

## Product Summary

$BV_{DSS}$	$R_{DS(ON) \max}$	$I_D$ $T_A = +25^\circ\text{C}$
-30V	14m $\Omega$ @ $V_{GS} = -10\text{V}$	-10.5A
	25m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-8A

## Description

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

## Applications

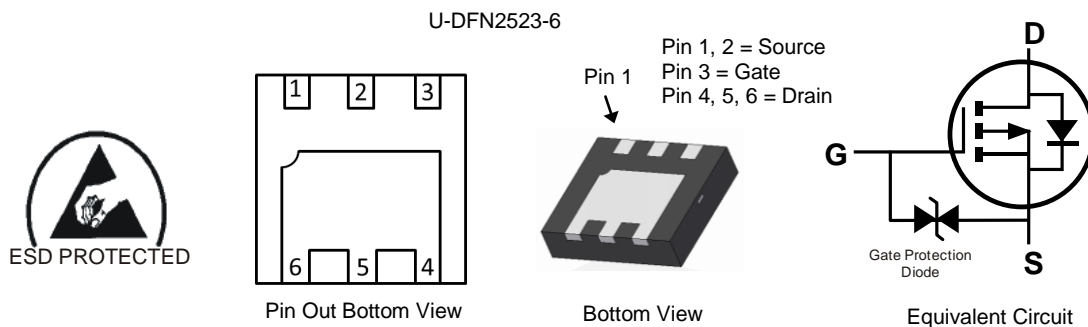
- Load Switch
- Power Management Functions
- DC-DC Converters

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Low Input/Output Leakage
- 100% Unclamped Inductive Switching (Test in Production) — Ensures More Reliability
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## 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 [e4](#)
- Weight: 0.008 grams (Approximate)



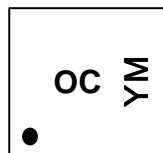
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP3013SFK-7	U-DFN2523-6	3000/Tape & Reel
DMP3013SFK-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) & 2015/863/EU (RoHS 3) compliant.
  2. 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.
  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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

U-DFN2523-6



OC = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: G = 2019)  
 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>	-30	V
Gate-Source Voltage	V <sub>GSS</sub>	±25	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = -10V	I <sub>D</sub>	T <sub>A</sub> = +25°C	-10.5
		T <sub>A</sub> = +70°C	-8.5
Continuous Drain Current (Note 6) V <sub>GS</sub> = -4.5V	I <sub>D</sub>	T <sub>A</sub> = +25°C	-8.0
		T <sub>A</sub> = +70°C	-6.5
Maximum Continuous Body Diode Forward Current (Note 6)	I <sub>S</sub>	-2.0	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>	100	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	126	°C/W
Total Power Dissipation (Note 6)	P <sub>D</sub>	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	61	°C/W
Total Power Dissipation (Note 6)	P <sub>D</sub>	T <sub>C</sub> = +25°C	19.5
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	6.4
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> = -250µA
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
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	µA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-1.0	—	-3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	10	14	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -9.5A
		—	14.2	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
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>ISS</sub>	—	1674	—	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	302	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	230	—		
Gate Resistance	R <sub>g</sub>	—	15.2	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = -5V)	Q <sub>g</sub>	—	16.2	—	nC	V <sub>DS</sub> = -15V, I <sub>D</sub> = -11.5A
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	—	33.7	—		
Gate-Source Charge	Q <sub>gs</sub>	—	3.5	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	6.7	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	4.0	—	ns	V <sub>DD</sub> = -15V, V <sub>GS</sub> = -10V, R <sub>G</sub> = 6Ω, I <sub>D</sub> = -11.5A
Turn-On Rise Time	t <sub>R</sub>	—	4.5	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	96	—		
Turn-Off Fall Time	t <sub>F</sub>	—	106.5	—		
Reverse Recovery Time	t <sub>RR</sub>	—	46	—	ns	I <sub>S</sub> = -11.5A, dI/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	25.5	—	nC	

- Notes:
- Device mounted on FR-4 substrate PCB, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PCB, 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.

