

P-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)max}$	I_D $T_A = +25^\circ C$
-30V	14.5m Ω @ $V_{GS} = -10V$	-10.2A
	25.5m Ω @ $V_{GS} = -4.5V$	-7.7A

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

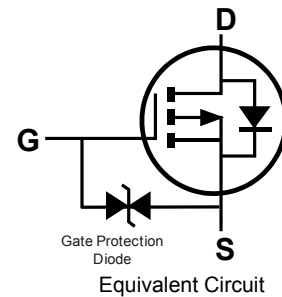
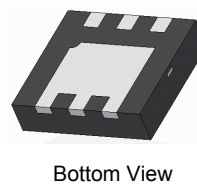
- Low On-Resistance
- Low Input Capacitance
- Low Input/Output Leakage
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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 (e4)
- Weight: 0.008 grams (Approximate)



U-DFN2523-6
 Pin 1
 Pin 1, 2 = Source
 Pin 3 = Gate
 Pin 4, 5, 6 = Drain

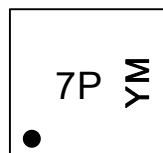
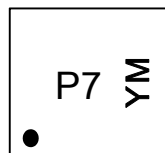

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP3018SFK-7	U-DFN2523-6	3,000/Tape & Reel
DMP3018SFK-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 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
 7P = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: B = 2014)
 M = Month (ex: 9 = September)

Date Code Key

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

Month Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
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	-10.2 -8.1	A
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-7.7 -6.1	A
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	-3	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}	104	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P _D	1	W
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	123	°C/W
Total Power Dissipation (Note 6)		P _D	2.2	W
Thermal Resistance, Junction to Ambient (Note 6)		R _{θJA}	55	°C/W
Total Power Dissipation (Note 6)	T _C = +25°C	P _D	17	W
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	7.2	°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 = -10mA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	µA	V _{DS} = -24V, V _{GS} = 0V
Zero Gate Voltage Drain Current T _J = +150°C (Note 9)		—	—	-100		
Gate-Source Leakage	I _{GSS}	—	—	±10	µA	V _{GS} = ±25V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(th)}	-1	-1.6	-3	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(on)}	—	9.5	14.5	mΩ	V _{GS} = -10V, I _D = -9.5A
		—	15	25.5		V _{GS} = -4.5V, I _D = -6.9A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
On State Drain Current (Note 9)	I _{D(on)}	-20	—	—	A	V _{DS} ≤ 5V, V _{GS} = -10V
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	2,207	4,414	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	390	780		
Reverse Transfer Capacitance	C _{rss}	—	343	686		
Gate Resistance	R _g	—	8.4	20	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -10V)	Q _g	—	42.7	90	nC	V _{DS} = -15V, I _D = -9.5A
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	21.6	45		
Gate-Source Charge	Q _{gs}	—	7.9	16		
Gate-Drain Charge	Q _{gd}	—	10	20		
Turn-On Delay Time	t _{D(on)}	—	7.35	15	ns	V _{DD} = -15V, V _{GS} = -10V, R _{GEN} = 6Ω, I _D = -9.5A
Turn-On Rise Time	t _r	—	16.4	30		
Turn-Off Delay Time	t _{D(off)}	—	67.2	110		
Turn-Off Fall Time	t _f	—	37.5	60		
Reverse Recovery Time	t _{rr}	—	18.6	35	ns	I _S = -9.5A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{rr}	—	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 1inch square copper plate.
 - UIS in production with L = 1mH, T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

