

Product Summary

| BV _{DSS} | R _{DS(ON)} max | I _D T _C = +25°C (Note 9) |
|-------------------|--------------------------------|--|
| 60V | 3.65mΩ @ V _{GS} = 10V | 100A |

Features

- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Low Input Capacitance
- Low Input/Output Leakage
- **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-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

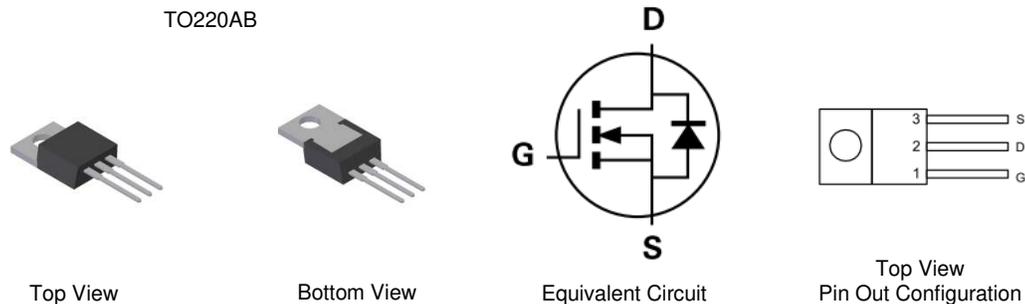
Description and Applications

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

- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

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 @3
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)

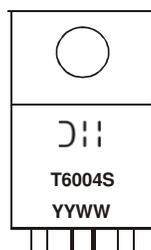


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|-------------|---------|----------------|
| DMT6004SCT | TO220AB | 50 Pieces/Tube |

- 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



D||| = Manufacturer's Marking
 T6004S = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 20 = 2020)
 WW = Week Code (01 to 53)

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

| Characteristic | Symbol | Value | Unit |
|---|------------------------|-------|------|
| Drain-Source Voltage | V _{DSS} | 60 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current (Notes 6 & 9) | T _C = +25°C | 100 | A |
| | T _C = +70°C | 100 | A |
| Maximum Continuous Body Diode Forward Current (Notes 6 & 9) | I _S | 100 | A |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) | I _{DM} | 180 | A |
| Avalanche Current, L = 0.2mH | I _{AS} | 45 | A |
| Avalanche Energy, L = 0.2mH | E _{AS} | 200 | mJ |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5) | P _D | 2.3 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 52.8 | °C/W |
| Total Power Dissipation (Note 6) | P _D | 113 | W |
| Thermal Resistance, Junction to Case (Note 6) | R _{θJC} | 1.1 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °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} | 60 | — | — | V | V _{GS} = 0V, I _D = 1mA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | µA | V _{DS} = 48V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 2 | — | 4 | V | V _{DS} = V _{GS} , I _D = 250µA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 3.1 | 3.65 | mΩ | V _{GS} = 10V, I _D = 100A |
| Diode Forward Voltage | V _{SD} | — | — | 1.3 | V | V _{GS} = 0V, I _S = 100A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 4556 | — | pF | V _{DS} = 30V, V _{GS} = 0V, f = 1MHz |
| Output Capacitance | C _{oss} | — | 1383 | — | | |
| Reverse Transfer Capacitance | C _{rss} | — | 105 | — | | |
| Gate Resistance | R _G | — | 0.7 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge | Q _g | — | 95.4 | — | nC | V _{DD} = 30V, I _D = 90A, V _{GS} = 10V |
| Gate-Source Charge | Q _{gs} | — | 21.6 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 20.4 | — | | |
| Turn-On Delay Time | t _{D(ON)} | — | 14.3 | — | ns | V _{DD} = 30V, V _{GS} = 10V, I _D = 90A, R _G = 3.5Ω |
| Turn-On Rise Time | t _r | — | 99.1 | — | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 40 | — | | |
| Turn-Off Fall Time | t _f | — | 17.6 | — | | |
| Reverse Recovery Time | t _{RR} | — | 50.5 | — | ns | I _F = 48A, di/dt = 100A/µs |
| Reverse Recovery Charge | Q _{RR} | — | 80.8 | — | nC | |

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on infinite heat sink.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.
 - Package limited.

