100V N-CHANNEL ENHANCEMENT MODE MOSFET IN SOT89 PACKAGE

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D max T_A = 25°C (Note 6)
100V	700mΩ @ V_{GS} = 10V	1.4A
	900mΩ @ V_{GS} = 6V	1.2A

Features and Benefits

- Low On-Resistance
- Low Threshold
- Fast Switching Speed
- Low Gate Drive
- **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**

Description and Applications

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.

- DC-DC Converters
- Power Management functions
- Motor control
- Disconnect switches

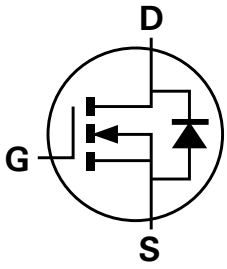
Mechanical Data

- Case: SOT89
- 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
- Weight: 0.052 grams (approximate)

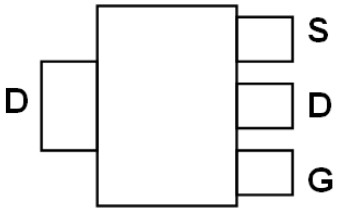
SOT89



Top View



Device symbol



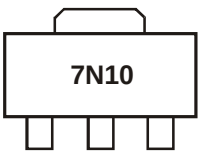
Top View
Pin-Out

Ordering Information (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN10A07ZTA	7N10	7	12	1,000

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. For packaging details, go to our website at http://www.diodes.com

Marking Information



7N10 = Product type Marking Code

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Maximum Ratings @T_A = 25°C unless otherwise specified

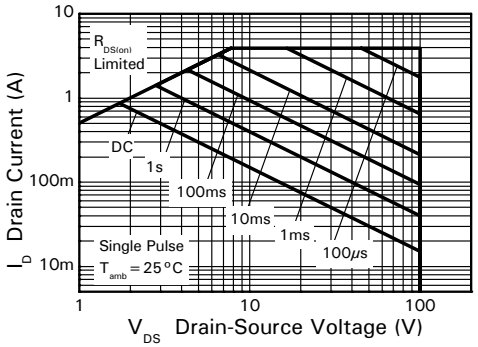
Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	100	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current	Steady State	@ V_{GS} = 10V; T_A = 25°C (Note 6) @ V_{GS} = 10V; T_A = 70°C (Note 6) @ V_{GS} = 10V; T_A = 25°C (Note 5)	I_D	1.4 1.1 1.0	A
Pulsed Drain Current (Note 7)			I_{DM}	4.2	A
Continuous Source Current (Body Diode) (Note 6)			I_S	2.1	A
Pulsed Source Current (Body Diode) (Note 7)			I_{SM}	4.2	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

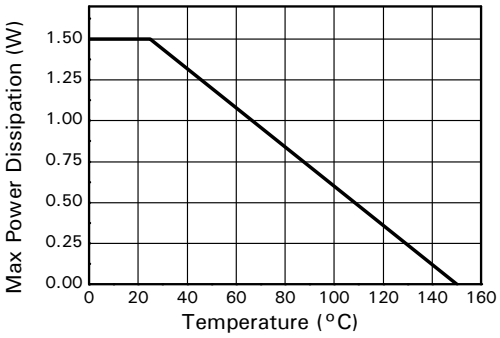
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5) Linear Derating Factor	P_D	1.5 12	W mW/°C
Power Dissipation (Note 6) Linear Derating Factor	P_D	2.6 21	W mW/°C
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	83.3	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	47.4	°C/W
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	6.36	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For a device surface mounted on FR4 PCB measured at t ≤ 10 sec.
7. Repetitive rating - 25mm x 25mm FR4 PCB, D = 0.02, pulse width 300µs – pulse width limited by maximum junction temperature.
8. Thermal resistance from junction to solder-point (at the end of the drain lead).

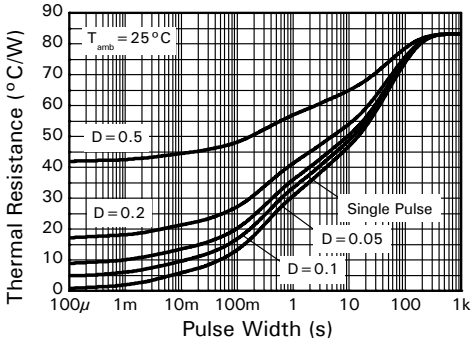
Thermal Characteristics



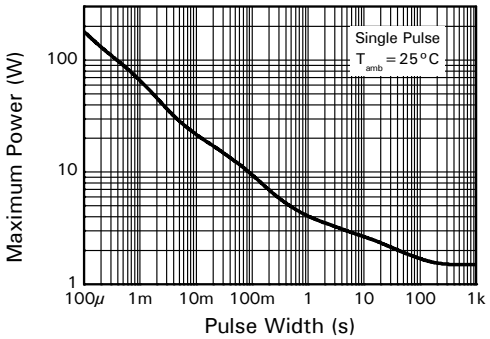
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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Electrical Characteristics @T_A = 25°C unless otherwise specified

