20V N-CHANNEL ENHANCEMENT MODE MOSFET IN SOT23

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D **Max** (Note 6)
20V	175mΩ @ V_{GS} = 4.5V	1.40A @ T_A = +25°C
	240mΩ @ V_{GS} = 2.5V	1.20A @ T_A = +25°C
	360mΩ @ V_{GS} = 1.8V	1.0A @ T_A = +25°C

Features and Benefits

- On Resistance <200mΩ
- Low Gate Threshold Voltage
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **ESD Protected Gate**

Description and Applications

This MOSFET has been 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.

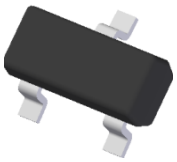
- Load Switch

Mechanical Data

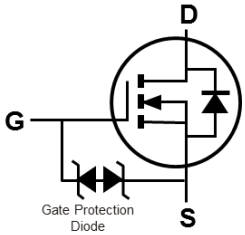
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.08 grams (Approximate)

SOT23

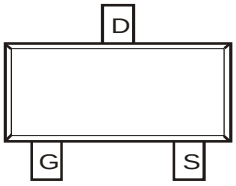




Top View



Equivalent Circuit



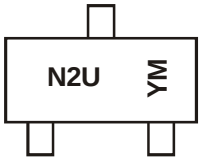
Top View

Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DMN2300U-7	N2U	7	8	3000

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



N2U = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

Year	2011	~	2019	2020	2021	2022	2023
Code	Y	~	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	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current	Steady State	T_A = +25°C (Note 6) T_A = +85°C (Note 6) T_A = +25°C (Note 5)	I_D	1.40 1.01 1.24	A
Pulsed Drain Current (Note 7)			I_{DM}	11	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	0.43	W
	(Note 6)		0.55	W
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	288	°C/W
	(Note 6)		228	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on 25mm × 25mm square copper plate with FR-4 substrate PC board, 2oz copper.
7. Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.