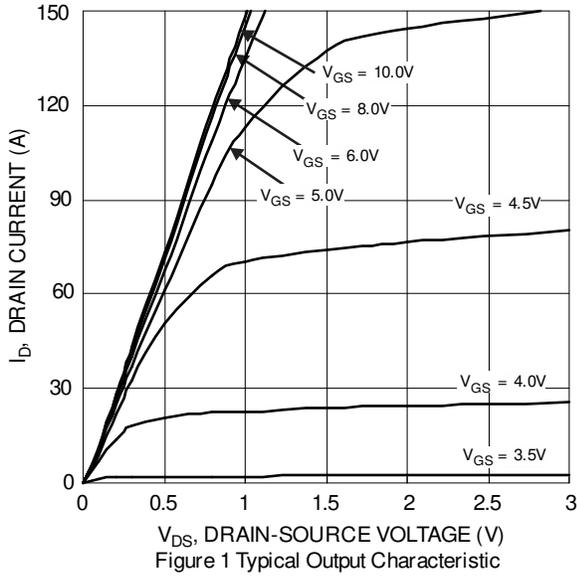


Figure 1 Typical Output Characteristic

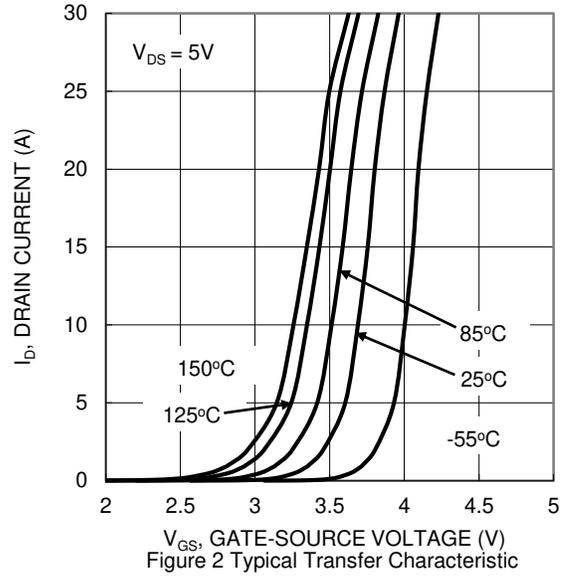


Figure 2 Typical Transfer Characteristic

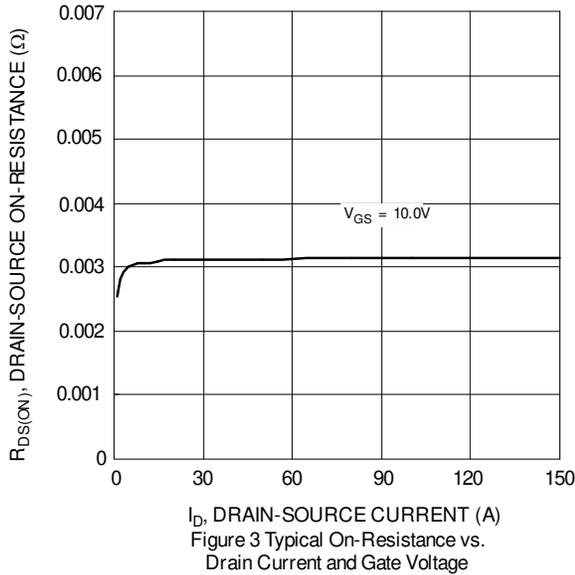


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

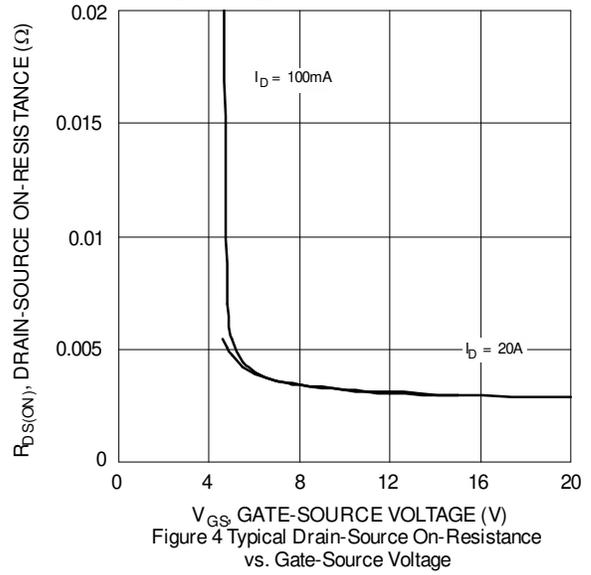


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

