

30V N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

BV _{DSS}	Max R _{DS(ON)}	I _D Max T _A = +25°C
30V	460mΩ @ V _{GS} = 4.5V	0.9A
	560mΩ @ V _{GS} = 2.5V	0.83A

Description and Applications

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

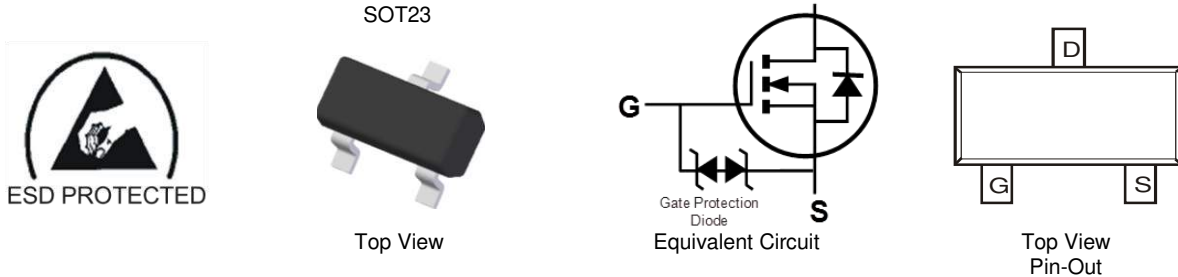
- Load Switch
- Portable Applications
- Power Management Functions

Features and Benefits

- Low V_{GS(TH)}, can be Driven Directly from a Battery
- Low R_{DS(ON)}
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

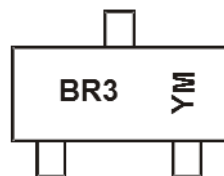
Mechanical Data

- 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: 0.009 grams (Approximate)


Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Quantity per Reel
DMN3731U-7	BR3	7	3,000
DMN3731U-13	BR3	13	10,000

- 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


BR3 = Product Type Marking Code
 YM or $\bar{Y}M$ = Date Code Marking
 Y or \bar{Y} = Year (ex: G = 2019)
 M = Month (ex: 9 = September)

Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024
Code	F	G	H	I	J	K	L

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	Unit
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	± 8	V
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	I_D	0.9	A
Steady State $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$		0.7	
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	0.55	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	3	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	0.4	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	303	$^\circ\text{C/W}$
Steady State			
Total Power Dissipation (Note 6)	P_D	0.58	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	215	$^\circ\text{C/W}$
Steady State			
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}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 10\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	3	μA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.45	—	0.95	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	271	460	m Ω	$V_{GS} = 4.5\text{V}, I_D = 200\text{mA}$
			288	560		
			324	730		
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 300\text{mA}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	73	—	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$
Output Capacitance	C_{OSS}	—	7.2	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	5	—	pF	
Gate Resistance	R_g	—	902	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	Q_g	—	5.5	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 15\text{V},$ $I_D = 1\text{A}$
Gate-Source Charge	Q_{gs}	—	0.8	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.4	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	2.5	—	ns	$V_{DS} = 10\text{V}, I_D = 1\text{A}$ $V_{GS} = 10\text{V}, R_g = 6\Omega$
Turn-On Rise Time	t_R	—	3.1	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	477	—	ns	
Turn-Off Fall Time	t_F	—	123	—	ns	$I_F = 1\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Time	t_{RR}	—	59	—	ns	
Reverse Recovery Charge	Q_{RR}	—	25	—	nC	

