

100V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	Max I_D $T_A = +25^\circ C$
100V	125m Ω @ $V_{GS} = 10V$	TO252 (DPAK)	6.4A
	150m Ω @ $V_{GS} = 6V$		5.8A

Description

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

Applications

- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control

Features

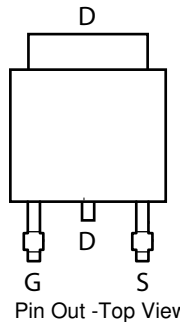
- Low On-Resistance
- Fast Switching Speed
- Low Gate Drive
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

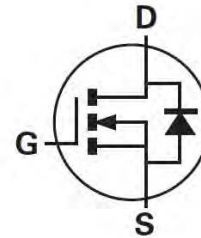
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (approximate)



Top View



Pin Out -Top View



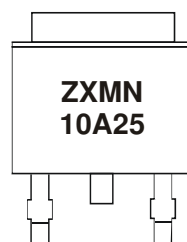
Equivalent Circuit

Ordering Information (4 & 5)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN10A25KTC	ZXMN10A25	13	16	2,500

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See <http://www.diodes.com> 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 <http://www.diodes.com>.
 5. Products with Q-suffix are automotive grade. Automotive products are electrical and thermal the same as the commercial, except where specified.

Marking Information



ZXMN10A25 = Product Type Marking Code

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

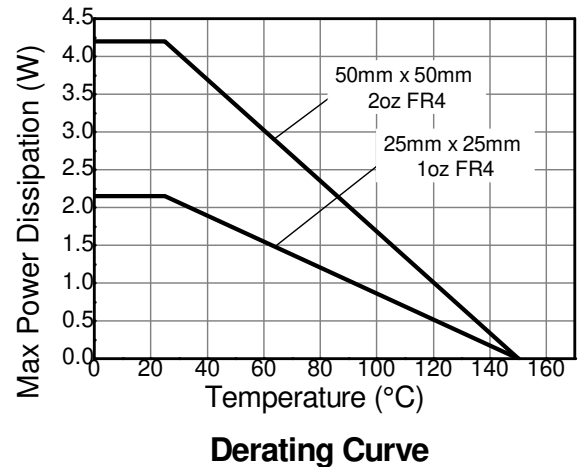
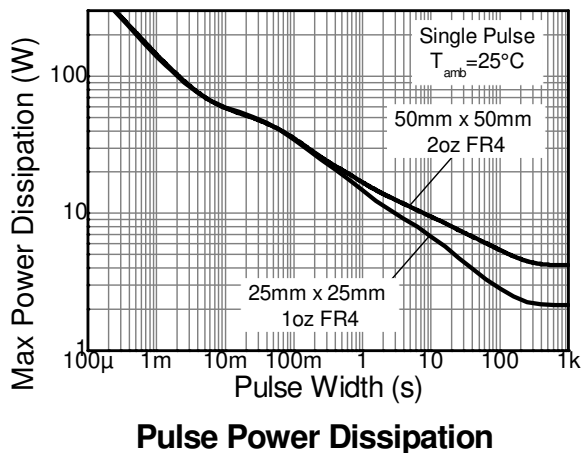
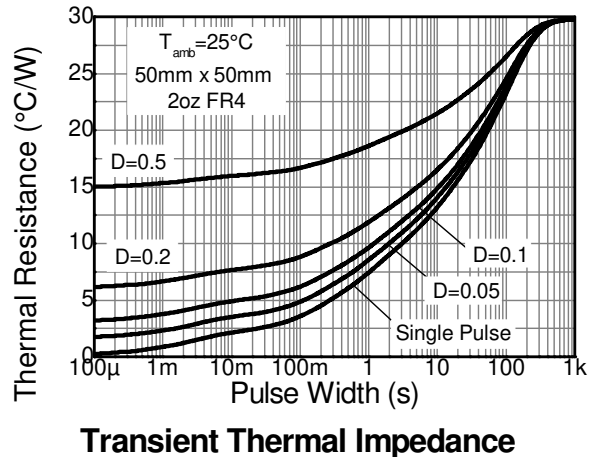
