

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON) MAX}$               | $I_D$<br>$T_A = +25^\circ C$ |
|---------------|--------------------------------|------------------------------|
| 12V           | 10m $\Omega$ @ $V_{GS} = 4.5V$ | 10.7A                        |
|               | 12m $\Omega$ @ $V_{GS} = 2.5V$ | 9.8A                         |
|               | 14m $\Omega$ @ $V_{GS} = 1.8V$ | 9.1A                         |
|               | 18m $\Omega$ @ $V_{GS} = 1.5V$ | 8.0A                         |
|               | 41m $\Omega$ @ $V_{GS} = 1.2V$ | 5.3A                         |

## Description

This new generation 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.

## Applications

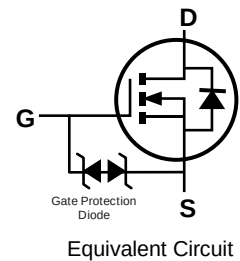
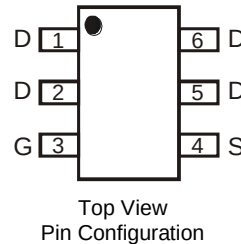
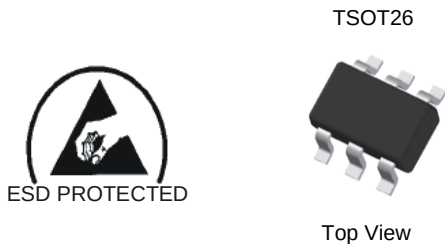
- Load Switch
- DC-DC Converters
- Power Management Functions

## Features

- Low On-Resistance
- ESD Protected Gate
- **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. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Solderable per MIL-STD-202, Method 208 
- Terminal Connections: See Diagram
- Weight: 0.008 grams (Approximate)

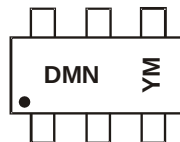


## Ordering Information (Note 4)

| Part Number   | Case   | Packaging          |
|---------------|--------|--------------------|
| DMN1019UVT-7  | TSOT26 | 3,000/Tape & Reel  |
| DMN1019UVT-13 | TSOT26 | 10,000/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



DMN = Product Type Marking Code  
YM or YM = Date Code Marking  
Y or Y = Year (ex: C = 2015)  
M = Month (ex: 9 = September)

### Date Code Key

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|------|------|------|------|------|------|------|------|------|
| Code | C    | D    | E    | F    | G    | H    | I    | J    |

| 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        | Units |
|----------------------------------------------------------|--------------|--------------------------------------------------|------------------|--------------|-------|
| Drain-Source Voltage                                     |              |                                                  | V <sub>DSS</sub> | 12           | V     |
| Gate-Source Voltage                                      |              |                                                  | V <sub>GSS</sub> | ±8           | V     |
| Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 10.7<br>8.6  | A     |
|                                                          | t < 10s      | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 12.7<br>10.1 | A     |
| Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)       |              |                                                  | I <sub>DM</sub>  | 70           | A     |
| Maximum Body Diode Forward Current (Note 5)              |              |                                                  | I <sub>S</sub>   | 2            | A     |
| Avalanche Current (Note 6) L = 0.1mH                     |              |                                                  | I <sub>AS</sub>  | 9.7          | A     |
| Avalanche Energy (Note 6) L = 0.1mH                      |              |                                                  | E <sub>AS</sub>  | 4.7          | mJ    |