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

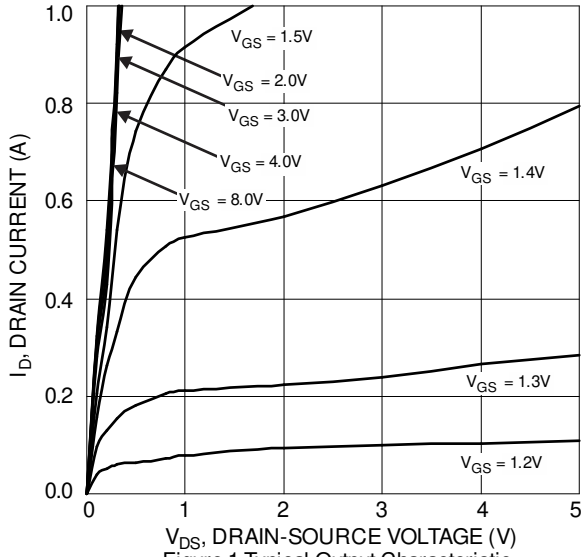


Figure 1 Typical Output Characteristic

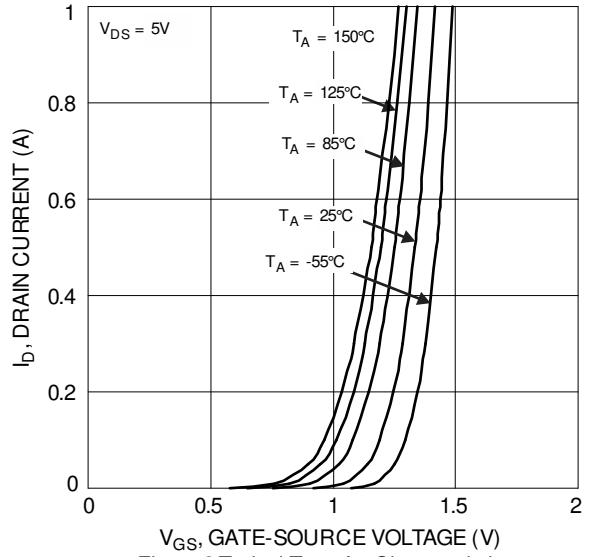


Figure 2 Typical Transfer Characteristics

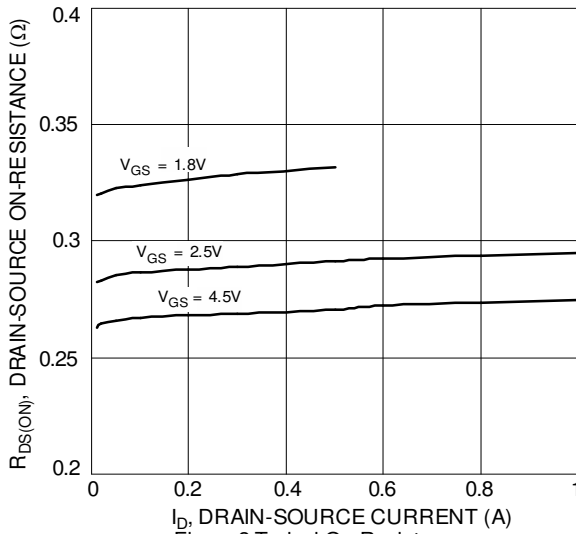


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

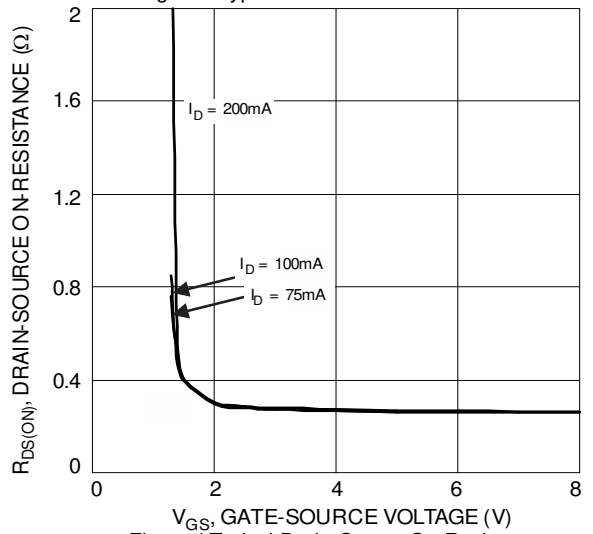


