



**THE DATASHEET OF  
DMP6110SSS-13**



## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max                        | $I_D$ max<br>$T_A = +25^\circ\text{C}$ |
|---------------|---|--|
| -60V          | 110m $\Omega$ @ $V_{GS} = -10\text{V}$  | -4.5A                                  |
|               | 130m $\Omega$ @ $V_{GS} = -4.5\text{V}$ | -4.2A                                  |

## Description and Applications

This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

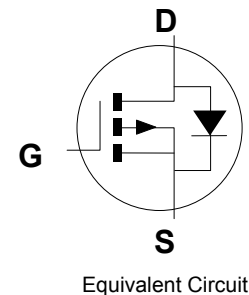
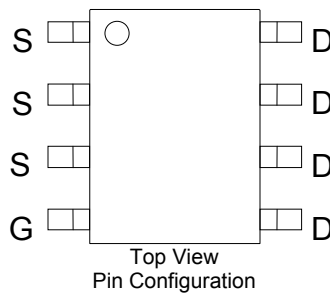
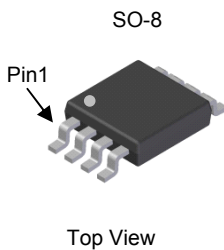
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/ Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 standards for High Reliability**

## Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208  $\text{\textcircled{e3}}$
- Weight: 0.072g (approximate)

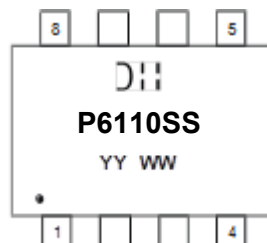
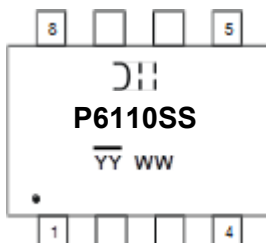


## Ordering Information (Note 4)

| Part Number   | Case | Packaging        |
|---------------|------|------------------|
| DMP6110SSS-13 | SO-8 | 2500/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](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
- P6110SS = Product Type Marking Code
- YYWW = Date Code Marking
- YY or  $\overline{YY}$  = Year (ex: 14 = 2014)
- WW = Week (01 - 53)
- $\overline{YY}$  = Date Code Marking for SAT (Shanghai Assembly/ Test site)
- YY = Date Code Marking for CAT (Chengdu Assembly/ Test site)

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

| Characteristic                                     | Symbol           | Value  | Units |
|--|------------------|--|-------|
| Drain-Source Voltage                               | V <sub>DSS</sub> | -60  | V     |
| Gate-Source Voltage                                | V <sub>GSS</sub> | ±20  | V     |
| Drain Current (Note 6) V <sub>GS</sub> = -10V      | I <sub>D</sub>   | -4.5<br>-3.6                                     | A     |
|  |                  | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C |       |
| Maximum Body Diode Forward Current (Note 6)        | I <sub>S</sub>   | -2.1   | A     |
| Pulsed Drain Current (10μs pulse, duty cycle = 1%) | I <sub>DM</sub>  | -19  | A     |
| Avalanche Current (Notes 7) L = 0.1mH              | I <sub>AS</sub>  | -17.6  | A     |
| Avalanche Energy (Notes 7) L = 0.1mH               | E <sub>AS</sub>  | 15.4   | mJ    |