**Thermal Characteristics**

| Characteristic                                   |                        | Symbol                            | Value       | Units |
|--------------------------------------------------|------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 1.73        | W     |
|                                                  | T <sub>A</sub> = +70°C |                                   | 1.11        |       |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State           | R <sub>θJA</sub>                  | 72.2        | °C/W  |
|                                                  | t < 10s                |                                   | 37.5        |       |
| Thermal Resistance, Junction to Case (Note 5)    |                        | R <sub>θJC</sub>                  | 14.4        | °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 7)</b>        |                     |      |       |     |      |                                                                                                                  |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 12   | —     | —   | 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> = 12V, V <sub>GS</sub> = 0V                                                                      |
| Gate-Body Leakage                          | I <sub>GSS</sub>    | —    | —     | ±2  | μA   | V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V                                                                      |
| <b>ON CHARACTERISTICS (Note 7)</b>         |                     |      |       |     |      |                                                                                                                  |
| Gate Threshold Voltage                     | V <sub>GS(TH)</sub> | 0.35 | 0.53  | 0.8 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                                       |
| Static Drain-Source On-Resistance          | R <sub>DS(ON)</sub> | —    | 7     | 10  | mΩ   | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 9.7A                                                                    |
|                                            |                     | —    | 8     | 12  |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 9A                                                                      |
|                                            |                     | —    | 10    | 14  |      | V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 8.1A                                                                    |
|                                            |                     | —    | 14    | 18  |      | V <sub>GS</sub> = 1.5V, I <sub>D</sub> = 4.5A                                                                    |
|                                            |                     | —    | 28    | 41  |      | V <sub>GS</sub> = 1.2V, I <sub>D</sub> = 2.4A                                                                    |
| Diode Forward Voltage                      | V <sub>SD</sub>     | —    | 0.8   | 1.2 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 10A                                                                       |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>    |                     |      |       |     |      |                                                                                                                  |
| Input Capacitance                          | C <sub>ISS</sub>    | —    | 2588  | —   | pF   | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V,<br>f = 1MHz                                                         |
| Output Capacitance                         | C <sub>OSS</sub>    | —    | 415   | —   | pF   |                                                                                                                  |
| Reverse Transfer Capacitance               | C <sub>RSS</sub>    | —    | 394   | —   | pF   |                                                                                                                  |
| Gate Resistance                            | R <sub>g</sub>      | —    | 1.1   | —   | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                                             |
| Total Gate Charge (V <sub>GS</sub> = 8V)   | Q <sub>g</sub>      | —    | 50.4  | —   | nC   | V <sub>DS</sub> = 4V, I <sub>D</sub> = 10A                                                                       |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | —    | 28.0  | —   |      |                                                                                                                  |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —    | 3.2   | —   |      |                                                                                                                  |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —    | 5.6   | —   |      |                                                                                                                  |
| Turn-On Delay Time                         | t <sub>D(ON)</sub>  | —    | 4.7   | —   | ns   | V <sub>DD</sub> = 4V, V <sub>GEN</sub> = 5V, I <sub>D</sub> = 10A,<br>R <sub>G</sub> = 1Ω, R <sub>L</sub> = 0.4Ω |
| Turn-Off Delay Time                        | t <sub>D(OFF)</sub> | —    | 32.2  | —   | ns   |                                                                                                                  |
| Turn-On Rise Time                          | t <sub>R</sub>      | —    | 3.7   | —   | ns   |                                                                                                                  |
| Turn-Off Fall Time                         | t <sub>F</sub>      | —    | 11.6  | —   | ns   |                                                                                                                  |
| Body Diode Reverse Recovery Time           | t <sub>RR</sub>     | —    | 20.55 | —   | ns   | I <sub>F</sub> = 10A, di/dt = 100A/μs                                                                            |
| Body Diode Reverse Recovery Charge         | Q <sub>rr</sub>     | —    | 4.5   | —   | nC   | I <sub>F</sub> = 10A, di/dt = 100A/μs                                                                            |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad.
  - I<sub>AS</sub> and E<sub>AS</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

