450V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D T_A = +25°C
450V	50Ω @ V_{GS} = 10V	140mA

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)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, 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/**

Description and Applications

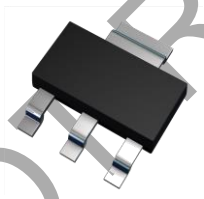
This new generation trench MOSFET features a unique structure combining the benefits of low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

- Offline power supply start-up circuitry

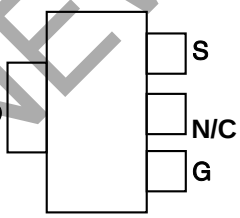
Mechanical Data

- 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)

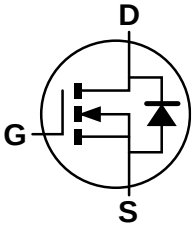
SOT223 (Type DN)



Top View



Pin Out - Top



Equivalent Circuit

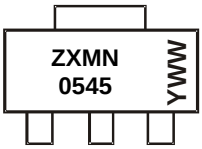
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZXMN0545G4TA	SOT223 (Type DN)	1,000	Tape & Reel
ZXMN0545G4TC	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)



ZXMN0545 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 2 = 2022)
WW or $\overline{WW}$ = Week Code (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	450	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current (V_{GS} = 10V, T_A = +25°C) (Note 5)	I_D	140	mA
Pulsed Drain Current (Note 7)	I_{DM}	600	mA
Continuous Source Current (Body Diode) (Note 6)	I_S	140	mA
Pulsed Source Current (Body Diode) (Note 7)	I_{SM}	600	mA

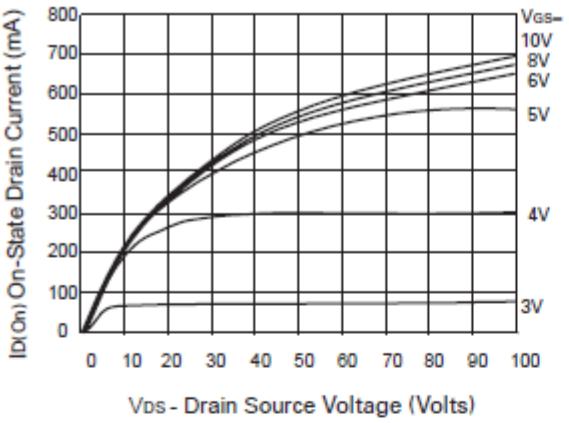
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation at T_A = +25°C (Note 5) Linear Derating Factor	P_D	2.0 1.6	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	32	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

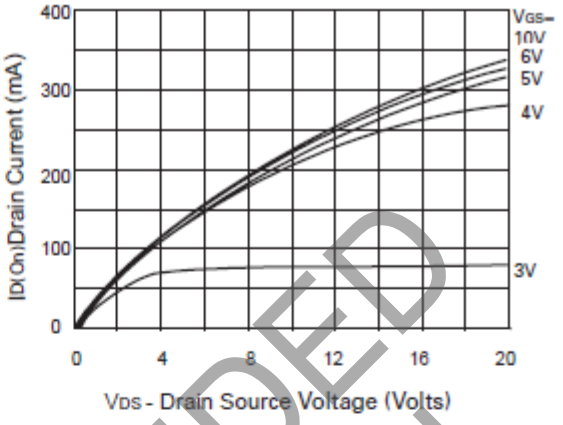
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	450	—	—	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	10 400	µA	V_{DS} = 450V, V_{GS} = 0V V_{DS} = 405V, V_{GS} = 0V, T = +125°C
Gate-Source Leakage	I_{GSS}	—	—	20	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	1	—	3	V	V_{DS} = V_{GS}, I_D = 1mA
Static Drain-Source On-Resistance (Note 8)	$R_{DS(on)}$	—	—	50	Ω	V_{GS} = 10V, I_D = 100mA
Forward Transconductance (Notes 8 & 10)	g_{fs}	100	—	—	mS	V_{DS} = 25V, I_D = 100mA
On-State Drain Current (Note 8)	$I_{D(on)}$	150	—	—	mA	V_{DS} = 25V, V_{GS} = 10V
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance (Note 10)	C_{iss}	—	—	70	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance (Note 10)	C_{oss}	—	—	10	pF	
Reverse Transfer Capacitance (Note 10)	C_{rss}	—	—	4	pF	
Turn-On Delay Time (Notes 9 & 10)	$t_{D(on)}$	—	—	7	ns	V_{DD} = 25V, I_D = 100mA
Turn-On Rise Time (Notes 9 & 10)	t_R	—	—	7	ns	
Turn-Off Delay Time (Notes 9 & 10)	$t_{D(off)}$	—	—	16	ns	
Turn-Off Fall Time (Notes 9 & 10)	t_F	—	—	10	ns	