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

| Characteristic                                   | Symbol                            | Value        | Units |
|--|-----------------------------------|--------------|-------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 1.5          | W     |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | Steady State | 80    |
|  |                                   | t<10s        | 48    |
| Total Power Dissipation (Note 6)                 | P <sub>D</sub>                    | 2.0          | W     |
| Thermal Resistance, Junction to Ambient (Note 6) | R <sub>θJA</sub>                  | Steady State | 61    |
|  |                                   | t<10s        | 37    |
| Thermal Resistance, Junction to Case             | R <sub>θJC</sub>                  | 6.4          | °C/W  |
| 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>   | -60 | —     | —    | 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> = -48V, V <sub>GS</sub> = 0V  |
| Gate-Source Leakage                         | I <sub>GSS</sub>    | —   | —     | 100  | nA   | V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0V  |
| <b>ON CHARACTERISTICS (Note 8)</b>          |                     |     |       |      |      |   |
| Gate Threshold Voltage                      | V <sub>GS(th)</sub> | -1  | —     | -3   | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                 |
| Static Drain-Source On-Resistance           | R <sub>DS(on)</sub> | —   | 86    | 110  | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.5A  |
|   |                     | —   | 98    | 130  |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.5A   |
| Diode Forward Voltage                       | V <sub>SD</sub>     | —   | -0.7  | -1.2 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A  |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>     |                     |     |       |      |      |   |
| Input Capacitance                           | C <sub>ISS</sub>    | —   | 1030  | —    | pF   | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V, f = 1.0MHz                                    |
| Output Capacitance                          | C <sub>OSS</sub>    | —   | 49.1  | —    |      |   |
| Reverse Transfer Capacitance                | C <sub>RSS</sub>    | —   | 38.7  | —    |      |   |
| Gate Resistance                             | R <sub>G</sub>      | —   | 13.6  | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz                                      |
| Total Gate Charge (V <sub>GS</sub> = -4.5V) | Q <sub>g</sub>      | —   | 9.5   | —    | nC   | V <sub>DS</sub> = -30V, I <sub>D</sub> = -5A  |
| Total Gate Charge (V <sub>GS</sub> = -10V)  | Q <sub>g</sub>      | —   | 19.4  | —    |      |   |
| Gate-Source Charge                          | Q <sub>gs</sub>     | —   | 2.3   | —    |      |   |
| Gate-Drain Charge                           | Q <sub>gd</sub>     | —   | 3.6   | —    |      |   |
| Turn-On Delay Time                          | t <sub>D(on)</sub>  | —   | 3.7   | —    | ns   | V <sub>GS</sub> = -10V, V <sub>DS</sub> = -30V, R <sub>GEN</sub> = 6Ω, I <sub>D</sub> = -5A |
| Turn-On Rise Time                           | t <sub>r</sub>      | —   | 6.3   | —    |      |   |
| Turn-Off Delay Time                         | t <sub>D(off)</sub> | —   | 58.7  | —    |      |   |
| Turn-Off Fall Time                          | t <sub>f</sub>      | —   | 26.1  | —    |      |   |
| Body Diode Reverse Recovery Time            | t <sub>rr</sub>     | —   | 14.85 | —    | ns   | I <sub>S</sub> = -5A, di/dt = 100A/μs   |
| Body Diode Reverse Recovery Charge          | Q <sub>rr</sub>     | —   | 8.8   | —    | nC   | I <sub>S</sub> = -5A, di/dt = 100A/μs   |

- Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.  
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.  
7. UIS in production with L = 0.1mH, starting T<sub>A</sub> = +25°C.  
8. Short duration pulse test used to minimize self-heating effect.  
9. Guaranteed by design. Not subject to product testing.

