

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max         | I <sub>D</sub> Max<br>T <sub>A</sub> = +25°C |
|-------------------|---------------------------------|----------------------------------------------|
| -20V              | 80mΩ @ V <sub>GS</sub> = -4.5V  | -3.7A                                        |
|                   | 110mΩ @ V <sub>GS</sub> = -2.5V | -3.1A                                        |

## Description

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

## Applications

- General Purpose Interfacing Switch
- Power Management Functions

## Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

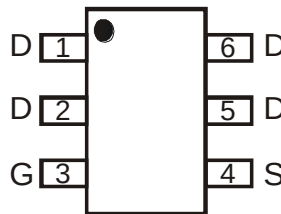
## Mechanical Data

- Case: TSOT26
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—Tin Finish Annealed over Copper Leadframe.  
Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.013 grams (Approximate)

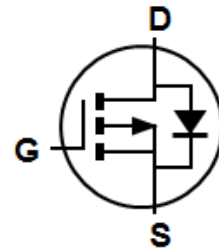
TSOT26



Top View



Top View  
Pin Configuration



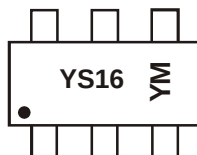
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number   | Case   | Packaging          |
|---------------|--------|--------------------|
| DMP2109UVT-7  | TSOT26 | 3000/Tape & Reel   |
| DMP2109UVT-13 | TSOT26 | 10,000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  - 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.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



YS16 = Product Type Marking Code  
YM = Date Code Marking  
Y or Ȳ = Year (ex: F = 2018)  
M = Month (ex: 9 = September)

### Date Code Key

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|------|------|------|------|------|------|------|------|------|------|
| Code | F    | G    | H    | I    | J    | K    | L    | M    | N    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

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

| Characteristic                                            |              |                        | Symbol           | Value | Unit |
|-----------------------------------------------------------|--------------|------------------------|------------------|-------|------|
| Drain-Source Voltage                                      |              |                        | V <sub>DSS</sub> | -20   | V    |
| Gate-Source Voltage                                       |              |                        | V <sub>GSS</sub> | ±10   | V    |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = -4.5V | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | -3.7  | A    |
|                                                           |              | T <sub>A</sub> = +70°C |                  | -2.9  |      |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = -2.5V | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | -3.1  | A    |
|                                                           |              | T <sub>A</sub> = +70°C |                  | -2.5  |      |
| Maximum Continuous Body Diode Forward Current (Note 6)    |              |                        | I <sub>S</sub>   | -1.2  | A    |
| Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)        |              |                        | I <sub>DM</sub>  | -20   | A    |

