

100V N-CHANNEL ENHANCEMENT MODE MOSFET IN SOT89 PACKAGE

Product Summary

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

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.

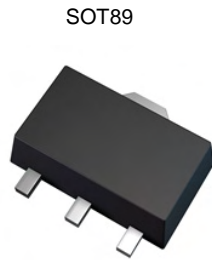
- DC-DC Converters
- Power Management functions
- Motor control
- Disconnect switches

Features and Benefits

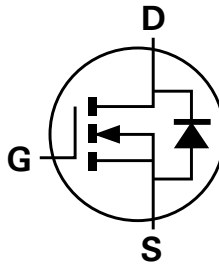
- Low On-Resistance
- Low Threshold
- Fast Switching Speed
- Low Gate Drive
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

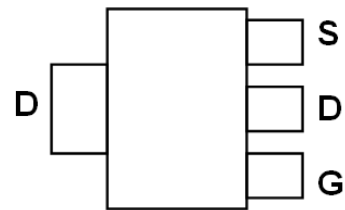
- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.052 grams (approximate)



Top View



Device symbol



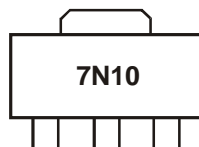
Top View
Pin-Out

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

Maximum Ratings @T_A = 25°C unless otherwise specified

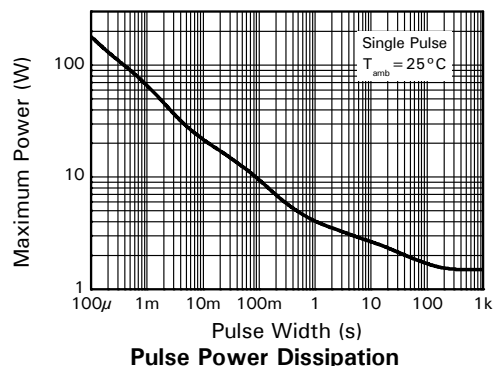
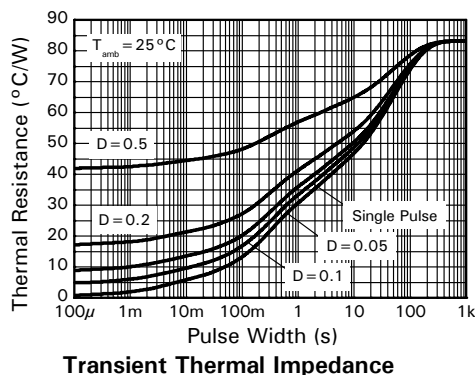
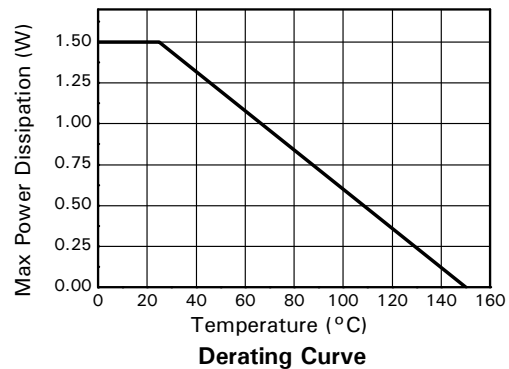
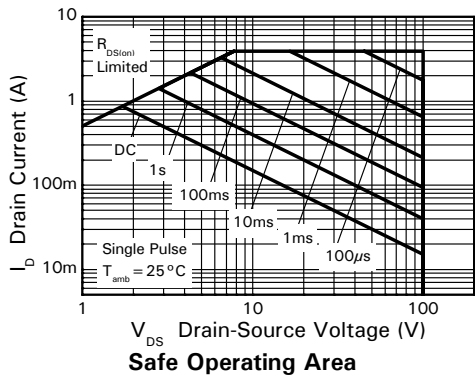
Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V _{DSS}	100	V
Gate-Source Voltage		V _{GSS}	±20	V
Continuous Drain Current	Steady State	@ V _{GS} = 10V; T _A = 25°C (Note 6)	1.4	A
		@ V _{GS} = 10V; T _A = 70°C (Note 6)	1.1	
		@ V _{GS} = 10V; T _A = 25°C (Note 5)	1.0	
Pulsed Drain Current (Note 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)		P _D	1.5	W
Linear Derating Factor			12	mW/°C
Power Dissipation (Note 6)		P _D	2.6	W
Linear Derating Factor			21	mW/°C
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	83.3	°C/W
Thermal Resistance, Junction to Ambient (Note 6)		R _{θJA}	47.4	°C/W
Thermal Resistance, Junction to Leads (Note 8)		R _{θJL}	6.36	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-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 ≤ 10 sec.
 - Repetitive rating - 25mm x 25mm FR4 PCB, D = 0.02, pulse width 300µs – pulse width limited by maximum junction temperature.
 - Thermal resistance from junction to solder-point (at the end of the drain lead).

