

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON) MAX}$ | I_D $T_A = +25^\circ C$ |
|---------------|--------------------------------|------------------------------|
| 12V | 10m Ω @ $V_{GS} = 4.5V$ | 10.7A |
| | 12m Ω @ $V_{GS} = 2.5V$ | 9.8A |
| | 14m Ω @ $V_{GS} = 1.8V$ | 9.1A |
| | 18m Ω @ $V_{GS} = 1.5V$ | 8.0A |
| | 41m Ω @ $V_{GS} = 1.2V$ | 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 e3
- Terminal Connections: See Diagram
- Weight: 0.008 grams (Approximate)

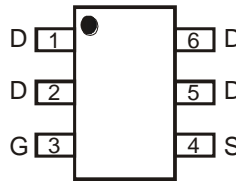
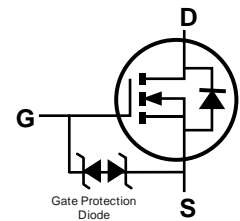


ESD PROTECTED

TSOT26



Top View


 Top View
Pin Configuration


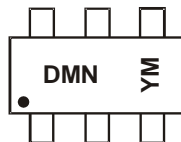
Equivalent Circuit

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 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_A = +25°C, unless otherwise specified.)

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

Thermal Characteristics

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

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