Thermal Characteristics

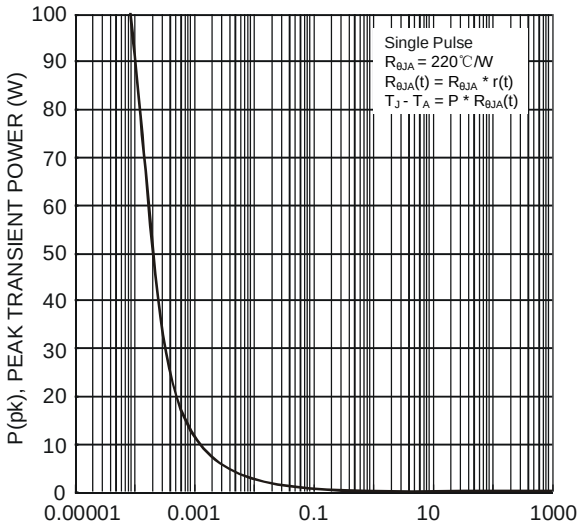

Fig. 1 Single Maximum Power Dissipation

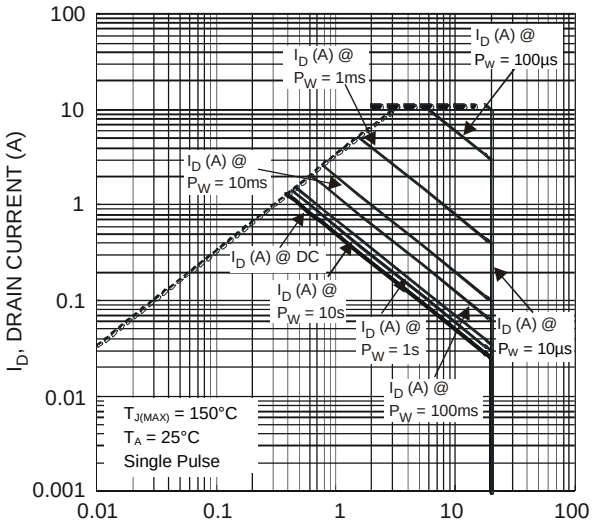

Fig. 2 SOA, Safe Operation Area

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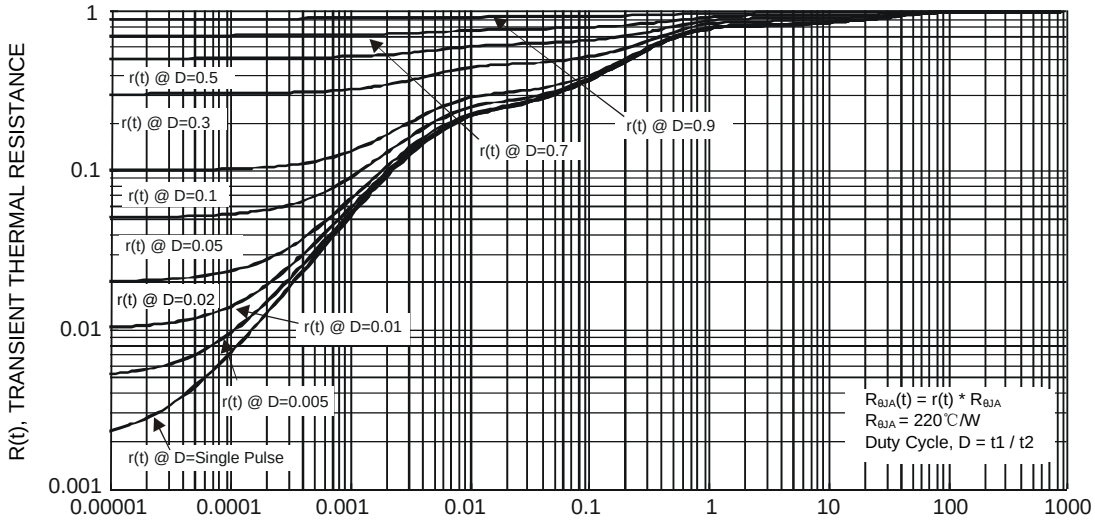

Fig. 3 Transient Thermal Resistance

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}	20	—	—	V	V_{GS} = 0V, I_D = 10μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1	μA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	10	μA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.45	—	0.95	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	175	mΩ	V_{GS} = 4.5V, I_D = 300mA
				240		V_{GS} = 2.5V, I_D = 250mA
				360		V_{GS} = 1.8V, I_D = 100mA
Forward Transfer Admittance	$\|Y_{fs}\|$	40	—	—	mS	V_{DS} = 3V, I_D = 30mA
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 300mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	67.6	—	pF	V_{DS} = 20V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	9.7	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	7.5	—	pF	
Gate Resistance	R_g	—	70	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	1.6	—	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 1A
Gate-Source Charge	Q_{gs}	—	0.2	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.2	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	3.5	—	ns	V_{DS} = 10V, I_D = 1A V_{GS} = 10V, R_G = 6Ω
Turn-On Rise Time	t_R	—	2.8	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	38	—	ns	
Turn-Off Fall Time	t_F	—	13	—	ns	

Note: 8. Short duration pulse test used to minimize self-heating effect.

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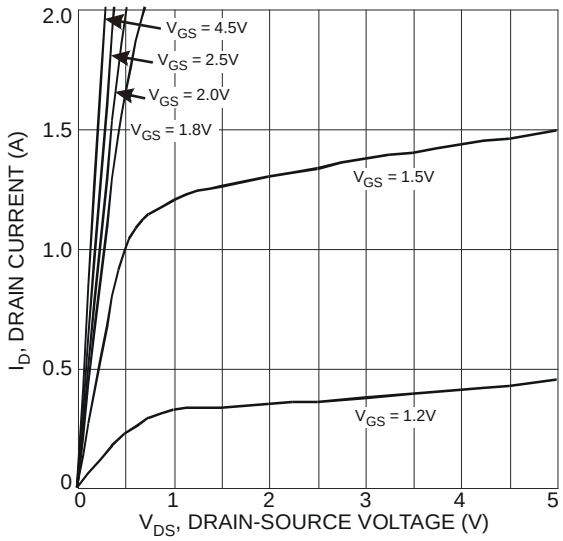

