Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_A = +25°C
-12V	31mΩ @ V_{GS} = -4.5V	5.2A
	45mΩ @ V_{GS} =-2.5V	4.3A

Description

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) while maintaining superior switching performance, which makes the device ideal for high-efficiency power-management applications.

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected**
- **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**
- **An Automotive-Compliant Part is Available Under Separate Data Sheet (DMP1045UQ)**

Applications

- DC-DC Converters
- Power Management Functions
- Analog Switch

Mechanical Data

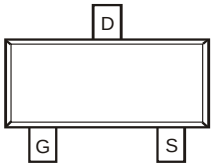
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—Matte Tin Annealed Over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3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



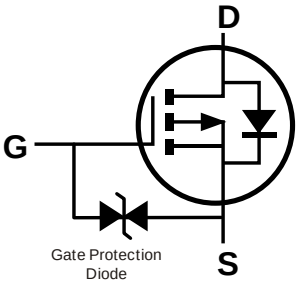
SOT23



Top View



Pin Configuration



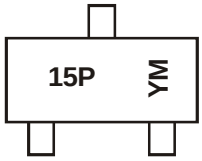
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP1045U-7	SOT23	3,000/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, see http://www.diodes.com/products/packages.html.

Marking Information



15P = Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: E = 2017)
M = Month (ex: 9 = September)

Date Code Key

Year	2010	~	2016	2017	2018	2019	2020	2021	2022	2023
Code	X	~	D	E	F	G	H	I	J	K

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	Units
Drain-Source Voltage			V_{DSS}	-12	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 5) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	4.0 3.1	A
Continuous Drain Current (Note 5) V_{GS} = -2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	3.3 2.6	A
Continuous Drain Current (Note 6) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	5.2 4.2	A
Continuous Drain Current (Note 6) V_{GS} = -2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	4.3 3.4	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) (Note 5)			I_{DM}	40	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	0.8	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	168	°C/W
Total Power Dissipation (Note 6)	P_D	1.3	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	99	°C/W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	14.8	°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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-12	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current (T_J = +25°C)	I_{DSS}	—	—	-1.0	µA	V_{DS} = -12V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.3	-0.55	-1.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	26	31	mΩ	V_{GS} = -4.5V, I_D = -4.0A
			31	45		V_{GS} = -2.5V, I_D = -3.5A
			45	75		V_{GS} = -1.8V, I_D = -2.7A
Forward Transfer Admittance	$\|Y_{FS}\|$	—	12	—	S	V_{DS} = -5V, I_D = -4A
Diode Forward Voltage	V_{SD}	—	-0.6	—	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	1357	—	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{OSS}	—	504	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	235	—	pF	
Gate Resistnace	R_G	—	14.1	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
SWITCHING CHARACTERISTICS (Note 8)						
Total Gate Charge	Q_G	—	15.8	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -4A
Gate-Source Charge	Q_{GS}	—	2.0	—	nC	
Gate-Drain Charge	Q_{GD}	—	3.9	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	15.7	—	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 2.5Ω, R_G = 3.0Ω
Turn-On Rise Time	t_R	—	23.3	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	91.2	—	ns	
Turn-Off Fall Time	t_F	—	106.9	—	ns	

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PCB, 2oz copper, with thermal vias to bottom layer 1-inch square copper plate.
7 .Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

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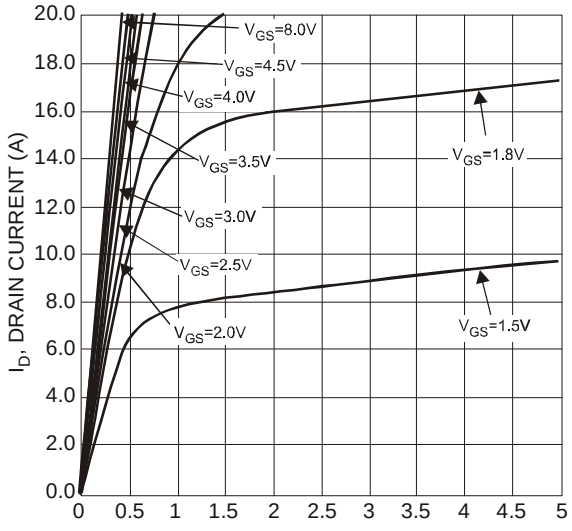

