

Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D max $T_A = +25^\circ\text{C}$
-40V	80m Ω @ $V_{GS} = -10\text{V}$	-3.4A
	100m Ω @ $V_{GS} = -4.5\text{V}$	-3.0A

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors

Features and Benefits

- Low On-Resistance
- 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)**
- **PPAP Capable (Note 4)**

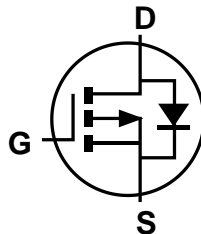
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. 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
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

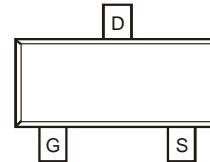
SOT23



Top View



Internal Schematic



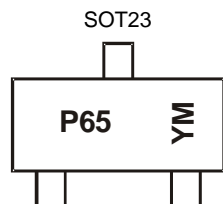
Top View

Ordering Information (Note 5)

Part Number	Case	Packaging
DMP4065SQ-7	SOT23	3,000/Tape & Reel
DMP4065SQ-13	SOT23	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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



P65 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: E = 2017)
 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_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-40	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _A = +25°C	I _D	-2.4	A
		T _A = +70°C		-1.9	
Continuous Drain Current (Note 7) V _{GS} = -10V	Steady State	T _A = +25°C	I _D	-3.4	A
		T _A = +70°C		-2.7	
Pulsed Drain Current			I _{DM}	-20	A
Avalanche Current, L = 0.1mH			I _{AS}	-14	A
Avalanche Energy, L = 0.1mH			E _{AS}	9.8	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	0.72	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	R _{θJA}	171	°C/W
Power Dissipation (Note 7)	P _D	1.4	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	R _{θJA}	90	°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}	-40	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1.0	μA	V _{DS} = -40V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	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)}	—	64	80	mΩ	V _{GS} = -10V, I _D = -4.2A
			85	100		V _{GS} = -4.5V, I _D = -3.3A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{ISS}	—	587	—	pF	V _{DS} = -20V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{OSS}	—	88	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	40	—	pF	
Gate Resistance	R _g	—	14.4	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	6.1	—	nC	V _{DS} = -20V, I _D = -4.2A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	12.2	—	nC	
Gate-Source Charge	Q _{gs}	—	1.8	—	nC	
Gate-Drain Charge	Q _{gd}	—	2.4	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.6	—	ns	V _{DD} = -15V, V _{GS} = -10V, I _D = -1.0A, R _G = 6Ω
Turn-On Rise Time	t _R	—	2.9	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	36.3	—	ns	
Turn-Off Fall Time	t _F	—	15.3	—	ns	

- Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing.

