

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ $T_A = +25^\circ\text{C}$
150V	310m $\Omega$ @ $V_{GS} = 10\text{V}$	2.0A
	330m $\Omega$ @ $V_{GS} = 5.0\text{V}$	1.9A

## 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

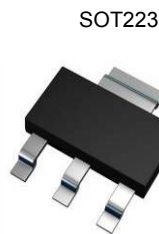
- Motor Control
- Transformer Driving Switch
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

## Features

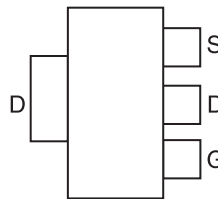
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Fast Switching Speed
- Low On-Resistance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

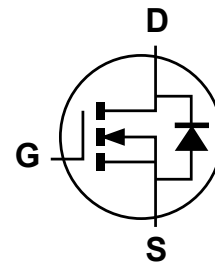
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208  $\text{\textcircled{3}}$
- Weight: 0.112 grams (Approximate)



Top View



Pin Out - Top View



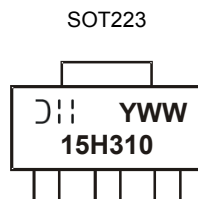
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN15H310SE-13	Standard	SOT223	2,500 / Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  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



$\text{\textcircled{D}}$  = Manufacturer's Marking  
 15H310 = Marking Code  
 YWW = Date Code Marking  
 Y or Y = Year (ex: 4 = 2014)  
 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>	150	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	I <sub>D</sub>	T <sub>A</sub> = +25°C	2.0
		T <sub>A</sub> = +70°C	1.6
	I <sub>D</sub>	T <sub>C</sub> = +25°C	7.1
		T <sub>C</sub> = +70°C	5.6
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I <sub>DM</sub>	10	A
Maximum Body Diode Continuous Current	I <sub>S</sub>	2.5	A
Avalanche Energy (Note 6) L=26mH	E <sub>AS</sub>	1.45	mJ
Avalanche Current (Note 6) L=26mH	I <sub>AS</sub>	0.2	A
Peak Diode Recovery dv/dt (I <sub>SD</sub> ≤ 7.3A, di/dt ≤ 300A/µs)	dv/dt	5	V/ns

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P <sub>D</sub>	T <sub>A</sub> = +25°C	1.9
		T <sub>A</sub> = +70°C	1.2
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	64	°C/W
Total Power Dissipation (Note 5)	P <sub>D</sub>	23.5	W
Thermal Resistance, Junction to Case (Note 5)	R <sub>θJC</sub>	5.3	°C/W
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>	150	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 120V, V <sub>GS</sub> = 0V
Gate-Source 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	2.2	3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	178	310	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.5A
		—	190	330		V <sub>GS</sub> = 5.0V, I <sub>D</sub> = 1.0A
Diode Forward Voltage	V <sub>SD</sub>	—	0.76	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1.7A
<b>DYNAMIC CHARACTERISTICS (Note 6)</b>						
Input Capacitance	C <sub>iss</sub>	—	405	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	40	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	20	—		
Gate Resistance	R <sub>G</sub>	—	2.88	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 5.0V)	Q <sub>g</sub>	—	4.6	—	nC	V <sub>DS</sub> = 80V, I <sub>D</sub> = 7.3A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	8.7	—		
Gate-Source Charge	Q <sub>gs</sub>	—	1.7	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	1.8	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	3.5	—	nS	V <sub>DD</sub> = 50V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 25Ω, I <sub>D</sub> = 7.3A
Turn-On Rise Time	t <sub>r</sub>	—	7.8	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	22	—		
Turn-Off Fall Time	t <sub>f</sub>	—	11	—		
Reverse Recovery Time	t <sub>rr</sub>	—	38	—	ns	I <sub>F</sub> = 7.3A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>rr</sub>	—	53	—	nC	I <sub>F</sub> = 7.3A, di/dt = 100A/µs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
  - Guaranteed by design. Not subject to product testing.
  - Short duration pulse test used to minimize self-heating effect.

