Product Summary

BV_{DSS}	$R_{DS(ON)\ max}$	I_D T_A = +25°C
-30V	14mΩ @ V_{GS} = -10V	-10.5A
	25mΩ @ V_{GS} = -4.5V	-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

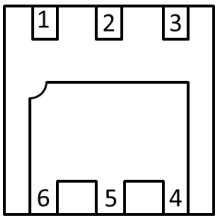
- Low On-Resistance
- Low Input Capacitance
- Low Input/Output Leakage
- 100% Unclamped Inductive Switching (Test in Production) — Ensures More Reliability
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

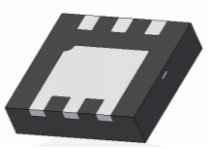
- Case: U-DFN2523-6
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.008 grams (Approximate)

ESD PROTECTED

U-DFN2523-6

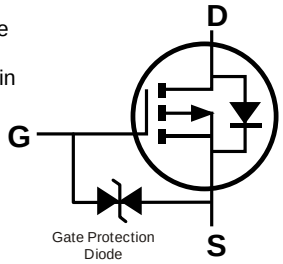


Pin Out Bottom View



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

Bottom View



Equivalent Circuit

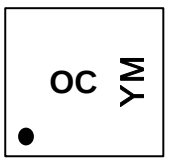
Ordering Information (Note 4)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-30	V
Gate-Source Voltage			V_{GSS}	±25	V
Continuous Drain Current (Note 6) V_{GS} = -10V	Steady State	T_A = +25°C T_A = +70°C	I_D	-10.5 -8.5	A
Continuous Drain Current (Note 6) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-8.0 -6.5	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	-2.0	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-80	A
Avalanche Current (Note 7)			I_{AS}	-14	A
Avalanche Energy (Note 7)			E_{AS}	100	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\Theta JA}$	126	°C/W
Total Power Dissipation (Note 6)		P_D	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\Theta JA}$	61	°C/W
Total Power Dissipation (Note 6)	T_C = +25°C	P_D	19.5	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\Theta JC}$	6.4	°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 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-30	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-1	µA	V_{DS} = -24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	—	-3.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	10	14	mΩ	V_{GS} = -10V, I_D = -9.5A
		—	14.2	25		V_{GS} = -4.5V, I_D = -6.9A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1674	—	pF	V_{DS} = -15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	302	—		
Reverse Transfer Capacitance	C_{rss}	—	230	—		
Gate Resistance	R_g	—	15.2	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = -5V)	Q_g	—	16.2	—	nC	V_{DS} = -15V, I_D = -11.5A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	33.7	—		
Gate-Source Charge	Q_{gs}	—	3.5	—		
Gate-Drain Charge	Q_{gd}	—	6.7	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.0	—	ns	V_{DD} = -15V, V_{GS} = -10V, R_G = 6Ω, I_D = -11.5A
Turn-On Rise Time	t_R	—	4.5	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	96	—		
Turn-Off Fall Time	t_F	—	106.5	—		
Reverse Recovery Time	t_{RR}	—	46	—	ns	I_S = -11.5A, dI/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	25.5	—	nC	

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 thermal vias to bottom layer 1-inch square copper plate.
7. UIS in production with L = 1mH, T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

