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Lead-free Green

DMP3013SFK

P-CHANNEL ENHANCEMENT MODE MOSFET

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

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)**

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.

Mechanical Data

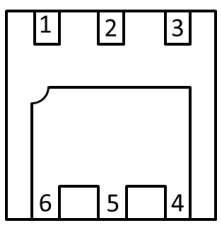
- Case: U-DFN2523-6
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.008 grams (Approximate)

Applications

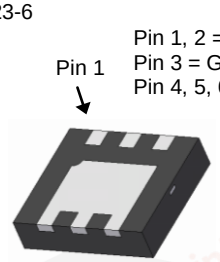
- Load Switch
- Power Management Functions
- DC-DC Converters

U-DFN2523-6

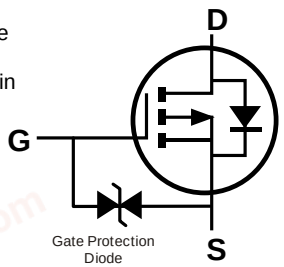




Pin Out Bottom View



Bottom View



Equivalent Circuit

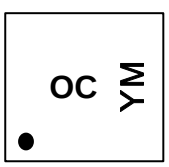
Ordering Information (Note 4)

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

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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.

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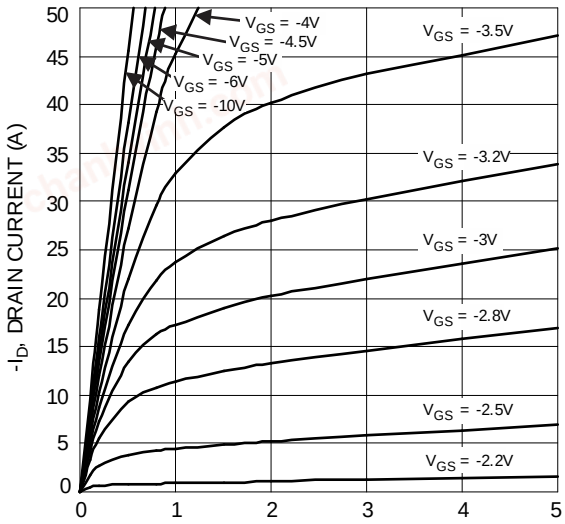


