

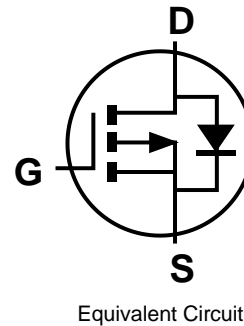
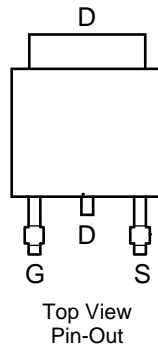
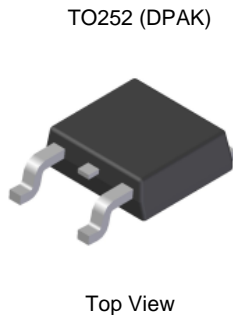
Product Summary

| BV _{DSS} | R _{DS(ON)} max | I _D T _C = +25°C |
|-------------------|--------------------------------|--|
| -30V | 7.5mΩ @ V _{GS} = -10V | -50A |
| | 10mΩ @ V _{GS} = -4.5V | -45A |

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported up by a PPAP and is ideal for use in:

- DC-DC Converters
- Power Management Functions
- Reverse Polarity Protection



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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

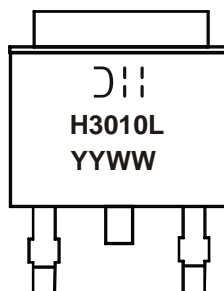
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202,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

Ordering Information (Note 5)

| Part Number | Case | Packaging |
|-----------------|--------------|-------------------|
| DMPH3010LK3Q-13 | TO252 (DPAK) | 2,500/Tape & Reel |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See http://www.diodes.com/quality/lead_free.html 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



DII = Manufacturer's Marking
 H3010L = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 16 = 2016)
 WW = Week (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Units |
|--|--------------|----------------------------|-----------|----------|-------|
| Drain-Source Voltage | | | V_{DSS} | -30 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 20 | V |
| Continuous Drain Current (Note 8) $V_{GS} = -10\text{V}$ | Steady State | $T_C = +25^\circ\text{C}$ | I_D | -50 | A |
| | | $T_C = +100^\circ\text{C}$ | | -40 | |
| Continuous Drain Current (Note 7) $V_{GS} = -10\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ | I_D | -16 | A |
| | | $T_A = +100^\circ\text{C}$ | | -11 | |
| Pulsed Drain Current (10 μs pulse, duty cycle = 1%) | | | I_{DM} | -100 | A |
| Maximum Body Diode Continuous Current (Note 7) | | | I_S | -3.5 | A |
| Avalanche Current (Note 9) $L = 0.1\text{mH}$ | | | I_{AS} | -47 | A |
| Avalanche Energy (Note 9) $L = 0.1\text{mH}$ | | | E_{AS} | 113 | mJ |

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Units |
|--|--|--------------|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 6) | | | P_D | 2.0 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | | Steady State | $R_{\theta JA}$ | 73 | $^\circ\text{C/W}$ |
| Total Power Dissipation (Note 7) | | | P_D | 3.9 | W |
| Thermal Resistance, Junction to Ambient (Note 7) | | Steady State | $R_{\theta JA}$ | 38 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case (Note 8) | | | $R_{\theta JC}$ | 1.0 | |
| Operating and Storage Temperature Range | | | T_J, T_{STG} | -55 to +175 | $^\circ\text{C}$ |

