Lead-free Green

SOT223 P-CHANNEL ENHANCEMENT MODE VERTICAL DMOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)\ MAX}$	I_D T_A = +25°C
-240V	9Ω @ V_{GS} = -10V	-480mA

Features and Benefits

- 240 Volt V_{DS}
- $R_{DS(ON)}$ = 8.8Ω Typical at V_{GS} = -3.5V
- Low Threshold and Fast Switching
- **Totally Lead-Free & Fully 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 contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

- Electronic Hook Switches
- Telecoms and Battery Powered Equipment

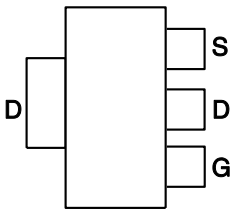
Mechanical Data

- Package: SOT223
- Package Material: Molded Plastic, "Green" Molding Compound. 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 e3
- Weight: 0.112 grams (Approximate)

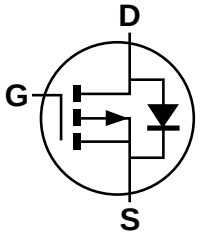
SOT223 (Type DN)



Top View



Pin Out - Top



Equivalent Circuit

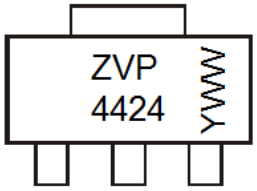
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZVP4424GTA	SOT223 (Type DN)	1,000	Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
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)



ZVP4424 = Product Type Marking Code
YWW = Date Code Marking
Y = Last Digit of Year (ex: 1 = 2021)
WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	-240	V
Gate-Source Voltage	V_{GSS}	±40	V
Continuous Drain Current (@ T_A = +25°C) (Note 5)	I_D	-480	mA
Maximum Body Diode Forward Current (@ T_A = +25°C) (Note 5)	I_S	-480	mA
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I_{DM}	-1.5	A
Pulsed Source Current (10µs Pulse, Duty Cycle = 1%)	I_{SM}	-1.5	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (@ T_A = +25°C) (Note 5)	P_D	2.5	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	50	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

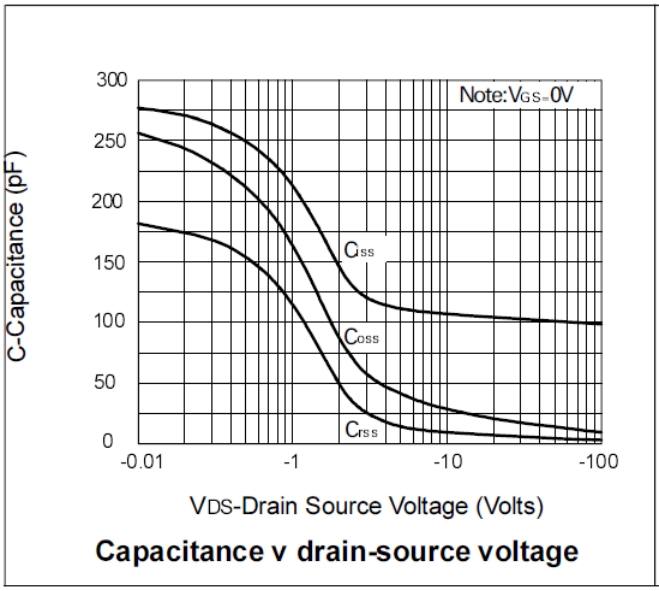
Electrical Characteristics (@ T_A = +25°C, unless otherwise stated.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	-240	—	—	V	V_{GS} = 0V, I_D = -1mA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-10 -100	µA µA	V_{DS} = -240V, V_{GS} = 0V V_{DS} = -190V, V_{GS} = 0V T_A = +125°C
Gate-Source Leakage	I_{GSS}	—	—	100	nA	V_{GS} = ±40V, V_{DS} = 0V
On-State Drain Current	$I_{D(ON)}$	-0.75	-1.0	—	A	V_{GS} = -10V, V_{DS} = -10V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.7	-1.4	-2.0	V	V_{DS} = V_{GS}, I_D = -1mA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	7.1 8.8	9 11	Ω Ω	V_{GS} = -10V, I_D = -200mA V_{GS} = -3.5V, I_D = -100mA
Forward Transconductance (Notes 7 & 8)	g_{FS}	125	—	—	mS	V_{DS} = -10V, I_D = -0.2A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	100	200	pF	V_{DS} = -25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	18	25	pF	
Reverse Transfer Capacitance	C_{rss}	—	5	15	pF	
Turn-On Delay Time (Note 9)	$t_{D(ON)}$	—	8	15	ns	V_{DD} ≈ -50V, I_D = -0.25A, V_{GEN} = -10V
Turn-On Rise Time (Note 9)	t_R	—	8	15	ns	
Turn-Off Delay Time (Note 9)	$t_{D(OFF)}$	—	26	40	ns	
Turn-Off Fall Time (Note 9)	t_F	—	20	30	ns	

