



## General Description

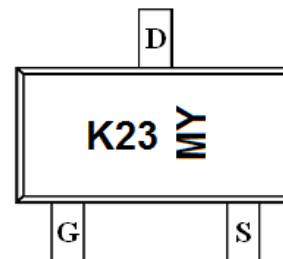
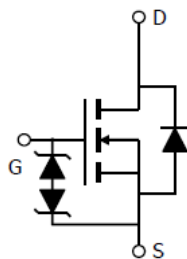
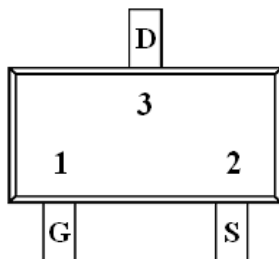
AFN123WS, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge.

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

- 100V/0.17A ,  $R_{DS(ON)}=5.8\Omega@V_{GS}=10V$
- 100V/0.17A ,  $R_{DS(ON)}=6.8\Omega@V_{GS}=4.5V$
- Super high density cell design for extremely low RDS (ON)
- Exceptional on-resistance and maximum DC current capability
- ESD Protection Diode design-in
- SOT-323 package design

## Pin Description ( SOT-323 )



## Application

- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- High saturation current capability. Direct Logic-Level Interface: TTL/CMOS
- Battery Operated Systems
- Solid-State Relays

## Pin Define

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

## Ordering Information

| Part Ordering No. | Part Marking | Package | Unit        | Quantity |
|-------------------|--------------|---------|-------------|----------|
| AFN123WSS32RG     | K23YM        | SOT-323 | Tape & Reel | 3000 EA  |

- ※ K23 Parts code
- ※ Y Year code ( 0 ~ 9 )
- ※ M Month code ( A ~ L = 1 ~ 12 )
- ※ AFN123WSS32RG : 7" Tape & Reel ; Pb- Free ; Halogen -Free



### Absolute Maximum Ratings

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

| Parameter   | Symbol          | Value                  | Unit    |
|---|-----------------|------------------------|---------|
| Drain-Source Voltage                                | $V_{DS}$        | 100                    | V       |
| Gate-Source Voltage                                 | $V_{GS}$        | $\pm 20$               | V       |
| Continuous Drain Current( $T_J=150^\circ\text{C}$ ) | $I_D$           | $T_A=25^\circ\text{C}$ | 0.17    |
|   |                 | $T_A=70^\circ\text{C}$ | 0.17    |
| Pulsed Drain Current                                | $I_{DM}$        | 0.68                   | A       |
| Continuous Source Current(Diode Conduction)         | $I_S$           | 0.4                    | A       |
| Power Dissipation                                   | $P_D$           | $T_A=25^\circ\text{C}$ | 0.35    |
|   |                 | $T_A=70^\circ\text{C}$ | 0.22    |
| Operating Junction Temperature                      | $T_J$           | 150                    | 150     |
| Storage Temperature Range                           | $T_{STG}$       | -55/150                | -55/150 |
| Thermal Resistance-Junction to Ambient              | $R_{\theta JA}$ | 120                    | 120     |

