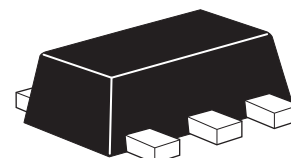


# ZXMN6A07Z

## 60V SOT89 N-channel enhancement mode mosfet

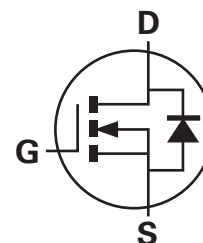
### Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
60	0.250 @ $V_{GS} = 10V$	2.5
	0.350 @ $V_{GS} = 4.5V$	2.1



### Description

This new generation trench MOSFET from Zetex utilizes a unique structure combining the benefits of low on-state resistance with fast switching speed.

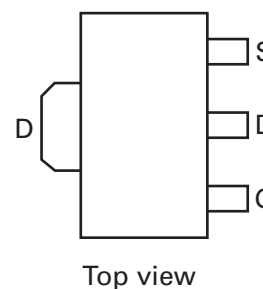


### Features

- Low on-resistance
- Fast switching speed
- Low threshold
- SOT89 package

### Applications

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



### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN6A07ZTA	7	12	1,000

### Device marking

7N6

**Absolute maximum ratings**

Parameter	Symbol	Limit	Unit
Drain-source voltage	$V_{DSS}$	60	V
Gate-source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current @ $V_{GS} = 10V$ ; $T_{amb}=25^{\circ}C^{(b)}$ @ $V_{GS} = 10V$ ; $T_{amb}=70^{\circ}C^{(b)}$ @ $V_{GS} = 10V$ ; $T_{amb}=25^{\circ}C^{(a)}$	$I_D$	2.5 2.0 1.9	A
Pulsed drain current <sup>(c)</sup>	$I_{DM}$	6.8	A
Continuous source current (body diode) <sup>(b)</sup>	$I_S$	3.3	A
Pulsed source current (body diode) <sup>(c)</sup>	$I_{SM}$	6.8	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$	$P_D$	1.5	W
Linear derating factor		12	mW/ $^{\circ}C$
Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$	$P_D$	2.6	W
Linear derating factor		21	mW/ $^{\circ}C$

**Thermal resistance**

Parameter	Symbol	Limit	Unit
Junction to ambient	$R_{\theta JA}$	83.3	$^{\circ}C/W$
Junction to ambient	$R_{\theta JA}$	47.4	$^{\circ}C/W$

**NOTES:**

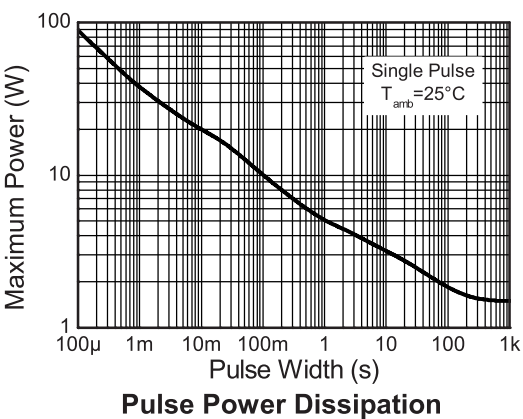
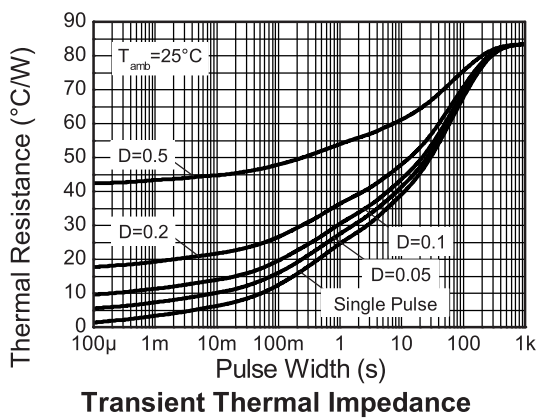
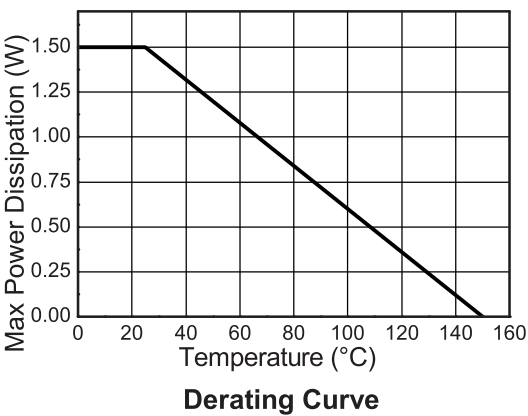
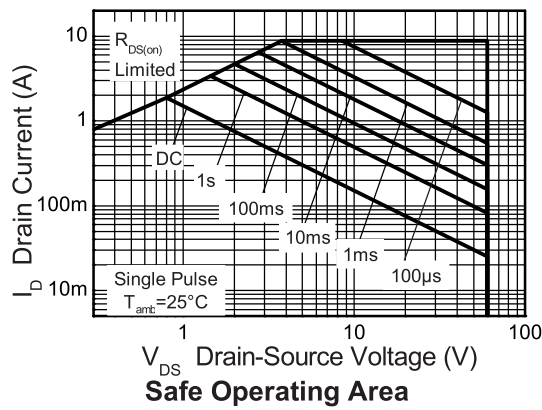
(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) For a device surface mounted on FR4 PCB measured at  $t \leq 10$  sec.

