

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)max}$                 | $I_D$<br>$T_A = +25^\circ C$ |
|---------------|---------------------------------|------------------------------|
| -30V          | 14m $\Omega$ @ $V_{GS} = -10V$  | -10.4A                       |
|               | 25m $\Omega$ @ $V_{GS} = -4.5V$ | -7.8A                        |

## Description

This new generation MOSFET is 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
- Power Management Functions
- DC-DC Converters

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Low Input/Output Leakage
- **ESD Protected Gate**
- **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**

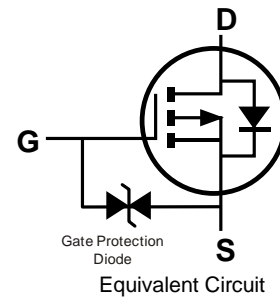
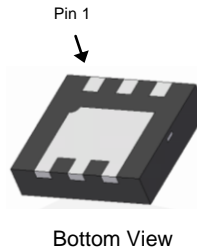
## Mechanical Data

- Case: U-DFN2523-6
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 **(4)**
- Weight: 0.008 grams (Approximate)



U-DFN2523-6

Pin 1, 2 = Source  
 Pin 3 = Gate  
 Pin 4, 5, 6 = Drain



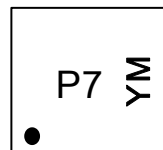
## Ordering Information (Note 4)

| Part Number   | Case        | Packaging            |
|---------------|-------------|----------------------|
| DMP3017SFK-7  | U-DFN2523-6 | 3,000 / Tape & Reel  |
| DMP3017SFK-13 | U-DFN2523-6 | 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

U-DFN2523-6



P7 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: B = 2014)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------|------|------|------|------|------|------|------|
| Code | B    | C    | D    | E    | F    | G    | H    |

| 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> | -30           | V     |
| Gate-Source Voltage                                       |              |  | V <sub>GSS</sub> | ±25           | V     |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = -10V  | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -10.4<br>-8.3 | A     |
| Continuous Drain Current (Note 6) 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>   | -7.8<br>-6.2  | A     |
| Maximum Continuous Body Diode Forward Current (Note 6)    |              |  | I <sub>S</sub>   | -3            | A     |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%)        |              |  | I <sub>DM</sub>  | -80           | A     |
| Avalanche Current (Note 7)                                |              |  | I <sub>AS</sub>  | -14           | A     |
| Avalanche Energy (Note 7)                                 |              |  | E <sub>AS</sub>  | 104           | 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           | W     |
| Thermal Resistance, Junction to Ambient (Note 5) |  |                        | R <sub>θJA</sub>                  | 123         | °C/W  |
| Total Power Dissipation (Note 6)                 |  |                        | P <sub>D</sub>                    | 2.2         | W     |
| Thermal Resistance, Junction to Ambient (Note 6) |  |                        | R <sub>θJA</sub>                  | 55          | °C/W  |
| Total Power Dissipation (Note 6)                 |  | T <sub>C</sub> = +25°C | P <sub>D</sub>                    | 17          | W     |
| Thermal Resistance, Junction to Case (Note 6)    |  |                        | R <sub>θJC</sub>                  | 7.2         | °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>   | -30 | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -10mA  |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C           | I <sub>DSS</sub>    | —   | —    | -1   | µA   | V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V  |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +150°C (Note 9) |                     | —   | —    | -100 |      |   |
| Gate-Source Leakage  | I <sub>GSS</sub>    | —   | —    | ±10  | µA   | V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V  |
| <b>ON CHARACTERISTICS (Note 8)</b>                               |                     |     |      |      |      |   |
| Gate Threshold Voltage   | V <sub>GS(th)</sub> | -1  | -1.6 | -2.5 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA                                   |
| Static Drain-Source On-Resistance                                | R <sub>DS(on)</sub> | —   | 9.5  | 14   | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -9.5A  |
|  |                     | —   | 15   | 25   |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -6.9A   |
| Diode Forward Voltage  | V <sub>SD</sub>     | —   | -0.7 | -1.2 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A  |
| On State Drain Current (Note 9)                                  | I <sub>D(on)</sub>  | -20 | —    | —    | A    | V <sub>DS</sub> ≤ -5V, V <sub>GS</sub> = -10V   |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>                          |                     |     |      |      |      |   |
| Input Capacitance  | C <sub>iss</sub>    | —   | 2207 | 4414 | pF   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1MHz  |
| Output Capacitance   | C <sub>oss</sub>    | —   | 390  | 780  |      |   |
| Reverse Transfer Capacitance                                     | C <sub>rss</sub>    | —   | 343  | 686  |      |   |
| Gate Resistance  | R <sub>g</sub>      | —   | 8.4  | 20   | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz  |
| Total Gate Charge (V <sub>GS</sub> = -10V)                       | Q <sub>g</sub>      | —   | 42.7 | 90   | nC   | V <sub>DS</sub> = -15V, I <sub>D</sub> = -9.5A  |
| Total Gate Charge (V <sub>GS</sub> = -4.5V)                      | Q <sub>g</sub>      | —   | 21.6 | 45   |      |   |
| Gate-Source Charge   | Q <sub>gs</sub>     | —   | 7.9  | 16   |      |   |
| Gate-Drain Charge  | Q <sub>gd</sub>     | —   | 10   | 20   |      |   |
| Turn-On Delay Time   | t <sub>D(on)</sub>  | —   | 7.35 | 15   | ns   | V <sub>DD</sub> = -15V, V <sub>GS</sub> = -10V, R <sub>GEN</sub> = 6Ω, I <sub>D</sub> = -9.5A |
| Turn-On Rise Time  | t <sub>r</sub>      | —   | 16.4 | 30   |      |   |
| Turn-Off Delay Time  | t <sub>D(off)</sub> | —   | 67.2 | 110  |      |   |
| Turn-Off Fall Time   | t <sub>f</sub>      | —   | 37.5 | 60   |      |   |
| Reverse Recovery Time  | t <sub>rr</sub>     | —   | 18.6 | 35   | ns   | I <sub>S</sub> = -9.5A, di/dt = 100A/µs   |
| Reverse Recovery Charge  | Q <sub>rr</sub>     | —   | 8.6  | 17.5 | nC   |   |

