



General Description

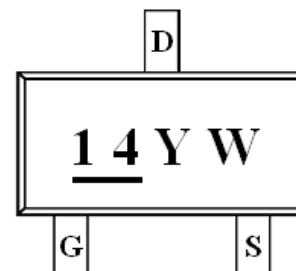
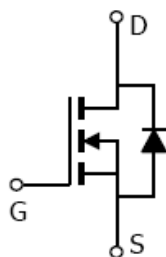
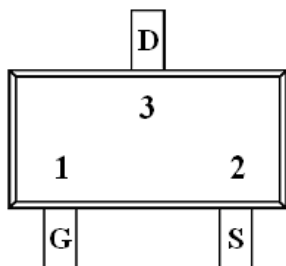
AFN3414, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent $R_{DS(ON)}$, low gate charge.

These devices are particularly suited for low voltage power management, such as smart phone and notebook computer and other battery powered circuits, and low in-line power loss are needed in commercial industrial surface mount applications.

Features

- 20V/3.6A, $R_{DS(ON)}=58m\Omega@V_{GS}=4.5V$
- 20V/3.2A, $R_{DS(ON)}=68m\Omega@V_{GS}=2.5V$
- 20V/2.8A, $R_{DS(ON)}=88m\Omega@V_{GS}=1.8V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-23-3L package design

Pin Description (SOT-23-3L)



Application

- Portable Equipment
- Battery Powered System
- Net Working System

Pin Define

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1 | G | Gate |
| 2 | S | Source |
| 3 | D | Drain |

Ordering Information

| Part Ordering No. | Part Marking | Package | Unit | Quantity |
|-------------------|--------------|-----------|-------------|----------|
| AFN3414S23RG | 14YW | SOT-23-3L | Tape & Reel | 3000 EA |

- ※ 14 parts code
- ※ Y year code (0 ~ 9)
- ※ W week code (A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52)
- ※ AFN3414S23RG : 7" Tape & Reel ; Pb- Free ; Halogen- Free



Absolute Maximum Ratings

($T_A=25^\circ\text{C}$ Unless otherwise noted)

| Parameter | Symbol | Typical | Unit |
|---|-----------------|------------------------|--------------------|
| Drain-Source Voltage | V_{DSS} | 20 | V |
| Gate –Source Voltage | V_{GSS} | ± 12 | V |
| Continuous Drain Current($T_J=150^\circ\text{C}$) | I_D | $T_A=25^\circ\text{C}$ | 3.6 |
| | | $T_A=70^\circ\text{C}$ | 2.6 |
| Pulsed Drain Current | I_{DM} | 10 | A |
| Continuous Source Current(Diode Conduction) | I_S | 1.6 | A |
| Power Dissipation | P_D | $T_A=25^\circ\text{C}$ | 1.25 |
| | | $T_A=70^\circ\text{C}$ | 0.8 |
| Operating Junction Temperature | T_J | 150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -55/150 | $^\circ\text{C}$ |
| Thermal Resistance-Junction to Ambient | $R_{\theta JA}$ | 120 | $^\circ\text{C/W}$ |