(c) Repetitive rating - 25mm x 25mm FR4 PCB,  $D=0.02$ , pulse width 300 $\mu s$  - pulse width limited by maximum junction temperature.

# ZXMN6A07Z

## Thermal characteristics



# ZXMN6A07Z

## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Static						
Drain-source breakdown voltage	V <sub>(BR)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-body leakage	I <sub>GSS</sub>			100	nA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Gate-source 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-state resistance (*)	R <sub>DS(on)</sub>			0.250	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.8A
				0.350	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 1.3A
Forward transconductance(*)(‡)	g <sub>fs</sub>		2.3		S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 1.8A
Dynamic(‡)						
Input capacitance	C <sub>iss</sub>		166		pF	V <sub>DS</sub> = 40V, V <sub>GS</sub> =0V f=1MHz
Output capacitance	C <sub>Oss</sub>		19.5		pF	
Reverse transfer capacitance	C <sub>rss</sub>		8.7		pF	
Switching (†) (‡)						
Turn-on-delay time	t <sub>d(on)</sub>		1.8		ns	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V I <sub>D</sub> = 1.8A R <sub>G</sub> ≈ 6.0Ω
Rise time	t <sub>r</sub>		1.4		ns	
Turn-off delay time	t <sub>d(off)</sub>		4.9		ns	
Fall time	t <sub>f</sub>		2.0		ns	
Total gate charge	Q <sub>g</sub>		1.65			V <sub>DS</sub> = 30V, V <sub>GS</sub> = 5V I <sub>D</sub> = 1.8A
Total gate charge	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	Q <sub>gs</sub>		0.67		nC	
Gate drain charge	Q <sub>gd</sub>		0.82		nC	
Source-drain diode						
Diode forward voltage(*)	V <sub>SD</sub>		0.80	0.95	V	T <sub>j</sub> =25°C, I <sub>S</sub> = 0.45A, V <sub>GS</sub> =0V
Reverse recovery time(‡)	t <sub>rr</sub>		20.5		ns	T <sub>j</sub> =25°C, I <sub>F</sub> = 1.8A, di/dt=100A/μs
Reverse recovery charge(‡)	Q <sub>rr</sub>		21.3		nC	

