

Product Summary

| BV _{DSS} | R _{DS(ON)} Max | I _D Max T _C = +25°C |
|-------------------|-----------------------------|----------------------------------------------|
| 30V | 4mΩ @V _{GS} = 10V | 75A |
| | 7mΩ @V _{GS} = 4.5V | 75A |

Features

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- High Conversion Efficiency
- Low R_{DS(ON)} – Minimizes On-State Losses
- Low Input Capacitance
- **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)**

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AECQ101, supported by a PPAP and is ideal for use in:

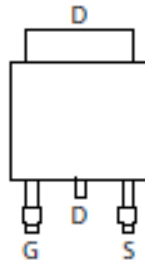
- Power Management Functions
- DC-DC Converters
- BLDC Motor control
- Reverse Polarity Protection

Mechanical Data

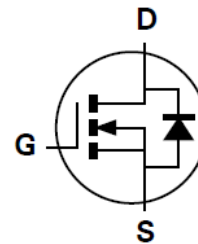
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish. Solderable per MIL-STD-202, Method 208 Ⓔ3
- Weight: 0.315 grams (Approximate)



Top View



Pin Out Top View



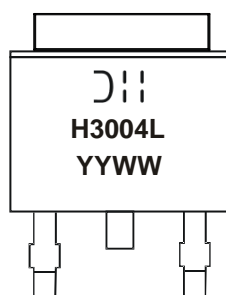
Equivalent Circuit

Ordering Information (Note 5)

| Part Number | Case | Packaging |
|-----------------|--------------|-------------------|
| DMTH3004LK3Q-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



Ⓜ|| = Manufacturer's Marking
 H3004L = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 16 = 2016)
 WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|--------------------------------------------------|-----------------------|---------------------------------------------------|------------------|------------|------|
| Drain-Source Voltage | | | V _{DSS} | 30 | V |
| Gate-Source Voltage | | | V _{GSS} | +20 -16 | V |
| Continuous Drain Current V _{GS} = 10V | Steady State (Note 7) | T _C = +25°C T _C = +100°C | I _D | 75 75 | A |
| | Steady State (Note 6) | T _A = +25°C T _A = +100°C | I _D | 21 15 | A |
| Pulsed Drain Current (10μs Pulse, Duty Cycle=1%) | | | I _{DM} | 105 | A |
| Maximum Continuous Body Diode Forward Current | | | I _S | 75 | A |
| Avalanche Current L=5mH | | | I _{AS} | 10.7 | A |
| Avalanche Energy L=5mH | | | E _{AS} | 287 | mJ |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 7) | P _D | 107 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | 50 | °C/W |
| Thermal Resistance, Junction to Case (Note 7) | R _{θJC} | 1.4 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +175 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------------|---------------------|------|-------|------|------|--------------------------------------------------------------------------------------------------------------------|
| OFF CHARACTERISTICS (Note 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | — | — | V | V _{GS} = 0V, I _D = 1mA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | μA | V _{DS} = 24V, V _{GS} = 0V |
| Zero Gate Voltage Drain Current (Note 9) | I _{DSS} | — | — | 10 | μA | V _{DS} = 24V, V _{GS} = 0V T _A = +125°C |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = +20V, V _{DS} = 0V V _{GS} = -16V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 1 | 1.7 | 3 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 3.3 | 4 | mΩ | V _{GS} = 10V, I _D = 20A |
| | | — | 5.5 | 7 | | V _{GS} = 4.5V, I _D = 7A |
| Diode Forward Voltage | V _{SD} | — | 0.75 | 1 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{ISS} | — | 2,370 | — | pF | V _{DS} = 15V, V _{GS} = 0V, f = 1MHz |
| Output Capacitance | C _{OSS} | — | 1,360 | — | pF | |
| Reverse Transfer Capacitance | C _{RSS} | — | 240 | — | pF | |
| Gate Resistance | R _G | 0.15 | 0.6 | 1.5 | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _G | — | 20 | — | nC | V _{DS} = 15V, I _D = 20A |
| Total Gate Charge (V _{GS} = 10V) | Q _G | — | 44 | — | nC | |
| Gate-Source Charge | Q _{GS} | — | 7 | — | nC | |
| Gate-Drain Charge | Q _{GD} | — | 8 | — | nC | |
| Turn-On Delay Time | t _{D(ON)} | — | 6.2 | — | ns | V _{DD} = 15V, V _{GS} = 10V, R _L = 0.75Ω, R _G = 3Ω, I _D = 20A |
| Turn-On Rise Time | t _R | — | 4.3 | — | ns | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 21 | — | ns | |
| Turn-Off Fall Time | t _F | — | 8 | — | ns | |
| Reverse Recovery Time | t _{RR} | — | 25 | — | ns | I _F = 15A, di/dt = 500A/μs |
| Reverse Recovery Charge | Q _{RR} | — | 37 | — | nC | |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch 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.

