

20V P-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

V _{(BR)DSS}	R _{DS(ON)} max	Package	I _D max T _A = +25°C
-20V	60mΩ @ V _{GS} = -4.5V	SOT-23	-4.0A
	90mΩ @ V _{GS} = -2.5V		-3.3A

Description and Applications

This 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.

Features

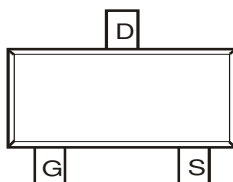
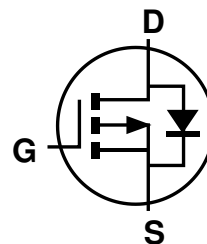
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under separate datasheet ([DMP2065UQ](#))**

Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe
Solderable per MIL-STD-202, Method 208 **e3**
- Terminal Connections: See Diagram
- Weight: 0.009 grams (Approximate)



Top View

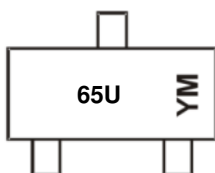

 Top View
Pin Configuration


Equivalent Circuit

Ordering Information (Note 4)

Part Number	Package	Packaging
DMP2065U-7	SOT23	3000/Tape & Reel
DMP2065U-13	SOT23	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


65U = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: L = 2024)
 M = Month (ex: 9 = September)

Date Code Key

Year	2020	2021	2022	2023	2024	2025	2026
Code	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 (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	-20	V
Gate-Source Voltage	V_{GSS}	± 12	V
Drain Current (Note 6) $V_{GS} = -4.5\text{V}$ Steady State $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-4.0 -3.0	A
Pulsed Drain Current (Pulse width $\leq 10\mu\text{s}$, Duty Cycle $\leq 1\%$)	I_{DM}	-15	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5) Steady State	$R_{\theta JA}$	138	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	P_D	1.5	W
Thermal Resistance, Junction to Ambient (Note 6) Steady State	$R_{\theta JA}$	83	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	-1.0	μA	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 50	nA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	—	-0.9	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	41	60	m Ω	$V_{GS} = -4.5\text{V}, I_D = -4.2\text{A}$
			53	90		$V_{GS} = -2.5\text{V}, I_D = -3.4\text{A}$
			72	113		$V_{GS} = -1.8\text{V}, I_D = -2.0\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.1	V	$V_{GS} = 0\text{V}, I_S = -1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	808	—	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	85	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	77	—	pF	
Gate Resistance	R_G	—	15.2	—	Ω	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge	Q_g	—	10.2	—	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -4\text{V}, I_D = -3.5\text{A}$
Gate-Source Charge	Q_{gs}	—	1.3	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.2	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	10.8	—	ns	$V_{DS} = -4\text{V}, V_{GS} = -4.5\text{V},$ $R_L = 4\Omega, R_G = 6\Omega, I_D = -1\text{A}$
Turn-On Rise Time	t_r	—	13.7	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	79.3	—	ns	
Turn-Off Fall Time	t_f	—	34.7	—	ns	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1in. square copper plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