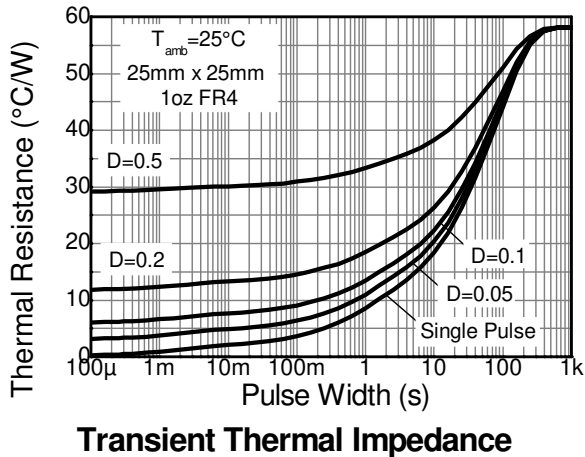
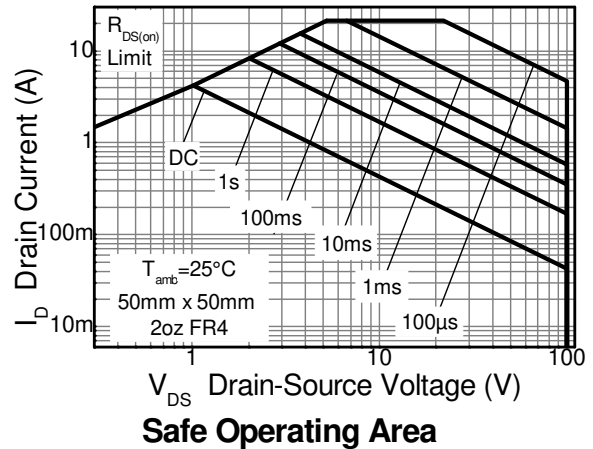
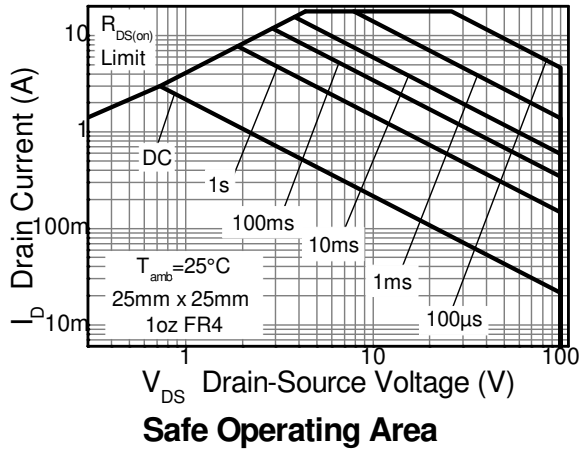
Characteristic		Symbol	Value	Unit
Drain-Source voltage		V_{DSS}	100	V
Gate-Source voltage		V_{GS}	± 20	V
Continuous Drain current	$V_{GS} = 10\text{V}$	(Note 7)	6.4	A
		$T_A = +70^\circ\text{C}$ (Note 7)	5	
		(Note 6)	4.2	
Pulsed Drain current		I_{DM}	21	A
Continuous Source current (Body diode)		I_S	10	A
Pulsed Source current (Body diode)		I_{SM}	21	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 6)	P_D	4.25	W mW/ $^\circ\text{C}$
			34	
	(Note 7)		9.85	
			78.7	
Thermal Resistance, Junction to Ambient	(Note 9)	$R_{\theta JA}$	2.11	$^\circ\text{C/W}$
			16.8	
	(Note 6)		29.4	
	(Note 7)		12.7	
	(Note 9)		59.1	
Thermal Resistance, Junction to Lead		$R_{\theta JL}$	1.43	
Operating and storage temperature range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

- Notes:
6. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 7. For a device surface mounted on FR4 PCB measured at $t \leq 10$ sec.
 8. Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, $D = 0.02$ and pulse width 300 μs . The pulse current is limited by the maximum junction temperature.
 9. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 10. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics

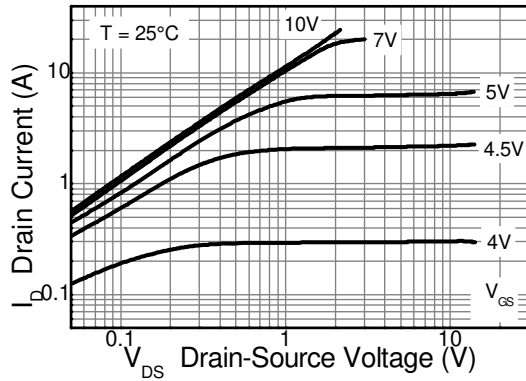


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

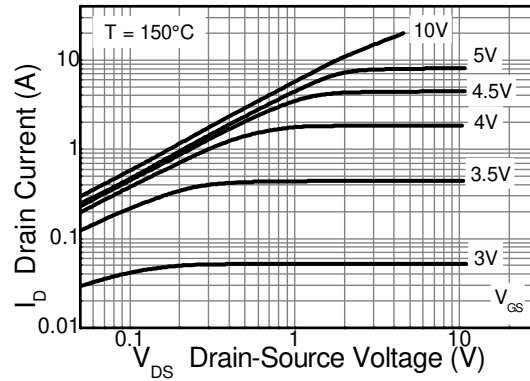
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV _{DSS}	100	—	—	V	I _D = 250μA, V _{GS} = 0V	
Zero Gate Voltage Drain Current	I _{DSS}	—	—	0.5	μA	V _{DS} = 100V, V _{GS} = 0V	
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V	
ON CHARACTERISTICS							
Gate Threshold Voltage	V _{GS(th)}	2.0	—	4.0	V	I _D = 250μA, V _{DS} = V _{GS}	
Static Drain-Source On-Resistance (Note 11)	R _{DS(on)}	—	—	125	mΩ	V _{GS} = 10V, I _D = 3.2A	
				150		V _{GS} = 6V, I _D = 2.6A	
Forward Transconductance (Notes 11 & 12)	g _{fs}	—	7.3	—	S	V _{DS} = 15V, I _D = 2.9A	
Diode Forward Voltage (Note 11)	V _{SD}	—	0.85	0.95	V	I _S = 3.2A, V _{GS} = 0V, T _J = +25°C	
Reverse recovery time (Note 12)	t _{rr}	—	40.5	—	ns	I _S = 2.9A, di/dt = 100A/μs	
Reverse recovery charge (Note 12)	Q _{rr}	—	62	—	nC	T _J = +25°C	
DYNAMIC CHARACTERISTICS (Note 12)							
Input Capacitance	C _{iSS}	—	859	—	pF	V _{DS} = 50V, V _{GS} = 0V f = 1MHz	
Output Capacitance	C _{oss}	—	57.3	—	pF		
Reverse Transfer Capacitance	C _{rSS}	—	33	—	pF		
Total Gate Charge (Note 13)	Q _g	—	9.6	—	nC	V _{GS} = 5V	V _{DS} = 50V I _D = 2.9A
Total Gate Charge (Note 13)	Q _g	—	17.16	—	nC	V _{GS} = 10V	
Gate-Source Charge (Note 13)	Q _{gs}	—	3.77	—	nC		
Gate-Drain Charge (Note 13)	Q _{gd}	—	5.36	—	nC		
Turn-On Delay Time (Note 13)	t _{D(on)}	—	4.9	—	ns	V _{DD} = 50V, V _{GS} = 10V I _D = 1A, R _G ≅ 6.0Ω	
Turn-On Rise Time (Note 13)	t _r	—	3.7	—	ns		
Turn-Off Delay Time (Note 13)	t _{D(off)}	—	17.7	—	ns		
Turn-Off Fall Time (Note 13)	t _f	—	9.4	—	ns		

- Notes:
- 11. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
 - 12. For design aid only, not subject to production testing.
 - 13. Switching characteristics are independent of operating junction temperatures.