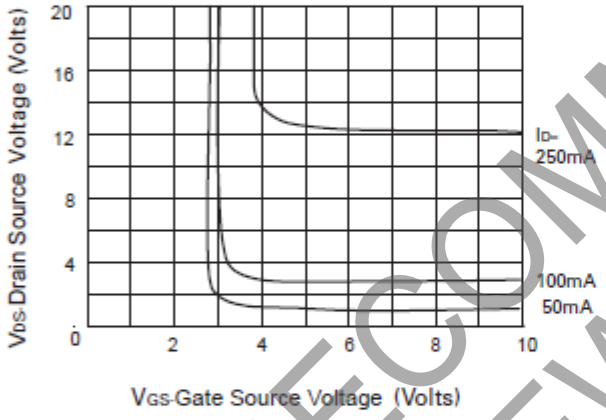
Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For a device surface mounted on FR4 PCB measured at t ≤ 5 secs.
7. Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
8. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.
9. Switching characteristics are independent of operating junction temperature.
10. Sample test.
11. For design aid only, not subject to production testing.



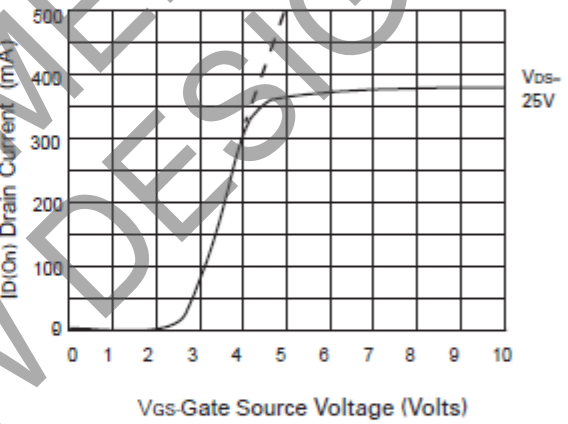
Output characteristics



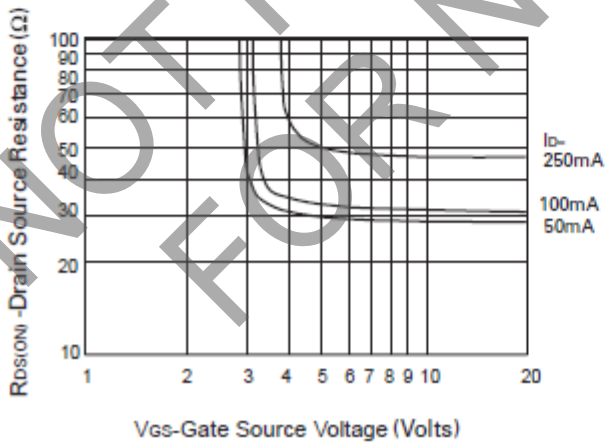
Saturation characteristics



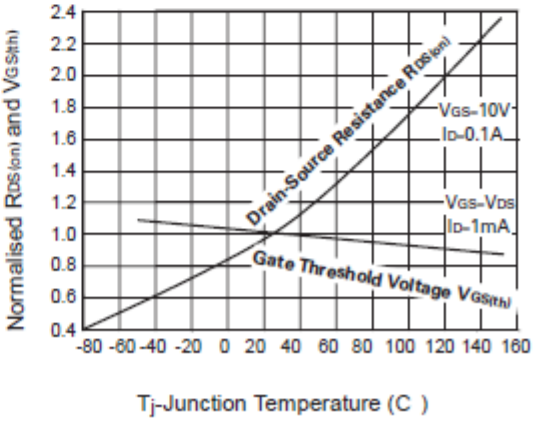
Voltage saturation characteristics



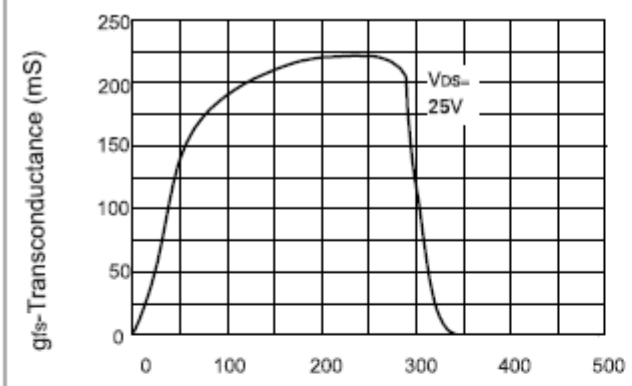
Transfer characteristics



