

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = +25^\circ C$
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-Q100/101/200, 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

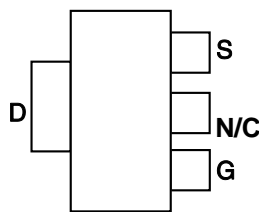
## Mechanical Data

- Package: SOT223 (Type DN)
- 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)

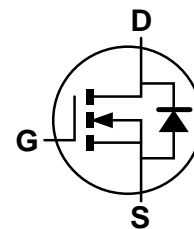
SOT223 (Type DN)



Top View



Pin Out - Top



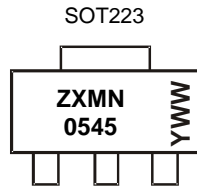
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
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



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

## Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	450	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $V_{GS} = 10\text{V}$ ; $T_A = +25^\circ\text{C}$ ) (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

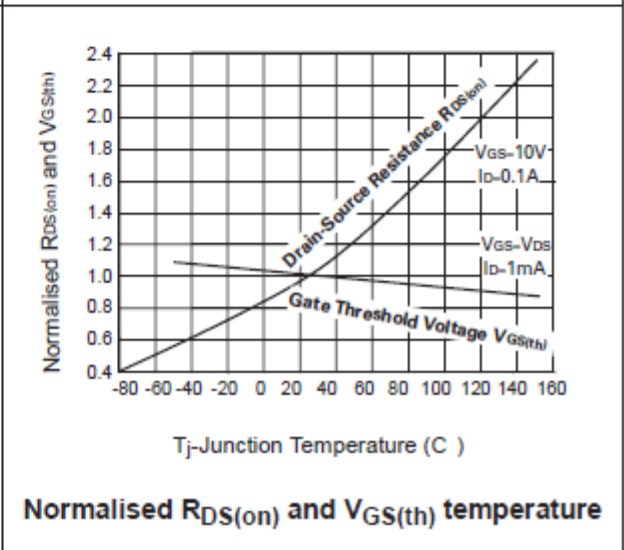
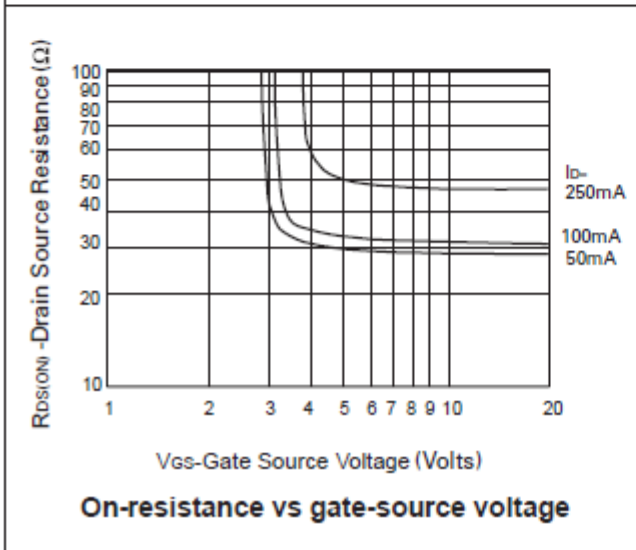
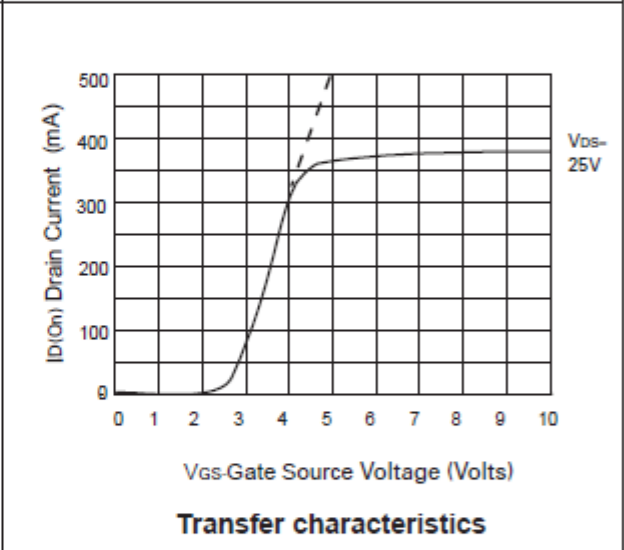
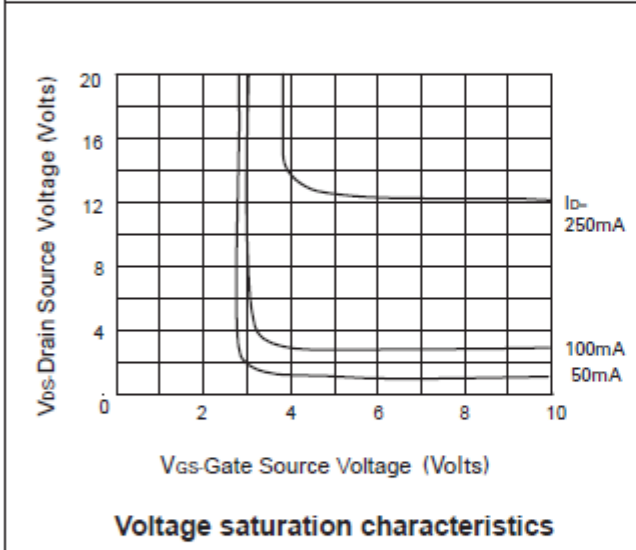
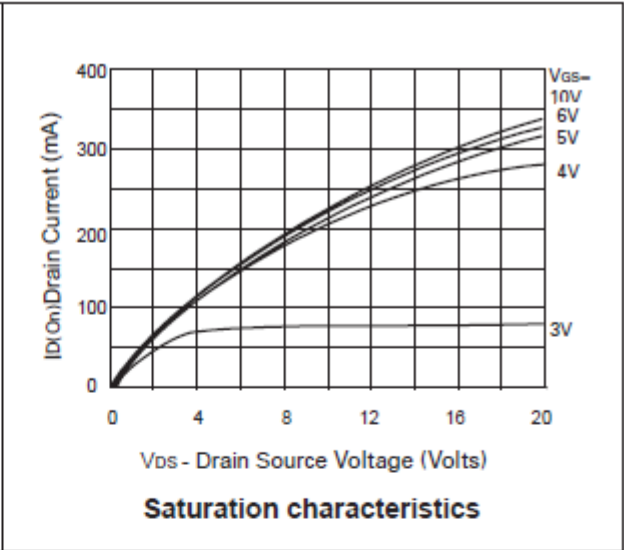
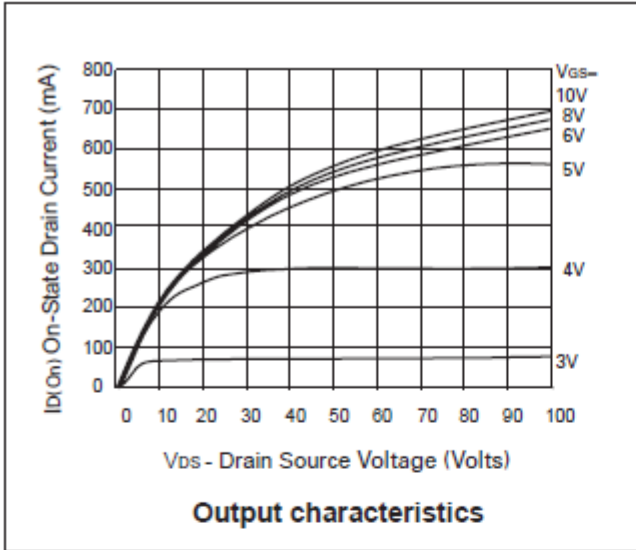
## Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