Thermal Characteristics



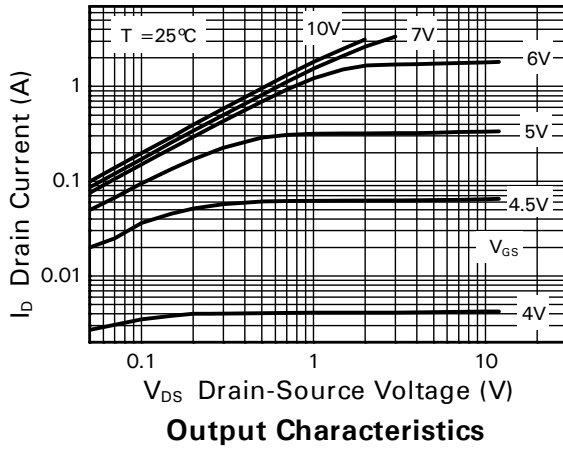
Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	100	-	-	V	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	

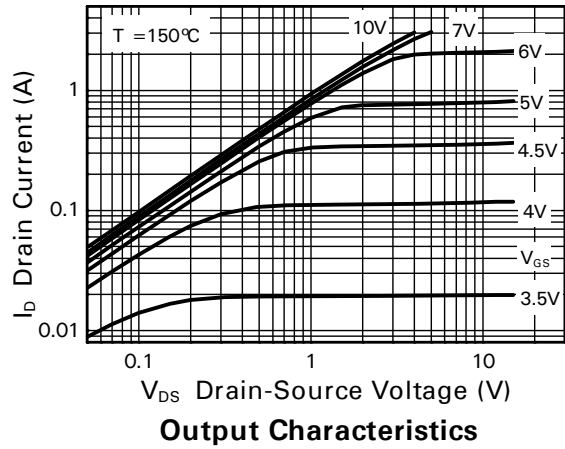
- Notes:
- 9. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
 - 10. Switching characteristics are independent of operating junction temperature.
 - 11. For design aid only, not subject to production testing.

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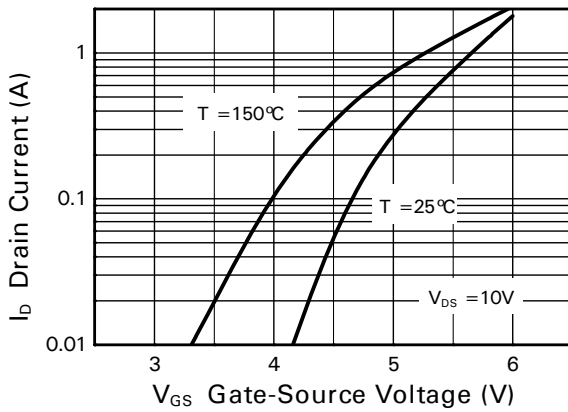
Typical Characteristics