Fig. 4 Typical Output Characteristic

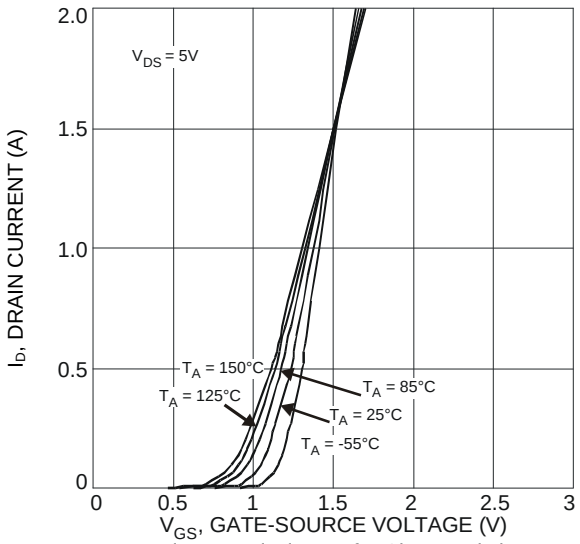

Fig. 5 Typical Transfer Characteristic

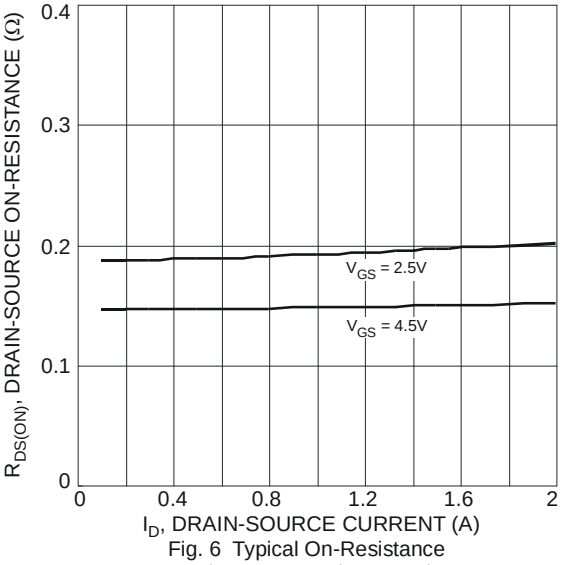

Fig. 6 Typical On-Resistance
vs. Drain Current and Gate Voltage

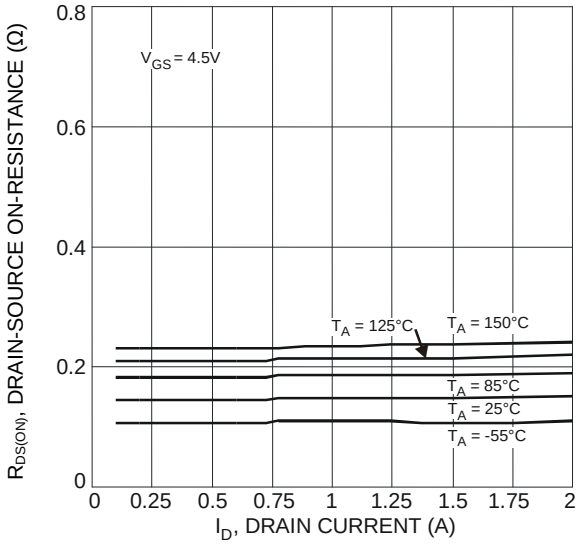

Fig. 7 Typical On-Resistance
vs. Drain Current and Temperature

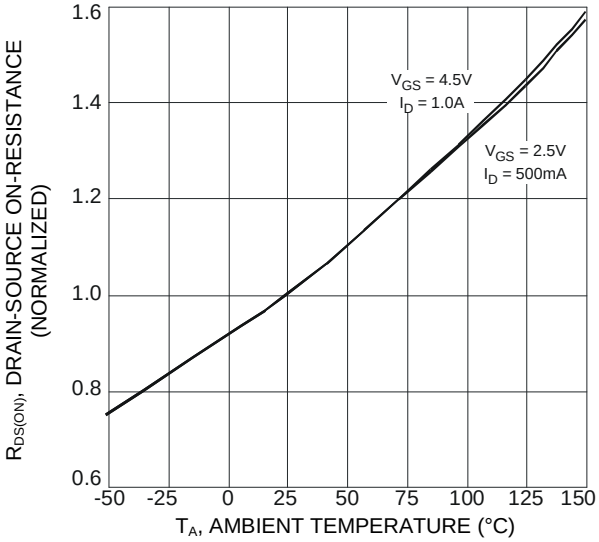

Fig. 8 On-Resistance Variation with Temperature

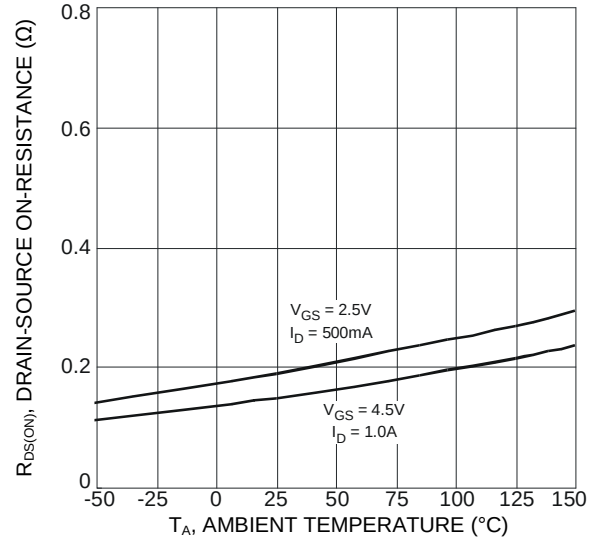

Fig. 9 On-Resistance Variation with Temperature

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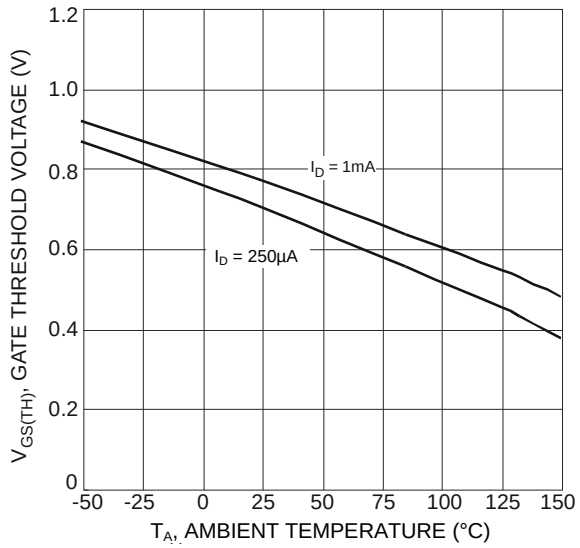

