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**DMN10H120SE**

**100V N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

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

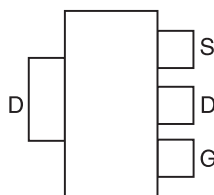
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Mechanical Data**

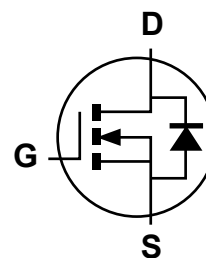
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208  $\text{E3}$
- Weight: 0.112 grams (Approximate)



Top View



Pin Out - Top View



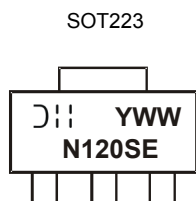
Equivalent Circuit

**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**



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

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Units	
Drain-Source Voltage	$V_{DSS}$	100	V	
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V	
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	$I_D$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	3.6 2.9	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle $\leq 1\%$ )		$I_{DM}$	16	A
Maximum Body Diode Continuous Current (Note 6)	$I_S$	2.5	A	

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

Characteristic	Symbol	Value	Units	
Total Power Dissipation	$P_D$	(Note 5)	1.3	W
		(Note 6)	2.1	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5)	94	$^\circ\text{C/W}$
		(Note 6)	58	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	8.2	$^\circ\text{C/W}$	
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
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	100	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1.5	2.6	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	77	110	m $\Omega$	$V_{GS} = 10\text{V}, I_D = 3.3\text{A}$
		—	84	122		$V_{GS} = 6.0\text{V}, I_D = 3.0\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.8	1.2	V	$V_{GS} = 0\text{V}, I_S = 3.2\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{ISS}$	—	549	—	pF	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{OSS}$	—	41	—		
Reverse Transfer Capacitance	$C_{RSS}$	—	19	—		
Gate Resistance	$R_g$	—	1.6	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	—	10	—	nC	$V_{DS} = 50\text{V}, I_D = 3.3\text{A}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	5.2	—		
Gate-Source Charge	$Q_{gs}$	—	2.3	—		
Gate-Drain Charge	$Q_{gd}$	—	2.6	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.8	—	nS	$V_{DD} = 50\text{V}, V_{GS} = 10\text{V}, R_G = 6.0\Omega, I_D = 3.3\text{A}$
Turn-On Rise Time	$t_r$	—	1.8	—		
Turn-Off Delay Time	$t_{D(off)}$	—	11	—		
Turn-Off Fall Time	$t_f$	—	2.5	—		
Reverse Recovery Time	$t_{rr}$	—	21	—	nS	$V_{GS} = 0\text{V}, I_S = 1.1\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	$Q_{rr}$	—	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.