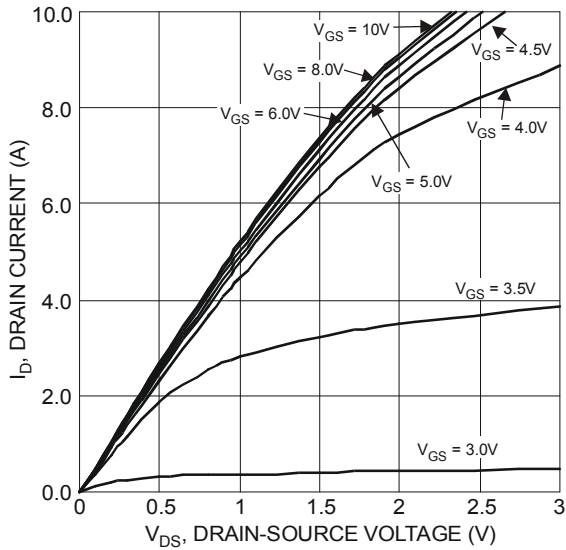


Figure 1 Typical Output Characteristics

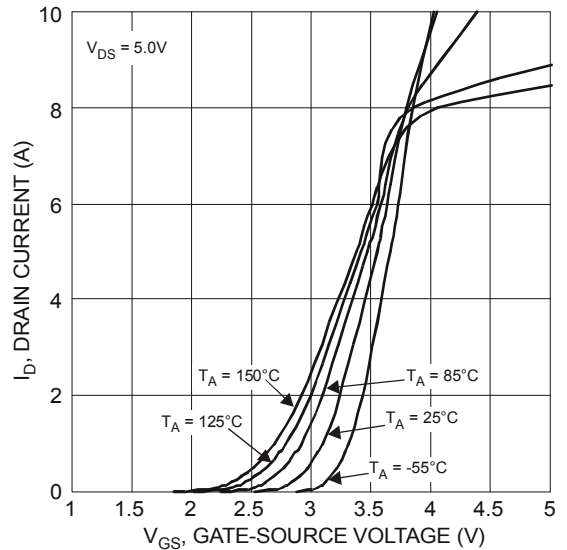


Figure 2 Typical Transfer Characteristics

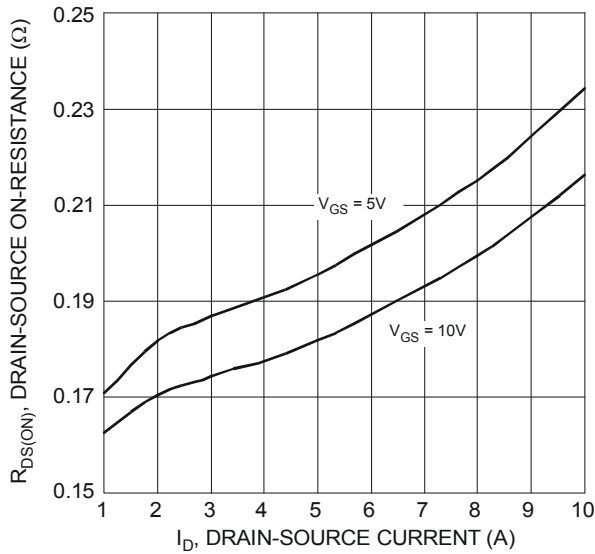


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

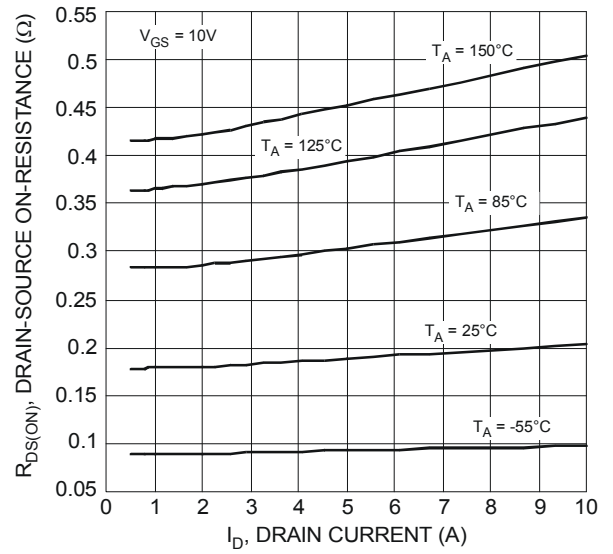