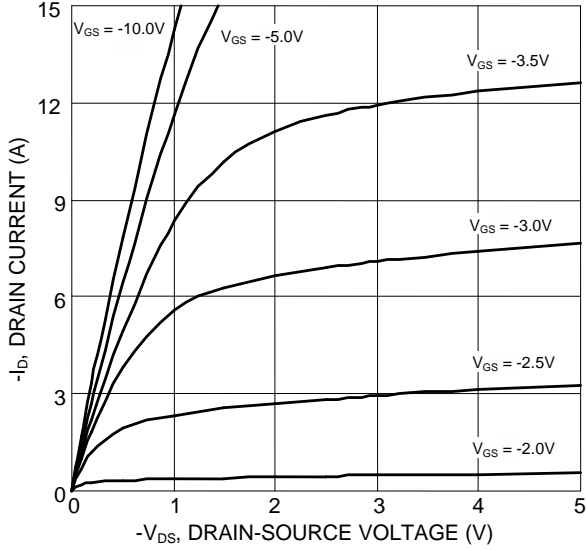


Figure 1 Typical Output Characteristic

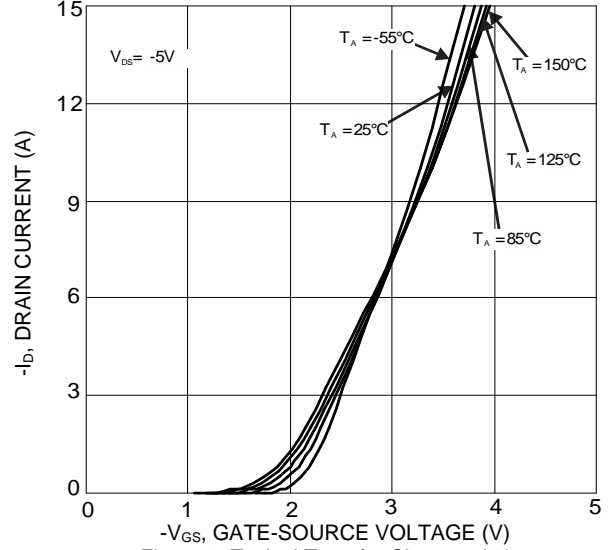


Figure 2. Typical Transfer Characteristics

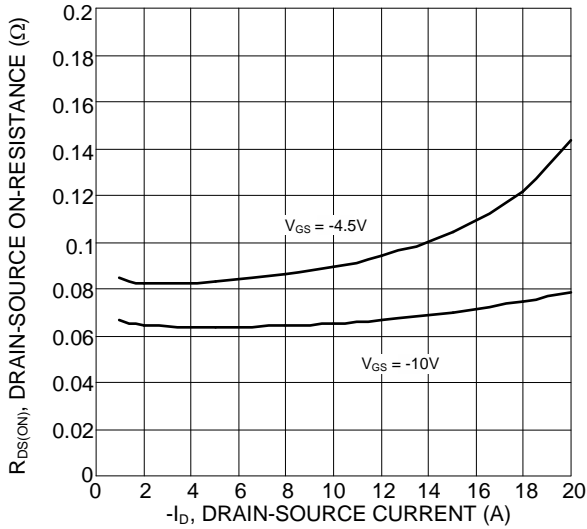


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

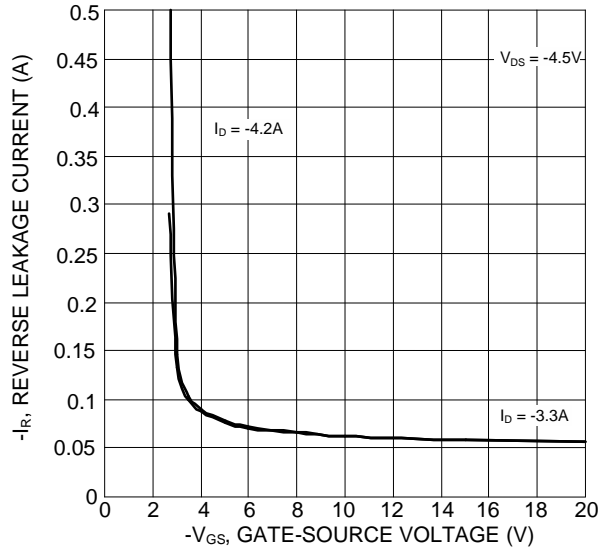


Figure 4 Typical Transfer Characteristics

