

**30V N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

BV <sub>DSS</sub>	Max R <sub>DS(on)</sub>	Max I <sub>D</sub> T <sub>A</sub> = 25°C (Note 4)
30V	65mΩ @ V <sub>GS</sub> = 10V	3.2A
	95mΩ @ V <sub>GS</sub> = 4.5V	2.6A

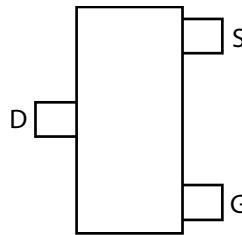
**Description and Applications**

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

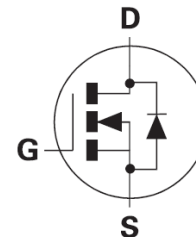
- DC - DC converters
- Power management functions
- Disconnect switches
- Motor control



Top View



Top View  
Pin Out



Equivalent Circuit

**Features and Benefits**

- Low on-resistance
- Fast switching speed
- Low gate charge
- Low threshold
- **Totally Lead-Free & Fully RoHS compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

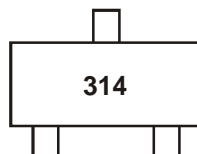
- Case: SOT23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper leadframe Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

**Ordering Information** (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN3A14FTA	314	7	8	3000 Units

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  3. For more packaging details, go to our website at <http://www.diodes.com>.

**Marking Information**



314 = Product Type Marking Code

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

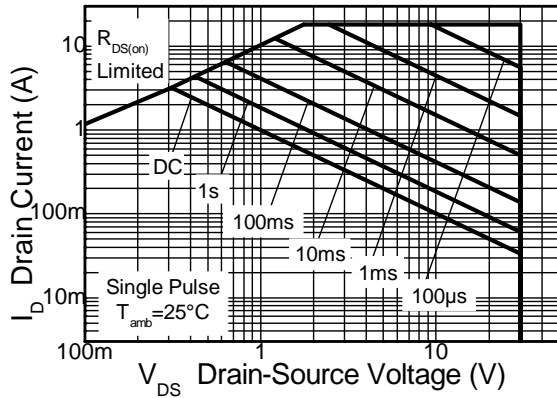
Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$V_{GS} = 10\text{V}$	$T_A = 70^\circ\text{C}$ (Note 5)	$I_D$	3.9	A
		(Note 5)		3.2	
		(Note 4)		3.2	
Pulsed Drain Current (Note 6)			$I_{DM}$	18	A
Continuous Source Current (Body Diode) (Note 5)			$I_S$	2.3	A
Pulsed Source Current (Body Diode) (Note 6)			$I_{SM}$	18	A

**Thermal Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

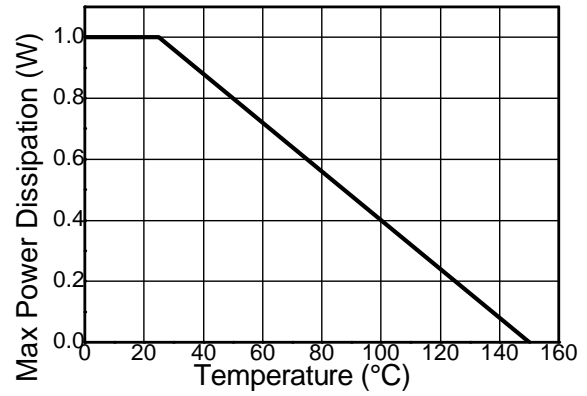
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	$P_D$	1	W
Linear Derating Factor		8	mW/ $^\circ\text{C}$
Power Dissipation (Note 5)	$P_D$	1.5	W
Linear Derating Factor		12	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	83	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Leads (Note 7)	$R_{\theta JL}$	70.44	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

