## Product Summary

| $BV_{DSS}$ | $R_{DS(ON)}$ | $I_D$ $T_C$ = +25°C |
|---|---|---|
| 600V | 0.75Ω @$V_{GS}$ = 10V | 12A |

## Features and Benefits

- Low Input Capacitance
- High $BV_{DSS}$ Rating for Power Application
- 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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us 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.

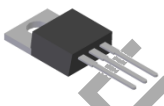
- Motor controls
- Backlighting
- DC-DC converters
- Power management functions

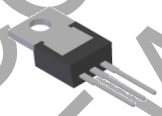
## Mechanical Data

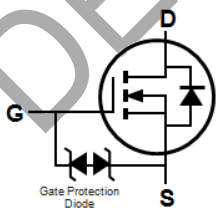
- Package: TO220AB
- Package Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)


ESD PROTECTED

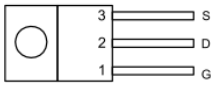
TO220AB (Type TH)


Top View


Bottom View



Equivalent Circuit



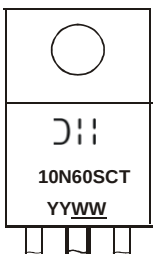
Top View
Pin Out Configuration

## Ordering Information (Note 4)

| Part Number | Package | Packing | |
|---|---|---|---|
| | | Qty. | Carrier |
| DMG10N60SCT | TO220AB (Type TH) | 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




= Manufacturer's Marking
10N60SCT = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 22 = 2022)
WW = Week Code (01 to 53)

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

| Characteristic | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 600 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±30 | V |
| Continuous Drain Current (Note 5) $V_{GS}$ = 10V | Steady State | $T_C$ = +25°C<br>$T_C$ = +100°C | $I_D$ | 12<br>7.9 | A |
| Continuous Drain Current (Note 5) $V_{GS}$ = 10V | Steady State | $T_A$ = +25°C | $I_D$ | 1.5 | A |
| Maximum Body Diode Forward Current (Note 5) | | | $I_S$ | 12 | A |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) | | | $I_{DM}$ | 15 | A |
| Avalanche Current, L = 60mH (Note 6) | | | $I_{AS}$ | 4.3 | A |
| Avalanche Energy, L = 60mH (Note 6) | | | $E_{AS}$ | 550 | mJ |

## Thermal Characteristics

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Total Power Dissipation (Note 5) | $T_C$ = +25°C | $P_D$ | 178 | W |
| | $T_C$ = +100°C | | 71 | |
| Total Power Dissipation (Note 5) | $T_A$ = +25°C | $P_D$ | 2.5 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | | $R_{\theta JA}$ | 49 | °C/W |
| Thermal Resistance, Junction to Case (Note 5) | | $R_{\theta JC}$ | 0.7 | |
| 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 | $BV_{DSS}$ | 600 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250µA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | 1 | µA | $V_{DS}$ = 600V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | 10 | µA | $V_{GS}$ = ±24V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 7)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 2 | 3.2 | 4 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 0.6 | 0.75 | Ω | $V_{GS}$ = 10V, $I_D$ = 5A |
| Diode Forward Voltage | $V_{SD}$ | — | — | 1 | V | $V_{GS}$ = 0V, $I_S$ = 1A |
| **DYNAMIC CHARACTERISTICS (Note 6)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 1587 | — | pF | $V_{DS}$ = 25V, f = 1.0MHz<br>$V_{GS}$ = 0V |
| Output Capacitance | $C_{oss}$ | — | 149 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 10 | — | | |
| Gate Resistance | $R_G$ | — | 1.5 | — | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1.0MHz |
| Total Gate Charge ($V_{GS}$ = 10V) | $Q_g$ | — | 35 | — | nC | $V_{DS}$ = 480V, $I_D$ = 10A<br>$V_{GS}$ = 10V |
| Gate-Source Charge | $Q_{gs}$ | — | 6 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 13 | — | | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 25 | — | ns | $V_{DS}$ = 300V, $R_G$ = 25Ω, $I_D$ = 10A<br>$V_{GS}$ = 10V |
| Turn-On Rise Time | $t_R$ | — | 45 | — | | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 97 | — | | |
| Turn-Off Fall Time | $t_F$ | — | 48 | — | | |
| Body Diode Reverse Recovery Time | $t_{RR}$ | — | 319 | — | ns | $V_{DS}$ = 100V, $I_F$ = 10A<br>dI/dt = 100A/µs |
| Body Diode Reverse Recovery Charge | $Q_{RR}$ | — | 3.5 | — | µC | |