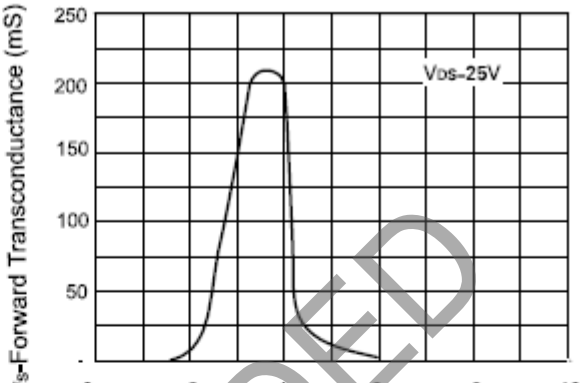
On-resistance vs gate-source voltage



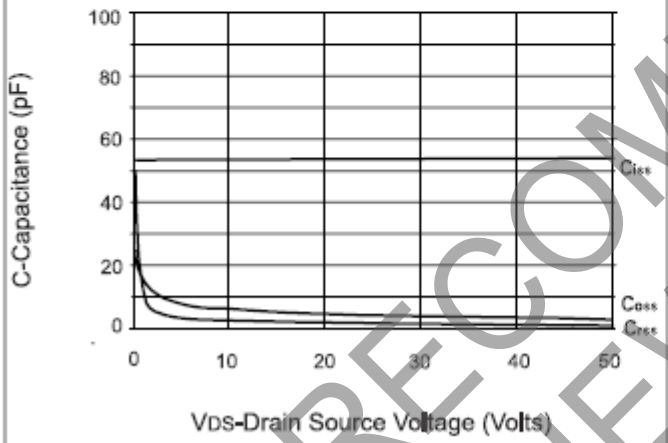
Normalised $R_{DS(on)}$ and $V_{GS(th)}$ temperature



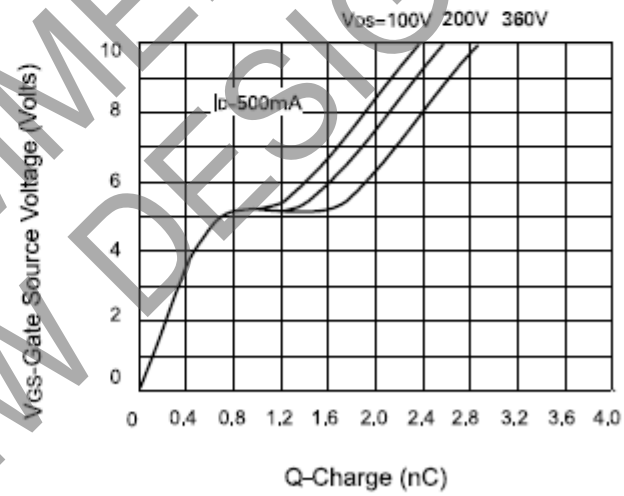
Transconductance v drain current



Transconductance v gate-source voltage



Capacitance v drain-source voltage

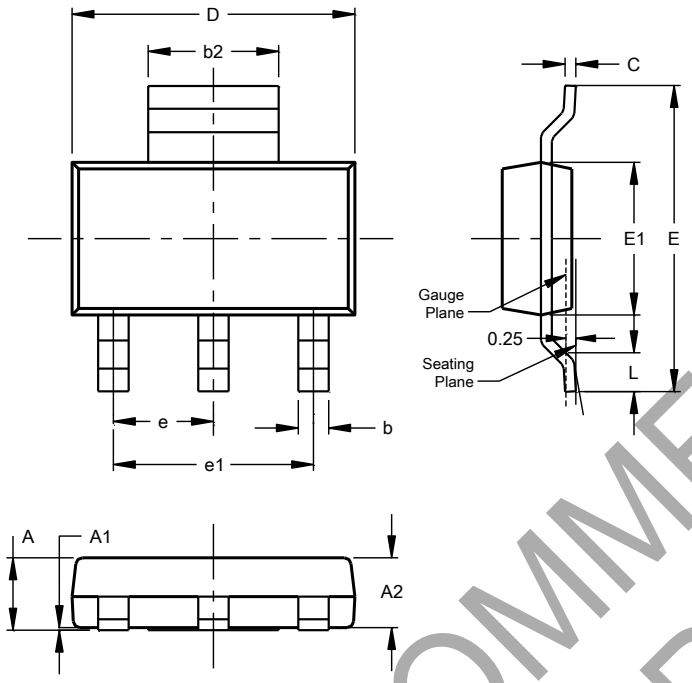


Gate charge v gate-source voltage

Package Outline Dimensions

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

SOT223 (Type DN)

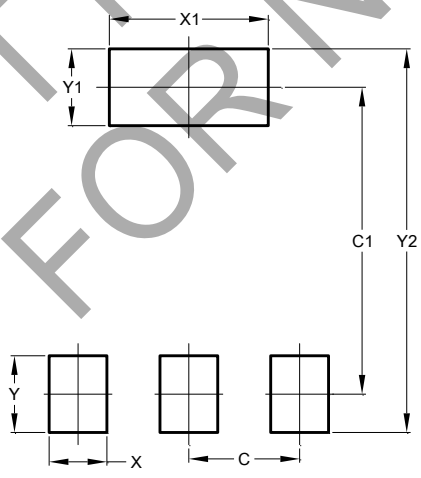


SOT223 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

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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