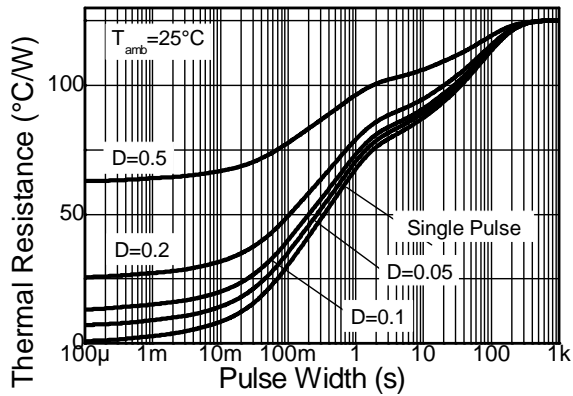
**Thermal Characteristics**



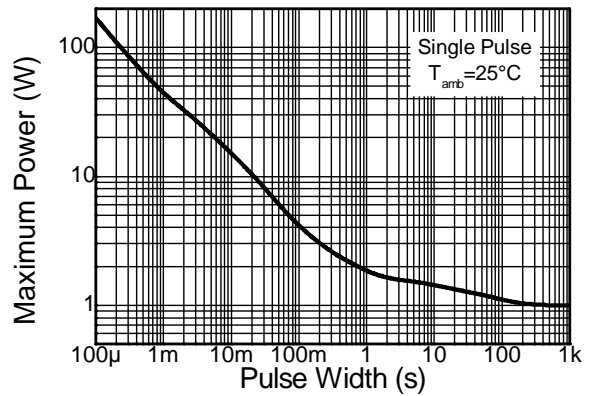
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



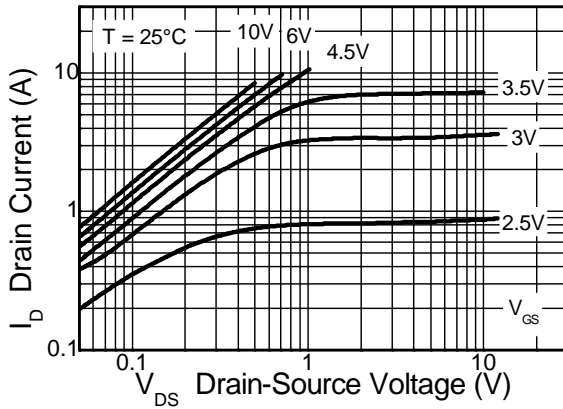
**Pulse Power Dissipation**

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

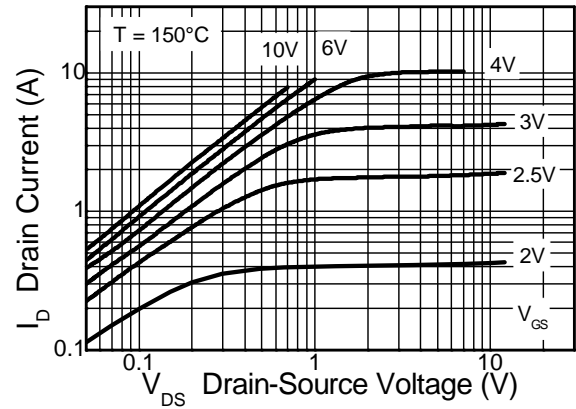
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	—	2.2	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 8)	R <sub>DS(on)</sub>	—	48	65	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.2A
			69	95		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.6A
Forward Transconductance (Notes 8 and 10)	g <sub>fs</sub>	—	7.1	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 3.2A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	0.85	0.95	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 2.5A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 10)	t <sub>rr</sub>	—	13	—	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 1.6A,
Reverse Recovery Charge (Note 10)	Q <sub>rr</sub>	—	7	—	nC	di/dt = 100A/μs
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	C <sub>iss</sub>	—	448	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	82	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	49	—		
Turn-On Delay Time (Note 9)	t <sub>D(on)</sub>	—	2.4	—	ns	V <sub>DD</sub> = 15V, I <sub>D</sub> = 1A, R <sub>G</sub> ≅ 6.0Ω, V <sub>GS</sub> = 10V
Turn-On Rise Time (Note 9)	t <sub>r</sub>	—	2.5	—		
Turn-Off Delay Time (Note 9)	t <sub>D(off)</sub>	—	13.1	—		
Turn-Off Fall Time (Note 9)	t <sub>f</sub>	—	5.3	—	nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.2A
Total Gate Charge (Note 9)	Q <sub>g</sub>	—	8.6	—		
Gate-Source Charge (Note 9)	Q <sub>gs</sub>	—	1.4	—		
Gate-Drain Charge (Note 9)	Q <sub>gd</sub>	—	1.8	—		

