

## Product Summary

BVDSS	RDS(ON)	ID TA = +25°C
100V	6.0Ω @ VGS = 10V	0.17A

## Description and Applications

These N-Channel enhancement mode field effect transistors are produced using Diodes Incorporated's proprietary, high density and advanced trench technology. These products have been designed to minimize on-state resistance while providing rugged, reliable and fast switching performance. These products are particularly suited for low-voltage, low-current applications such as:

- Small servo motor controls
- Power MOSFET gate drivers
- Switching applications

## Features and Benefits

- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- High Drain-Source Voltage Rating
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.  
<https://www.diodes.com/quality/product-definitions/>
- An automotive-compliant part is available under separate datasheet ([BSS123Q](#))

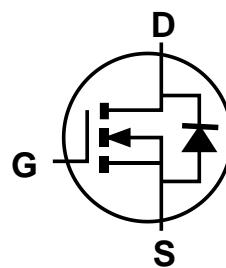
## Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram
- Weight: 0.008 grams (Approximate)

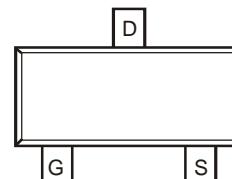
SOT23



Top View



Equivalent Circuit



Top View

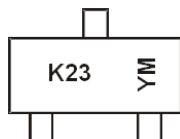
## Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
BSS123-7-F	SOT23	3,000	Tape & Reel
BSS123-13-F	SOT23	10,000	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, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



K23 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or Y or Y = Year (ex: M = 2025)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2002	...	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	N	...	M	N	P	R	S	T	U	V	W	X
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	$V_{DSS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	Continuous $I_D$	0.17	A
	Pulsed $I_{DM}$	0.68	

## Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	$P_D$	300	mW
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5)	$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

## Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 6)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	100	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
		—	—	0.1	$\mu\text{A}$	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	30	$\mu\text{A}$	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$ @ $T_A = +150^\circ\text{C}$ (Note 7)
		—	—	10	nA	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage, Forward	$I_{GSSF}$	—	—	50	nA	$V_{GS} = 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	0.8	1.4	2.0	V	$V_{DS} = V_{GS}, I_D = 1\text{mA}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	3.2	6.0	$\Omega$	$V_{GS} = 10\text{V}, I_D = 0.17\text{A}$
		—	3.8	10		$V_{GS} = 4.5\text{V}, I_D = 0.17\text{A}$
Forward Transfer Admittance	$g_{FS}$	80	370	—	ms	$V_{DS} = 10\text{V}, I_D = 0.17\text{A}, f = 1.0\text{kHz}$
Diode Forward Voltage	$V_{SD}$	—	0.84	1.3	V	$V_{GS} = 0\text{V}, I_S = 0.34\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	$C_{iss}$	—	22	60	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	3.5	15		
Reverse Transfer Capacitance	$C_{rss}$	—	2.0	6		
<b>SWITCHING CHARACTERISTICS (Note 7)</b>						
Turn-On Delay Time	$t_{D(ON)}$	—	—	8	ns	$V_{GS} = 10\text{V}, V_{DD} = 30\text{V}$ $I_D = 0.28\text{A}, R_{GEN} = 50\Omega$
Turn-On Rise Time	$t_R$	—	—	8	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	—	13	ns	
Turn-Off Fall Time	$t_F$	—	—	16	ns	

Notes: 5. Part mounted on FR-4 board with recommended pad layout, which can be found on our website at <http://www.diodes.com/package-outlines.html>.  
 6. Short duration pulse test used to minimize self-heating effect.  
 7. Guaranteed by design. Not subject to production testing.