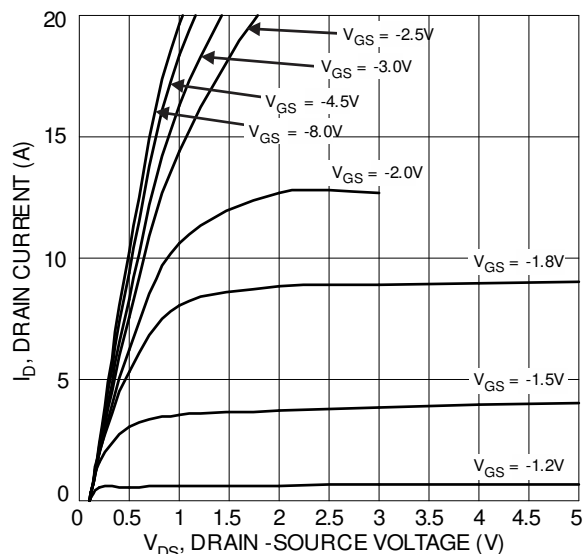


Figure 1 Typical Output Characteristics

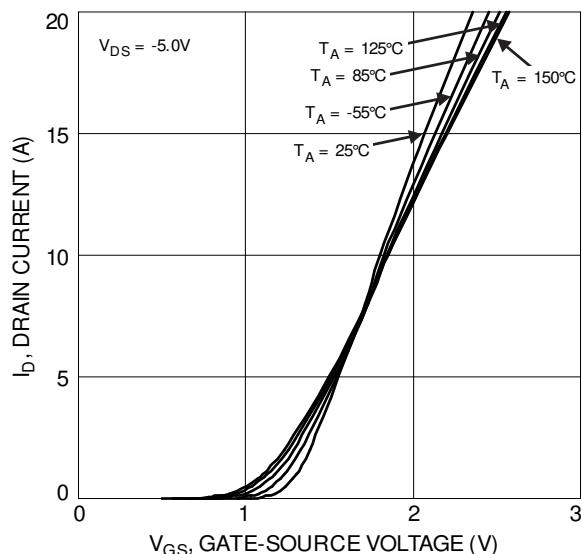


Figure 2 Typical Transfer Characteristics

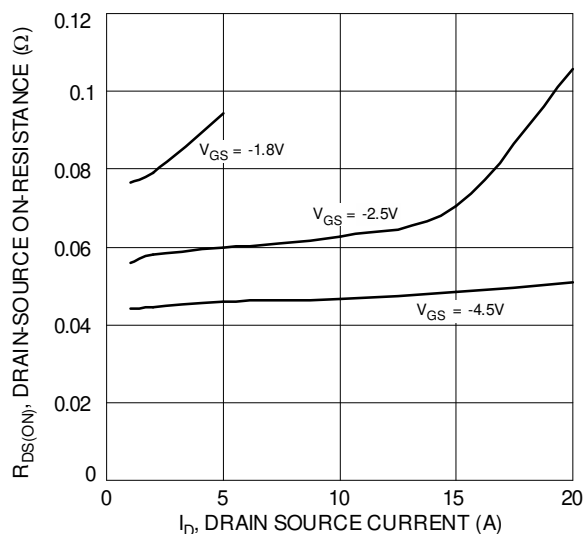


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