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

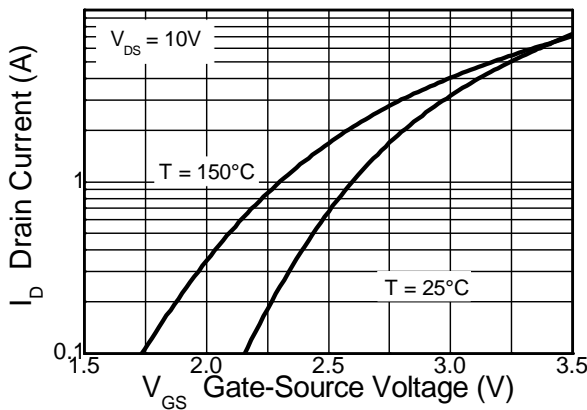
**Typical Characteristics**



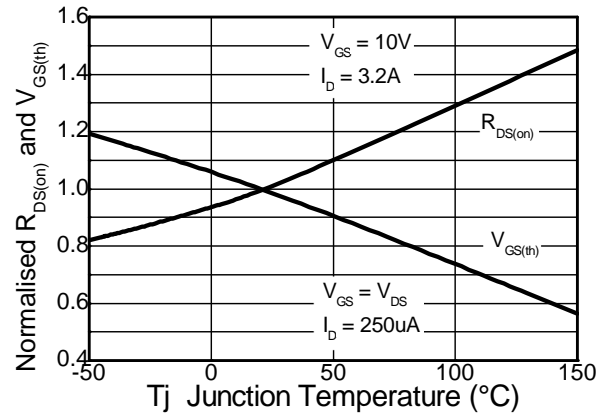
**Output Characteristics**



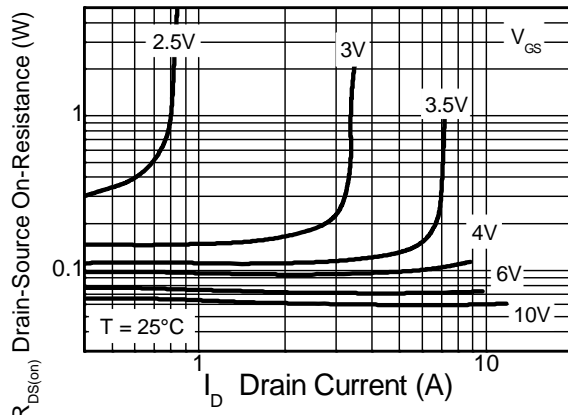
**Output Characteristics**



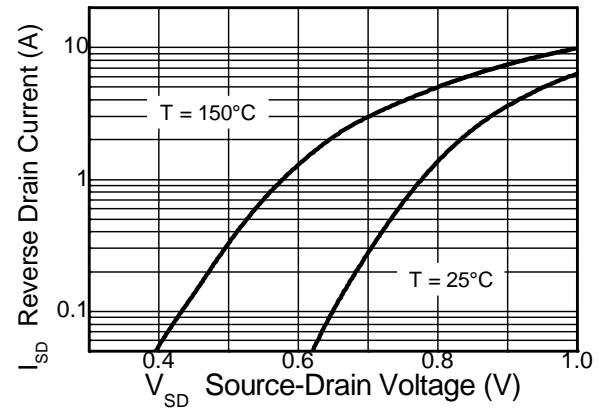
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**