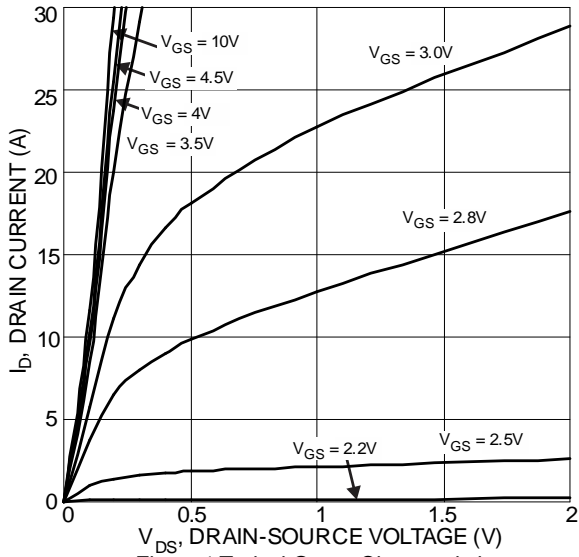


Figure 1 Typical Output Characteristic

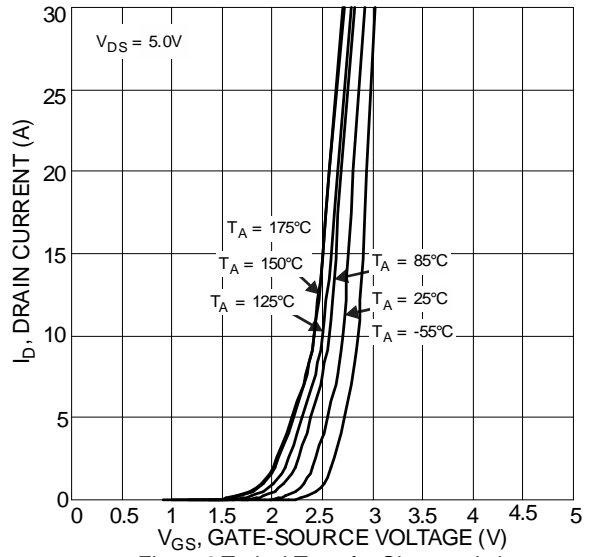


Figure 2 Typical Transfer Characteristics

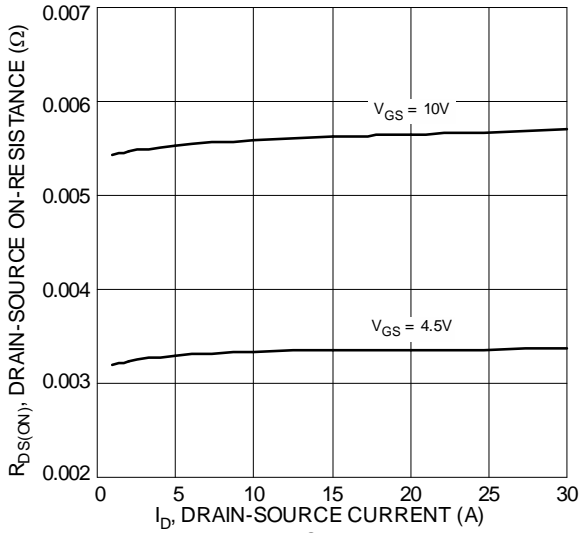


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