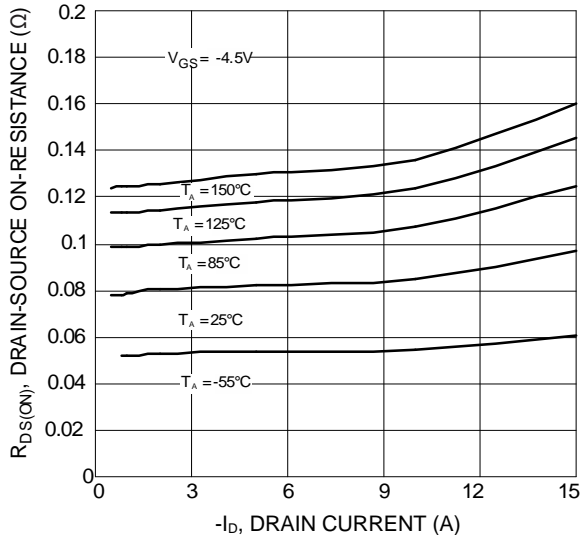


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

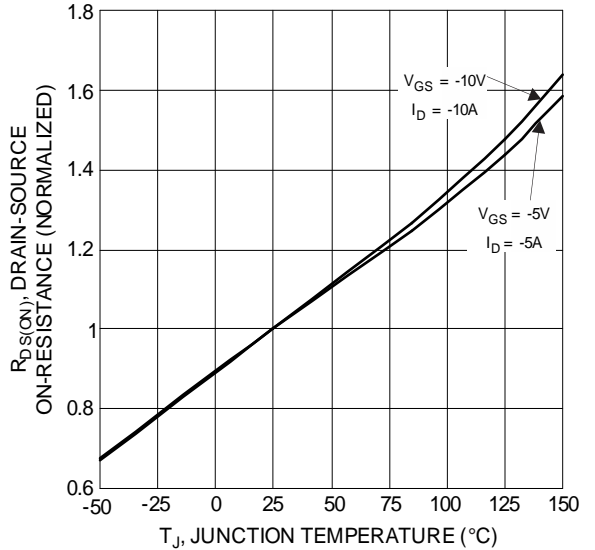


Figure 6 On-Resistance Variation with Temperature

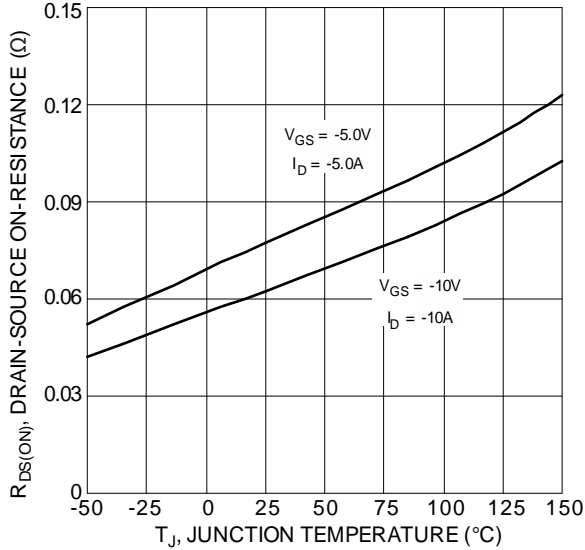


Figure 7 On-Resistance Variation with Temperature

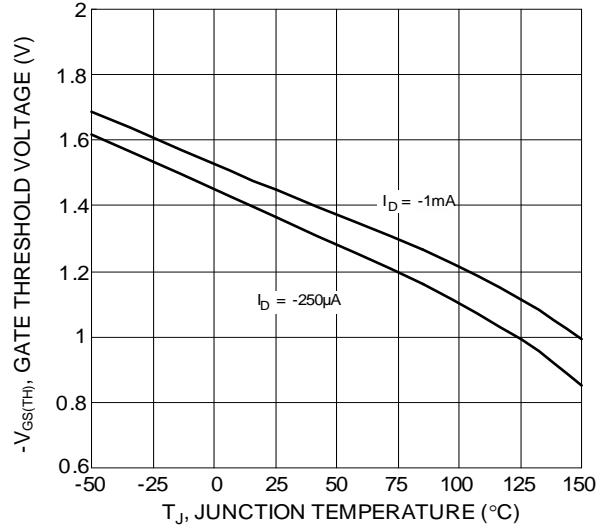


