

60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

Description

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.

Applications

- DC-DC Converters
- Power Management Functions
- Relay And Solenoid Driving
- Motor Control

Features

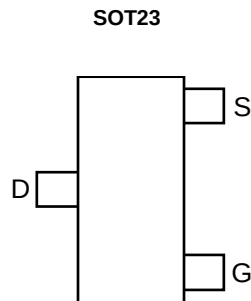
- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Charge
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

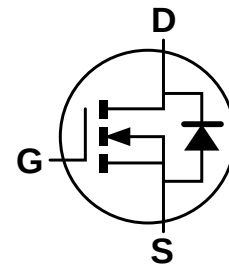
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish (e3)
- Weight: 0.008 grams (Approximate)



Top View



Top View
Pin Out



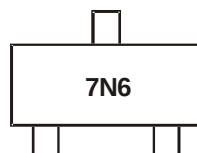
Equivalent Circuit

Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN6A07FTA	AEC-Q101	7N6	7	8	3,000
ZXMN6A07FQTA	Automotive	7N6	7	8	3,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



7N6 = Product Type Marking Code

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

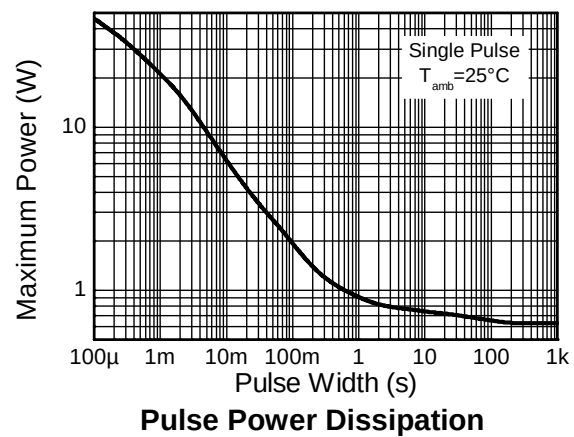
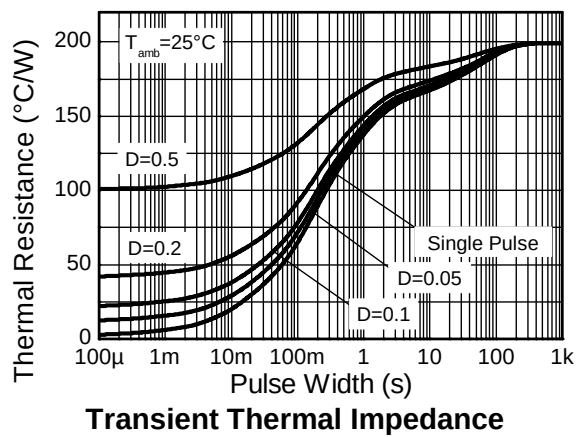
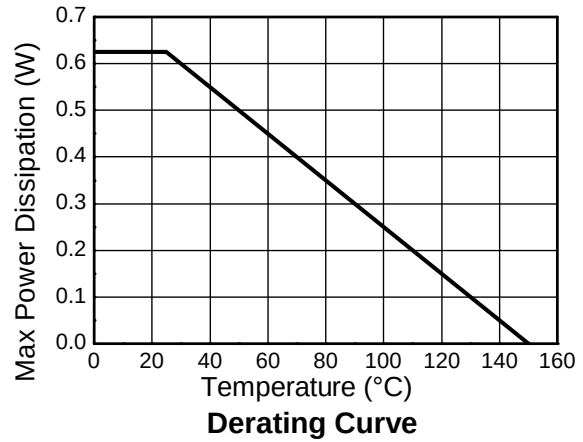
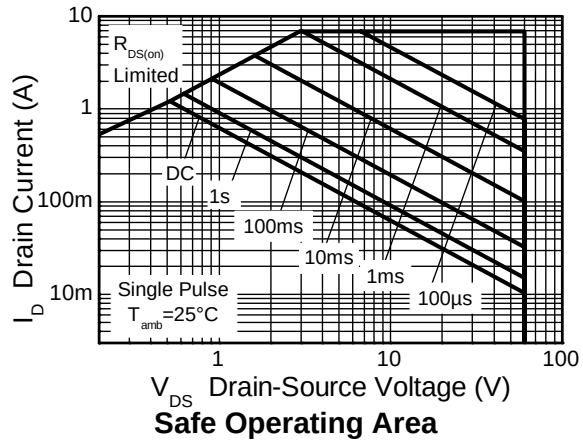
Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	60	V
Gate-Source Voltage			V _{GS}	±20	V
Continuous Drain Current	V _{GS} = 10V	T _A = +25°C (Note 7)	I _D	1.4	A
		T _A = +70°C (Note 7)		1.1	
		T _A = +25°C (Note 6)		1.2	
Pulsed Drain Current (Note 8)			I _{DM}	6.9	A
Continuous Source Current (Body Diode) (Note 7)			I _S	1	A
Pulsed Source Current (Body Diode) (Note 8)			I _{SM}	6.9	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 6)		P _D	625	mW
Linear Derating Factor			5	mW/°C
Power Dissipation (Note 7)		P _D	806	mW
Linear Derating Factor			6.4	mW/°C
Thermal Resistance, Junction to Ambient	(Note 6)	R _{θJA}	200	°C/W
	(Note 7)		155	
Thermal Resistance, Junction to Ambient (Note 9)		R _{θJL}	194	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes:
6. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
 7. For a device surface mounted on FR4 PCB measured at t ≤ 5 secs.
 8. Repetitive rating 25mm x 25mm FR4 PCB, D=0.02 pulse width=300μs - pulse current limited by maximum junction temperature.
 9. Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics (continued)

