

Product Summary

BV_{DSS}	$R_{DS(ON)} \text{ max}$	I_D $T_A = +25^\circ\text{C}$
100V	220m Ω @ $V_{GS} = 10\text{V}$	2.3A
	250m Ω @ $V_{GS} = 4.5\text{V}$	2.1A

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

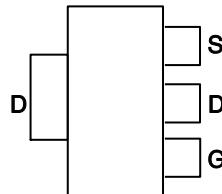
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**
- An Automotive-Compliant Part is Available Under Separate Datasheet ([DMN10H220LEQ](#))**

Mechanical Data

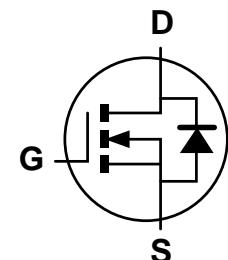
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method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



Top View



Pin Out - Top View



Equivalent Circuit

Ordering Information (Note 4)

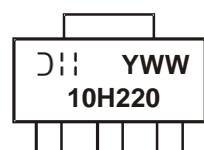
Part Number	Compliance	Case	Packaging
DMN10H220LE-13	Standard	SOT223	2,500/Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See 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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

SOT223



DII = Manufacturer's Marking
 10H220 = Marking Code
 YWW = Date Code Marking
 Y or \overline{Y} = Year (ex: 7 = 2017)
 WW = Week (01 to 53)

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_{GSS}	± 20	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	$T_A = +25^\circ\text{C}$	2.3	A
	$T_A = +70^\circ\text{C}$	1.8	A
Maximum Continuous Body Diode Forward Current (Note 5)	$T_C = +25^\circ\text{C}$	6.2	A
	$T_C = +70^\circ\text{C}$	4.9	A
Maximum Continuous Body Diode Forward Current (Note 5)	I_S	1.5	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	8	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	1.8	W
		1.1	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	69	°C/W
Total Power Dissipation (Note 5)	P_D	14	W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	8.7	°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
OFF CHARACTERISTICS (Note 6)						
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	μA	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	1.7	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	155	220	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 1.6\text{A}$
		—	190	250		$V_{GS} = 4.5\text{V}, I_D = 1.3\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.5	V	$V_{GS} = 0\text{V}, I_S = 1.1\text{A}$
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	401	—	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	22	—		
Reverse Transfer Capacitance	C_{rss}	—	17	—		
Gate Resistance	R_g	—	2.1	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	4.1	—	nC	$V_{DS} = 50\text{V}, I_D = 1.6\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	8.3	—		
Gate-Source Charge	Q_{gs}	—	1.5	—		
Gate-Drain Charge	Q_{gd}	—	2	—		
Turn-On Delay Time	$t_{D(ON)}$	—	6.8	—	ns	$V_{DS} = 50\text{V}, V_{GS} = 4.5\text{V}, R_G = 6.8\Omega, I_D = 1.0\text{A}$
Turn-On Rise Time	t_R	—	8.2	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	7.9	—		
Turn-Off Fall Time	t_F	—	3.6	—		
Reverse Recovery Time	t_{RR}	—	17	—	ns	$I_S = 1.1\text{A}, \text{di}/\text{dt} = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	9.8	—	nC	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1-inch square copper plate.

