

Product Summary

BV _{DSS}	Max R _{DS(ON)}	Max I _D @ T _A = 25°C
-30V	1Ω @ V _{GS} = -4.5V	-0.67A
	1.5Ω @ V _{GS} = -2.5V	-0.54A
	2Ω @ V _{GS} = -1.8V	-0.47A

Description and Applications

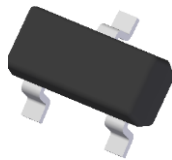
This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Load Switch in Portable Electronics

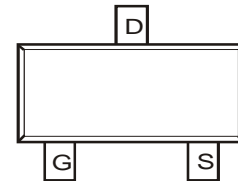


ESD PROTECTED TO 2kV

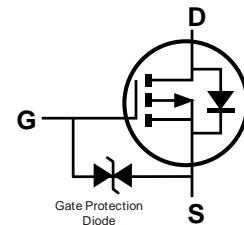
SOT23



Top View



Top View
Internal Schematic



Equivalent Circuit

Features and Benefits

- Low Gate Threshold Voltage
- Fast Switching Speed
- **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

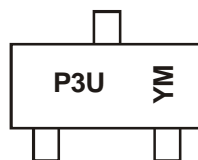
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (Ⓢ)
- Terminals Connections: See Diagram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

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP31D0U-7	SOT23	3,000/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



P3U = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Y = 2011)
 M = Month (ex: 9 = September)

Date Code Key

Year	2011	~	2016	2017	2018	2019	2020	2021	2022	2023
Code	Y	~	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

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	-30	V
Gate-Source Voltage		V _{GSS}	±8	V
Continuous Drain Current	Steady State	T _A = +25°C (Note 6)	-0.67	A
		T _A = +85°C (Note 6)	-0.48	
		T _A = +25°C (Note 5)	-0.53	
Pulsed Drain Current (Note 7)		I _{DM}	2.5	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P _D	0.45	W
	(Note 6)		0.71	W
Thermal Resistance, Junction to Ambient	(Note 5)	R _{θJA}	275	°C/W
	(Note 6)		177	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout
 6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
 7. Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.

