



**THE DATASHEET OF  
ZXMN6A07FTA**



## Product Summary

$BV_{DSS}$	Max $R_{DS(ON)}$	Max $I_D$ $T_A = +25^\circ C$ (Note 7)
60V	250m $\Omega$ @ $V_{GS} = 10V$	1.4A
	350m $\Omega$ @ $V_{GS} = 4.5V$	1.2A

## Description and Applications

This MOSFET utilizes a unique structure that combines the benefits of low on-resistance with a fast switching speed, making it ideal for high-efficiency power-management applications.

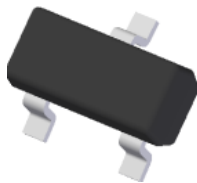
- DC-DC converters
- Power-management functions
- Relay and solenoid driving
- Motor controls

## Features and Benefits

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Charge
- **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-Q100/101/104/200, 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/>**

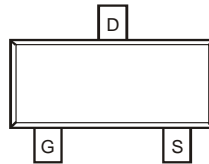
## Mechanical Data

- Package: SOT23
- 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<sup>(3)</sup>
- Weight: 0.008 grams (Approximate)

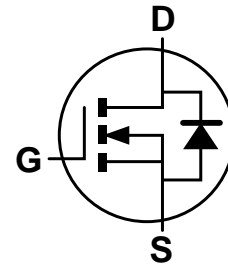


Top View

SOT23



Top View  
Pin Out



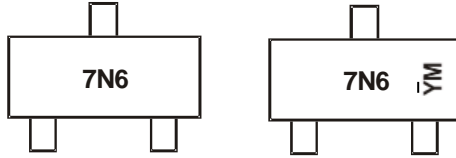