Notes: 5. Device mounted on an infinite heatsink.
6. Guaranteed by design. Not subject to production testing.
7. Short duration pulse test used to minimize self-heating effect.

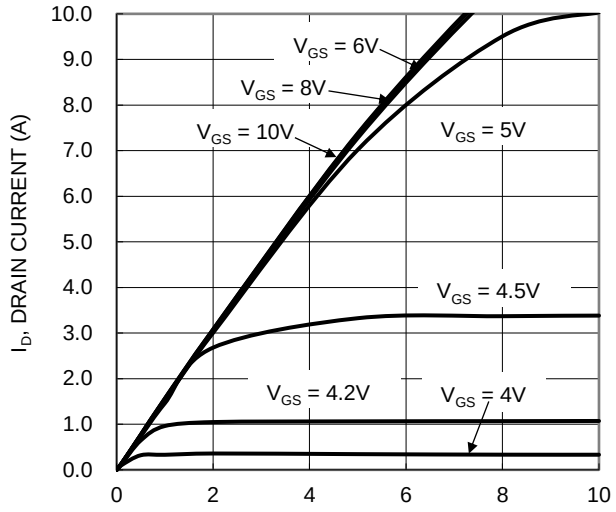



Figure 1. Typical Output Characteristic

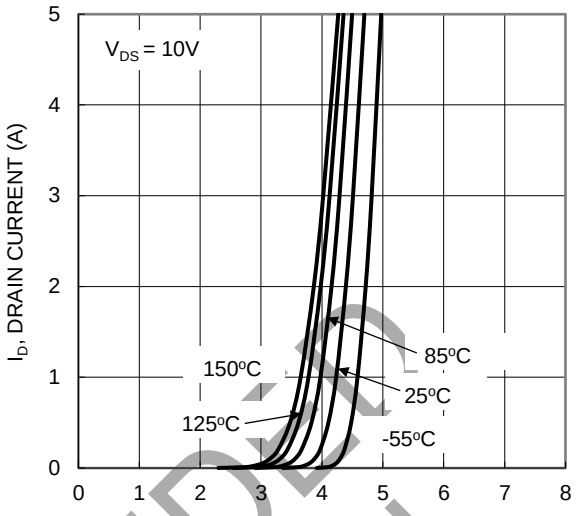