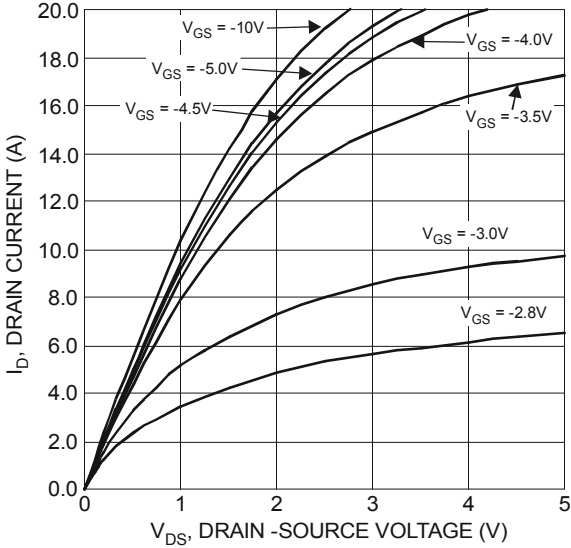


Figure 1 Typical Output Characteristics

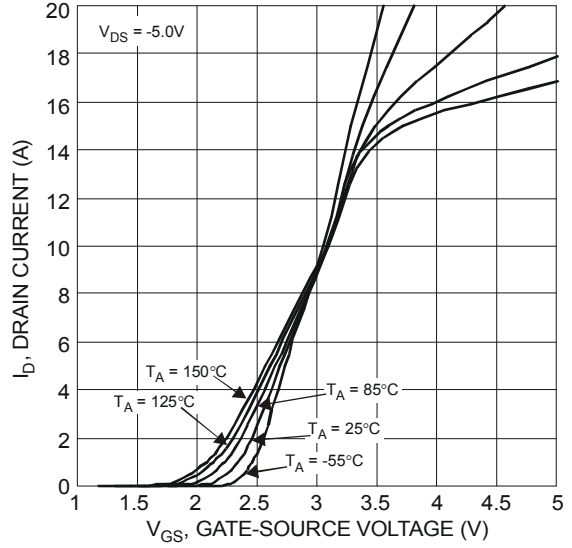


Figure 2 Typical Transfer Characteristics

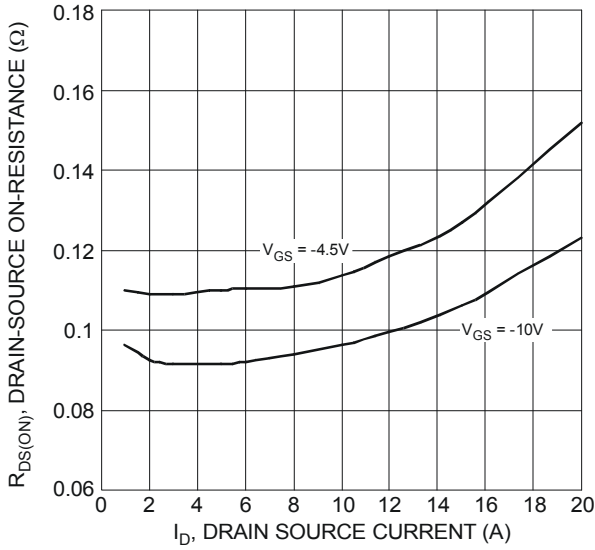


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

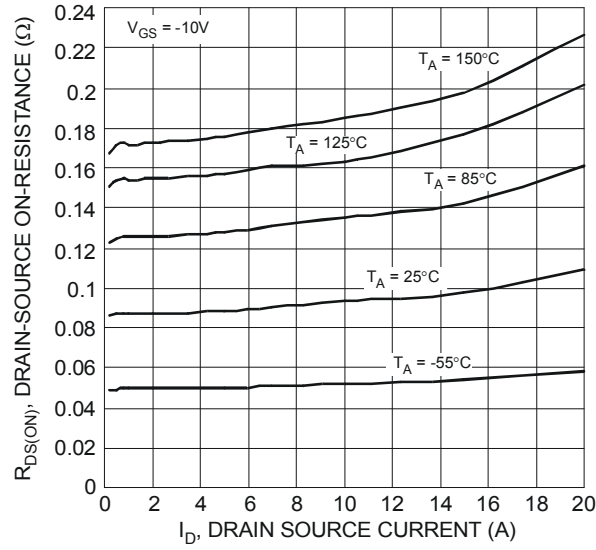


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

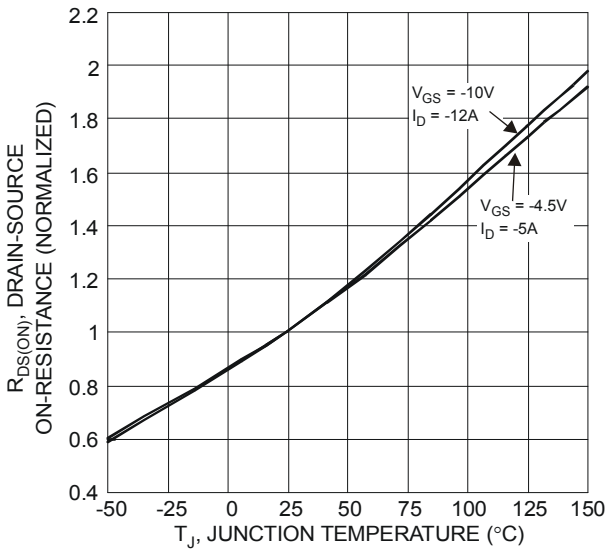


Figure 5 On-Resistance Variation with Temperature

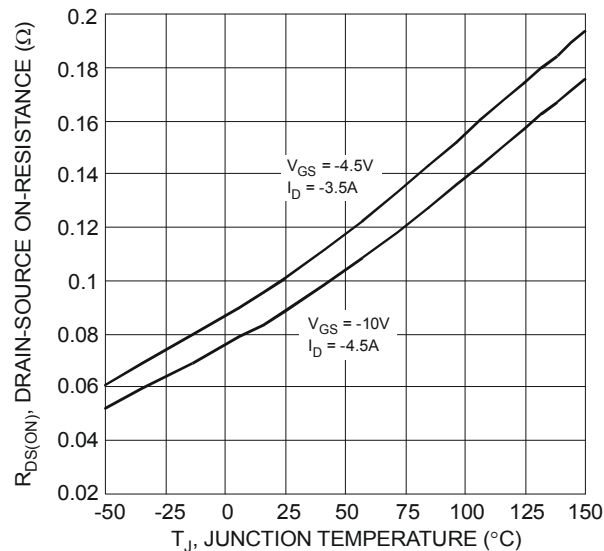