Figure 8 Gate Threshold Variation vs. Junction Temperature

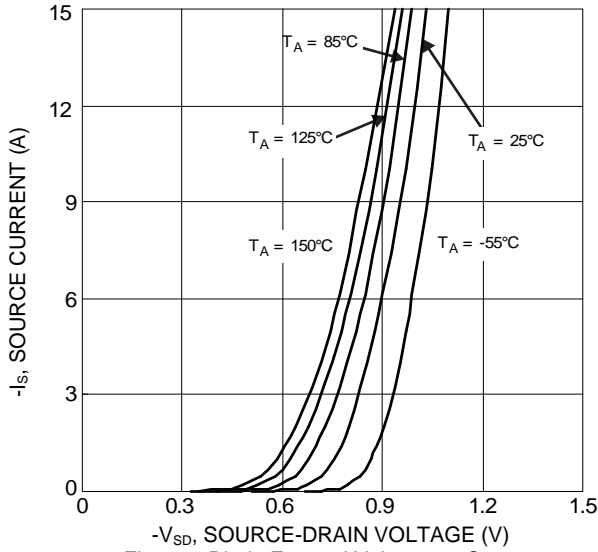


Figure 9 Diode Forward Voltage vs. Current

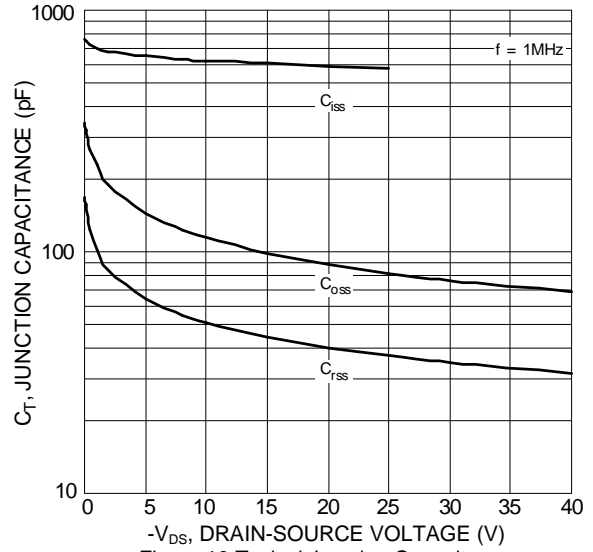


Figure 10 Typical Junction Capacitance

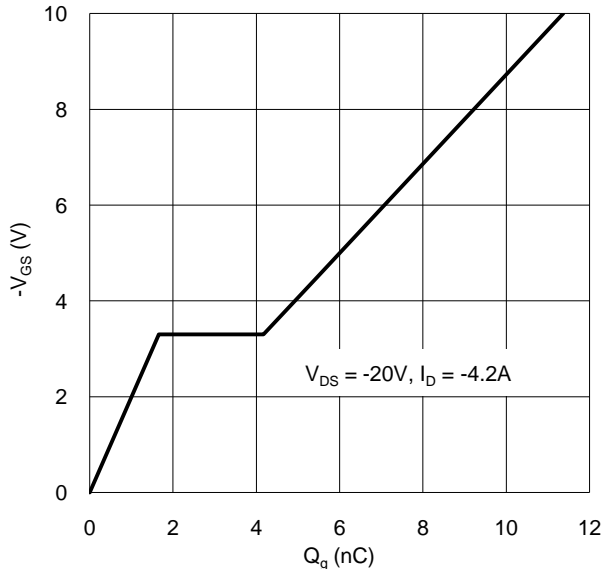


Figure 11 Gate Charge

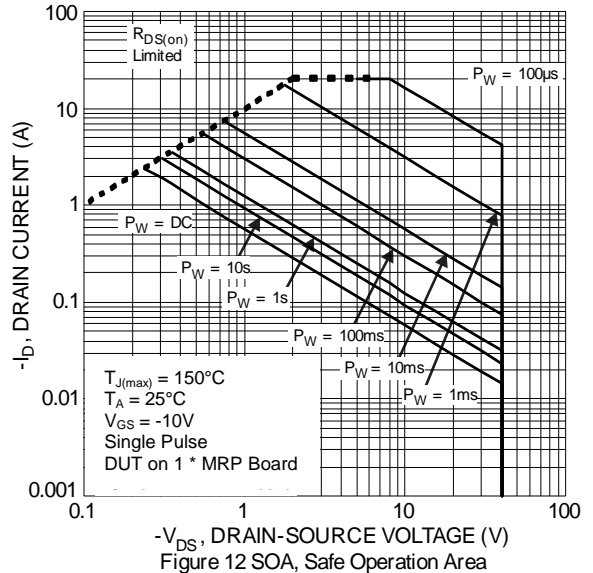
