

OBSOLETE - PART DISCONTINUED

**Product Summary**

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub>          | Package              | I <sub>D</sub><br>T <sub>c</sub> = +25°C |
|-------------------|------------------------------|----------------------|--|
| 650V              | 1.3Ω @ V <sub>GS</sub> = 10V | TO220AB<br>(Type TH) | 8A                                       |

**Description**

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

**Applications**

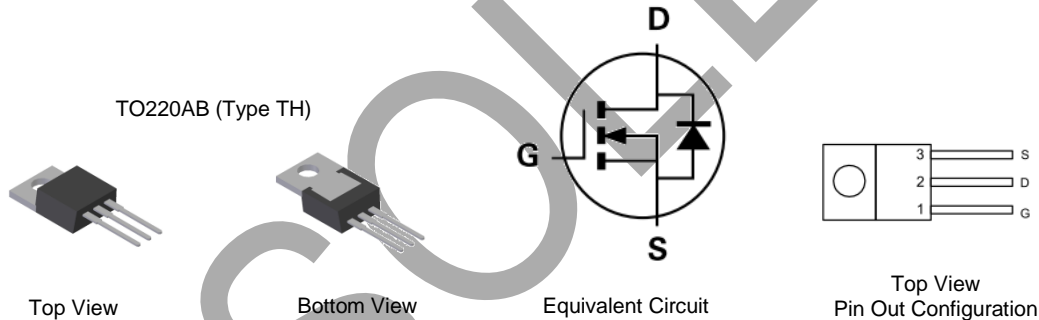
- Motor controls
- Backlighting
- DC-DC converters
- Power management functions

**Features**

- Low Input Capacitance
- High BV<sub>DSS</sub> 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](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**  
<https://www.diodes.com/quality/product-definitions/>

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



**Ordering Information (Note 4)**

| Part Number | Package           | Packing   |         |
|-------------|-------------------|-----------|---------|
|             |                   | Qty.      | Carrier |
| DMG8N65SCT  | 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**



D = Manufacturer's Marking  
 8N65SCT = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Last Two Digits of Year (ex: 22 = 2022)  
 WW or WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                      | Symbol           | Value   | Unit |   |
|---|------------------|---|------|---|
| Drain-Source Voltage                                | V <sub>DSS</sub> | 650   | V    |   |
| Gate-Source Voltage                                 | V <sub>GSS</sub> | ±30   | V    |   |
| Continuous Drain Current V <sub>GS</sub> = 10V      | I <sub>D</sub>   | Steady State                                      | 8.0  | A |
|   |                  | T <sub>C</sub> = +25°C<br>T <sub>C</sub> = +100°C | 3.8  |   |
| Maximum Body Diode Forward Current (Note 5)         | I <sub>S</sub>   | 12  | A    |   |
| Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%) | I <sub>DM</sub>  | 12  | A    |   |
| Avalanche Current, L = 60mH (Note 7)                | I <sub>AS</sub>  | 3.6   | A    |   |
| Avalanche Energy, L = 60mH (Note 7)                 | E <sub>AS</sub>  | 389   | mJ   |   |
| Peak Diode Recovery dV/dt                           | dV/dt            | 5   | V/ns |   |

