

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _A = +25°C
40V	0.05Ω @ V _{GS} = 10V	7A

Description and Applications

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

- DC-DC Converters
- Audio Output Stages
- Relay and Solenoid Driving
- Motor Control

Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([ZXMN4A06GQ](#))**

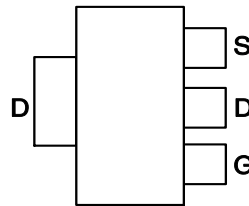
Mechanical Data

- Package: SOT223
- Package Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 Ⓔ3
- Weight: 0.112 grams (Approximate)

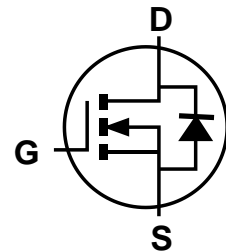
SOT223 (Type DN)



Top View



Pin Out - Top View



Equivalent Circuit

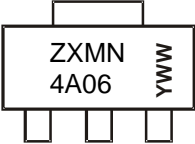
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZXMN4A06GTA	SOT223 (Type DN)	1,000	Tape & Reel
ZXMN4A06GTC	SOT223 (Type DN)	4,000	Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

SOT223 (Type DN)



ZXMN4A06 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 1 = 2021)
 WW or $\bar{W}W$ = Week Code (01 to 53)

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

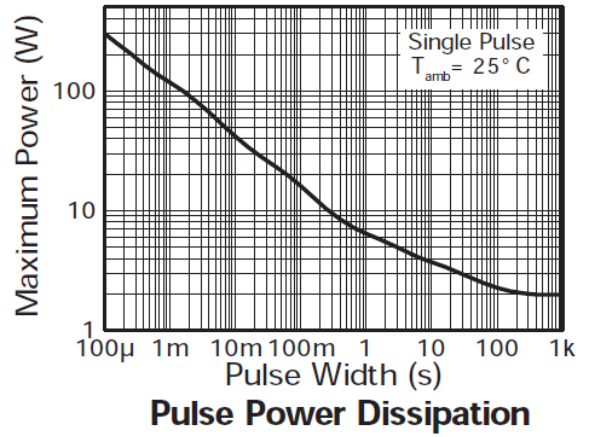
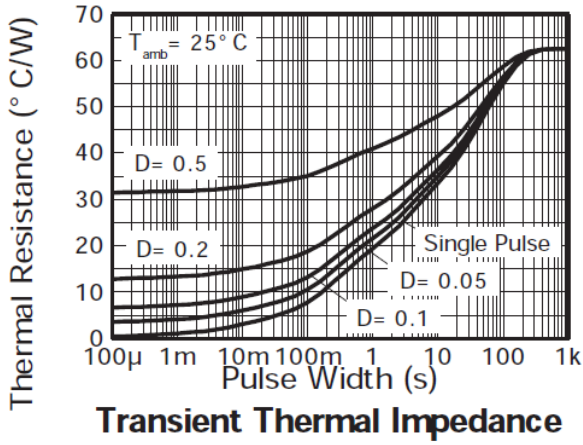
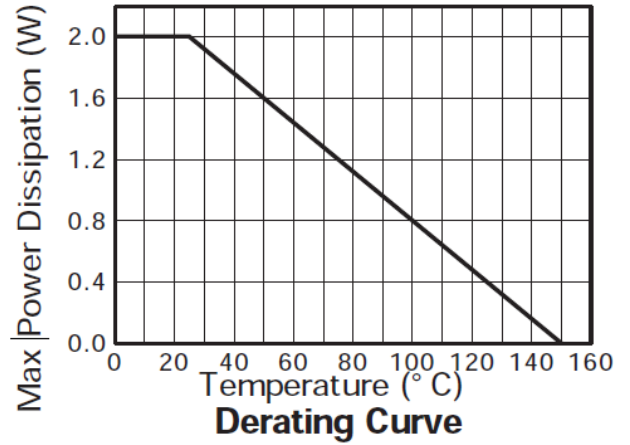
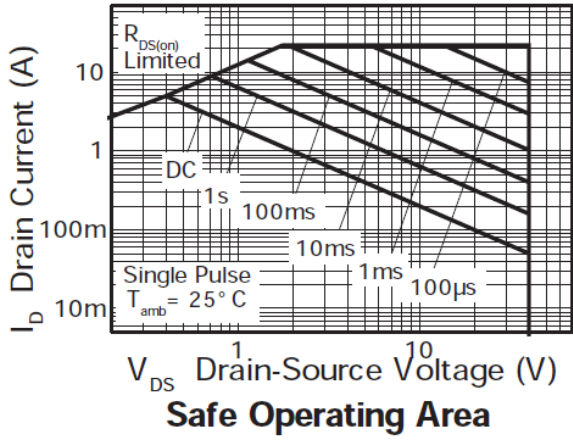
Characteristic			Symbol	Value	Unit	
Drain-Source Voltage			V _{DSS}	40	V	
Gate-Source Voltage			V _{GS}	±20	V	
Continuous Drain Current	V _{GS} = 10V	(Note 6)	I _D	7	A	
		T _A = +70°C (Note 6)		5.6		
		(Note 5)		5		
Pulsed Drain Current	V _{GS} = 10V	(Note 7)	I _{DM}	22	A	
Continuous Source Current (Body Diode)			(Note 6)	I _S	5.4	A
Pulsed Source Current (Body Diode)			(Note 7)	I _{SM}	22	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P _D	2	W
	(Note 6)		16	
Linear Derating Factor	(Note 6)	R _{θJA}	3.9	mW/°C
	(Note 7)		31	
Thermal Resistance, Junction to Ambient	(Note 7)	R _{θJA}	62.5	°C/W
	(Note 6)		32.2	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes:
5. For a device surface mounted on 25mm x 25mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 6. For a device surface mounted on FR-4 PCB measured at t ≤ 5 seconds.
 7. Repetitive rating 25mm x 25mm FR-4 PCB, D = 0.05, pulse width 10μs - pulse width limited by maximum junction temperature.