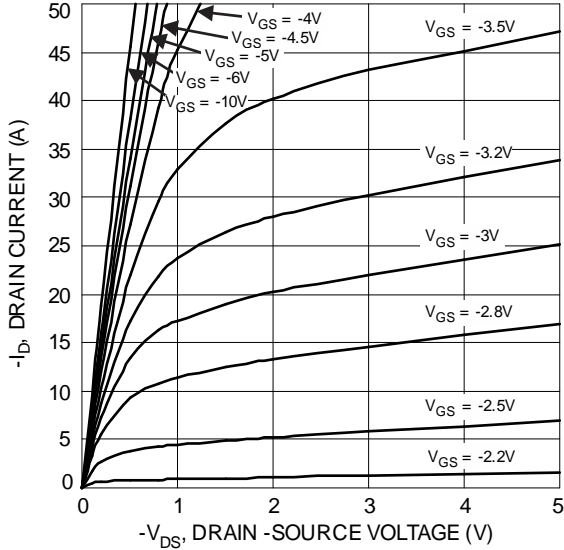


Figure 1 Typical Output Characteristics

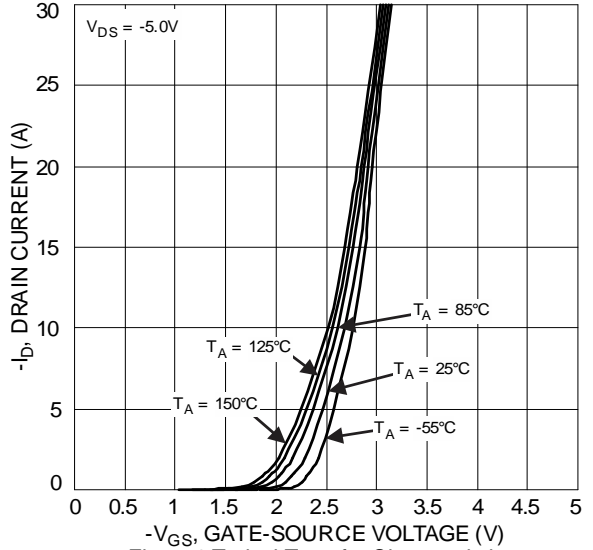


Figure 2 Typical Transfer Characteristics

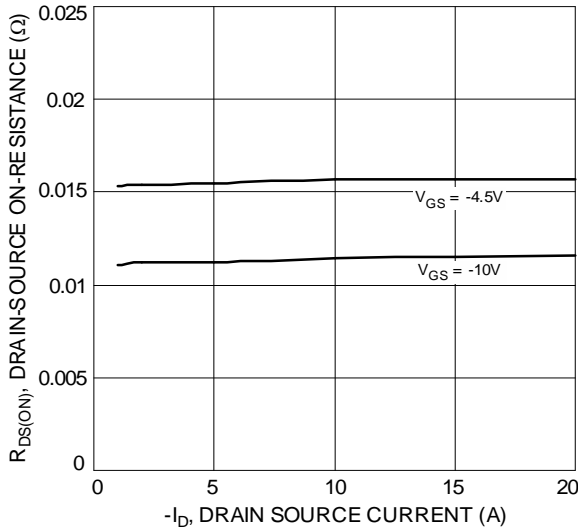


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

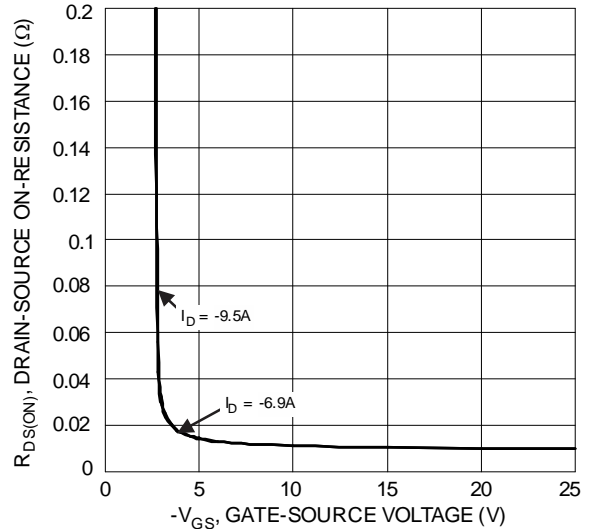