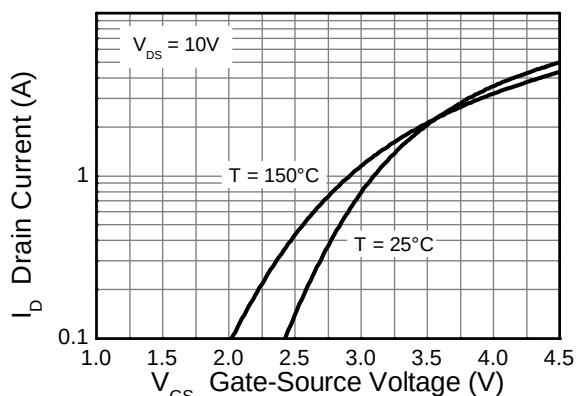
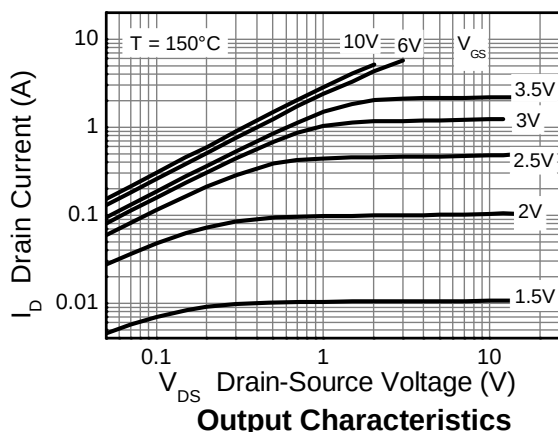
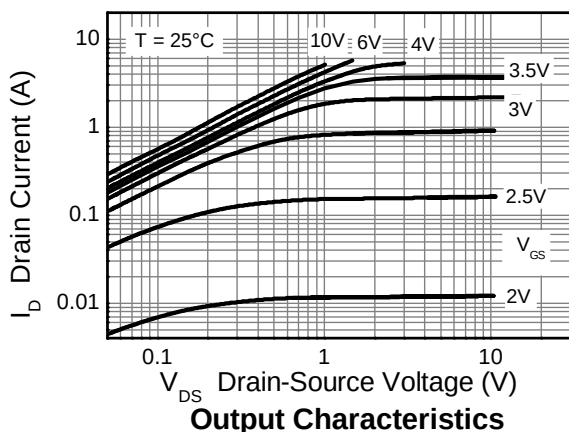


