

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)max}$	$I_D$ $T_A = +25^\circ C$
-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**

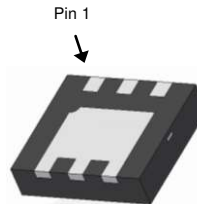
## Mechanical Data

- 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)

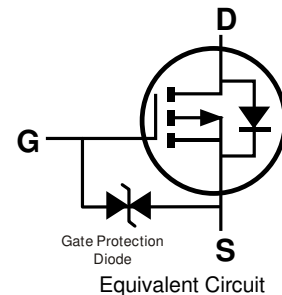


U-DFN2523-6

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



Bottom View



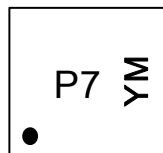
## Ordering Information (Note 4)

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	I <sub>D</sub>	-10.4	A
		T <sub>A</sub> = +70°C		-8.3	
Continuous Drain Current (Note 6) V <sub>GS</sub> = -4.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	-7.8	A
		T <sub>A</sub> = +70°C		-6.2	
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.

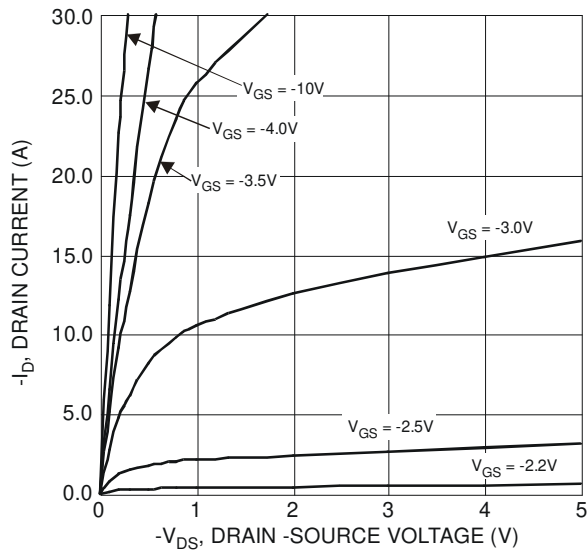


Figure 1 Typical Output Characteristics

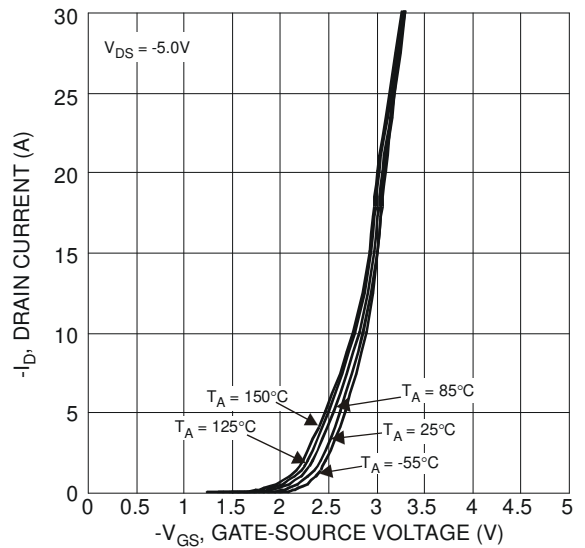


Figure 2 Typical Transfer Characteristics

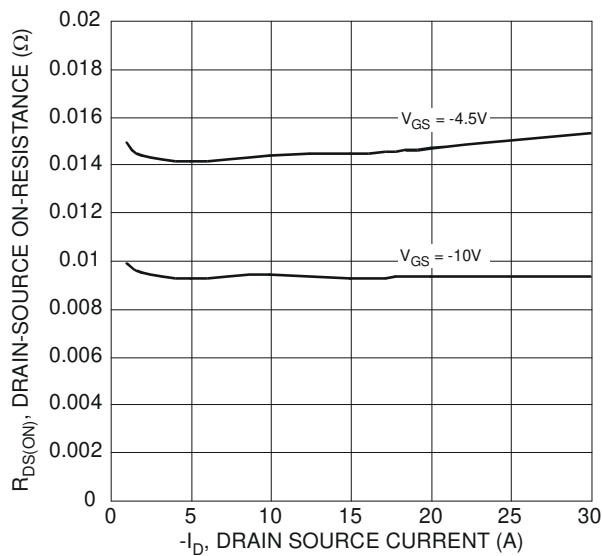


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

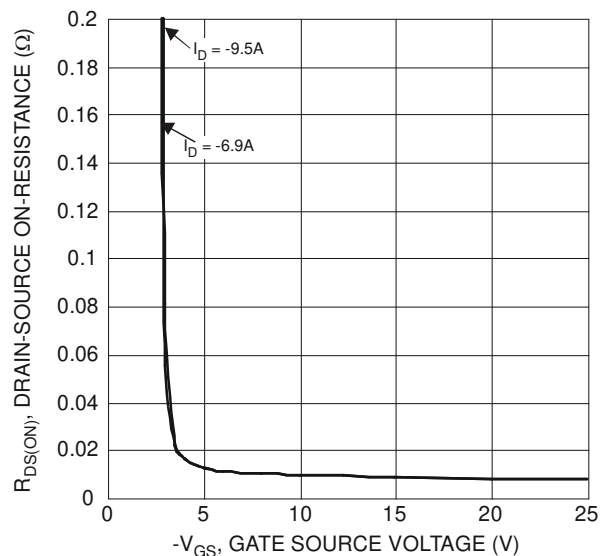