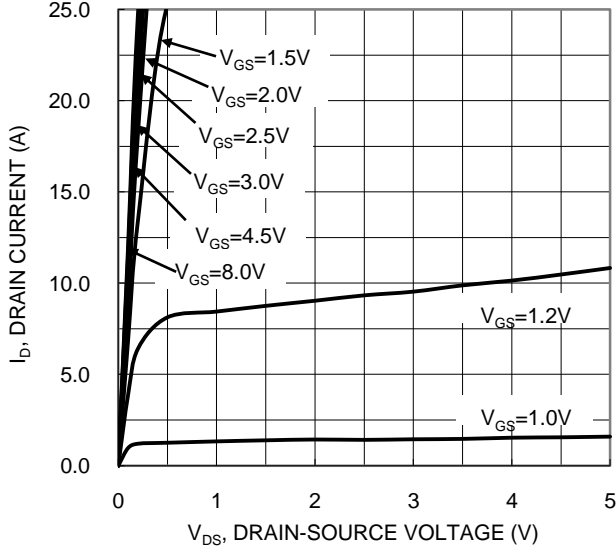


Figure 1 Typical Output Characteristic

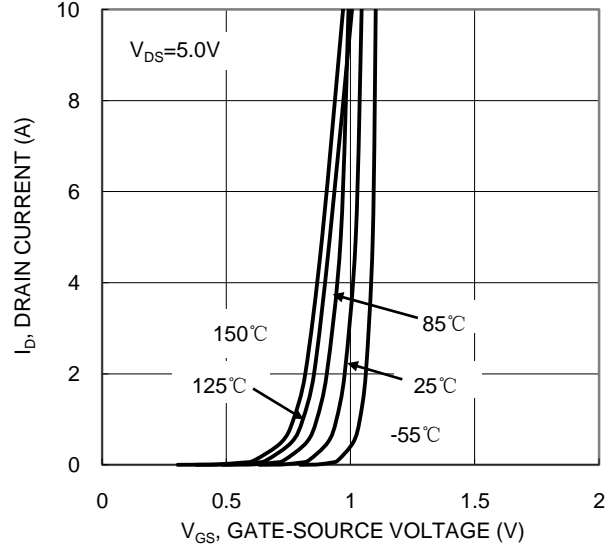


Figure 2 Typical Transfer Characteristic

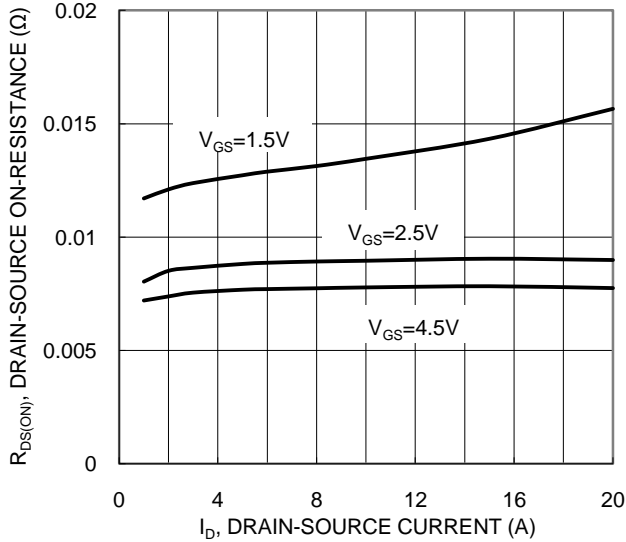


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

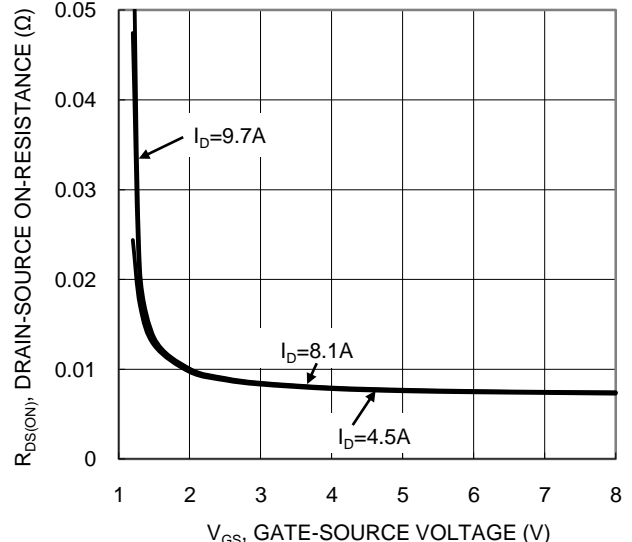


Figure 4 Typical On-Resistance vs Drain Current and Gate Voltage

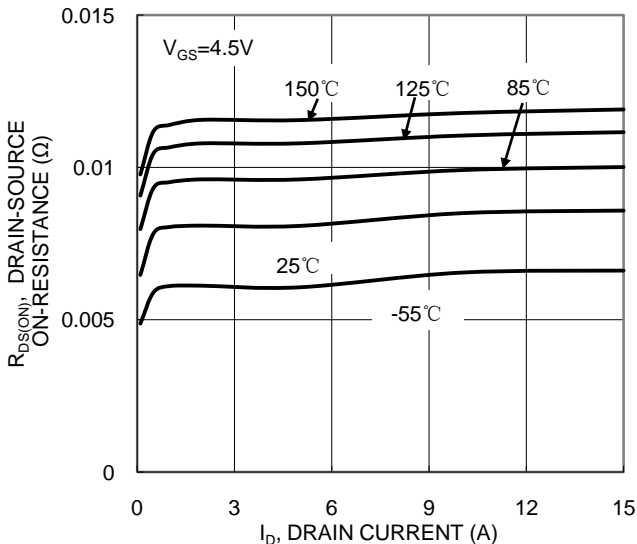


Figure 5 Typical On-Resistance vs Drain Current and Temperature

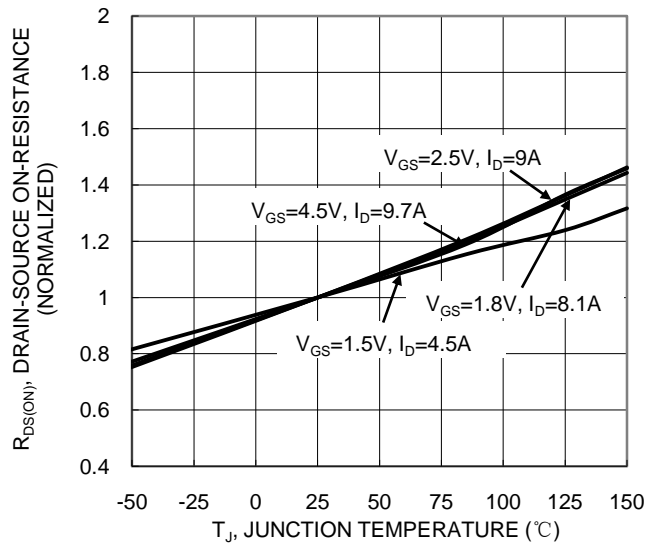