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

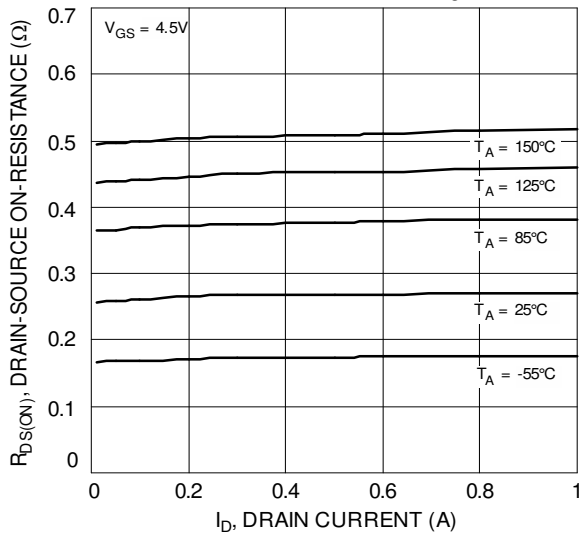


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

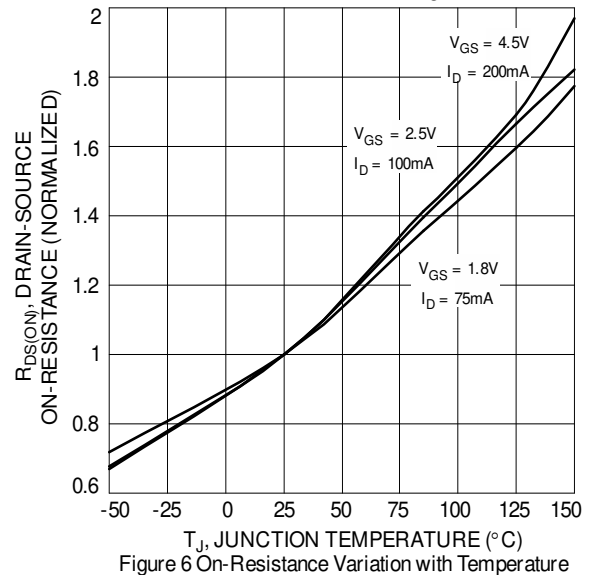


Figure 6 On-Resistance Variation with Temperature

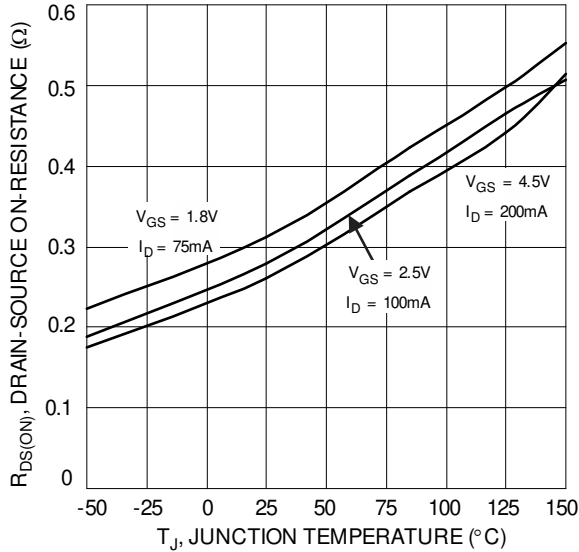


Figure 7 On-Resistance Variation with Temperature