Fig. 1 Typical Output Characteristics

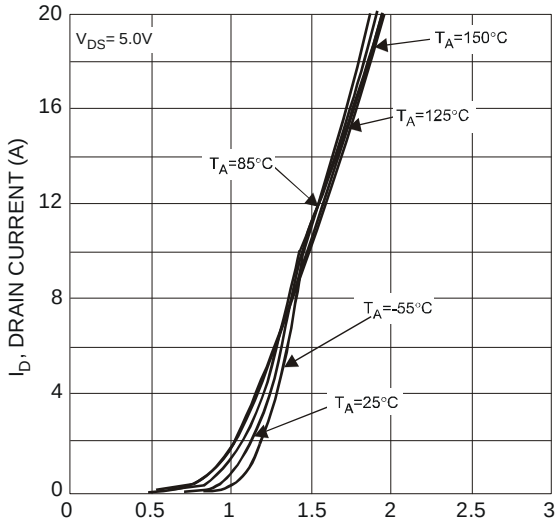

Fig. 2 Typical Transfer Characteristics

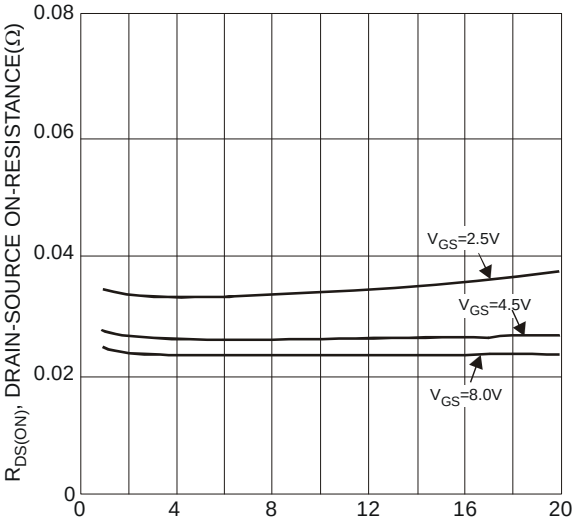

Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

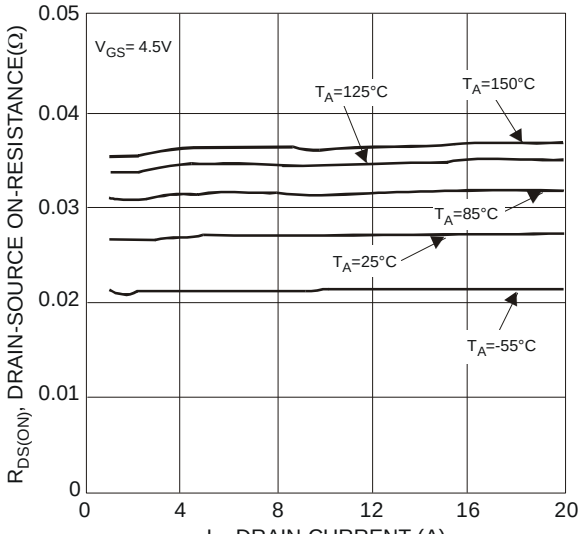

Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