Figure 6 On-Resistance Variation with Temperature

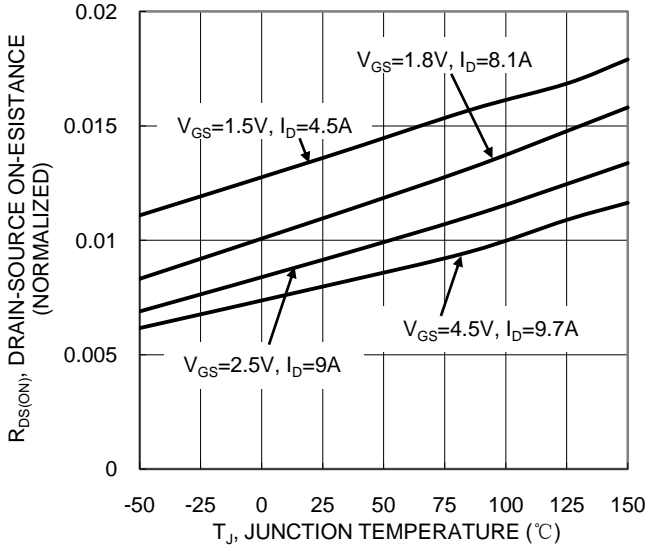


Figure 7 On-Resistance Variation with Temperature

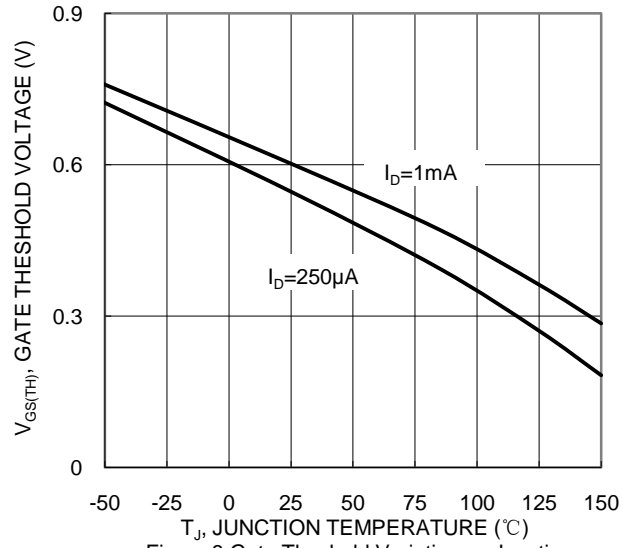


Figure 8 Gate Threshold Variation vs Junction Temperature

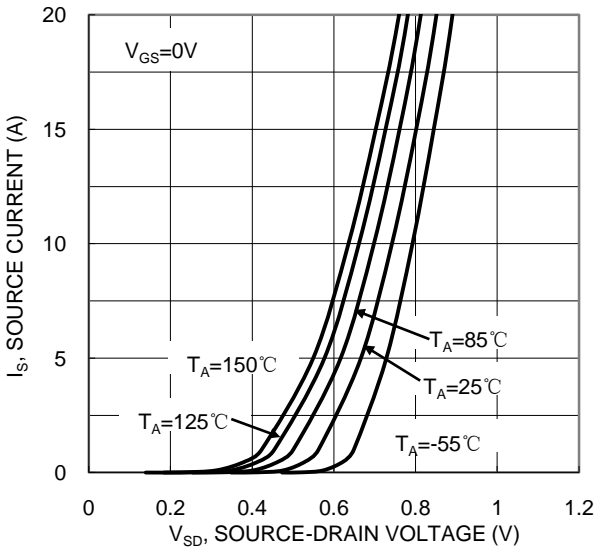


Figure 9 Diode Forward Voltage vs Current

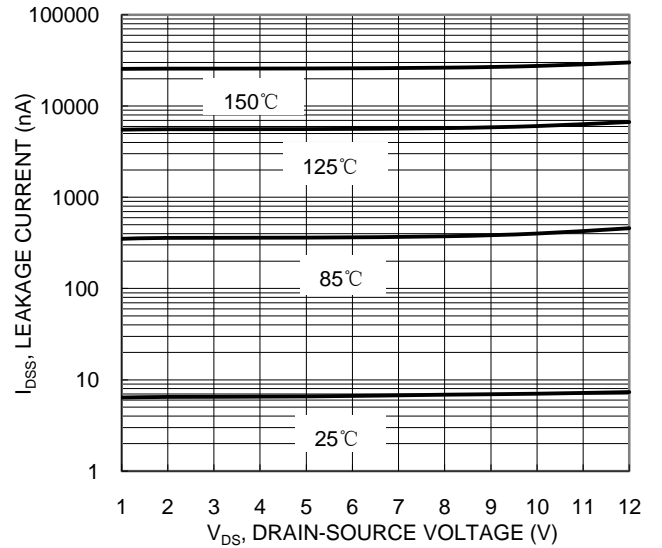


Figure 10 Typical Drain-Source Leakage Current vs Voltage

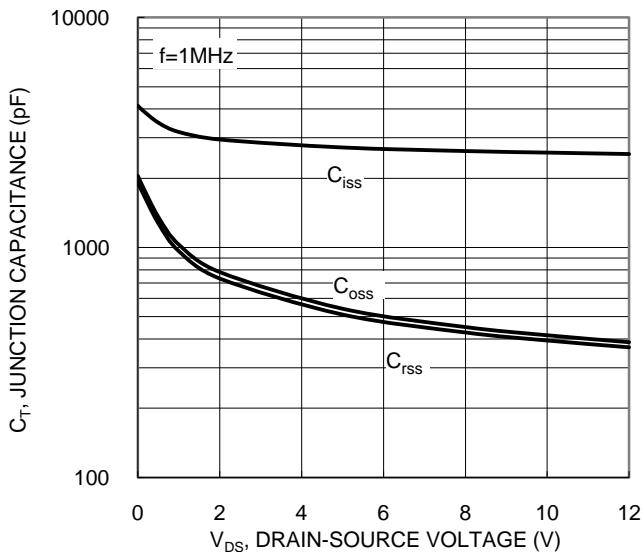


Figure 11 Typical Junction Capacitance