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--------------|------|-------|-----------|---------------|--|
| OFF CHARACTERISTICS (Note 10) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | -30 | — | — | V | $V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | -1.0 | μA | $V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 10) | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -1.1 | -1.6 | -2.1 | V | $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 6.2 | 7.5 | m Ω | $V_{GS} = -10\text{V}, I_D = -10\text{A}$ |
| | | — | 7.8 | 10 | | $V_{GS} = -4.5\text{V}, I_D = -10\text{A}$ |
| Diode Forward Voltage | V_{SD} | — | -0.65 | -1.0 | V | $V_{GS} = 0\text{V}, I_S = -1\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 11) | | | | | | |
| Input Capacitance | C_{iss} | — | 6807 | — | pF | $V_{DS} = -15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | — | 988 | — | pF | |
| Reverse Transfer Capacitance | C_{riss} | — | 647 | — | pF | |
| Gate Resistance | R_g | — | 6.2 | — | Ω | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$ |
| Total Gate Charge ($V_{GS} = -4.5\text{V}$) | Q_g | — | 66 | — | nC | $V_{DS} = -15\text{V}, I_D = -10\text{A}$ |
| Total Gate Charge ($V_{GS} = -10\text{V}$) | Q_g | — | 139 | — | nC | |
| Gate-Source Charge | Q_{gs} | — | 19.1 | — | nC | |
| Gate-Drain Charge | Q_{gd} | — | 21.7 | — | nC | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 9.0 | — | ns | $V_{DS} = -15\text{V}, V_{GEN} = -10\text{V}, R_G = 6\Omega, I_D = -1\text{A}$ |
| Turn-On Rise Time | t_F | — | 10.5 | — | ns | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 255 | — | ns | |
| Turn-Off Fall Time | t_F | — | 95 | — | ns | |
| Body Diode Reverse Recovery Time | t_{RR} | — | 27 | — | ns | |
| Body Diode Reverse Recovery Charge | Q_{RR} | — | 21 | — | nC | $I_F = -10\text{A}, di/dt = -100\text{A}/\mu\text{s}$ |

- 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 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