Thermal Characteristics

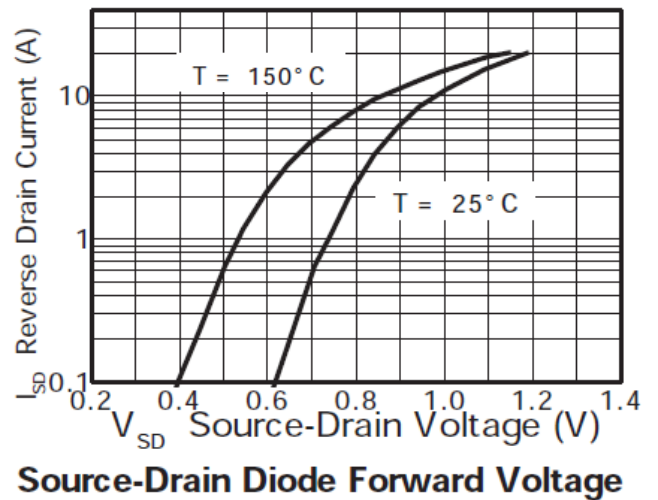
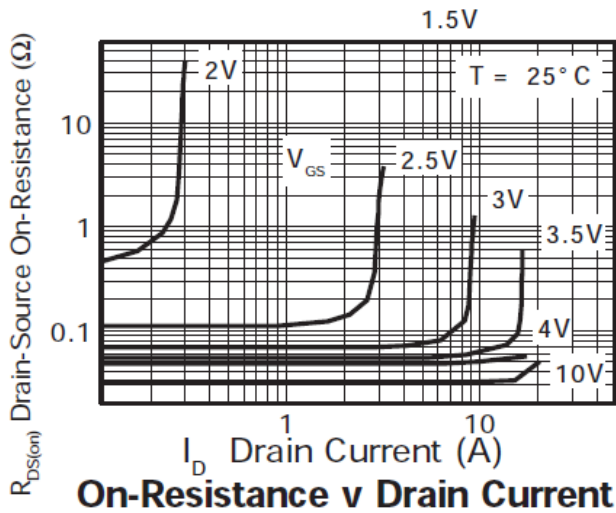
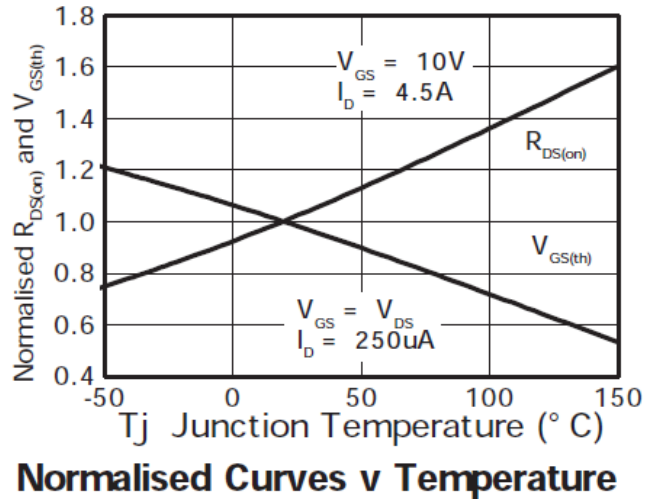