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZXMN6A07FTA	SOT23	3,000	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

**SOT23**


7N6 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: K = 2023)  
 M = Month (ex: 9 = September)

**Date Code Key**

Year	2010	...	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	X	...	K	L	M	N	P	R	S	T	U	V

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

## Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

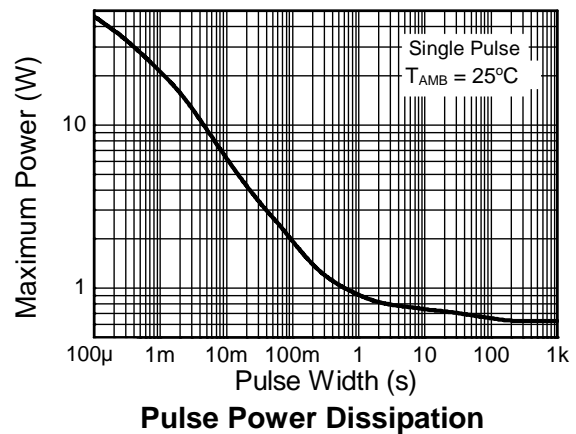
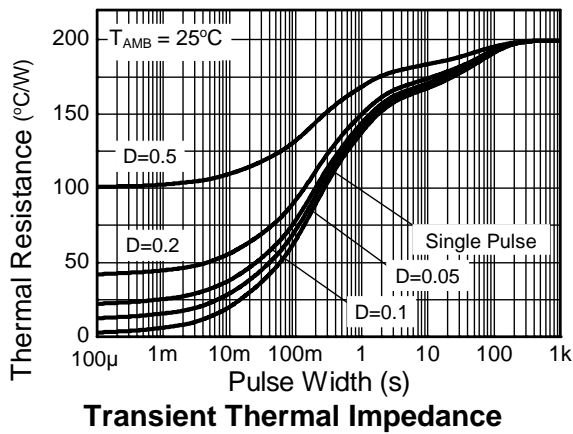
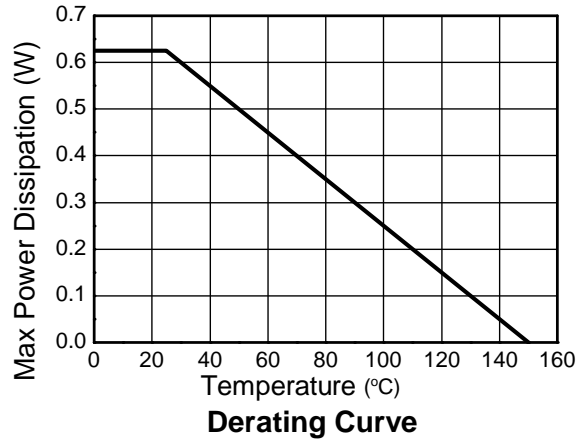
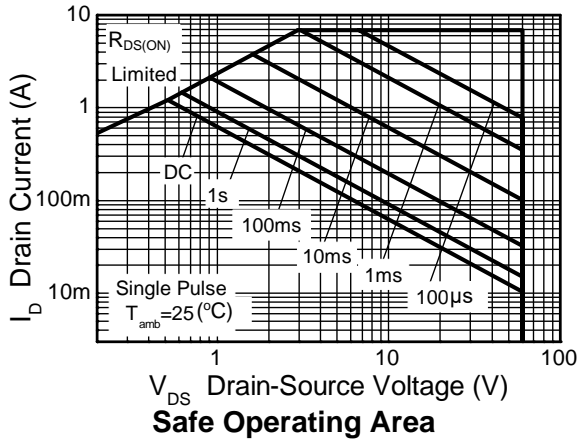
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V <sub>DSS</sub>	60	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Continuous Drain Current	V <sub>GS</sub> = 10V	T <sub>A</sub> = +25°C (Note 6)	1.4	A
		T <sub>A</sub> = +70°C (Note 6)	1.1	
		T <sub>A</sub> = +25°C (Note 5)	1.2	
Pulsed Drain Current (Note 7)		I <sub>DM</sub>	6.9	A
Continuous Source Current (Body Diode) (Note 6)		I <sub>S</sub>	1	A
Pulsed Source Current (Body Diode) (Note 7)		I <sub>SM</sub>	6.9	A

## Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)		P <sub>D</sub>	625	mW
Linear Derating Factor			5	
Power Dissipation (Note 6)		P <sub>D</sub>	806	mW
Linear Derating Factor			6.4	
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	200	°C/W
	(Note 6)		155	
Thermal Resistance, Junction to Ambient (Note 8)		R <sub>θJL</sub>	194	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- 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 ≤ 5secs.
  - Repetitive rating 25mm x 25mm FR4 PCB, D = 0.02 pulse width = 300µs - pulse current limited by maximum junction temperature.
  - Thermal resistance from junction to solder-point (at the end of the drain lead).

**Thermal Characteristics (continued)**

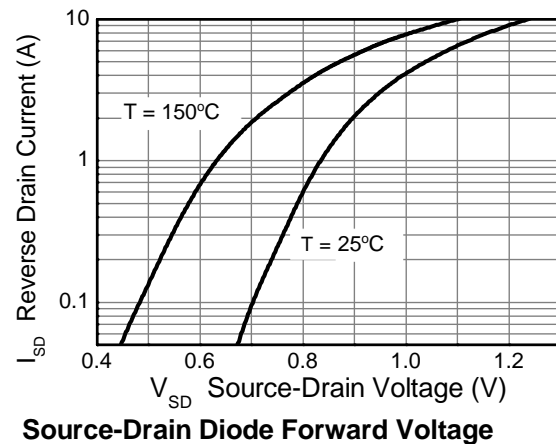
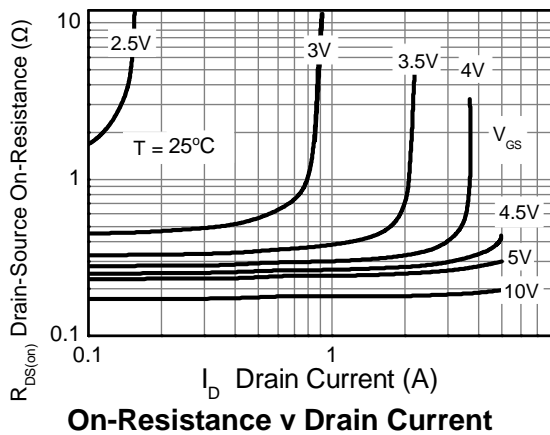
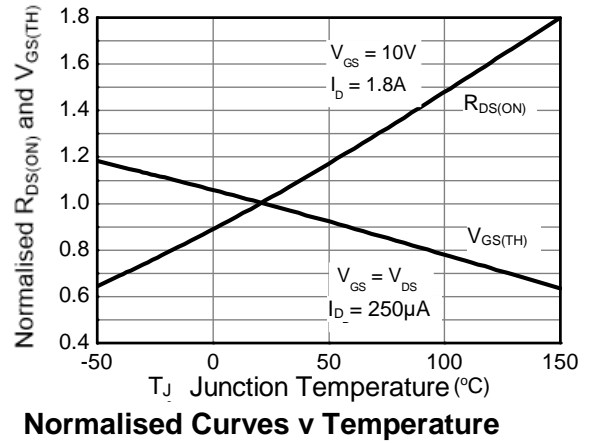
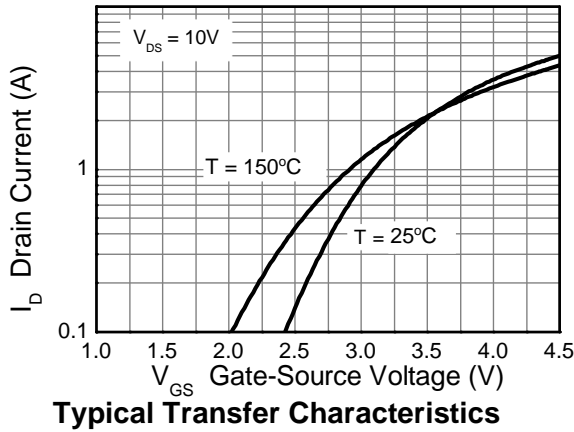
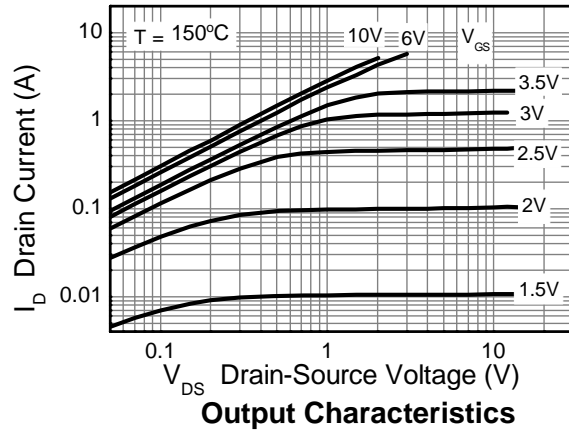
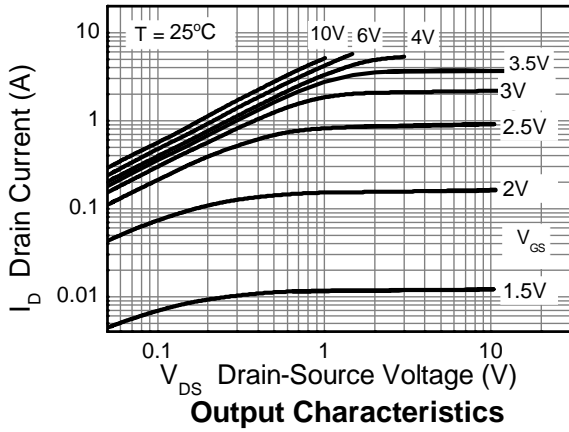