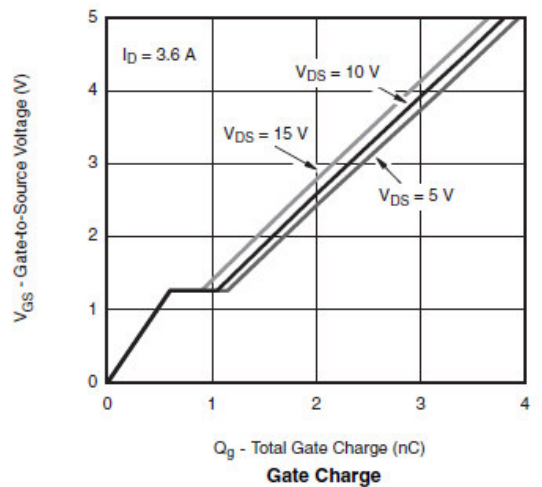
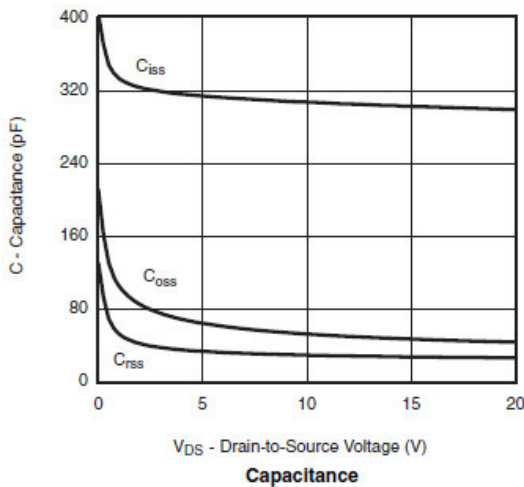
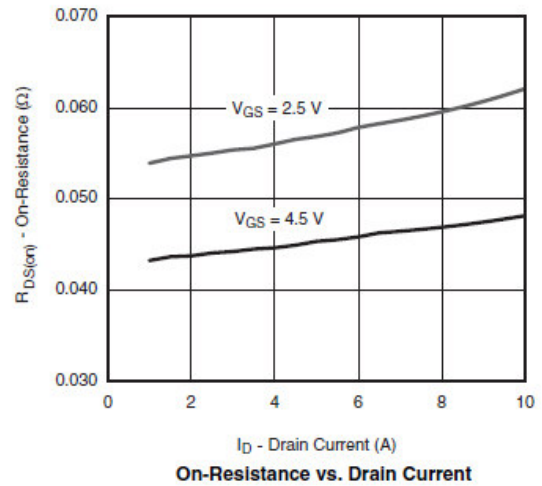
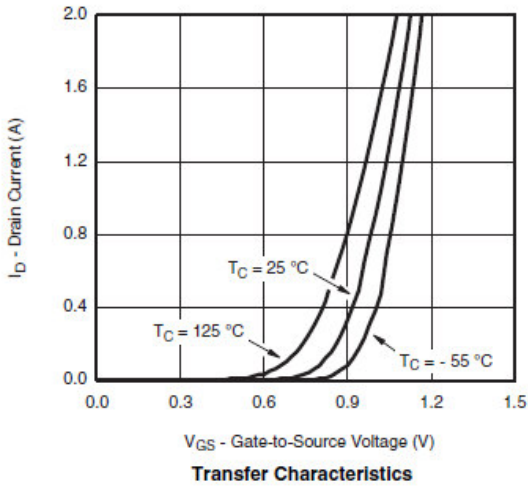
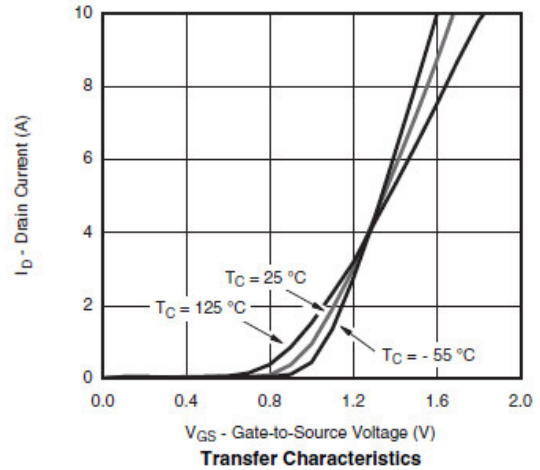
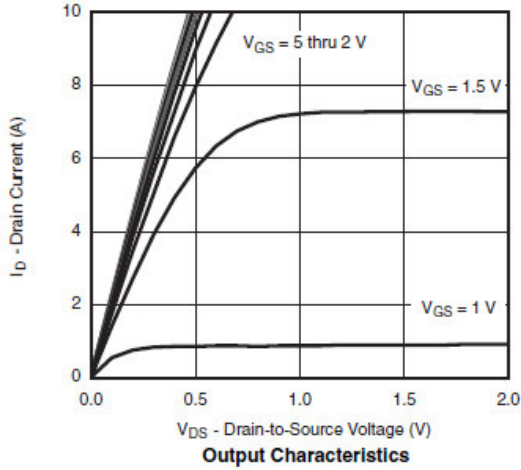
Electrical Characteristics