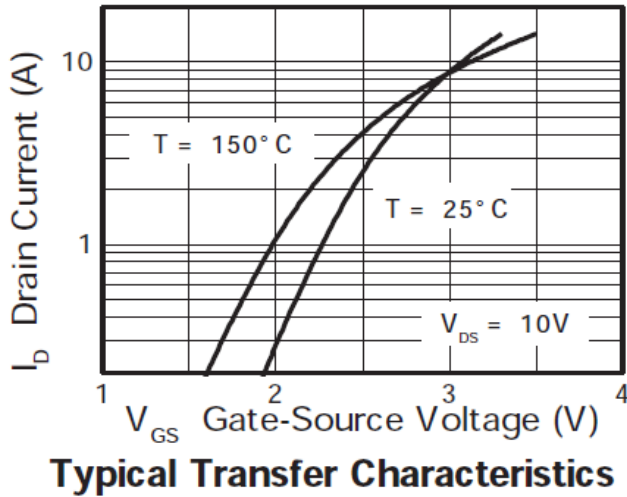
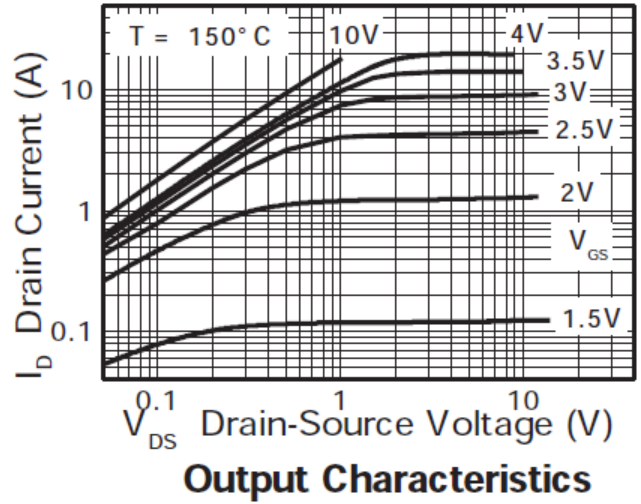
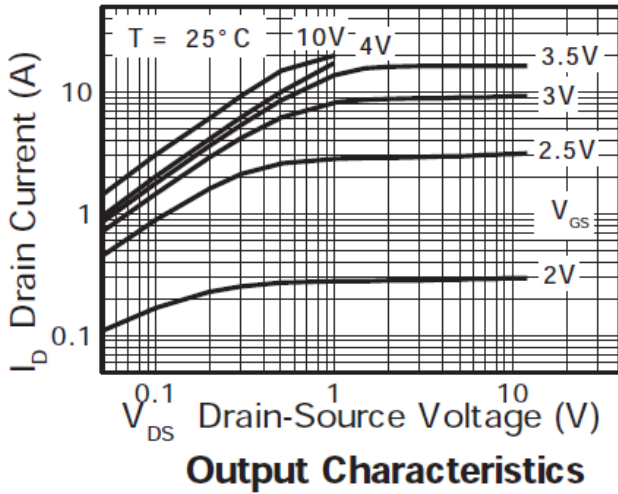