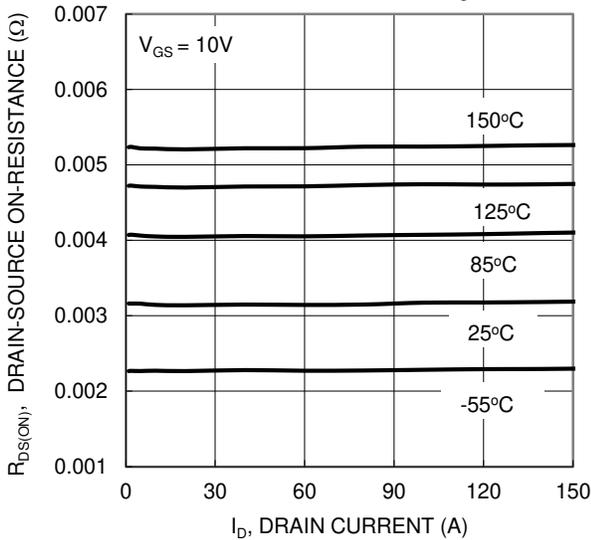


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

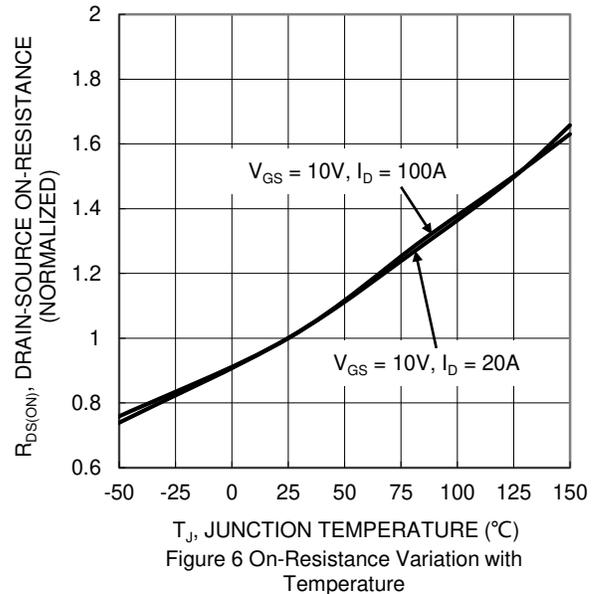


Figure 6 On-Resistance Variation with Temperature

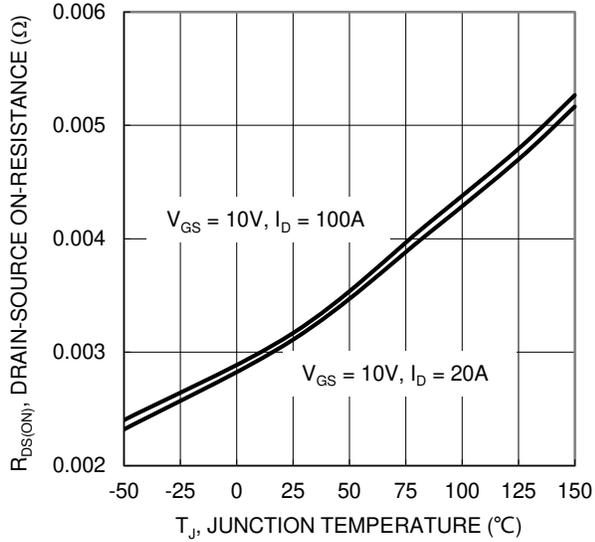


Figure 7 On-Resistance Variation with Temperature

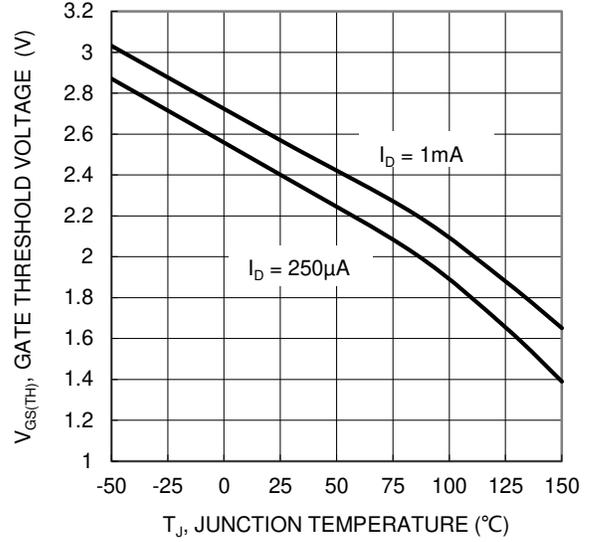