**Thermal Characteristics**

| Characteristic                                   | Symbol                            | Value                   | Unit |   |
|--|-----------------------------------|-------------------------|------|---|
| Total Power Dissipation                          | P <sub>D</sub>                    | T <sub>C</sub> = +25°C  | 125  | W |
|  |                                   | T <sub>C</sub> = +100°C | 50   |   |
| Thermal Resistance, Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | 54                      | °C/W |   |
| Thermal Resistance, Junction to Case             | R <sub>θJC</sub>                  | 1                       |      |   |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150             | °C   |   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                          | Symbol              | Min | Typ   | Max | Unit | Test Condition   |
|---|---------------------|-----|-------|-----|------|--|
| <b>OFF CHARACTERISTICS (Note 8)</b>     |                     |     |       |     |      |  |
| Drain-Source Breakdown Voltage          | BV <sub>DSS</sub>   | 650 | —     | —   | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA   |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | —   | —     | 1   | µA   | V <sub>DS</sub> = 650V, V <sub>GS</sub> = 0V   |
| Gate-Source Leakage                     | I <sub>GSS</sub>    | —   | —     | 100 | nA   | V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V   |
| <b>ON CHARACTERISTICS (Note 8)</b>      |                     |     |       |     |      |  |
| Gate Threshold Voltage                  | V <sub>GS(TH)</sub> | 2   | 3     | 4   | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                                 |
| Static Drain-Source On-Resistance       | R <sub>DS(ON)</sub> | —   | 0.9   | 1.3 | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 4A   |
| Diode Forward Voltage                   | V <sub>SD</sub>     | —   | 0.87  | 1.5 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 8A  |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b> |                     |     |       |     |      |  |
| Input Capacitance                       | C <sub>iss</sub>    | —   | 1,217 | —   | pF   | V <sub>DS</sub> = 25V, f = 1.0MHz<br>V <sub>GS</sub> = 0V                                  |
| Output Capacitance                      | C <sub>oss</sub>    | —   | 115   | —   |      |  |
| Reverse Transfer Capacitance            | C <sub>rss</sub>    | —   | 12    | —   |      |  |
| Gate Resistance                         | R <sub>G</sub>      | —   | 1.24  | —   | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz                                     |
| Total Gate Charge                       | Q <sub>g</sub>      | —   | 30    | —   | nC   | V <sub>DD</sub> = 520V, I <sub>D</sub> = 8A<br>V <sub>GS</sub> = 10V                       |
| Gate-Source Charge                      | Q <sub>gs</sub>     | —   | 4.8   | —   |      |  |
| Gate-Drain Charge                       | Q <sub>gd</sub>     | —   | 13.3  | —   |      |  |
| Turn-On Delay Time                      | t <sub>D(ON)</sub>  | —   | 23    | —   | ns   | V <sub>DD</sub> = 450V, R <sub>G</sub> = 25Ω, I <sub>D</sub> = 8A<br>V <sub>GS</sub> = 10V |
| Turn-On Rise Time                       | t <sub>r</sub>      | —   | 46    | —   |      |  |
| Turn-Off Delay Time                     | t <sub>D(OFF)</sub> | —   | 115   | —   |      |  |
| Turn-Off Fall Time                      | t <sub>f</sub>      | —   | 52    | —   |      |  |
| Body Diode Reverse Recovery Time        | t <sub>RR</sub>     | —   | 296   | —   | ns   | dI/dt = 100A/µs, V <sub>DS</sub> = 100V  |
| Body Diode Reverse Recovery Charge      | Q <sub>RR</sub>     | —   | 2.7   | —   | µC   | I <sub>F</sub> = 8A  |

- Notes:
- Device mounted on infinite heatsink.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Guaranteed by design. Not subject to production testing.
  - Short duration pulse test used to minimize self-heating effect.