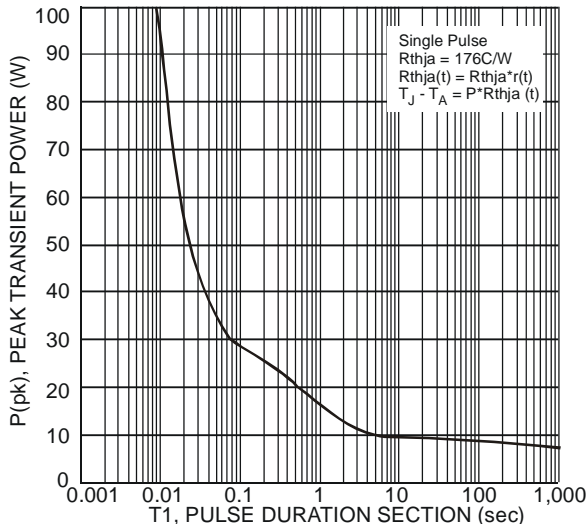


Fig. 1 Single Maximum Power Dissipation

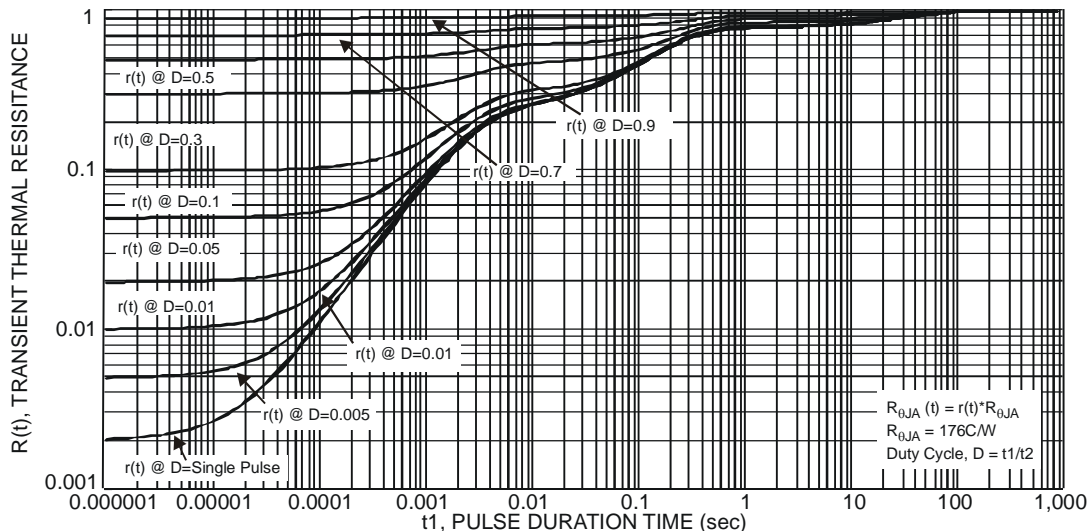


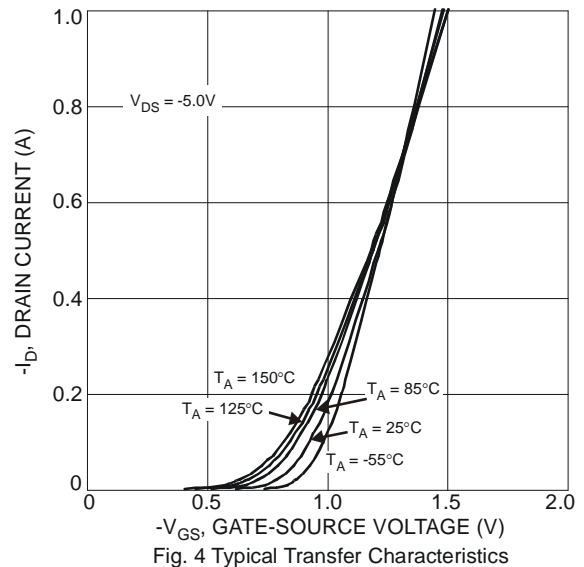
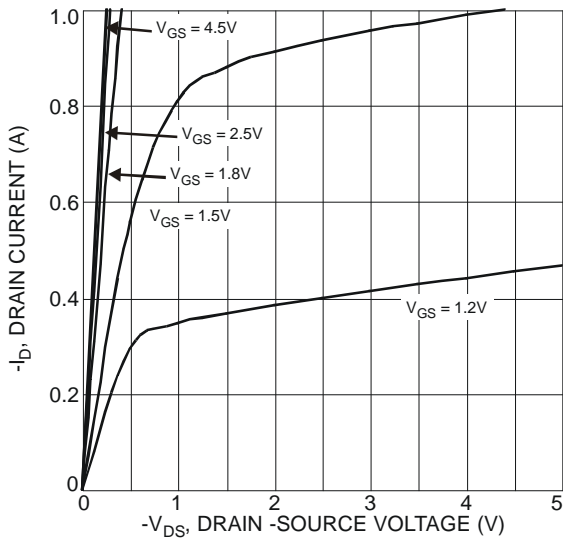
Fig. 2 Transient Thermal Resistance

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 = -250μA
Zero Gate Voltage Drain Current T _J = 25°C	I _{DSS}	—	—	-1	μA	V _{DS} = -30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±3	μA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-0.5	—	-1.1	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	1	Ω	V _{GS} = -4.5V, I _D = -400mA
				1.5		V _{GS} = -2.5V, I _D = -200mA
				2		V _{GS} = -1.8V, I _D = -100mA
Forward Transfer Admittance	Y _{FS}	50	—	—	mS	V _{DS} = -3V, I _D = -300mA
Diode Forward Voltage	V _{SD}	—	—	-1.2	V	V _{GS} = 0V, I _S = -300mA
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{ISS}	—	76	150	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{OSS}	—	9	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	6.43	—	pF	
Gate Resistance	R _G	—	167	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _G	—	0.9	—	nC	V _{GS} = -4.5V, V _{DS} = -15V, I _D = -1A
Total Gate Charge	Q _G	—	1.5	—	nC	V _{GS} = -8V, V _{DS} = -15V, I _D = -1A
Gate-Source Charge	Q _{GS}	—	0.1	—	nC	
Gate-Drain Charge	Q _{GD}	—	0.2	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	5.0	—	ns	V _{DD} = -10V, R _L = 10Ω V _{GS} = -4.5V, R _G = 6Ω
Turn-On Rise Time	t _R	—	5.9	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	35.7	—	ns	
Turn-Off Fall Time	t _F	—	16.7	—	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