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

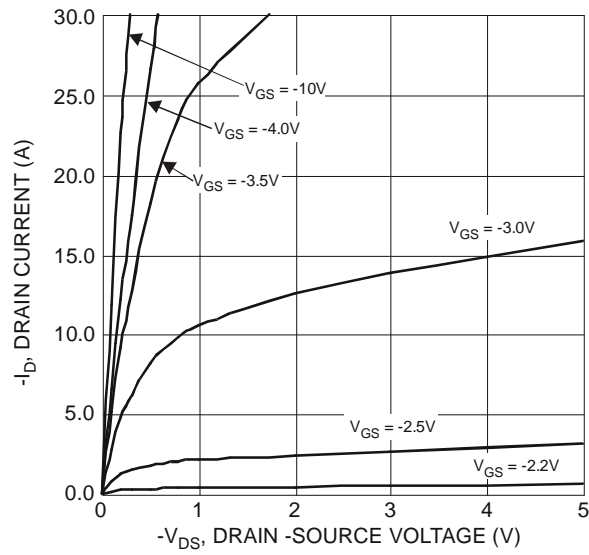


Figure 1 Typical Output Characteristics

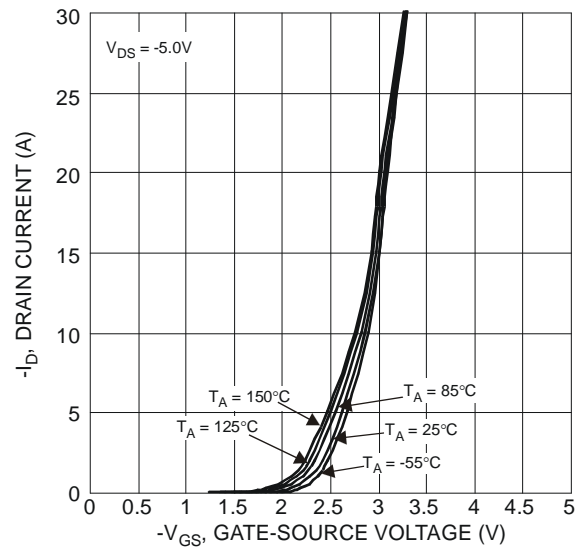


Figure 2 Typical Transfer Characteristics

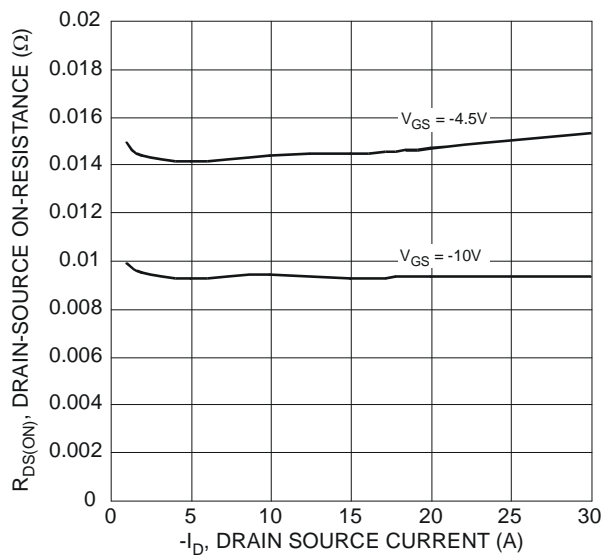