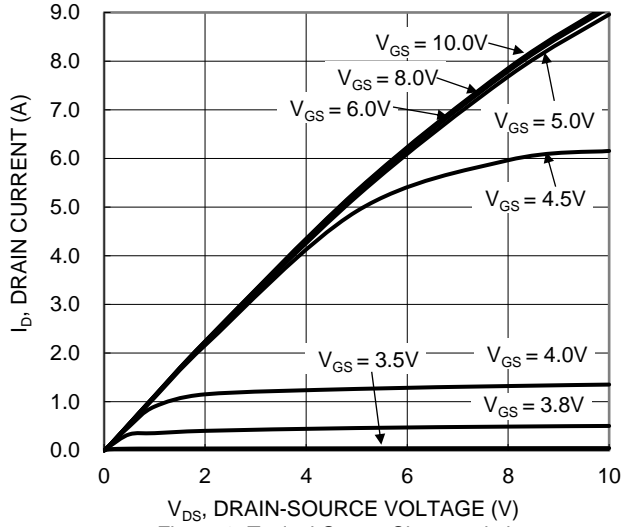


Figure 1. Typical Output Characteristic

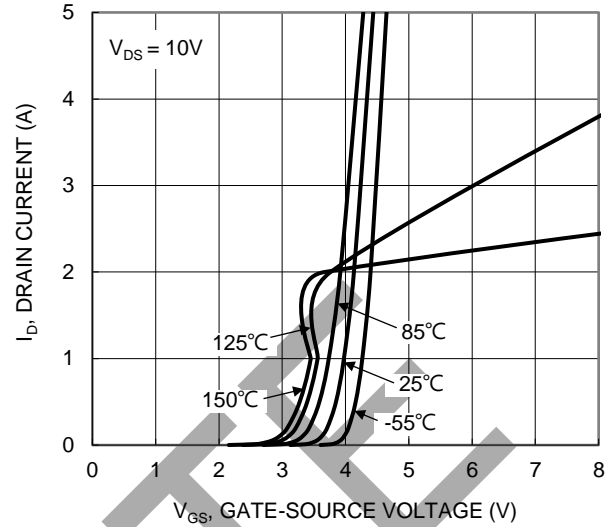


Figure 2. Typical Transfer Characteristic

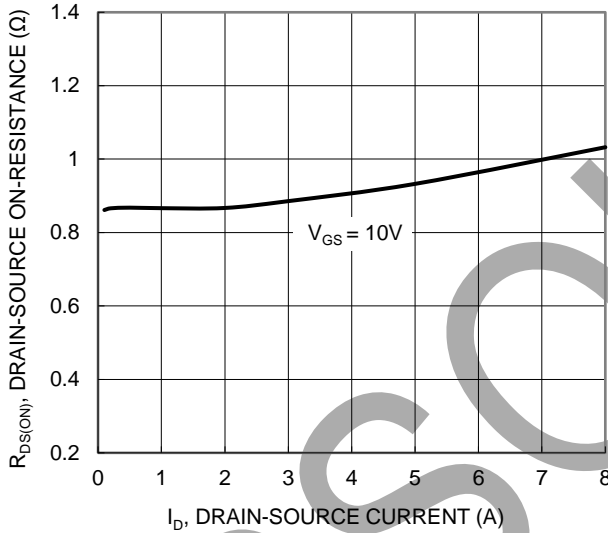


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