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

| Characteristic                                   |              | Symbol                            | Value       | Unit |
|--------------------------------------------------|--------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 |              | P <sub>D</sub>                    | 1.2         | W    |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R <sub>ΘJA</sub>                  | 105         | °C/W |
| Total Power Dissipation (Note 6)                 |              | P <sub>D</sub>                    | 1.0         | W    |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R <sub>ΘJA</sub>                  | 77          | °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 7)</b>                    |                     |       |      |      |      |                                                                                                                       |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>   | -20   | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                                                                         |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C | I <sub>DSS</sub>    | —     | —    | -1.0 | μA   | V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V                                                                          |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | —     | —    | ±100 | nA   | V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V                                                                           |
| <b>ON CHARACTERISTICS (Note 7)</b>                     |                     |       |      |      |      |                                                                                                                       |
| Gate Threshold Voltage                                 | V <sub>GS(TH)</sub> | -0.45 | —    | -1.0 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                                           |
| Static Drain-Source On-Resistance                      | R <sub>DS(ON)</sub> | —     | 54   | 80   | mΩ   | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.8A                                                                       |
|                                                        |                     |       | 70   | 110  |      | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -2.0A                                                                       |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | —     | -0.7 | -1.0 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A                                                                            |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>                |                     |       |      |      |      |                                                                                                                       |
| Input Capacitance                                      | C <sub>iss</sub>    | —     | 443  | —    | pF   | V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                                            |
| Output Capacitance                                     | C <sub>oss</sub>    | —     | 59   | —    | pF   |                                                                                                                       |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | —     | 47   | —    | pF   |                                                                                                                       |
| Gate Resistance                                        | R <sub>G</sub>      | —     | 8.5  | —    | Ω    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1.0MHz                                                                |
| Total Gate Charge                                      | Q <sub>g</sub>      | —     | 6.0  | —    | nC   | V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V, I <sub>D</sub> = -3A                                                 |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | —     | 0.6  | —    | nC   |                                                                                                                       |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | —     | 1.8  | —    | nC   |                                                                                                                       |
| Turn-On Delay Time                                     | t <sub>D(ON)</sub>  | —     | 4.0  | —    | ns   | V <sub>DS</sub> = -10V, V <sub>GS</sub> = -4.5V,<br>R <sub>L</sub> = 10Ω, R <sub>G</sub> = 1.0Ω, I <sub>D</sub> = -1A |
| Turn-On Rise Time                                      | t <sub>r</sub>      | —     | 3.7  | —    | ns   |                                                                                                                       |
| Turn-Off Delay Time                                    | t <sub>D(OFF)</sub> | —     | 24.5 | —    | ns   |                                                                                                                       |
| Turn-Off Fall Time                                     | t <sub>f</sub>      | —     | 9.5  | —    | ns   | I <sub>F</sub> = -1.0A, di/dt = 100A/μs                                                                               |
| Reverse Recovery Time                                  | t <sub>RR</sub>     | —     | 8.3  | —    | ns   |                                                                                                                       |
| Reverse Recovery Charge                                | Q <sub>RR</sub>     | —     | 2.0  | —    | nC   | I <sub>F</sub> = -1.0A, di/dt = 100A/μs                                                                               |

- Notes:
5. Device mounted on FR-4 substrate PCB, 2oz copper, with minimum recommended pad layout.
  6. Device mounted on FR-4 substrate PCB, 2oz copper, with 1inch square copper plate.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.

