250V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
-250V	14Ω @ V_{GS}= -10V	-265mA
	18Ω @ V_{GS}= -3.5V	-235mA

Description and Applications

This new generation trench MOSFET features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high efficiency power management applications.

- Earth recall and dialling switches
- Electronic hook switches
- High voltage power MOSFET drivers
- Telecom call routers
- Solid state relays

Features and Benefits

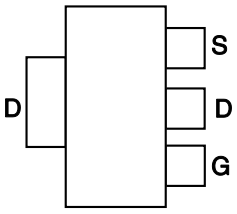
- High Voltage
- Low On-Resistance
- Fast Switching Speed
- Low Gate Drive
- Low Threshold
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The ZVP4525GQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Mechanical Data

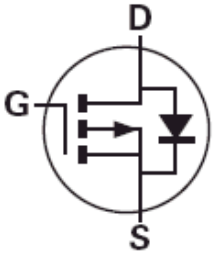
- Package: SOT223
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish (e3)
- Weight: 0.112 grams (Approximate)

SOT223 (Type DN)

Top View



Pin Out - Top View



Equivalent Circuit

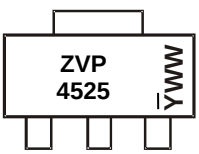
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZVP4525GQTA	SOT223 (Type DN)	1,000	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)



ZVP4525 = Product Type Marking Code
YWW = Date Code Marking
Y = Last Digit of Year (ex: 2 = 2022)
WW = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	-250	V
Gate-Source Voltage	V_{GSS}	±40	V
Continuous Drain Current @V_{GS} = 10V; T_A = +25°C (Note 5) @V_{GS} = 10V; T_A = +70°C (Note 5)	I_D	-265 -212	mA
Pulsed Drain Current (Note 7)	I_{DM}	-1	A
Continuous Source Current (Body Diode)	I_S	-0.265	A
Pulsed Source Current (Body Diode)	I_{SM}	-1	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation at T_A = +25°C (Note 5) Linear Derating Factor	P_D	2.0 16	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	63	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	105	°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						
Drain-Source Breakdown Voltage	BV_{DSS}	-250	—	—	V	V_{GS} = 0V, I_D = -1mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-500	nA	V_{DS} = -250V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±40V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.8	-1.5	-2.0	V	V_{DS} = V_{GS}, I_D = -1mA
Static Drain-Source On-Resistance (Note 8)	$R_{DS(ON)}$	—	10	14	Ω	V_{GS} = -10V, I_D = -200mA
		—	13	18	Ω	V_{GS} = -3.5V, I_D = -100mA
Forward Transconductance (Note 10)	g_{fs}	80	200	—	mS	V_{DS} = -10V, I_D = -0.15A
Diode Forward Voltage (Note 8)	V_{SD}	—	—	0.97	V	I_S = -200mA, V_{GS} = 0V, T_J = +25°C
DYNAMIC CHARACTERISTICS						
Input Capacitance (Note 10)	C_{iss}	—	82	—	pF	V_{DS} = -25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance (Note 10)	C_{oss}	—	16	—	pF	
Reverse Transfer Capacitance (Note 10)	C_{rss}	—	5	—	pF	
Total Gate Charge (Notes 9 &10)	Q_g	—	3	—	nC	V_{GS} = -10V, V_{DS} = -25V, I_D = -200mA
Gate-Source Charge (Notes 9 &10)	Q_{gs}	—	0.3	—	nC	
Gate-Drain Charge (Notes 9 &10)	Q_{gd}	—	0.5	—	nC	
Turn-On Delay Time (Notes 9 & 10)	$t_{D(ON)}$	—	1.5	—	ns	V_{DD} = -30V, I_D = -200mA, V_{GS} = -10V, R_G = 50Ω
Turn-On Rise Time (Notes 9 & 10)	t_R	—	4.2	—	ns	
Turn-Off Delay Time (Notes 9 & 10)	$t_{D(OFF)}$	—	27	—	ns	
Turn-Off Fall Time (Notes 9 & 10)	t_F	—	10	—	ns	
Reverse Recovery Time (Note 10)	t_{RR}	—	80	—	ns	I_F = -1A, di/dt = 100A/µs, T_J = +25°C
Reverse Recovery Charge (Note 10)	Q_{rr}	—	230	—	nC	