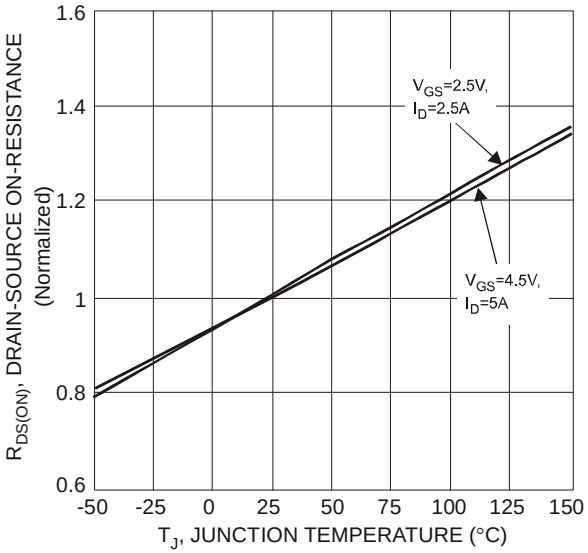

Fig. 5 On-Resistance Variation with Temperature

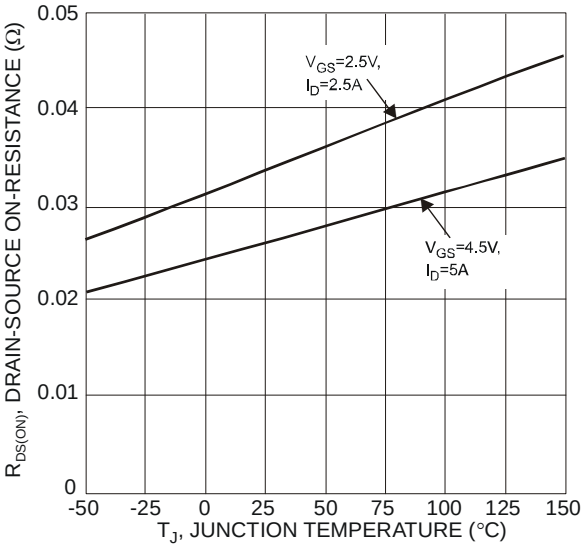

Fig. 6 On-Resistance Variation with Temperature

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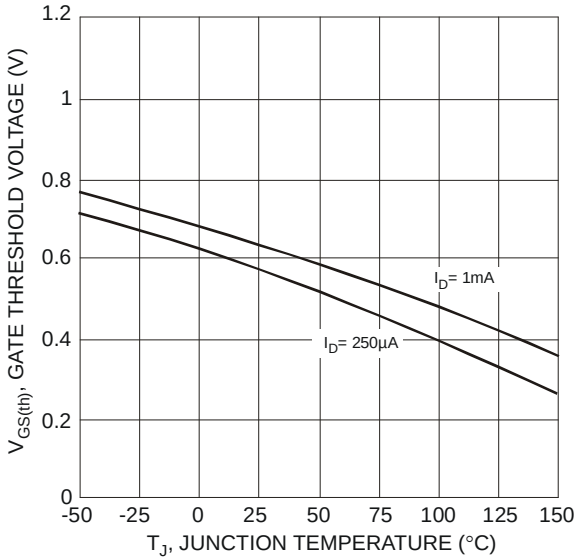