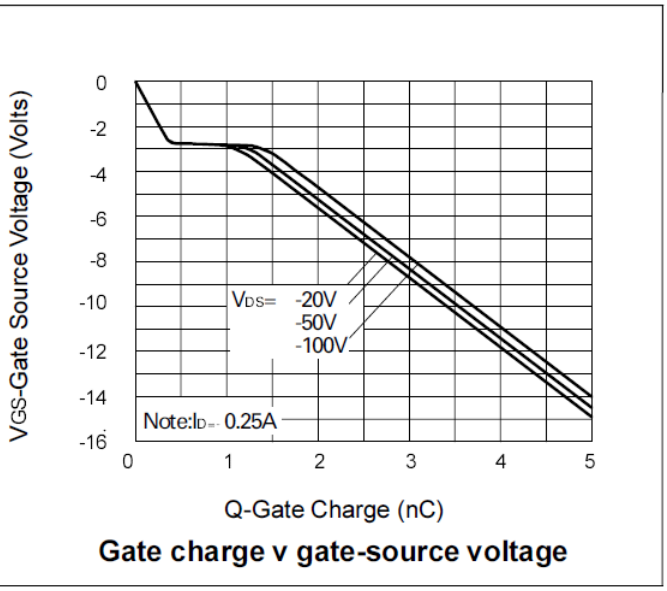
Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square pad layout.
6. Short duration pulse test used to minimize self-heating effect.
7. Measured under pulsed conditions. Pulse width = 300ms. Duty cycle ≤ 2%.
8. Guaranteed by design. Not subject to production testing.
9. Switching times measured with 50Ω source impedance and <5ns rise time on a pulse generator spice parameter data is available upon request for this device.

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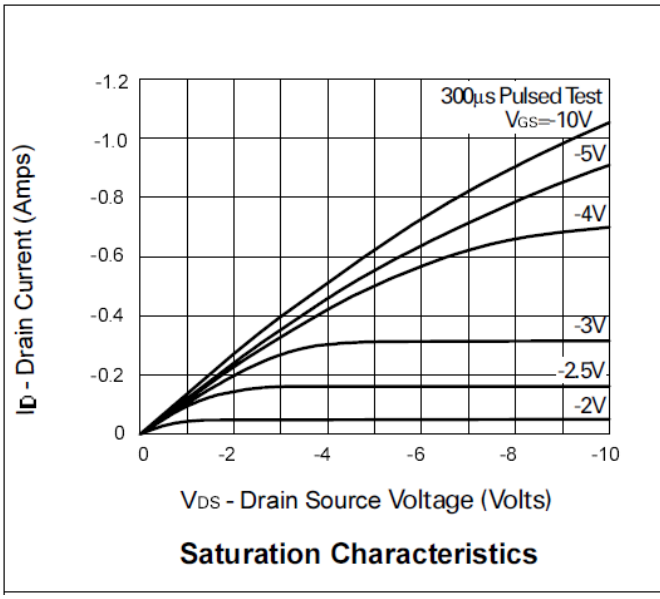
Typical Characteristics