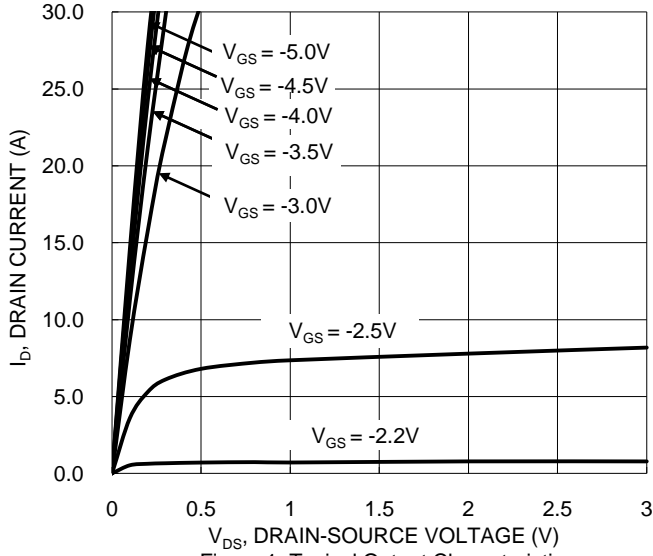


Figure 1. Typical Output Characteristic

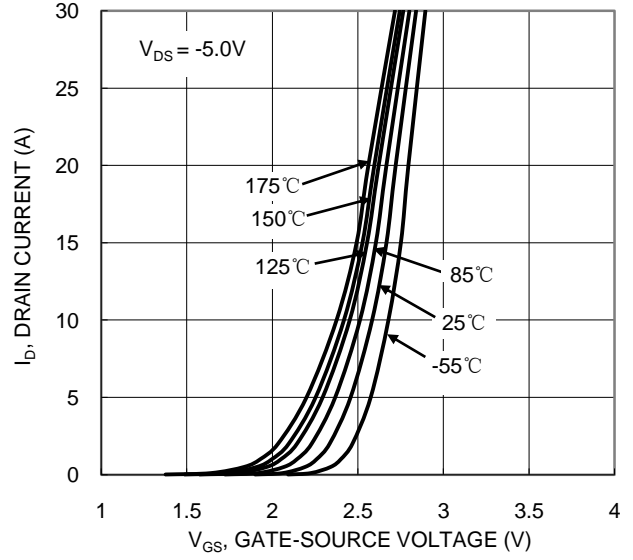


Figure 2. Typical Transfer Characteristic

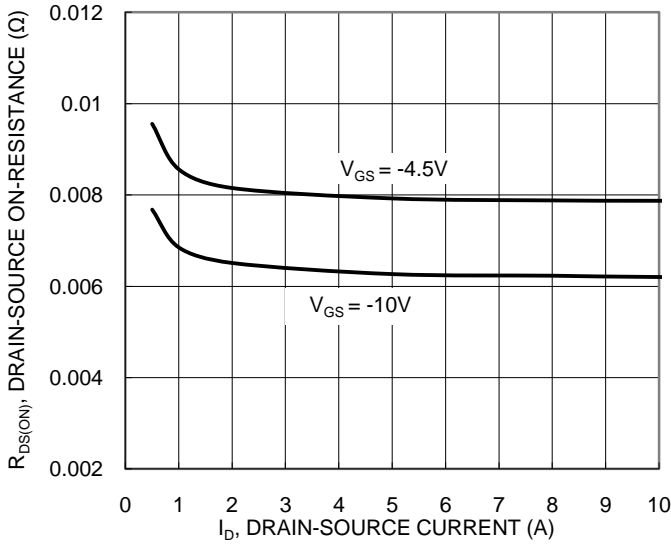


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