Typical Electrical Characteristics



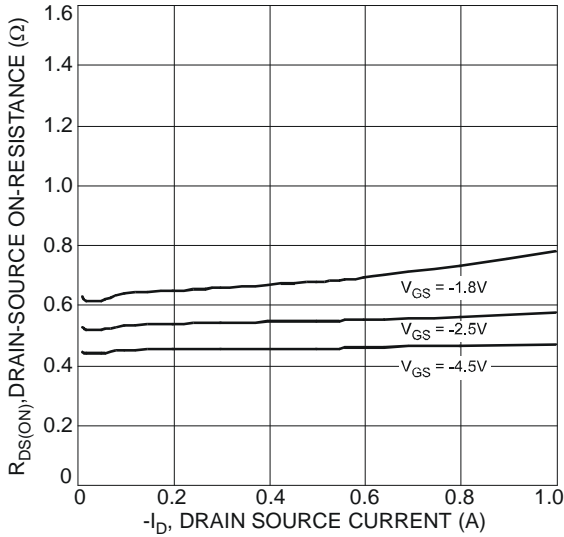


Fig. 5 Typical On-Resistance vs. Drain Current and Gate Voltage

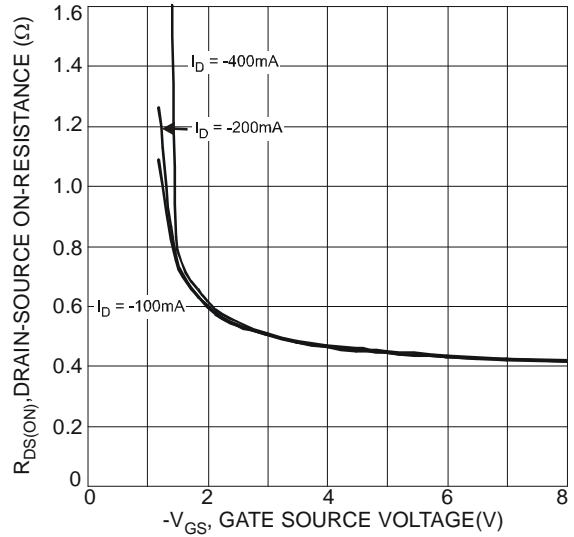


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

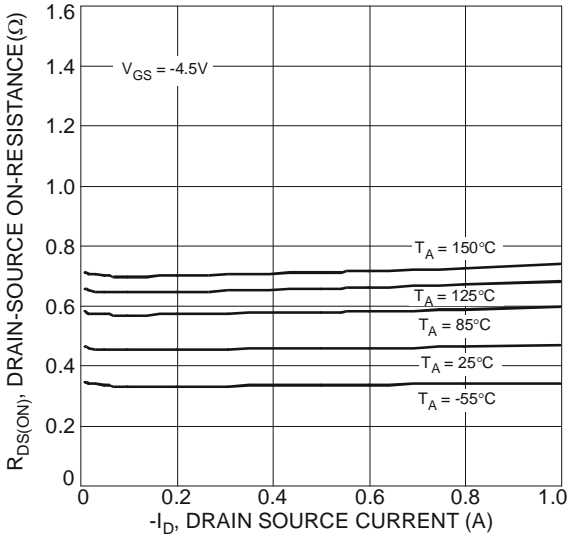


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

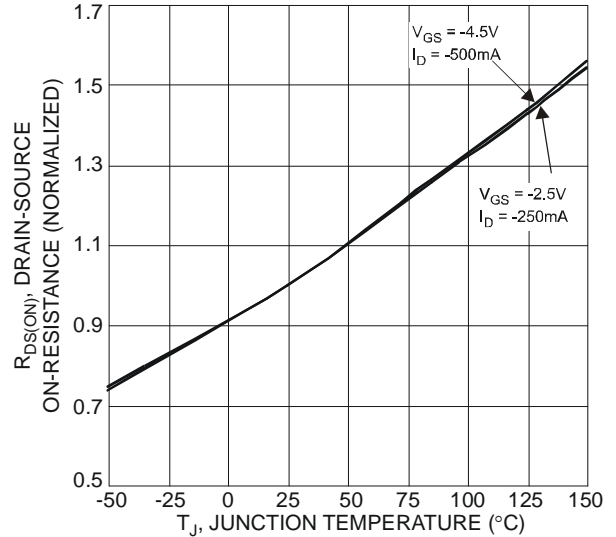


Fig. 8 On-Resistance Variation with Temperature