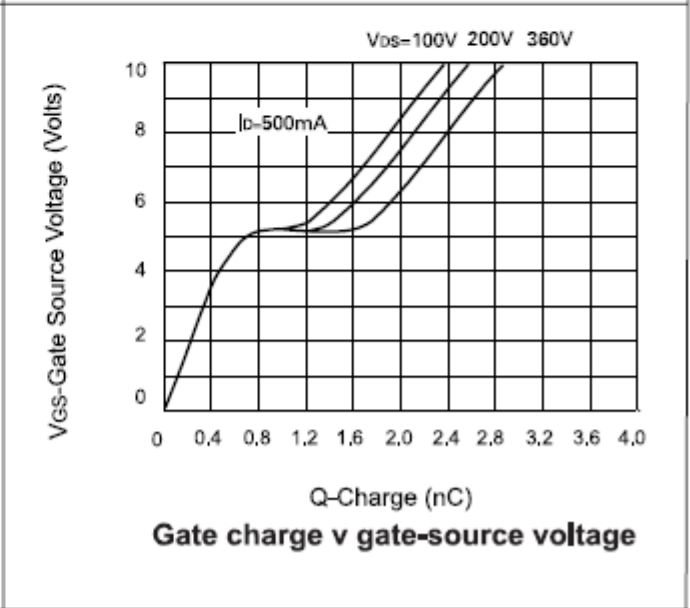
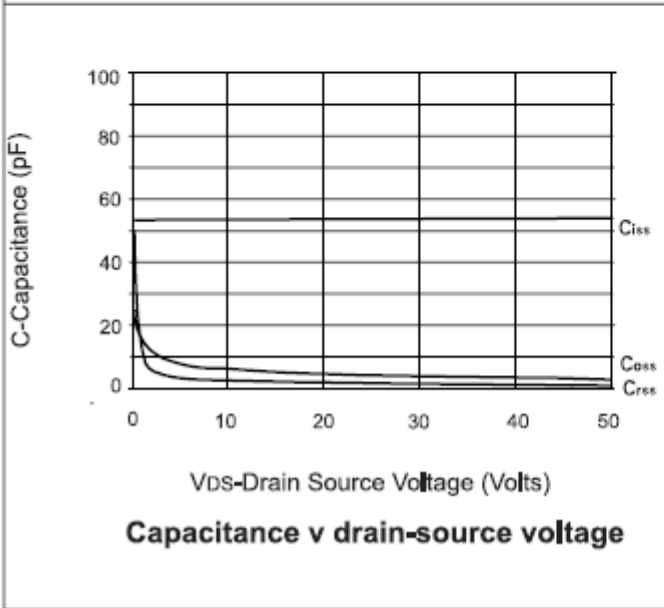
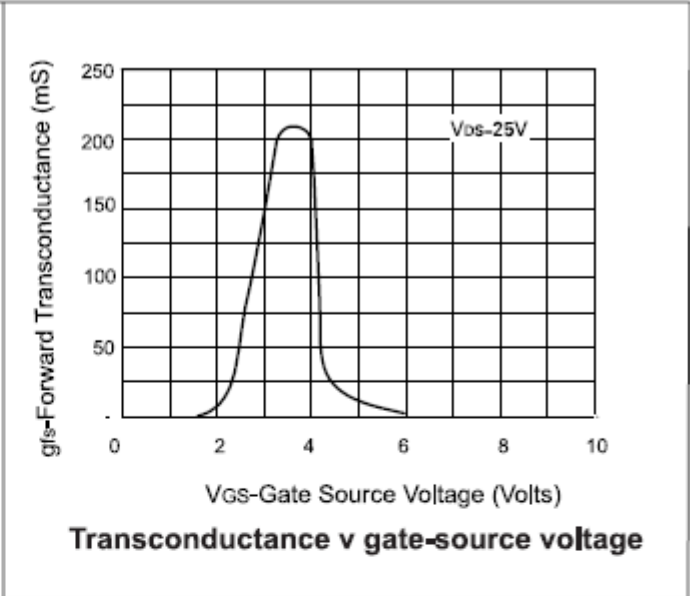
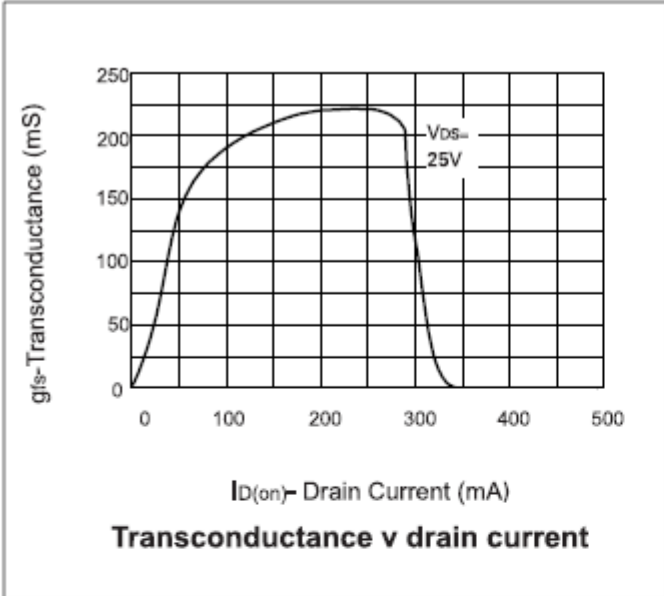
Characteristic	Symbol	Value	Unit
Power Dissipation at $T_A = +25^\circ\text{C}$ (Note 5)	$P_D$	2.0	W
Linear Derating Factor		1.6	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta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

## Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	450	-	-	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	10 400	$\mu\text{A}$	$V_{DS} = 450\text{V}, V_{GS} = 0\text{V}$ $V_{DS} = 405\text{V}, V_{GS} = 0\text{V}, T = +125^\circ\text{C}$
Gate-Source Leakage	$I_{GSS}$	-	-	20	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1	-	3	V	$V_{DS} = V_{GS}, I_D = 1\text{mA}$
Static Drain-Source On-Resistance (Note 8)	$R_{DS(on)}$	-	-	50	$\Omega$	$V_{GS} = 10\text{V}, I_D = 100\text{mA}$
Forward Transconductance (Notes 8 & 10)	$g_{fs}$	100	-	-	mS	$V_{DS} = 25\text{V}, I_D = 100\text{mA}$
On-State Drain Current (Note 8)	$I_{D(on)}$	150	-	-	mA	$V_{DS} = 25\text{V}, V_{GS} = 10\text{V}$
<b>DYNAMIC CHARACTERISTICS (Note 11)</b>						
Input Capacitance (Note 10)	$C_{iss}$	-	-	70	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$
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	$V_{DD} = 25\text{V}, I_D = 100\text{mA}$
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:
- For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  - For a device surface mounted on FR4 PCB measured at  $t \leq 5$  secs.
  - Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal Impedance graph.
  - Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .
  - Switching characteristics are independent of operating junction temperature.
  - Sample test.
  - For design aid only, not subject to production testing.