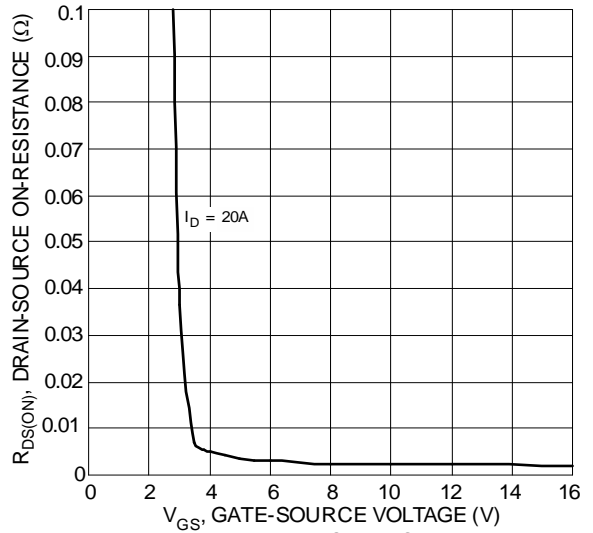


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

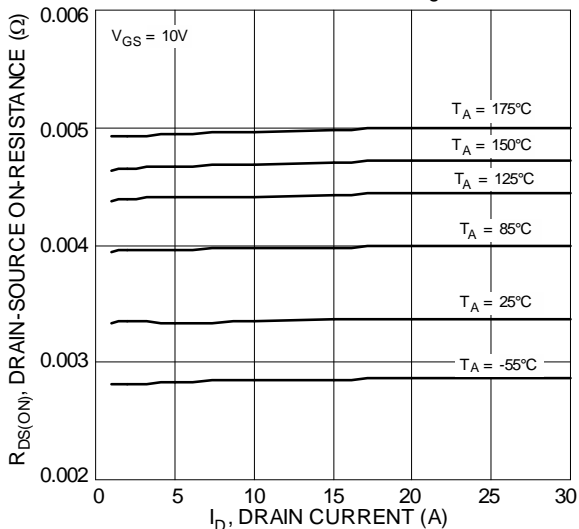


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

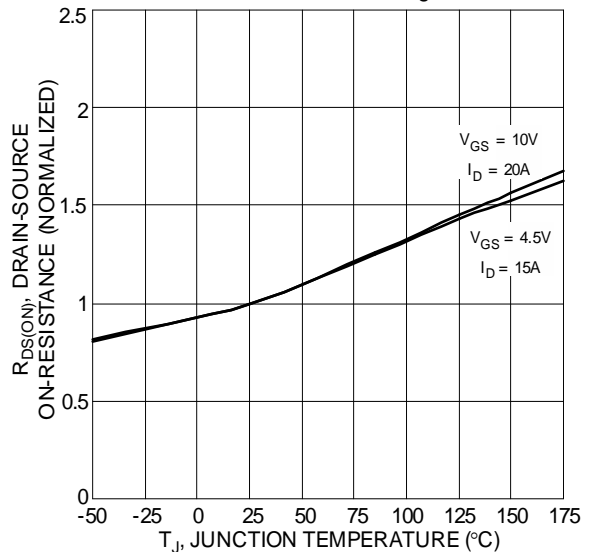


Figure 6 On-Resistance Variation with Temperature