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
7. Repetitive rating 25mm x 25mm FR4 PCB, D=0.02 pulse width=300µs - pulse width limited by maximum junction temperature.
8. Measured under pulsed conditions. Pulse width ≤ 300µs; duty cycle ≤ 2%.
9. Switching characteristics are independent of operating junction temperature.
10. For design aid only, not subject to production testing.

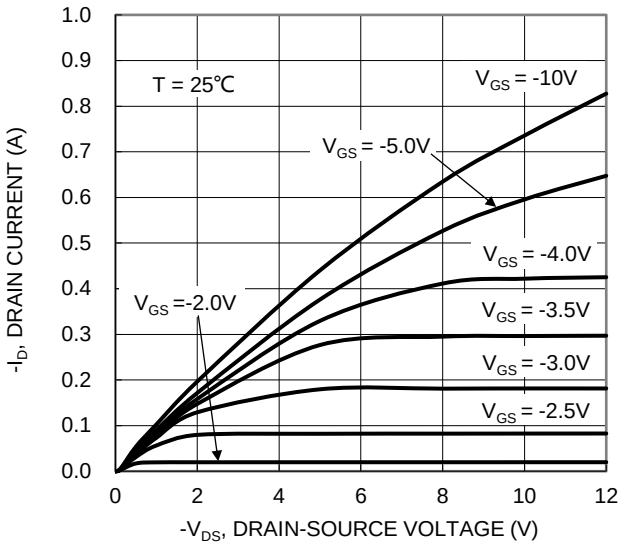


Figure 1. Typical Output Characteristic

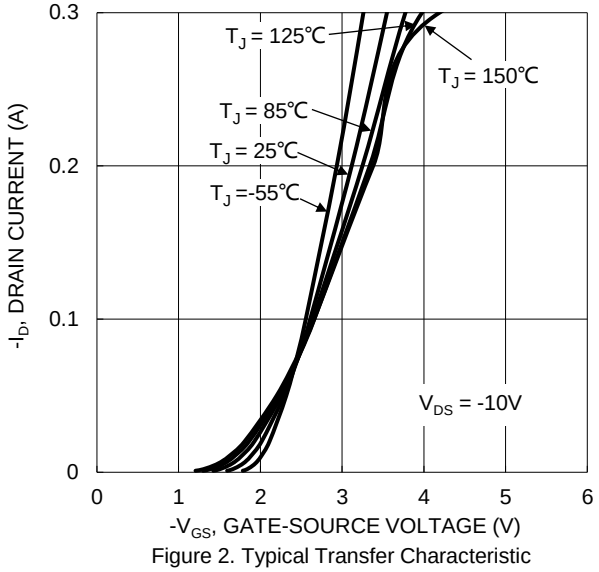


Figure 2. Typical Transfer Characteristic

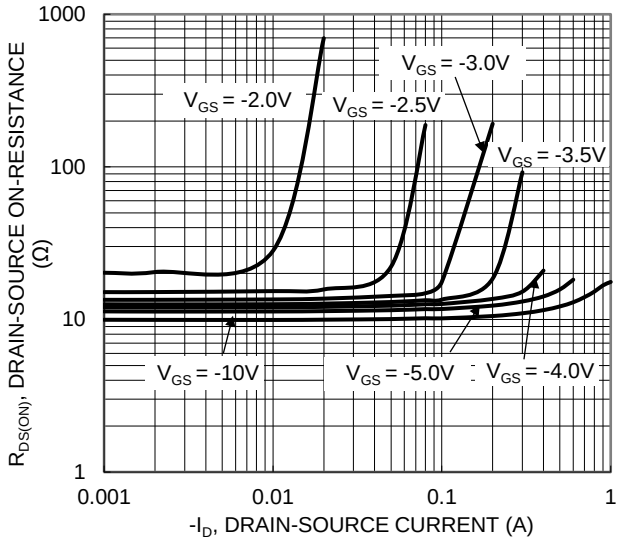


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

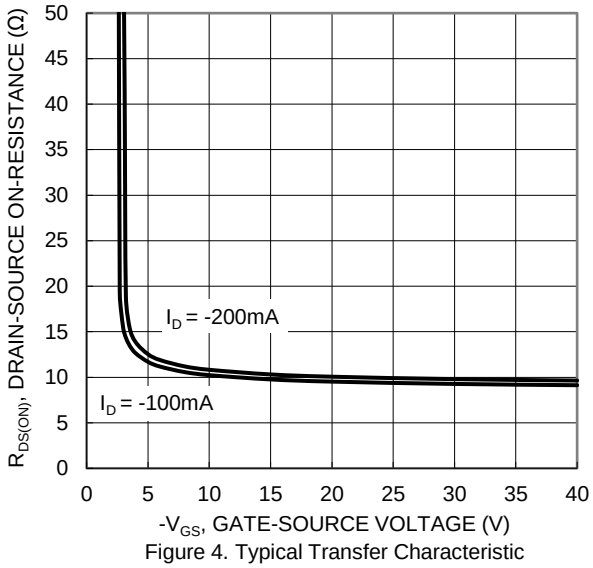


Figure 4. Typical Transfer Characteristic