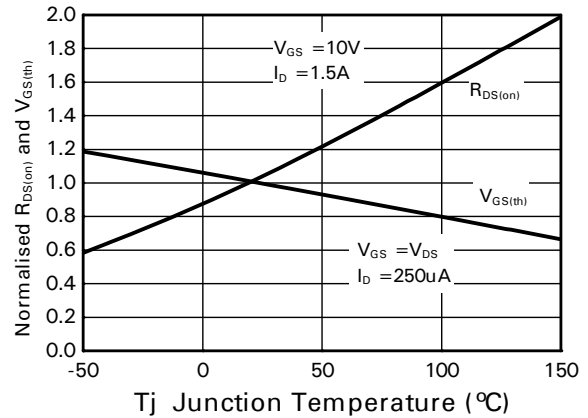
Output Characteristics



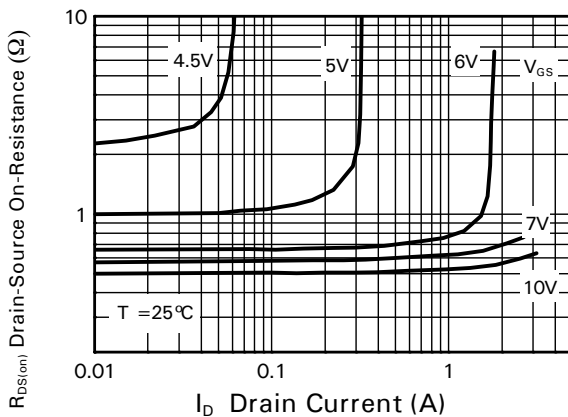
Output Characteristics



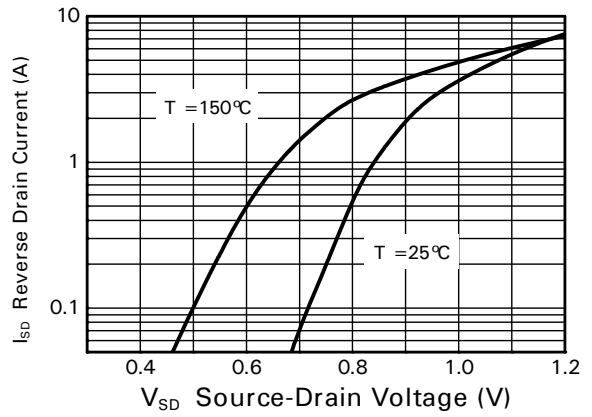
Typical Transfer Characteristics



Normalised Curves v Temperature

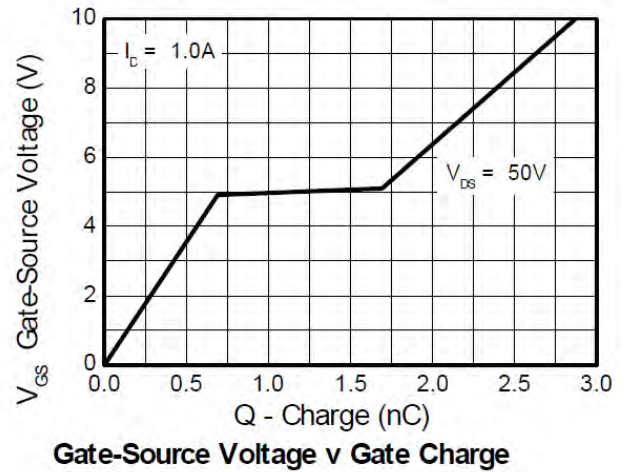
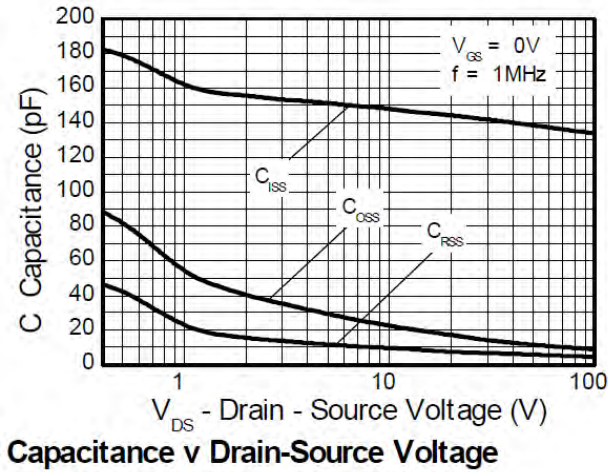