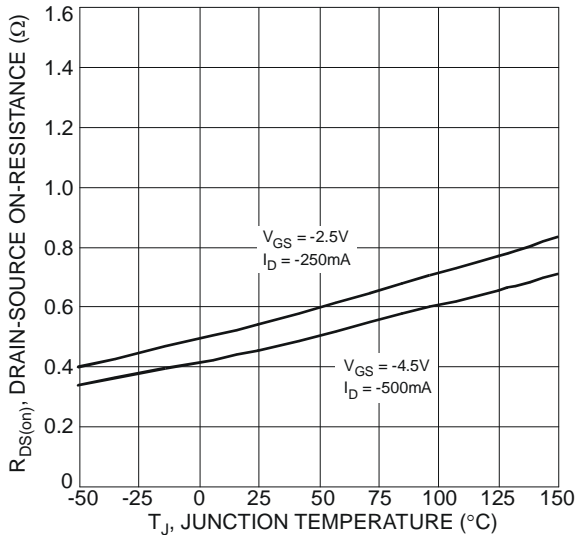


Fig. 9 On-Resistance Variation with Temperature

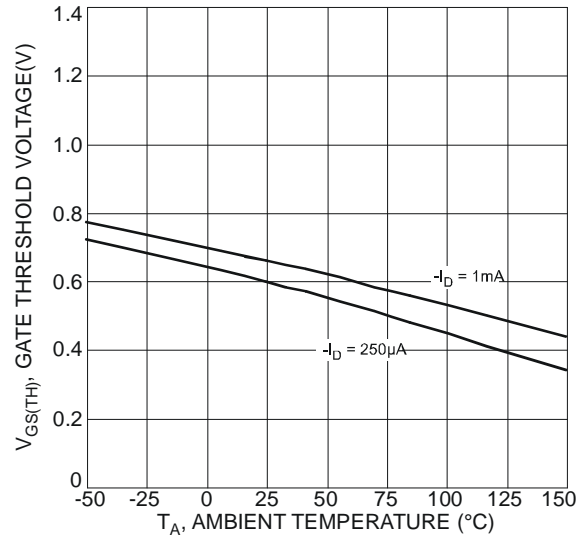


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

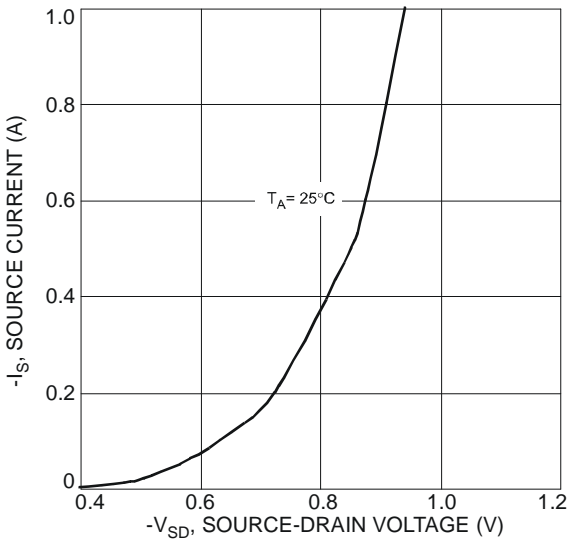


Fig. 11 Diode Forward Voltage vs. Current

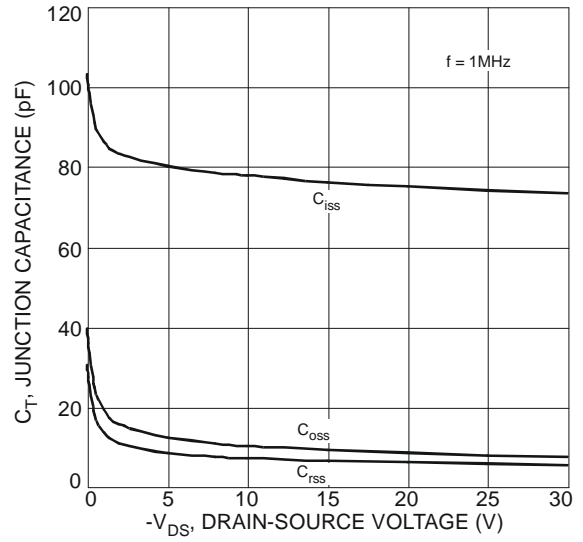


Fig. 12 Typical Junction Capacitance

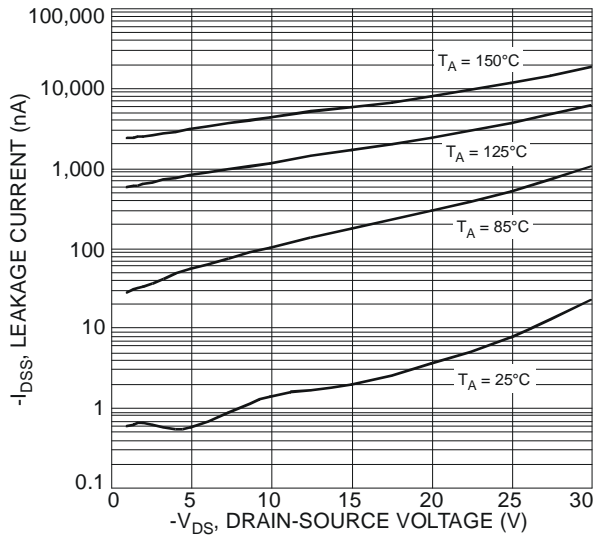


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