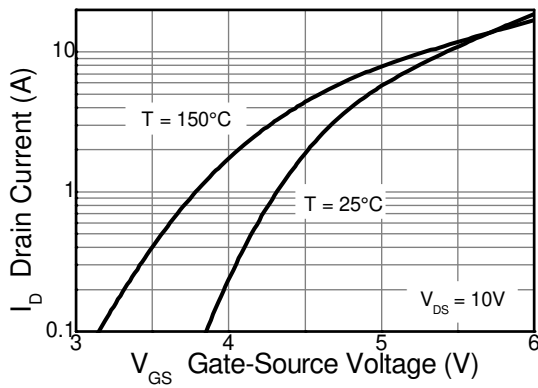
Typical Characteristics



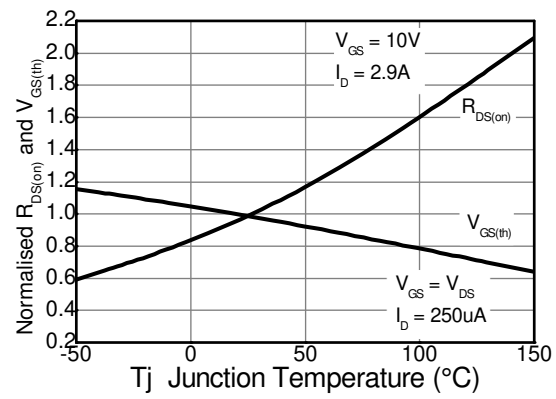
Output Characteristics



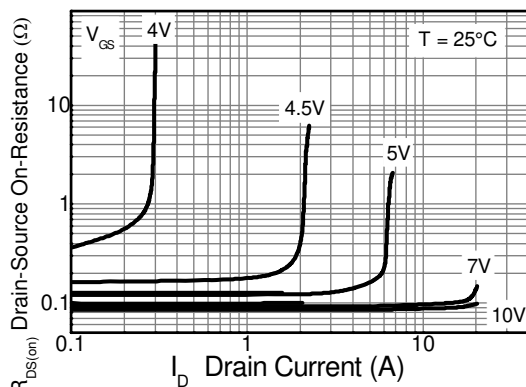
Output Characteristics



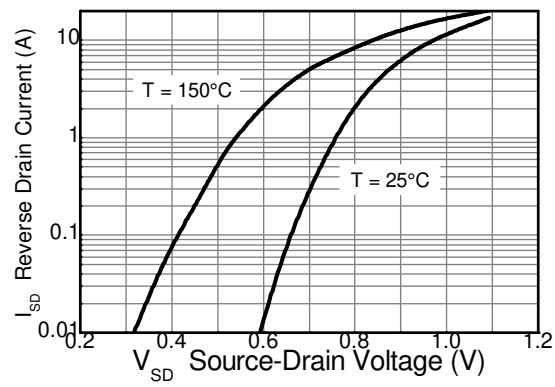
Typical Transfer Characteristics



Normalised Curves v Temperature

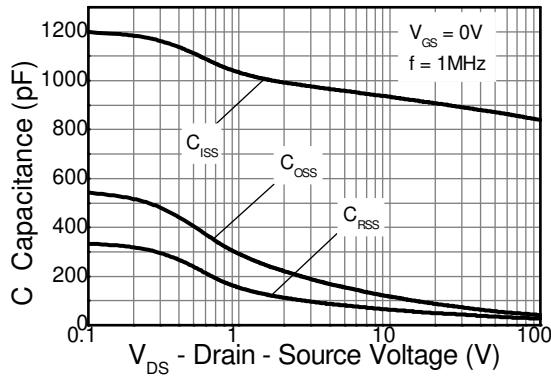


On-Resistance v Drain Current

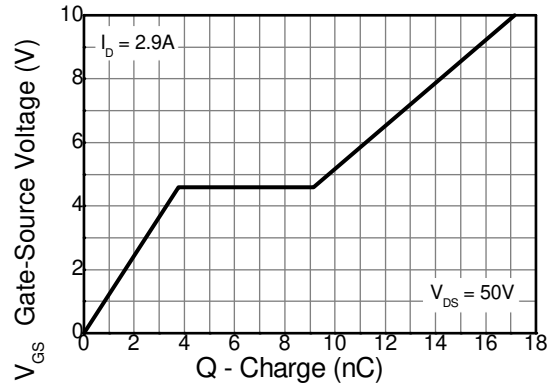


Source-Drain Diode Forward Voltage

Typical Characteristics (cont.)