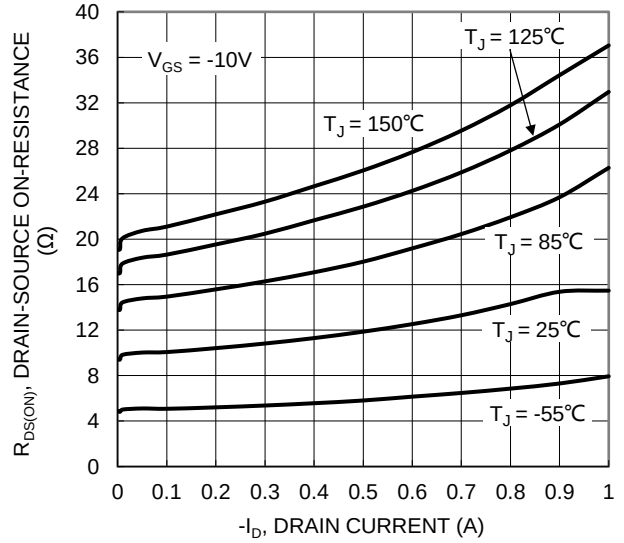


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

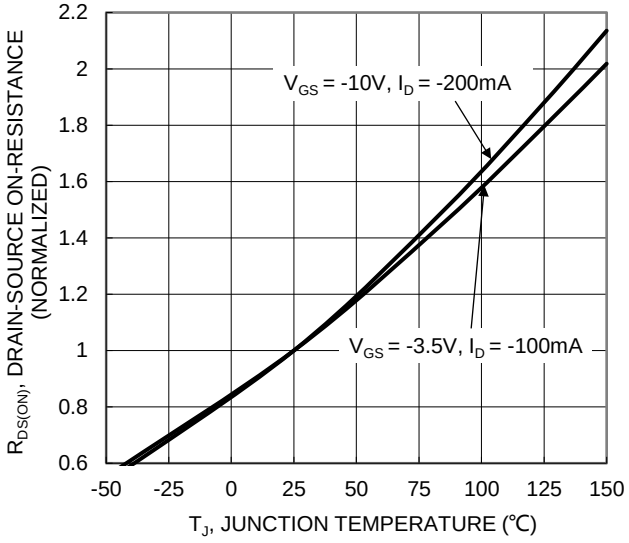


Figure 6. On-Resistance Variation with Temperature

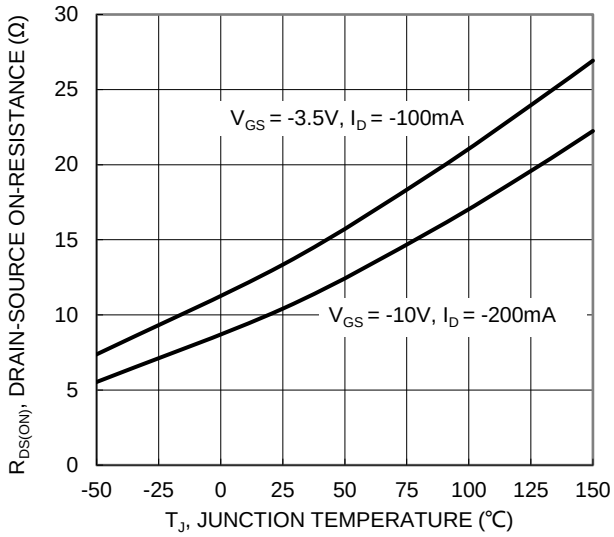


Figure 7. On-Resistance Variation with Temperature

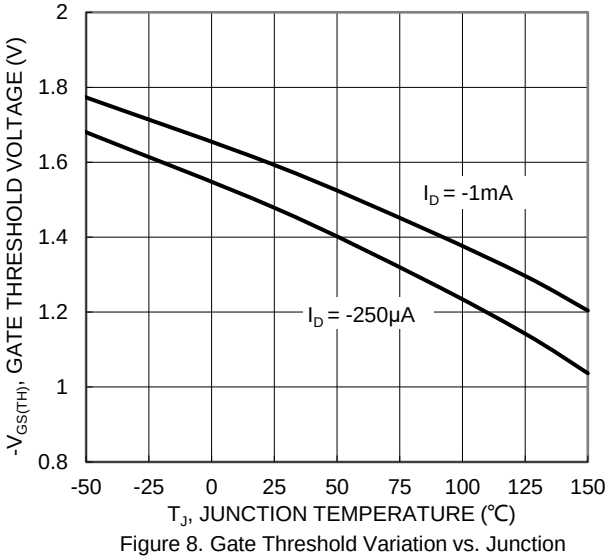