Fig. 10 Gate Threshold Variation vs. Ambient Temperature

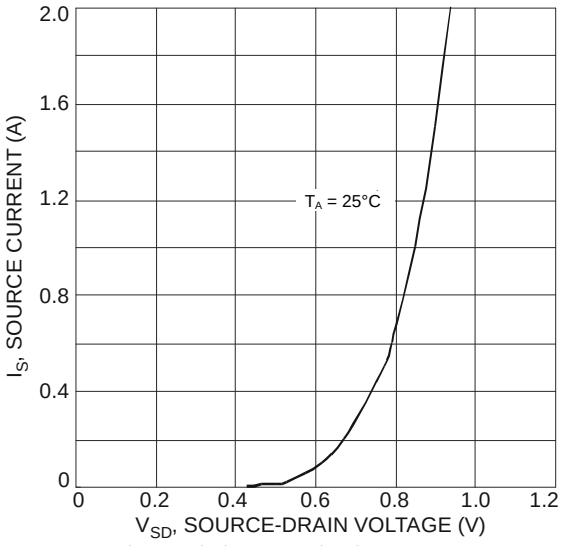

Fig. 11 Diode Forward Voltage vs. Current

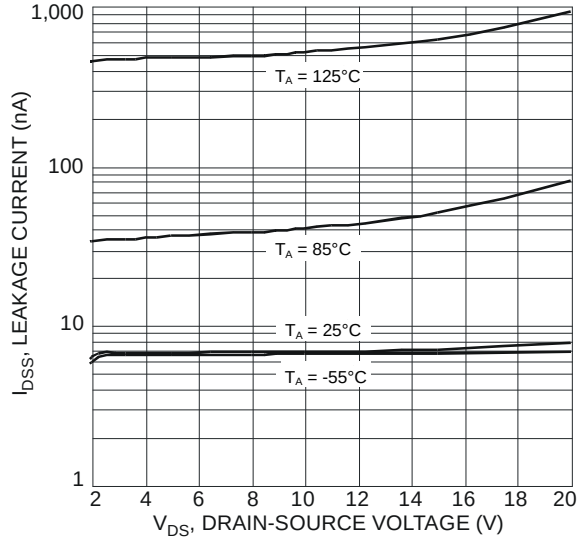

Fig. 12 Typical Leakage Current
vs. Drain-Source Voltage

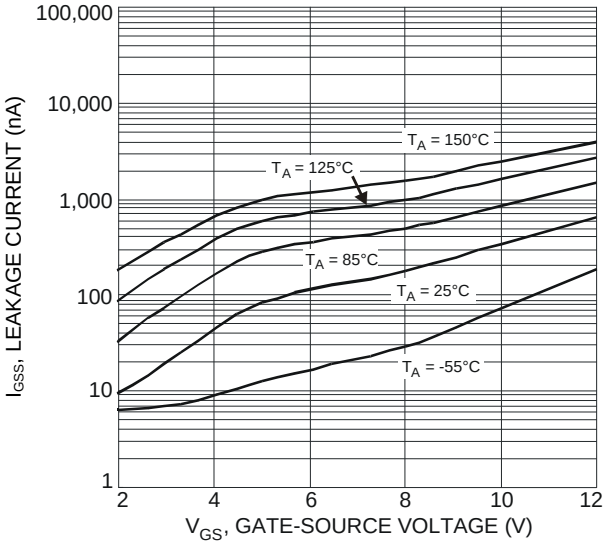

Fig.13 Leakage Current vs. Gate-Source Voltage

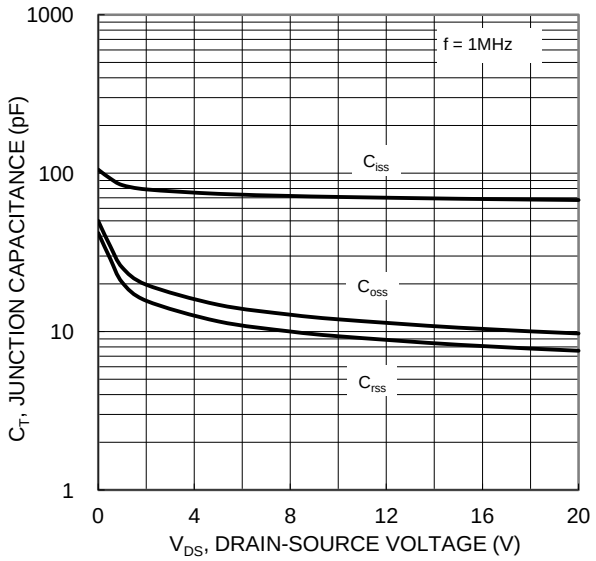

Fig. 14 Typical Junction Capacitance