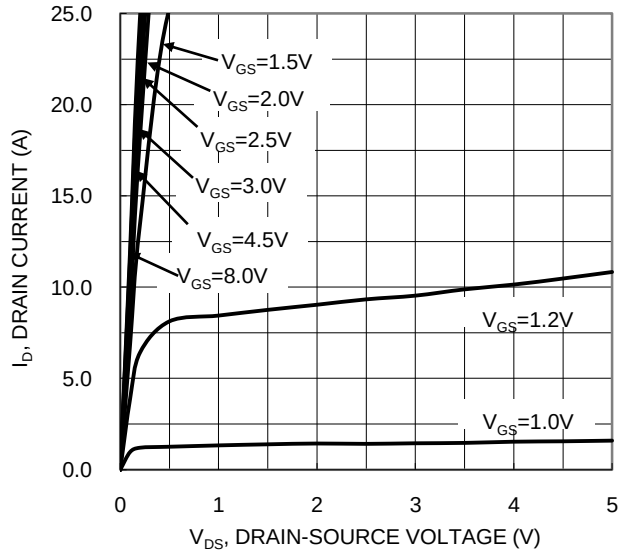


Figure 1 Typical Output Characteristic

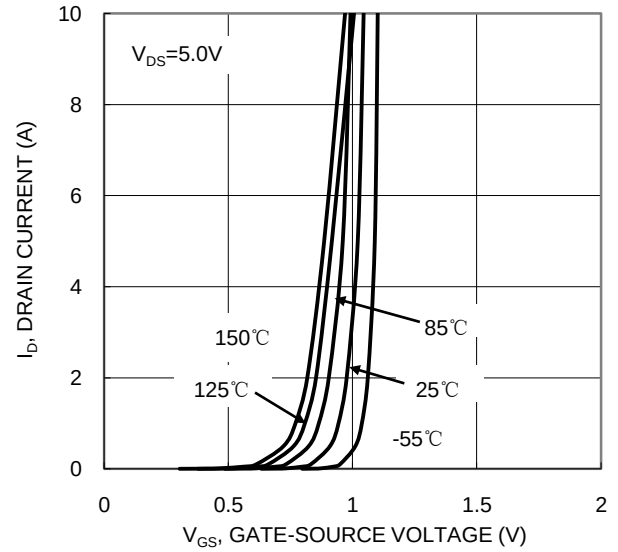


Figure 2 Typical Transfer Characteristic

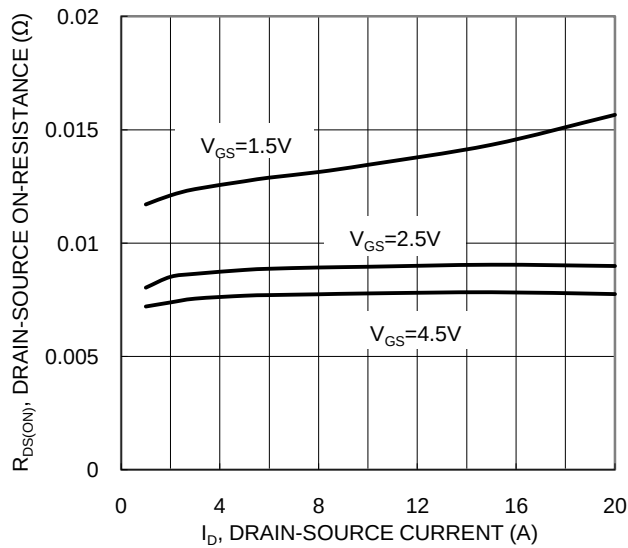


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

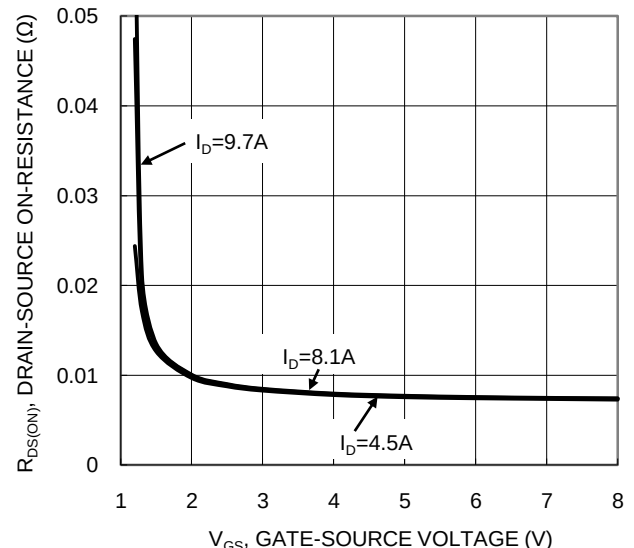


Figure 4 Typical On-Resistance vs Drain Current and Gate Voltage

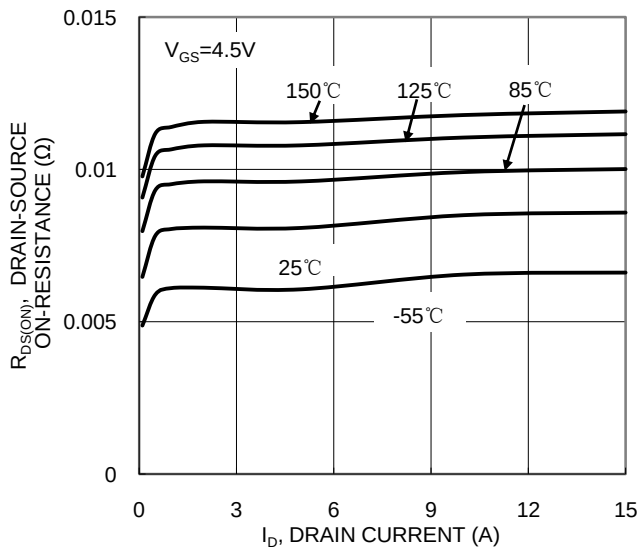


Figure 5 Typical On-Resistance vs Drain Current and Temperature