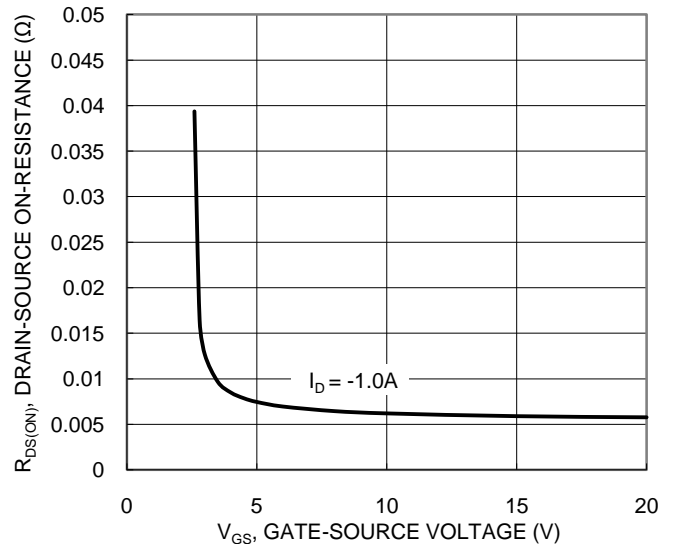


Figure 4. Typical Transfer Characteristic

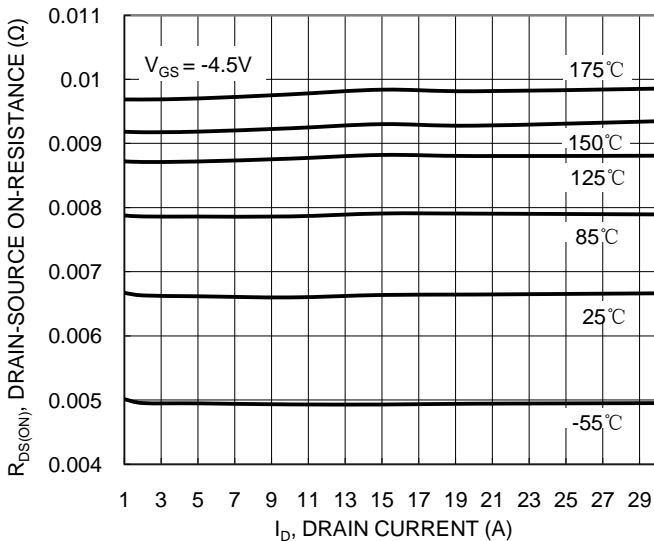


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

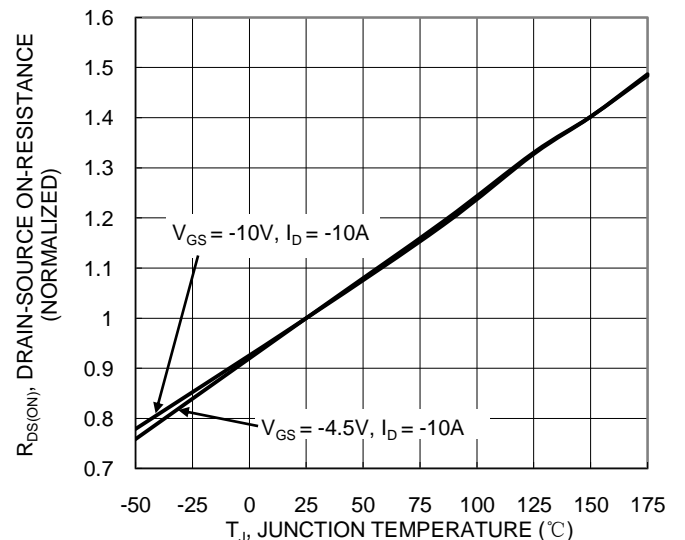
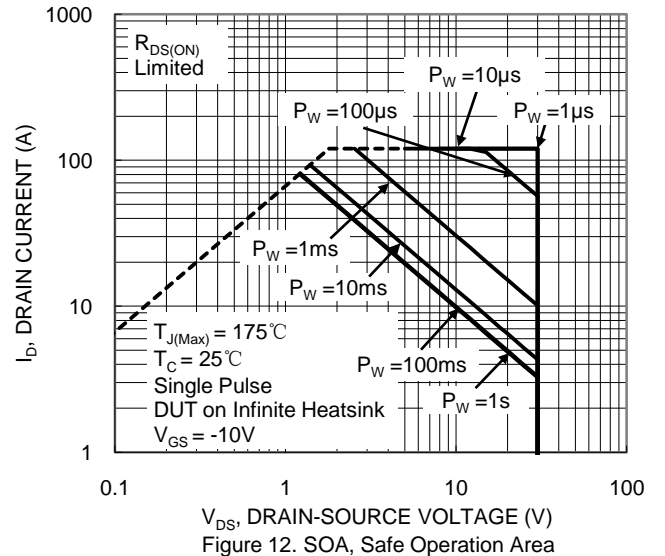