Figure 4 Typical Transfer Characteristics

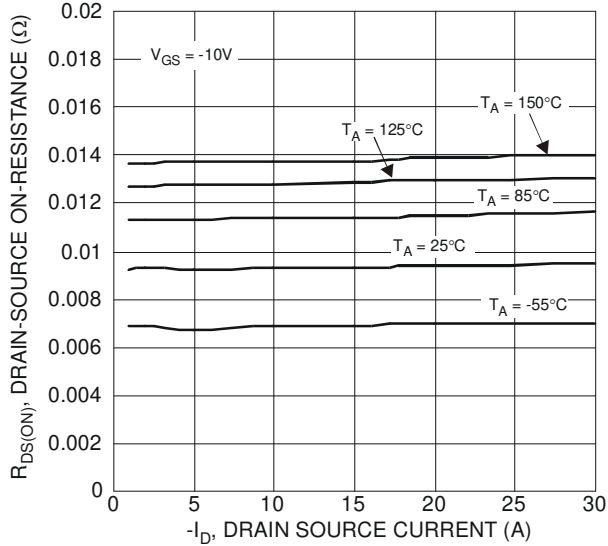


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

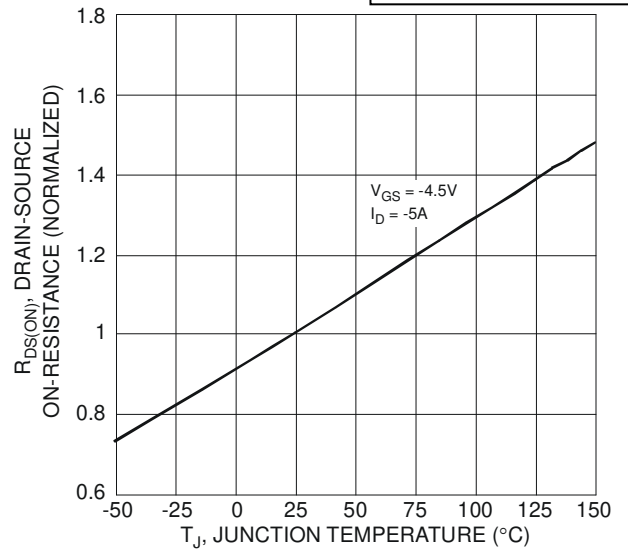


Figure 6 On-Resistance Variation with Temperature

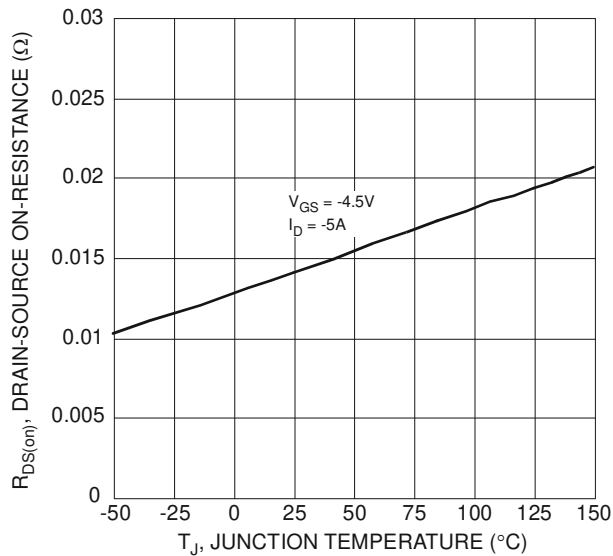


Figure 7 On-Resistance Variation with Temperature

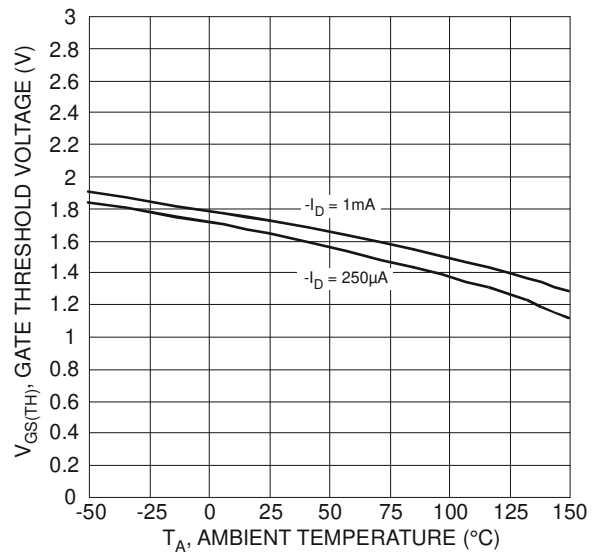


Figure 8 Gate Threshold Variation vs. Ambient Temperature

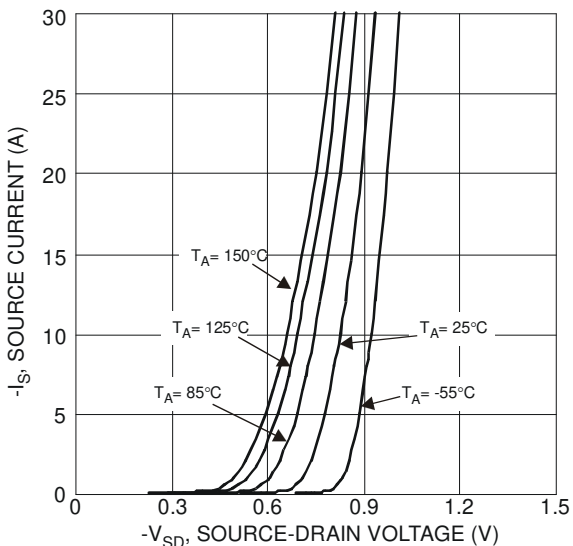


Figure 9 Diode Forward Voltage vs. Current