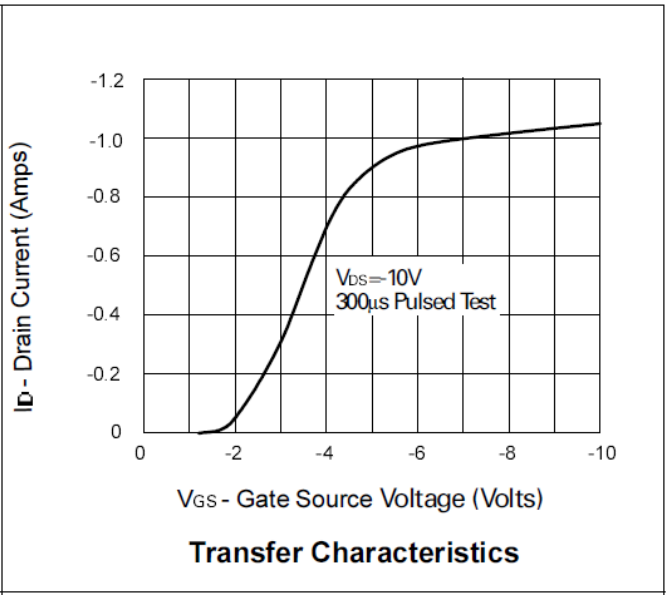
Capacitance v drain-source voltage



Gate charge v gate-source voltage



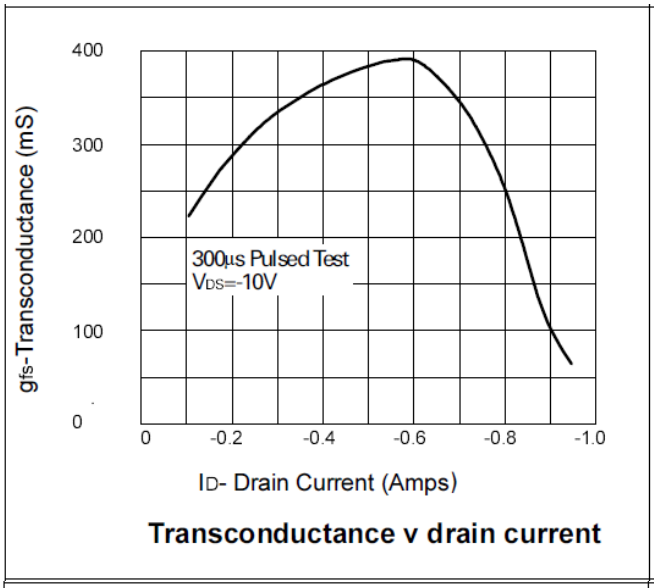
Saturation Characteristics



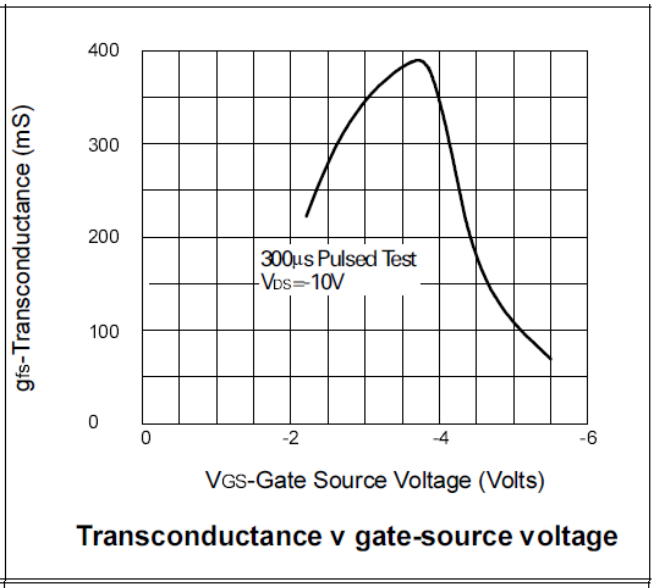
Transfer Characteristics

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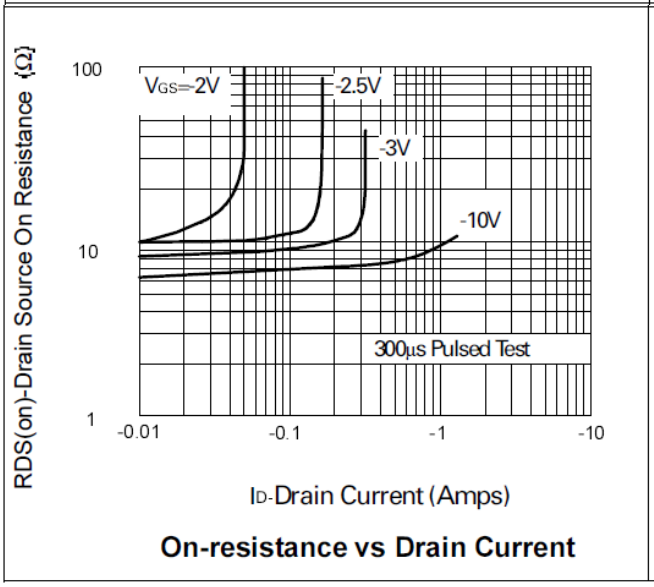
Typical Characteristics (continued)