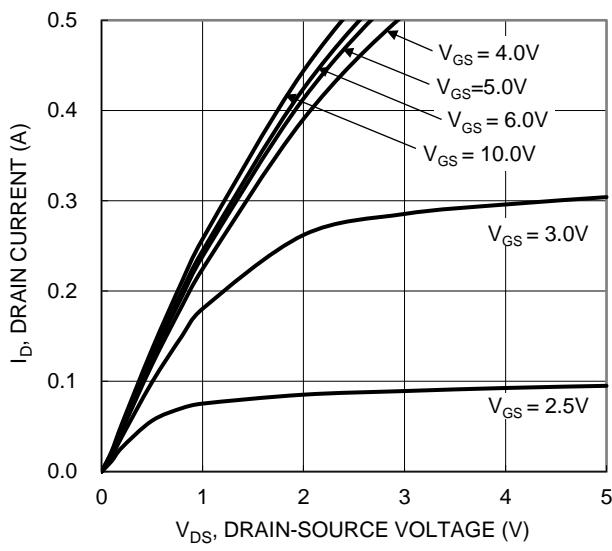


Figure 1. Typical Output Characteristic

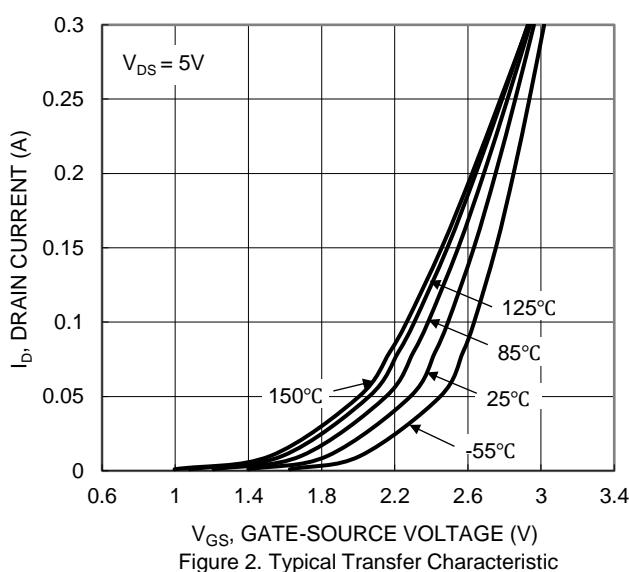


Figure 2. Typical Transfer Characteristic

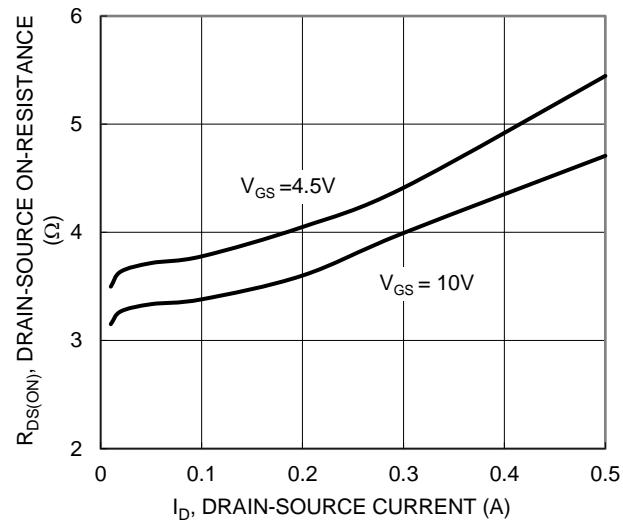


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

