

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = +25^\circ\text{C}$
100V	110m $\Omega$ @ $V_{GS} = 10\text{V}$	3.6A
	122m $\Omega$ @ $V_{GS} = 6.0\text{V}$	3.4A

## Description

This new generation MOSFET is 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.

## Applications

- DC-DC Converters
- Power Management Functions

## Features and Benefits

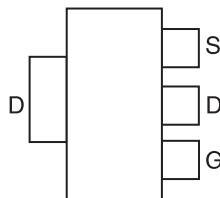
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

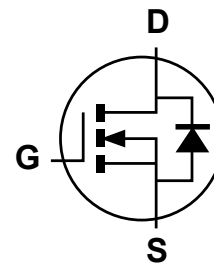
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208  $\text{e3}$
- Weight: 0.112 grams (Approximate)



Top View



Pin Out - Top View



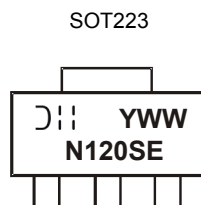
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
DMN10H120SE-13	Standard	SOT223	2,500/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](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



$\text{D}|||$  = Manufacturer's Marking  
 N120SE = Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: 5 = 2015)  
 WW = Week (01 - 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	100	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	3.6	A
		T <sub>A</sub> = +70°C		2.9	
Pulsed Drain Current (10µs pulse, duty cycle ≤ 1%)			I <sub>DM</sub>	16	A
Maximum Body Diode Continuous Current (Note 6)			I <sub>S</sub>	2.5	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 5)	P <sub>D</sub>	1.3	W
	(Note 6)		2.1	
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	94	°C/W
	(Note 6)		58	
Thermal Resistance, Junction to Case	(Note 6)	R <sub>θJC</sub>	8.2	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1.0	µA	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.5	2.6	3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	77	110	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.3A
		—	84	122		V <sub>GS</sub> = 6.0V, I <sub>D</sub> = 3.0A
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 3.2A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	549	—	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	41	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	19	—		
Gate Resistance	R <sub>g</sub>	—	1.6	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	10	—	nC	V <sub>DS</sub> = 50V, I <sub>D</sub> = 3.3A
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	5.2	—		
Gate-Source Charge	Q <sub>gs</sub>	—	2.3	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	2.6	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	3.8	—	nS	V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 6.0Ω, I <sub>D</sub> = 3.3A
Turn-On Rise Time	t <sub>r</sub>	—	1.8	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	11	—		
Turn-Off Fall Time	t <sub>f</sub>	—	2.5	—		
Reverse Recovery Time	t <sub>rr</sub>	—	21	—	nS	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1.1A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>rr</sub>	—	17	—	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 product testing.