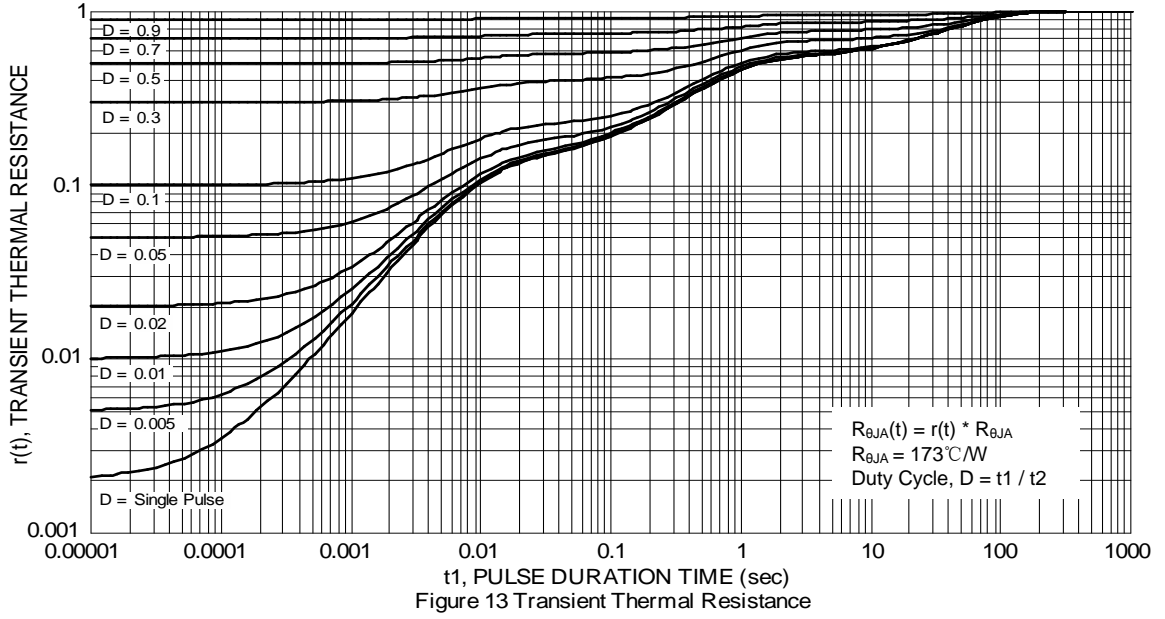


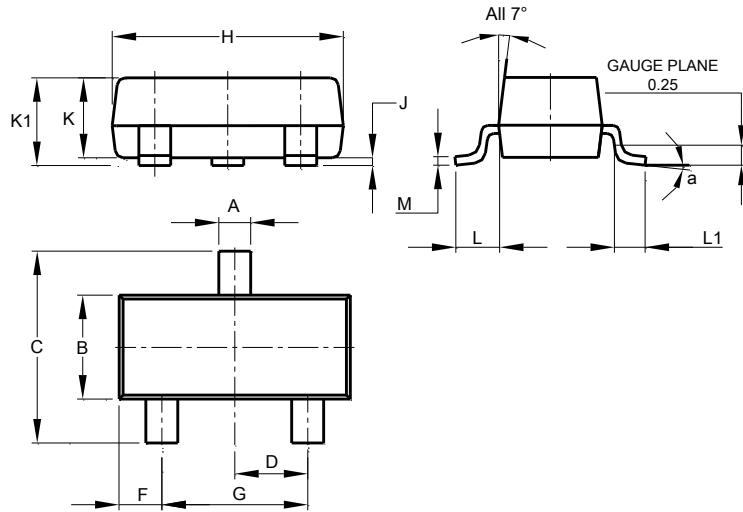
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

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

SOT23

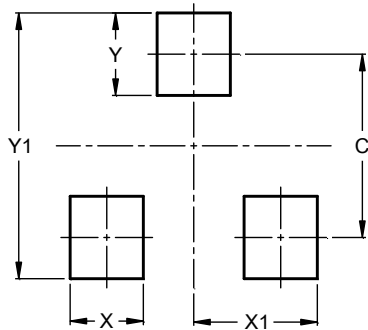


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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