Fig. 7 Gate Threshold Variation vs. Ambient Temperature

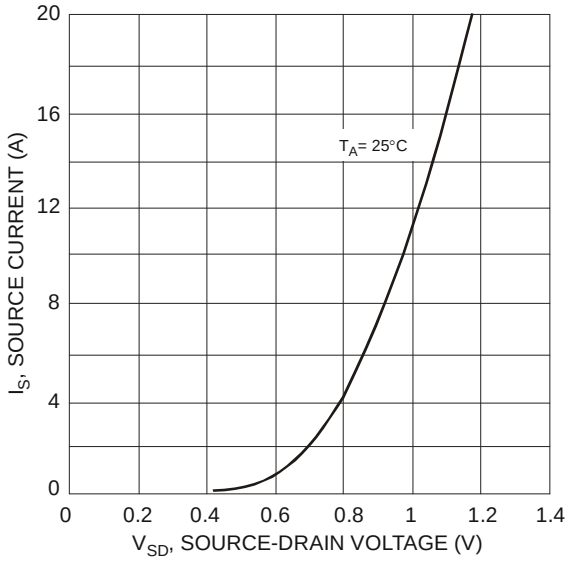

Fig. 8 Diode Forward Voltage vs. Current

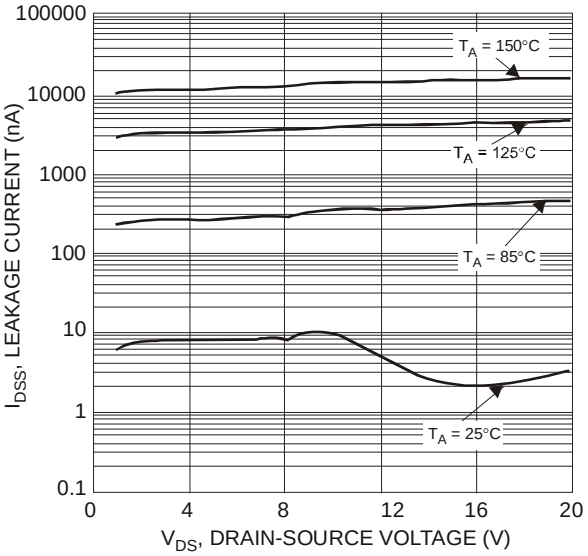

Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

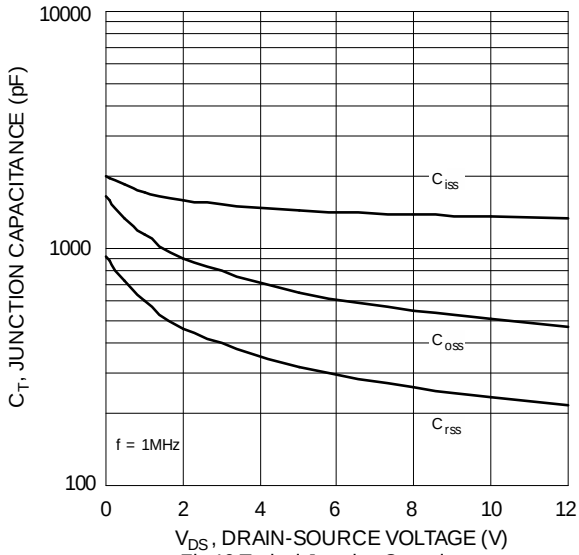

Fig 10 Typical Junction Capacitance

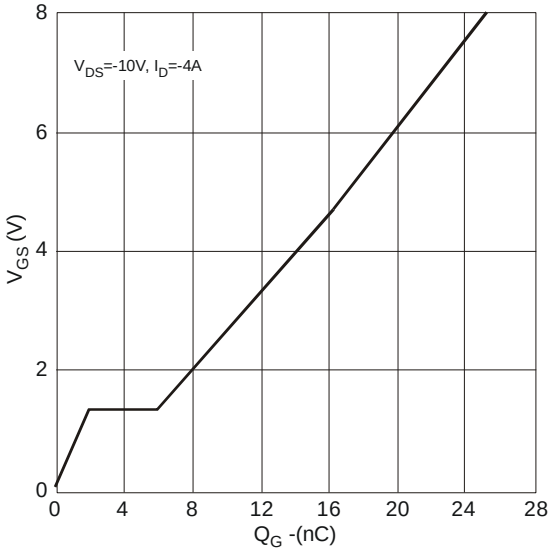

Fig. 11 Gate Charge Characteristics

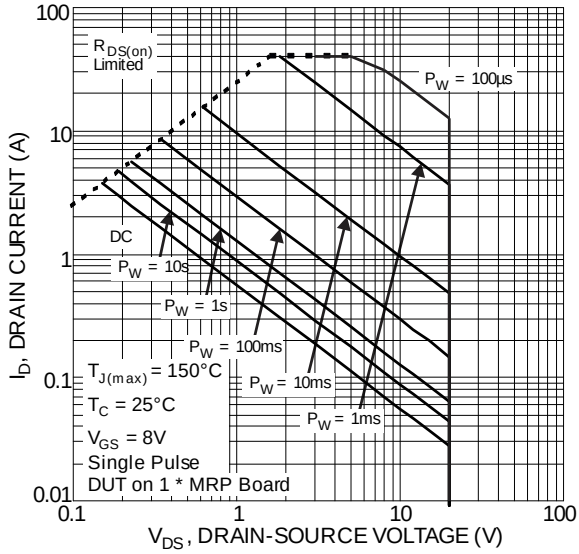

Figure 12 SOA, Safe Operation Area

