

30V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| BV _{DSS} | Max R _{DS(on)} | Max I _D T _A = 25°C (Note 4) |
|-------------------|-------------------------------|---|
| 30V | 65mΩ @ V _{GS} = 10V | 3.2A |
| | 95mΩ @ V _{GS} = 4.5V | 2.6A |

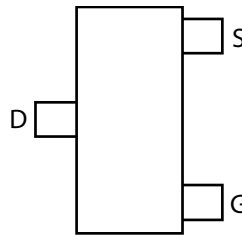
Description and Applications

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.

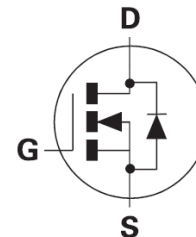
- DC - DC converters
- Power management functions
- Disconnect switches
- Motor control



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

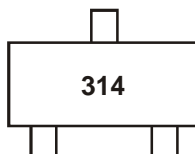
- Case: SOT23
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Copper leadframe Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)

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

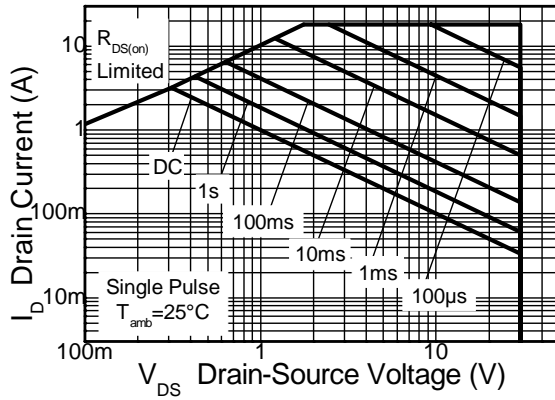
| Characteristic | | | Symbol | Value | Units |
|---|-----------------------|-----------------------------------|-----------|----------|-------|
| Drain-Source Voltage | | | V_{DSS} | 30 | V |
| Gate-Source Voltage | | | V_{GS} | ± 20 | V |
| Continuous Drain Current | $V_{GS} = 10\text{V}$ | $T_A = 70^\circ\text{C}$ (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

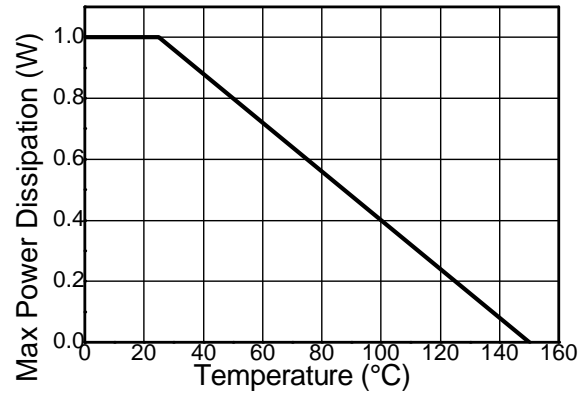
| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 4) | P_D | 1 | W |
| Linear Derating Factor | | 8 | mW/ $^\circ\text{C}$ |
| Power Dissipation (Note 5) | P_D | 1.5 | W |
| Linear Derating Factor | | 12 | mW/ $^\circ\text{C}$ |
| 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 μs - pulse current limited by maximum junction temperature.
 7. Thermal resistance from junction to solder-point (at the end of the drain lead).