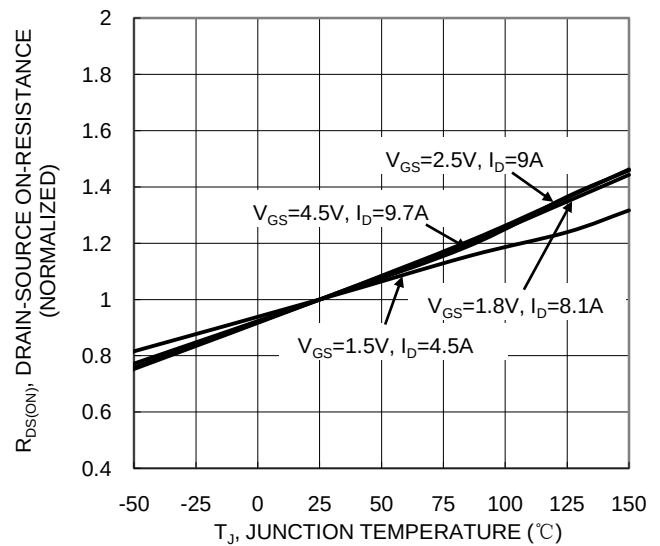


Figure 6 On-Resistance Variation with Temperature

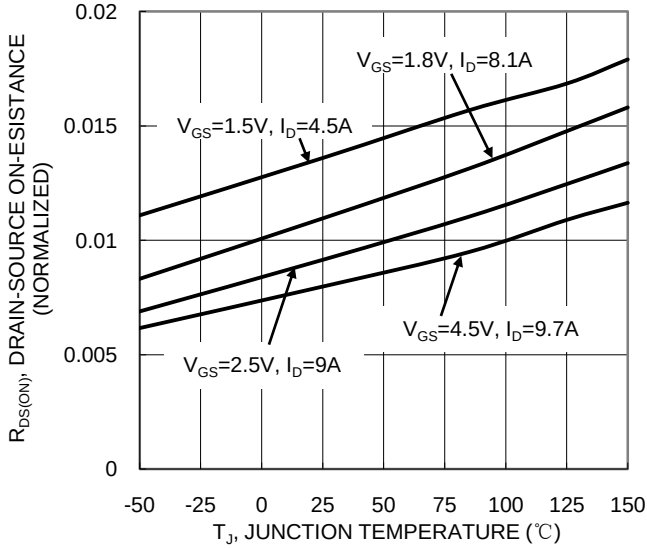


Figure 7 On-Resistance Variation with Temperature

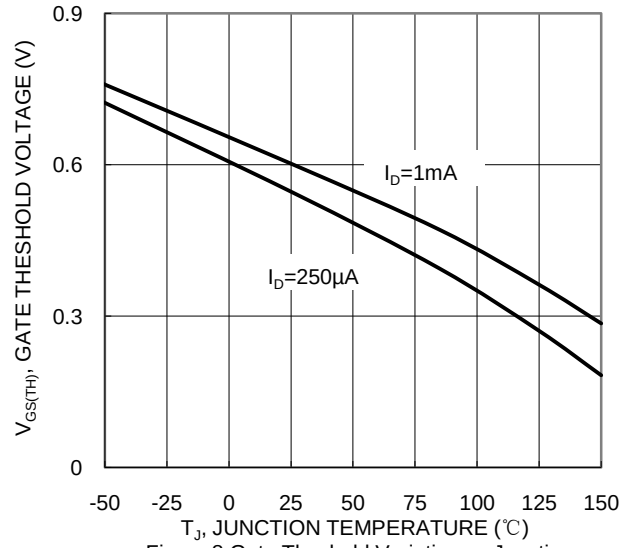


Figure 8 Gate Threshold Variation vs Junction Temperature

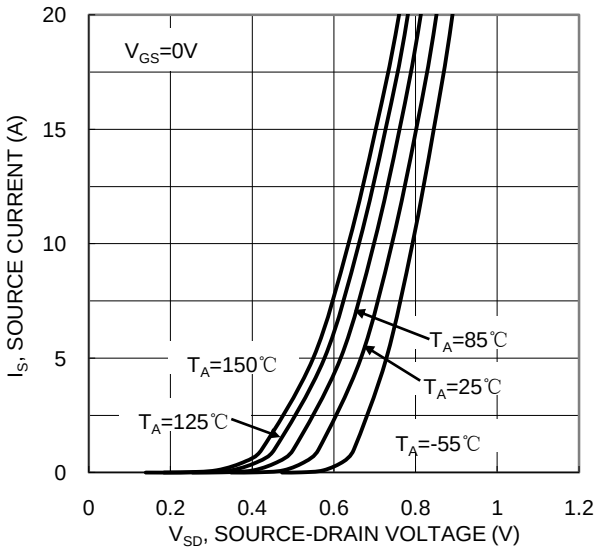


Figure 9 Diode Forward Voltage vs Current

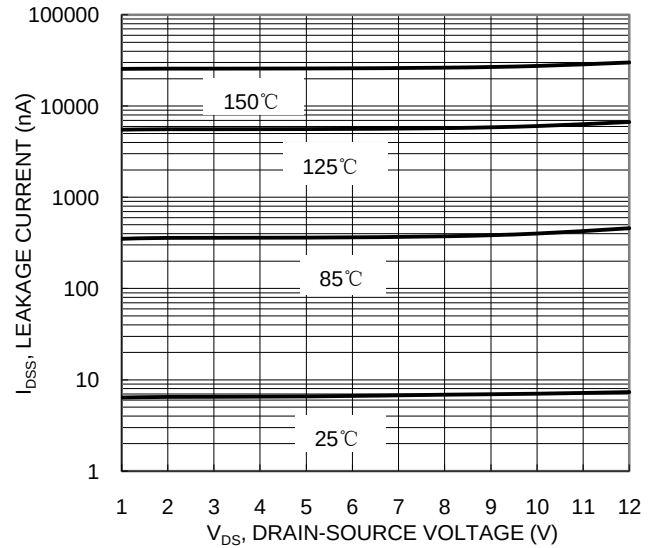