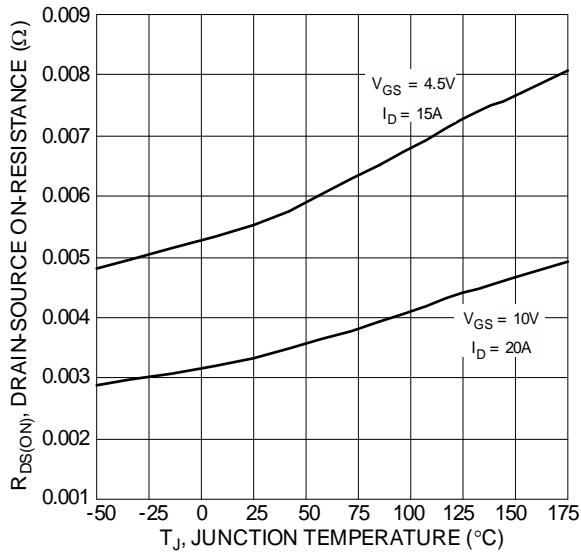


Figure 7 On-Resistance Variation with Temperature

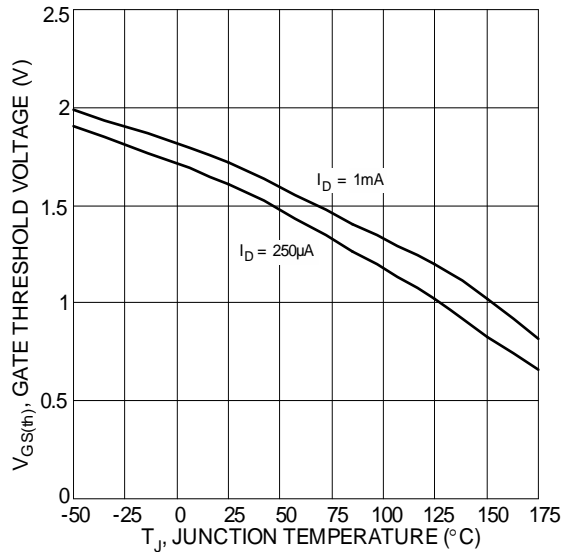


Figure 8 Gate Threshold Variation vs. Ambient Temperature

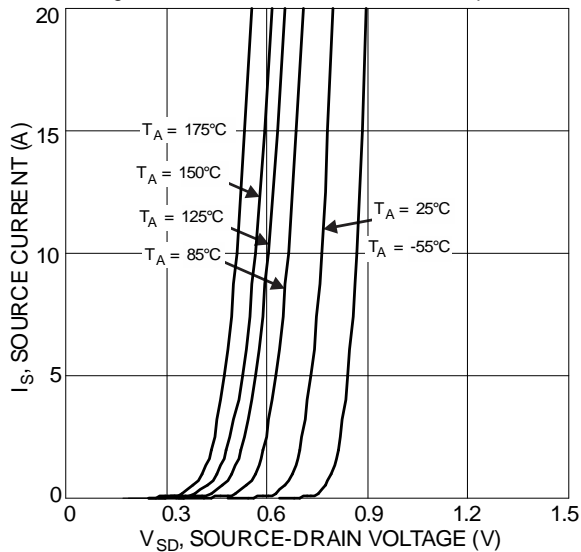