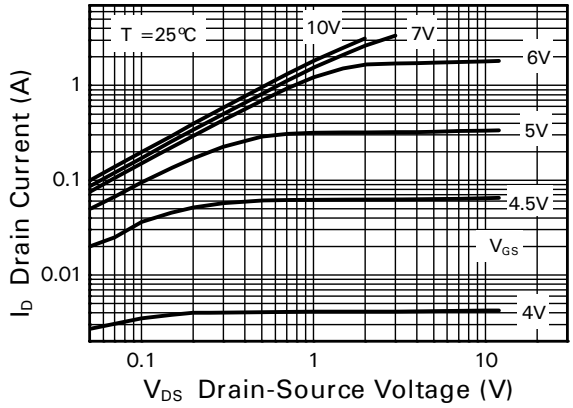
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	100	-	-	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	1.0	µA	V_{DS} = 100V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	2	-	4	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance (Note 9)	$R_{DS\ (ON)}$	-	-	700	mΩ	V_{GS} = 10V, I_D = 1.5A
			-	900		V_{GS} = 6V, I_D = 1A
Forward Transconductance (Note 9 & 11)	g_{FS}	-	1.6	-	S	V_{DS} = 15V, I_D = 1A
Diodes Forward Voltage (Note 9)	V_{SD}	-	0.85	0.95	V	T_J = 25°C, I_S = 1.5A, V_{GS} = 0V
DYNAMIC CHARACTERISTICS						
Input Capacitance (Note 10 & 11)	C_{iss}	-	138	-	pF	V_{DS} = 50V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance (Note 10 & 11)	C_{oss}	-	12	-	pF	
Reverse Transfer Capacitance (Note 10 & 11)	C_{rss}	-	6	-	pF	
Gate Resistance (Note 10 & 11)	R_g	1.8	-	2.6	Ω	f = 1MHz, V_{GS} = 0V, V_{DS} = 0V
Total Gate Charge (Note 10 & 11)	Q_g	-	2.9	-	nC	V_{GS} = 10V, V_{DS} = 50V, I_D = 1A
Gate-Source Charge (Note 10 & 11)	Q_{gs}	-	0.7	-	nC	
Gate-Drain Charge (Note 10 & 11)	Q_{gd}	-	1	-	nC	
Reverse Recovery Time (Note 11)	t_{rr}		27		ns	T_J = 25°C, I_F = 1A, di/dt = 100A/µs
Reverse Recovery Charge (Note 11)	Q_{rr}		12		nC	
Turn-On Delay Time (Note 10 & 11)	$t_{D(on)}$	-	1.8	-	ns	V_{GS} = 10V, V_{DD} = 50V, R_G = 6Ω , I_D = 1A
Turn-On Rise Time (Note 10 & 11)	t_r	-	1.5	-	ns	
Turn-Off Delay Time (Note 10 & 11)	$t_{D(off)}$	-	4.1	-	ns	
Turn-Off Fall Time (Note 10 & 11)	t_f	-	2.1	-	ns	

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.

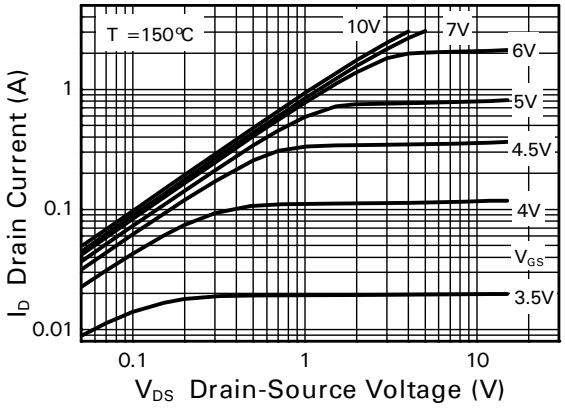
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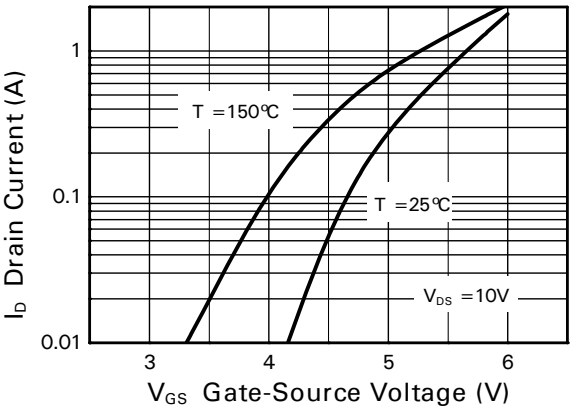
Typical Characteristics