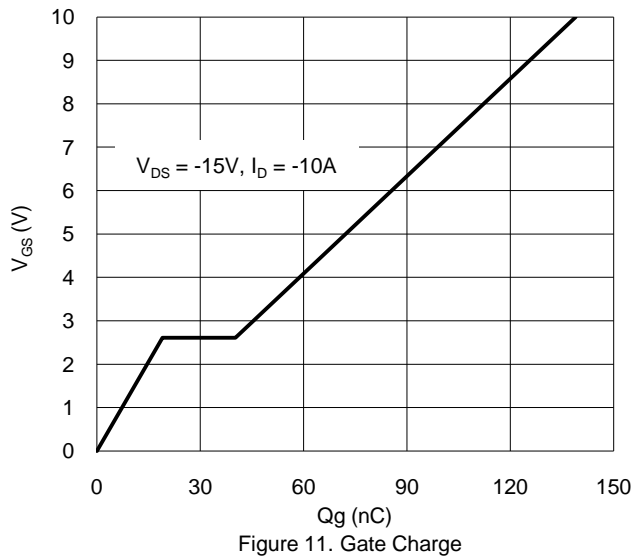
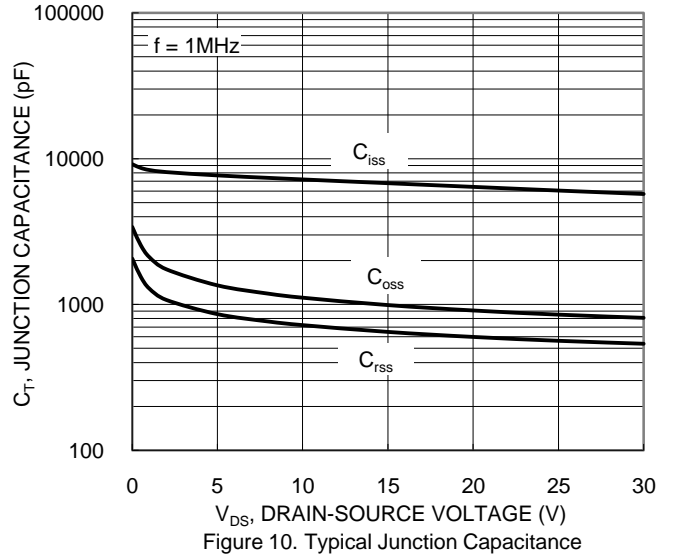
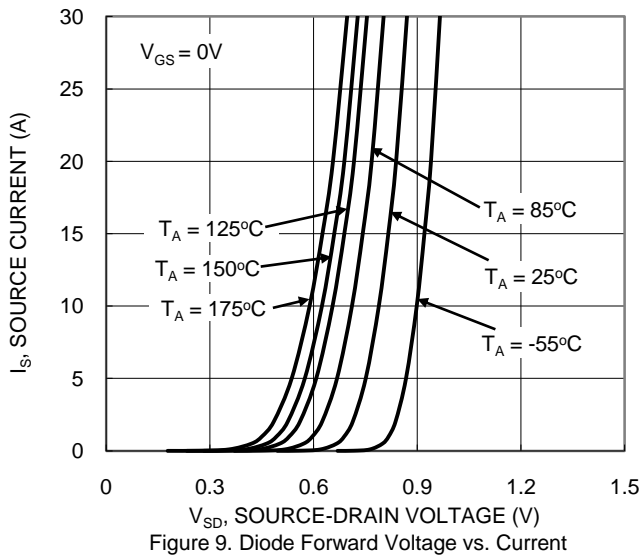
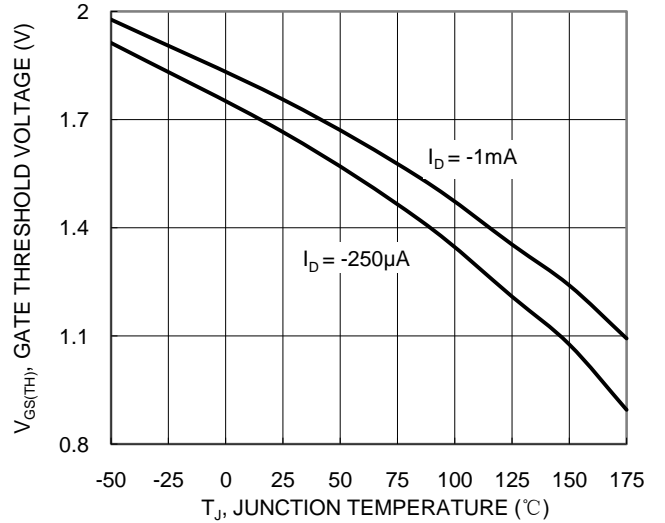
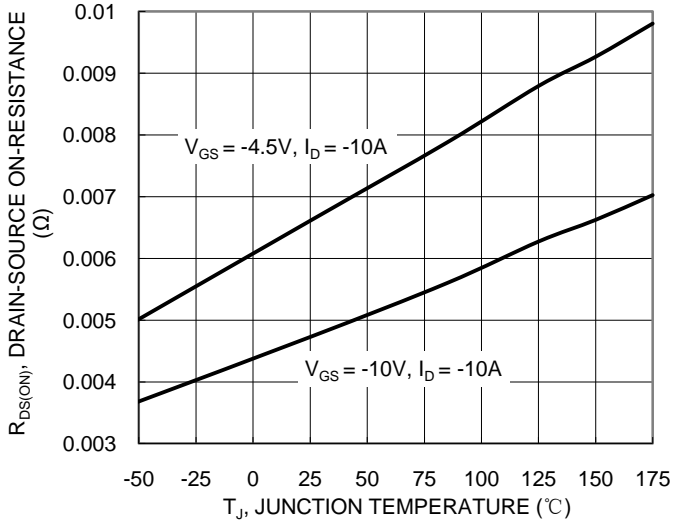
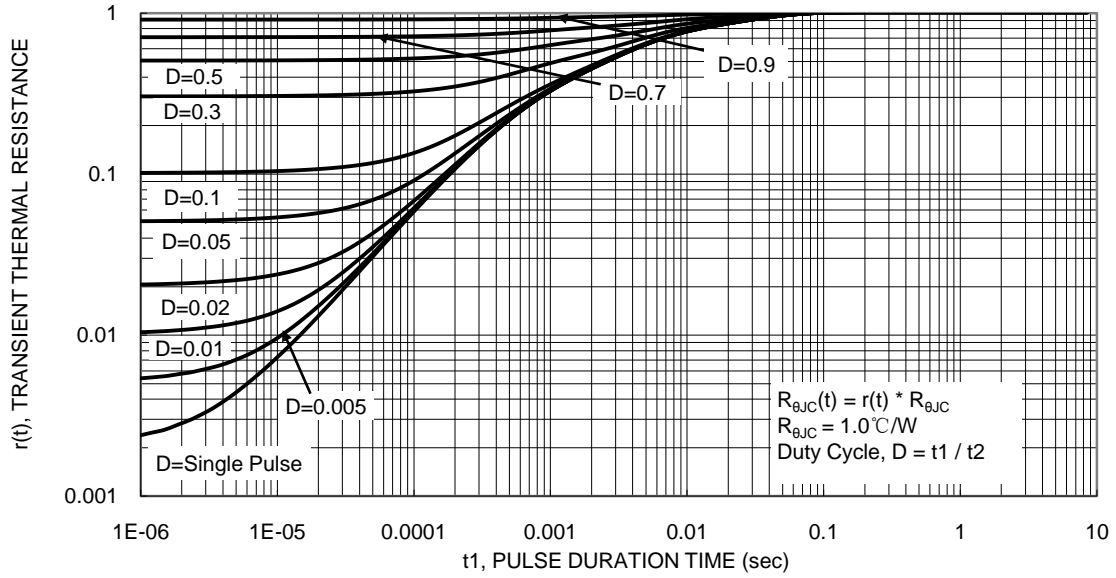