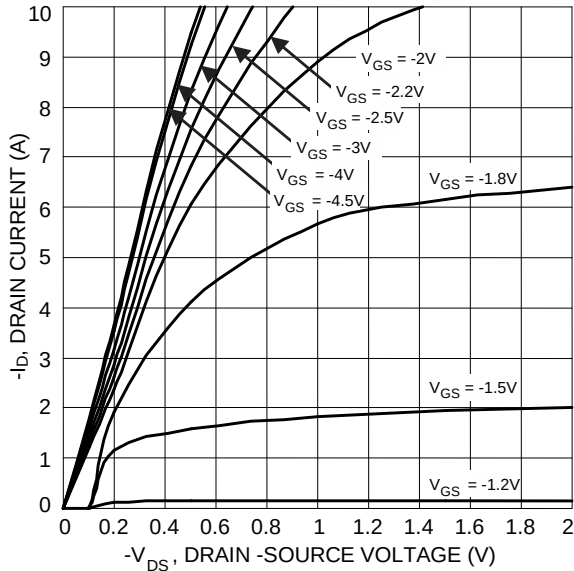


Figure 1 Typical Output Characteristics

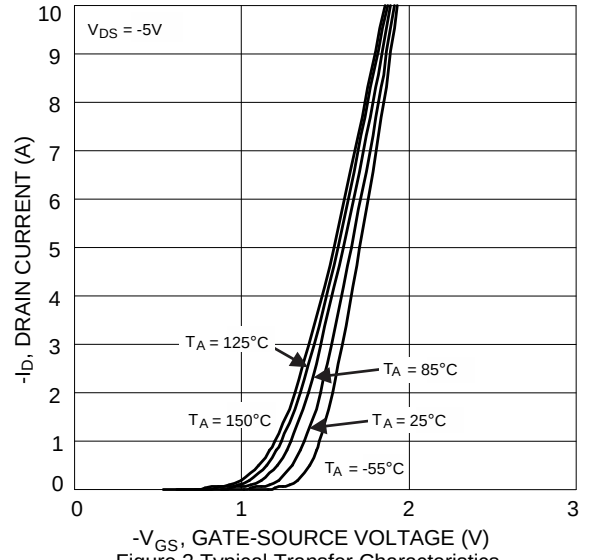


Figure 2 Typical Transfer Characteristics

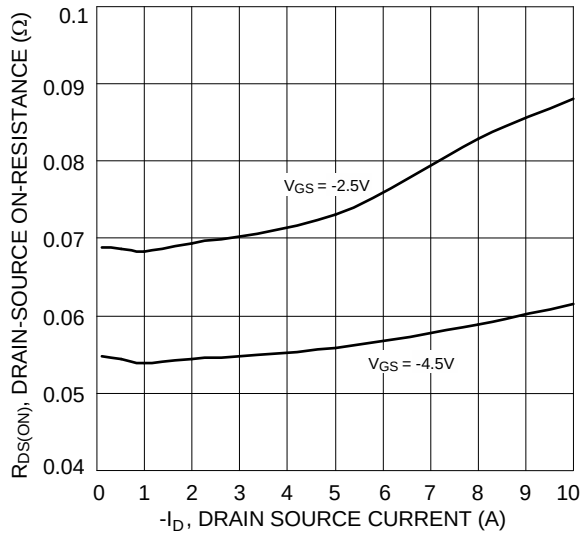


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

