

Product Summary

| BV _{DSS} | R _{DS(ON)} | I _D T _C = +25°C |
|-------------------|-------------------------------|--|
| 40V | 4.0mΩ @ V _{GS} = 10V | 150A |

Description

This new generation Enhancement Mode MOSFET is designed to minimize R_{DS(ON)} and yet maintain superior switching performance, making it ideal for high efficiency power management applications.


Applications

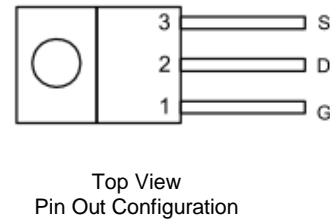
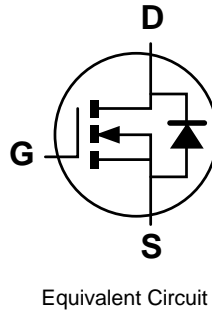
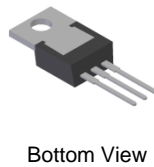
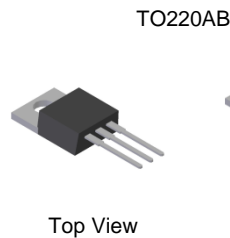
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

Features

- Low Input Capacitance
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMNH4005SCTQ](#))**

Mechanical Data

- Case: TO220AB
- Case Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)

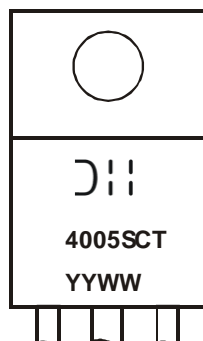



Ordering Information (Note 4)

| Part Number | Case | Packaging |
|-------------|---------|----------------|
| DMNH4005SCT | TO220AB | 50 Pieces/Tube |

- 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



 = Manufacturer's Marking
 4005SCT = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 16 = 2016)
 WW = Week (01 to 53)

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

| Characteristic | | | Symbol | Value | Unit |
|--|--------------|-------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | 40 | V |
| Gate-Source Voltage | | | V _{GSS} | 20 | V |
| Continuous Drain Current V _{GS} = 10V | Steady State | T _C = +25°C | I _D | 150 | A |
| | | T _C = +100°C | | 100 | |
| Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%) | | | I _{DM} | 90 | A |
| Maximum Continuous Body Diode Forward Current (Note 5) | | | I _S | 80 | A |
| Avalanche Current (Note 6) L=1mH | | | I _{AS} | 30 | A |
| Avalanche Energy (Note 6) L=1mH | | | E _{AS} | 500 | mJ |

Thermal Characteristics

| Characteristic | | Symbol | Value | Unit |
|---|------------------------|-----------------------------------|-------------|------|
| Power Dissipation | T _C = +25°C | P _D | 165 | W |
| | T _C = +70°C | | 100 | |
| Thermal Resistance, Junction to Case | | R _{θJC} | 0.9 | °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 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 40 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | μA | V _{DS} = 32V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±16V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 1 | — | 3 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 3.4 | 4.0 | mΩ | V _{GS} = 10V, I _D = 20A |
| Diode Forward Voltage | V _{SD} | — | — | 1.2 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{ISS} | — | 2846 | — | pF | V _{DS} = 20V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{OSS} | — | 742 | — | | |
| Reverse Transfer Capacitance | C _{RSS} | — | 242 | — | | |
| Gate Resistance | R _G | — | 1.9 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 48 | — | nC | V _{DD} = 20V, I _D = 20A |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 23 | — | | |
| Gate-Source Charge | Q _{gs} | — | 9.5 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 11.5 | — | | |
| Turn-On Delay Time | t _{D(ON)} | — | 6.6 | — | ns | V _{DD} = 20V, V _{GS} = 10V, R _G = 1Ω, I _D = 20A |
| Turn-On Rise Time | t _R | — | 12.1 | — | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 18.3 | — | | |
| Turn-Off Fall Time | t _F | — | 4.9 | — | | |
| Reverse Recovery Time | t _{RR} | — | 29 | — | ns | I _F = 15A, di/dt = 100A/μs |
| Reverse Recovery Charge | Q _{RR} | — | 24 | — | nC | |

- Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 6. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.