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

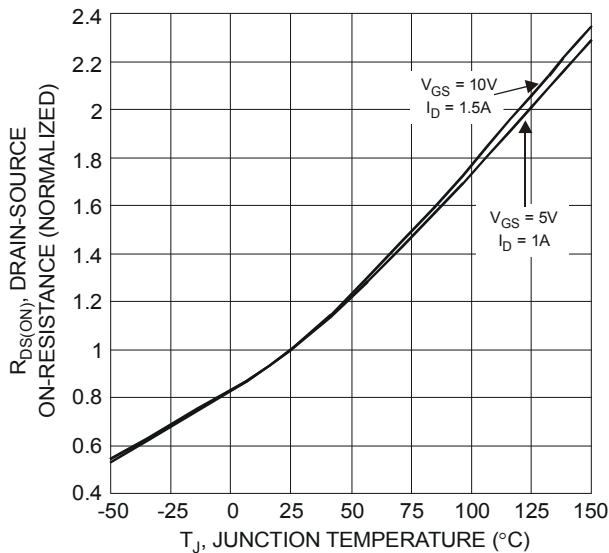


Figure 5 On-Resistance Variation with Temperature

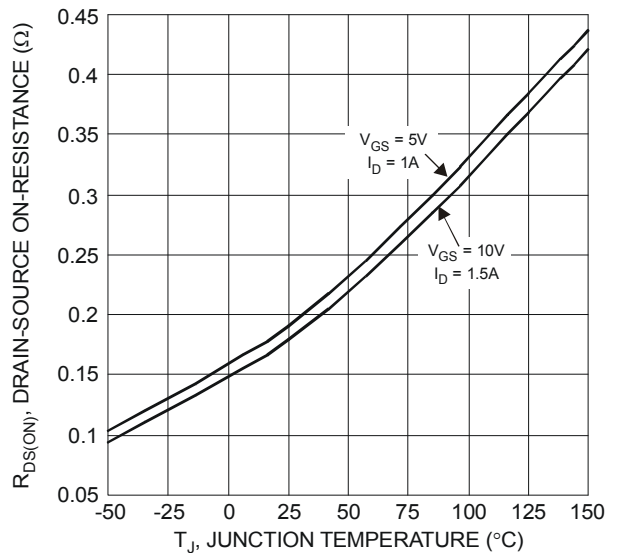


Figure 6 On-Resistance Variation with Temperature

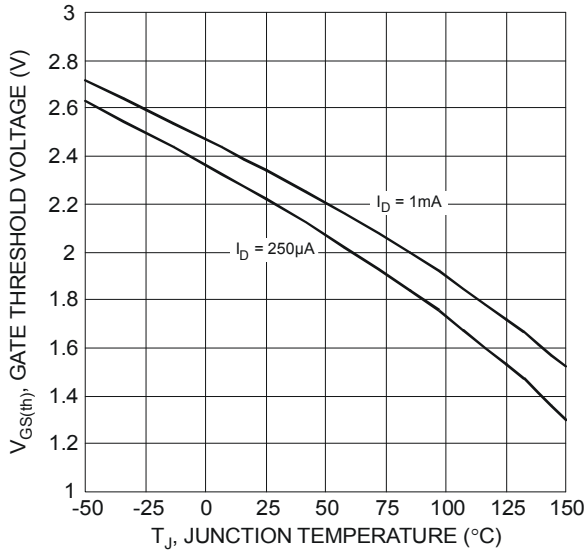


Figure 7 Gate Threshold Variation vs. Ambient Temperature