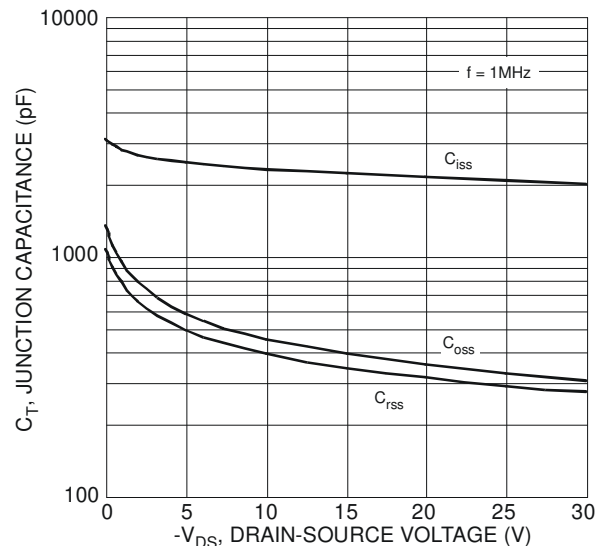


Figure 10 Typical Junction Capacitance

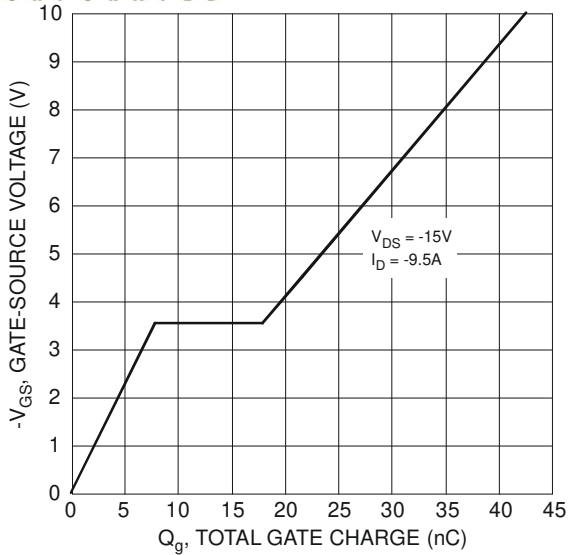


Figure 11 Gate-Charge Characteristics

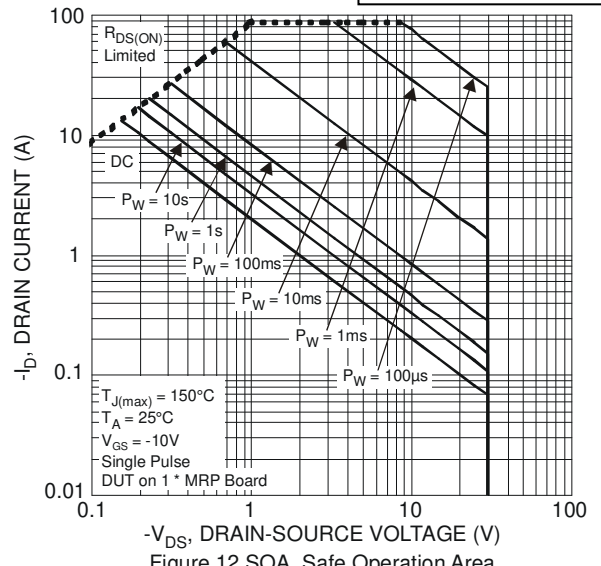


Figure 12 SOA, Safe Operation Area

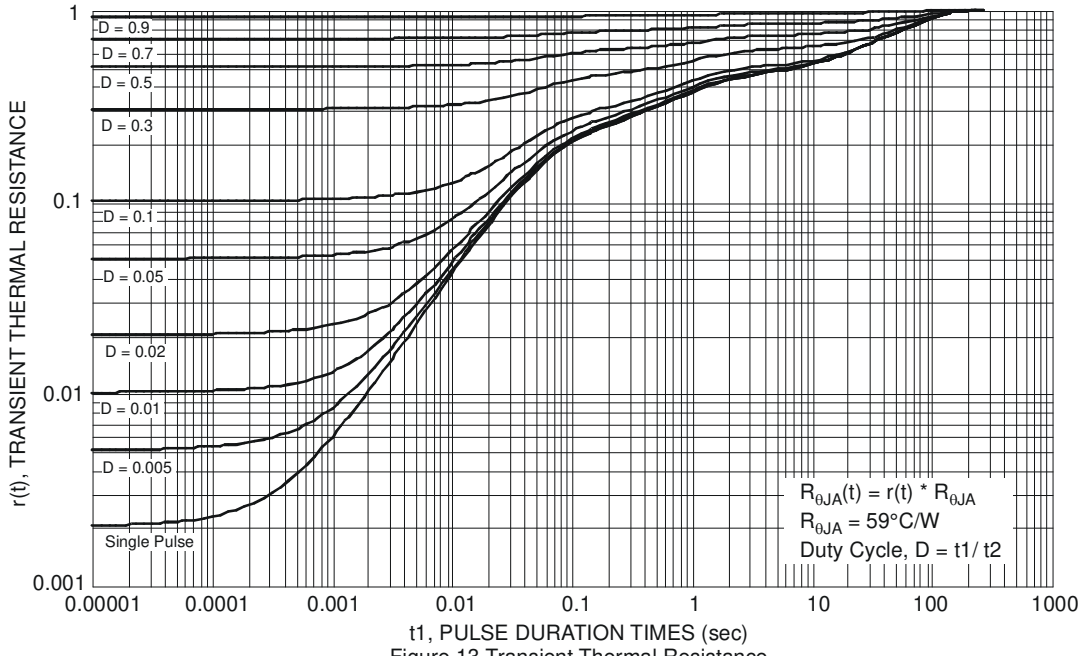
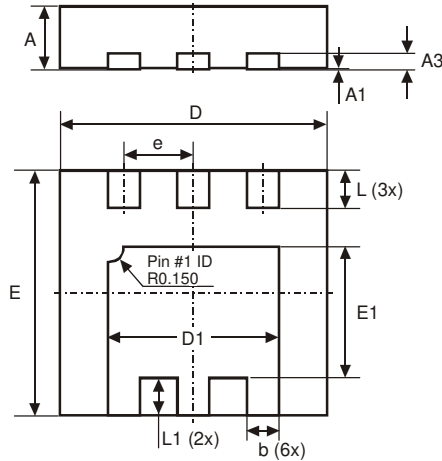


Figure 13 Transient Thermal Resistance

**Package Outline Dimensions**

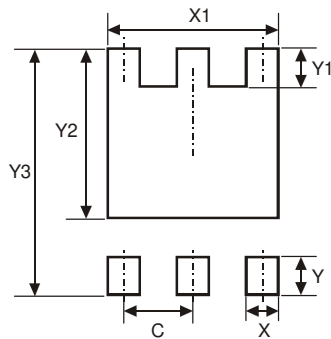
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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