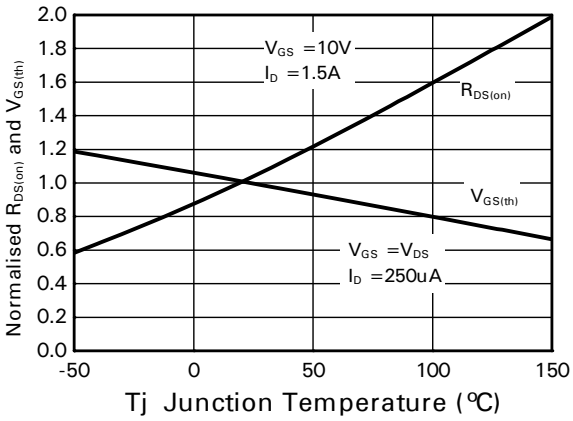
Output Characteristics



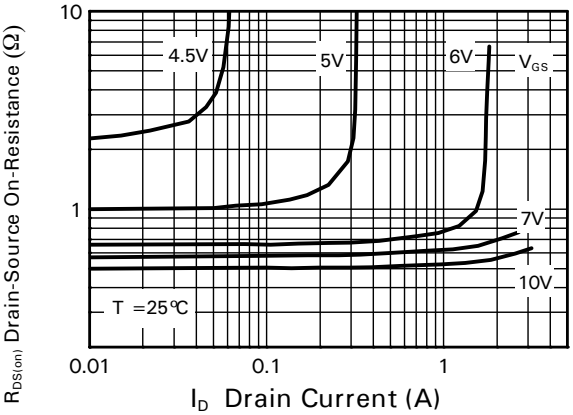
Output Characteristics



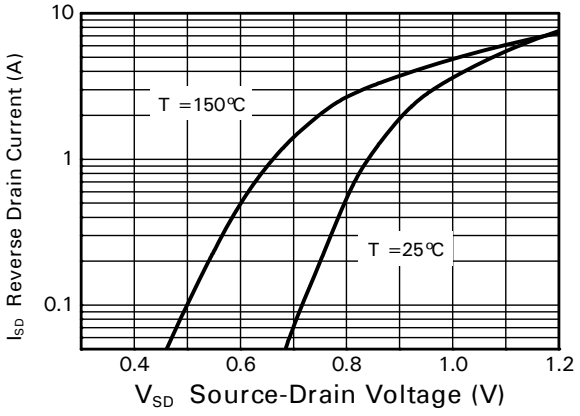
Typical Transfer Characteristics



Normalised Curves v Temperature



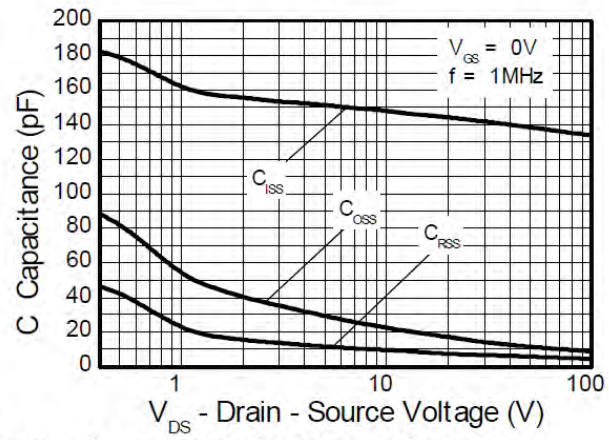
On-Resistance v Drain Current



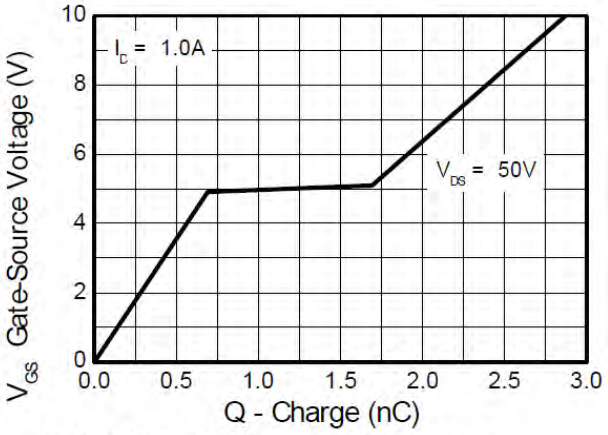
Source-Drain Diode Forward Voltage

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Typical Characteristics - Continued