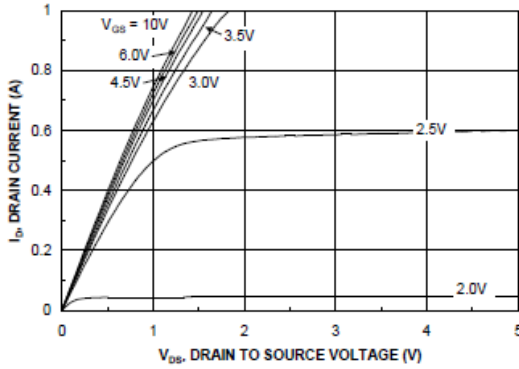
### Electrical Characteristics

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

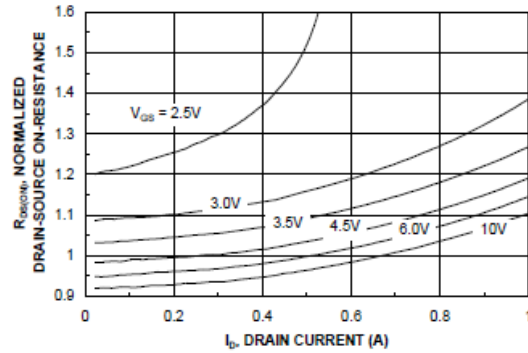
| Parameter                       | Symbol       | Conditions   | Min. | Typ  | Max. | Unit     |
|---------------------------------|--------------|--|------|------|------|----------|
| <b>Static</b>                   |              |  |      |      |      |          |
| Drain-Source Breakdown Voltage  | $V_{(BR)DS}$ | $V_{GS}=0V, I_D=250\mu A$                              | 100  |      |      | V        |
| Gate Threshold Voltage          | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                          | 1.0  |      | 3.0  |          |
| Gate Leakage Current            | $I_{GSS}$    | $V_{DS}=0V, V_{GS}=\pm 20V$                            |      |      | 10   | $\mu A$  |
| Zero Gate Voltage Drain Current | $I_{DSS}$    | $V_{DS}=80V, V_{GS}=0V$                                |      |      | 1    | $\mu A$  |
|                                 |              | $V_{DS}=80V, V_{GS}=0V$<br>$T_J=85^\circ\text{C}$      |      |      | 10   |          |
| Drain-Source On-Resistance      | $R_{DS(on)}$ | $V_{GS}=10V, I_D=0.17A$                                |      | 4.0  | 5.8  | $\Omega$ |
|                                 |              | $V_{GS}=4.5V, I_D=0.17A$                               |      | 4.6  | 6.8  |          |
| Forward Transconductance        | $g_{FS}$     | $V_{DS}=10V, I_D=0.17A$                                |      | 0.8  |      | S        |
| Diode Forward Voltage           | $V_{SD}$     | $I_S=0.17A, V_{GS}=0V$                                 |      | 0.75 | 1.3  | V        |
| <b>Dynamic</b>                  |              |  |      |      |      |          |
| Total Gate Charge               | $Q_g$        | $V_{DS}=30V, V_{GS}=10V$<br>$I_D=0.22A$                |      | 1.8  | 3.5  | nC       |
| Gate-Source Charge              | $Q_{gs}$     |  |      | 0.2  |      |          |
| Gate-Drain Charge               | $Q_{gd}$     |  |      | 0.3  |      |          |
| Input Capacitance               | $C_{iss}$    | $V_{DS}=25V, V_{GS}=0V$<br>$f=1\text{MHz}$             |      | 70   |      | pF       |
| Output Capacitance              | $C_{oss}$    |  |      | 8    |      |          |
| Reverse Transfer Capacitance    | $C_{rss}$    |  |      | 5    |      |          |
| Turn-On Time                    | $t_{d(on)}$  | $V_{DD}=30V, R_G=50\Omega$<br>$I_D=0.28A, V_{GEN}=10V$ |      | 5    | 10   | ns       |
|                                 | $t_r$        |  |      | 5    | 10   |          |
| Turn-Off Time                   | $t_{d(off)}$ |  |      | 7    | 15   |          |
|                                 | $t_f$        |  |      | 10   | 20   |          |