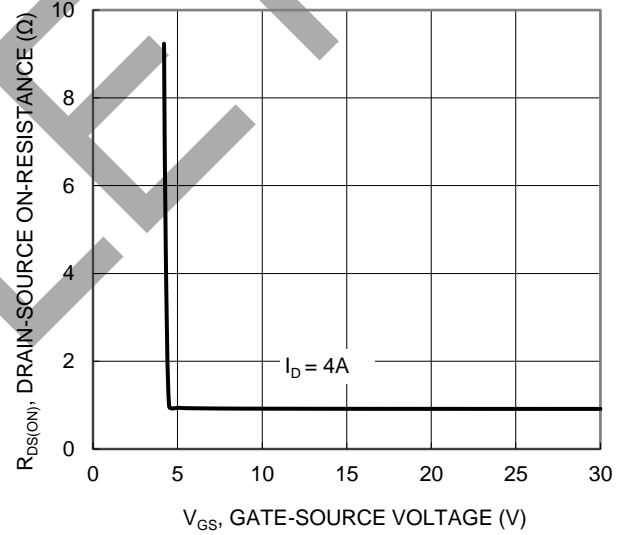


Figure 4. Typical Transfer Characteristic

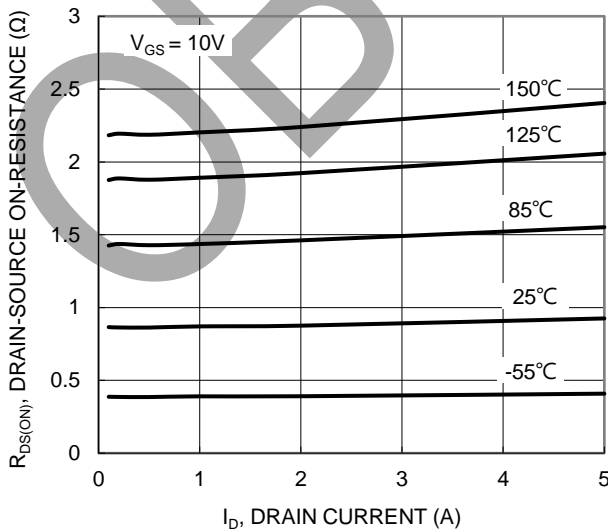


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

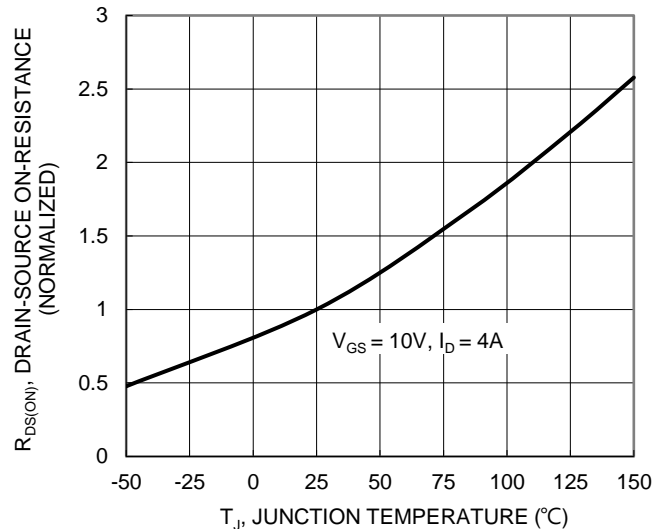