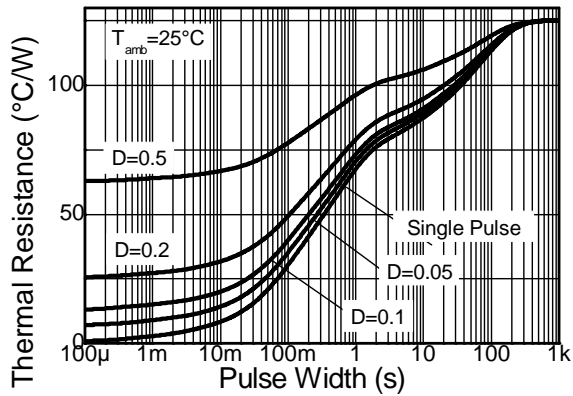
Thermal Characteristics



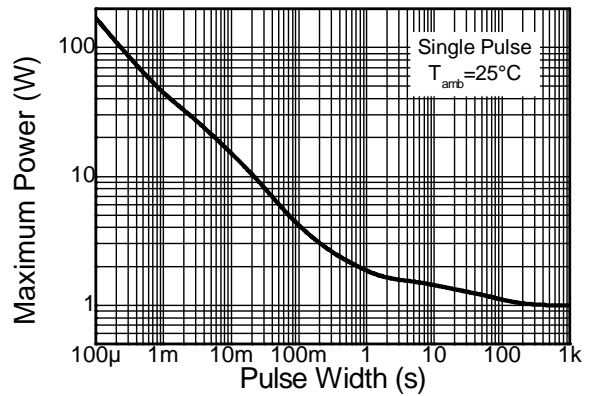
Safe Operating Area



Derating Curve



Transient Thermal Impedance



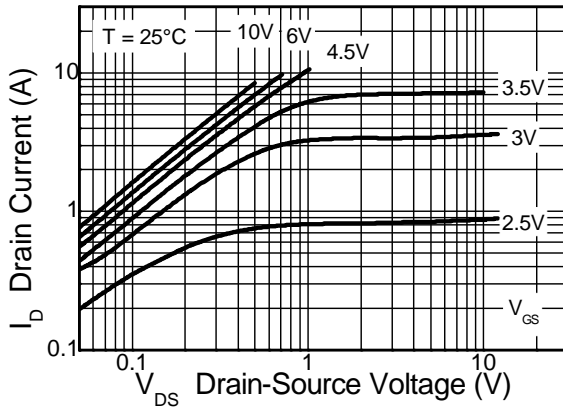
Pulse Power Dissipation

Electrical Characteristics @T_A = 25°C unless otherwise specified

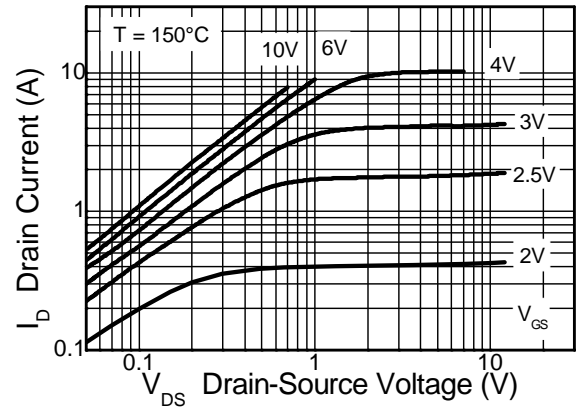
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|------|------|------|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | — | — | V | I _D = 250μA, V _{GS} = 0V |
| Zero Gate Voltage Drain Current | I _{DSS}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