Figure 2. Typical Transfer Characteristic

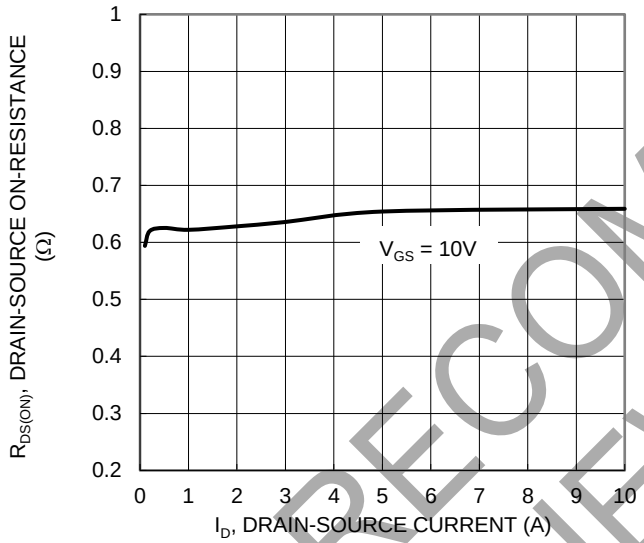



Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

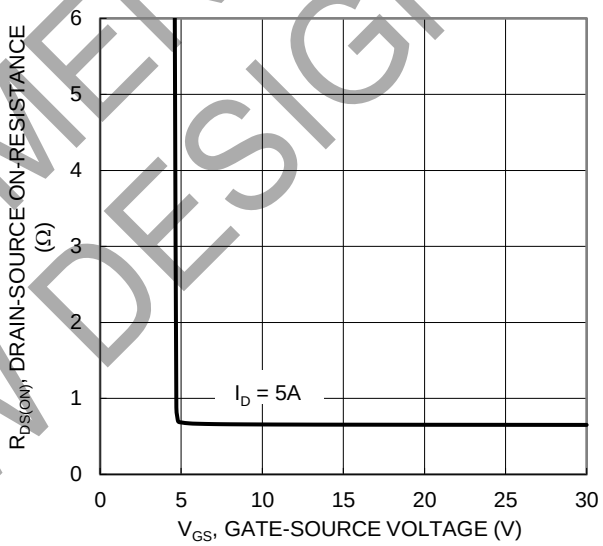



Figure 4. Typical Transfer Characteristic

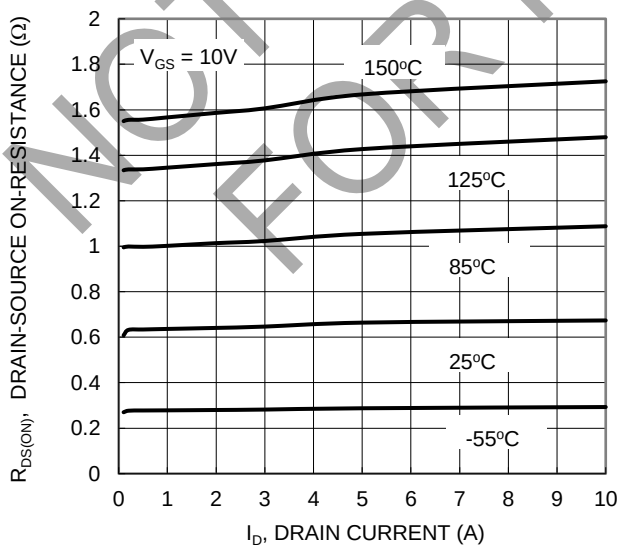



Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