($T_A=25^\circ\text{C}$ Unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit |
|---------------------------------|---------------|--|------|------|-----------|------------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu\text{A}$ | 20 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu\text{A}$ | 0.3 | | 0.8 | |
| Gate Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 12V$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=16V, V_{GS}=0V$ | | | 1 | uA |
| | | $V_{DS}=16V, V_{GS}=0V$ $T_J=85^\circ\text{C}$ | | | 10 | |
| On-State Drain Current | $I_{D(on)}$ | $V_{DS} \geq 5V, V_{GS}=4.5V$ | 6 | | | A |
| | | $V_{DS} \geq 5V, V_{GS}=2.5V$ | 4 | | | |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}=4.5V, I_D=3.6A$ | | 46 | 58 | m Ω |
| | | $V_{GS}=2.5V, I_D=3.2A$ | | 56 | 68 | |
| | | $V_{GS}=1.8V, I_D=2.8A$ | | 72 | 88 | |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=3.6A$ | | 10 | | S |
| Diode Forward Voltage | V_{SD} | $I_S=1.6A, V_{GS}=0V$ | | 0.85 | 1.2 | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | $V_{DS}=10V, V_{GS}=4.5V$ $I_D=3.6A$ | | 4.2 | 5.0 | nC |
| Gate-Source Charge | Q_{gs} | | | 0.6 | | |
| Gate-Drain Charge | Q_{gd} | | | 0.4 | | |
| Input Capacitance | C_{iss} | $V_{DS}=10V, V_{GS}=0V$ $f=1\text{MHz}$ | | 340 | | pF |
| Output Capacitance | C_{oss} | | | 115 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 33 | | |
| Turn-On Time | $t_{d(on)}$ | $V_{DD}=10V, R_L=2.8\Omega$ $I_D=3.6A, V_{GEN}=4.5V$ $R_G=1\Omega$ | | 8 | 15 | ns |
| | t_r | | | 8 | 15 | |
| Turn-Off Time | $t_{d(off)}$ | | | 25 | 40 | |
| | t_f | | | 8 | 15 | |