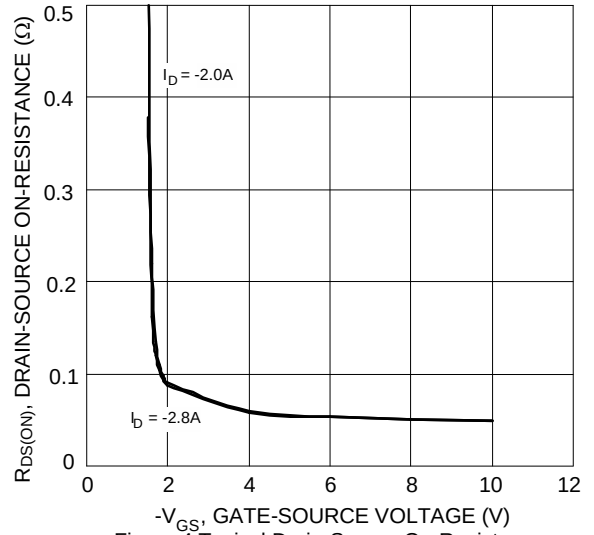


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

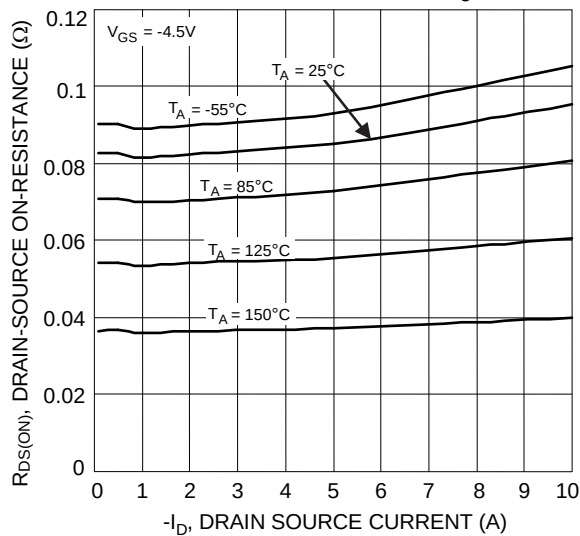


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

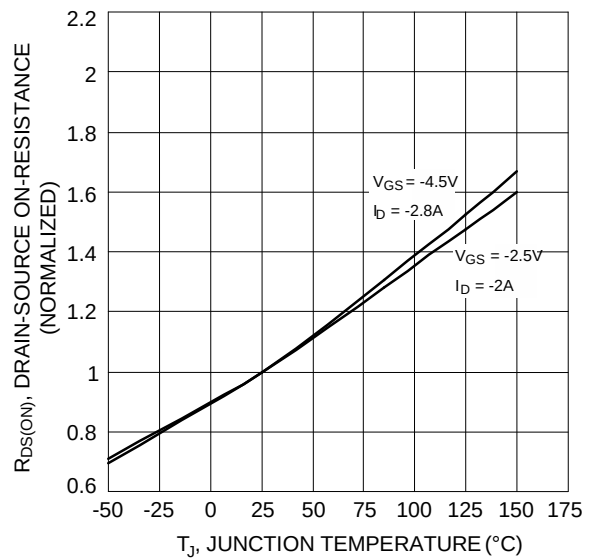