6. Short duration pulse test used to minimize self-heating effect.

7. Guaranteed by design. Not subject to production testing.

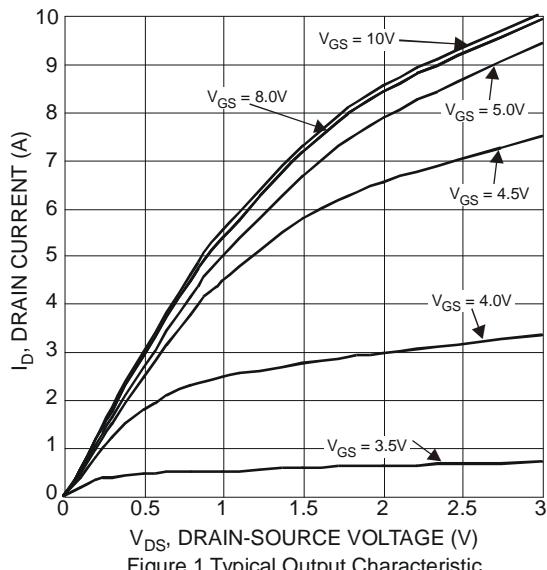


Figure 1 Typical Output Characteristic

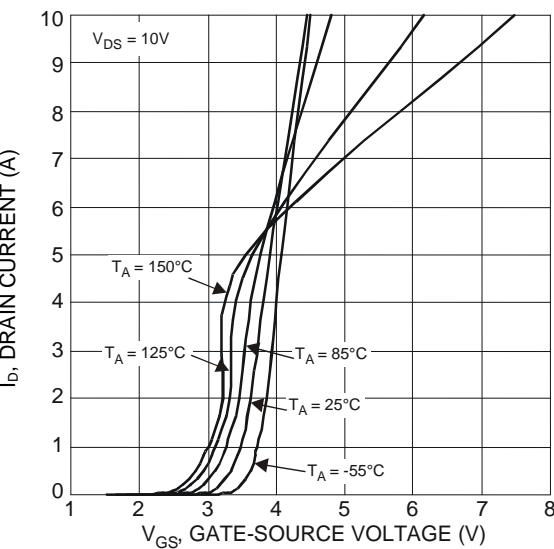


Figure 2 Typical Transfer Characteristics