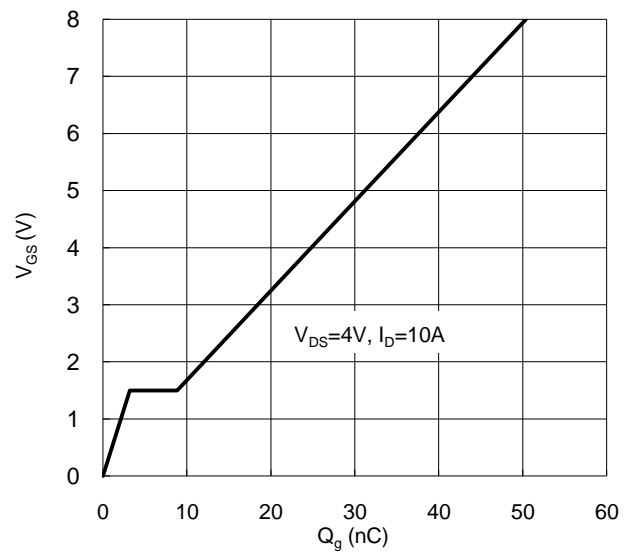
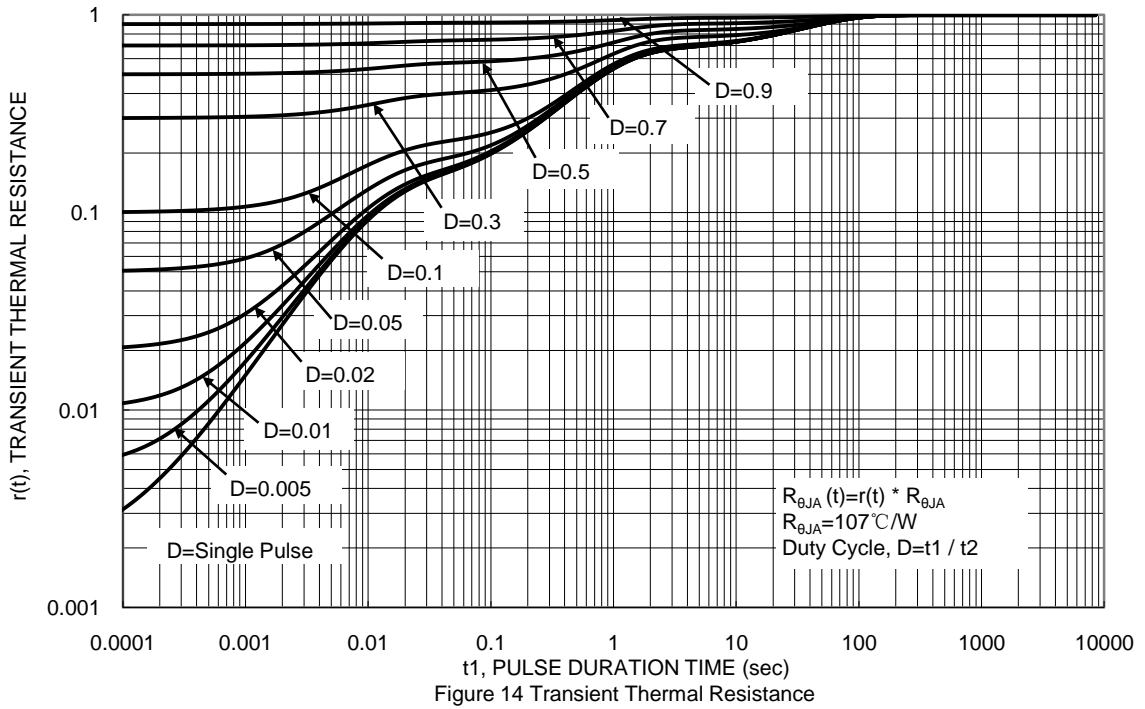
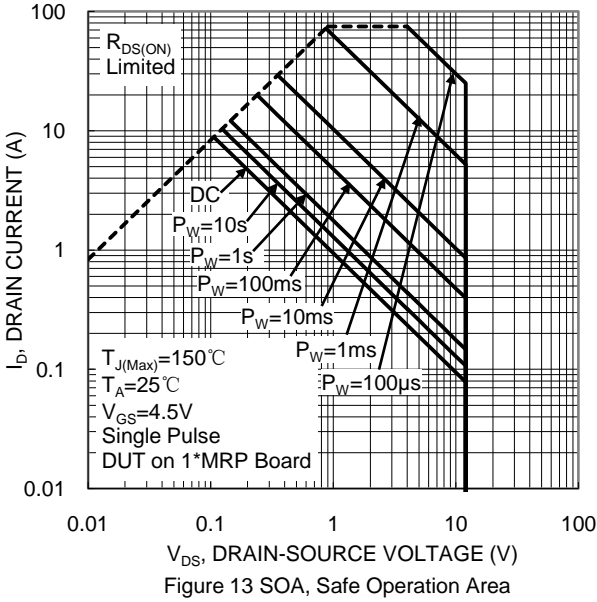
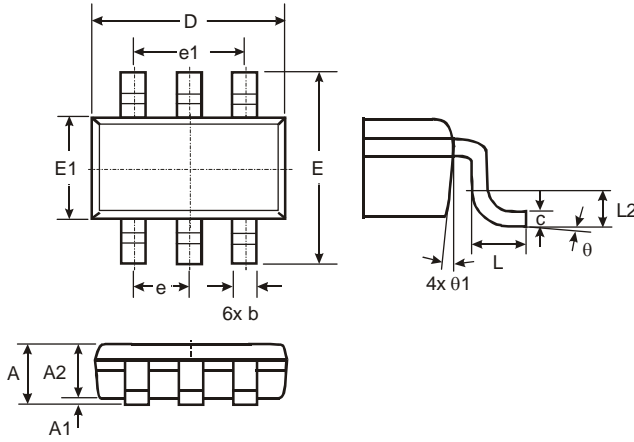


Figure 12 Gate Charge



Package Outline Dimensions

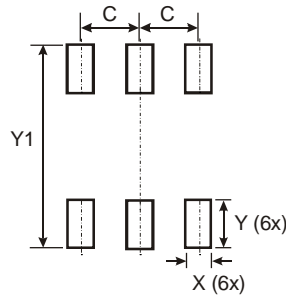
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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 |
| theta | 0° | 8° | 4° |
| theta1 | 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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