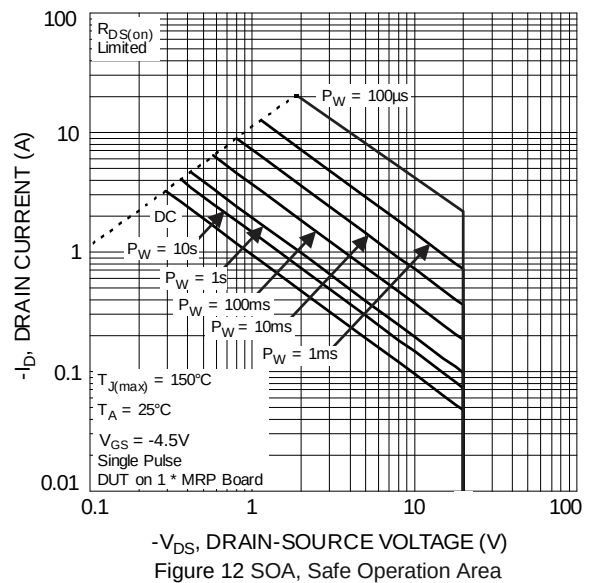
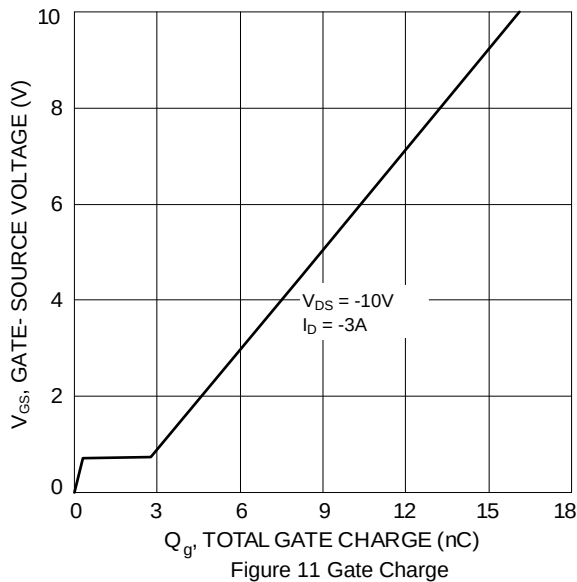
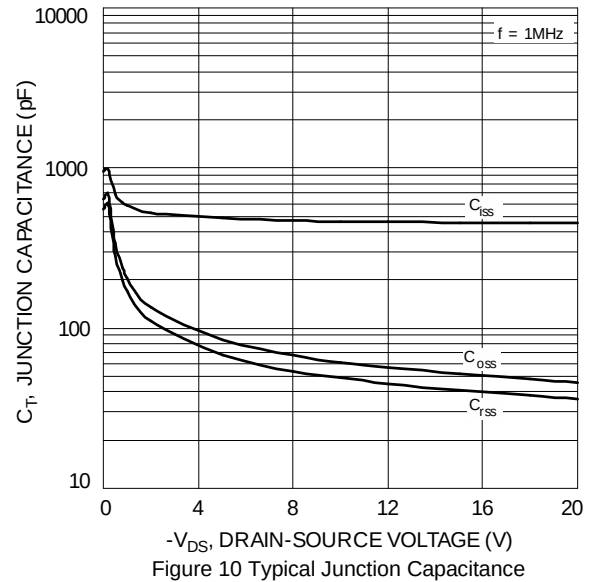
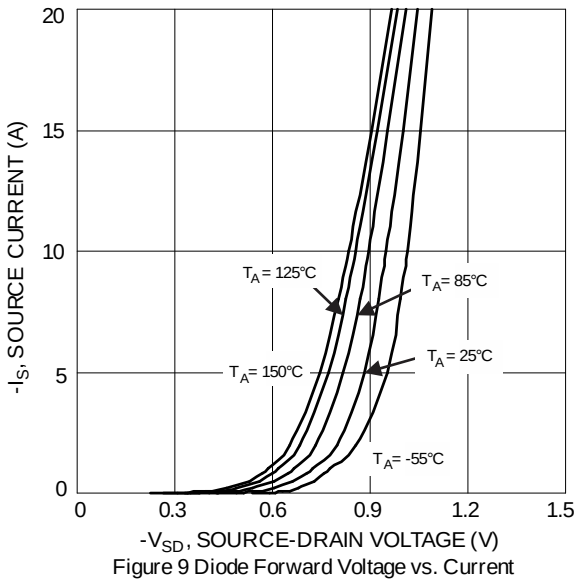
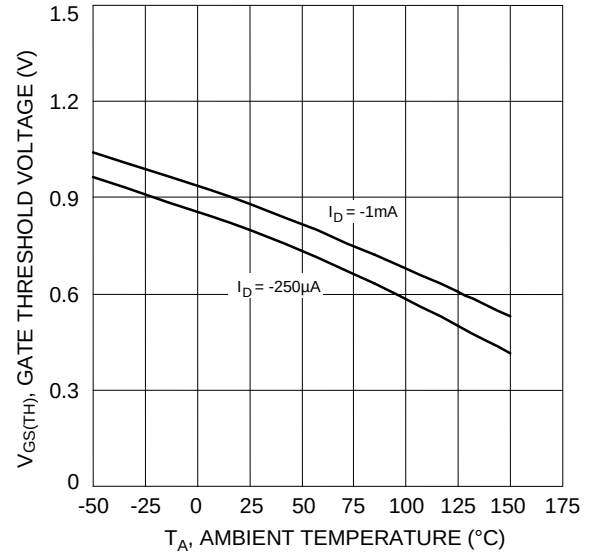
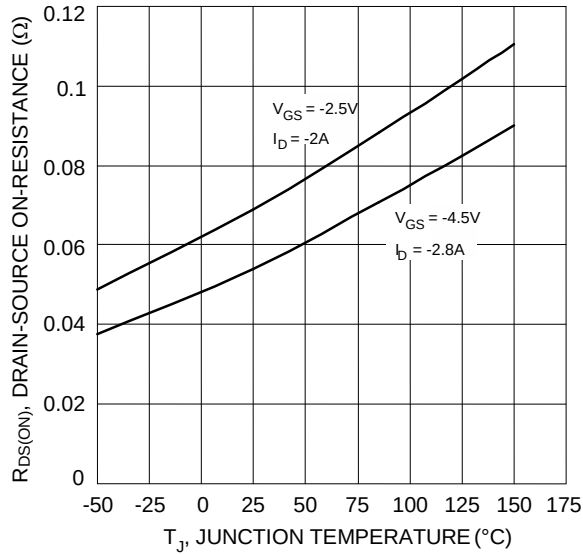