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

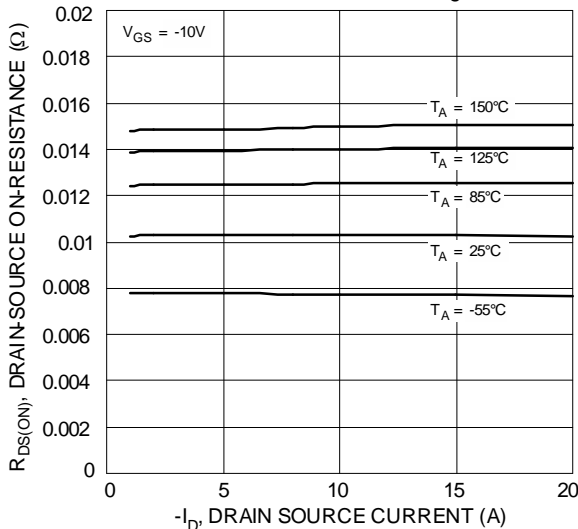


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

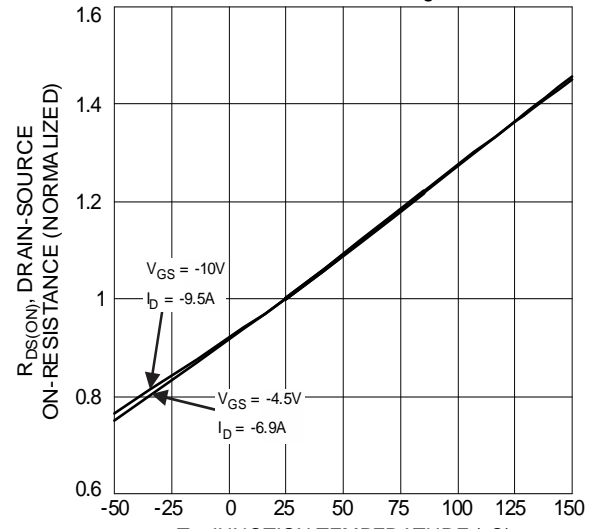


Figure 6 On-Resistance Variation with Temperature

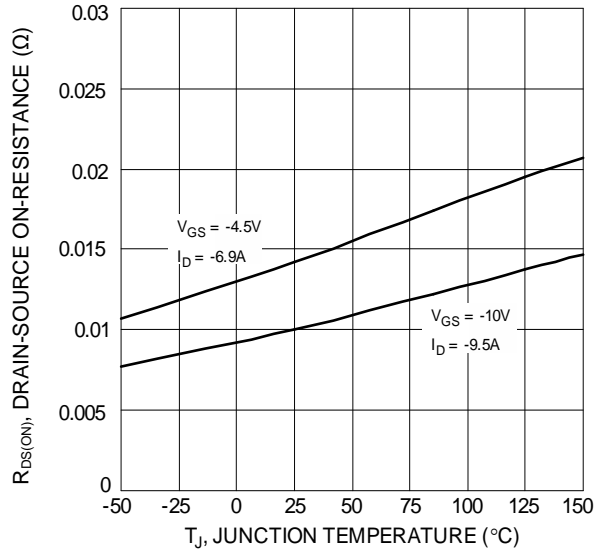