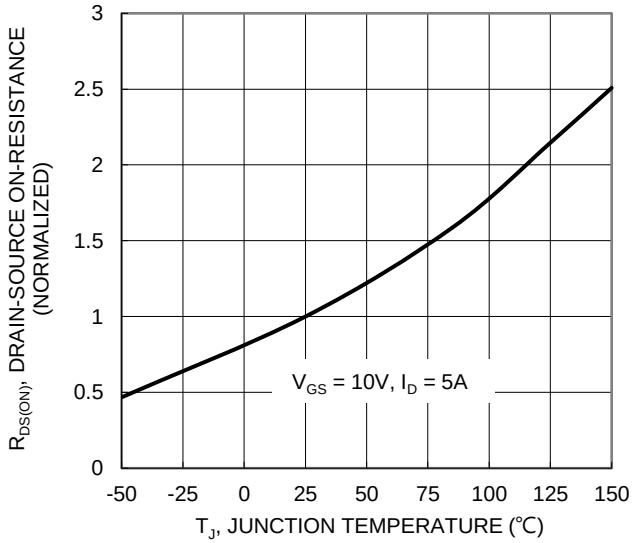



Figure 6. On-Resistance Variation with Junction Temperature

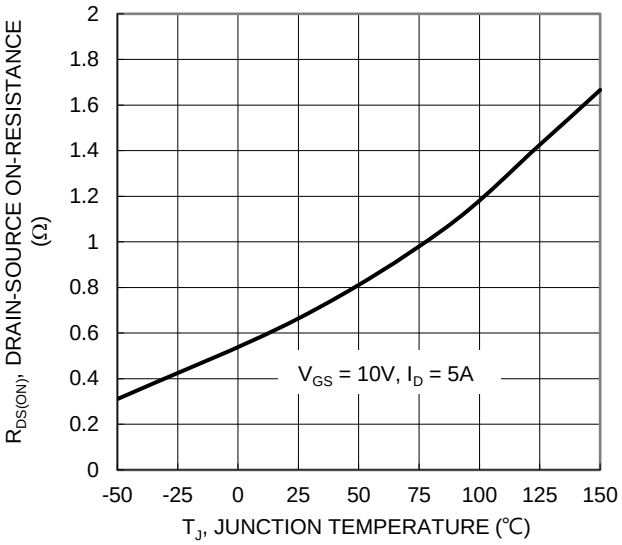



Figure 7. On-Resistance Variation with Junction Temperature

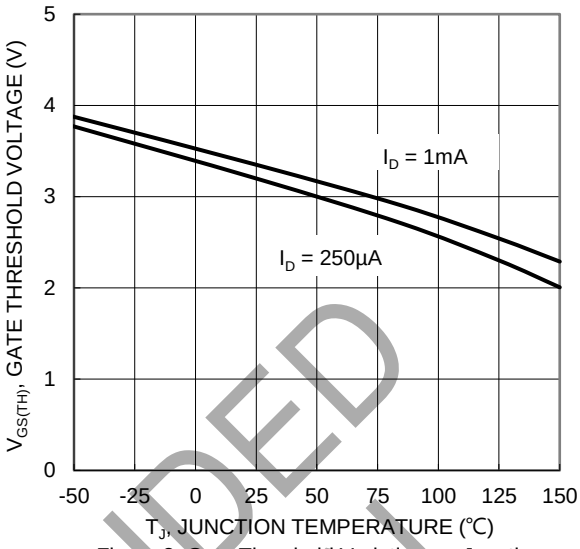



Figure 8. Gate Threshold Variation vs. Junction Temperature