Figure 6 On-Resistance Variation with Temperature



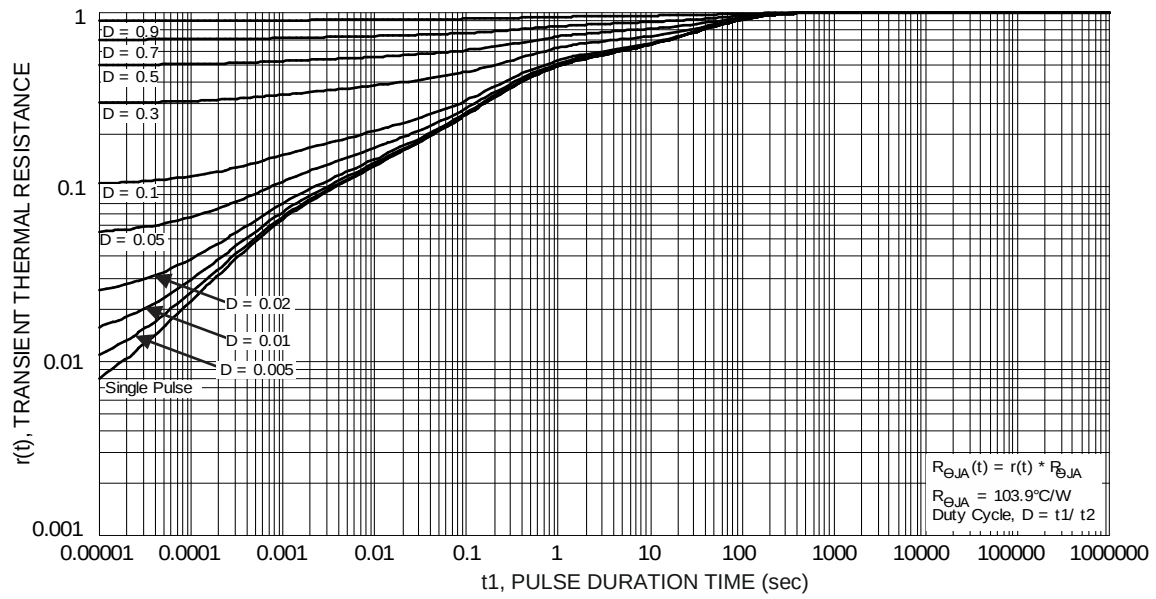
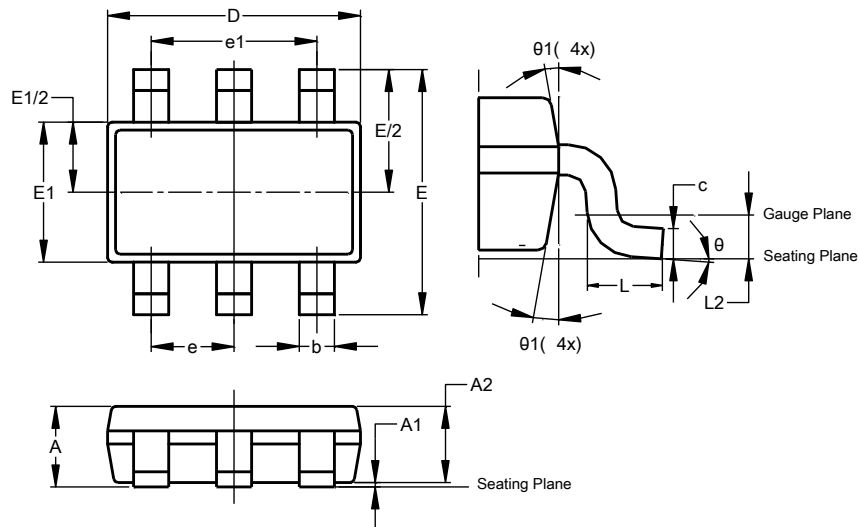


Figure 13 Transient Thermal Resistance

## Package Outline Dimensions

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

**TSOT26**

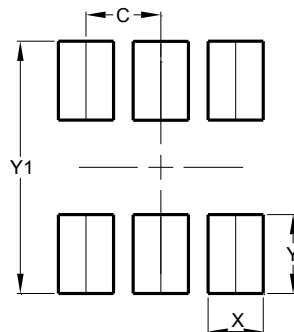


| TSOT26               |           |       |       |
|----------------------|-----------|-------|-------|
| Dim                  | Min       | Max   | Typ   |
| A                    | —         | 1.00  | —     |
| A1                   | 0.010     | 0.100 | —     |
| A2                   | 0.840     | 0.900 | —     |
| D                    | 2.800     | 3.000 | 2.900 |
| E                    | 2.800 BSC |       |       |
| E1                   | 1.500     | 1.700 | 1.600 |
| b                    | 0.300     | 0.450 | —     |
| c                    | 0.120     | 0.200 | —     |
| e                    | 0.950 BSC |       |       |
| e1                   | 1.900 BSC |       |       |
| L                    | 0.30      | 0.50  | —     |
| L2                   | 0.250 BSC |       |       |
| θ                    | 0°        | 8°    | 4°    |
| θ1                   | 4°        | 12°   | —     |
| All Dimensions in mm |           |       |       |

## Suggested Pad Layout

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

**TSOT26**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.950         |
| X          | 0.700         |
| Y          | 1.000         |
| Y1         | 3.199         |

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