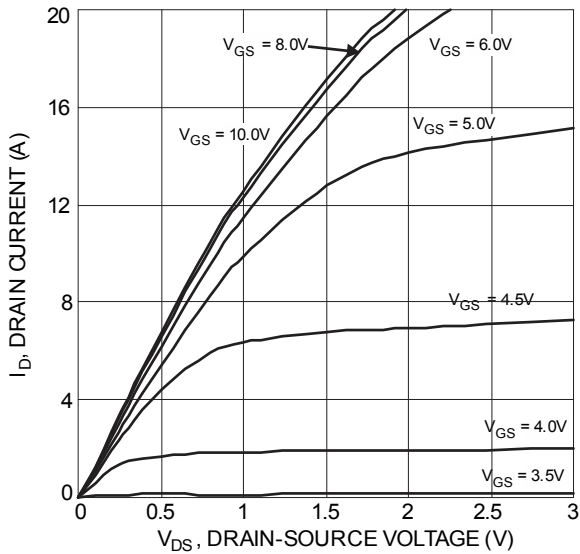


Figure 1 Typical Output Characteristics

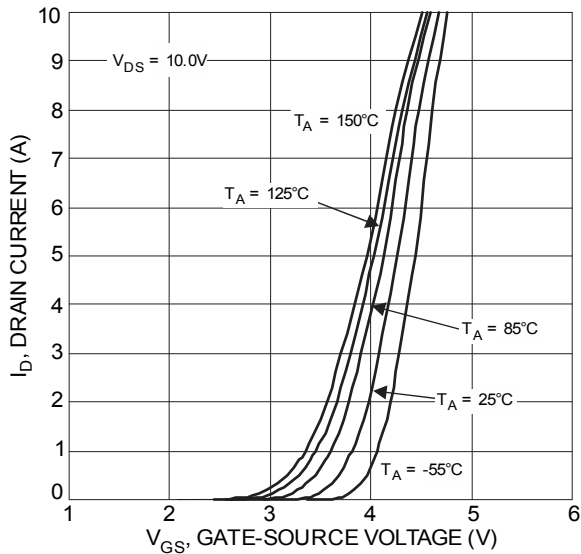


Figure 2 Typical Transfer Characteristics

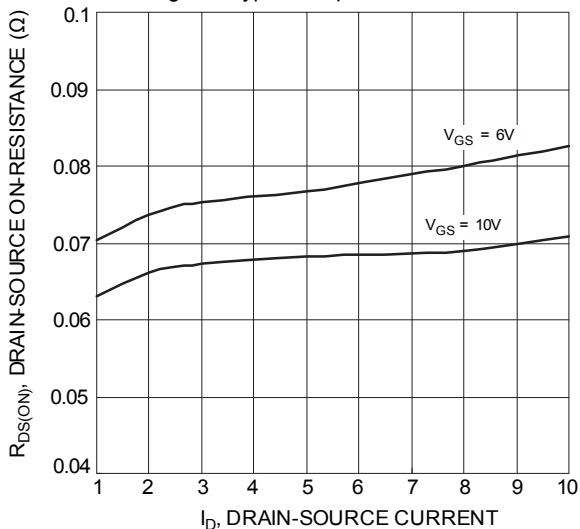


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

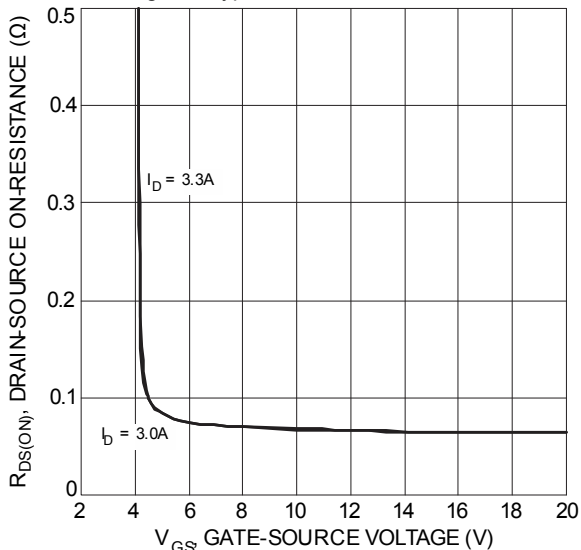


Figure 4 Typical Transfer Characteristics