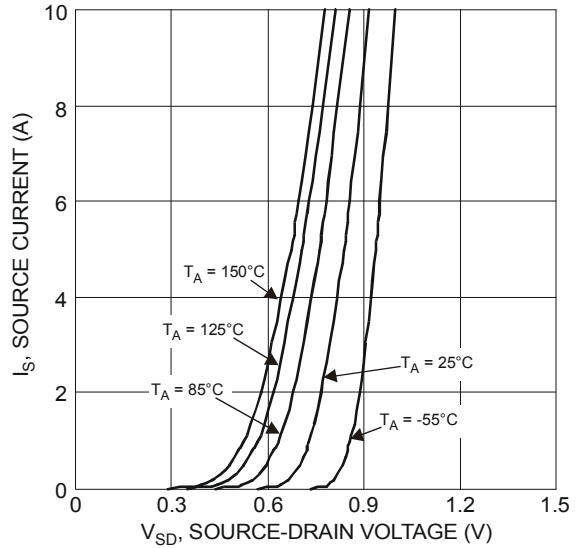


Figure 8 Diode Forward Voltage vs. Current

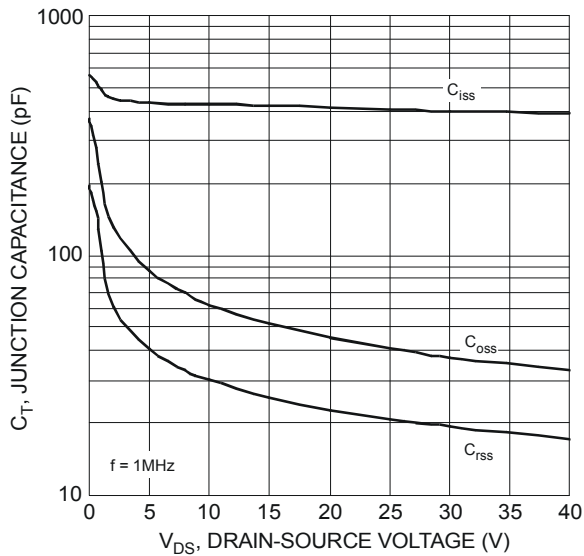


Figure 9 Typical Junction Capacitance

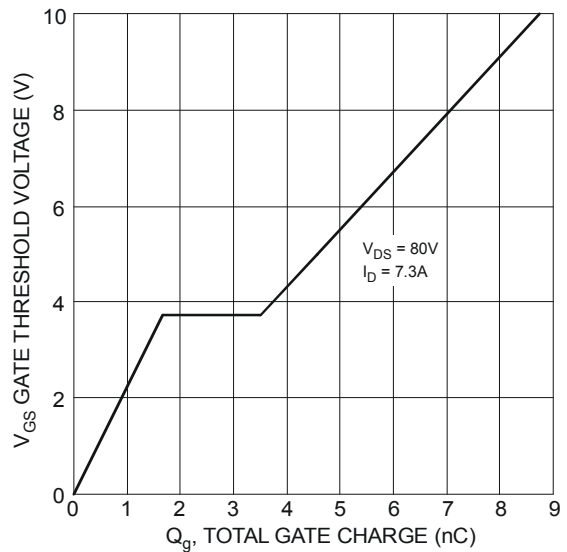


Figure 10 Gate Charge

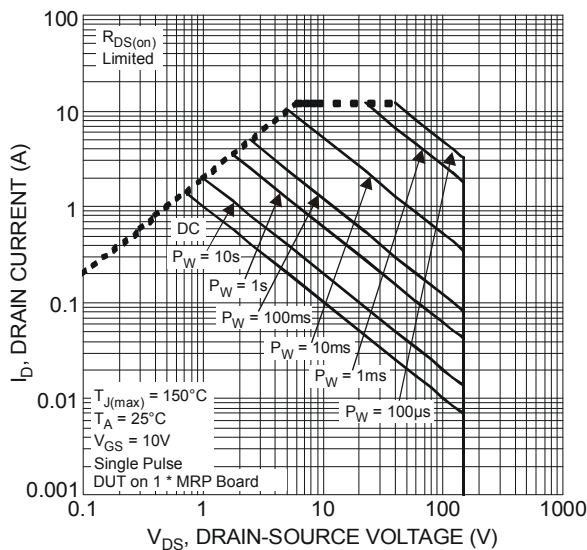


Figure 11 SOA, Safe Operation Area