Figure 9 Diode Forward Voltage vs. Current

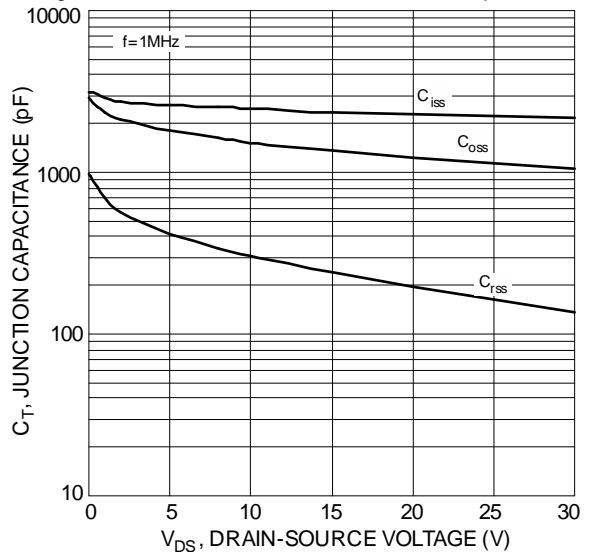


Figure 10 Typical Junction Capacitance

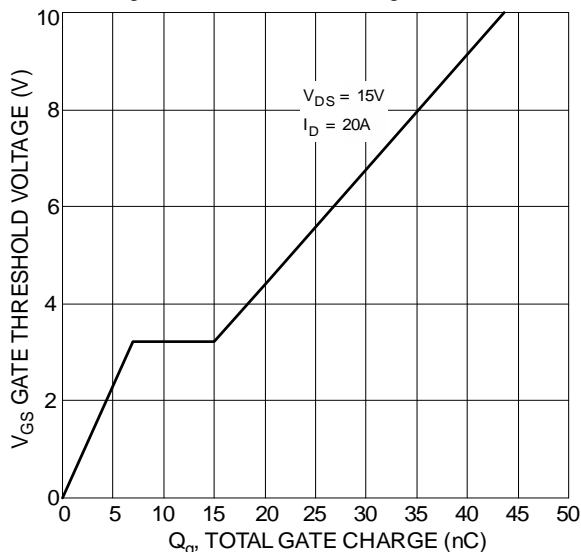


Figure 11 Gate Charge

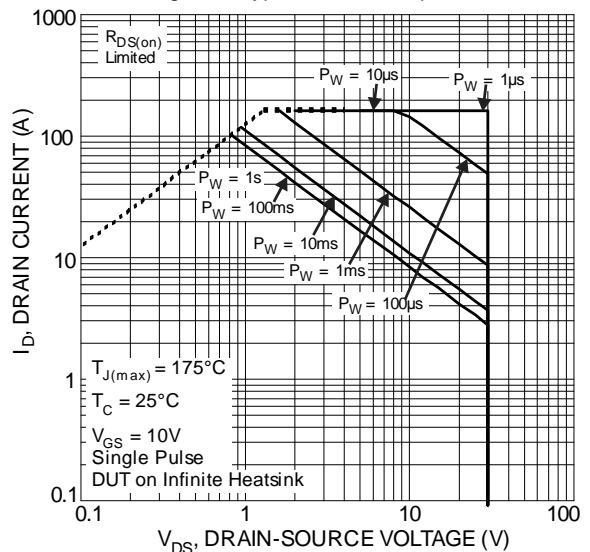
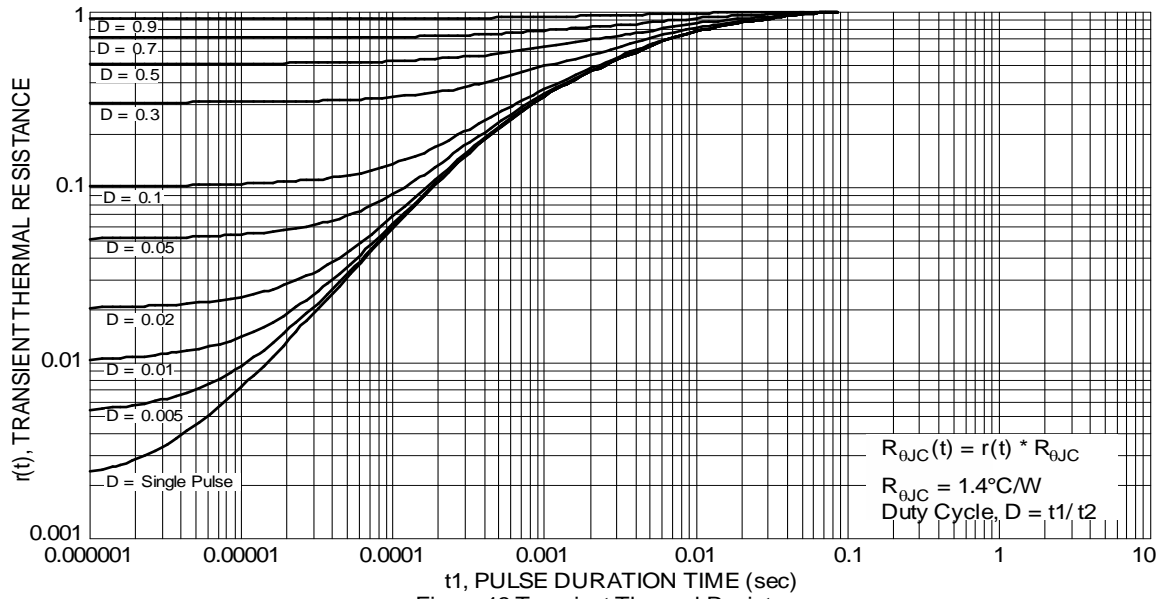