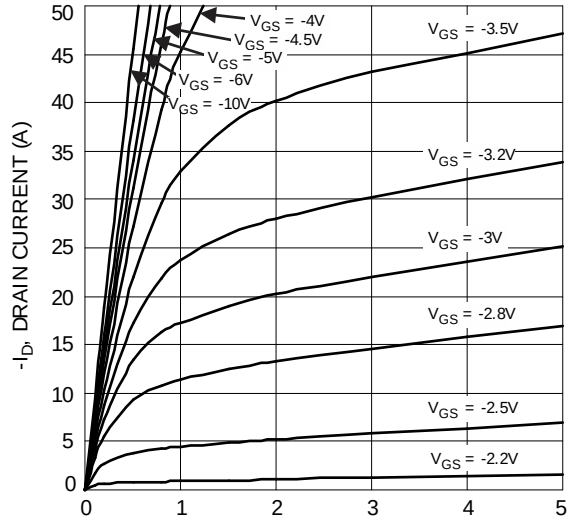


Figure 1 Typical Output Characteristics

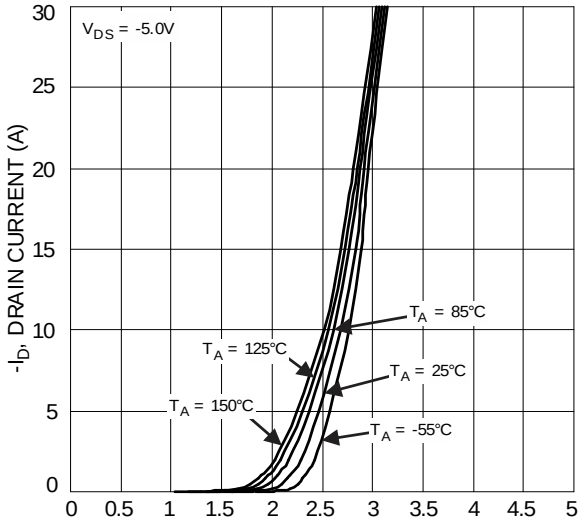


Figure 2 Typical Transfer Characteristics

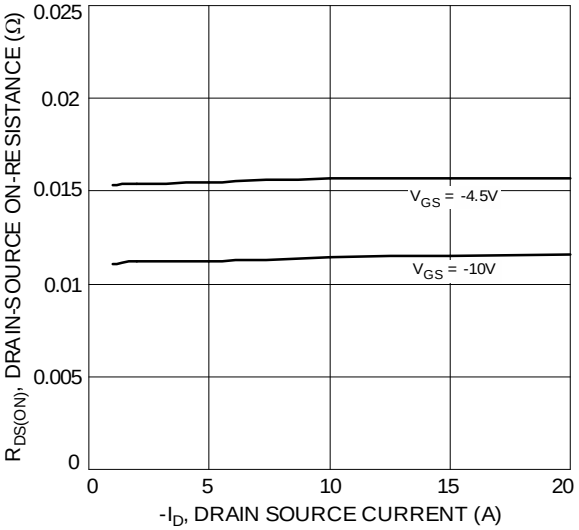


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

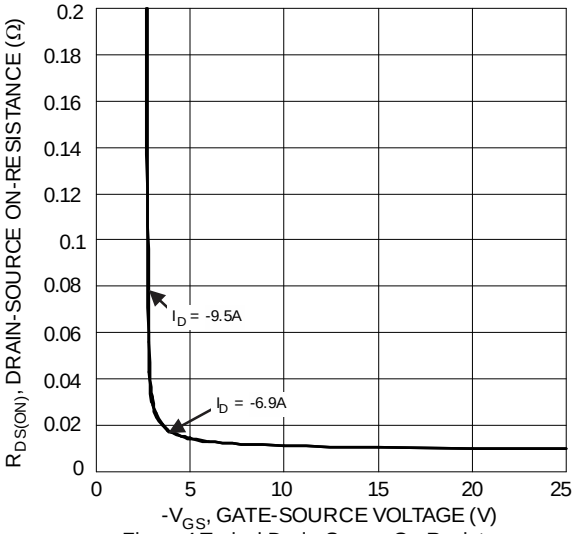


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

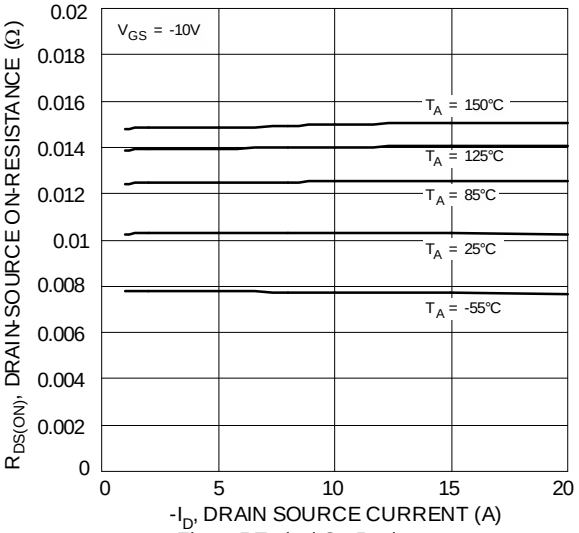


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