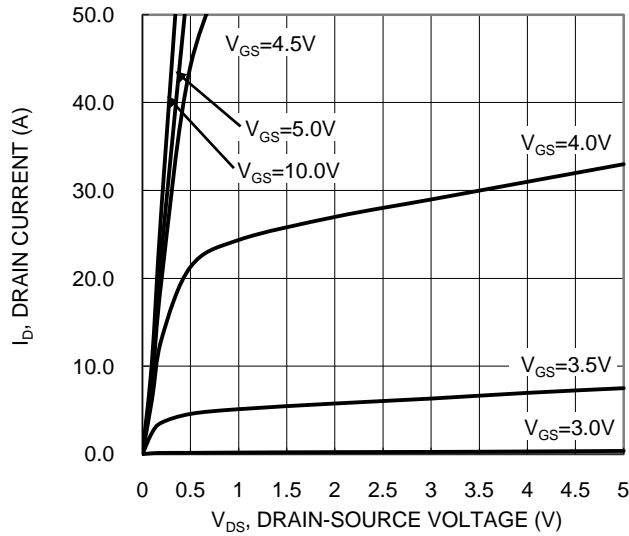


Figure 1. Typical Output Characteristic

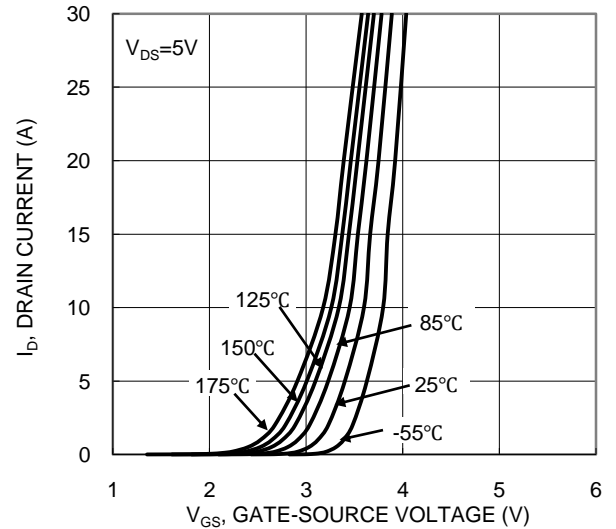


Figure 2. Typical Transfer Characteristic

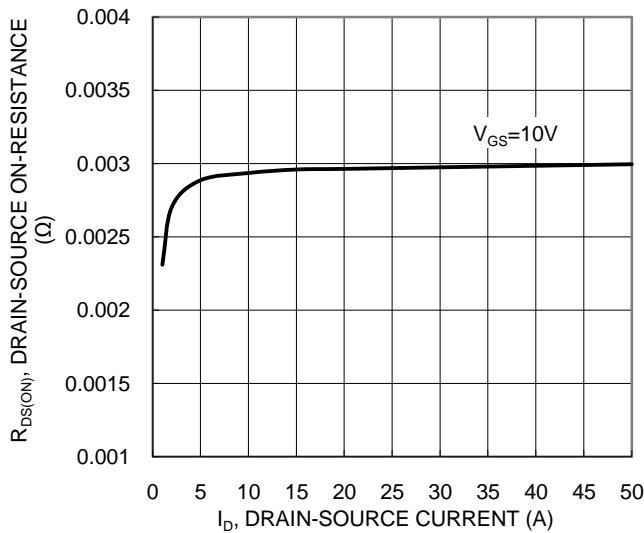