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

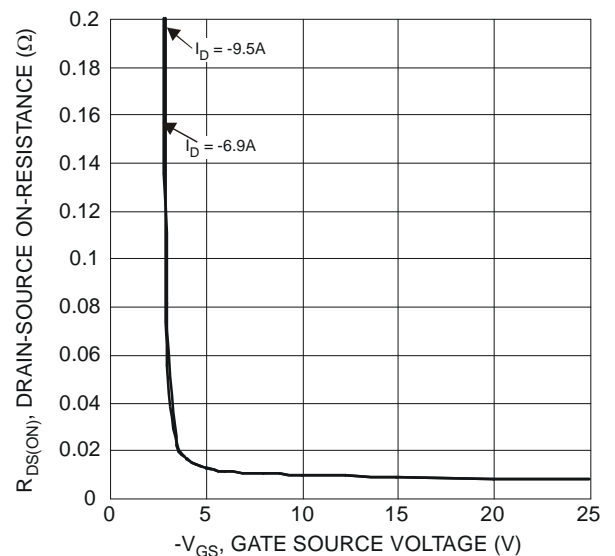


Figure 4 Typical Transfer Characteristics

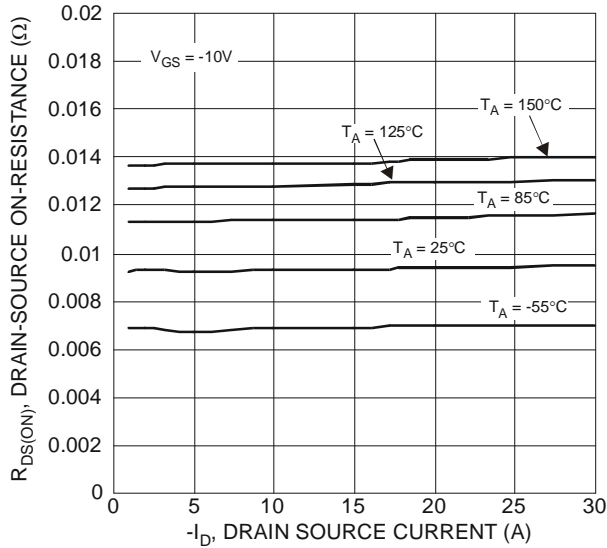


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

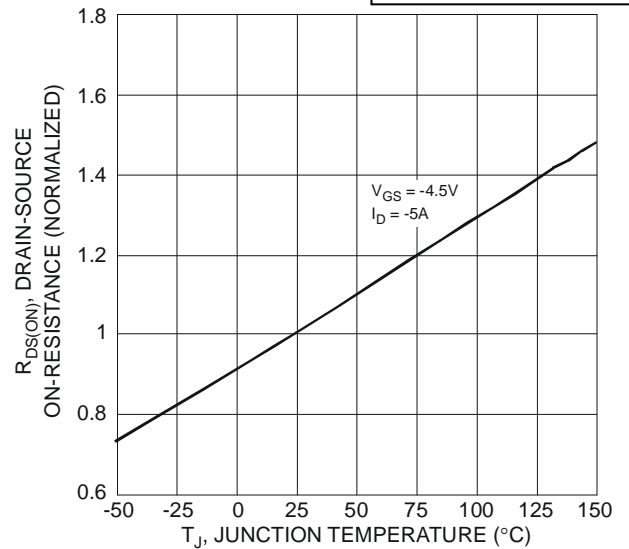