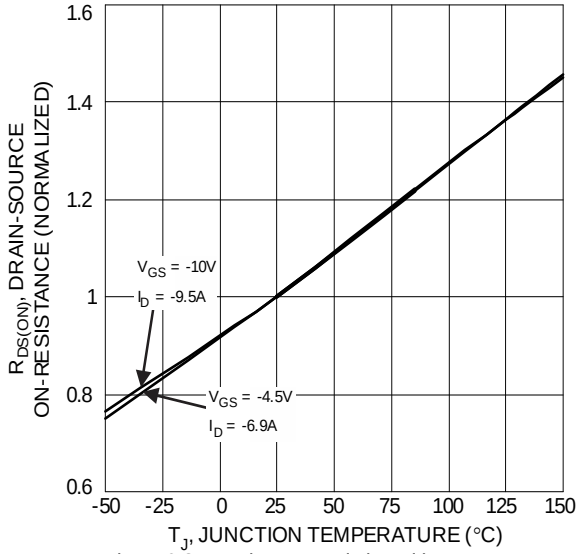


Figure 6 On-Resistance Variation with Temperature

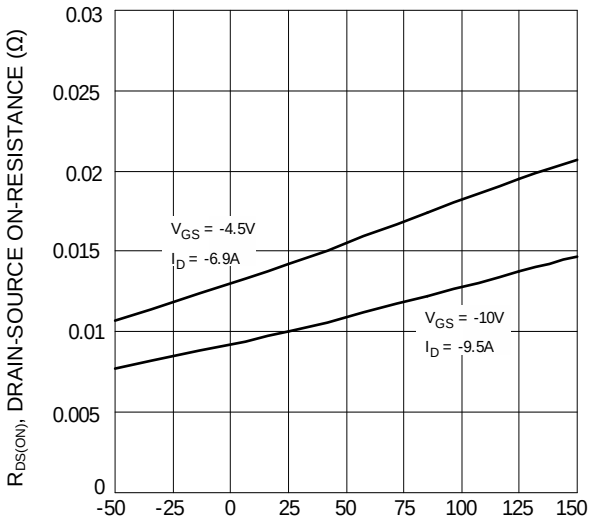


Figure 7 On-Resistance Variation with Temperature

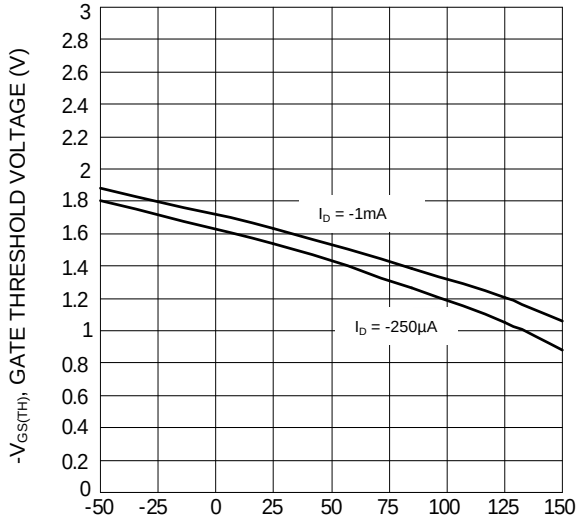


Figure 8 Gate Threshold Variation vs. Ambient Temperature

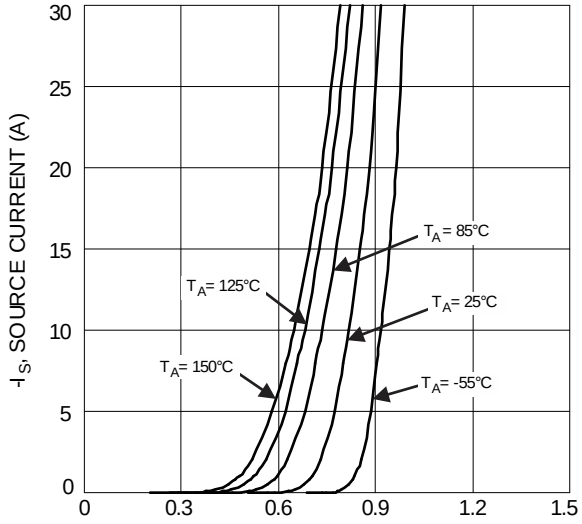


Figure 9 Diode Forward Voltage vs. Current

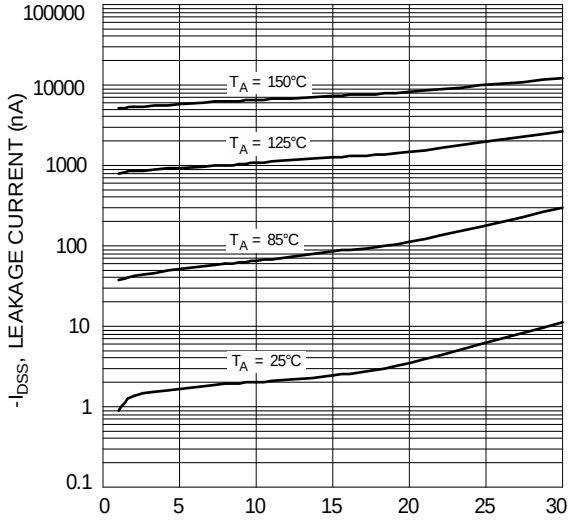