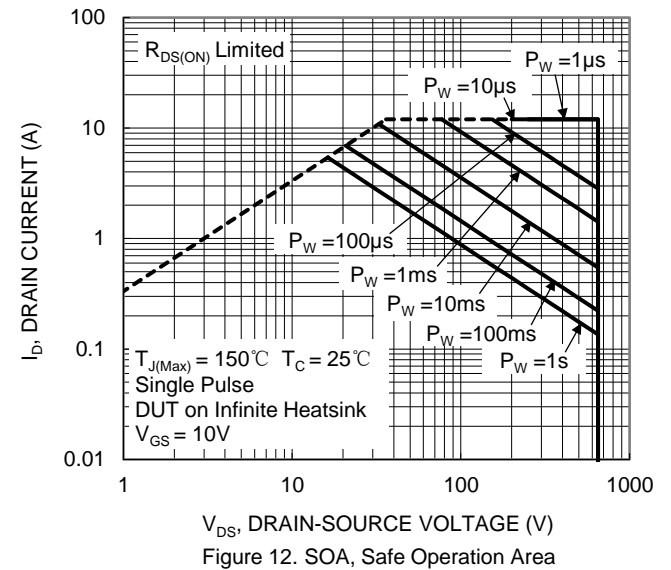
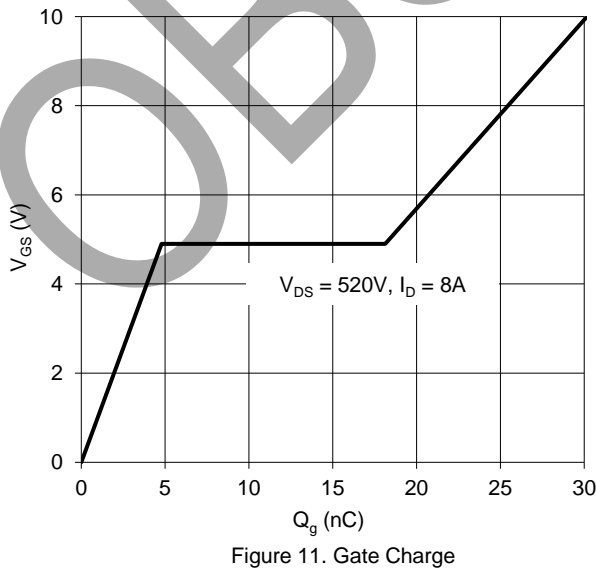
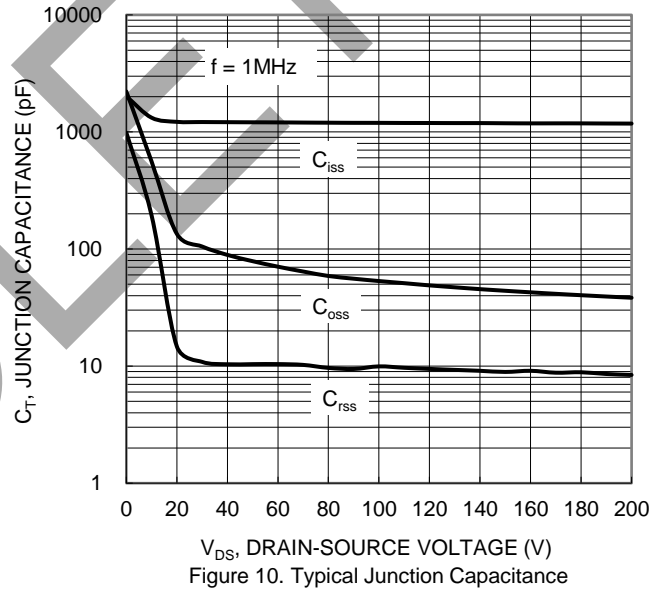
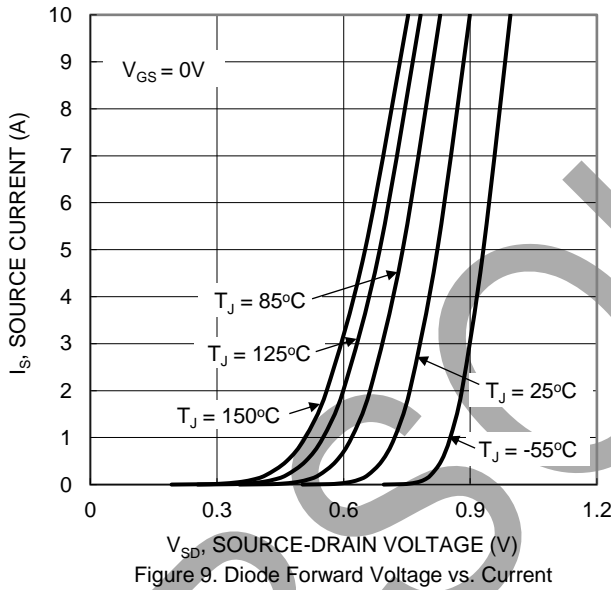
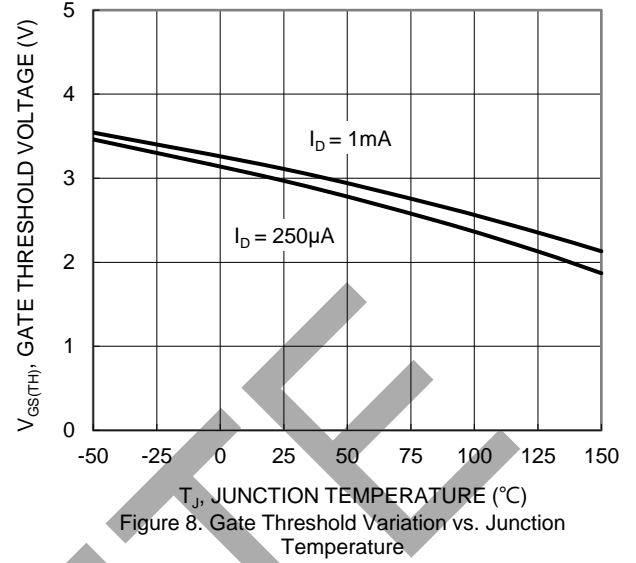
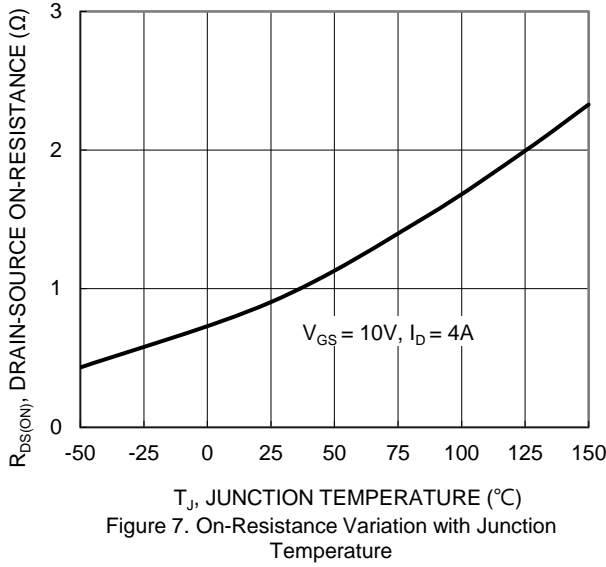