Figure 8. Gate Threshold Variation vs. Junction Temperature

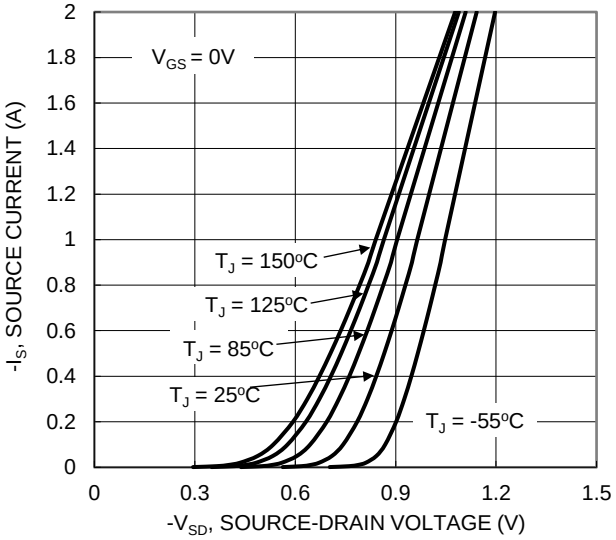


Figure 9. Diode Forward Voltage vs. Current

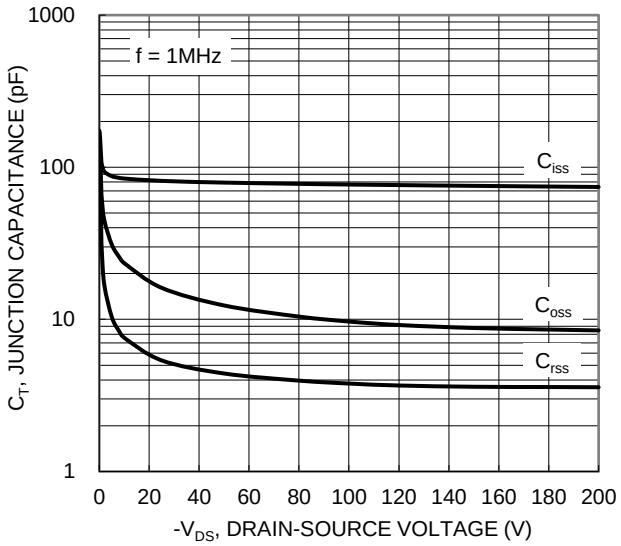


Figure 10. Typical Junction Capacitance

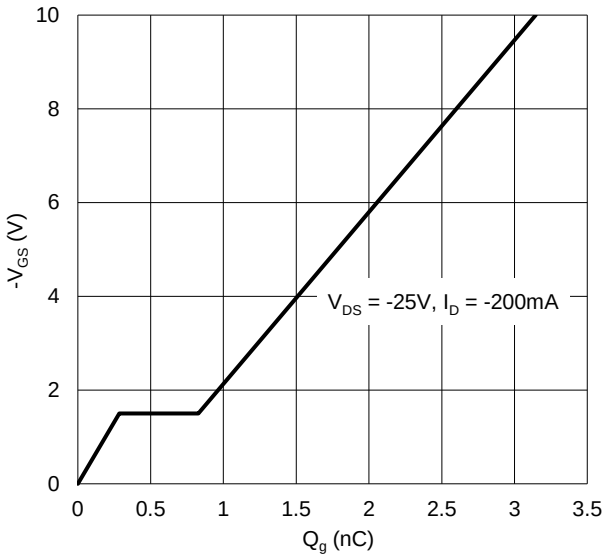


Figure 11. Gate Charge

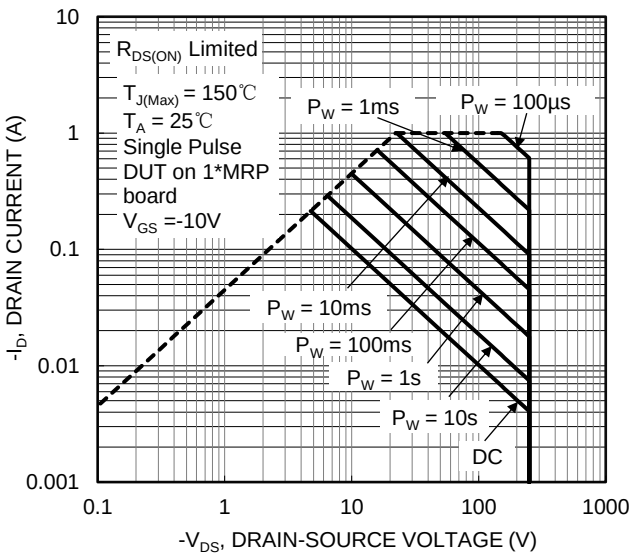


Figure 12. SOA, Safe Operation Area