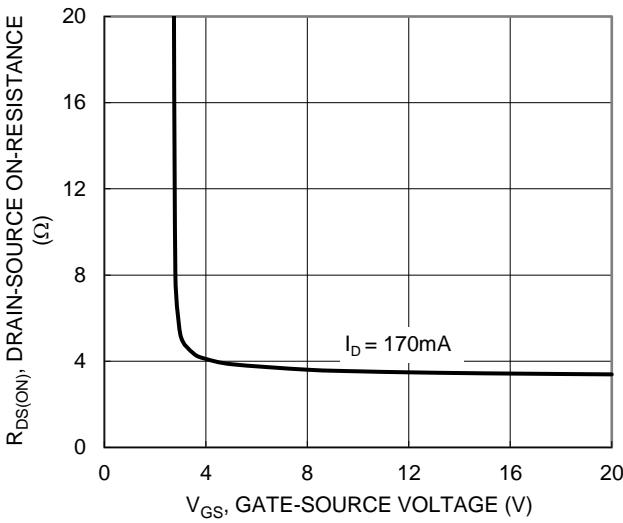


Figure 4. Typical Transfer Characteristic

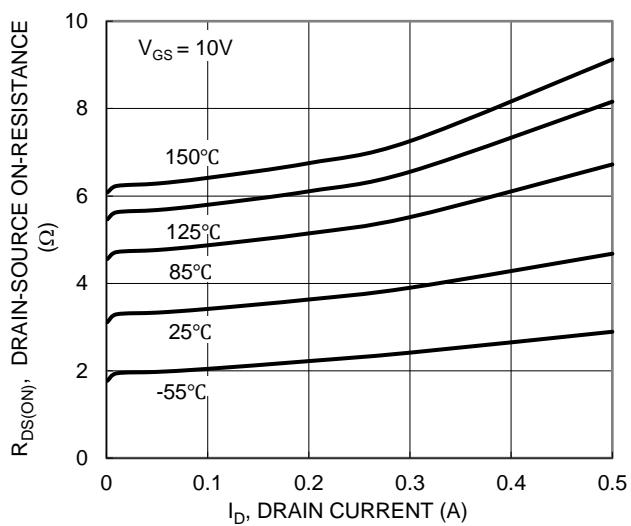


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

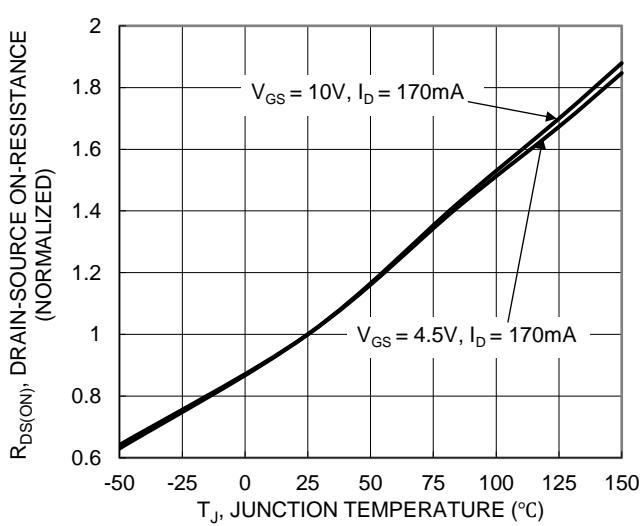