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

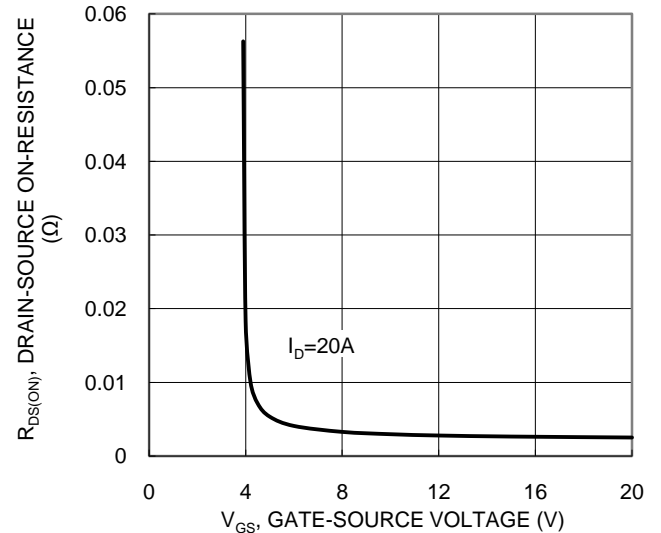


Figure 4. Typical Transfer Characteristic

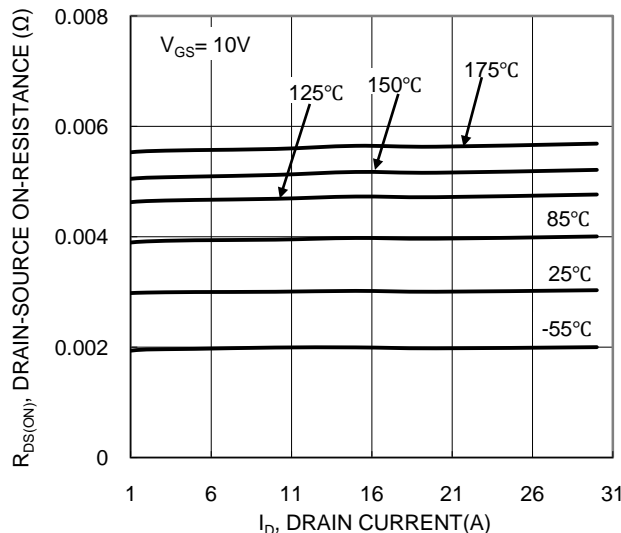