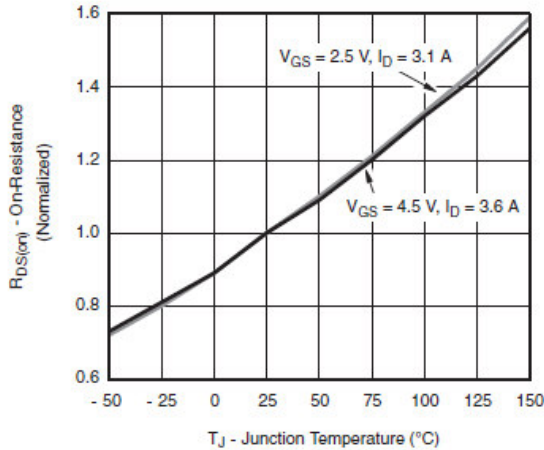


Typical Characteristics

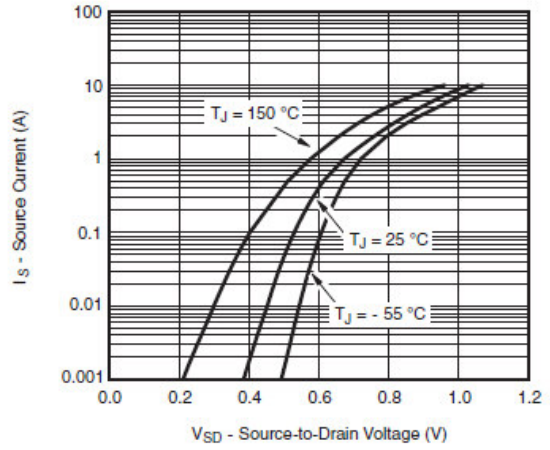




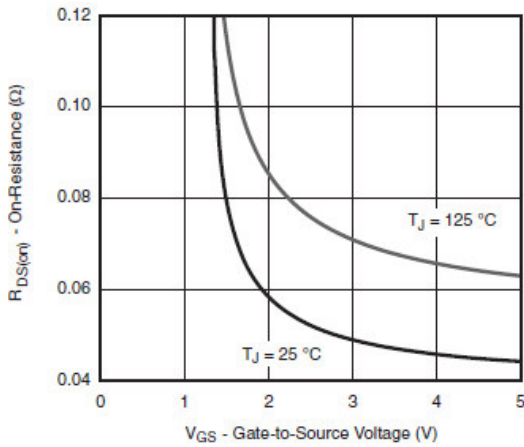
Typical Characteristics



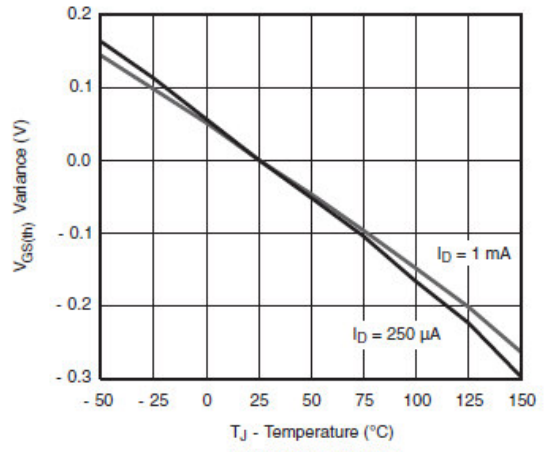
On-Resistance vs. Junction Temperature



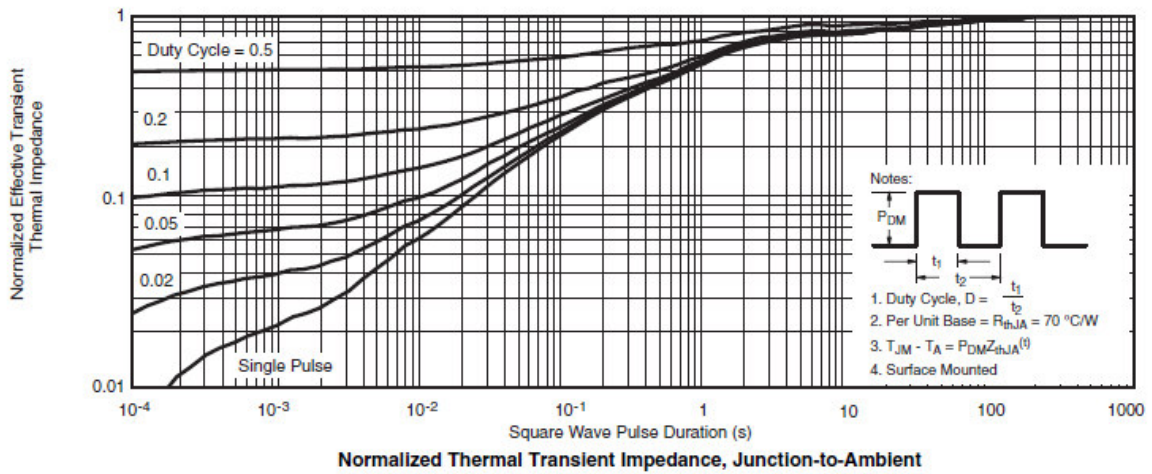
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Normalized Thermal Transient Impedance, Junction-to-Ambient