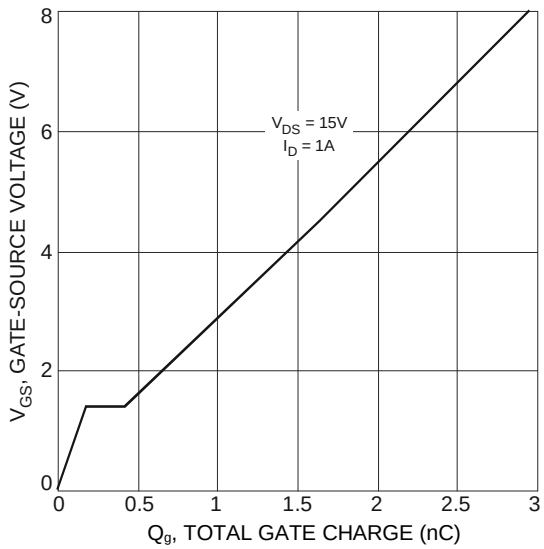

Fig. 15 Gate Charge Characteristics

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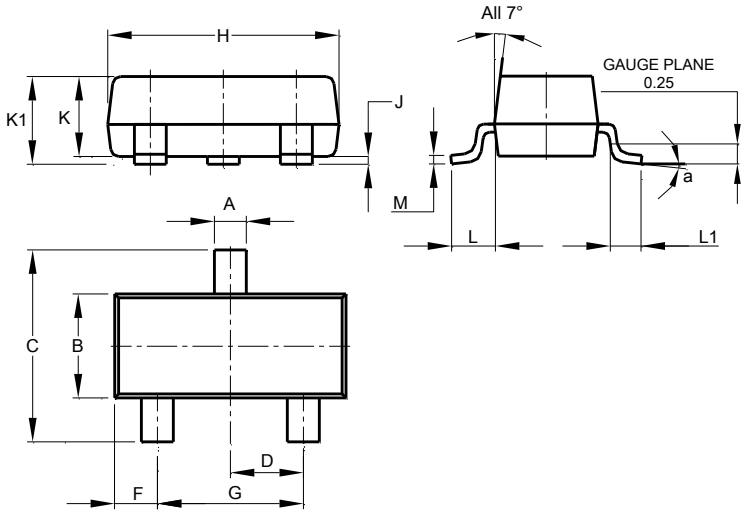
Package Outline Dimensions

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

SOT23

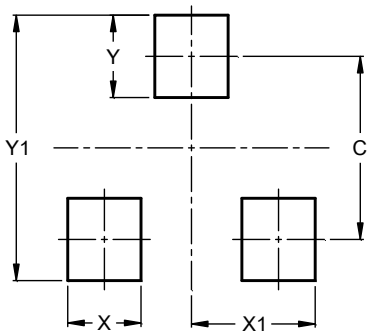


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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