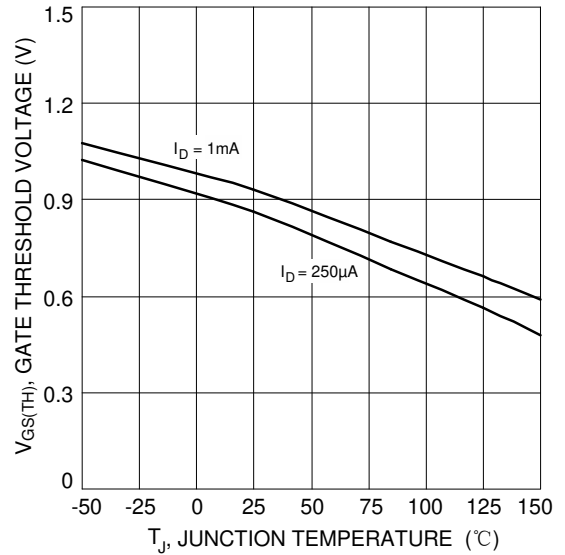


Figure 8 Gate Threshold Variation vs. Junction Temperature

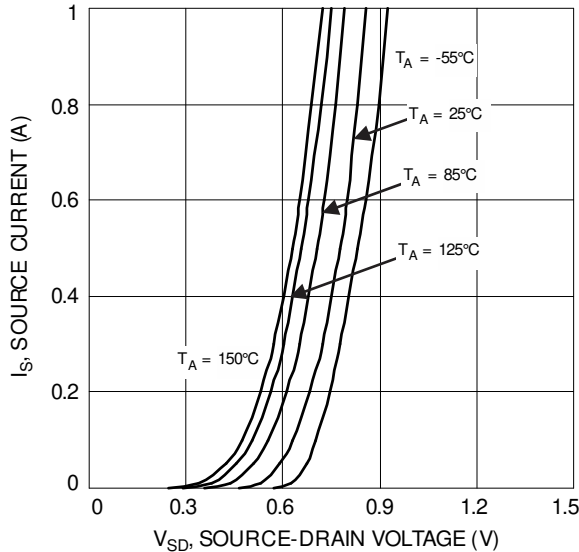


Figure 9 Diode Forward Voltage vs. Current

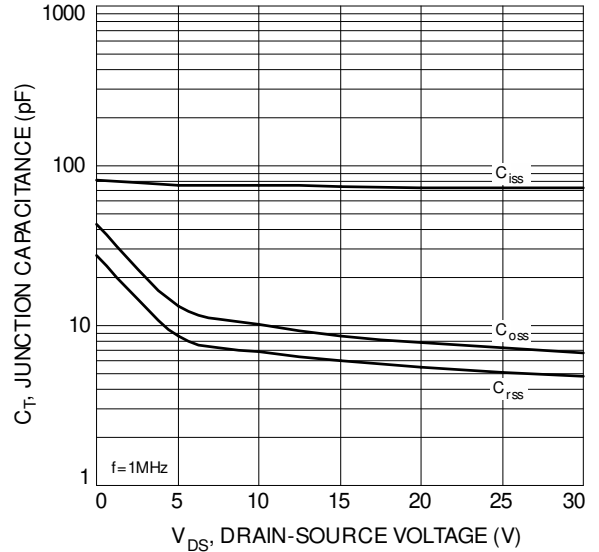


Figure 10 Typical Junction Capacitance

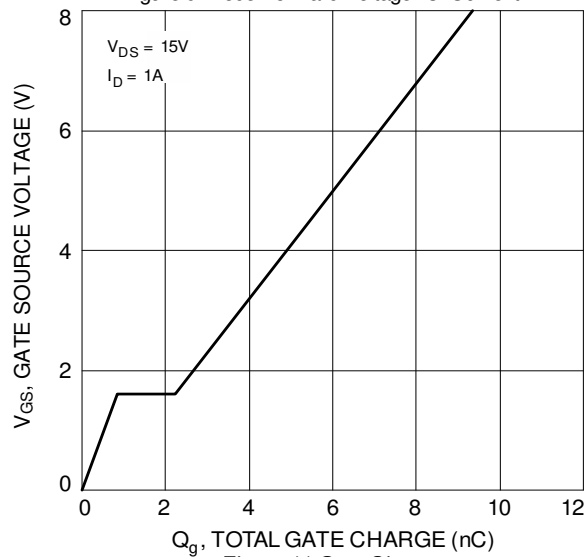


Figure 11 Gate Charge

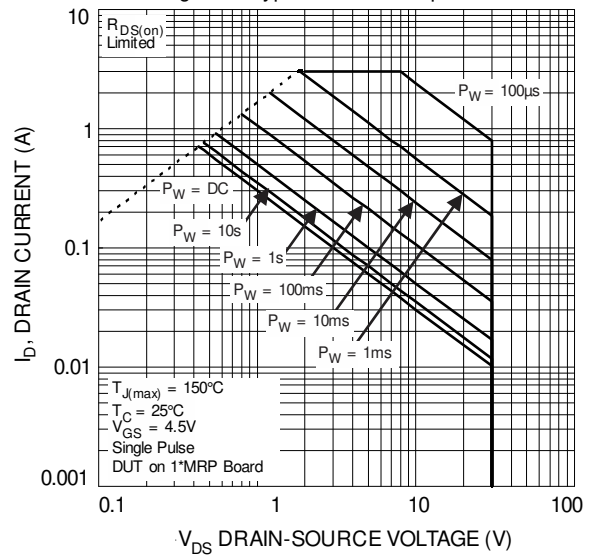