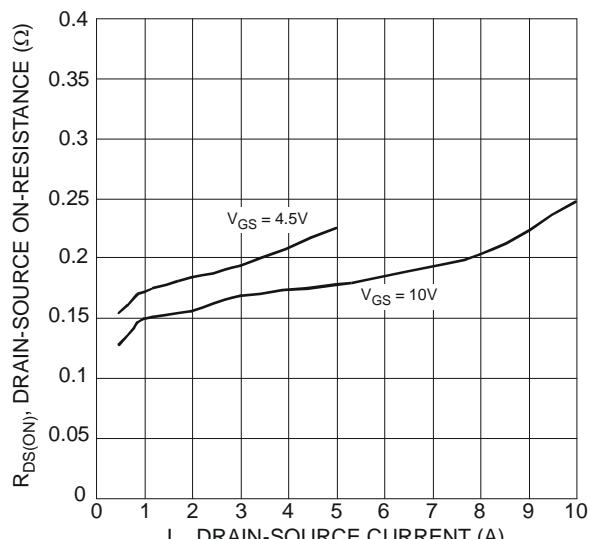


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

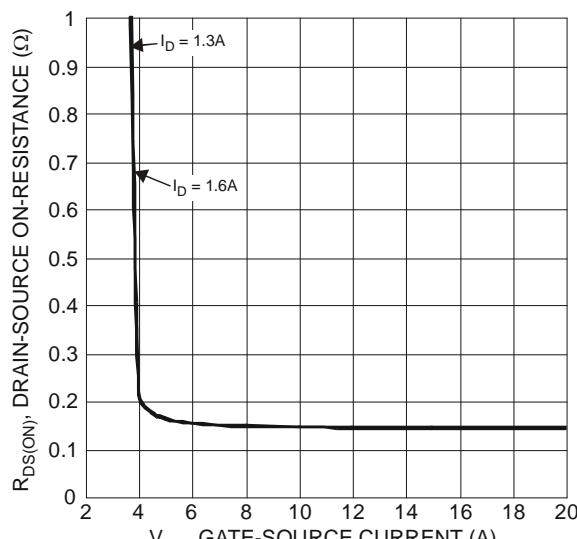


Figure 4 Typical Transfer Characteristic

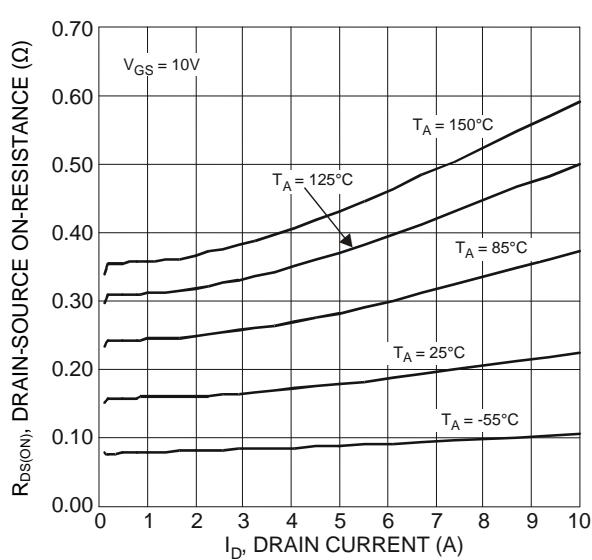


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