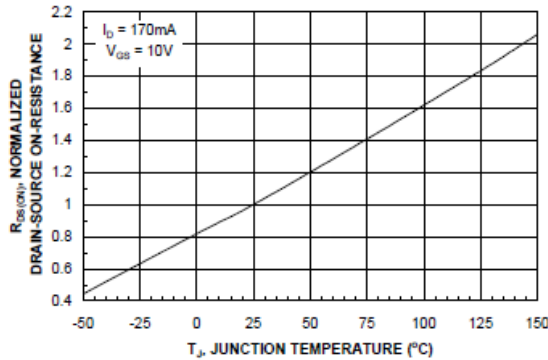
## Typical Characteristics



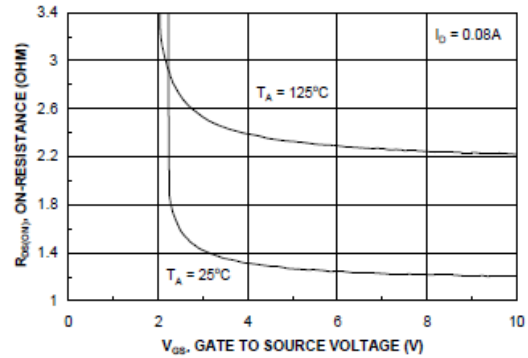
On-Region Characteristics



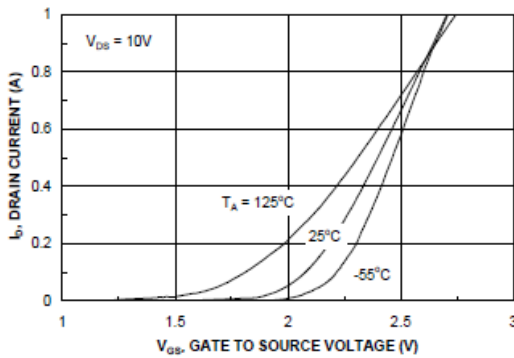
On-Resistance Variation with  
Drain Current and Gate Voltage



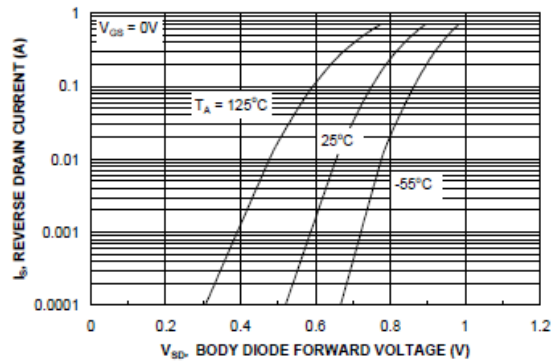
On-Resistance Variation with Temperature



On-Resistance Variation with  
Gate-to-Source Voltage



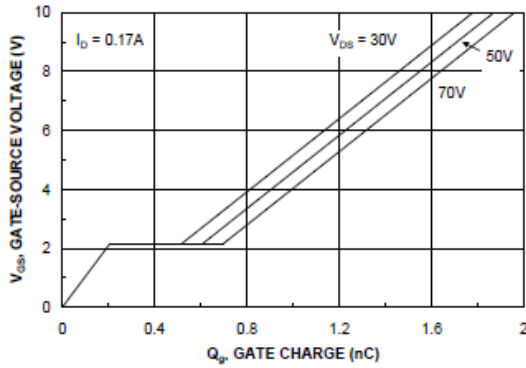
Transfer Characteristics



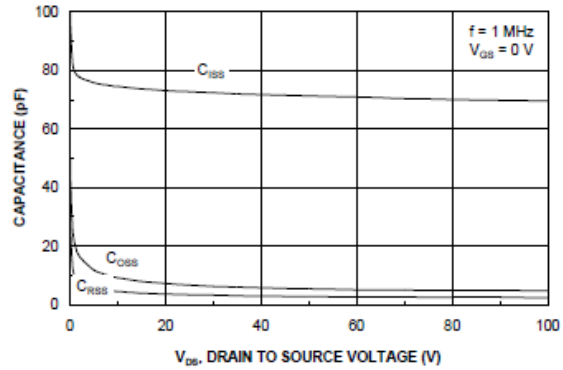
Body Diode Forward Voltage Variation  
with Source Current and Temperature