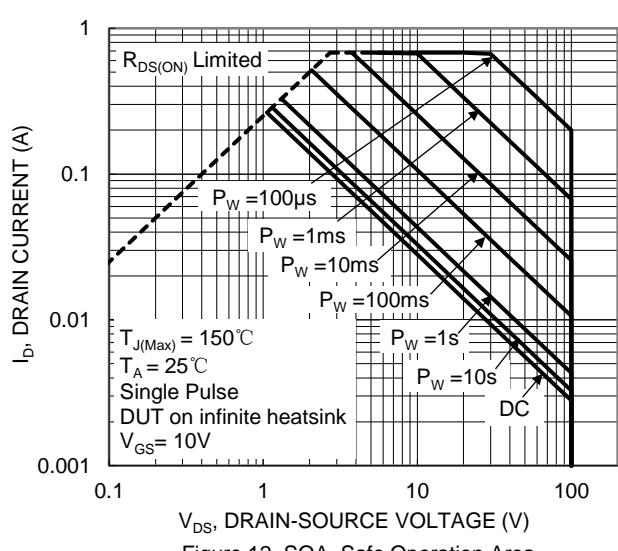
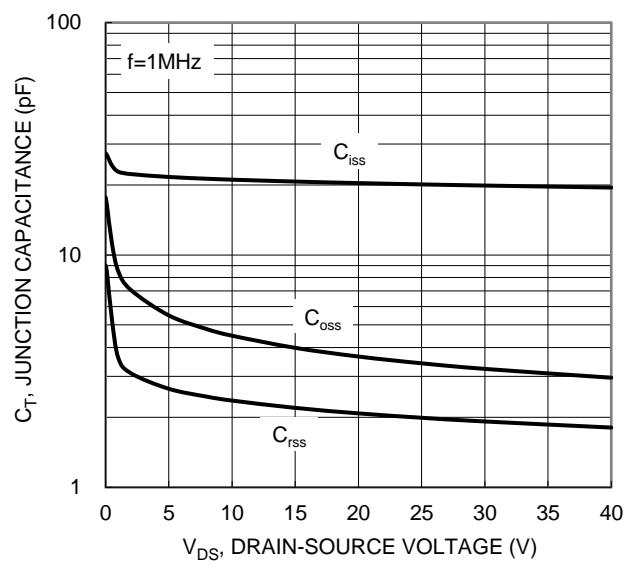
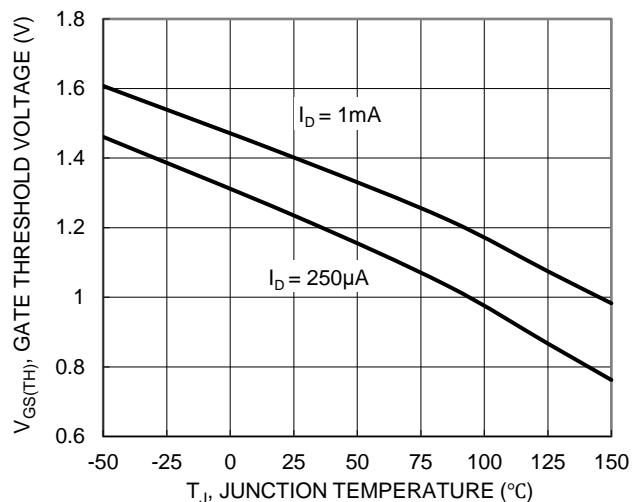
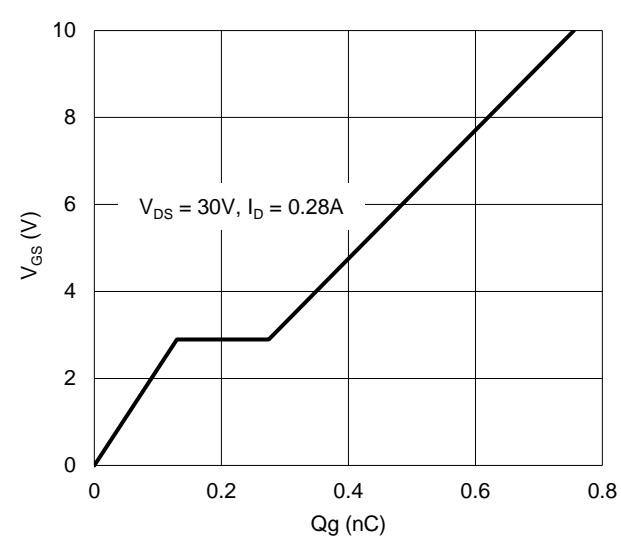
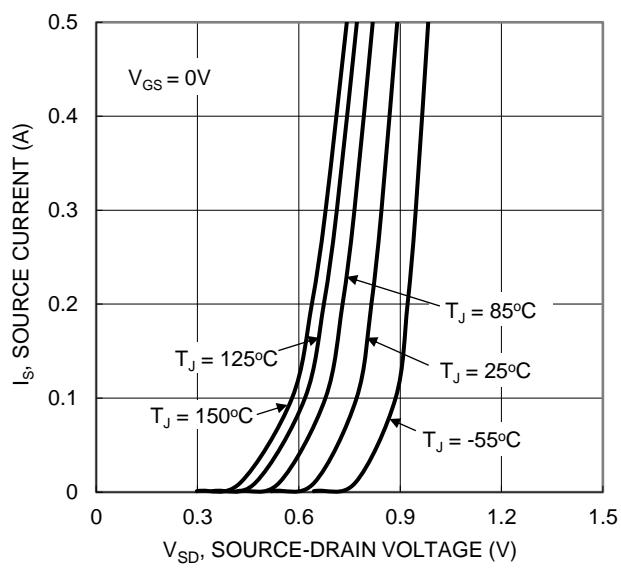
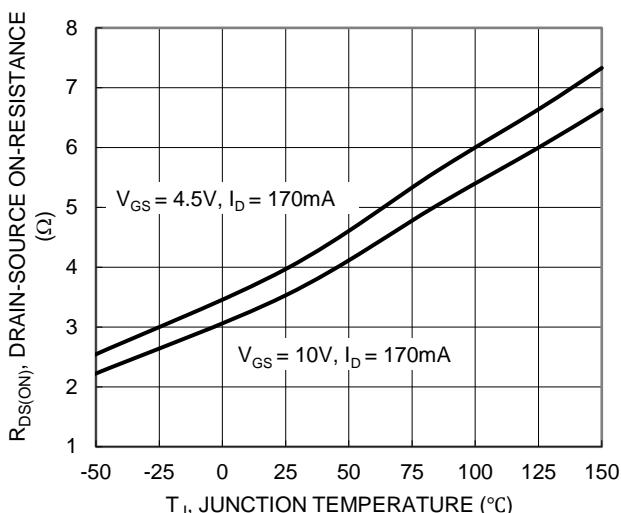