Figure 6 On-Resistance Variation with Temperature

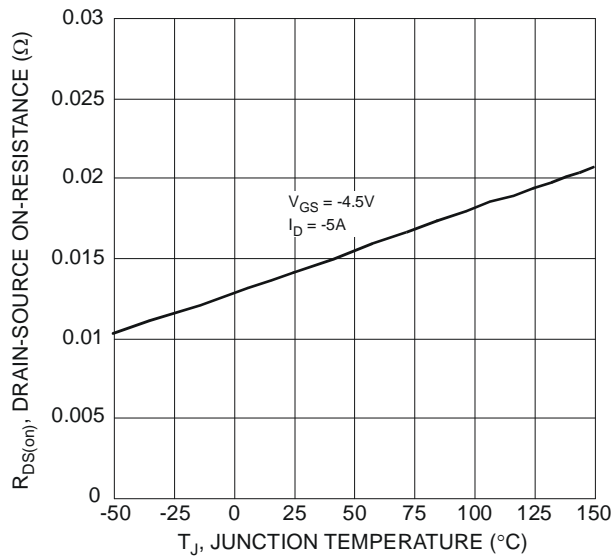


Figure 7 On-Resistance Variation with Temperature

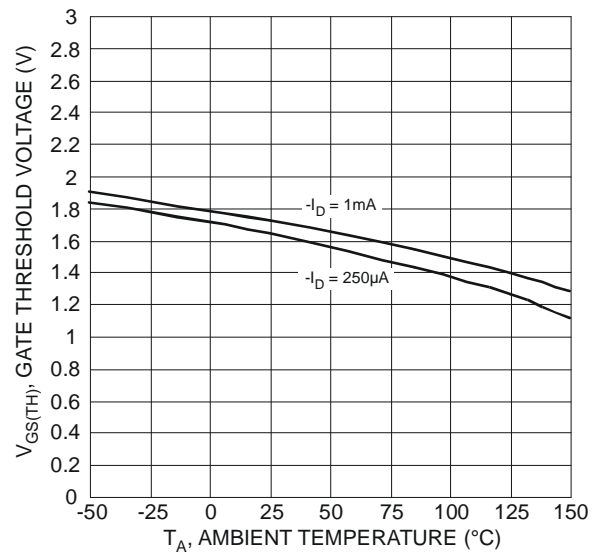


Figure 8 Gate Threshold Variation vs. Ambient Temperature