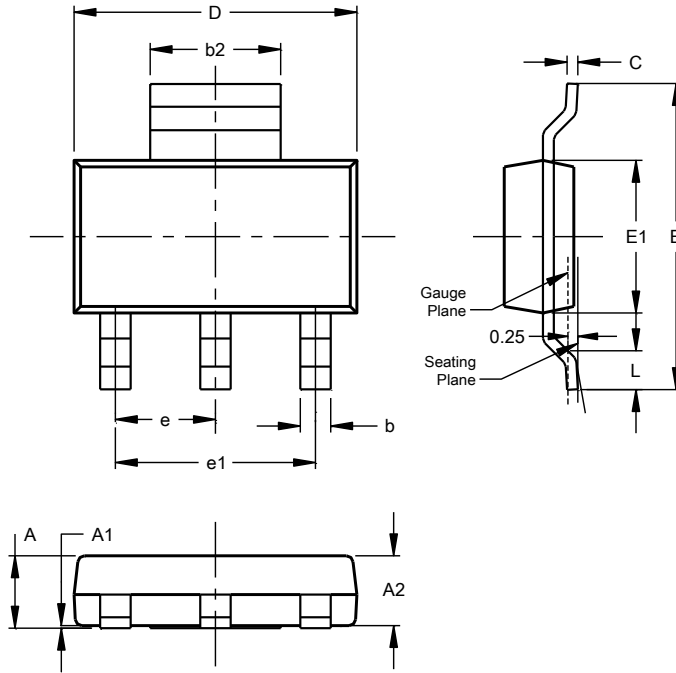




**Package Outline Dimensions**

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

**SOT223 (Type DN)**

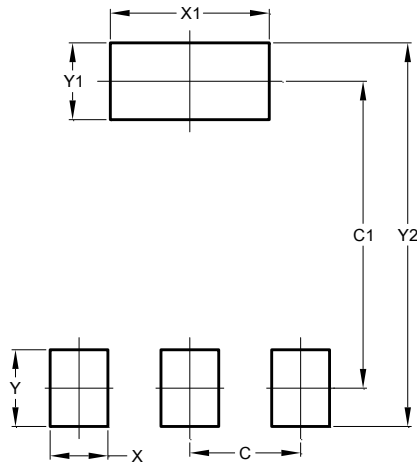


SOT223 (Type DN)			
Dim	Min	Max	Typ
A	--	1.70	--
A1	0.01	0.15	--
A2	1.50	1.68	1.60
b	0.60	0.80	0.70
b2	2.90	3.10	--
c	0.20	0.32	--
D	6.30	6.70	--
E	6.70	7.30	--
E1	3.30	3.70	--
e	--	--	2.30
e1	--	--	4.60
L	0.85	--	--
All Dimensions in mm			

**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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