**DMN10H120SE**

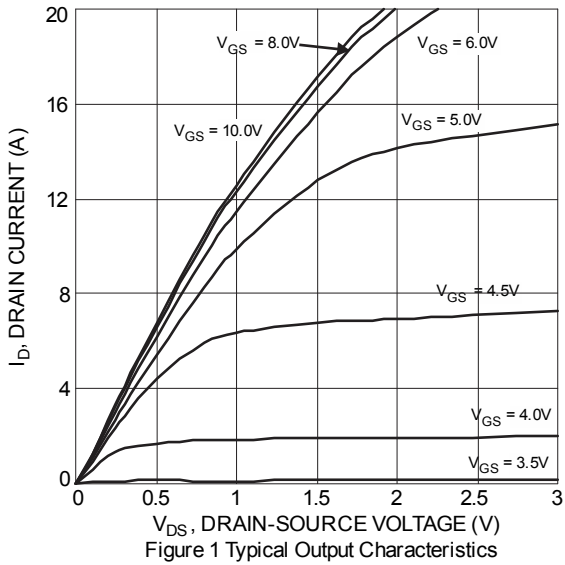


Figure 1 Typical Output Characteristics

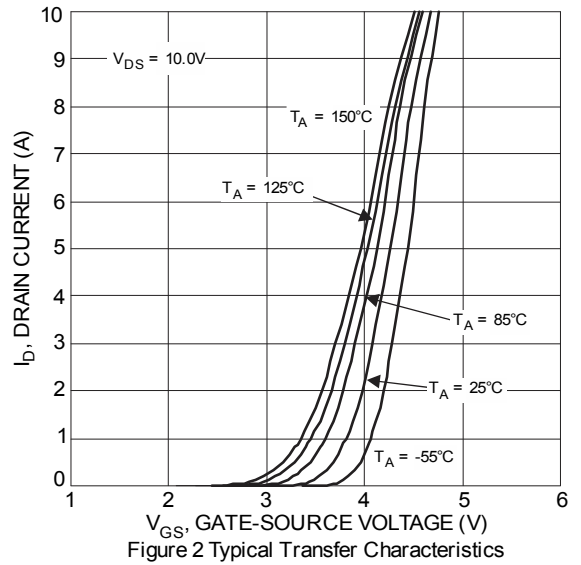


Figure 2 Typical Transfer Characteristics

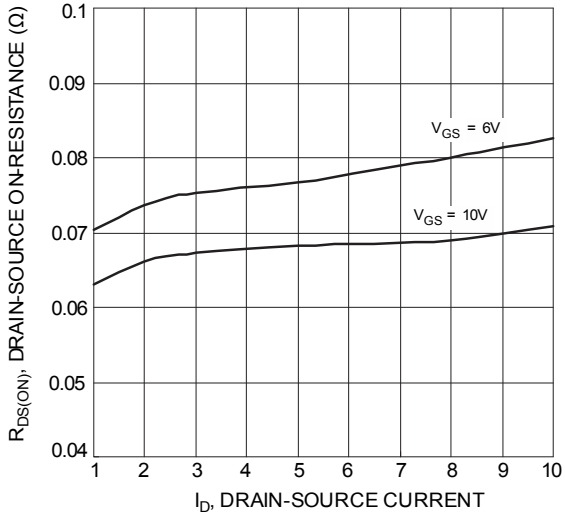


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

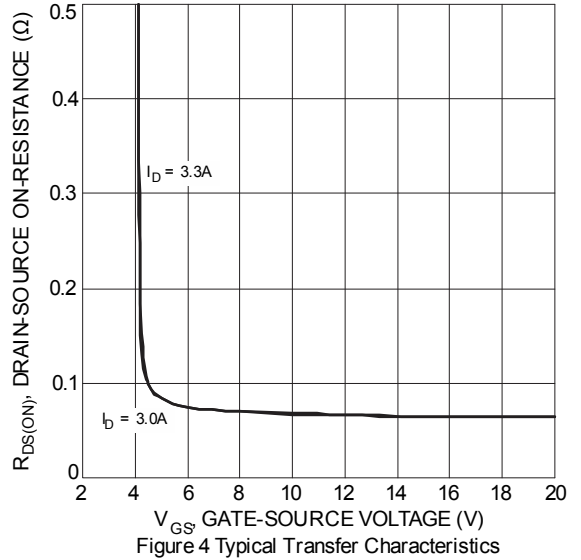


Figure 4 Typical Transfer Characteristics