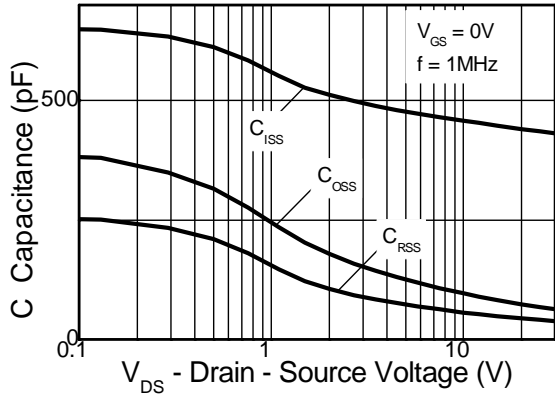


**On-Resistance v Drain Current**

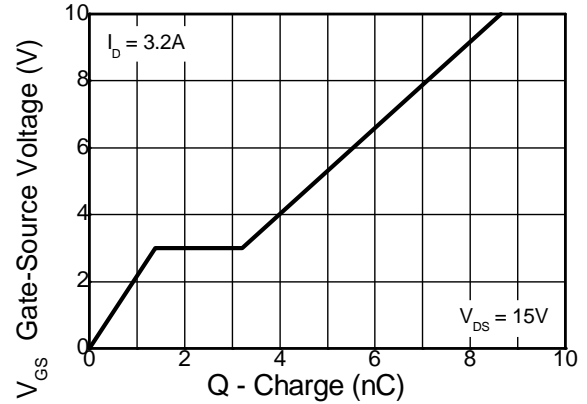


**Source-Drain Diode Forward Voltage**

**Typical Characteristics - continued**

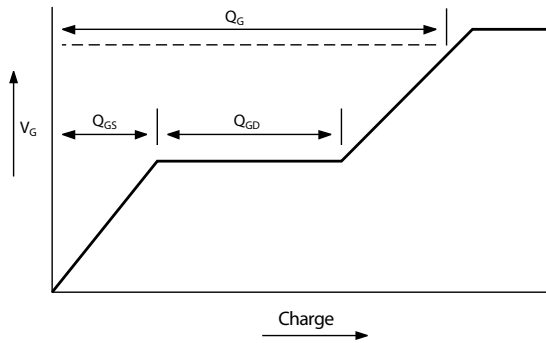


**Capacitance v Drain-Source Voltage**

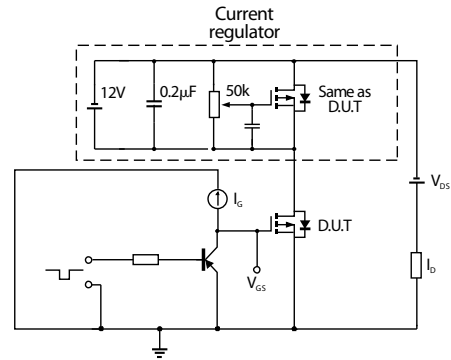


**Gate-Source Voltage v Gate Charge**

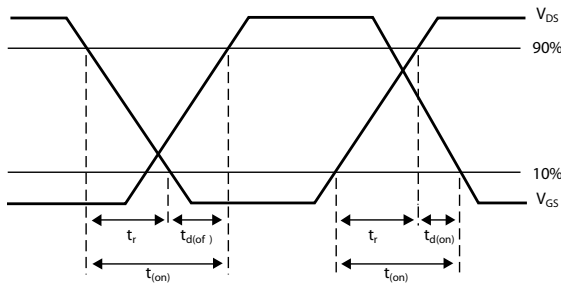
**Test Circuits**



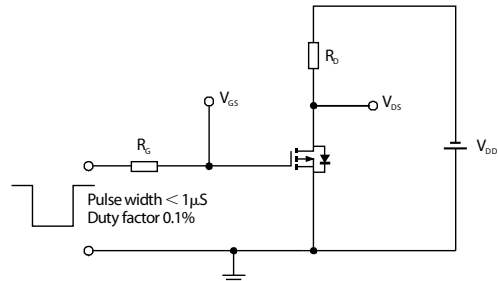
**Basic gate charge waveform**



**Gate charge test circuit**

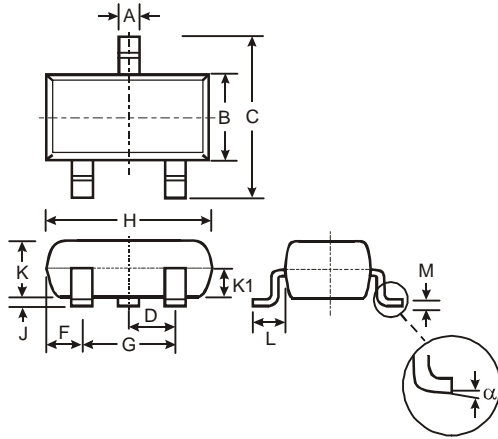


**Switching time waveforms**



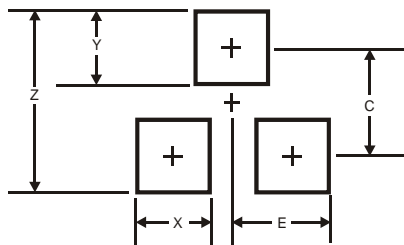
**Switching time test circuit**

**Package Outline Dimensions**



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**



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

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А