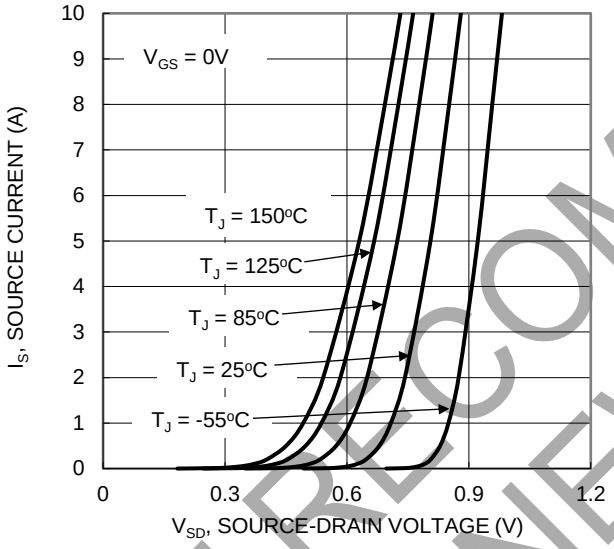



Figure 9. Diode Forward Voltage vs. Current

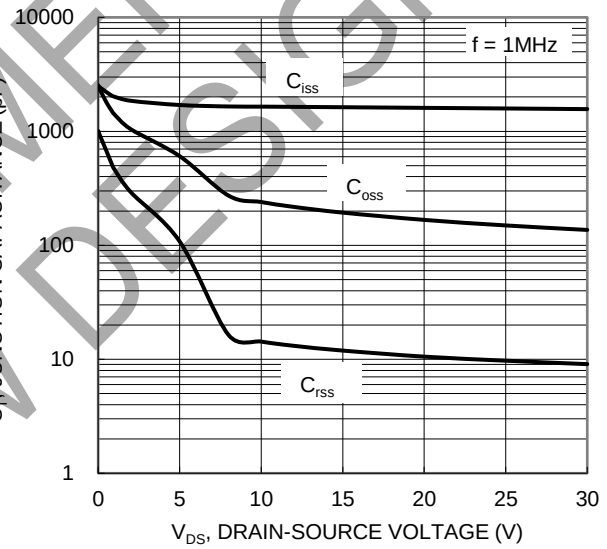



Figure 10. Typical Junction Capacitance

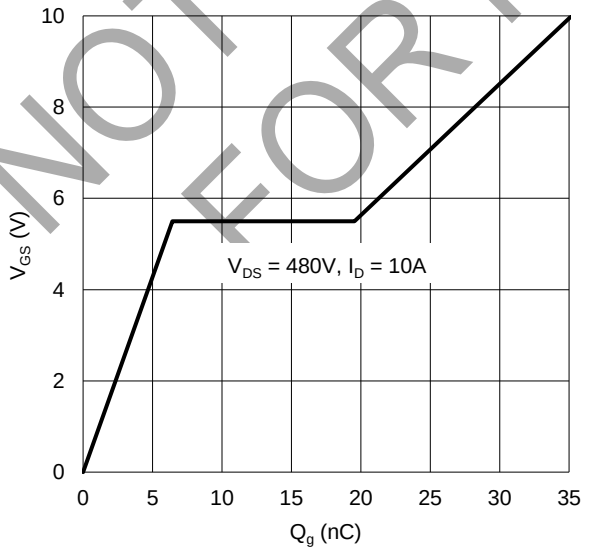



Figure 11. Gate Charge

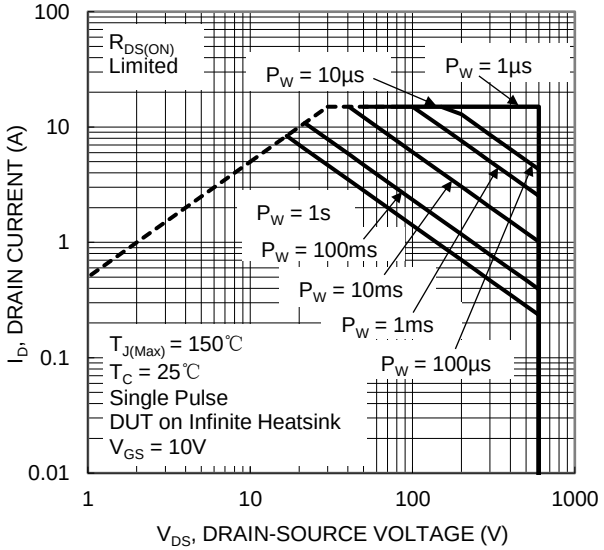
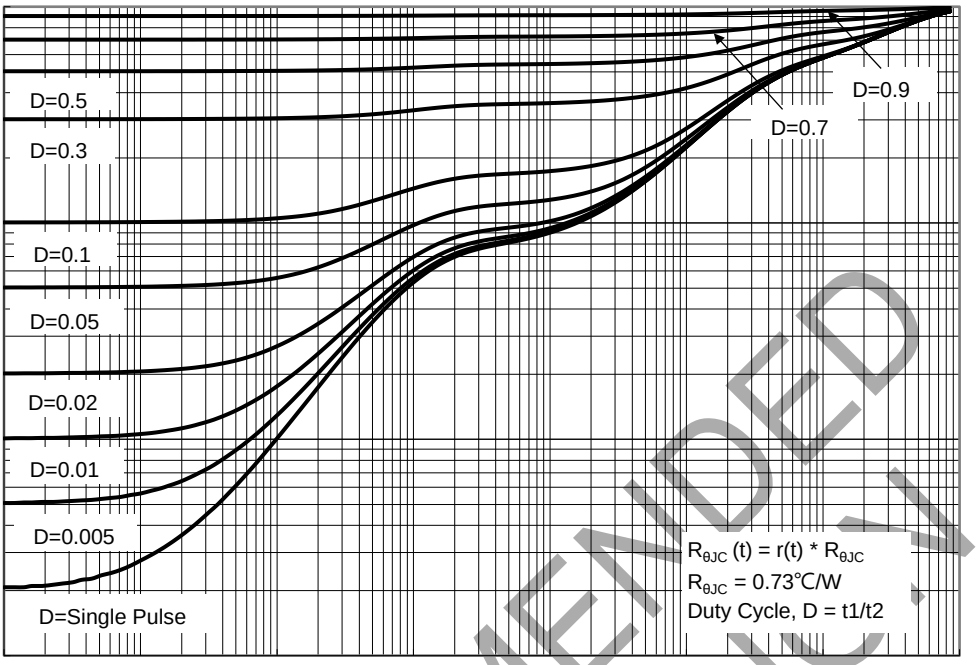