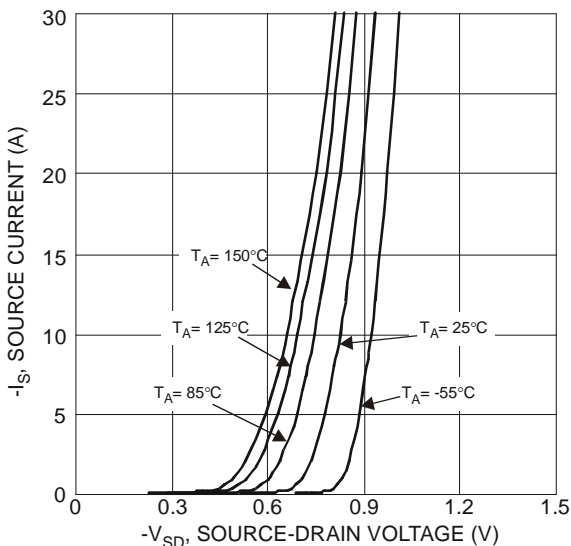


Figure 9 Diode Forward Voltage vs. Current

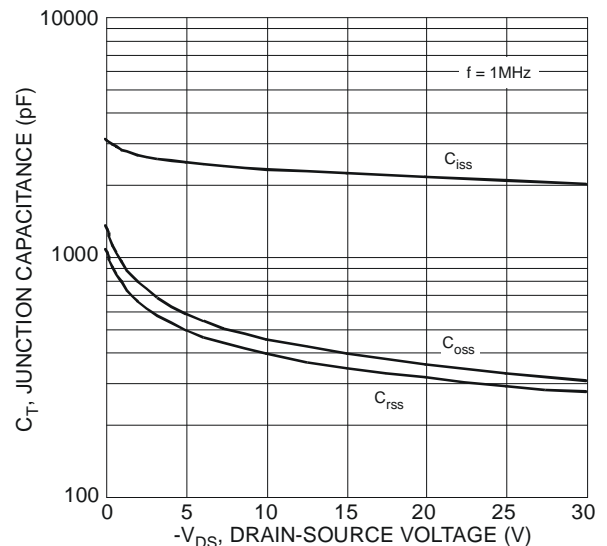
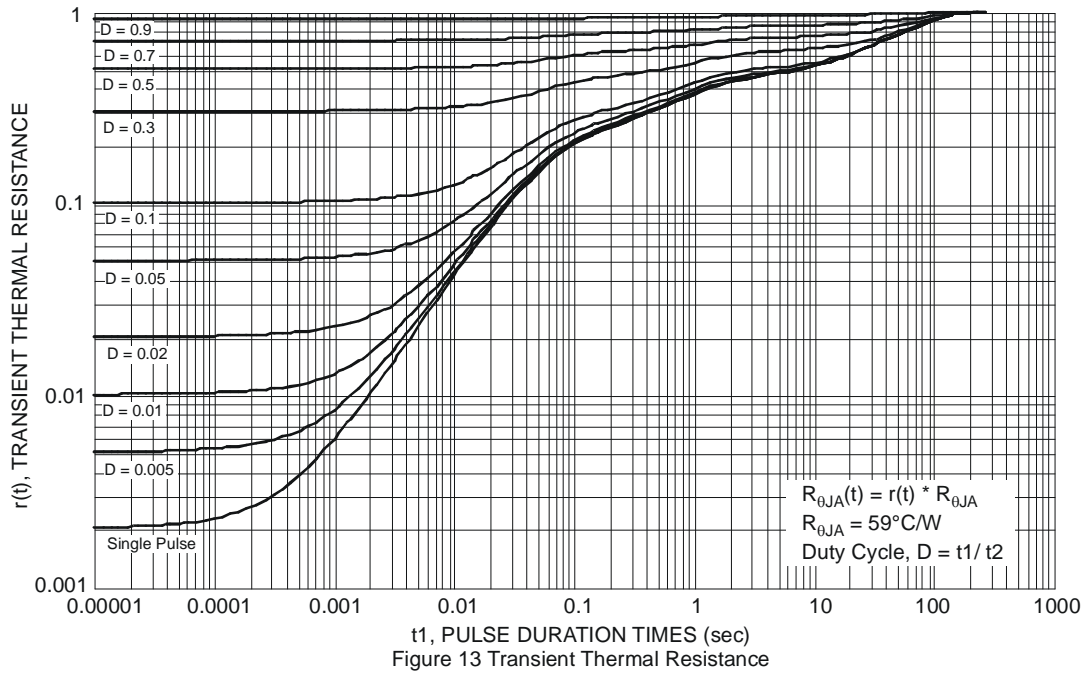
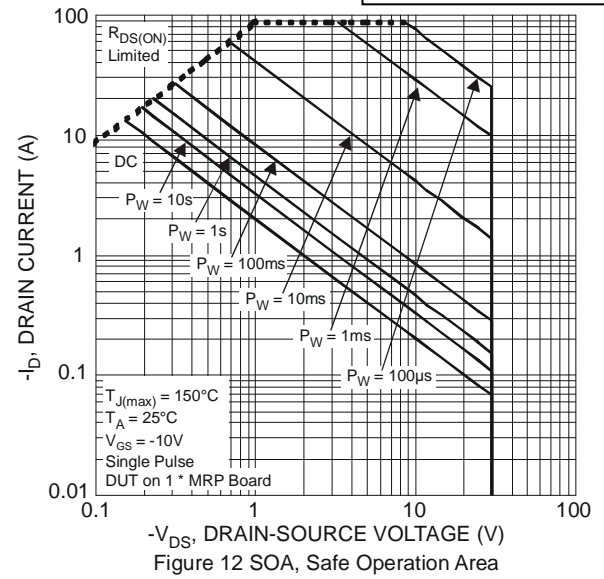
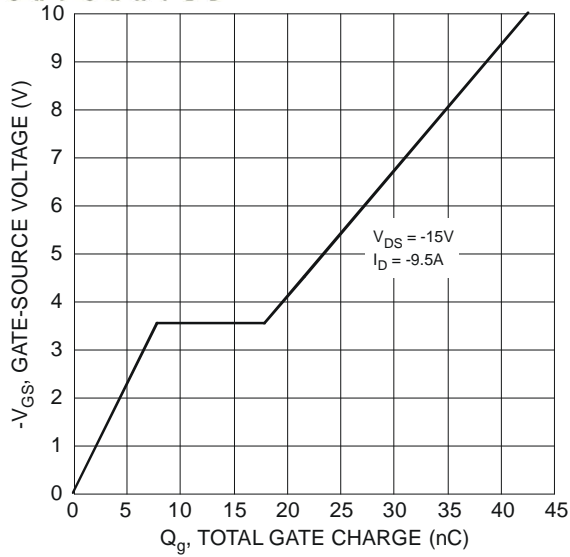
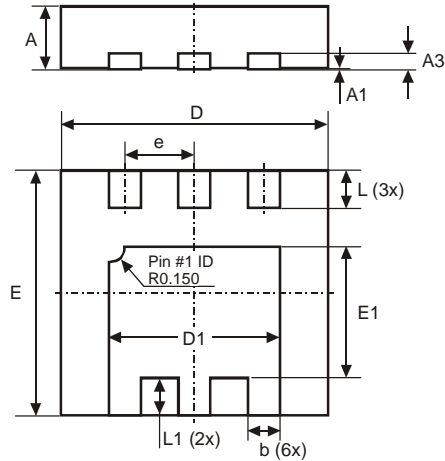