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

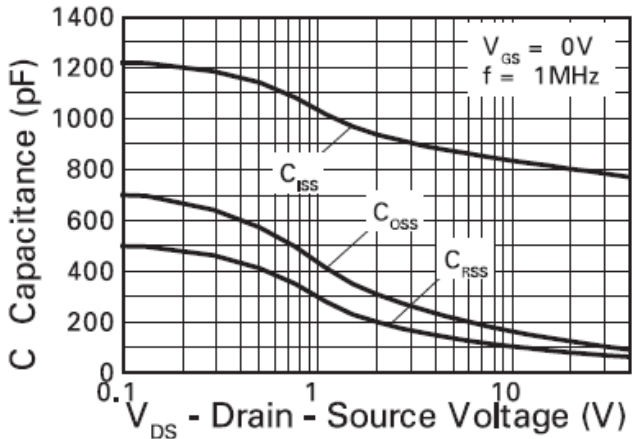
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	40	—	—	V	I _D = 250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 40V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	1	—	2	V	I _D = 250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 8)	R _{DS(ON)}	—	—	0.05	Ω	V _{GS} = 10V, I _D = 4.5A
				0.075		V _{GS} = 4.5V, I _D = 3.2A
Forward Transconductance	g _{fs}	—	8.7	—	S	V _{DS} = 15V, I _D = 2.5A
Diode Forward Voltage (Note 8)	V _{SD}	—	0.8	0.95	V	I _S = 2.5A, V _{GS} = 0V, T _J = +25°C
Reverse Recovery Time (Note 9)	t _{RR}	—	19.86	—	ns	I _F = 2.5A, di/dt = 100A/μs, T _J = +25°C
Reverse Recovery Charge (Note 9)	Q _{RR}	—	16.36	—	nC	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	770	—	pF	V _{DS} = 40V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	92	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	61	—	pF	
Total Gate Charge	Q _g	—	18.2	—	nC	V _{DS} = 30V, V _{GS} = 10V, I _D = 2.5A (Refer to test circuit)
Gate-Source Charge	Q _{gs}	—	2.1	—	nC	
Gate-Drain Charge	Q _{gd}	—	4.5	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	2.55	—	ns	V _{DD} = 30V, V _{GS} = 10V I _D = 2.5A, R _G ≅ 6Ω (Refer to test circuit)
Turn-On Rise Time	t _r	—	4.45	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	28.61	—	ns	
Turn-Off Fall Time	t _f	—	7.35	—	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

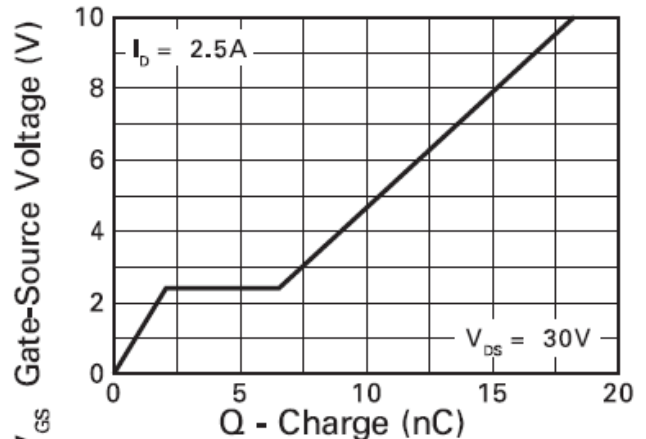
Typical Characteristics



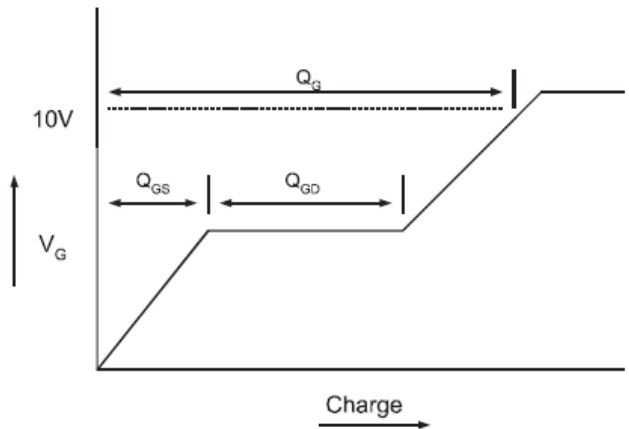
Typical Characteristics (continued)