Figure 8 Gate Threshold Variation vs. Temperature

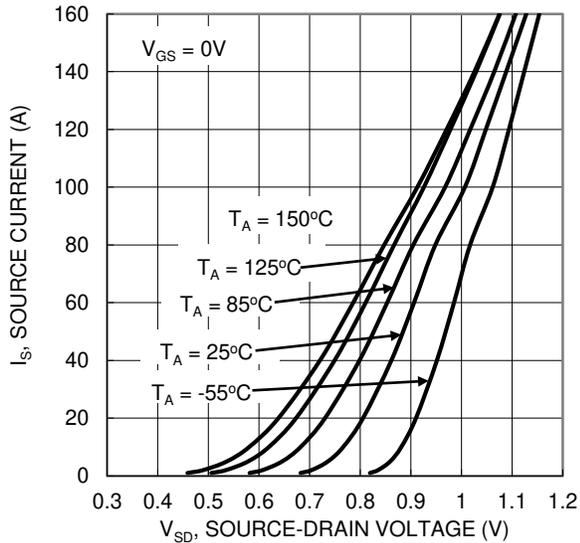


Figure 9 Diode Forward Voltage vs. Current

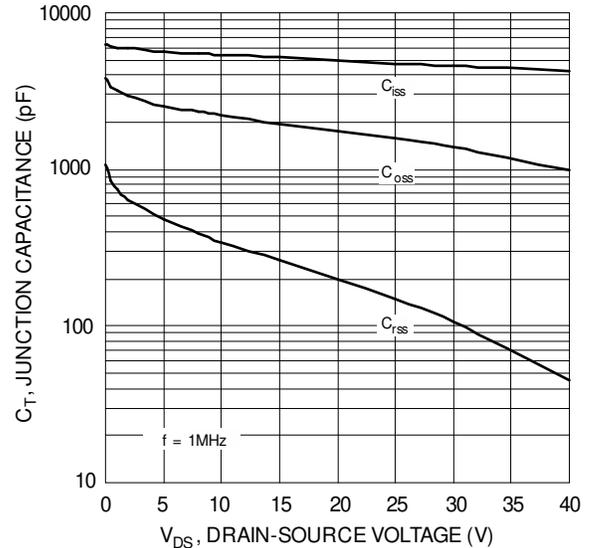


Figure 10 Typical Junction Capacitance

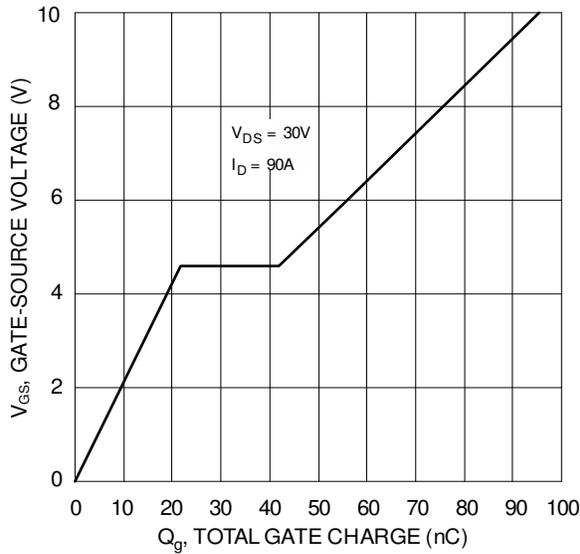


Figure 11 Gate Charge

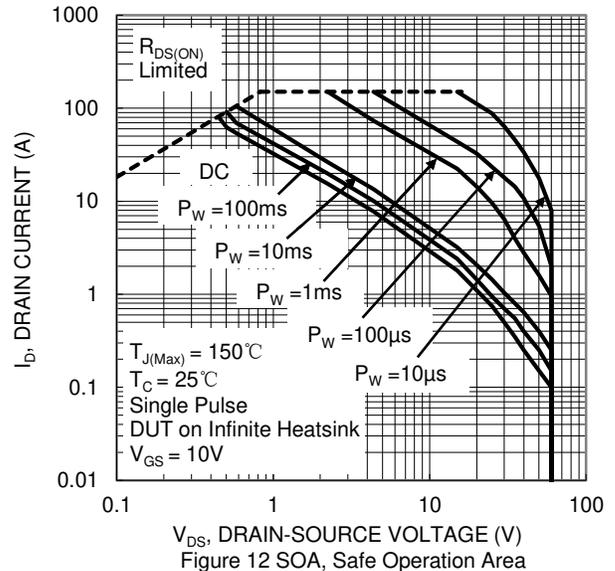


Figure 12 SOA, Safe Operation Area