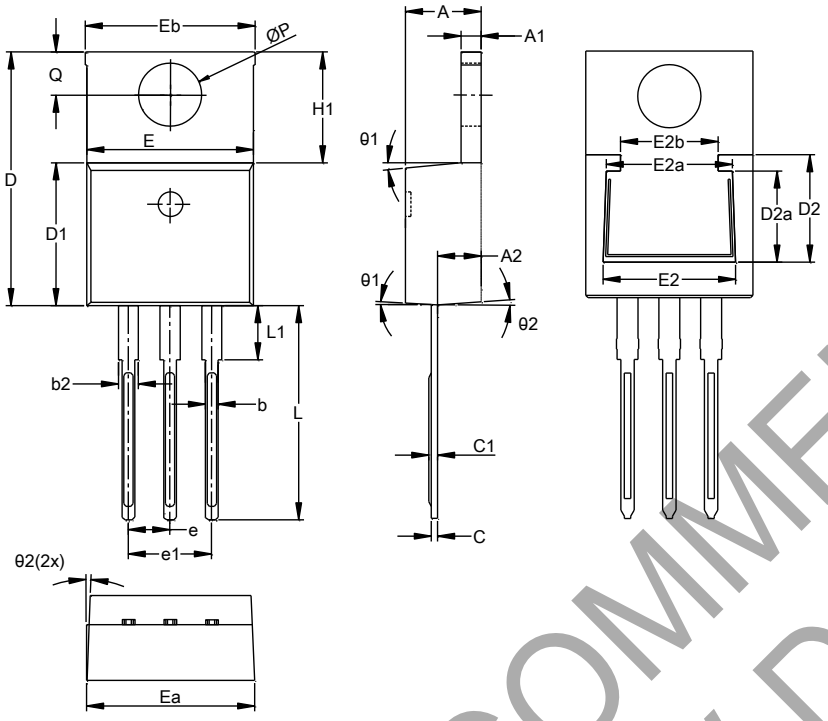

Figure 12. SOA, Safe Operation Area



## Package Outline Dimensions

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

**TO220AB (Type TH)**




| TO220AB (Type TH) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 4.27 | 4.87 | 4.57 |
| **A1** | 1.12 | 1.42 | 1.27 |
| **A2** | 2.39 | 2.99 | 2.69 |
| **b** | 0.70 | 1.01 | 0.81 |
| **b2** | 1.17 | 1.50 | 1.27 |
| **c** | 0.30 | 0.53 | 0.38 |
| **c1** | 0.38 | 0.72 | 0.56 |
| **D** | 14.60 | 15.40 | 15.00 |
| **D1** | 8.40 | 9.00 | 8.70 |
| **D2** | 5.33 | 6.63 | 6.33 |
| **D2a** | 4.54 | 5.84 | 5.54 |
| **e** | 2.54 BSC | | |
| **e1** | 5.08 BSC | | |
| **E** | 9.88 | 10.50 | 10.16 |
| **Ea** | 9.90 | 10.45 | 10.10 |
| **Eb** | 9.90 | 10.65 | 10.25 |
| **E2** | 7.06 | 8.36 | 8.06 |
| **E2a** | 6.67 | 7.97 | 7.67 |
| **E2b** | 4.94 | 6.24 | 5.94 |
| **H1** | 5.70 | 6.65 | 6.30 |
| **L** | 13.00 | 13.80 | 13.40 |
| **L1** | - | 4.10 | 3.75 |
| **Q** | 2.50 | 2.99 | 2.74 |
| **ØP** | 3.70 | 3.99 | 3.84 |
| **θ1** | 4° | 10° | 7° |
| **θ2** | 0° | 6° | 3° |
| **All Dimensions in mm** | | | |

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