Figure 1 Typical Output Characteristics

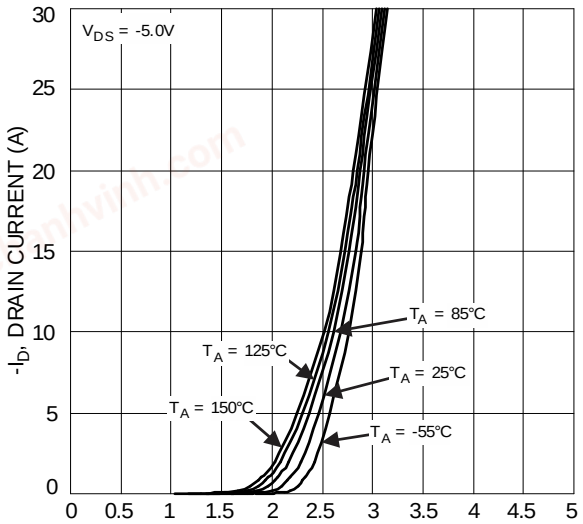


Figure 2 Typical Transfer Characteristics

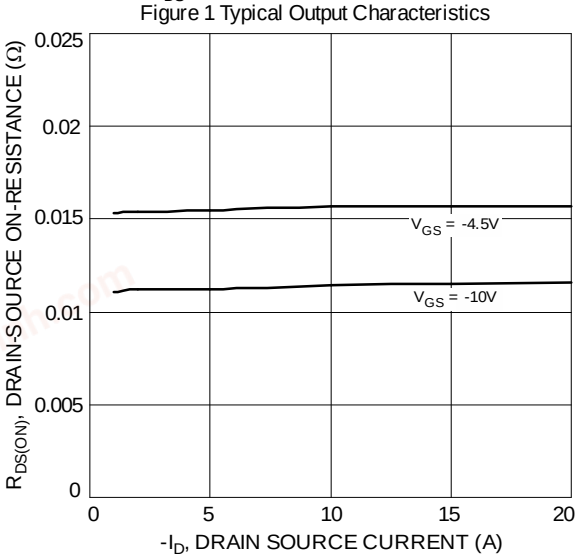


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

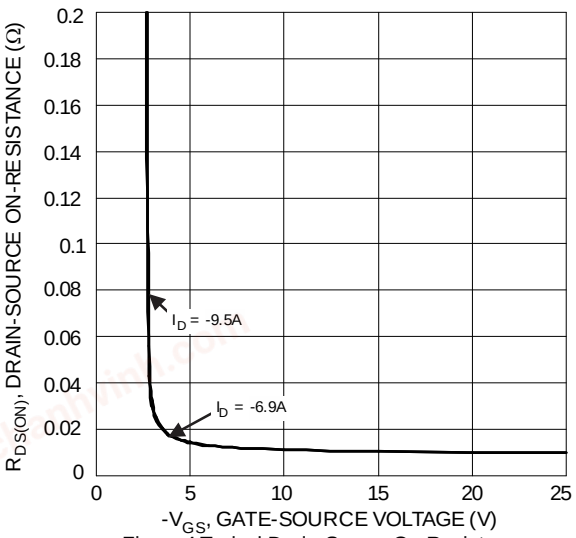


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

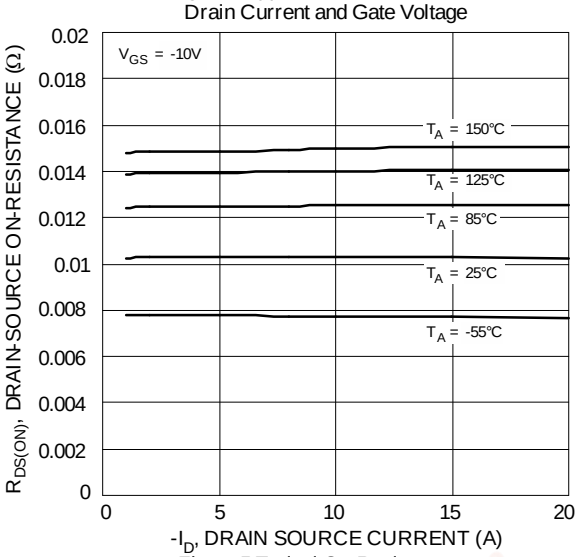


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

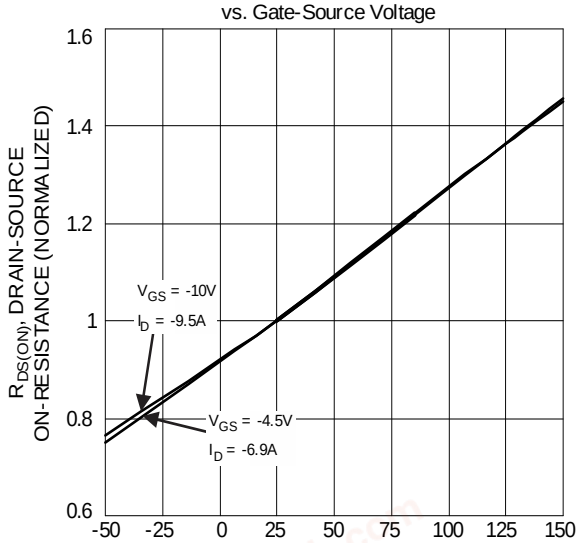


Figure 6 On-Resistance Variation with Temperature

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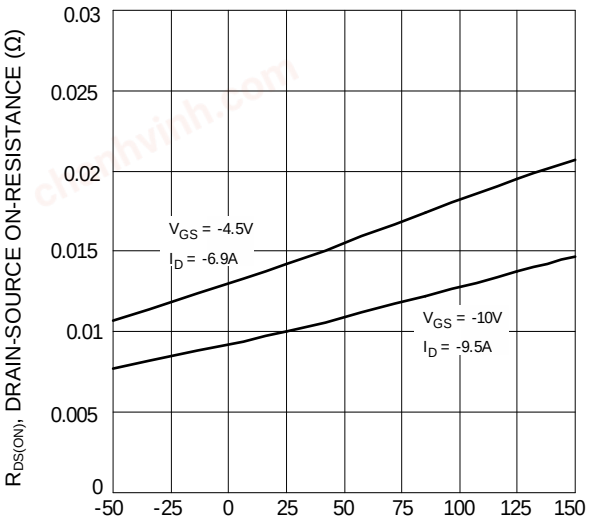