Figure 6. On-Resistance Variation with Temperature

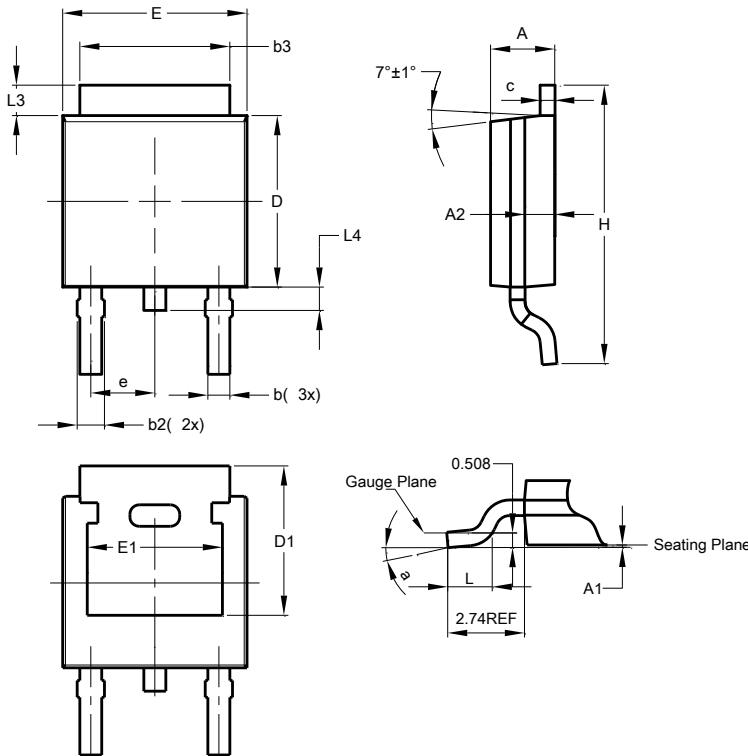




Package Outline Dimensions

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

TO252 (DPAK)

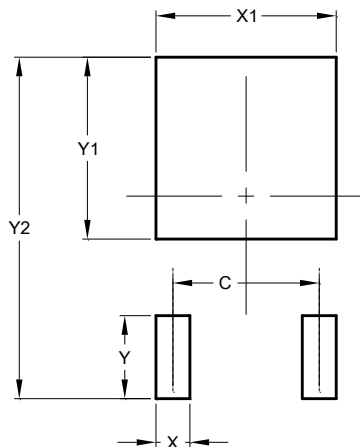


| TO252 (DPAK) | | | |
|----------------------|------|-------|-------|
| Dim | Min | Max | Typ |
| A | 2.19 | 2.39 | 2.29 |
| A1 | 0.00 | 0.13 | 0.08 |
| A2 | 0.97 | 1.17 | 1.07 |
| b | 0.64 | 0.88 | 0.783 |
| b2 | 0.76 | 1.14 | 0.95 |
| b3 | 5.21 | 5.46 | 5.33 |
| c | 0.45 | 0.58 | 0.531 |
| D | 6.00 | 6.20 | 6.10 |
| D1 | 5.21 | - | - |
| e | - | - | 2.286 |
| 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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