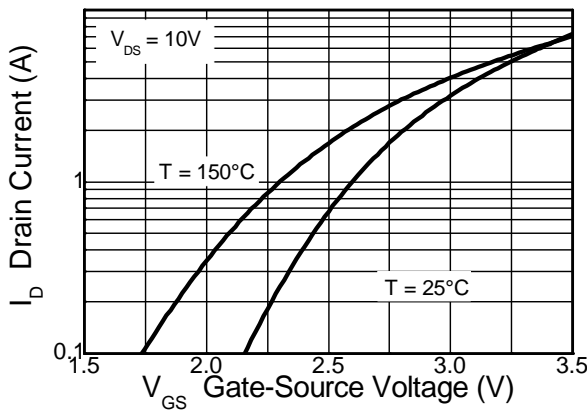
Typical Characteristics



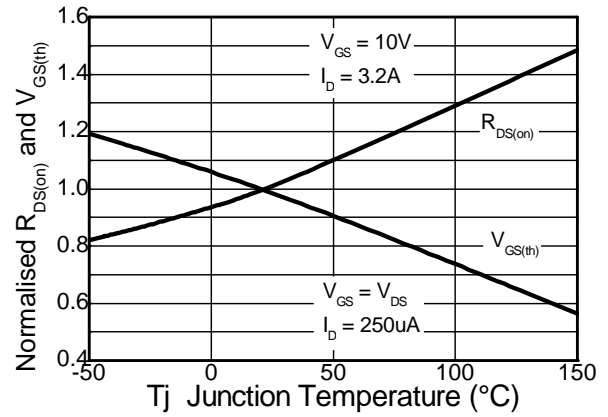
Output Characteristics



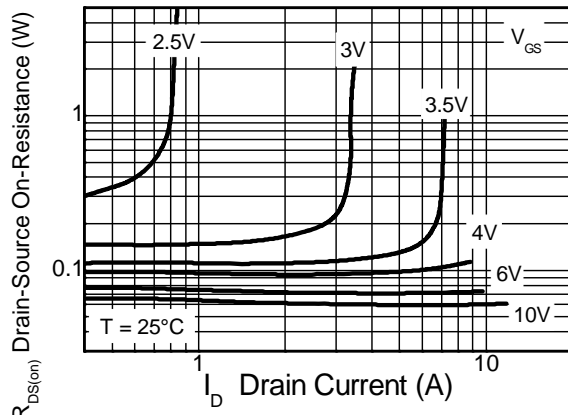
Output Characteristics



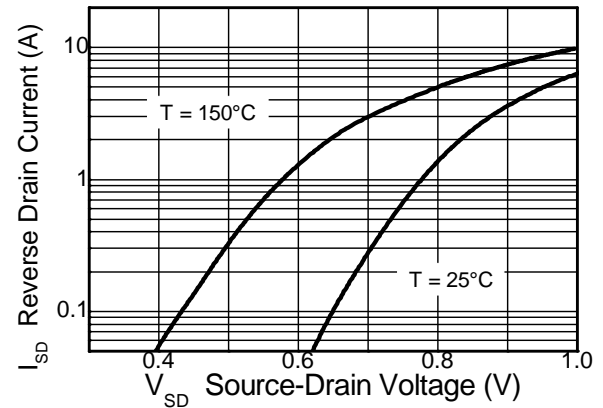
Typical Transfer Characteristics



Normalised Curves v Temperature

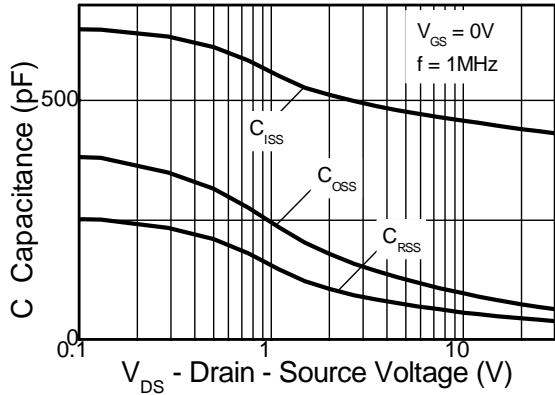


On-Resistance v Drain Current

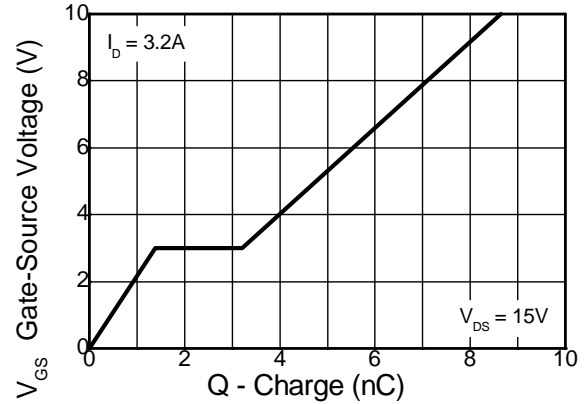


Source-Drain Diode Forward Voltage

Typical Characteristics - continued

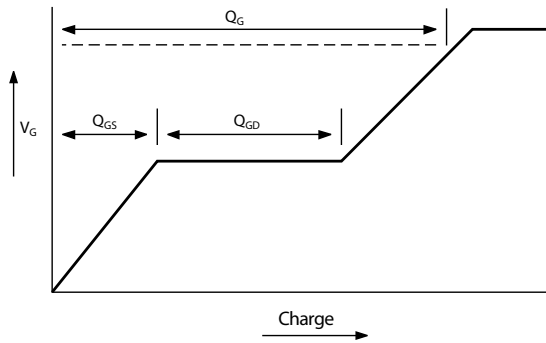