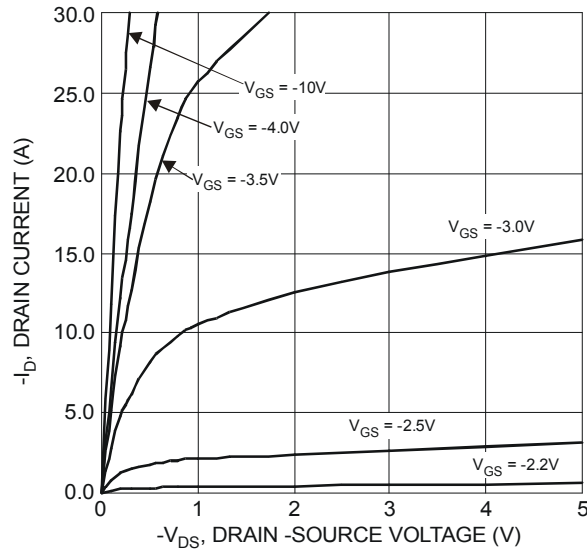


Figure 1 Typical Output Characteristics

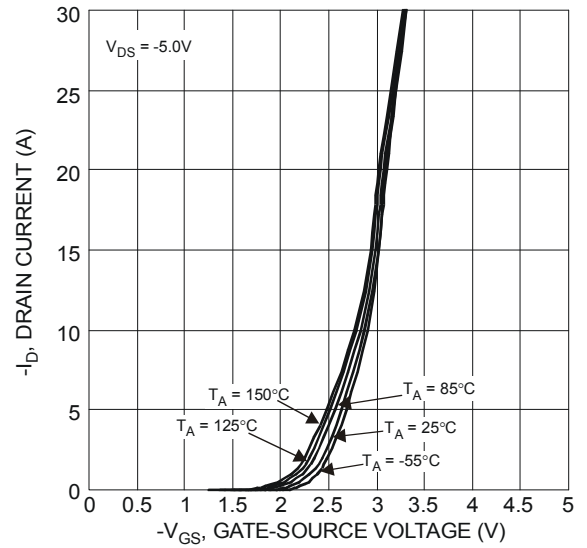


Figure 2 Typical Transfer Characteristics

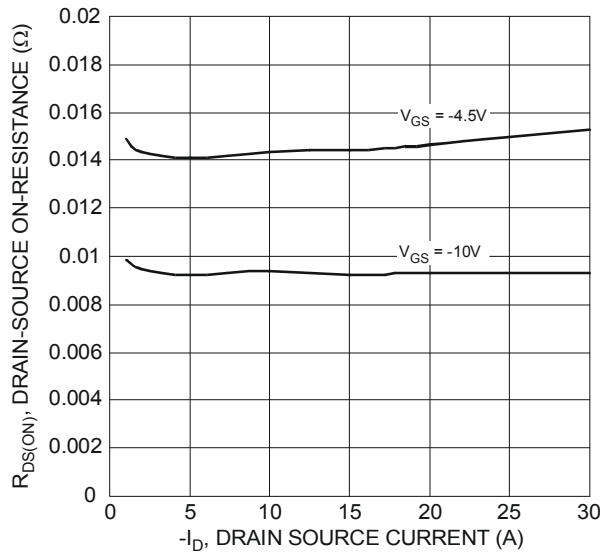


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

