

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-60V	28mΩ @ V _{GS} = -10V	-7A
	35mΩ @ V _{GS} = -4.5V	-6.2A

Description and Applications

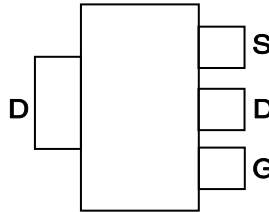
This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Backlighting
- Power Management Functions
- DC-DC Converters

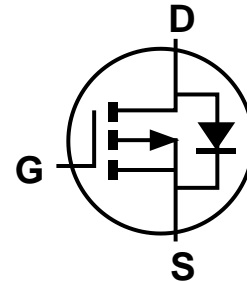
SOT223



Top View



Pin Out - Top View



Equivalent Circuit

Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

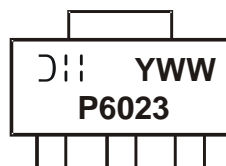
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe.
Solderable per MIL-STD-202, Method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

Ordering Information (Note 5)

Part Number	Case	Packaging
DMP6023LEQ-13	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 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



DII = Manufacturer's Marking
 P6023 = Marking Code
 YWW = Date Code Marking
 Y or Y= Year (ex: 7 = 2017)
 WW = Week (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	-60	V
Gate-Source Voltage		V _{GSS}	±20	V
Continuous Drain Current (Note 5) V _{GS} = -10V	T _A = +25°C	I _D	-7	A
	T _A = +70°C		-5.6	
	T _C = +25°C	I _D	-18.2	A
T _C = +70°C			-14.5	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I _{DM}	-50	A
Maximum Continuous Body Diode Forward Current (Note 5)		I _S	-2	A
Avalanche Current, L = 0.1mH		I _{AS}	-35.5	A
Avalanche Energy, L = 0.1mH		E _{AS}	62.9	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C T _A = +70°C	P _D	2 1.3	W
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	60	°C/W
Total Power Dissipation (Note 5)	T _C = +25°C	P _D	17.3	W
Thermal Resistance, Junction to Case (Note 5)		R _{θJC}	7.2	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	-60	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	µA	V _{DS} = -60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V _{GS(TH)}	-1	—	-3	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	28	mΩ	V _{GS} = -10V, I _D = -5A
		—	—	35		V _{GS} = -4.5V, I _D = -4A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	—	2569	—	pF	V _{DS} = -30V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	179	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	143	—	pF	
Gate Resistance	R _g	—	8	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	26.5	—	nC	V _{DS} = -30V, I _D = -5A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	53.1	—	nC	
Gate-Source Charge	Q _{gs}	—	7.1	—	nC	
Gate-Drain Charge	Q _{gd}	—	12.6	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	6	—	ns	V _{GS} = -10V, V _{DS} = -30V, R _g = 3Ω, I _D = -5A
Turn-On Rise Time	t _R	—	7.1	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	110	—	ns	
Turn-Off Fall Time	t _F	—	62	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	20	—	ns	I _F = -5A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{RR}	—	14	—	nC	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square pad layout.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