Capacitance v Drain-Source Voltage

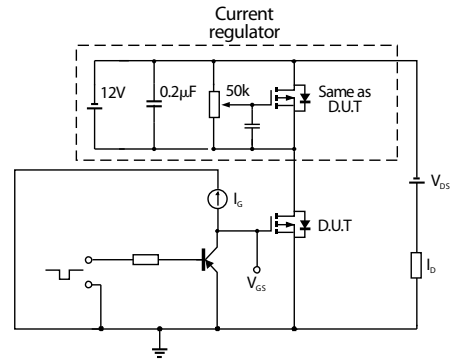


Gate-Source Voltage v Gate Charge

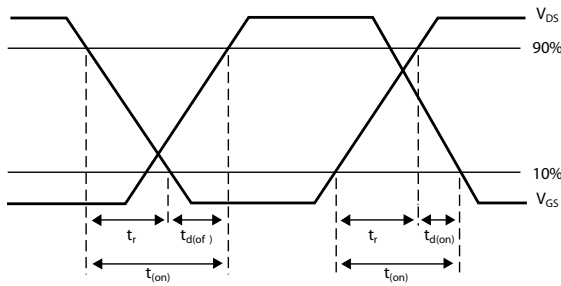
Test Circuits



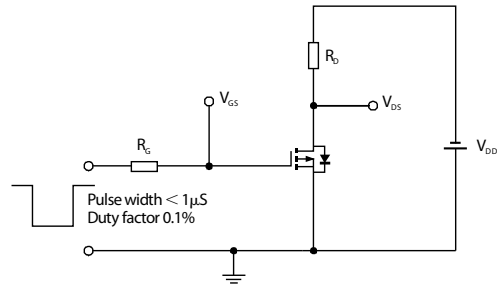
Basic gate charge waveform



Gate charge test circuit

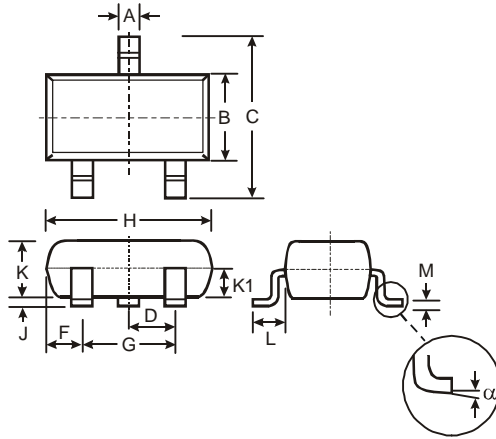


Switching time waveforms



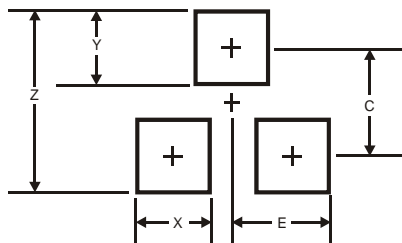
Switching time test circuit

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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