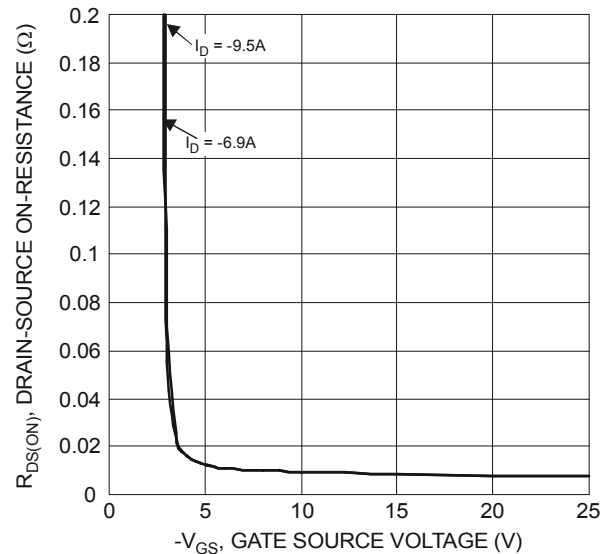


Figure 4 Typical Transfer Characteristics

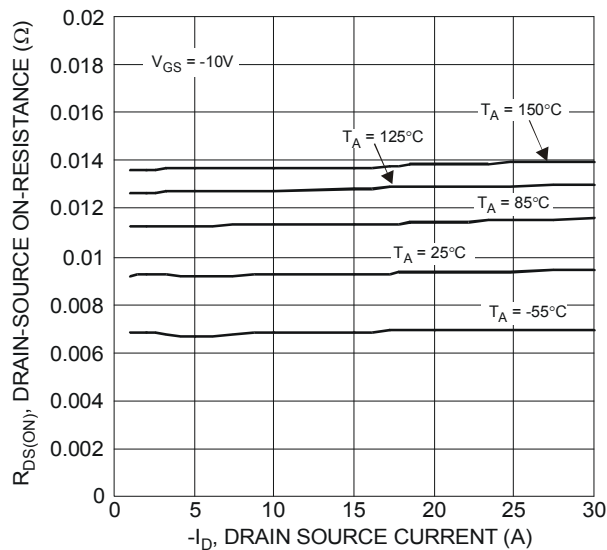


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

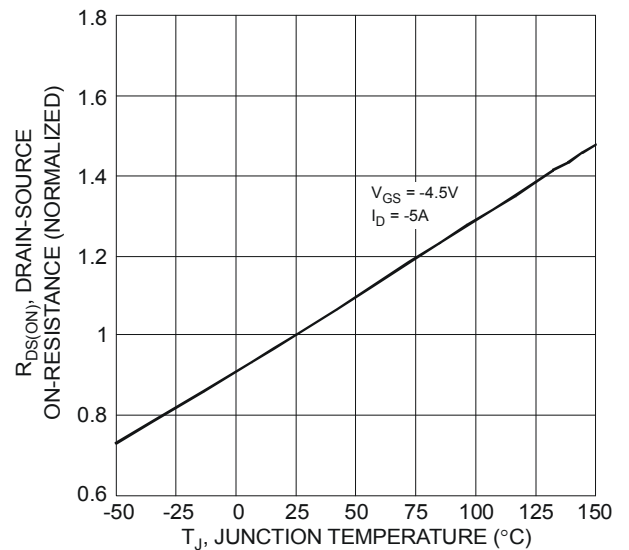