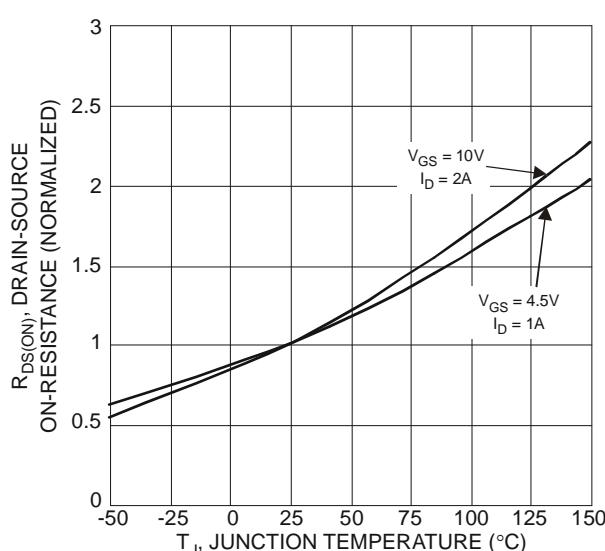
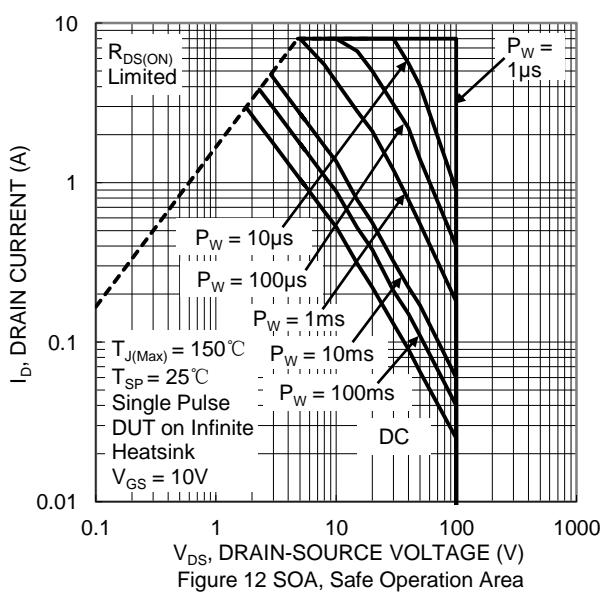
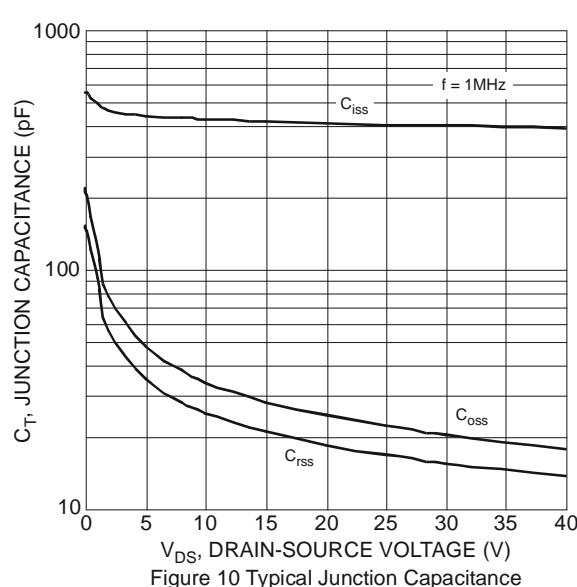
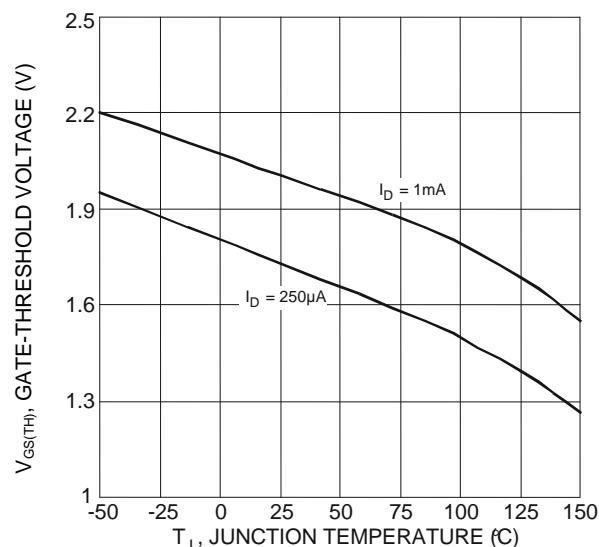
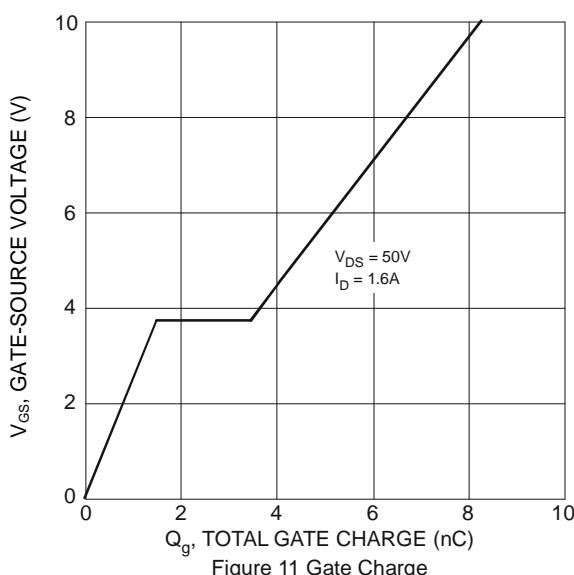
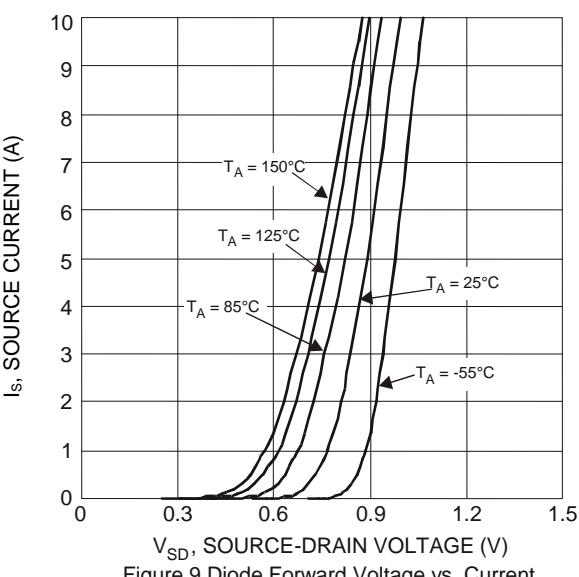
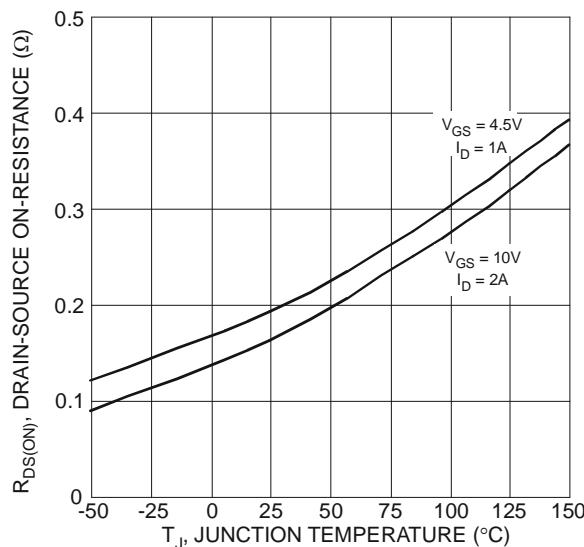