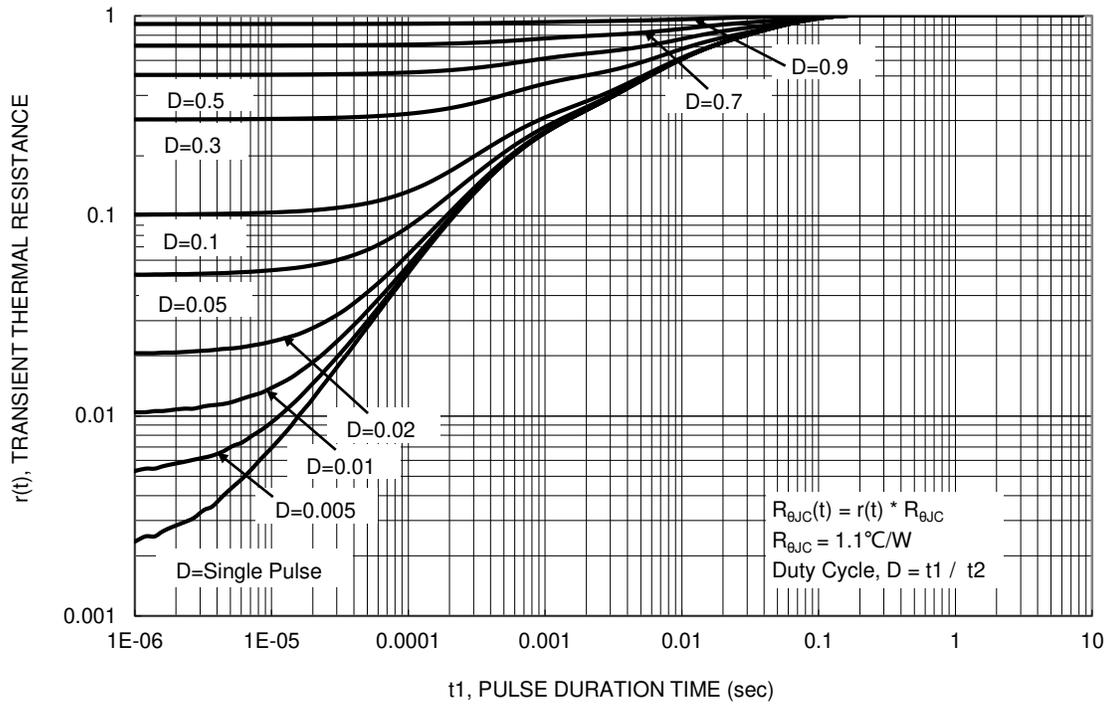
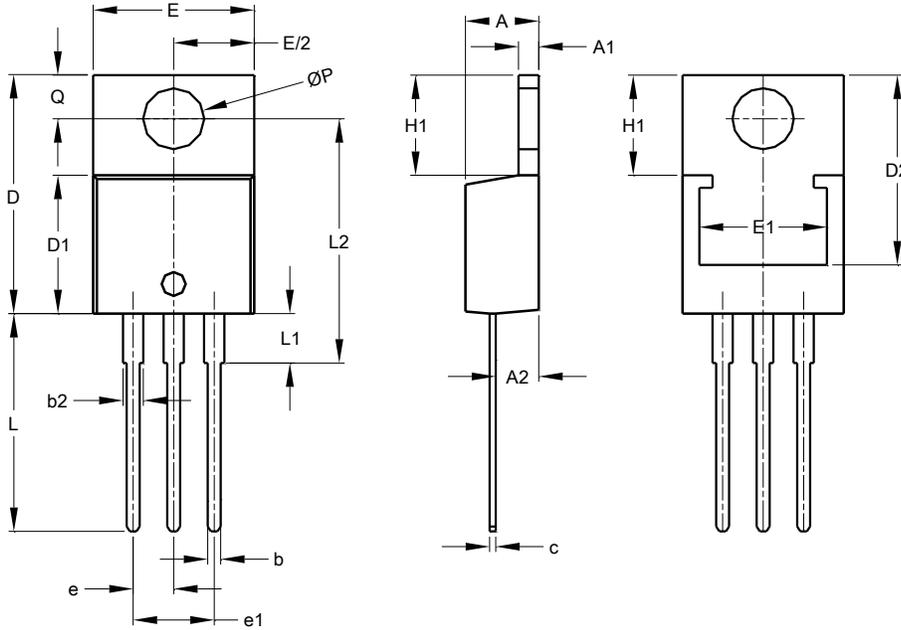


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

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 | - | 4.42 | - |
| L2 | 15.80 | 17.51 | 16.00 |
| P | 3.54 | 4.08 | - |
| Q | 2.54 | 3.42 | - |
| All Dimensions in mm | | | |

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