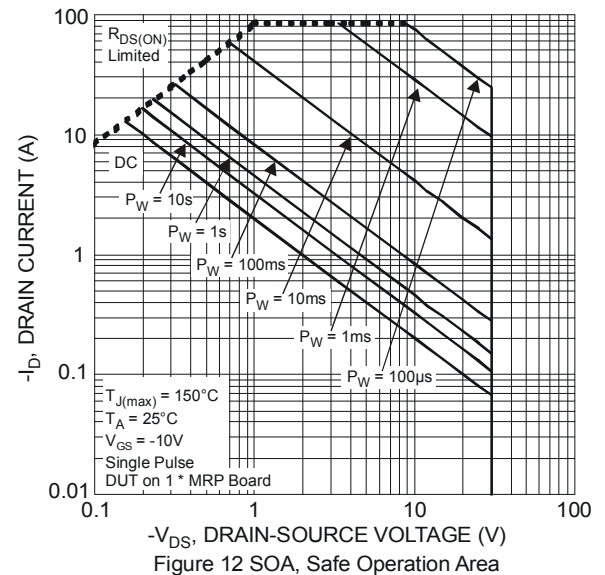
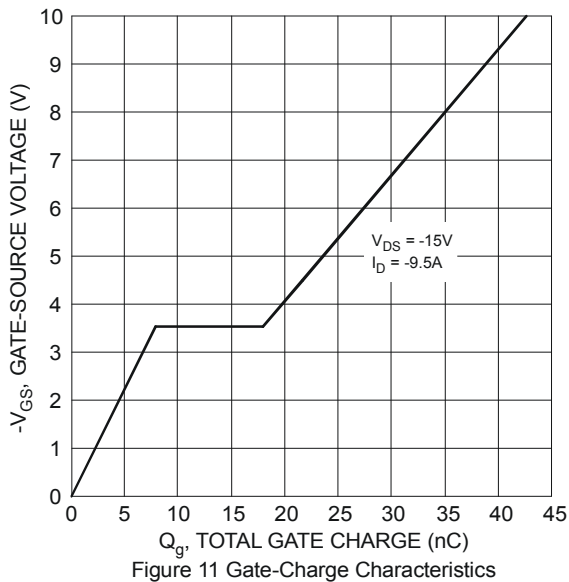
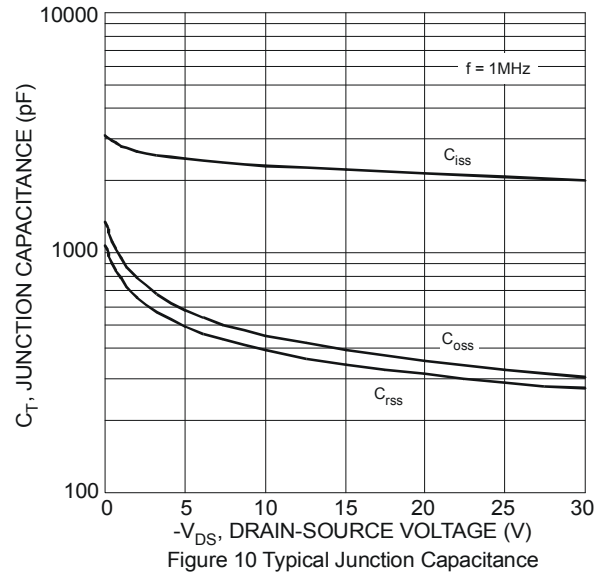
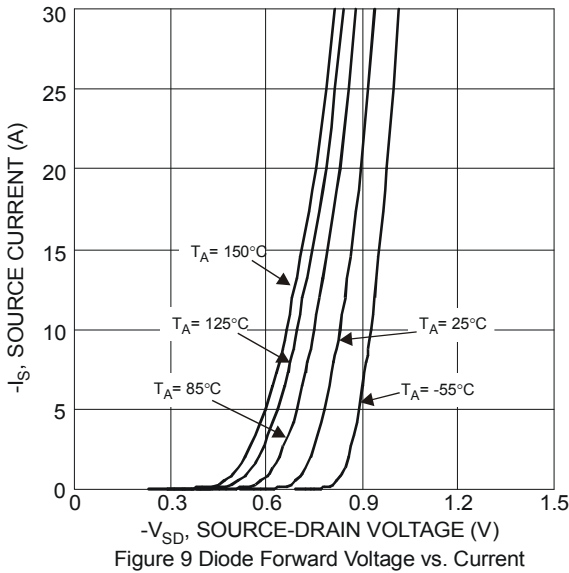
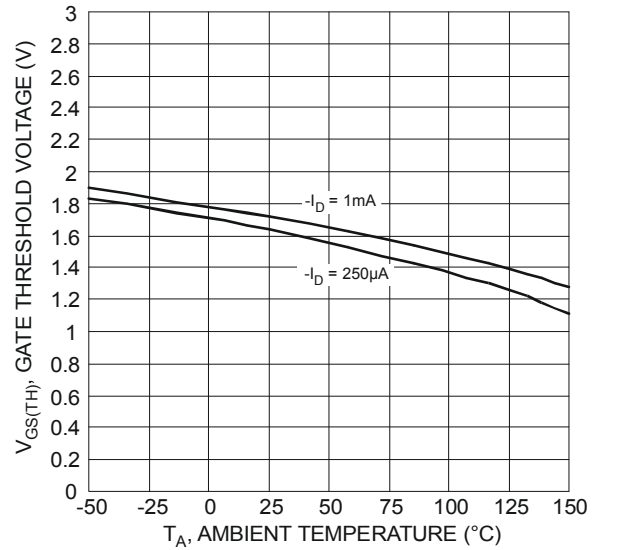
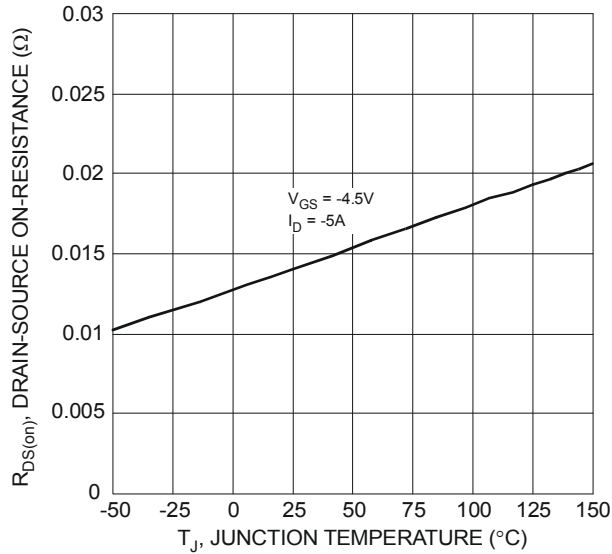