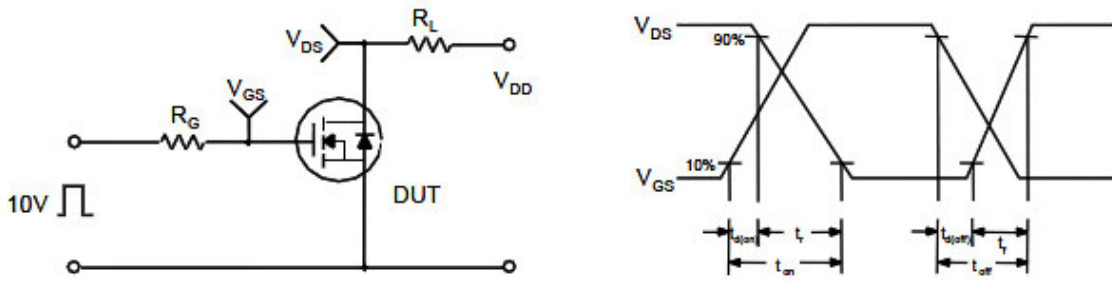


Typical Characteristics

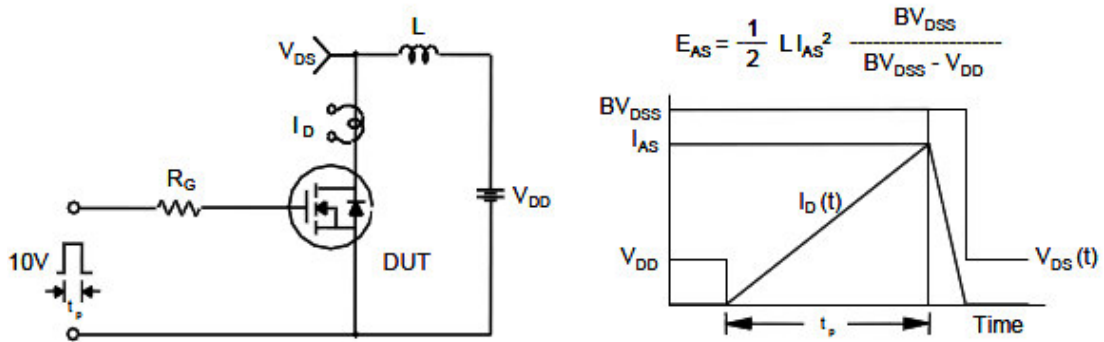
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

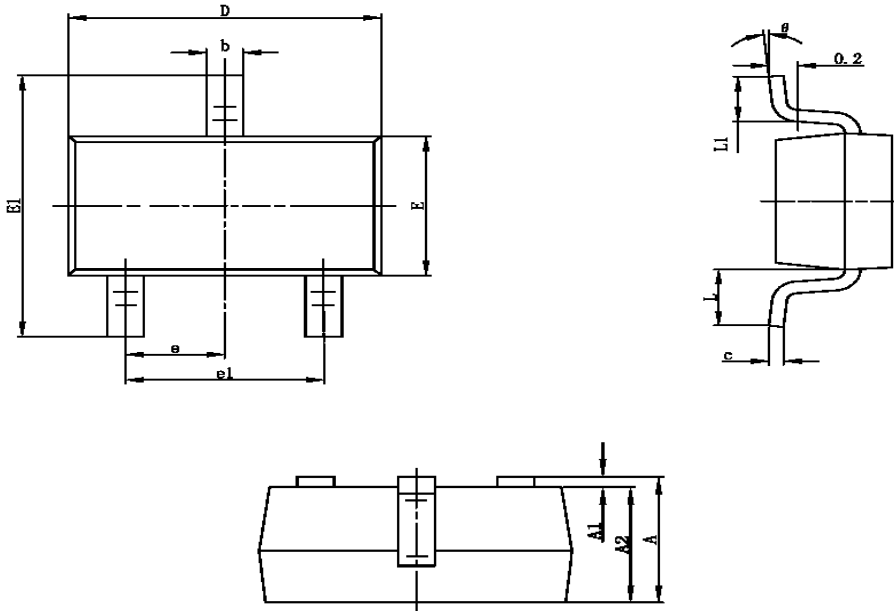


Unclamped Inductive Switching Test Circuit & Waveforms





Package Information (SOT-23-3L)



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.400 | 0.012 | 0.016 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950TYP | | 0.037TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.700REF | | 0.028REF | |
| L1 | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

©2010 Alfa-MOS Technology Corp.
 2F, No.80, Sec.1, Cheng Kung Rd., Nan Kang Dist., Taipei City 115, Taiwan (R.O.C.)
 Tel : 886 2) 2651 3928
 Fax : 886 2) 2786 8483
 ©http://www.alfa-mos.com