Figure 7 On-Resistance Variation with Temperature

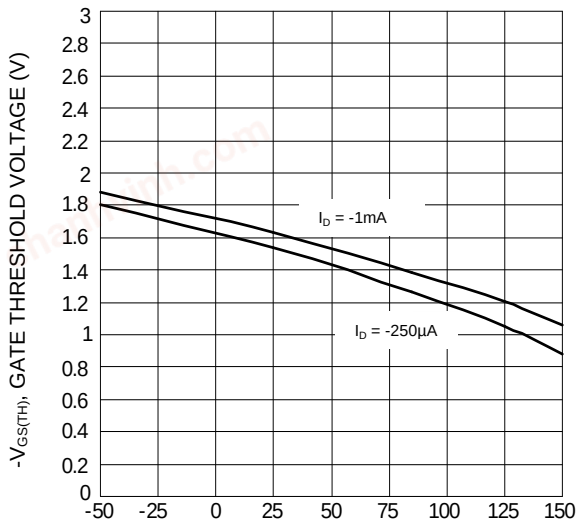


Figure 8 Gate Threshold Variation vs. Ambient Temperature

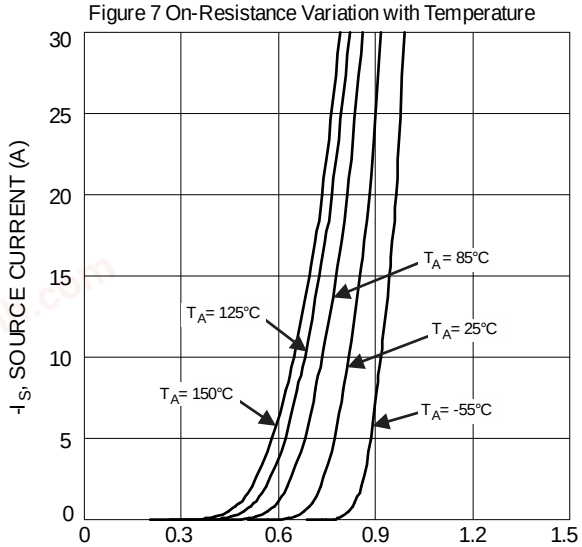


Figure 9 Diode Forward Voltage vs. Current

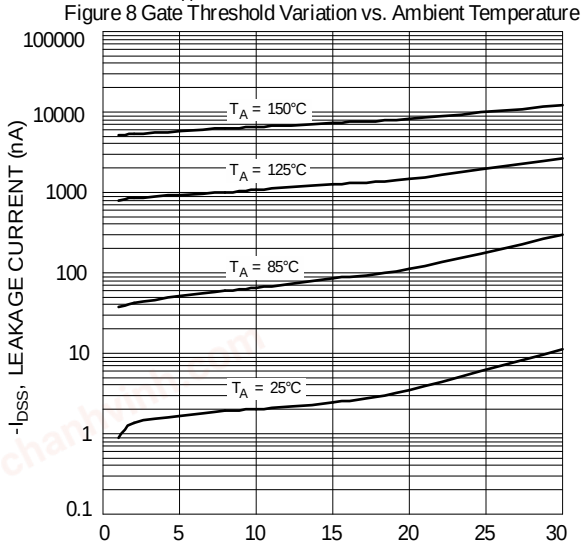


Figure 10 Typical Drain-Source Leakage Current vs. Voltage