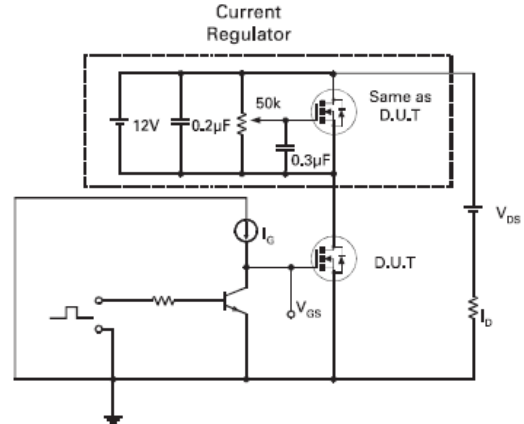
Capacitance v Drain-Source Voltage



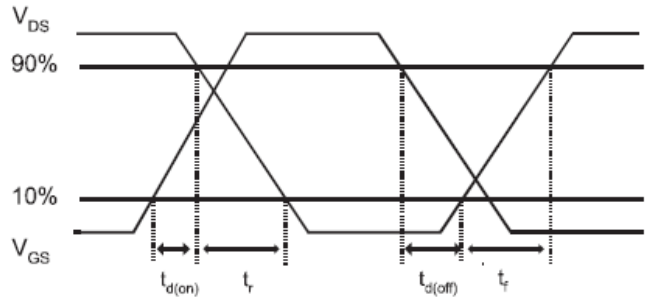
Gate-Source Voltage v Gate Charge



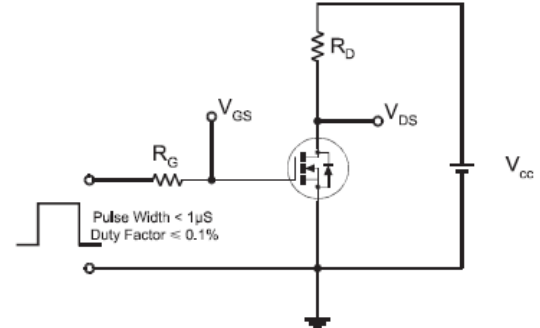
Basic Gate Charge Waveform



Gate Charge Test Circuit



Switching Time Waveforms

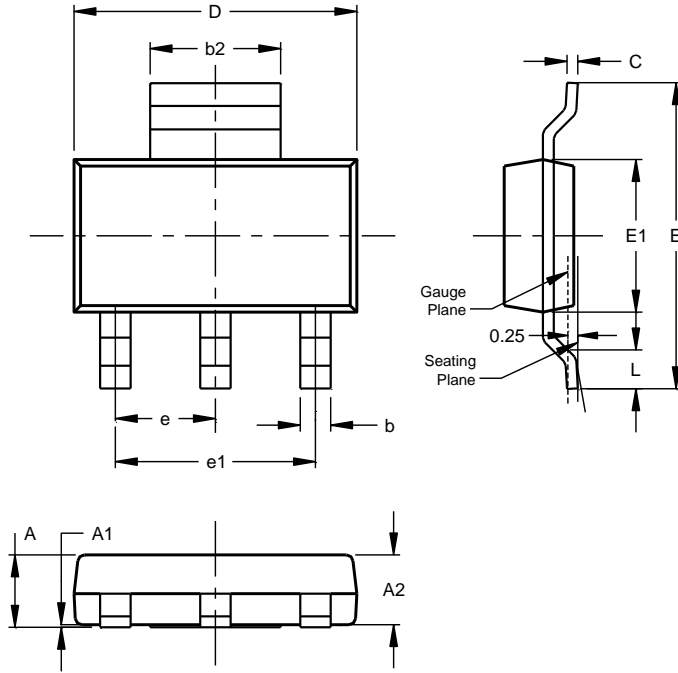


Switching Time Test Circuit

Package Outline Dimensions

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

SOT223 (Type DN)

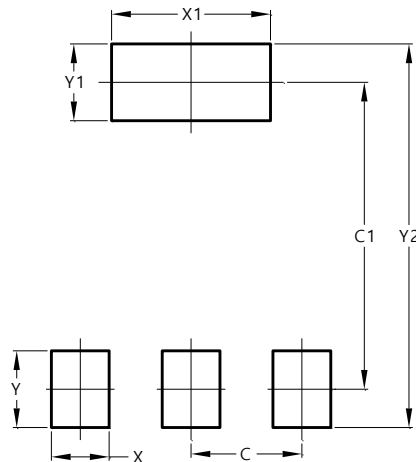


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT223 (Type DN)



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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