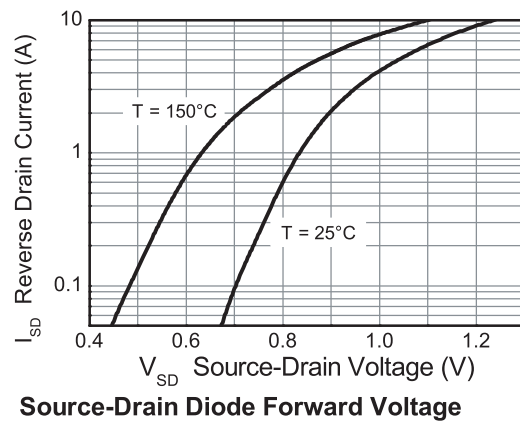
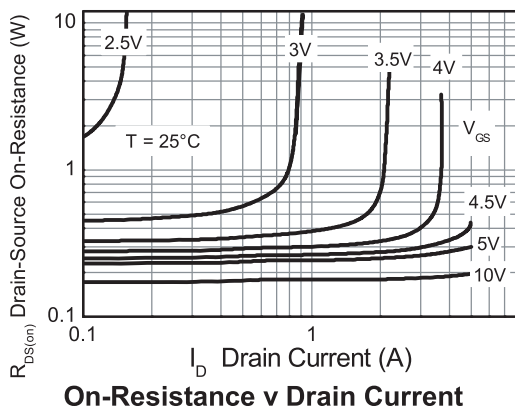
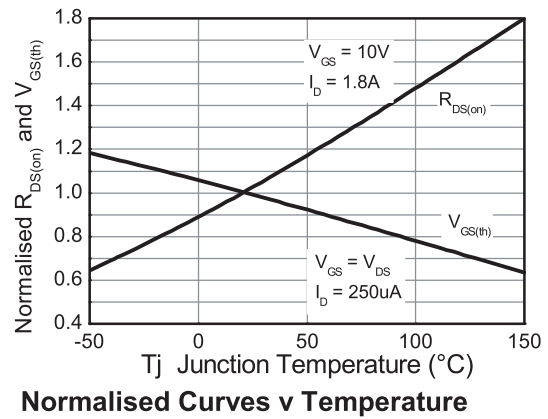
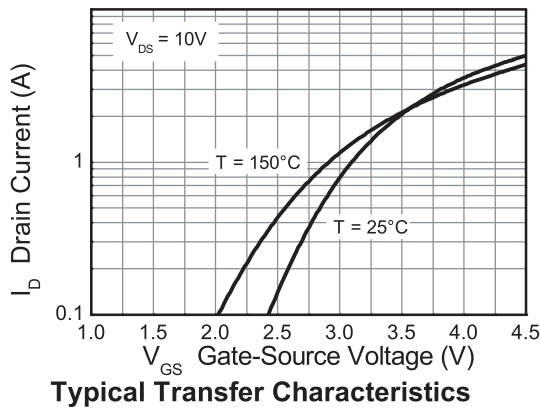
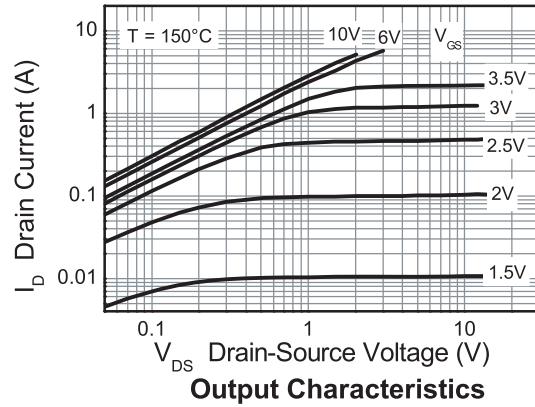
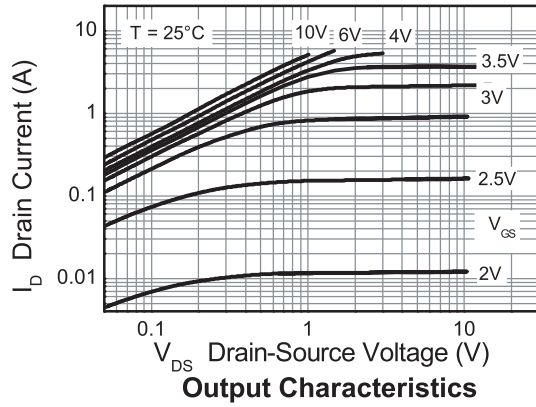
### NOTES:

(\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

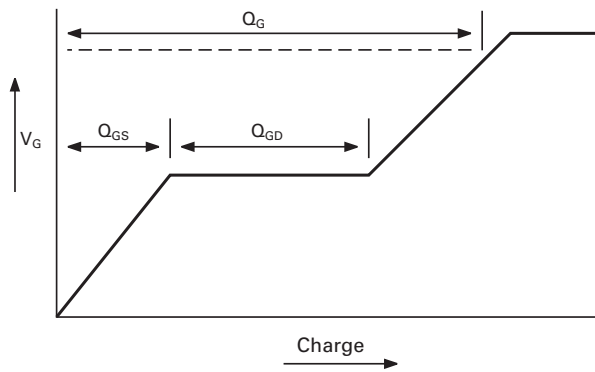
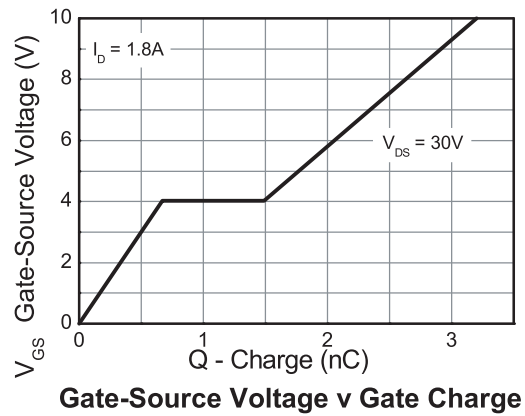
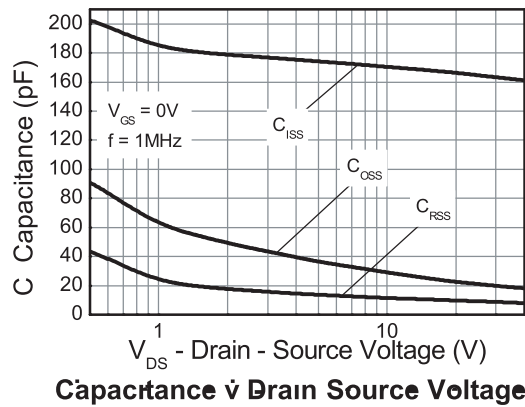
(†) Switching characteristics are independent of operating junction temperature.