Figure 10 Typical Drain-Source Leakage Current vs. Voltage

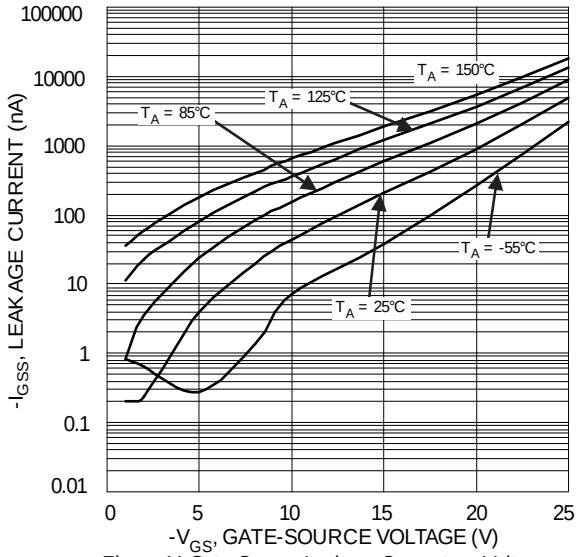


Figure 11 Gate-Source Leakage Current vs. Voltage

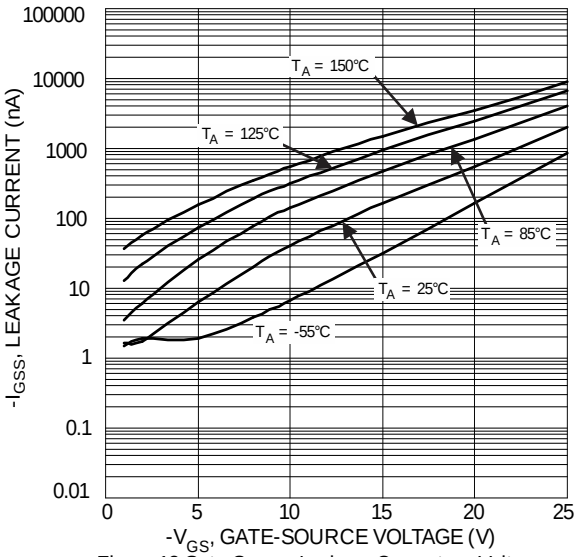


Figure 12 Gate-Source Leakage Current vs. Voltage

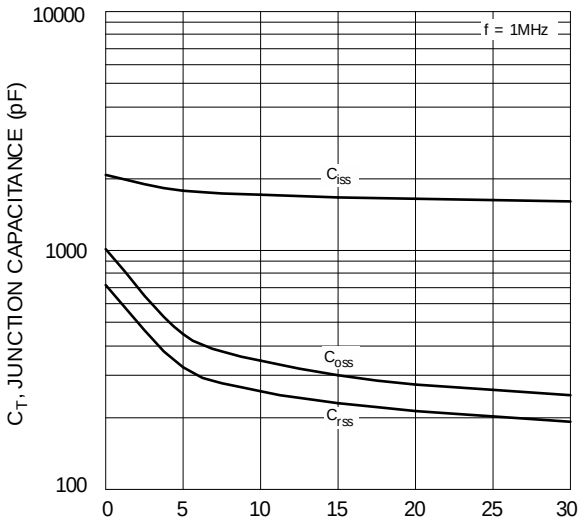


Figure 13 Typical Junction Capacitance

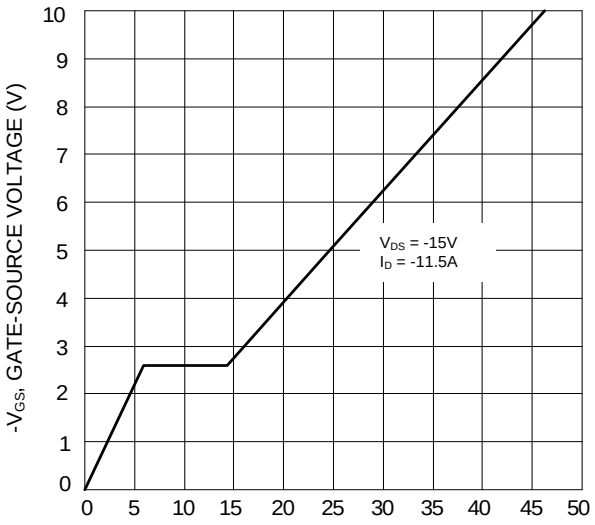


Figure 14 Gate Charge

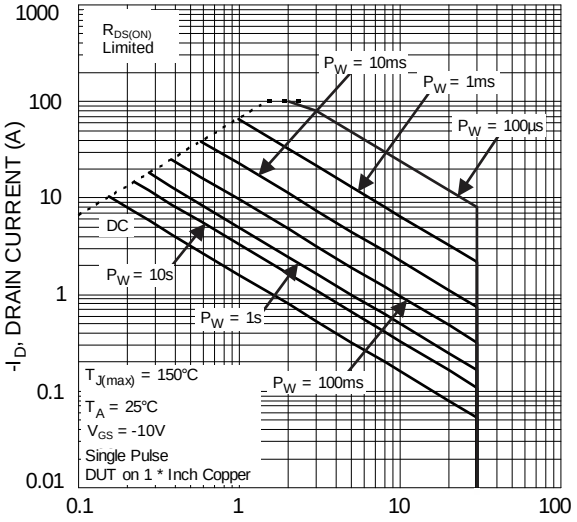