Figure 6 On-Resistance Variation with Temperature

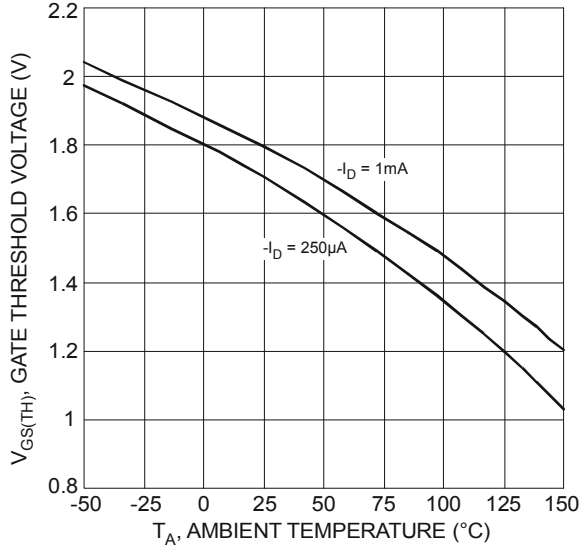


Figure 7 Gate Threshold Variation vs. Ambient Temperature

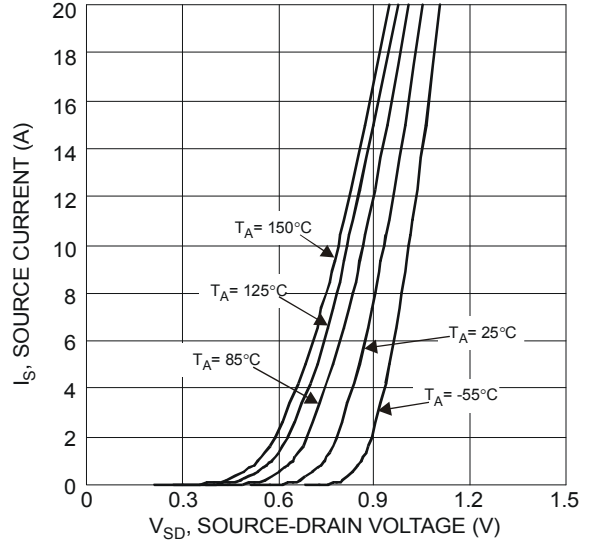


Figure 8 Diode Forward Voltage vs. Current

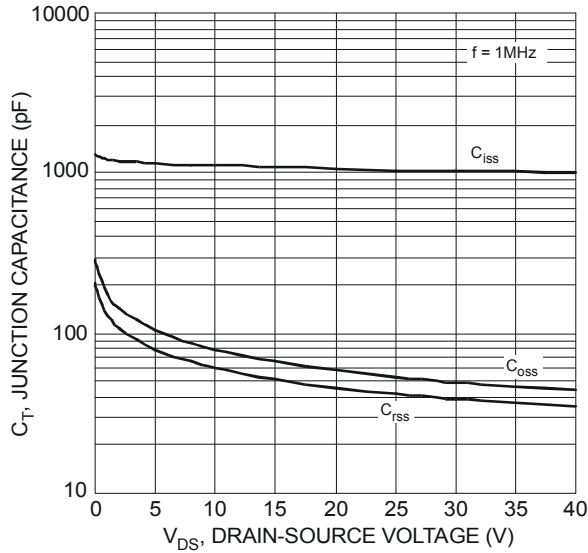


Figure 9 typical Junction Capacitance

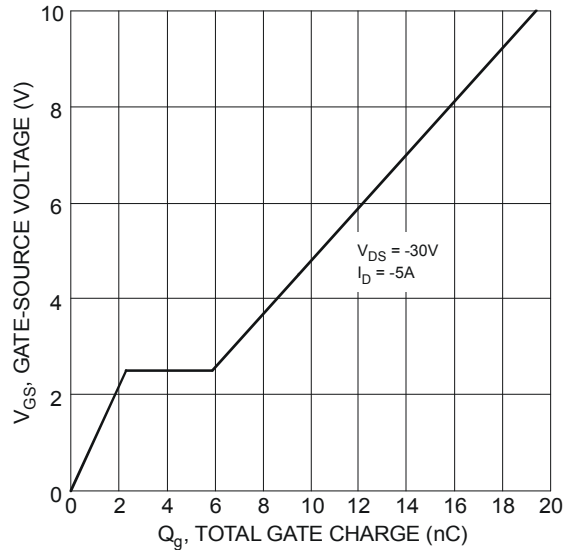


Figure 10 Gate-Charge Characteristics

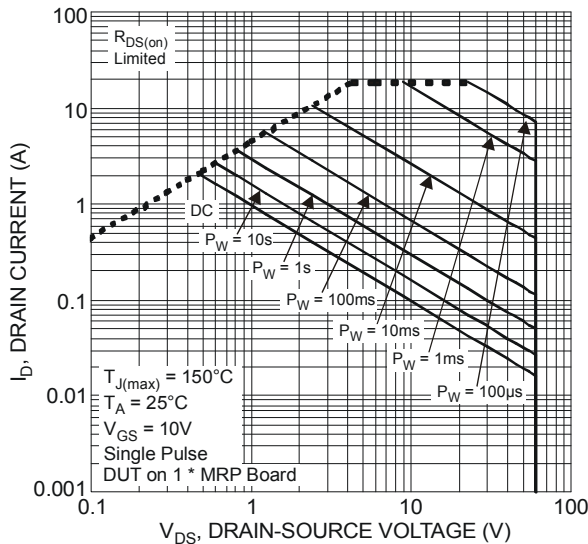


Figure 11 SOA, Safe Operation Area

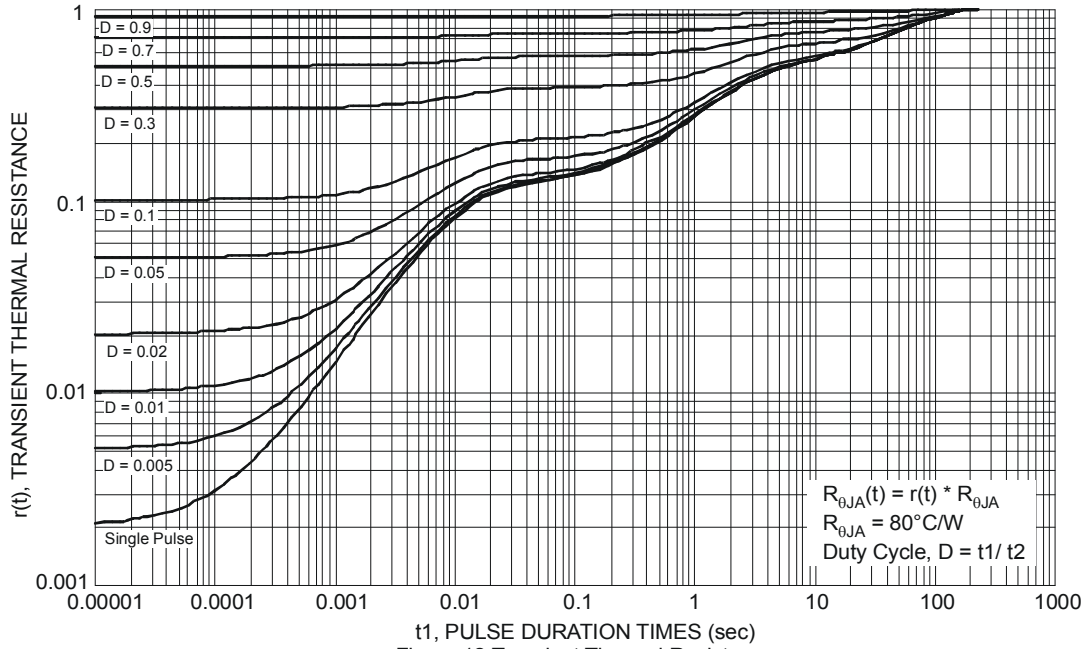
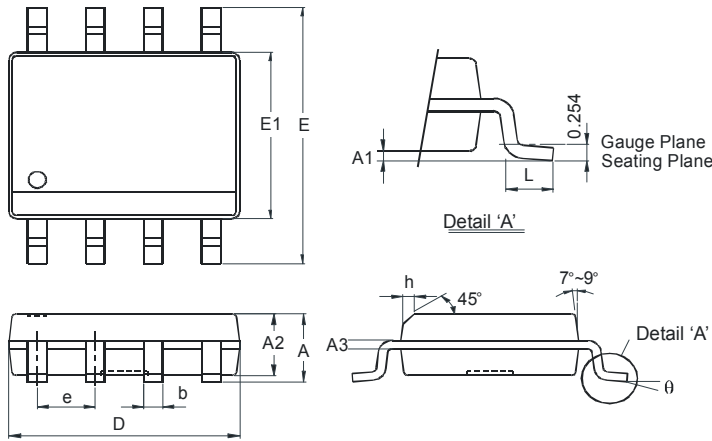


Figure 12 Transient Thermal Resistance

**Package Outline Dimensions**

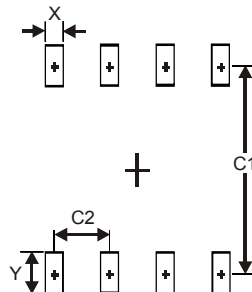
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SO-8                 |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| A                    | -        | 1.75 |
| A1                   | 0.10     | 0.20 |
| A2                   | 1.30     | 1.50 |
| A3                   | 0.15     | 0.25 |
| b                    | 0.3      | 0.5  |
| D                    | 4.85     | 4.95 |
| E                    | 5.90     | 6.10 |
| E1                   | 3.85     | 3.95 |
| e                    | 1.27 Typ |      |
| h                    | -        | 0.35 |
| L                    | 0.62     | 0.82 |
| θ                    | 0°       | 8°   |
| All Dimensions in mm |          |      |

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| X          | 0.60          |
| Y          | 1.55          |
| C1         | 5.4           |
| C2         | 1.27          |

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