Figure 6. On-Resistance Variation with Junction Temperature



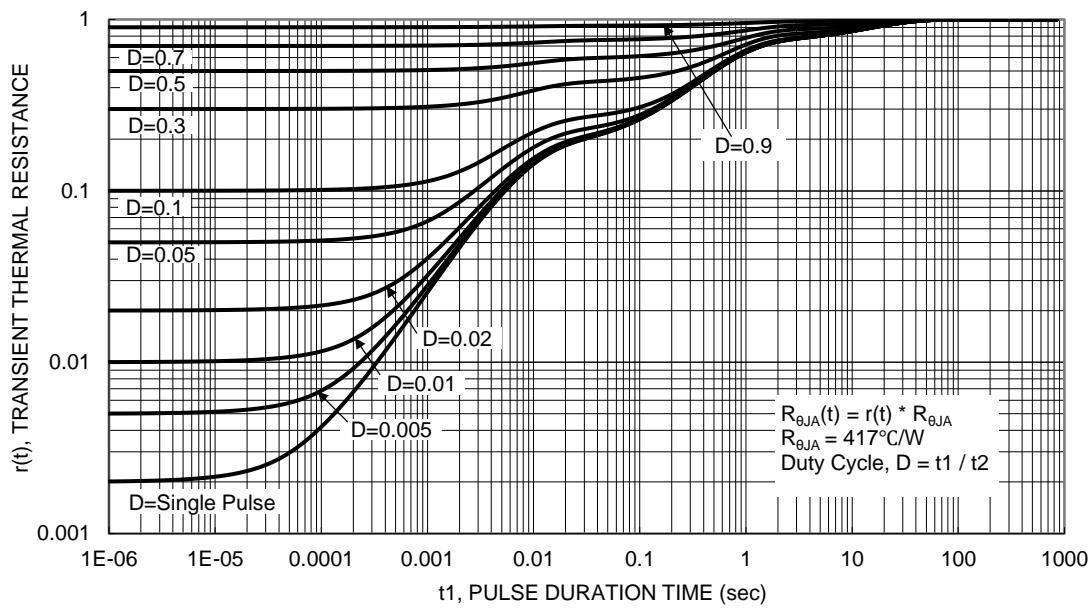
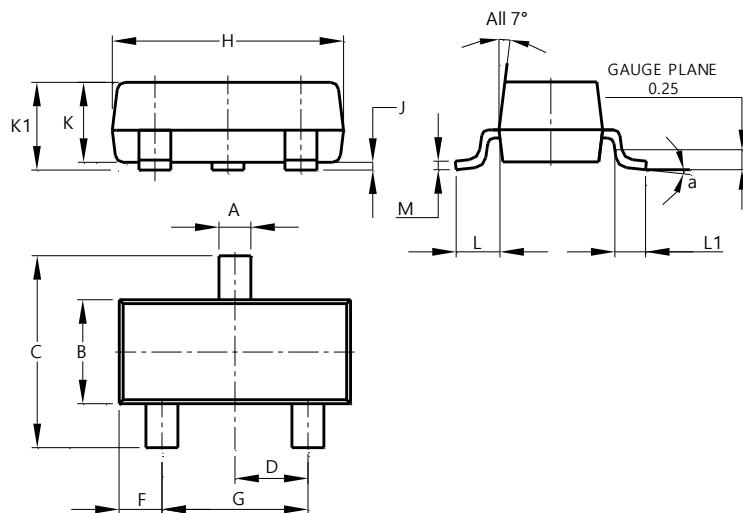


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

**SOT23**



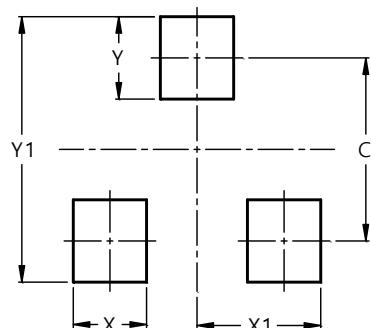
<b>SOT23</b>			
<b>Dim</b>	<b>Min</b>	<b>Max</b>	<b>Typ</b>
<b>A</b>	0.37	0.51	0.40
<b>B</b>	1.20	1.40	1.30
<b>C</b>	2.30	2.50	2.40
<b>D</b>	0.89	1.03	0.915
<b>F</b>	0.45	0.60	0.535
<b>G</b>	1.78	2.05	1.83
<b>H</b>	2.80	3.00	2.90
<b>J</b>	0.013	0.10	0.05
<b>K</b>	0.890	1.00	0.975
<b>K1</b>	0.903	1.10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

**All Dimensions in mm**

## Suggested Pad Layout

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

**SOT23**



<b>Dimensions</b>	<b>Value (in mm)</b>
<b>C</b>	2.0
<b>X</b>	0.8
<b>X1</b>	1.35
<b>Y</b>	0.9
<b>Y1</b>	2.9

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