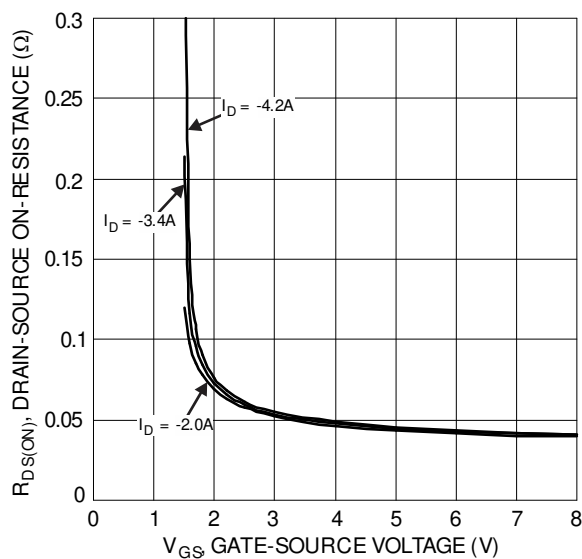


Figure 4 Typical Transfer Characteristics

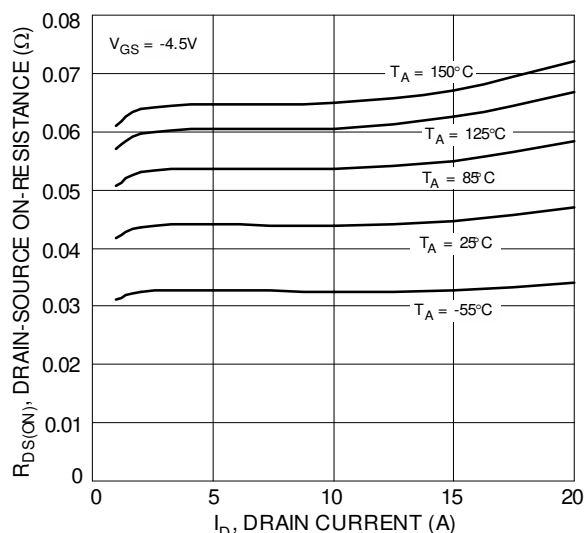


Figure 5 Typical On-Resistance vs. Drain Current and Junction Temperature

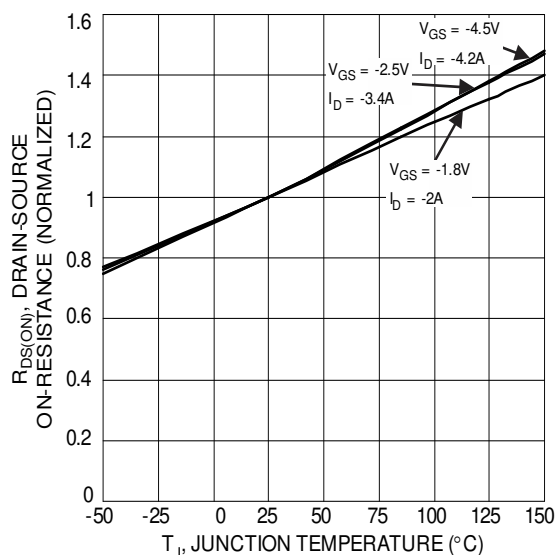
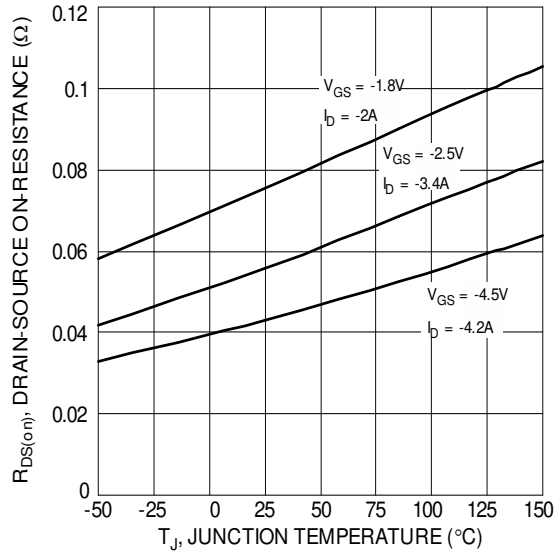