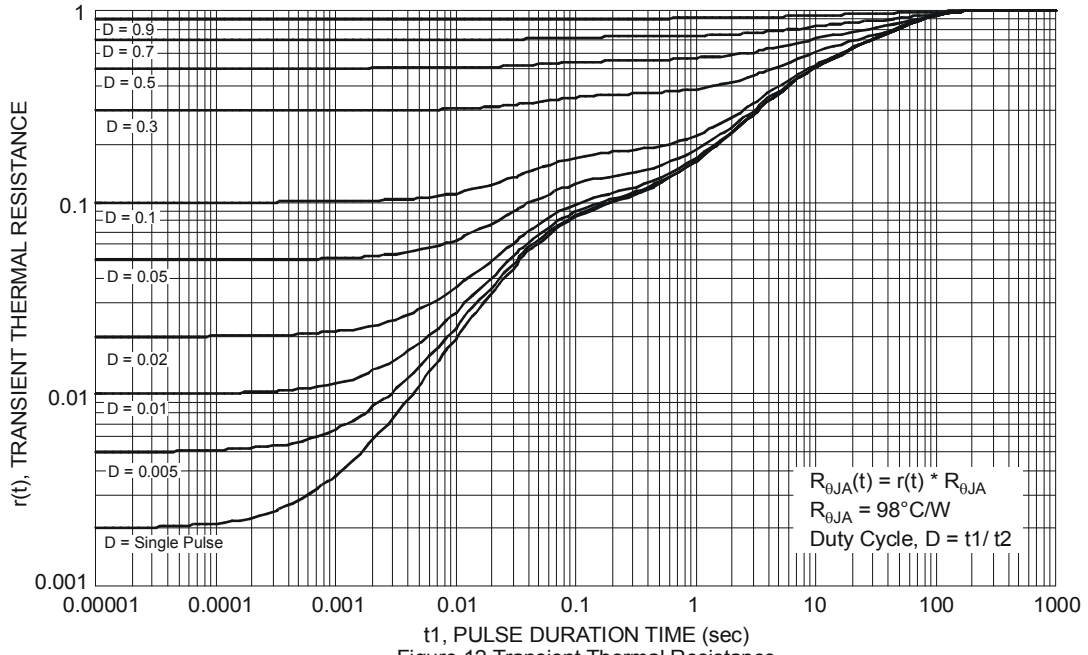
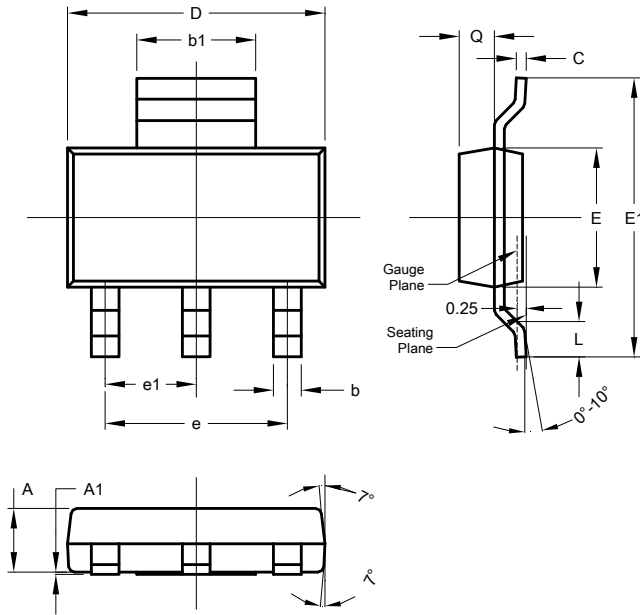


Figure 12 Transient Thermal Resistance

**Package Outline Dimensions**

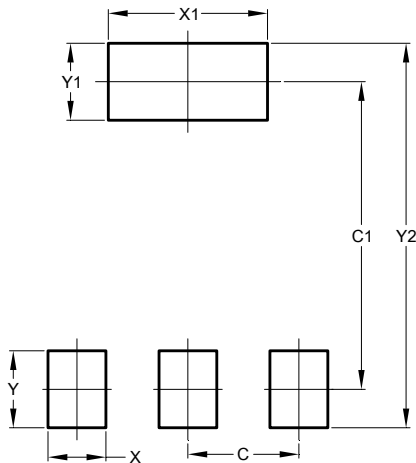
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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