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

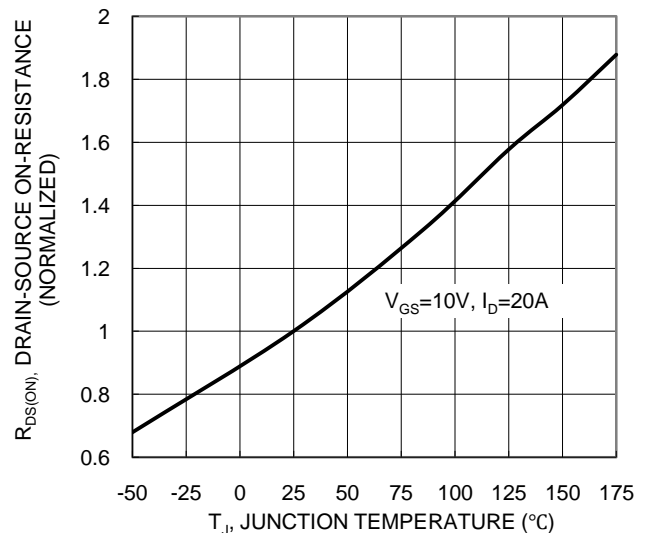
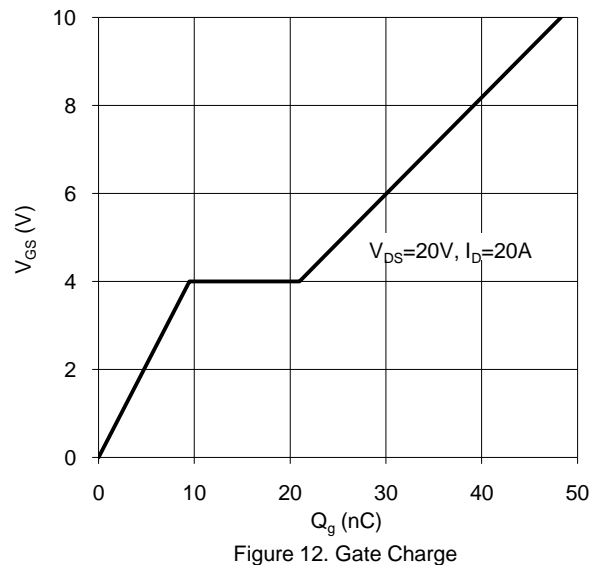
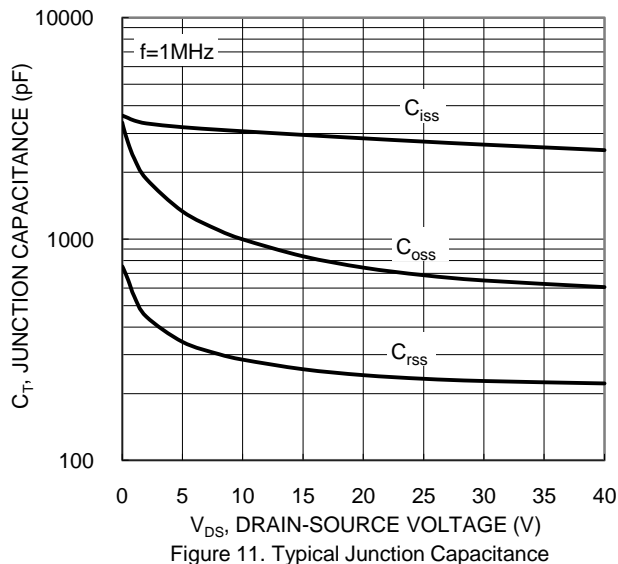
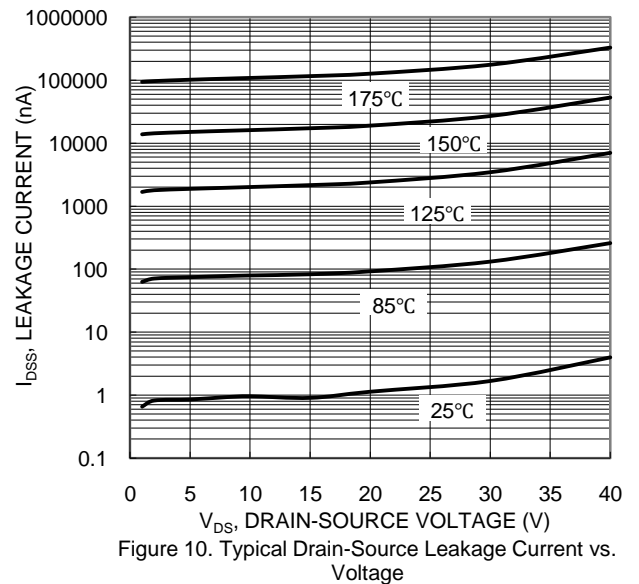