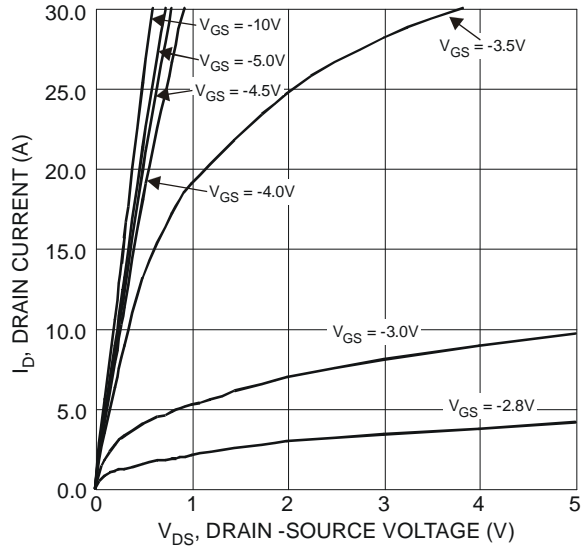


Figure 1 Typical Output Characteristics

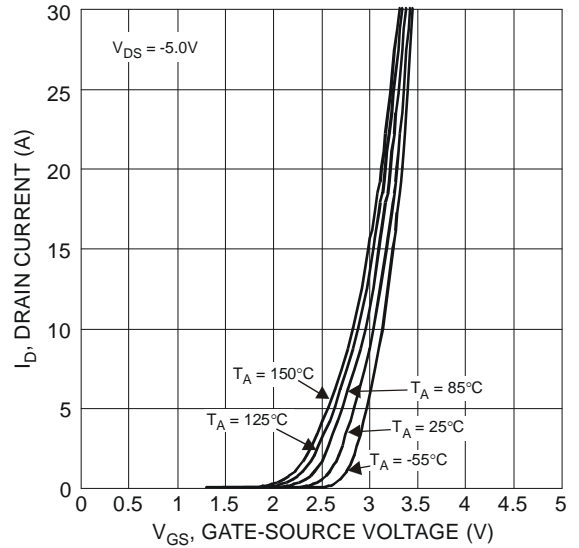


Figure 2 Typical Transfer Characteristics

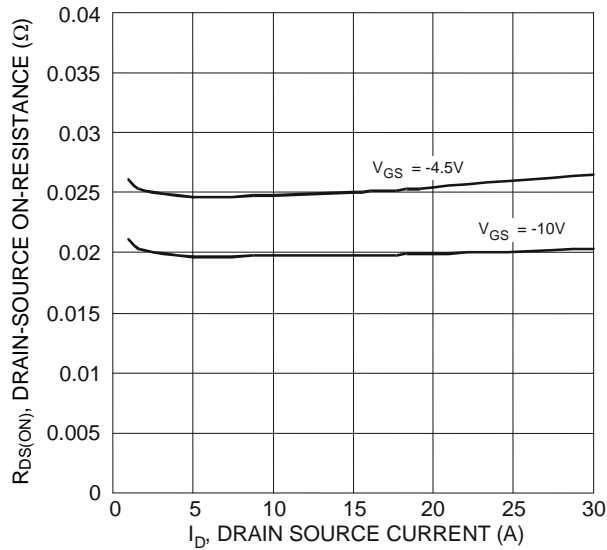


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