Figure 7 On-Resistance Variation with Temperature

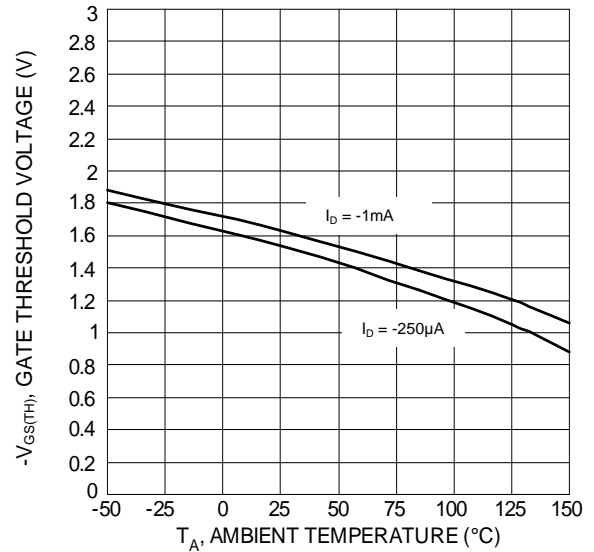


Figure 8 Gate Threshold Variation vs. Ambient Temperature

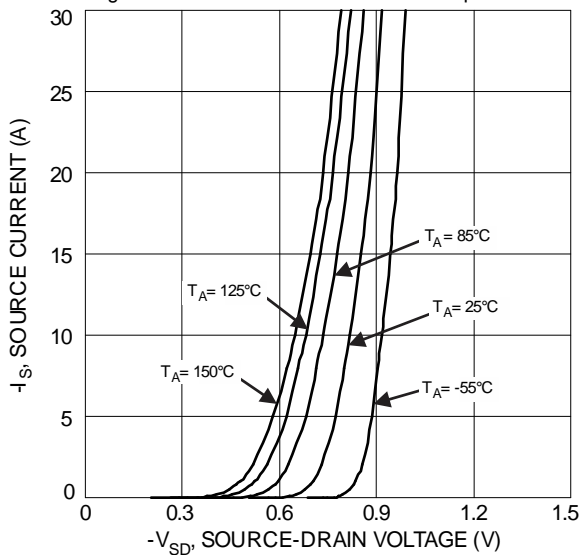


Figure 9 Diode Forward Voltage vs. Current

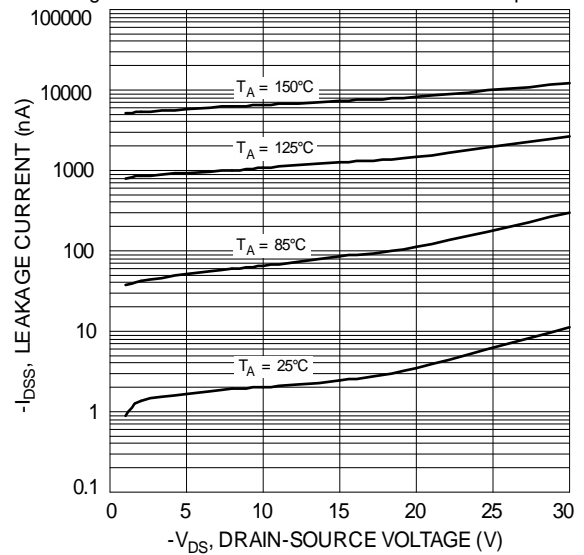


Figure 10 Typical Drain-Source Leakage Current vs. Voltage