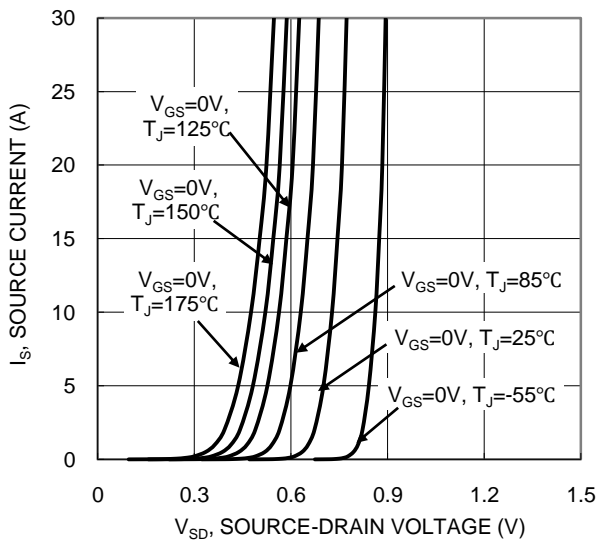
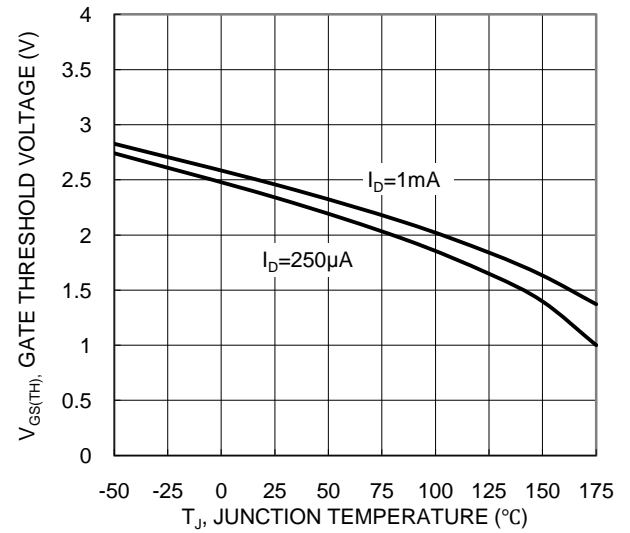
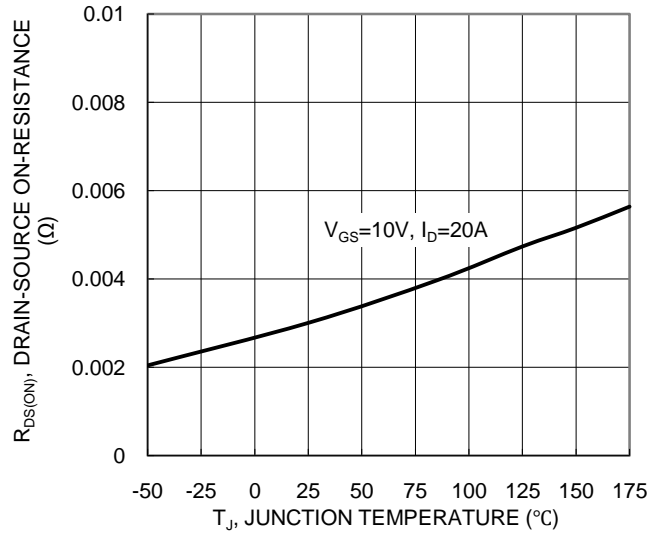
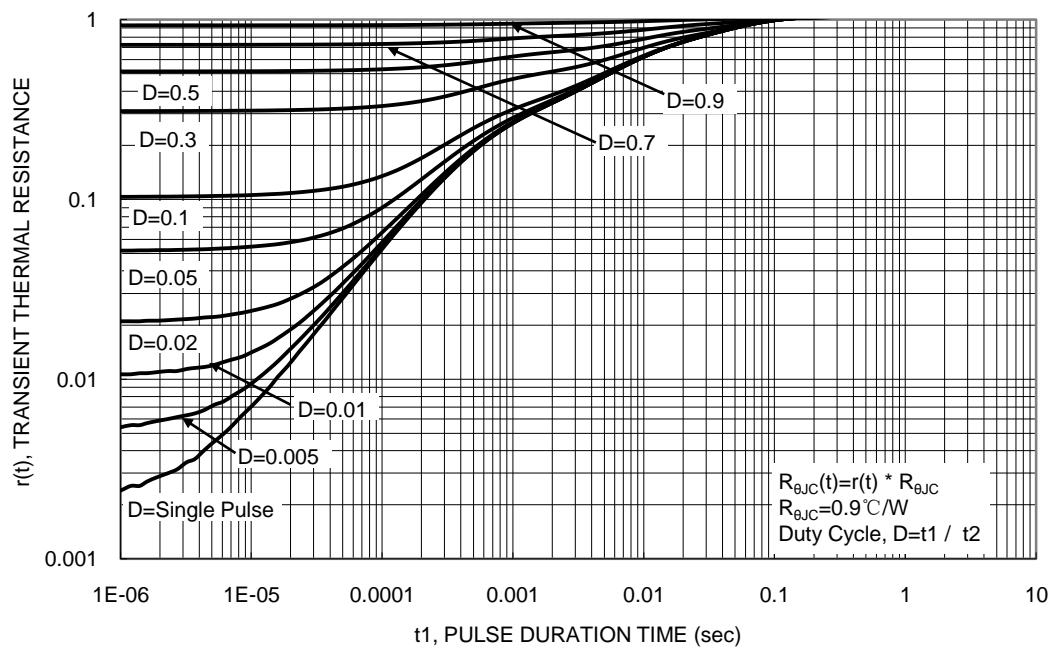
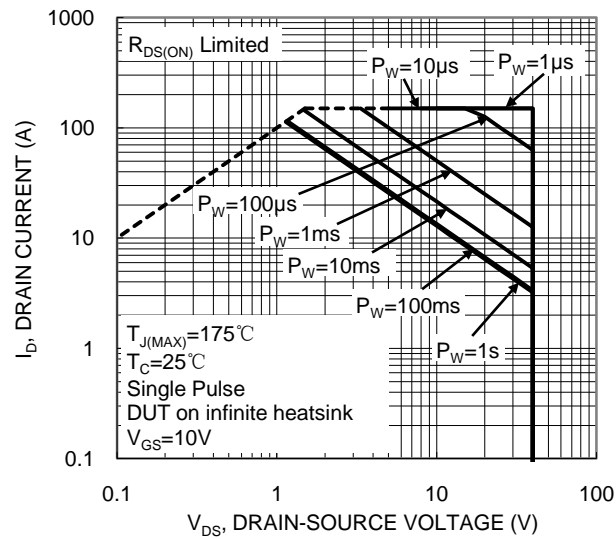