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

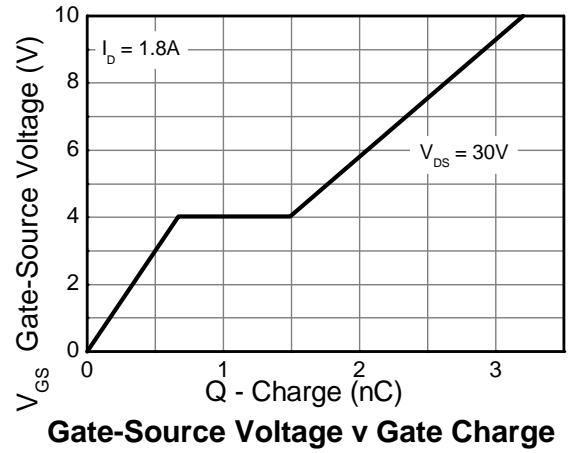
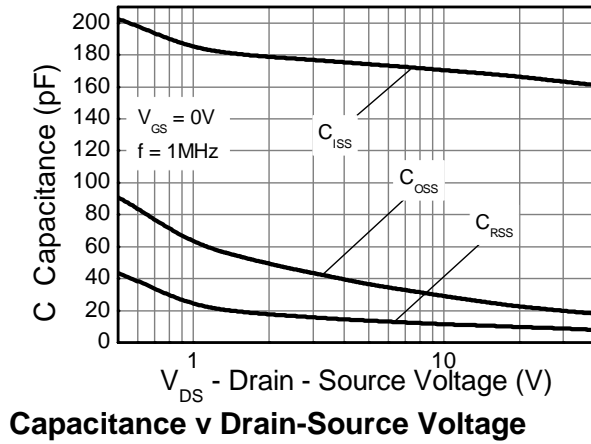
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.0	—	3.0	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 9)	R <sub>DS(ON)</sub>	—	—	0.250	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.8A
				0.350		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 1.3A
Forward Transconductance (Notes 9 and 11)	G <sub>FS</sub>	—	2.3	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 1.8A
Diode Forward Voltage (Note 9)	V <sub>SD</sub>	—	0.8	0.95	V	T <sub>J</sub> = +25°C, I <sub>S</sub> = 0.45A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 11)	t <sub>RR</sub>	—	20.5	—	ns	T <sub>J</sub> = +25°C, I <sub>F</sub> = 1.8A,
Reverse Recovery Charge (Note 11)	Q <sub>RR</sub>	—	21.3	—	nC	di/dt = 100A/μs
<b>DYNAMIC CHARACTERISTICS (Note 11)</b>						
Input Capacitance	C <sub>iss</sub>	—	166	—	pF	V <sub>DD</sub> = 40V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	19.5	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	8.7	—		
Turn-On Delay Time (Note 10)	t <sub>D(ON)</sub>	—	1.8	—	ns	V <sub>DD</sub> = 30V, I <sub>D</sub> = 1.8A, R <sub>G</sub> ≅ 6.0Ω, V <sub>GS</sub> = 10V
Turn-On Rise Time (Note 10)	t <sub>R</sub>	—	1.4	—		
Turn-Off Delay Time (Note 10)	t <sub>D(OFF)</sub>	—	4.9	—		
Turn-Off Fall Time (Note 10)	t <sub>F</sub>	—	2.0	—		
Total Gate Charge (Note 10)	Q <sub>g</sub>	—	1.65	—	nC	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 5V, I <sub>D</sub> = 1.8A
Total Gate Charge (Note 10)	Q <sub>g</sub>	—	3.2	—	nC	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.8A
Gate-Source Charge (Note 10)	Q <sub>gs</sub>	—	0.67	—		
Gate-Drain Charge (Note 10)	Q <sub>gd</sub>	—	0.82	—		

- Notes:
- 9. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤ 2%.
  - 10. Switching characteristics are independent of operating junction temperature.
  - 11. For design aid only, not subject to production testing.