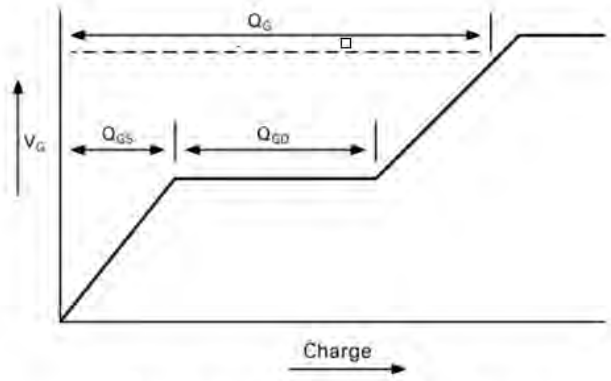


Capacitance v Drain-Source Voltage

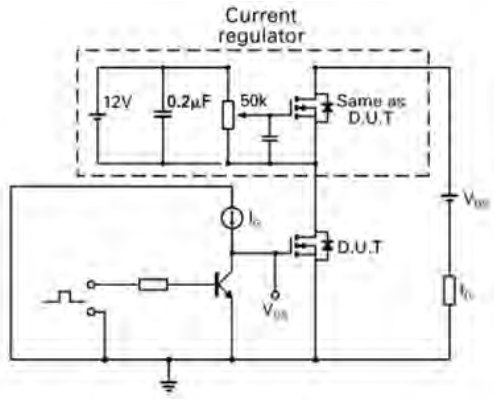


Gate-Source Voltage v Gate Charge

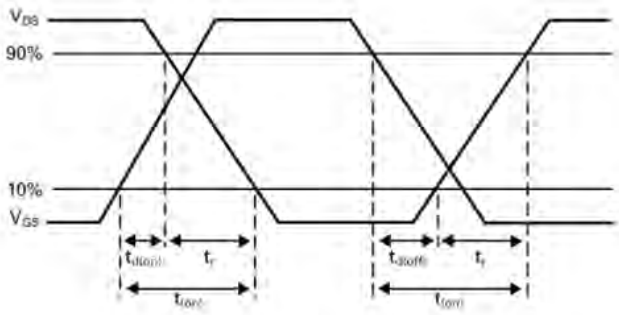
Test Circuits



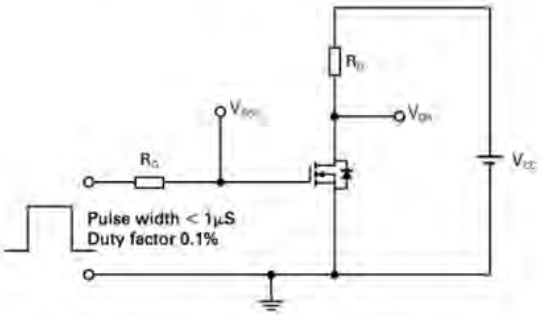
Basic gate charge waveform



Gate charge test circuit



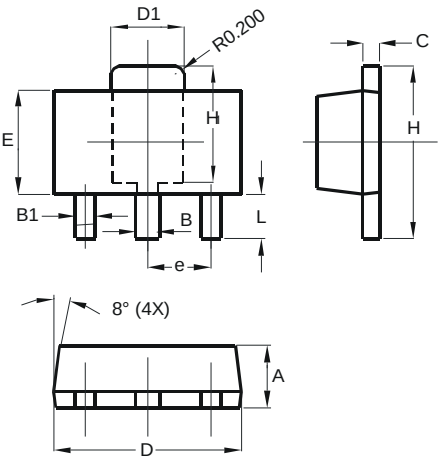
Switching time waveforms



Switching time test circuit

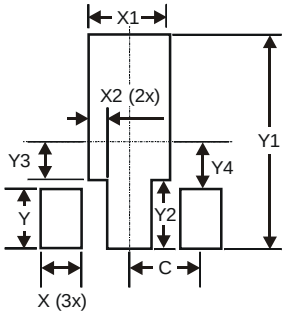
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Package Outline Dimensions



SOT89		
Dim	**Min**	**Max**
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20
All Dimensions in mm		

Suggested Pad Layout



Dimensions	Value (in mm)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500

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