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

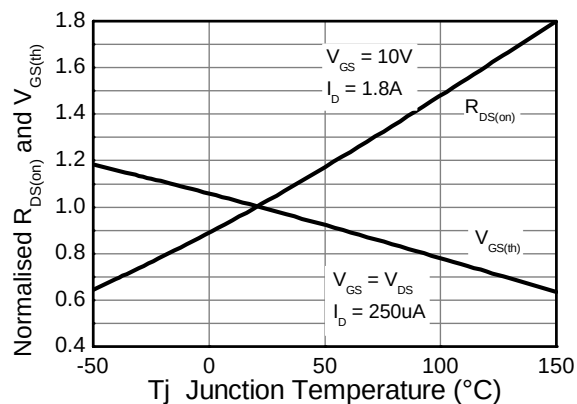
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	I _D = 250μA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	1.0	—	3.0	V	I _D = 250μA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance (Note 10)	R _{DS(on)}	—	—	0.250	Ω	V _{GS} = 10V, I _D = 1.8A
				0.350		V _{GS} = 4.5V, I _D = 1.3A
Forward Transconductance (Notes 10 and 12)	g _{fs}	—	2.3	—	S	V _{DS} = 15V, I _D = 1.8A
Diode Forward Voltage (Note 10)	V _{SD}	—	0.8	0.95	V	T _J = +25°C, I _S = 0.45A, V _{GS} = 0V
Reverse Recovery Time (Note 12)	t _{rr}	—	20.5	—	ns	T _J = +25°C, I _F = 1.8A,
Reverse Recovery Charge (Note 12)	Q _{rr}	—	21.3	—	nC	di/dt = 100A/μs
DYNAMIC CHARACTERISTICS (Note 12)						
Input Capacitance	C _{iss}	—	166	—	pF	V _{DD} = 40V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	19.5	—		
Reverse Transfer Capacitance	C _{rss}	—	8.7	—		
Turn-On Delay Time (Note 11)	t _{D(on)}	—	1.8	—	ns	V _{DD} = 30V, I _D = 1.8A, R _G ≅ 6.0Ω, V _{GS} = 10V
Turn-On Rise Time (Note 11)	t _r	—	1.4	—		
Turn-Off Delay Time (Note 11)	t _{D(off)}	—	4.9	—		
Turn-Off Fall Time (Note 11)	t _f	—	2.0	—		
Total Gate Charge (Note 11)	Q _g	—	1.65	—	nC	V _{DS} = 30V, V _{GS} = 5V, I _D = 1.8A
Total Gate Charge (Note 11)	Q _g	—	3.2	—	nC	V _{DS} = 30V, V _{GS} = 10V, I _D = 1.8A
Gate-Source Charge (Note 11)	Q _{gs}	—	0.67	—		
Gate-Drain Charge (Note 11)	Q _{gd}	—	0.82	—		

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

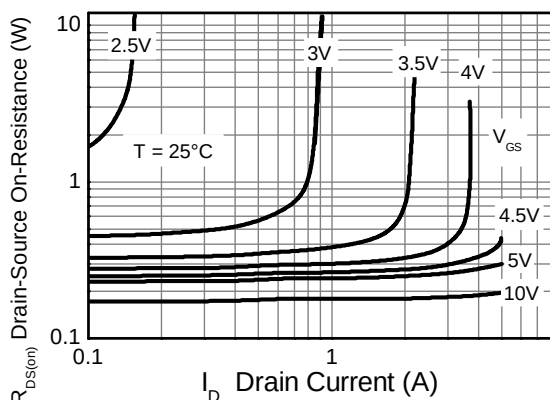
Typical Characteristics



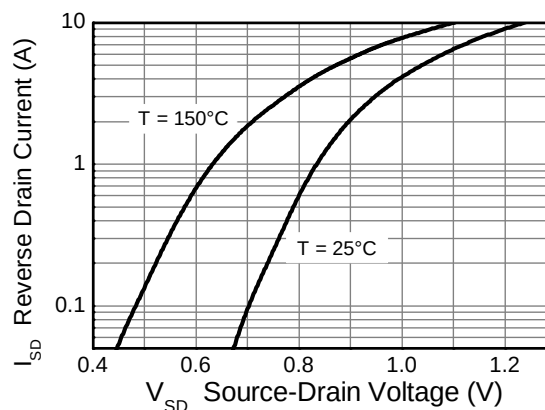
Typical Transfer Characteristics



Normalised Curves v Temperature

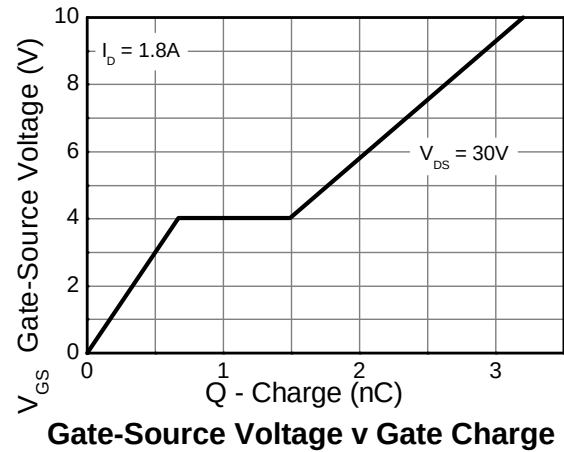
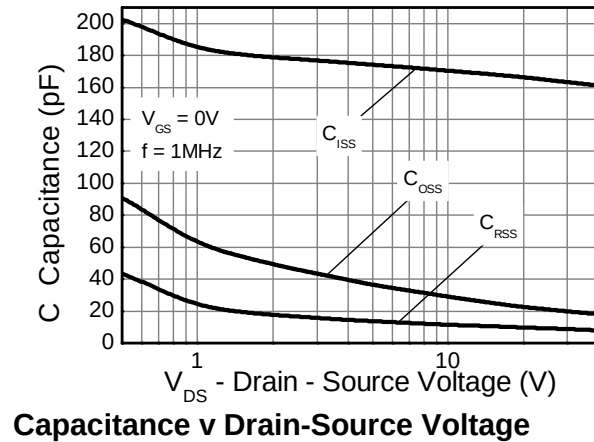