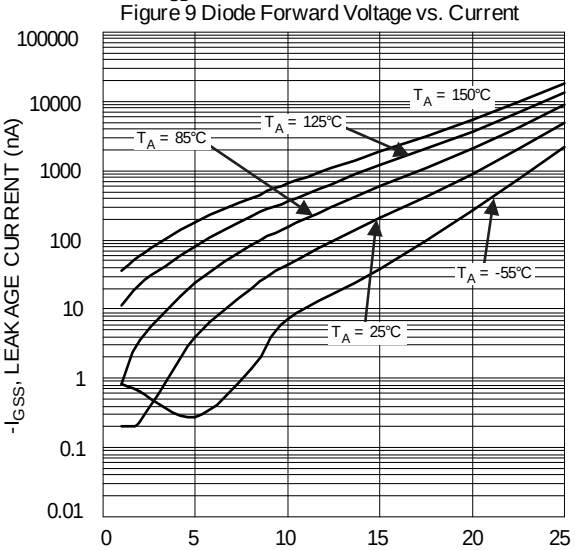


Figure 11 Gate-Source Leakage Current vs. Voltage

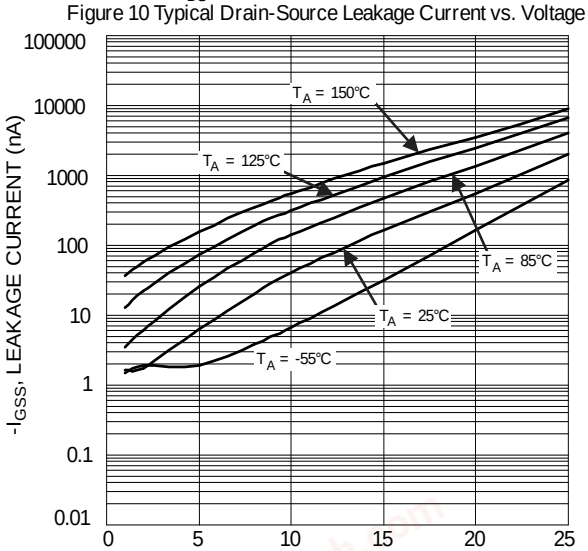


Figure 12 Gate-Source Leakage Current vs. Voltage

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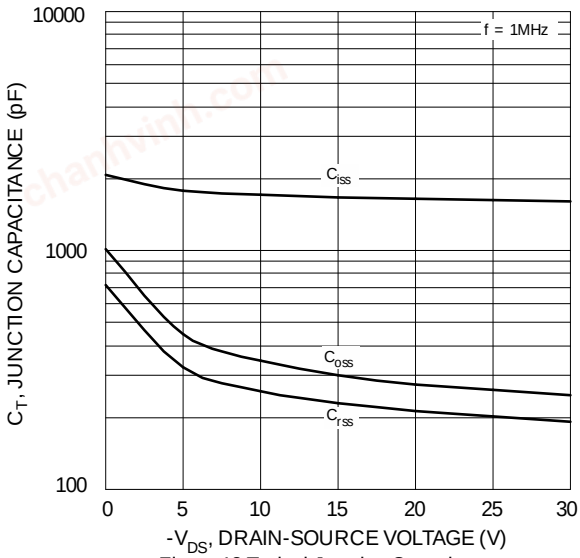