Figure 10 Typical Junction Capacitance



## Package Outline Dimensions

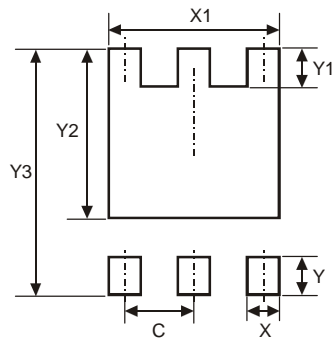
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| U-DFN2523-6          |      |      |       |
|----------------------|------|------|-------|
| Dim                  | Min  | Max  | Typ   |
| A                    | 0.57 | 0.63 | 0.60  |
| A1                   | 0    | 0.05 | 0.02  |
| A3                   | —    | —    | 0.152 |
| b                    | 0.25 | 0.35 | 0.30  |
| D                    | 2.45 | 2.55 | 2.50  |
| D1                   | 1.55 | 1.65 | 1.60  |
| e                    | —    | —    | 0.65  |
| E                    | 2.25 | 2.35 | 2.30  |
| E1                   | 1.18 | 1.28 | 1.23  |
| L                    | 0.30 | 0.40 | 0.35  |
| L1                   | 0.30 | 0.40 | 0.35  |
| All Dimensions in mm |      |      |       |

## Suggested Pad Layout

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



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| X          | 0.400         |
| X1         | 1.700         |
| Y          | 0.650         |
| Y1         | 0.450         |
| Y2         | 1.830         |
| Y3         | 2.700         |

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