On-Resistance v Drain Current

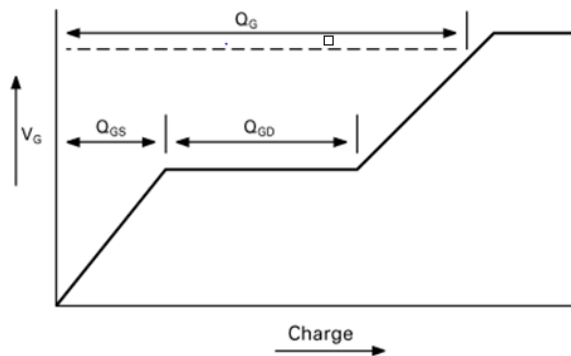


Source-Drain Diode Forward Voltage

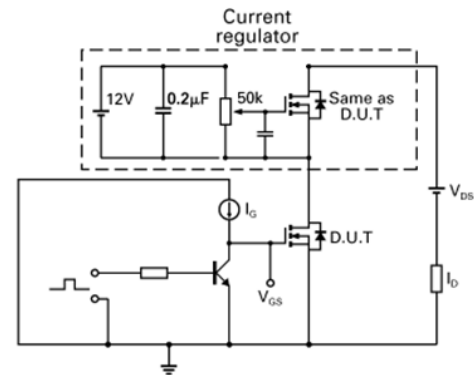
Typical Characteristics (continued)



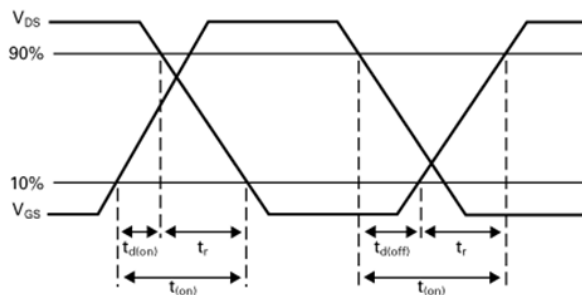
Test Circuits



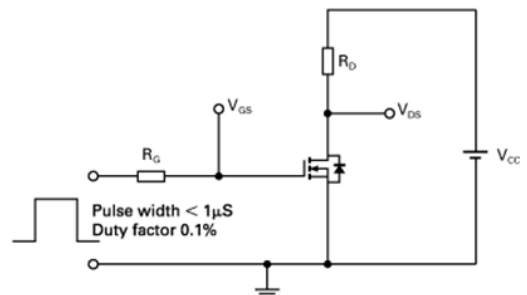
Basic gate charge waveform



Gate charge test circuit



Switching time waveforms

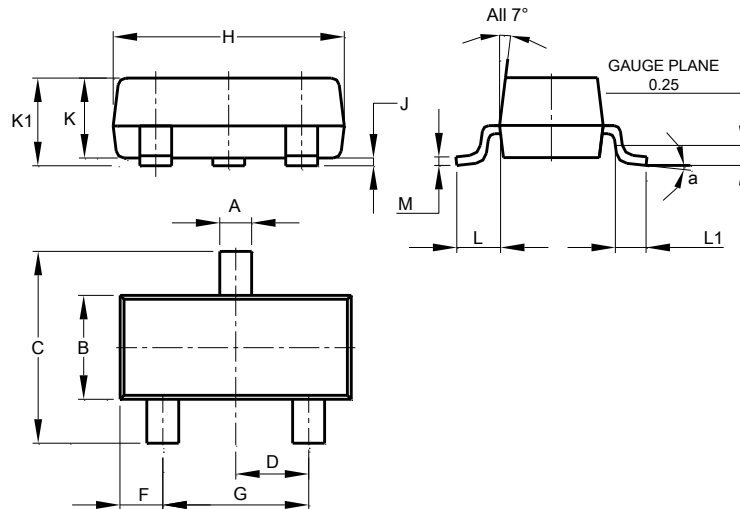


Switching time test circuit

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

SOT23

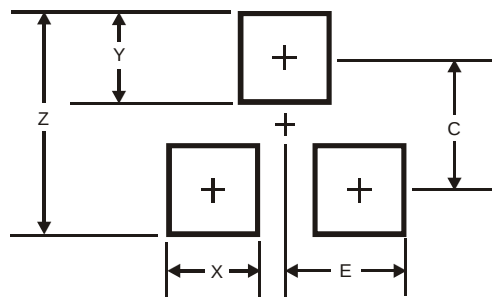


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

SOT23



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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