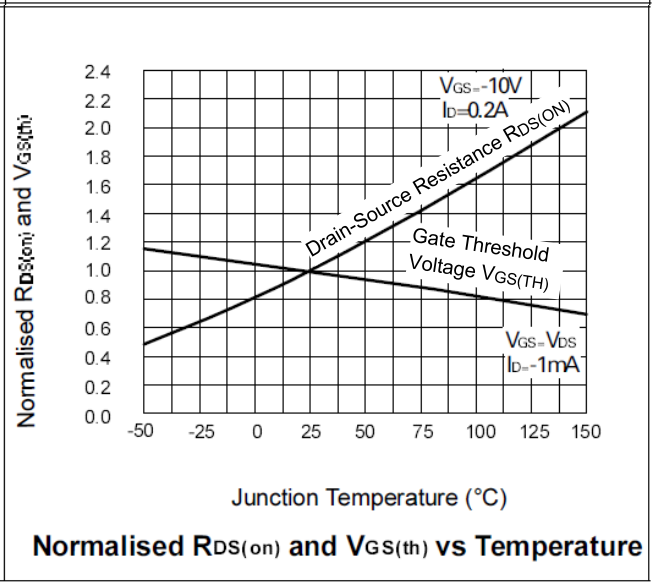
Transconductance v drain current



Transconductance v gate-source voltage



On-resistance vs Drain Current



Normalised $R_{DS(on)}$ and $V_{GS(th)}$ vs Temperature

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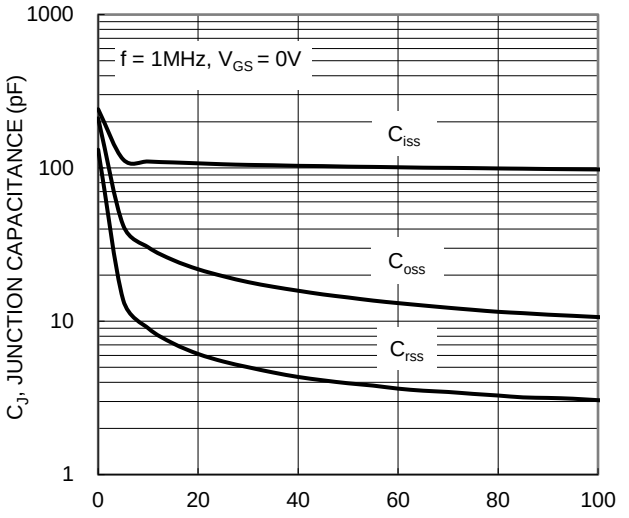