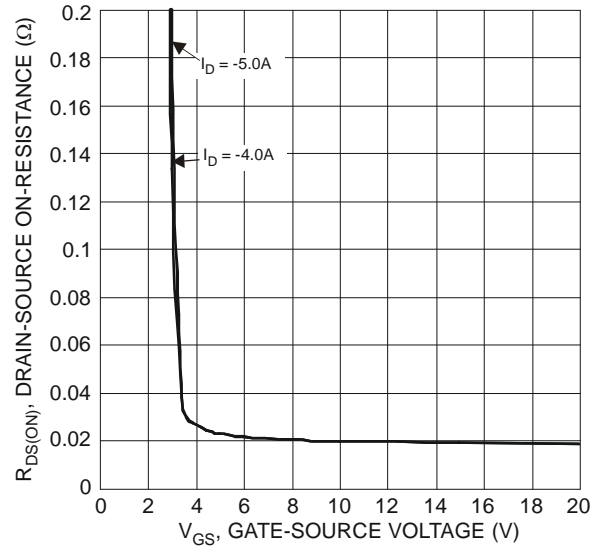


Figure 4 Typical Transfer Characteristics

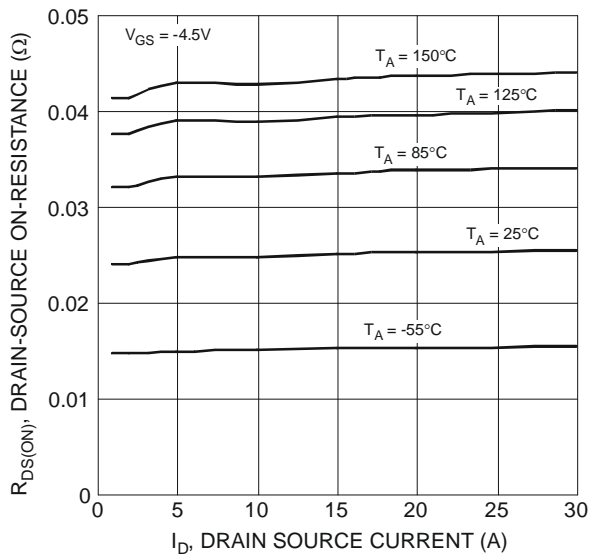


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

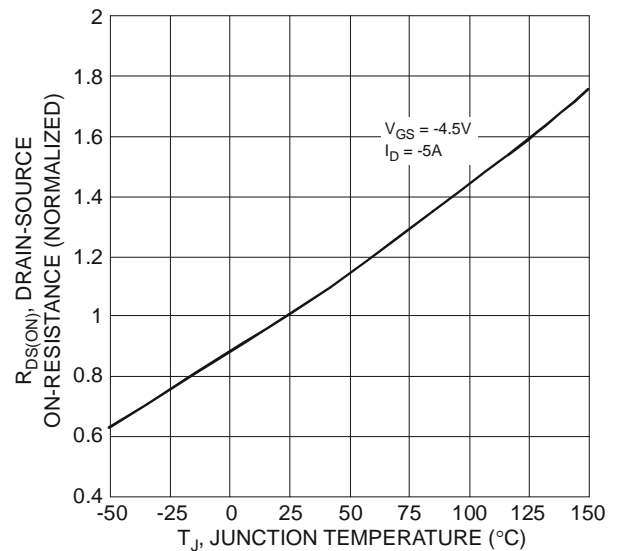
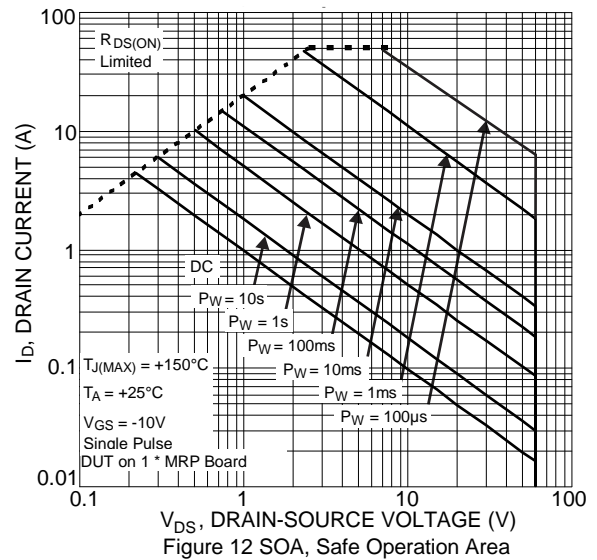