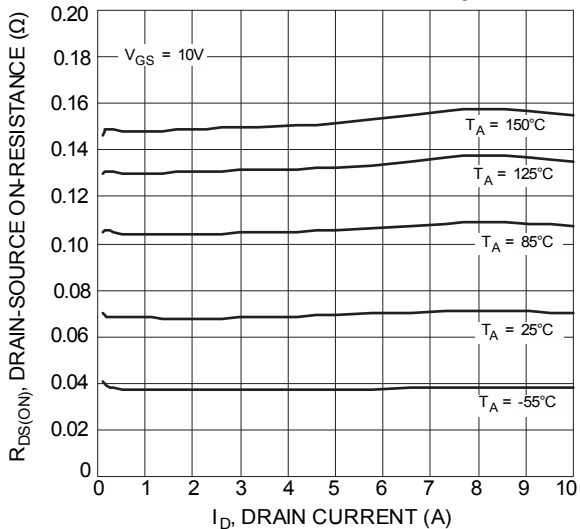


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

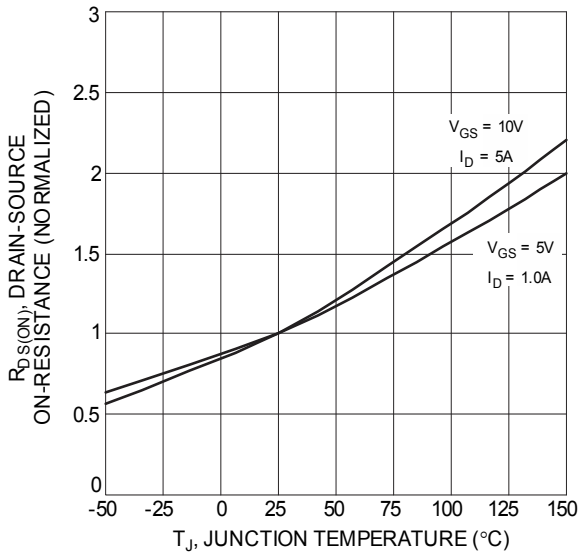


Figure 6 On-Resistance Variation with Temperature

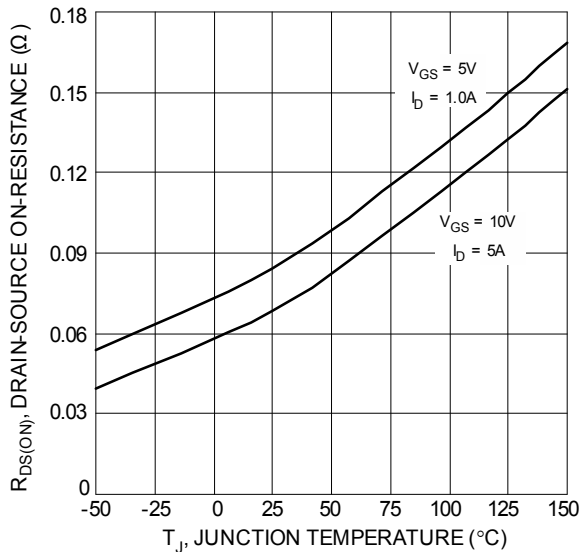


Figure 7 On-Resistance Variation with Temperature

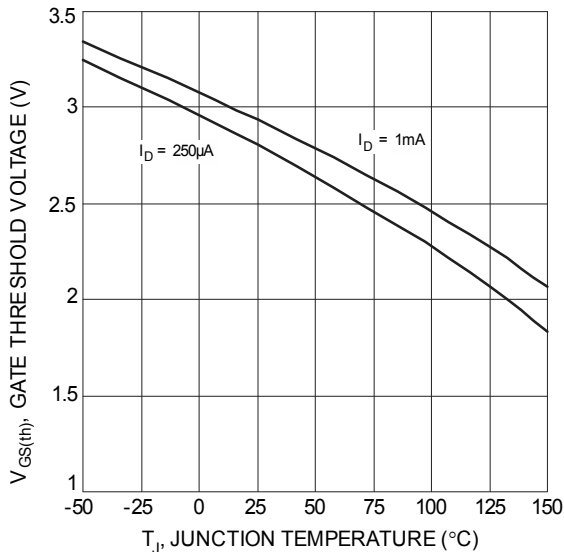