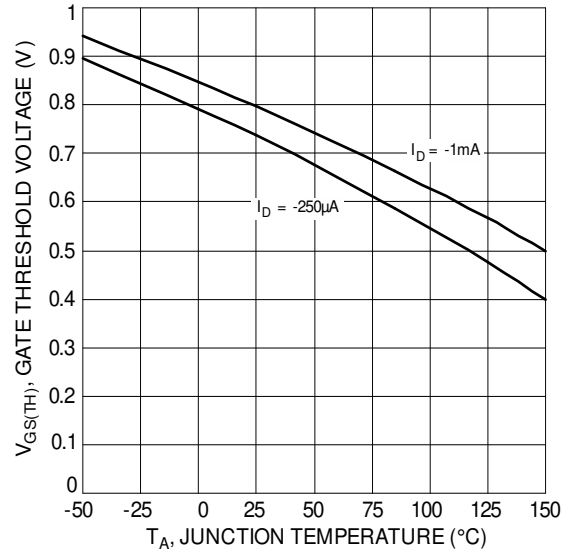
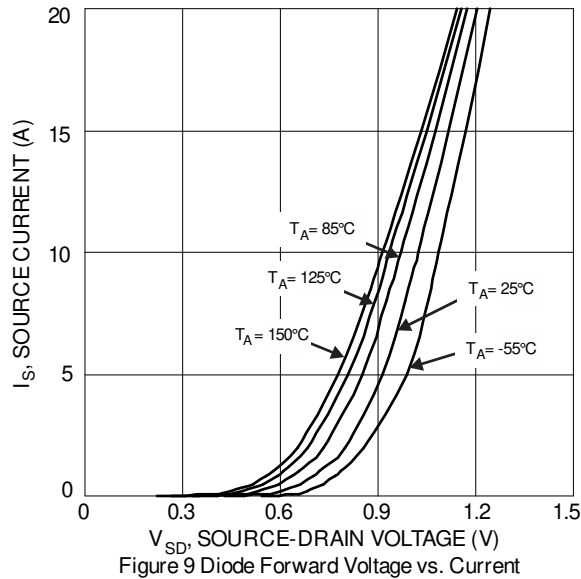
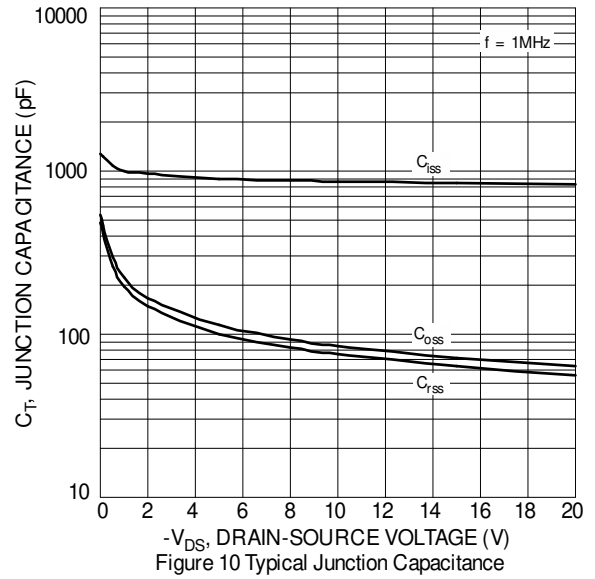
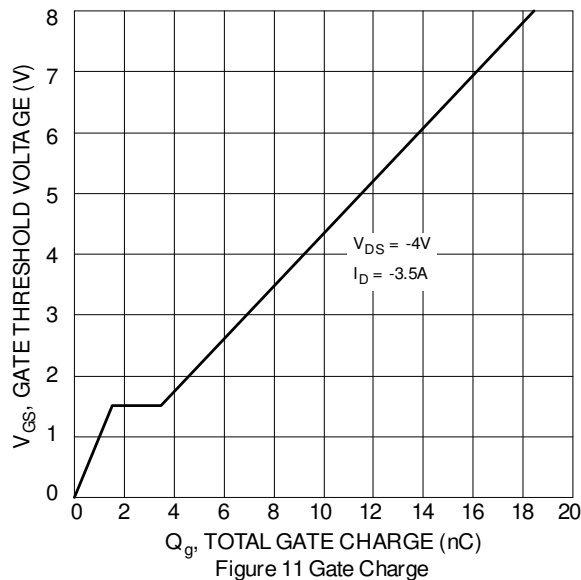
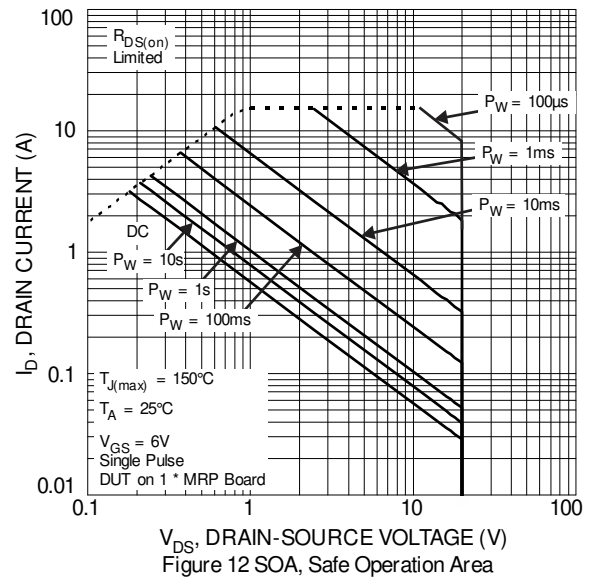
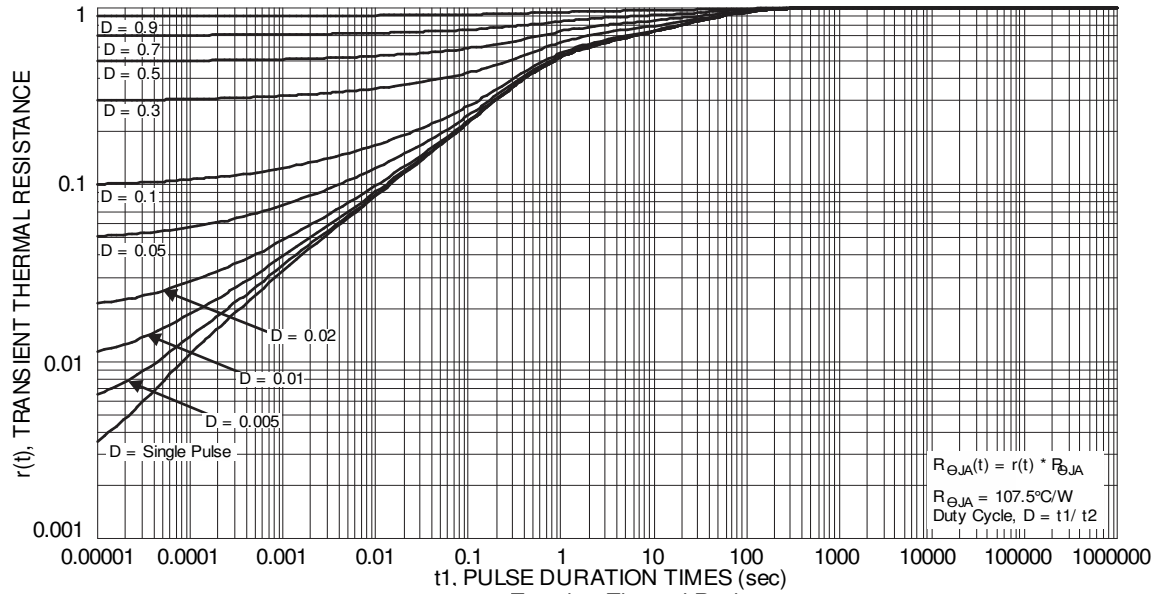