Figure 6. On-Resistance Variation with Junction Temperature

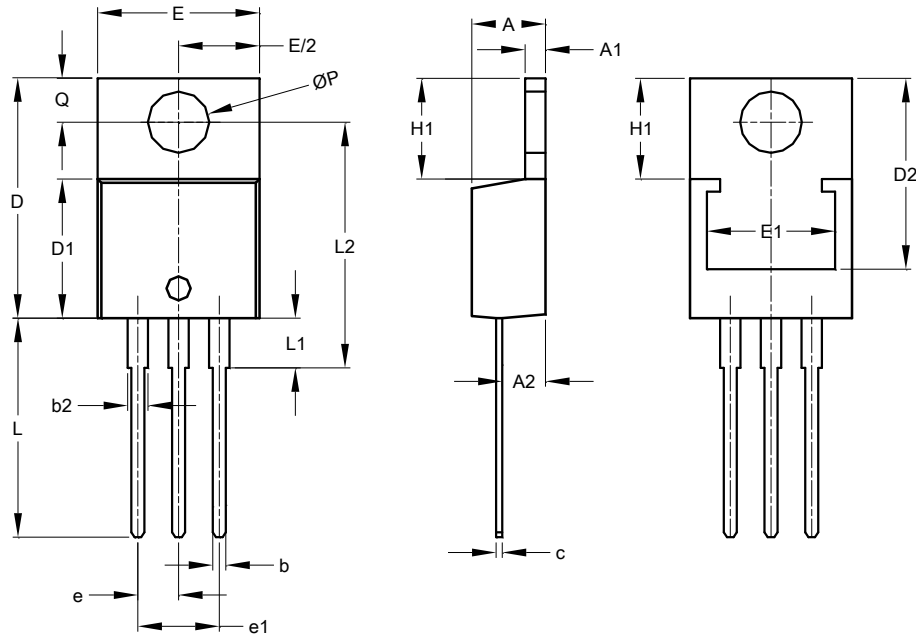




Package Outline Dimensions

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

TO220AB



| TO220AB | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 3.56 | 4.82 | - |
| A1 | 0.51 | 1.39 | - |
| A2 | 2.04 | 2.92 | - |
| b | 0.39 | 1.01 | 0.81 |
| b2 | 1.15 | 1.77 | 1.24 |
| c | 0.356 | 0.61 | - |
| D | 14.22 | 16.51 | - |
| D1 | 8.39 | 9.01 | - |
| D2 | 11.45 | 12.87 | - |
| e | - | - | 2.54 |
| e1 | - | - | 5.08 |
| E | 9.66 | 10.66 | - |
| E1 | 6.86 | 8.89 | - |
| H1 | 5.85 | 6.85 | - |
| L | 12.70 | 14.73 | - |
| L1 | - | 6.35 | - |
| L2 | 15.80 | 16.20 | 16.00 |
| P | 3.54 | 4.08 | - |
| Q | 2.54 | 3.42 | - |
| All Dimensions in mm | | | |

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