(‡) For design aid only, not subject to production testing.

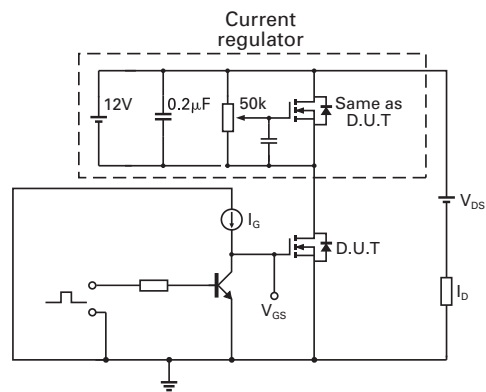
## Typical characteristics



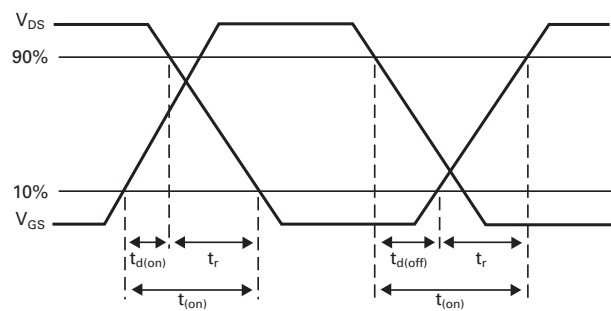
Typical characteristics



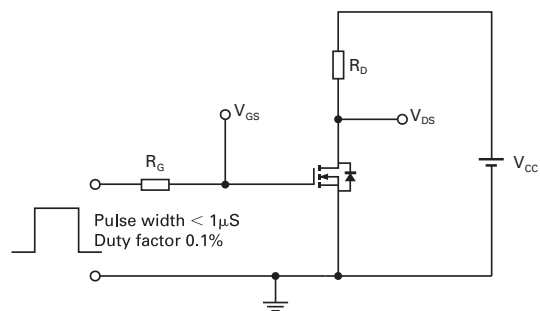
Basic gate charge waveform



Gate charge test circuit



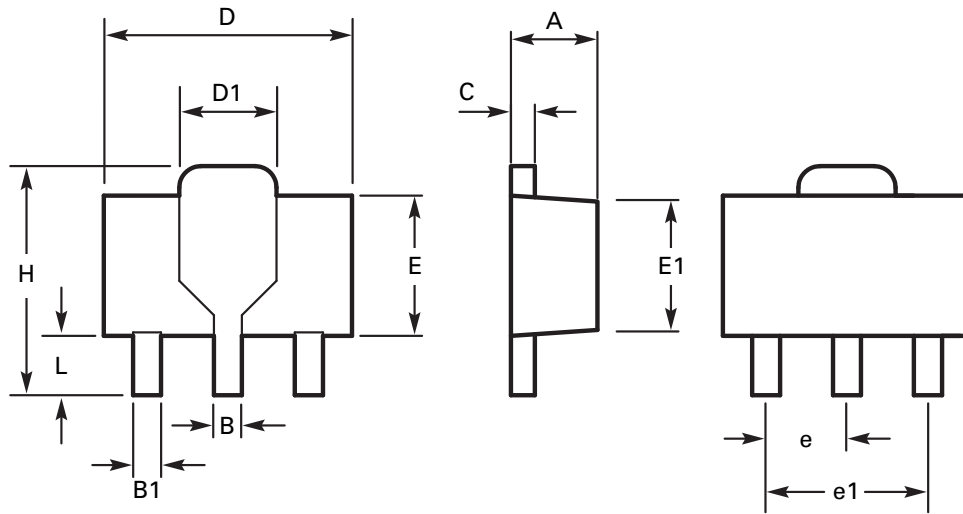
Switching time waveforms



Switching time test circuit

# ZXMN6A07Z

## Package outline - SOT89



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.40	1.60	0.550	0.630	E	2.29	2.60	0.090	0.102
B	0.44	0.56	0.017	0.022	E1	2.13	2.29	0.084	0.090
B1	0.36	0.48	0.014	0.019	e	1.50 BSC		0.059 BSC	
C	0.35	0.44	0.014	0.017	e1	3.00 BSC		0.118 BSC	
D	4.40	4.60	0.173	0.181	H	3.94	4.25	0.155	0.167
D1	1.62	1.83	0.064	0.072	L	0.89	1.20	0.035	0.047

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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