Figure 6. On-Resistance Variation with Junction Temperature



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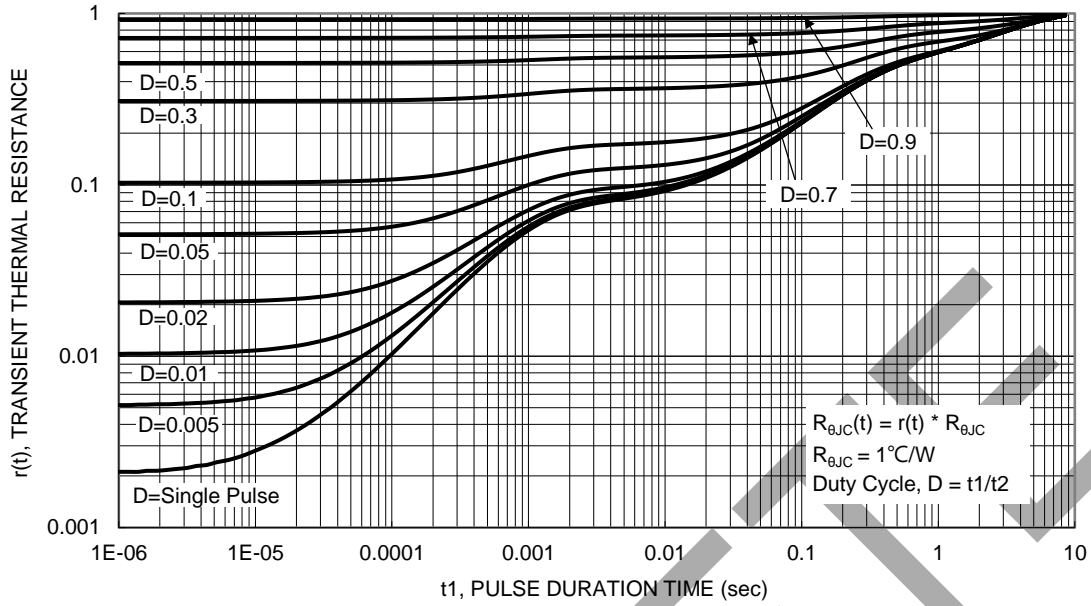


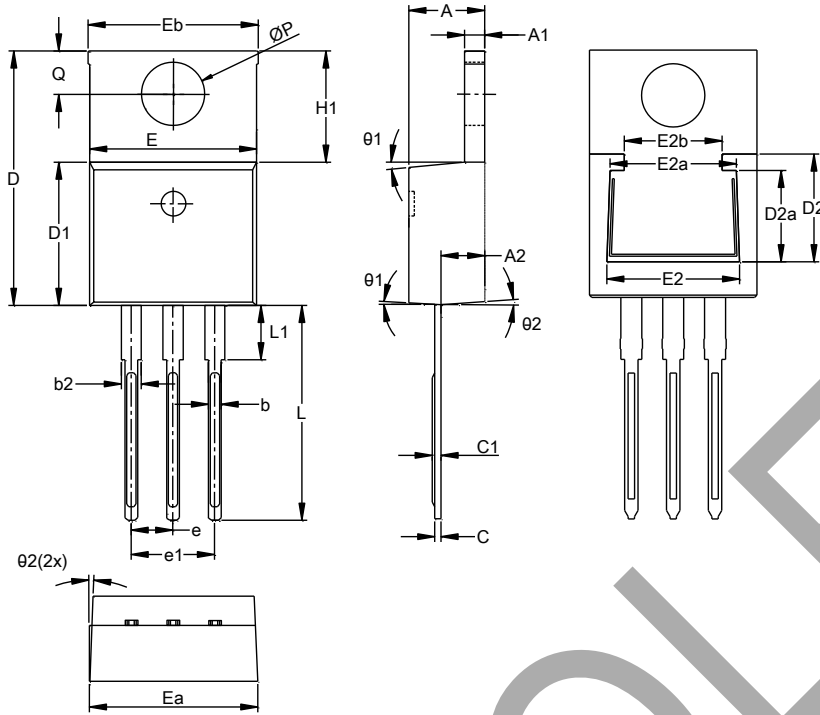
Figure 13. Transient Thermal Resistance

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**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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