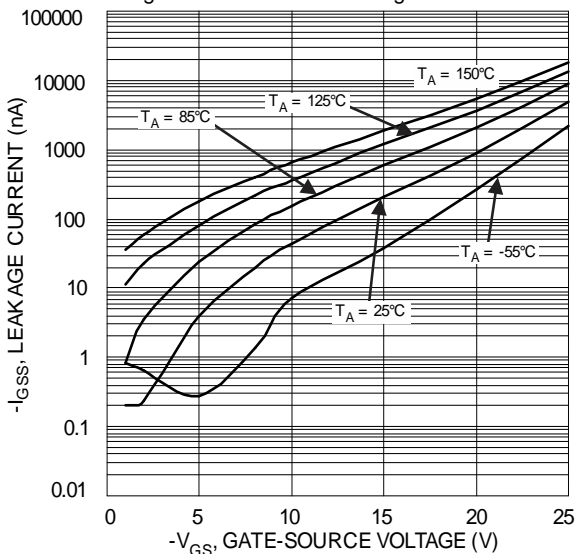


Figure 11 Gate-Source Leakage Current vs. Voltage

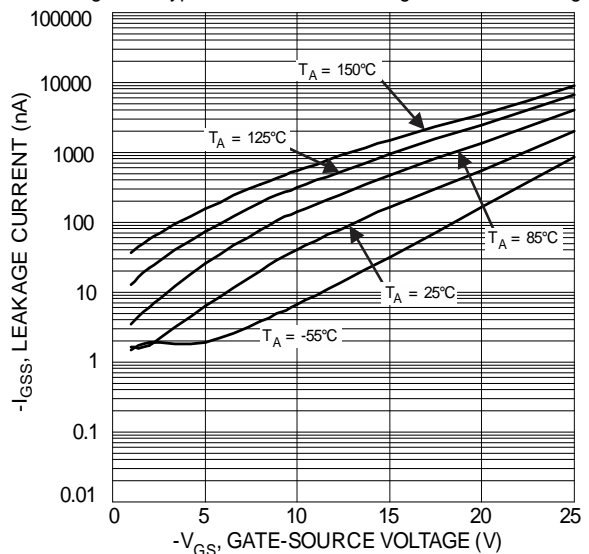
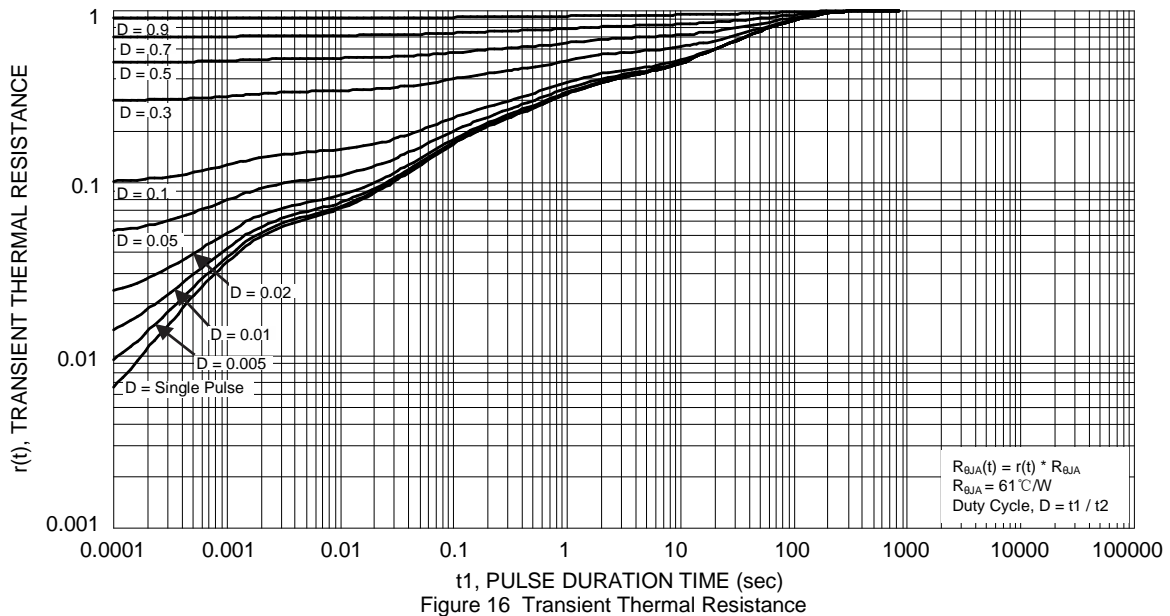
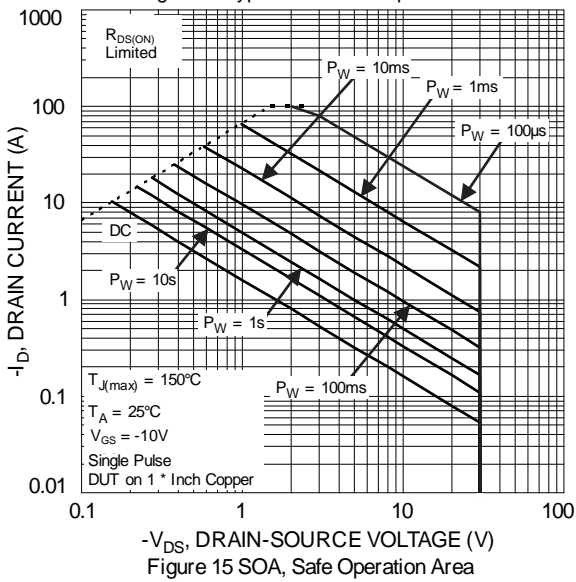
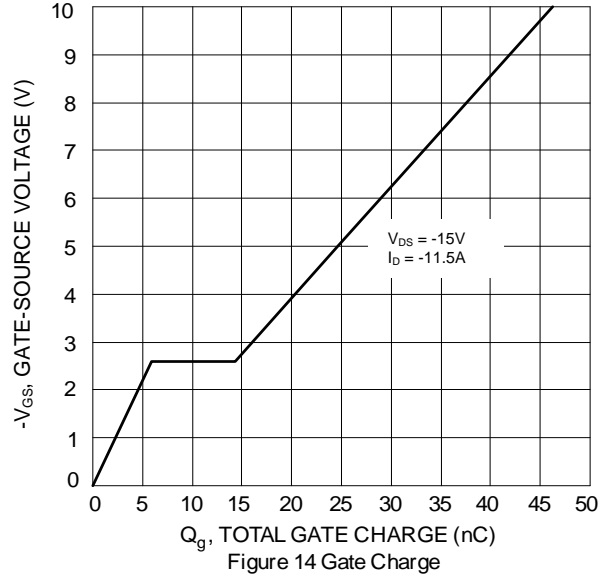
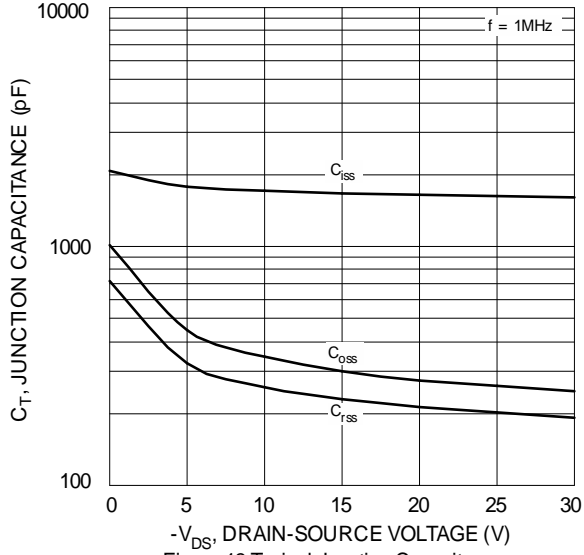