Figure 8 Gate Threshold Variation vs. Ambient Temperature

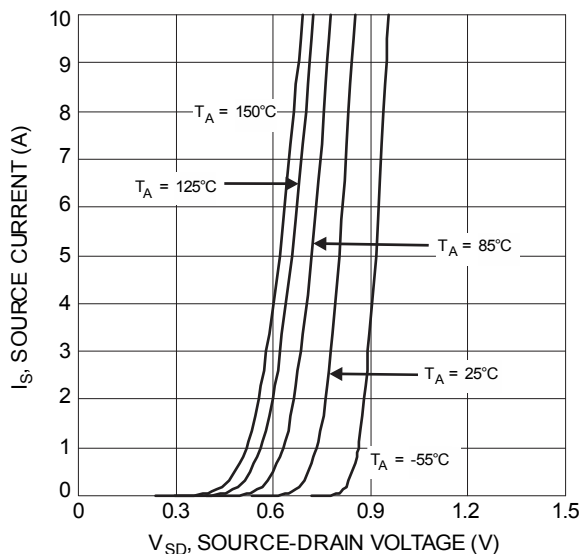


Figure 9 Diode Forward Voltage vs. Current

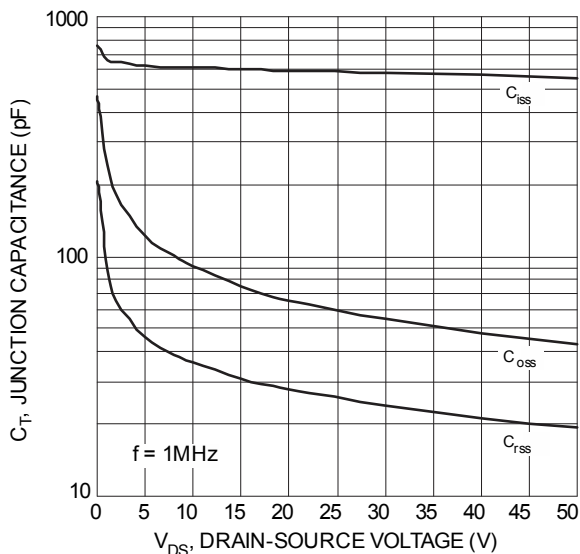


Figure 10 Typical Junction Capacitance

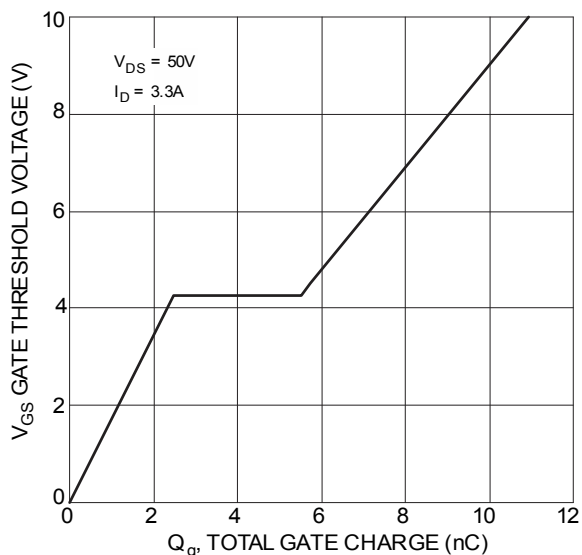


Figure 11 Gate Charge

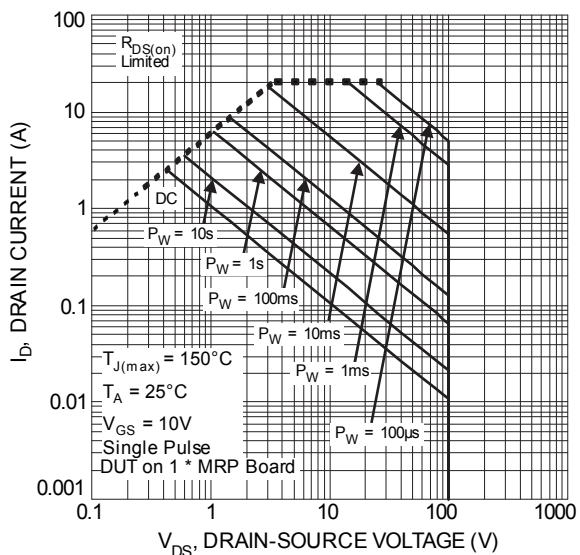