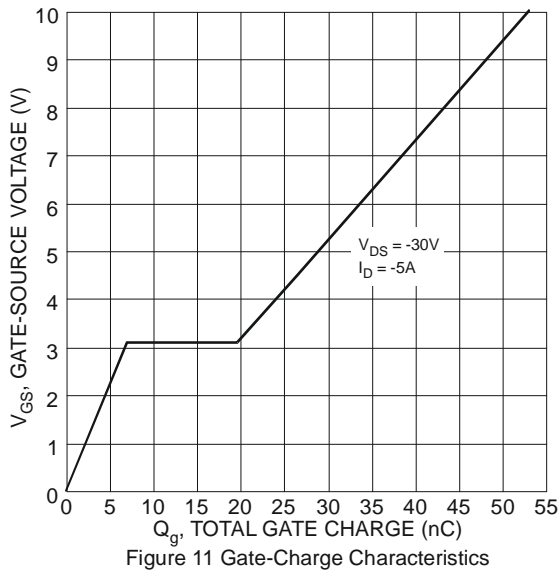
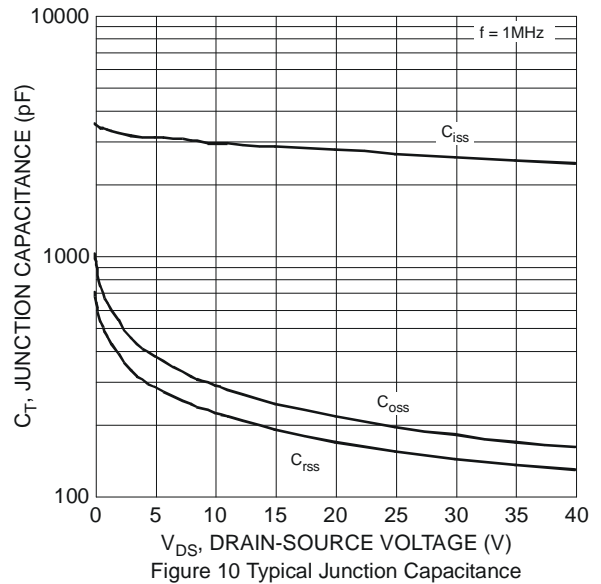
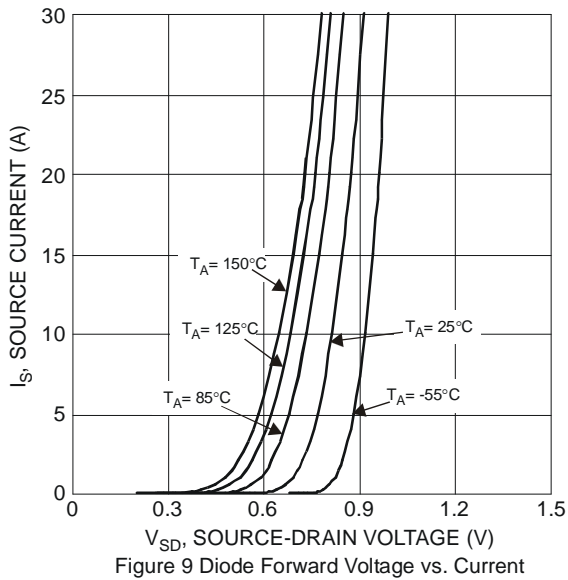
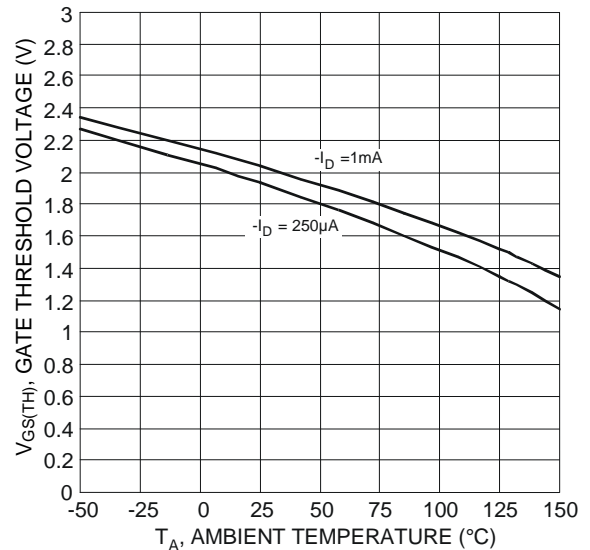
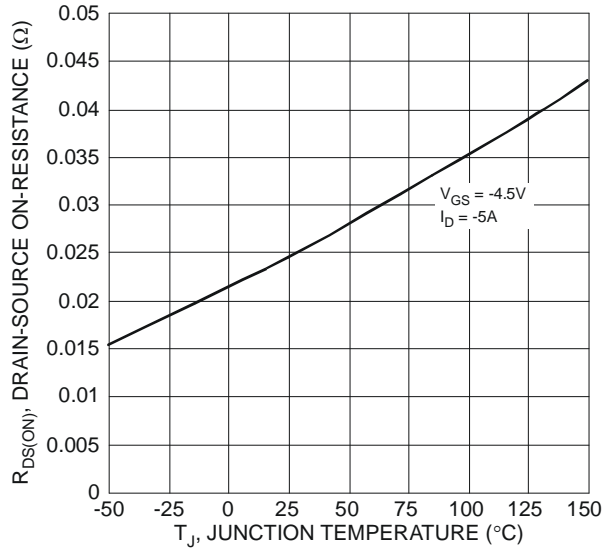
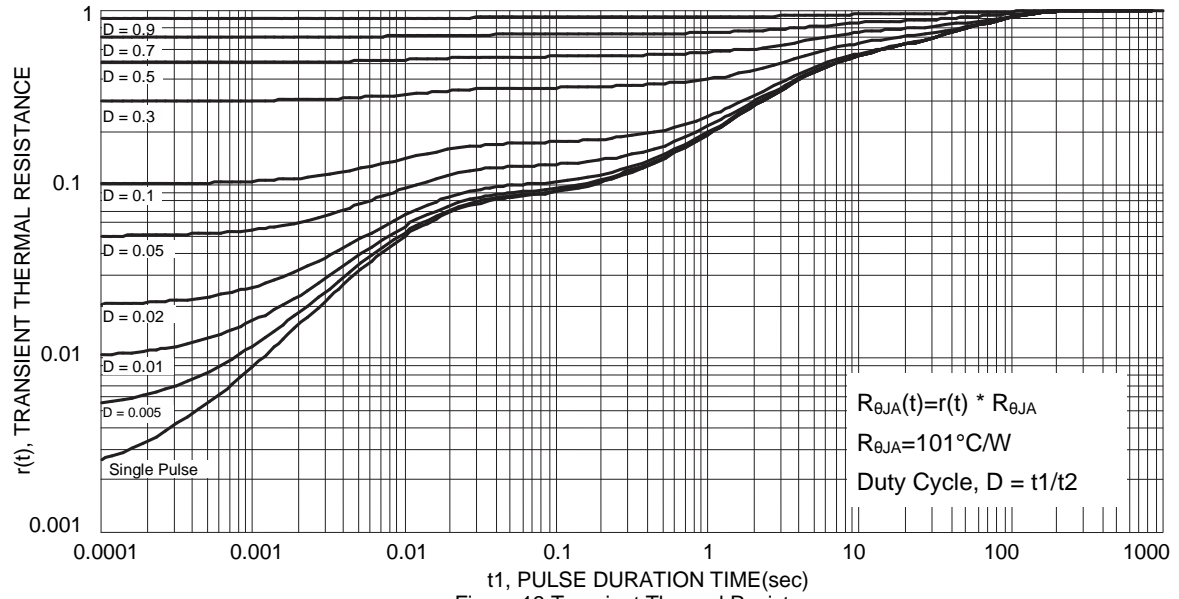