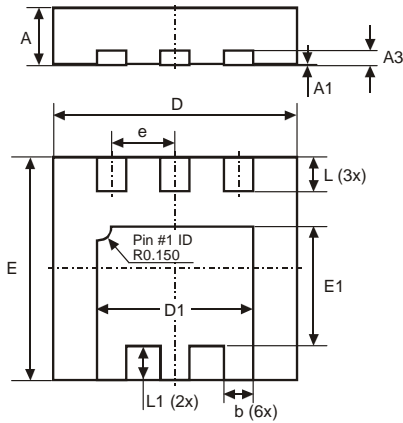
Figure 12 Gate-Source Leakage Current vs. Voltage



## Package Outline Dimensions

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

### U-DFN2523-6

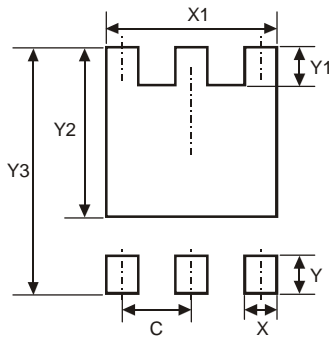


U-DFN2523-6			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0	0.05	0.02
A3	-	-	0.152
b	0.25	0.35	0.30
D	2.45	2.55	2.50
D1	1.55	1.65	1.60
e	-	-	0.65
E	2.25	2.35	2.30
E1	1.18	1.28	1.23
L	0.30	0.40	0.35
L1	0.30	0.40	0.35
All Dimensions in mm			

## Suggested Pad Layout

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

### U-DFN2523-6



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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