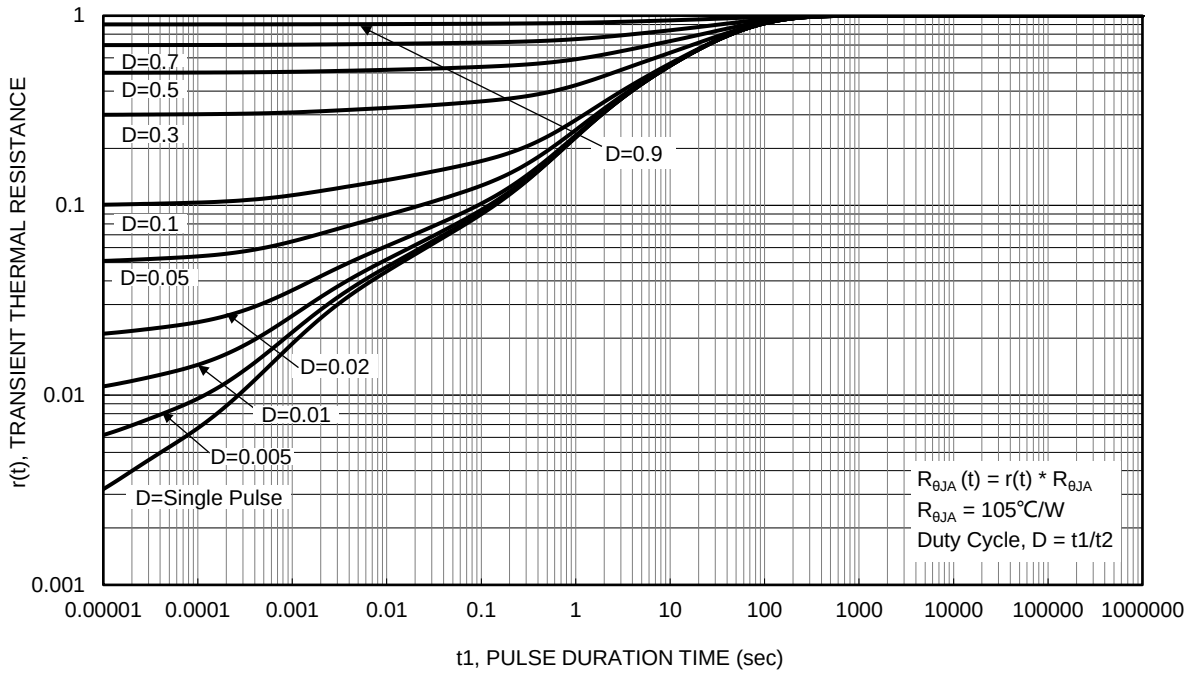
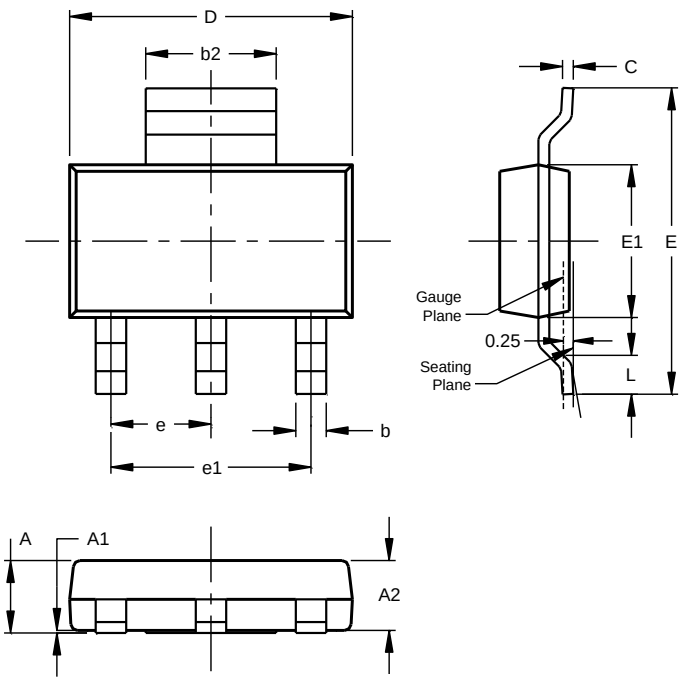


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SOT223 (Type DN)

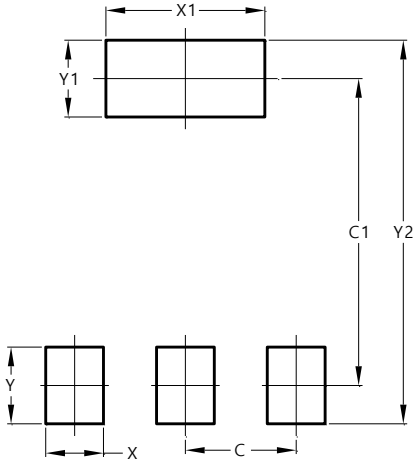


SOT223 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

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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