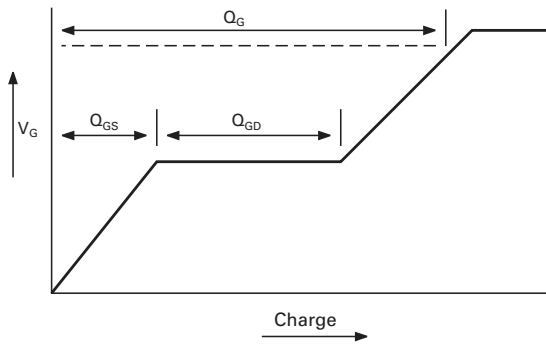


Capacitance v Drain-Source Voltage

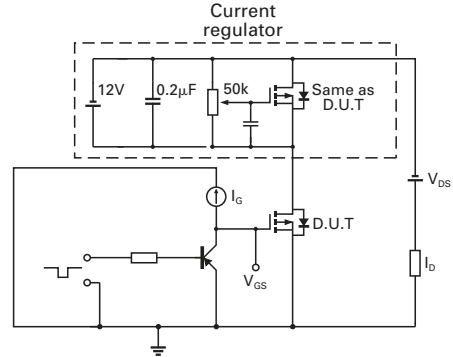


Gate-Source Voltage v Gate Charge

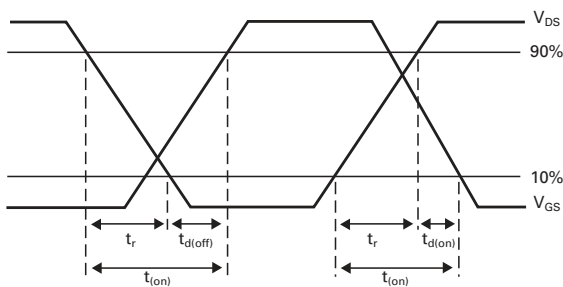
Test Circuits



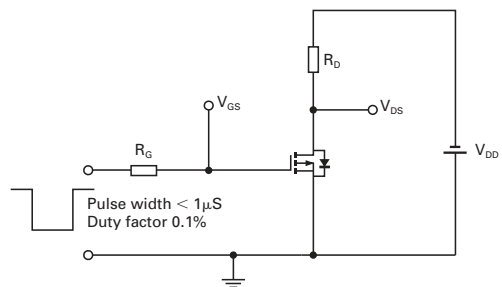
Basic gate charge waveform



Gate charge test circuit



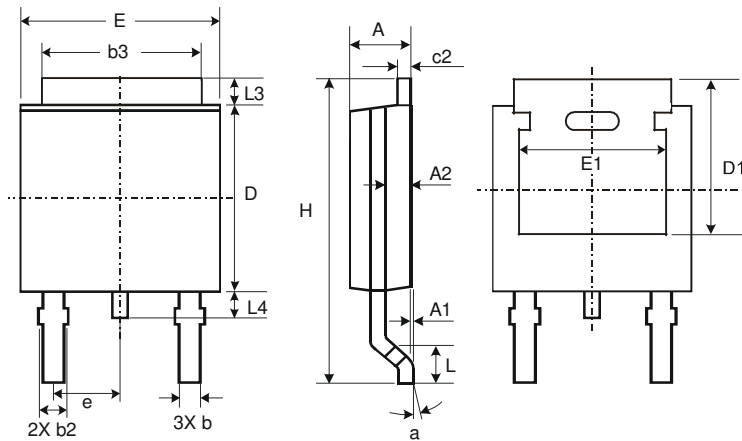
Switching time waveforms



Switching time test circuit

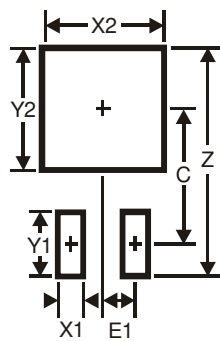
ZXMN10A25K

Package Outline Dimensions



TO252			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c2	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	2.3

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