Figure 6 On-Resistance Variation with Junction Temperature

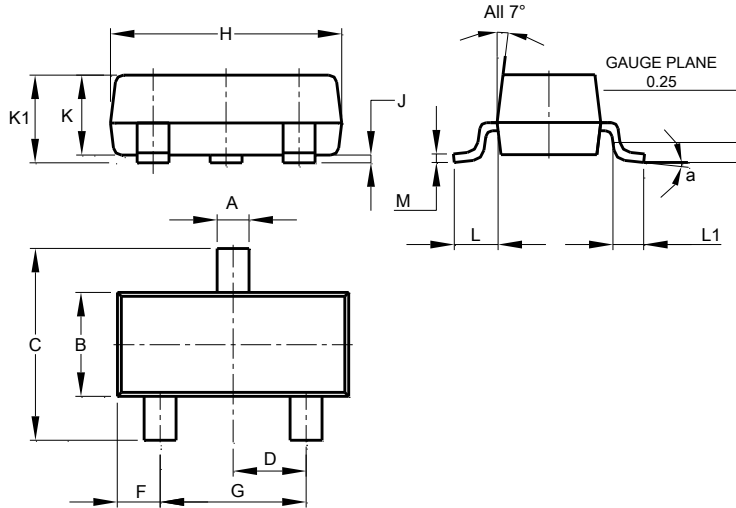




Package Outline Dimensions

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

SOT23

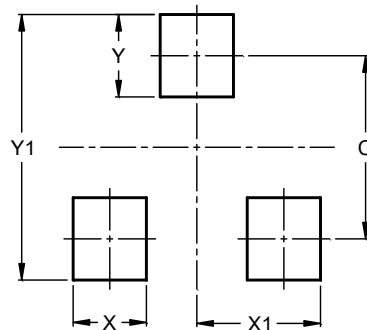


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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