Figure 15 SOA, Safe Operation Area

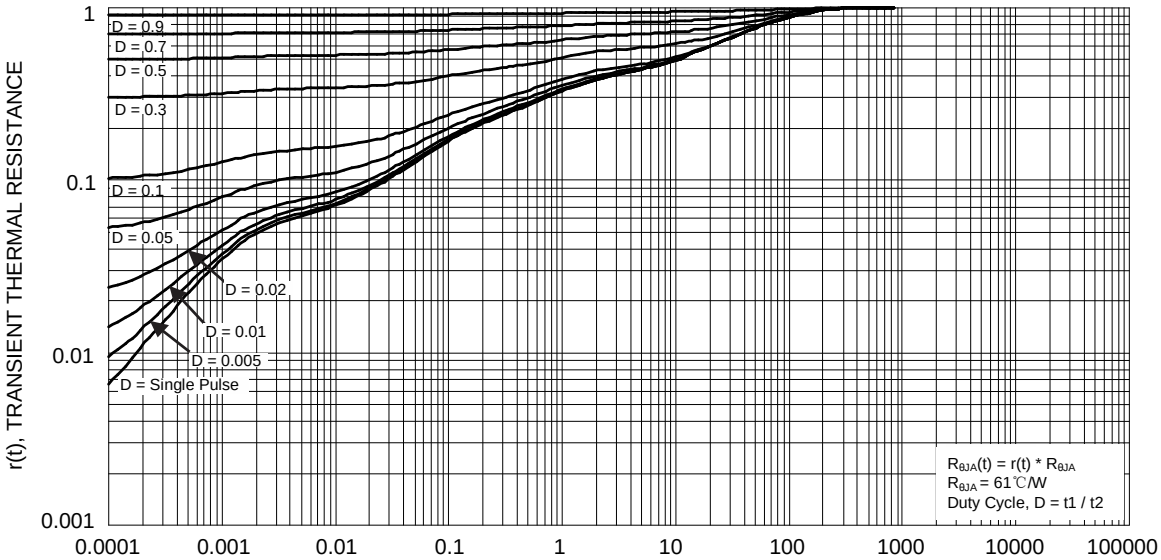
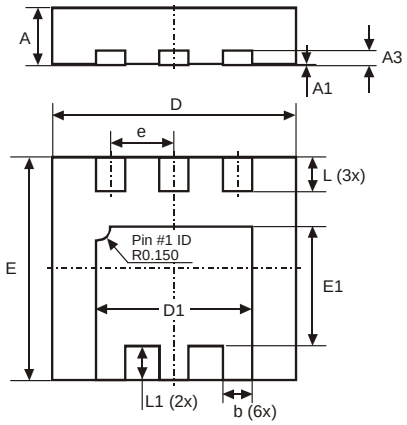


Figure 16 Transient Thermal Resistance

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.

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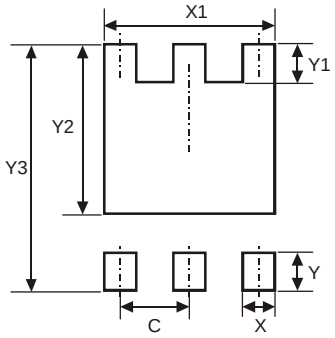

Dimensions	Value (in mm)
C	0.650
X	0.400
X1	1.700
Y	0.650
Y1	0.450
Y2	1.830
Y3	2.700

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