Figure 6 On-Resistance Variation with Temperature

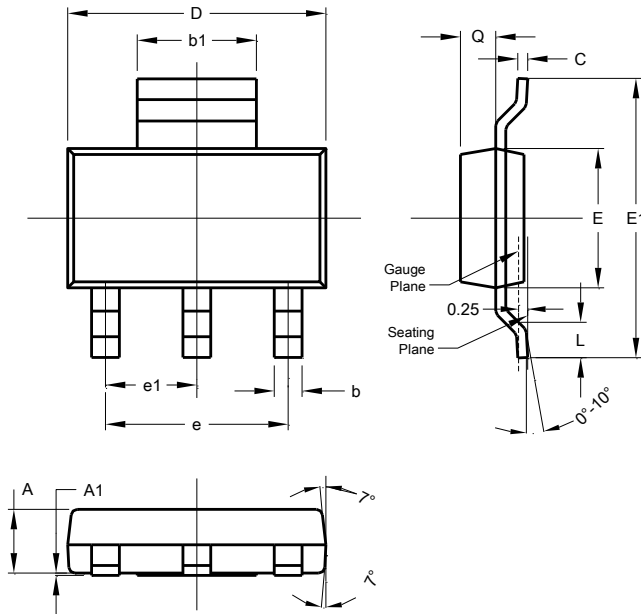




Package Outline Dimensions

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

SOT223

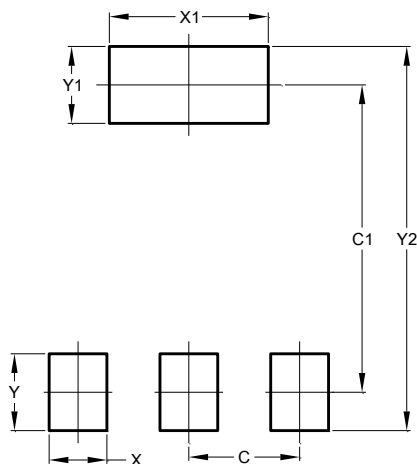


SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

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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