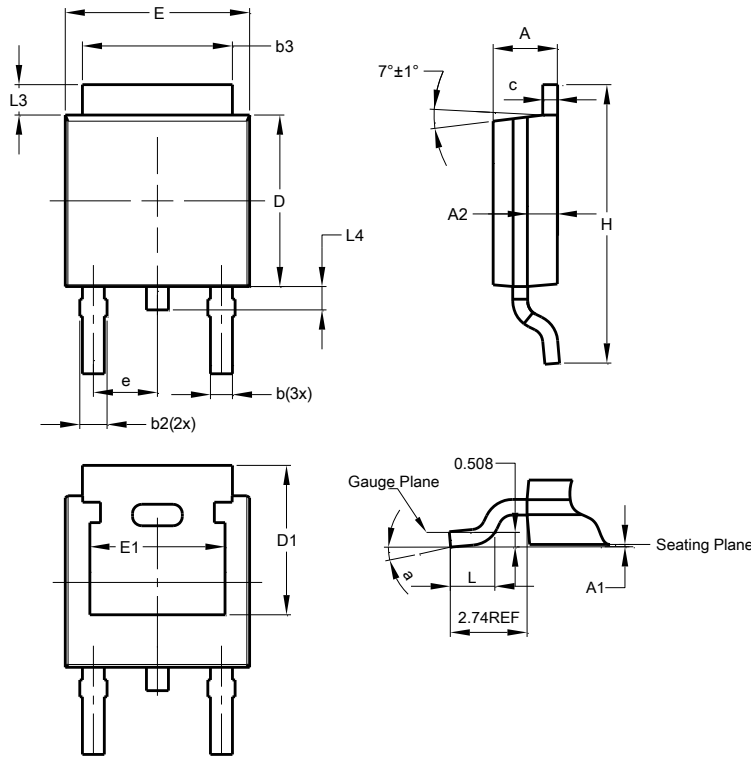
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

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

TO252 (DPAK)

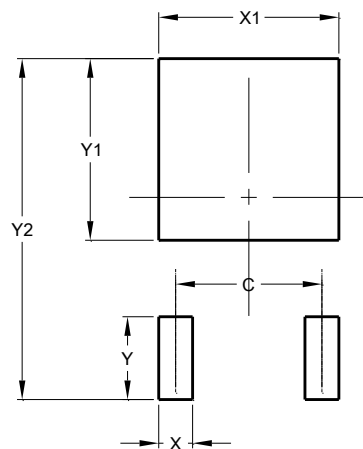


| TO252 (DPAK) | | | |
|-----------------------------|------|-------|-------|
| Dim | Min | Max | Typ |
| A | 2.19 | 2.39 | 2.29 |
| A1 | 0.00 | 0.13 | 0.08 |
| A2 | 0.97 | 1.17 | 1.07 |
| b | 0.64 | 0.88 | 0.783 |
| b2 | 0.76 | 1.14 | 0.95 |
| b3 | 5.21 | 5.46 | 5.33 |
| c | 0.45 | 0.58 | 0.531 |
|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