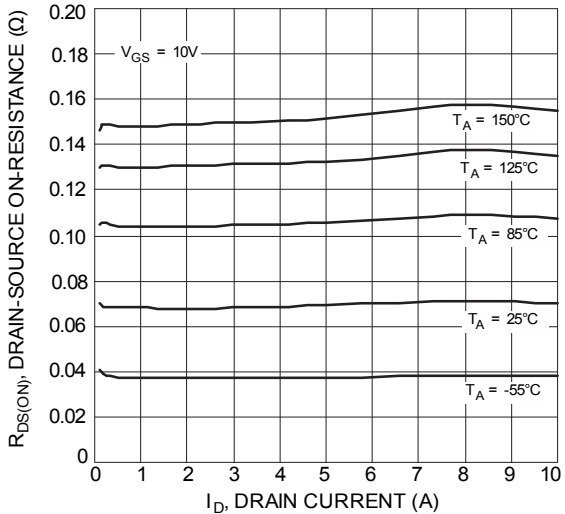


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

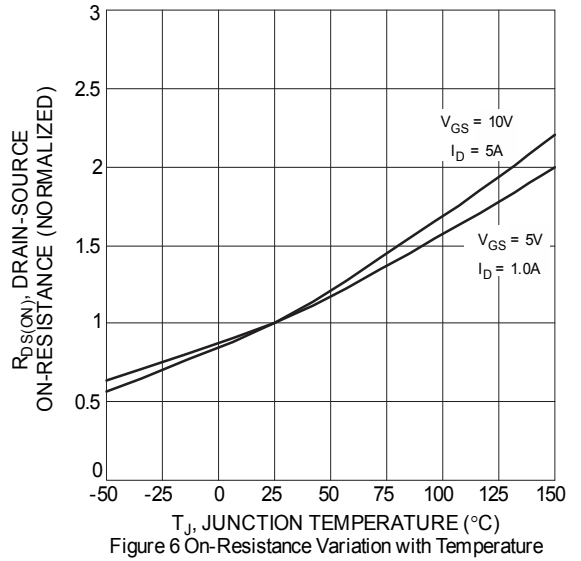


Figure 6 On-Resistance Variation with Temperature



**DMN10H120SE**

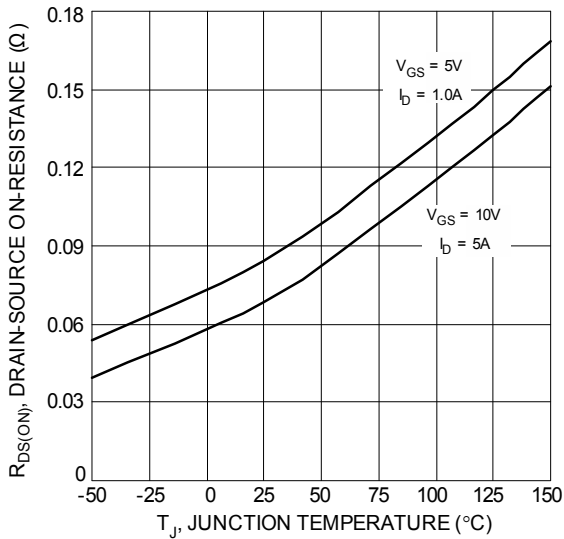


Figure 7 On-Resistance Variation with Temperature

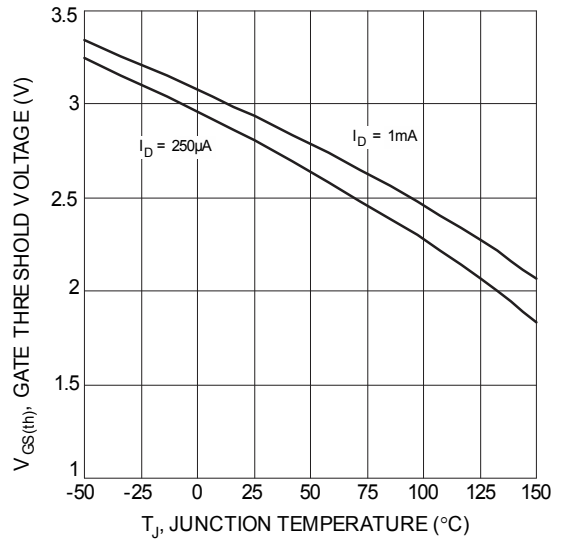


Figure 8 Gate Threshold Variation vs. Ambient Temperature