Figure 13 Typical Junction Capacitance

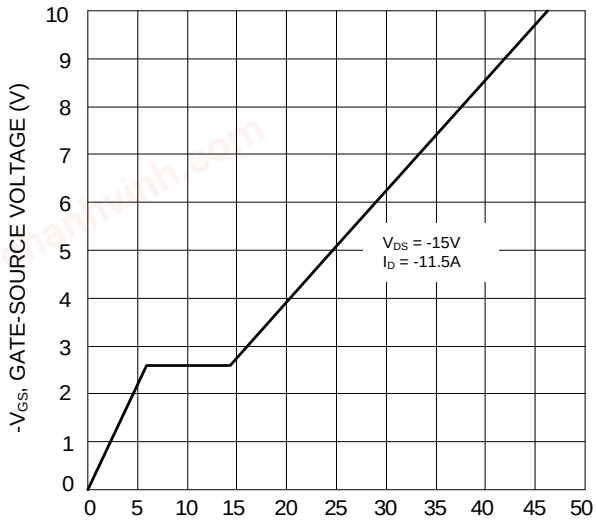


Figure 14 Gate Charge

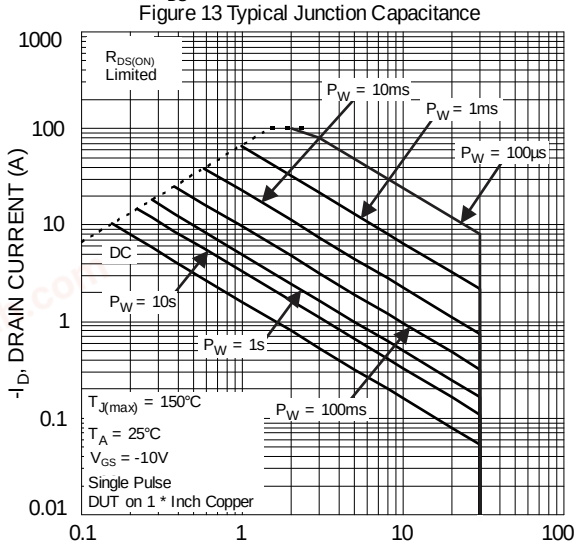


Figure 15 SOA, Safe Operation Area

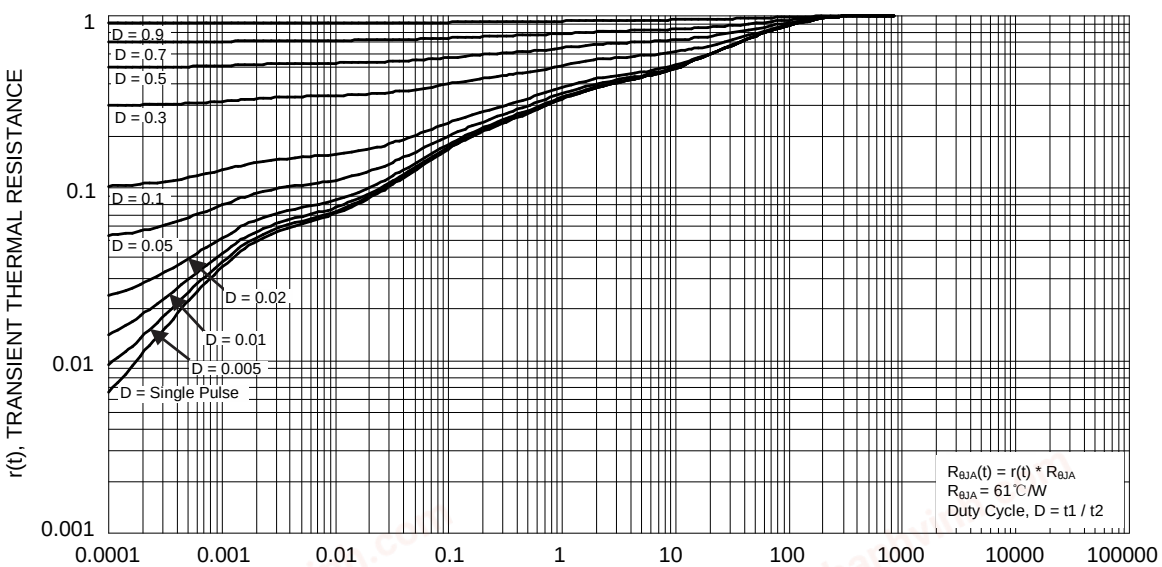


Figure 16 Transient Thermal Resistance

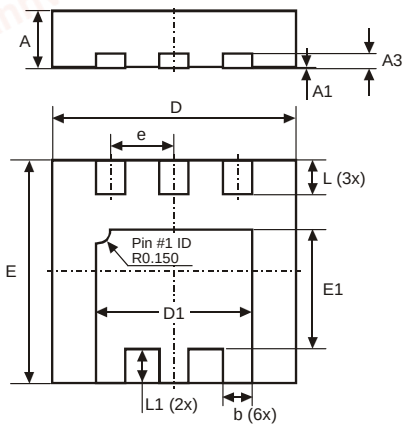
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Package Outline Dimensions

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

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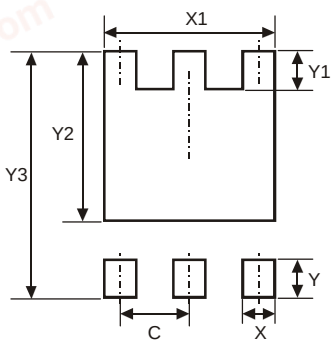


U-DFN2523-6			
Dim	**Min**	**Max**	**Typ**
A	0.57	0.63	0.60
A1	0	0.05	0.02
A3	-	-	0.152
b	0.25	0.35	0.30
D	2.45	2.55	2.50
D1	1.55	1.65	1.60
e	-	-	0.65
E	2.25	2.35	2.30
E1	1.18	1.28	1.23
L	0.30	0.40	0.35
L1	0.30	0.40	0.35
All Dimensions in mm			

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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