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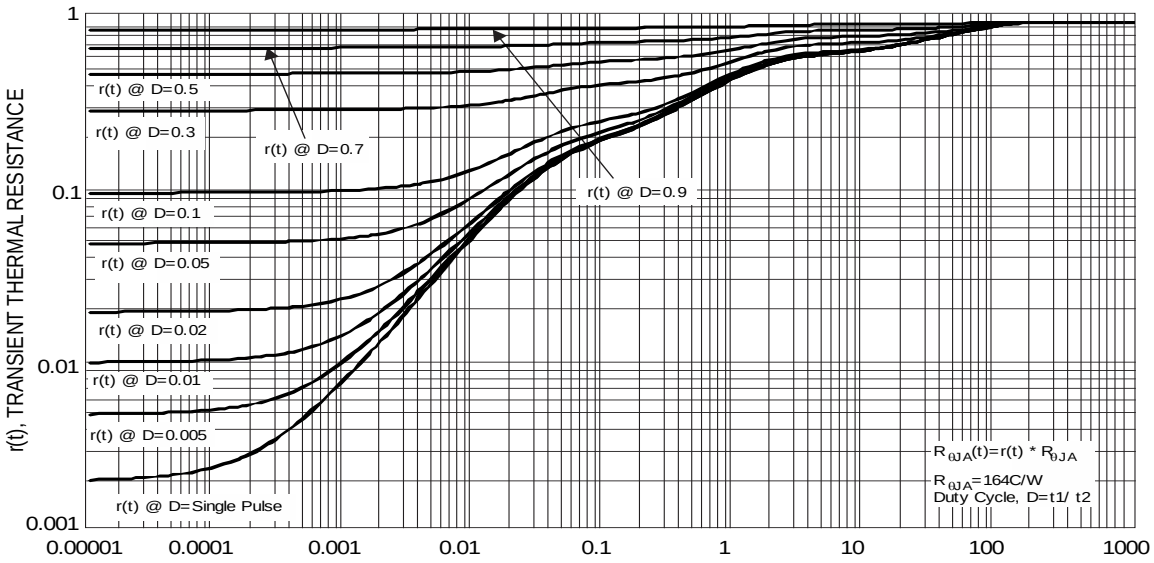

Fig. 13 Transient Thermal Resistance

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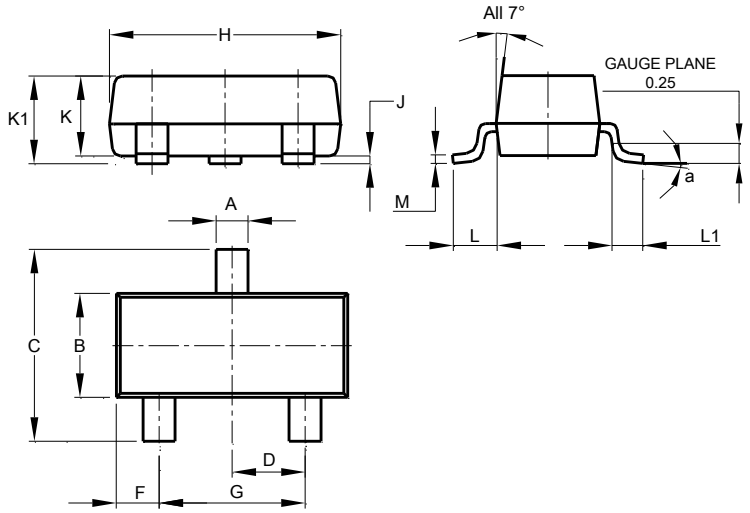
Package Outline Dimensions

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

SOT23

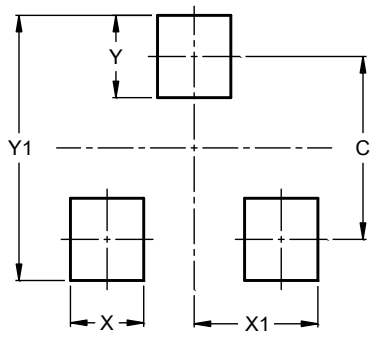


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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