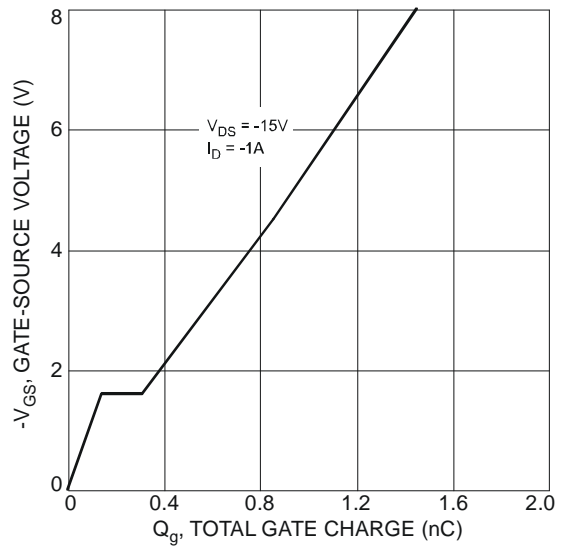
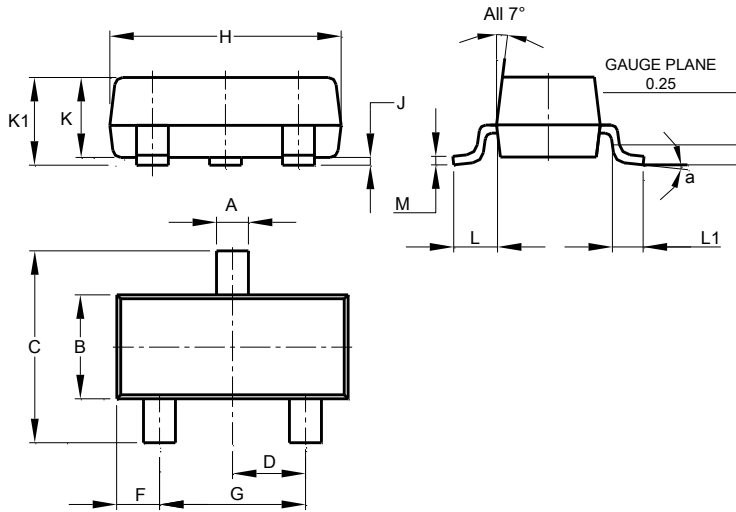


Fig. 14 Gate-Charge Characteristics

Package Outline Dimensions

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

SOT23

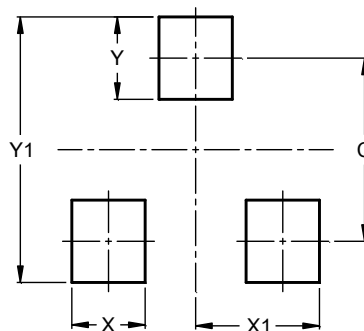


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	-
All Dimensions in mm			

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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