On-Resistance v Drain Current

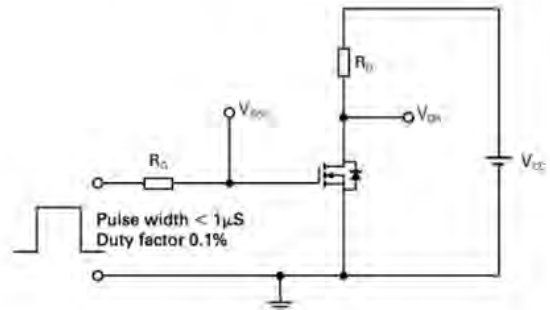
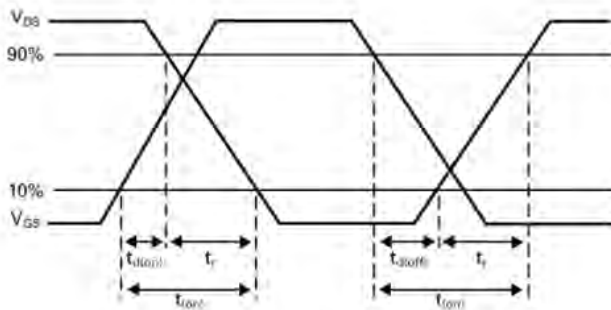
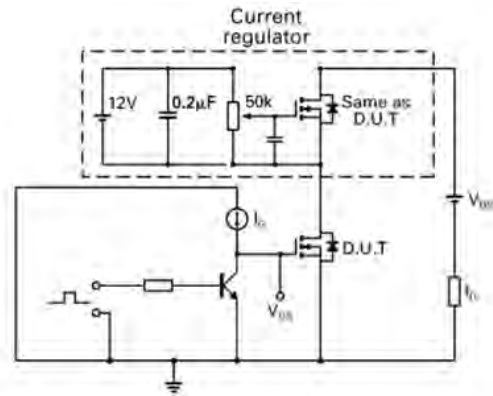
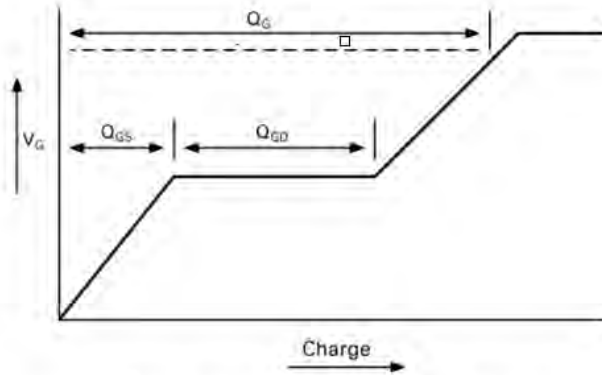


Source-Drain Diode Forward Voltage

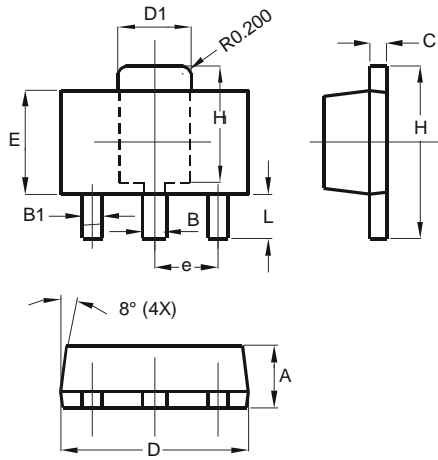
Typical Characteristics - Continued



Test Circuits

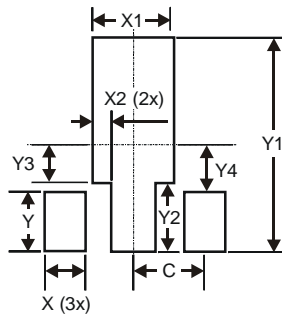


Package Outline Dimensions



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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