Figure 10 Typical Drain-Source Leakage Current vs Voltage

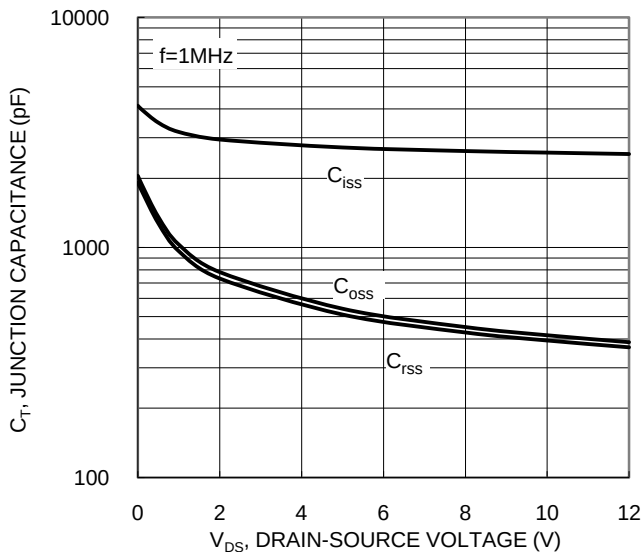


Figure 11 Typical Junction Capacitance

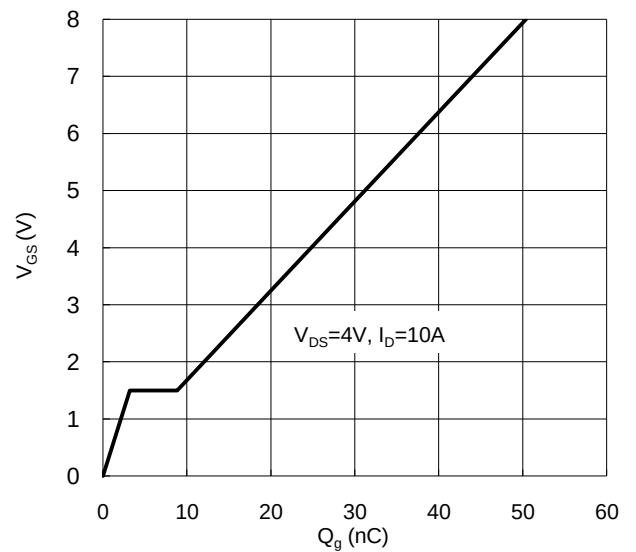
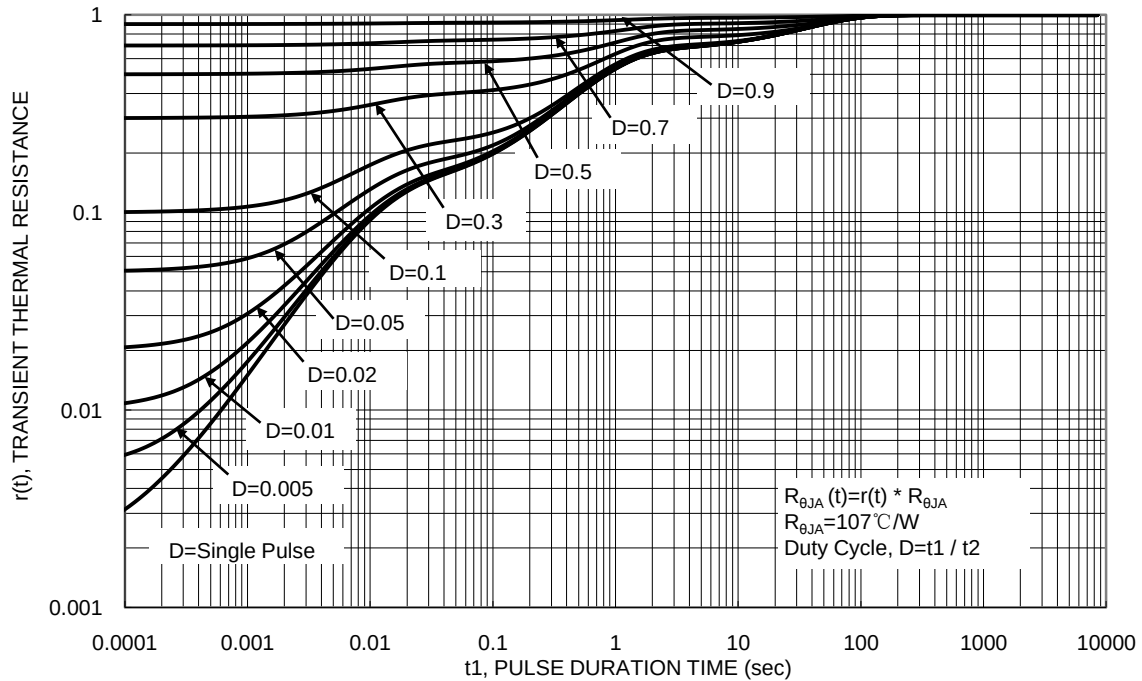
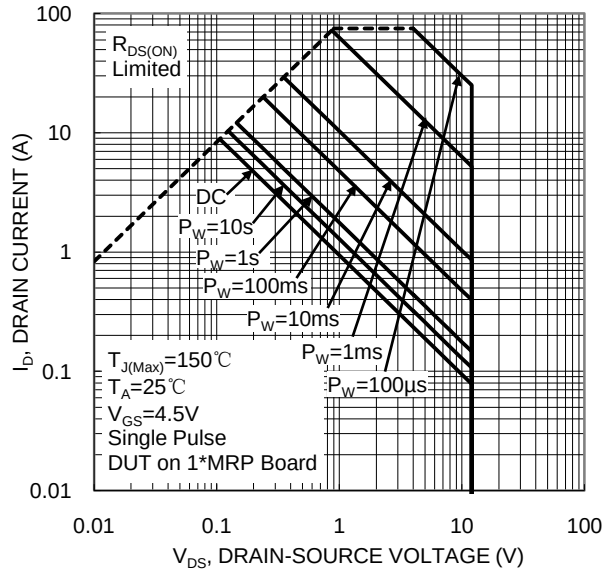
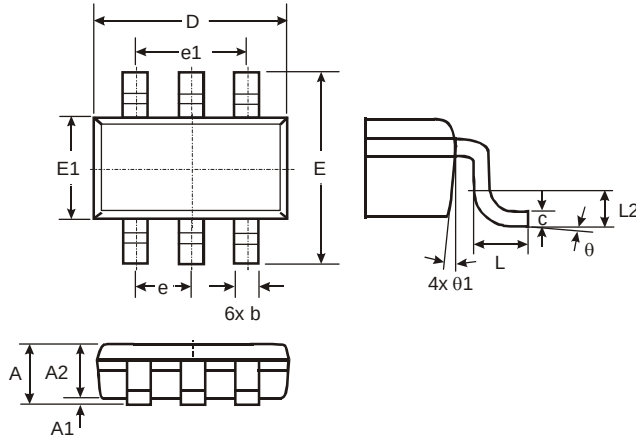


Figure 12 Gate Charge



## Package Outline Dimensions

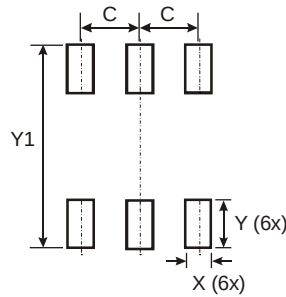
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| TSOT26               |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | —    | 1.00 | —    |
| A1                   | 0.01 | 0.10 | —    |
| A2                   | 0.84 | 0.90 | —    |
| D                    | —    | —    | 2.90 |
| E                    | —    | —    | 2.80 |
| E1                   | —    | —    | 1.60 |
| b                    | 0.30 | 0.45 | —    |
| c                    | 0.12 | 0.20 | —    |
| e                    | —    | —    | 0.95 |
| e1                   | —    | —    | 1.90 |
| L                    | 0.30 | 0.50 | —    |
| L2                   | —    | —    | 0.25 |
| θ                    | 0°   | 8°   | 4°   |
| θ1                   | 4°   | 12°  | —    |
| 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) |
|------------|---------------|
| C          | 0.950         |
| X          | 0.700         |
| Y          | 1.000         |
| Y1         | 3.199         |

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