Figure 1. Junction Capacitance vs. Drain-Source Voltage

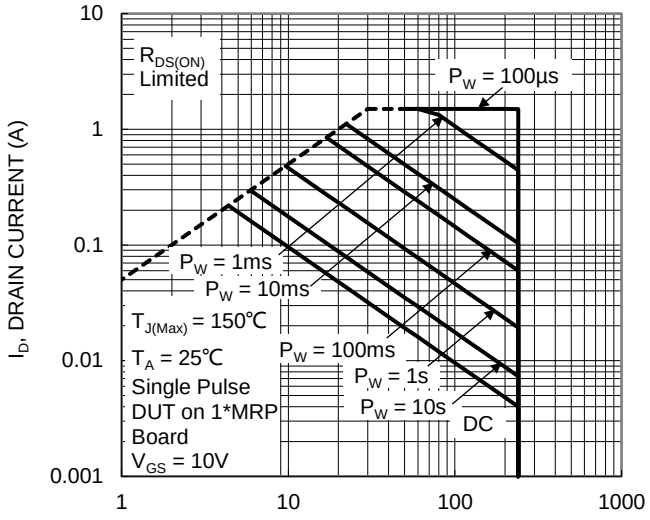


Figure 2. SOA, Safe Operation Area

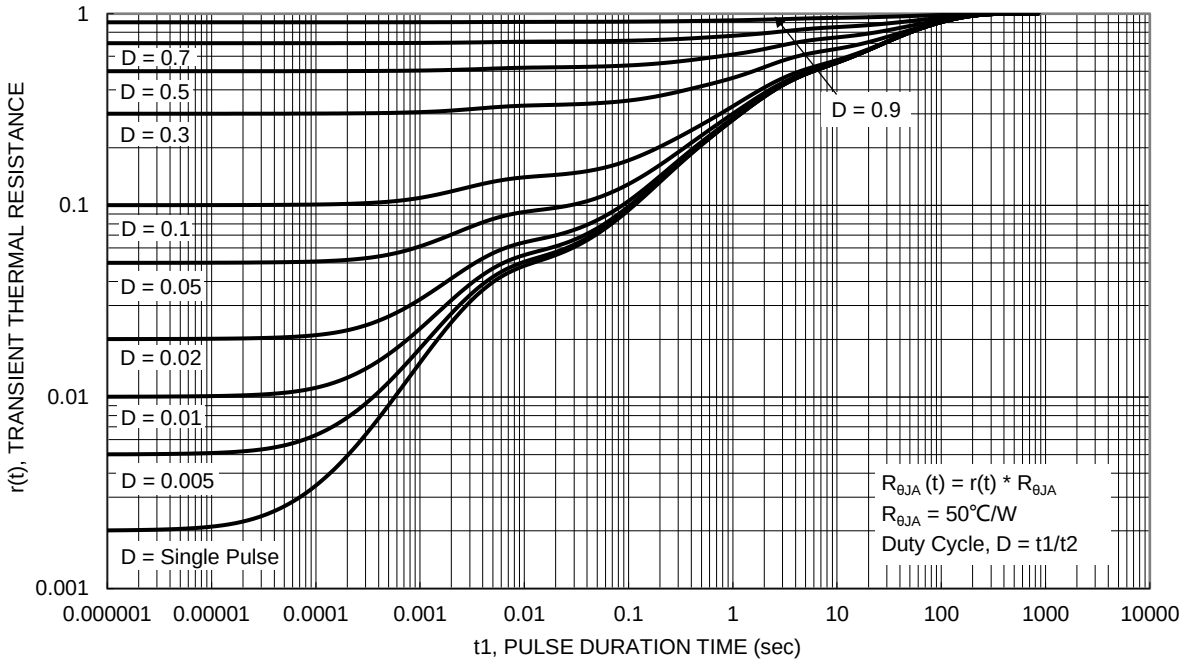


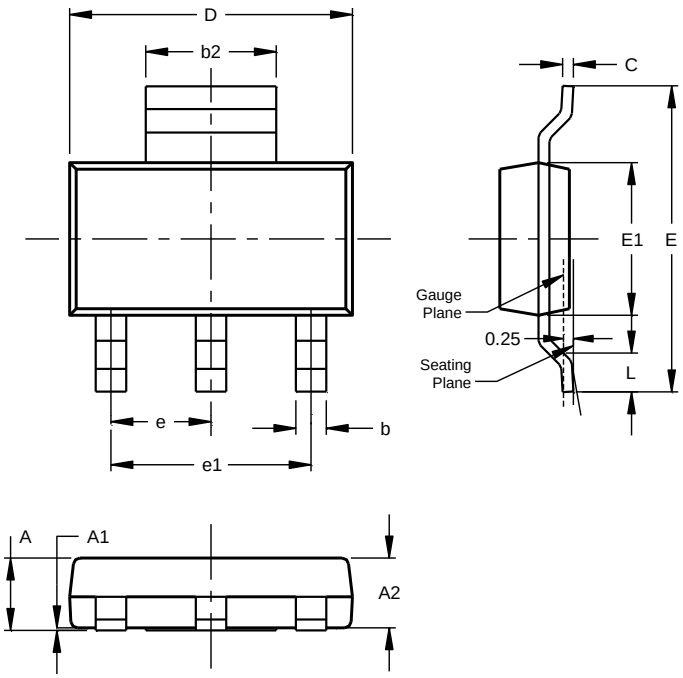
Figure 3. Transient Thermal Resistance

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Package Outline Dimensions

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

SOT223 (Type DN)

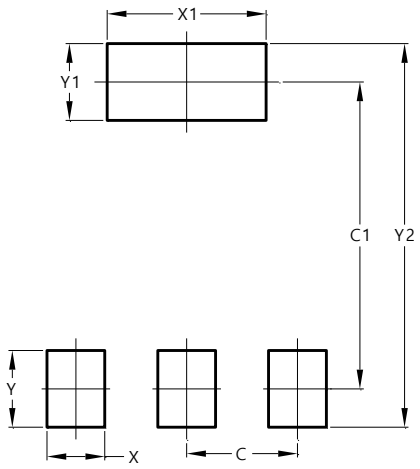


SOT223 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

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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