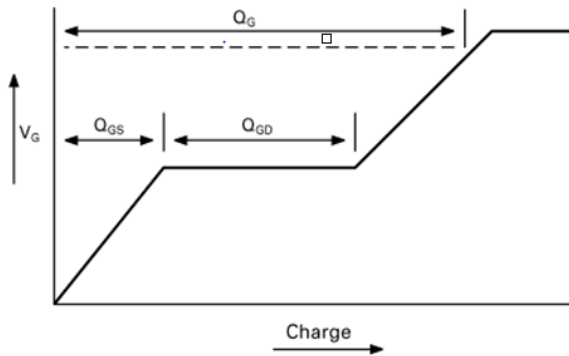
**Typical Characteristics**



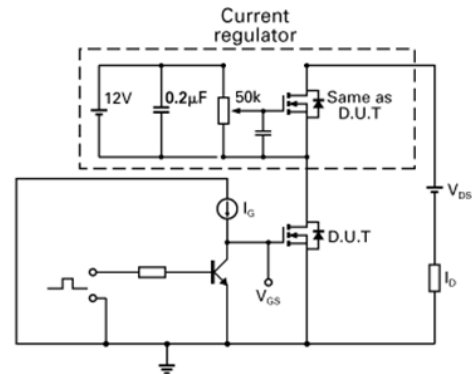
**Typical Characteristics** (continued)



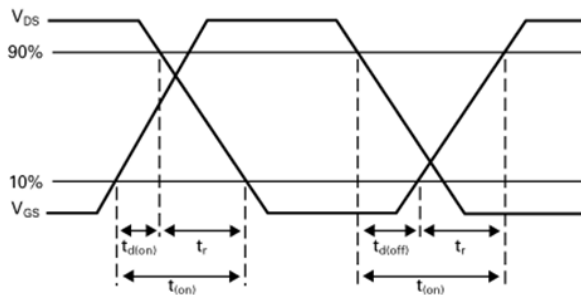
**Test Circuits**



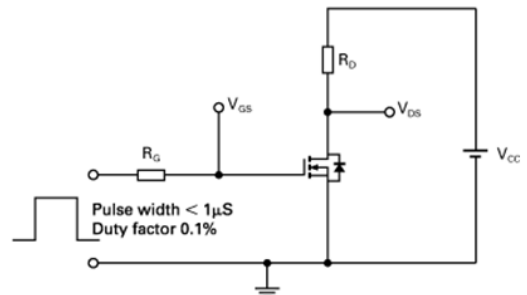
**Basic gate charge waveform**



**Gate charge test circuit**



**Switching time waveforms**

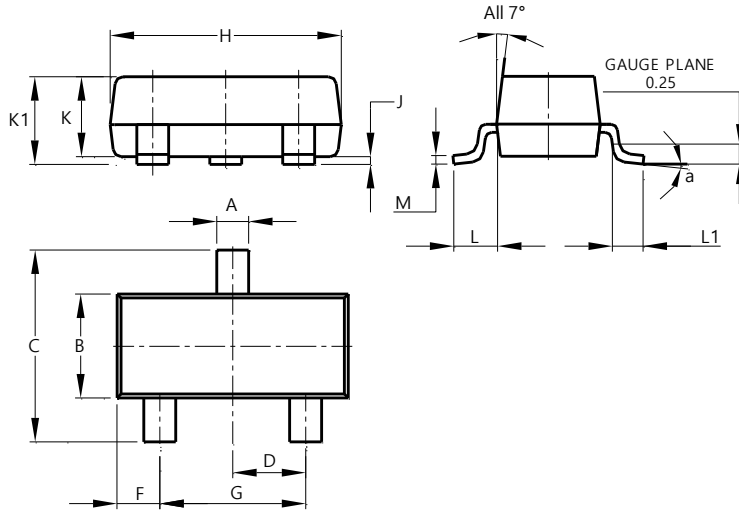


**Switching time test circuit**

## Package Outline Dimensions

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

**SOT23**

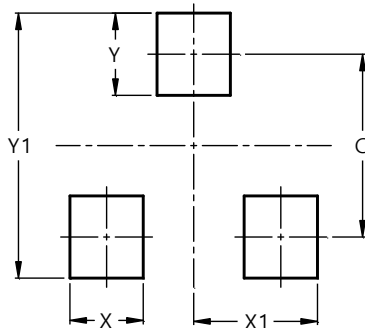


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

## Suggested Pad Layout

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

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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