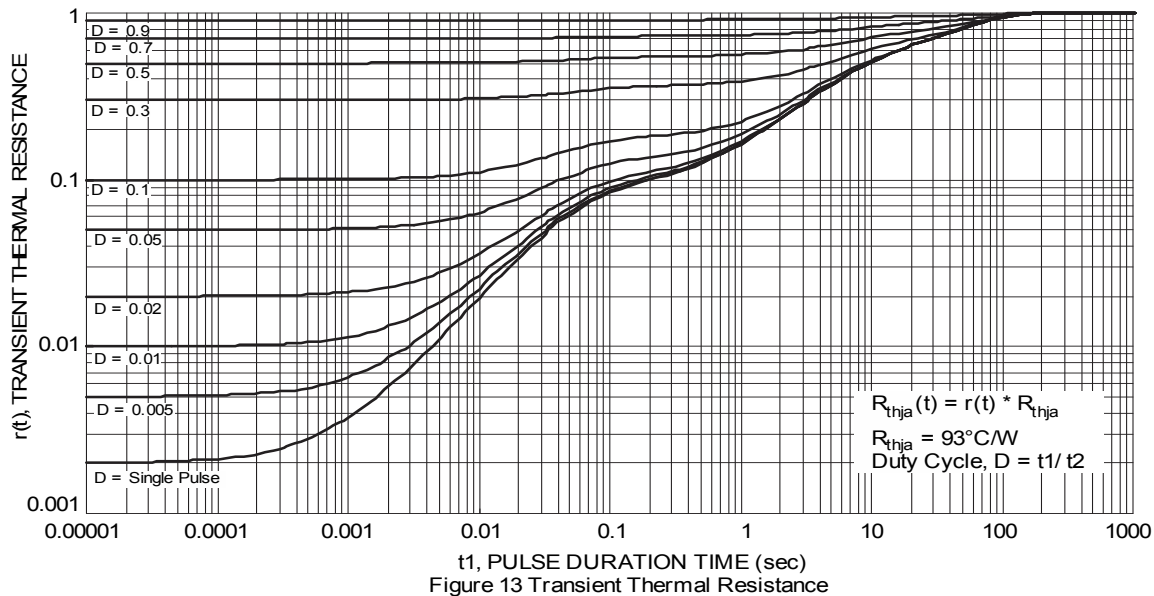
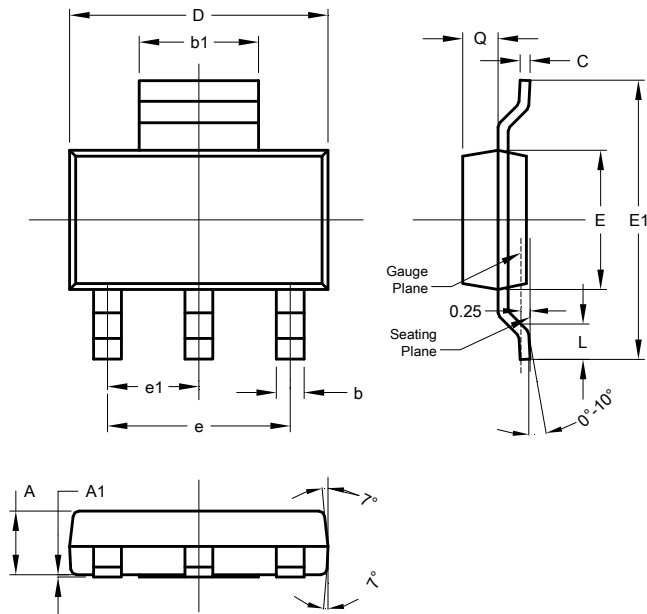


Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions & Suggested Pad Layout**

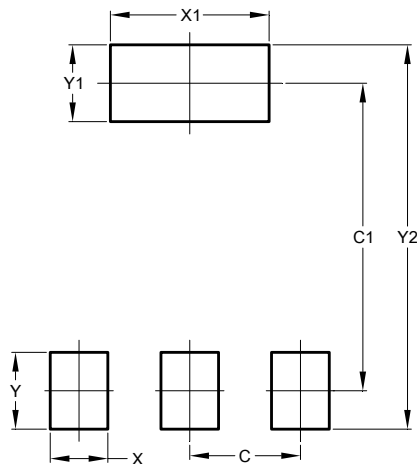
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
C2	8.00

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