Figure 6 On-Resistance Variation with Temperature



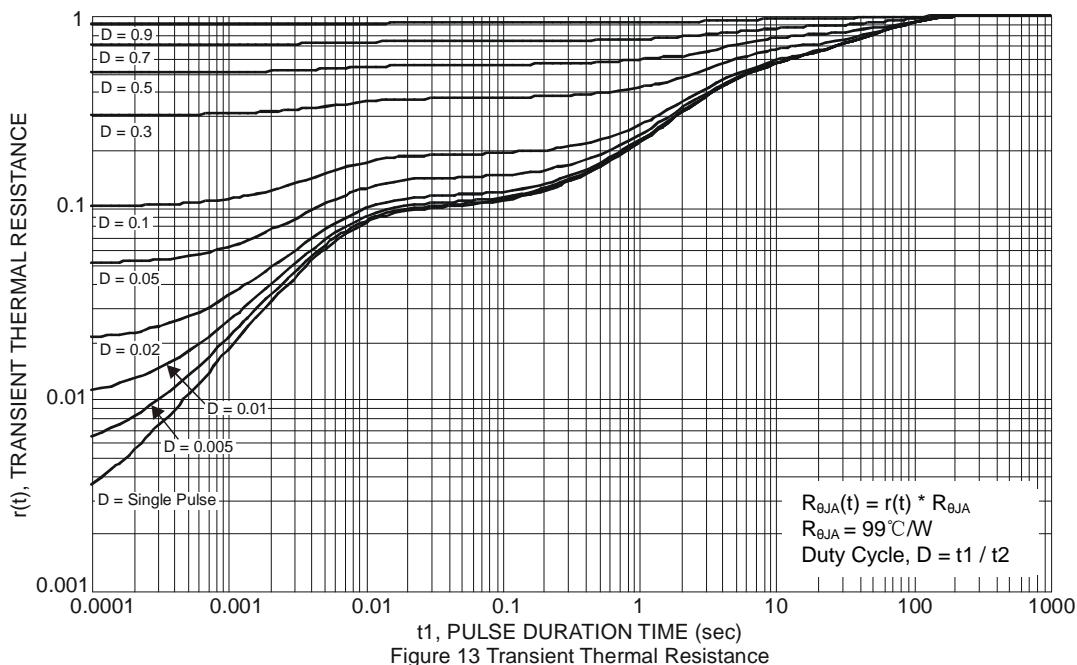
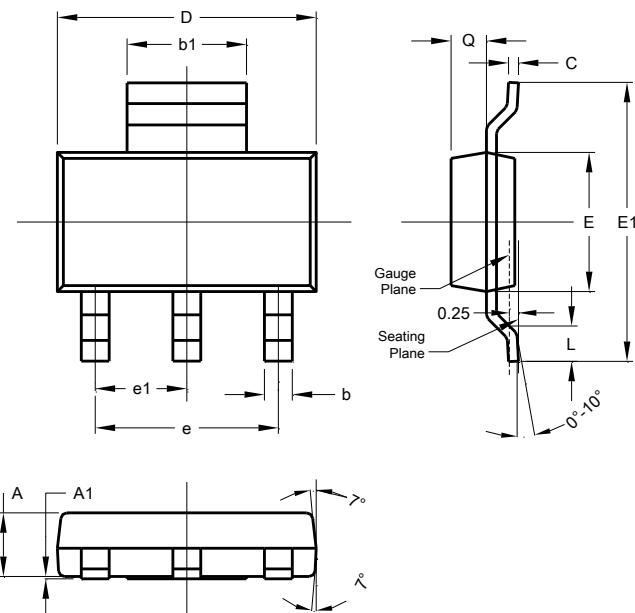


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

SOT223



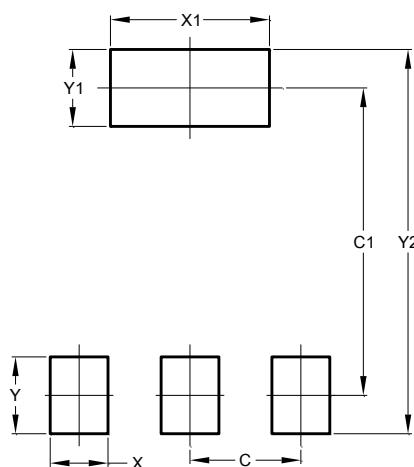
SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89

All Dimensions in mm

Suggested Pad Layout

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

SOT223



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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