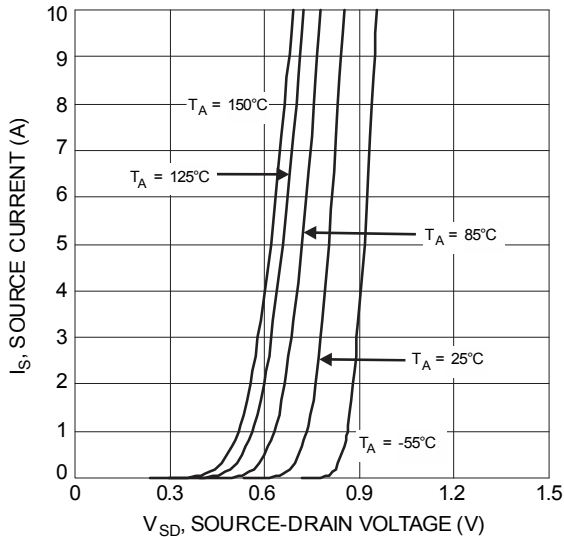


Figure 9 Diode Forward Voltage vs. Current

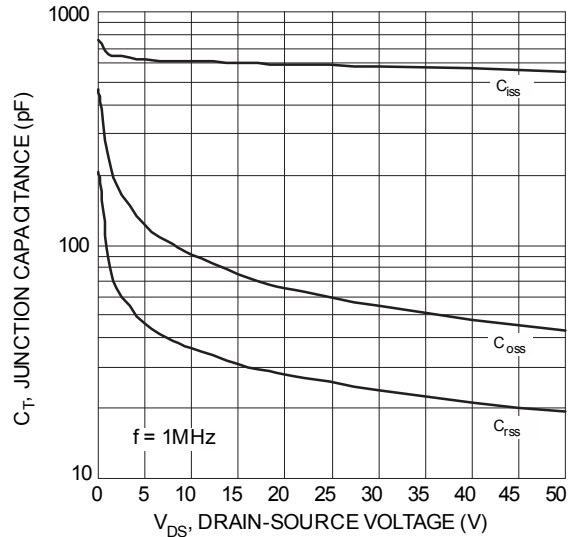


Figure 10 Typical Junction Capacitance

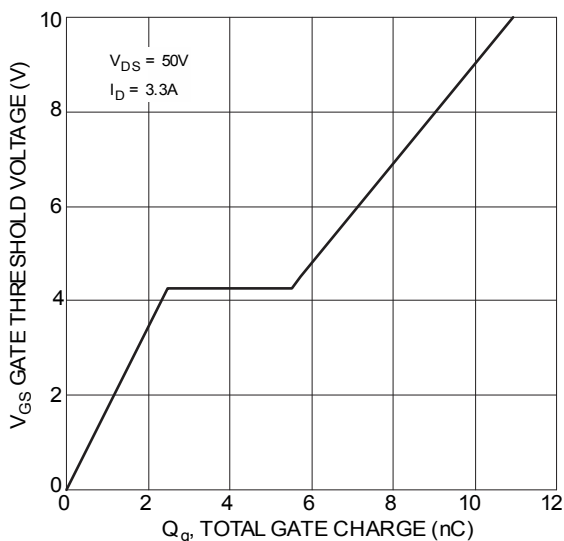


Figure 11 Gate Charge

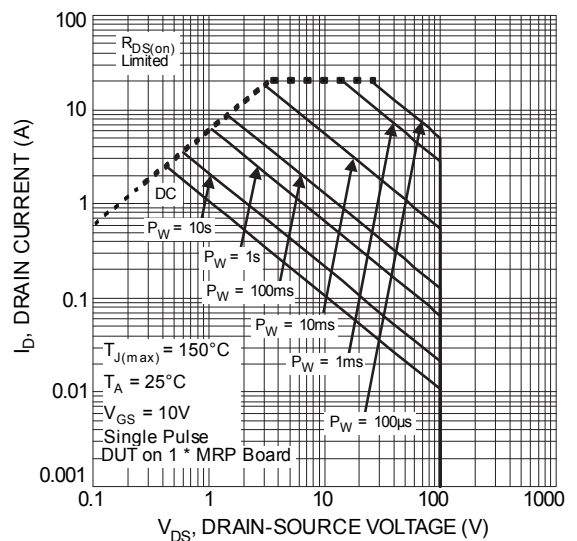


Figure 12 SOA, Safe Operation Area

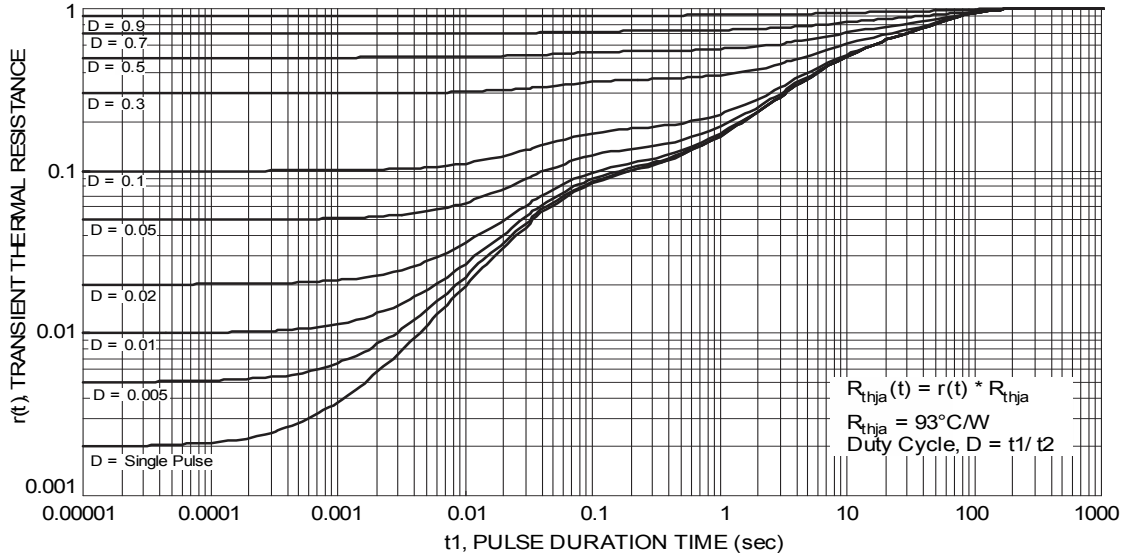
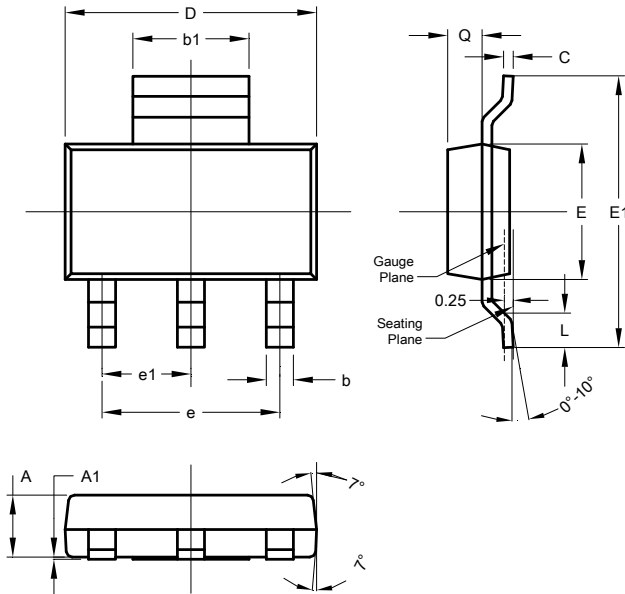


Figure 13 Transient Thermal Resistance

**Package Outline Dimensions & Suggested Pad Layout**

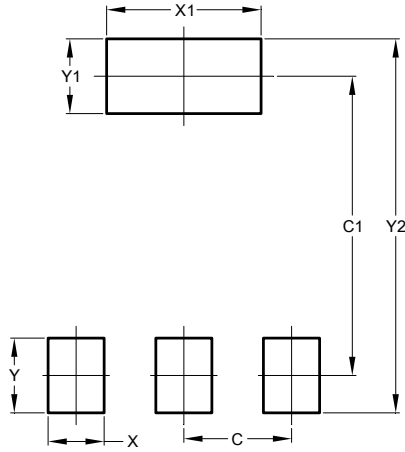
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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
<b>All Dimensions in mm</b>			

**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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