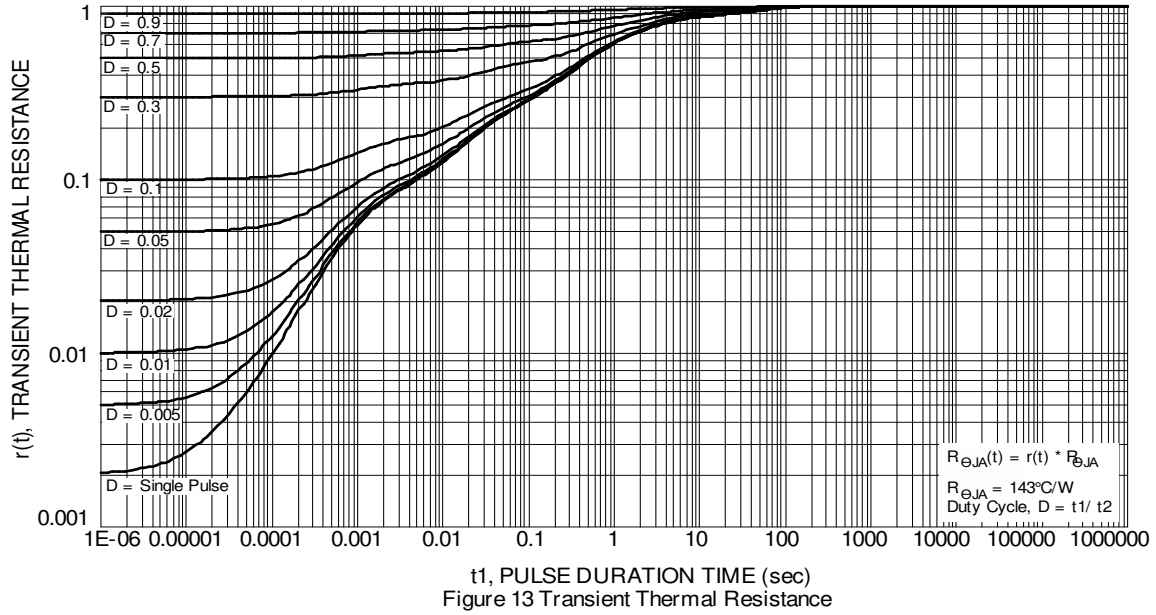


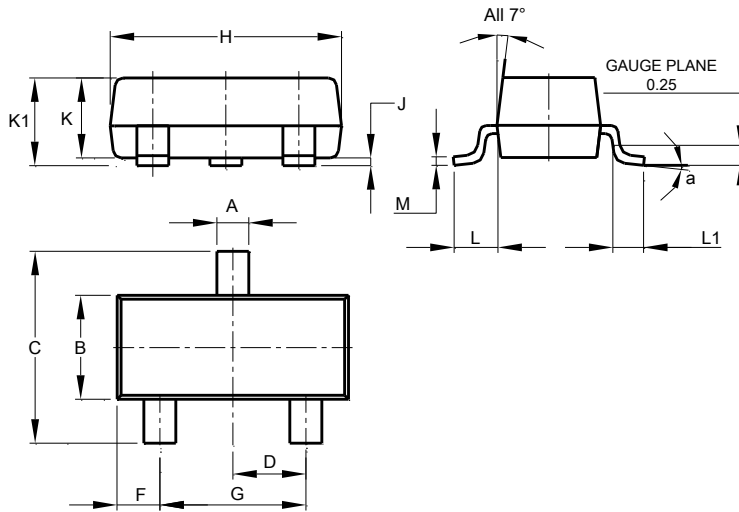
Figure # SOA, Safe Operation Area



Package Outline Dimensions

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

SOT23

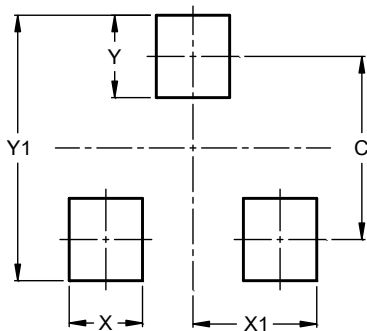


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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