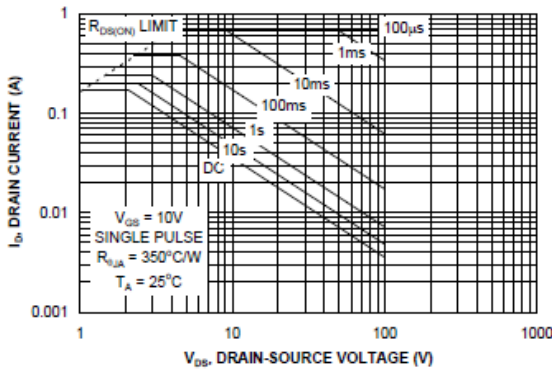
## Typical Characteristics



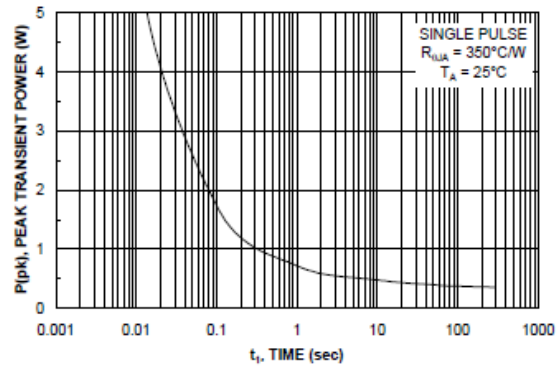
Gate Charge Characteristics



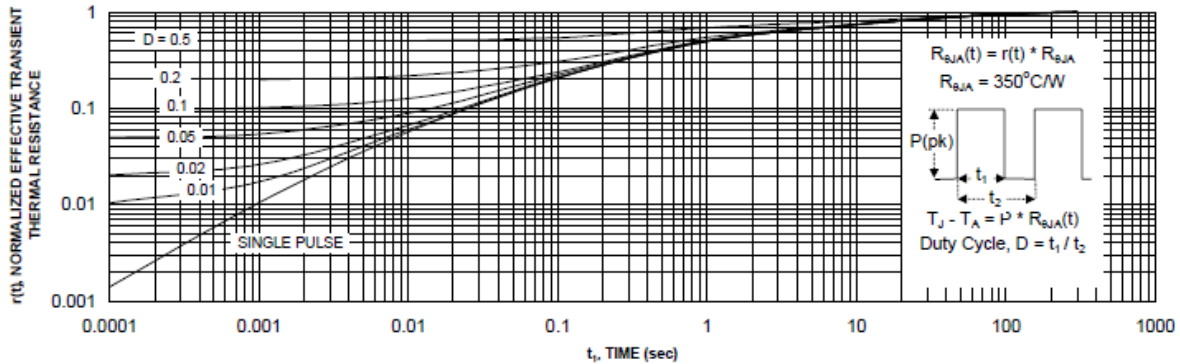
Capacitance Characteristics



Maximum Safe Operating Area



Single Pulse Maximum Power Dissipation

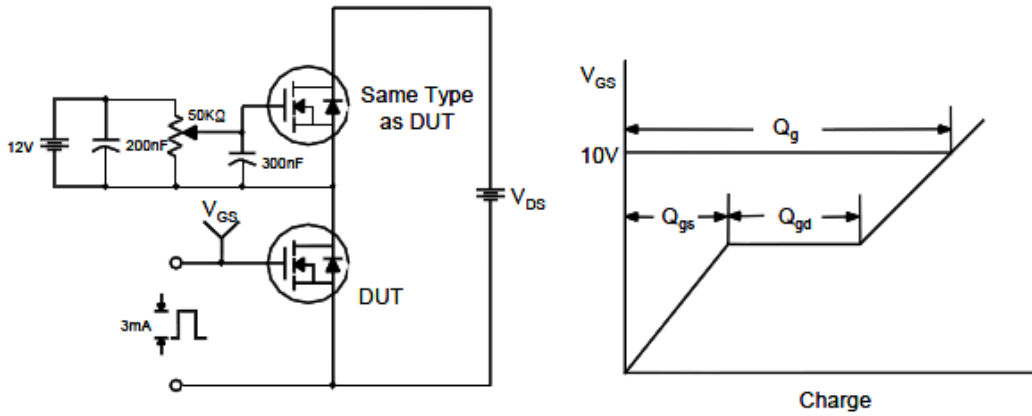


Transient Thermal Response Curve, Junction to Ambient

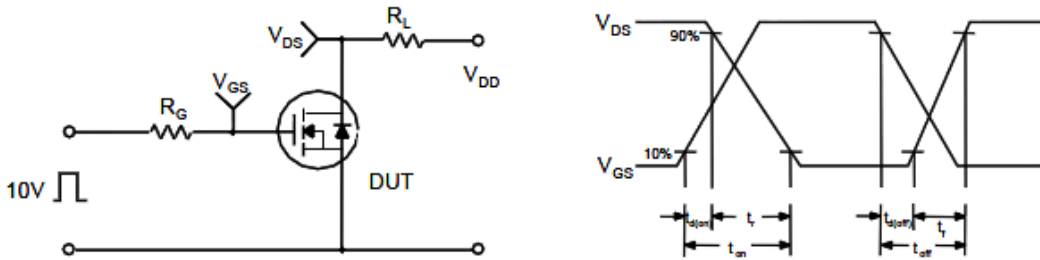


Typical Characteristics

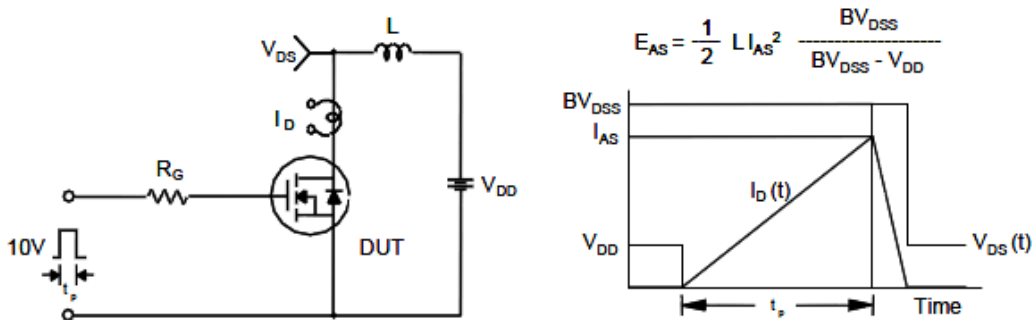
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

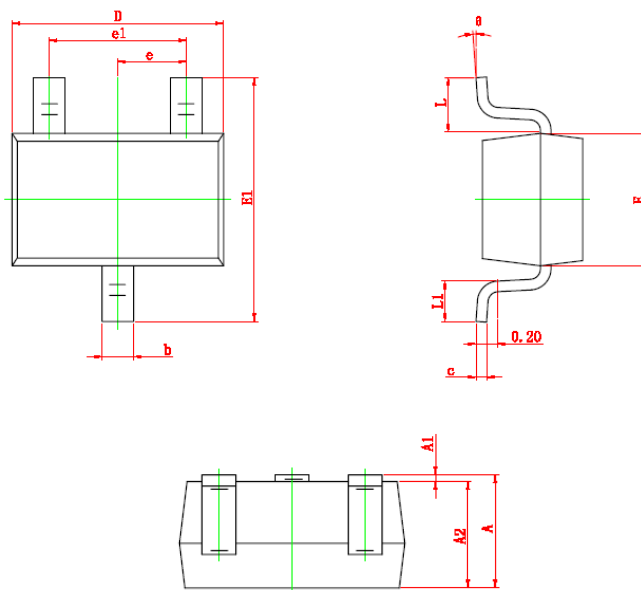


Unclamped Inductive Switching Test Circuit & Waveforms





**Package Information ( SOT-323 )**



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 0.900                     | 1.100 | 0.035                | 0.043 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 0.900                     | 1.000 | 0.035                | 0.039 |
| b        | 0.200                     | 0.400 | 0.008                | 0.016 |
| c        | 0.080                     | 0.150 | 0.003                | 0.006 |
| D        | 2.000                     | 2.200 | 0.079                | 0.087 |
| E        | 1.150                     | 1.350 | 0.045                | 0.053 |
| E1       | 2.150                     | 2.450 | 0.085                | 0.096 |
| e        | 0.650 TYP                 |       | 0.026 TYP            |       |
| e1       | 1.200                     | 1.400 | 0.047                | 0.055 |
| L        | 0.525 REF                 |       | 0.021 REF            |       |
| L1       | 0.260                     | 0.460 | 0.010                | 0.018 |
| $\theta$ | 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