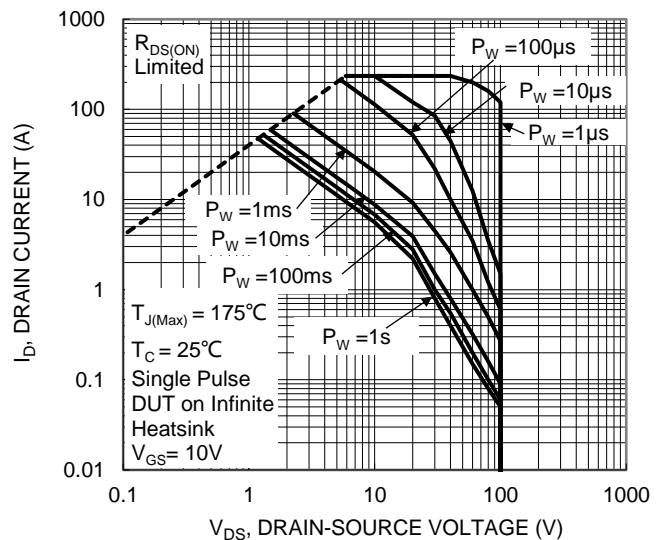


Figure 12. SOA, Safe Operation Area

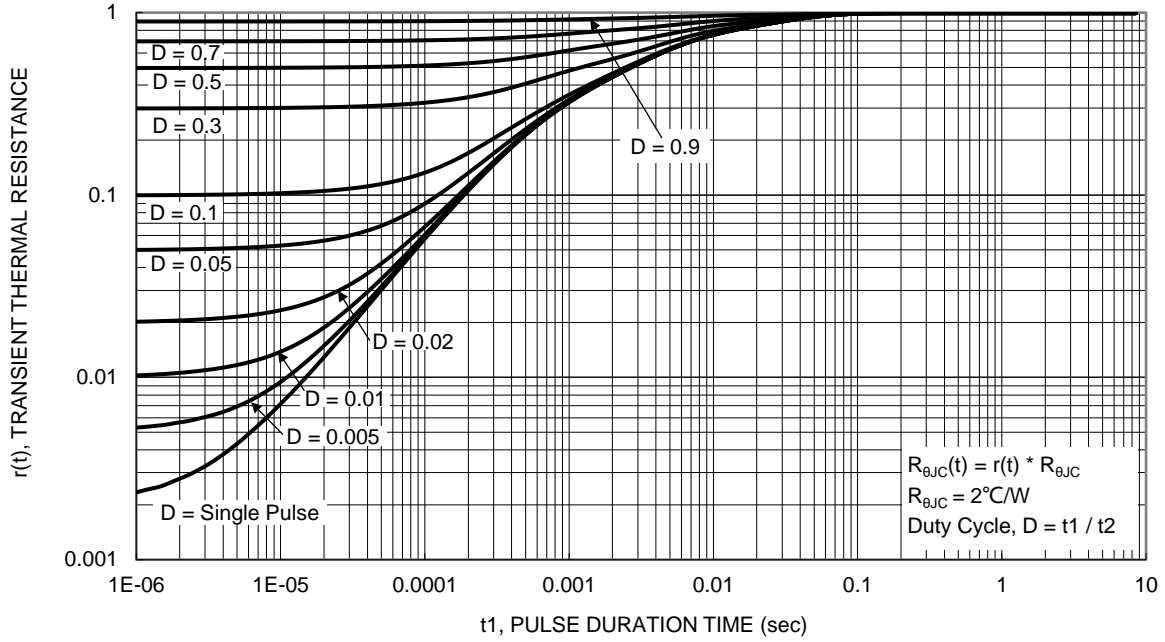
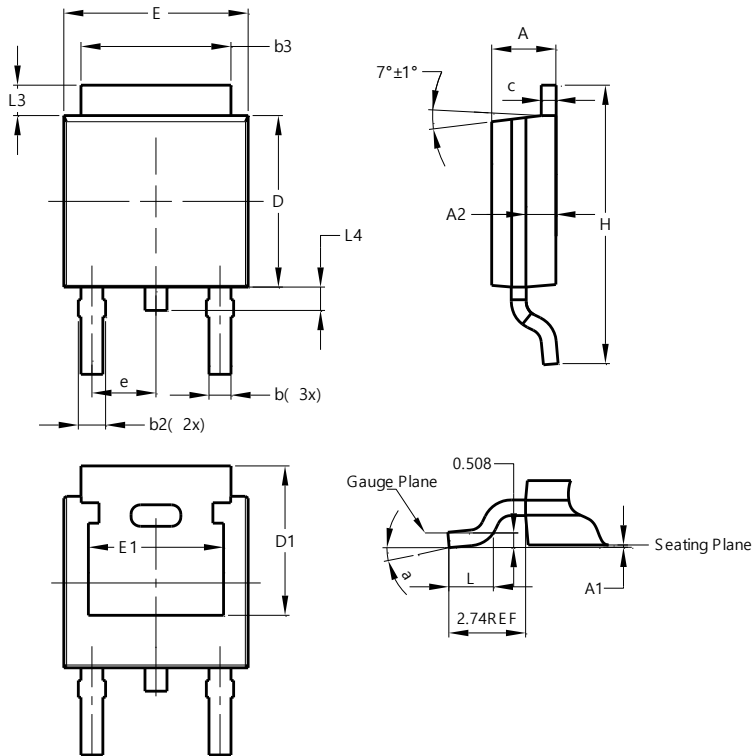


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**TO252 (DPAK)**

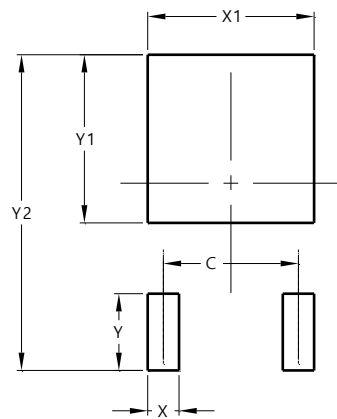


| TO252 (DPAK)         |           |       |       |
|----------------------|-----------|-------|-------|
| Dim                  | Min       | Max   | Typ   |
| A                    | 2.19      | 2.39  | 2.29  |
| A1                   | 0.00      | 0.13  | 0.08  |
| A2                   | 0.97      | 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°   | --    |
| All Dimensions in mm |           |       |       |

**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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