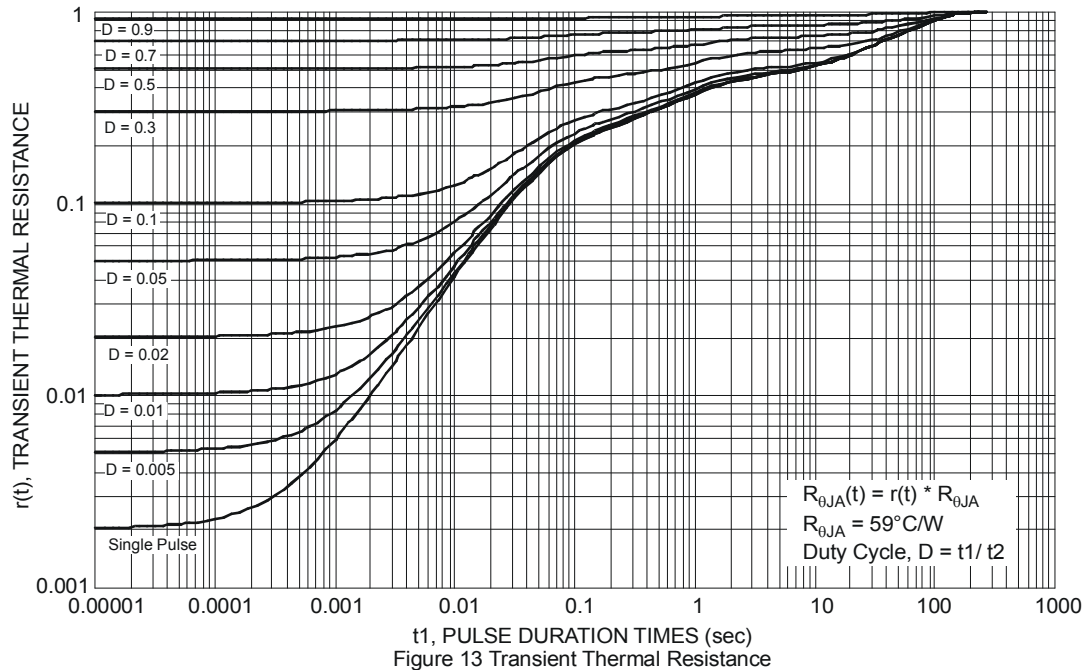


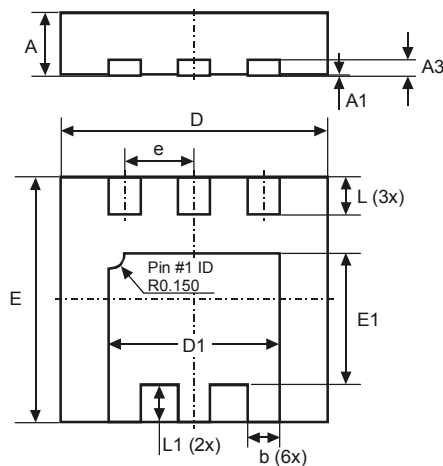
Figure 6 On-Resistance Variation with Temperature





Package Outline Dimensions

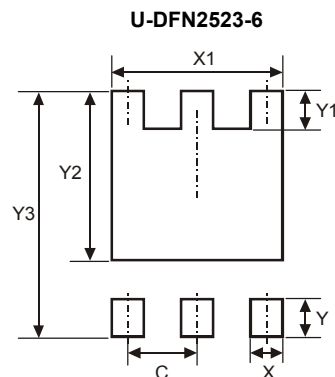
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331