



### General Description

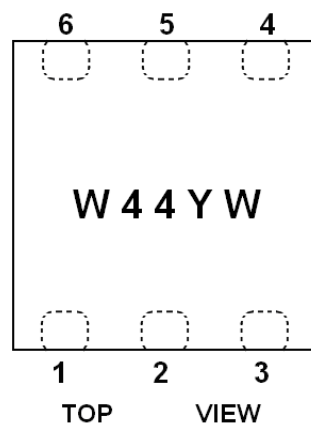
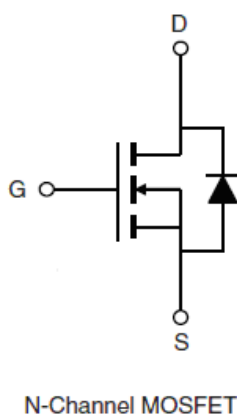
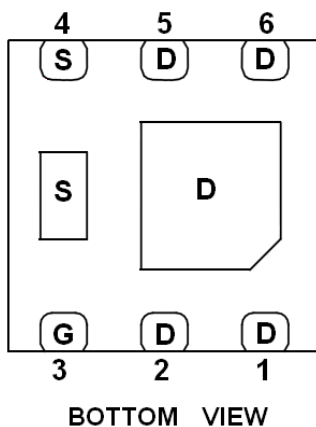
AFN2444WS, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge.

These devices are particularly suited for low voltage power management, and low in-line power loss are needed in commercial industrial surface mount applications.

### Features

- $I_D=3.0A, R_{DS(ON)}=15m\Omega@V_{GS}=10V$
- $I_D=3.0A, R_{DS(ON)}=20m\Omega@V_{GS}=4.5V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- DFN2X2-6L package design

### Pin Description ( DFN2X2-6L )



### Application

- DC/DC Converter
- High Frequency Switching

### Pin Define

| Pin     | Symbol | Description |
|---------|--------|-------------|
| 1,2,5,6 | D      | Drain       |
| 4       | S      | Source      |
| 3       | G      | Gate        |

### Ordering Information

| Part Ordering No. | Part Marking | Package   | Unit        | Quantity |
|-------------------|--------------|-----------|-------------|----------|
| AFN2444WSFN226RG  | W44YW        | DFN2X2-6L | Tape & Reel | 4000 EA  |

※ W44 part code

※ Y year code

※ W week code

※ AFN2444WSFN226RG : 7" Tape & Reel ; Pb- Free ; Halogen- Free



**Absolute Maximum Ratings**

(T<sub>A</sub>=25°C Unless otherwise noted)

| Parameter                                       | Symbol           | Value                | Unit |
|---|------------------|----------------------|------|
| Drain-Source Voltage                            | V <sub>DSS</sub> | 30                   | V    |
| Gate –Source Voltage                            | V <sub>GSS</sub> | ±20                  | V    |
| Continuous Drain Current(T <sub>J</sub> =150°C) | I <sub>D</sub>   | T <sub>A</sub> =25°C | 11   |
|   |                  | T <sub>A</sub> =70°C | 8.8  |
| Pulsed Drain Current                            | I <sub>DM</sub>  | 40                   | A    |
| Continuous Source Current(Diode Conduction)     | I <sub>S</sub>   | 2.9                  | A    |
| Power Dissipation                               | P <sub>D</sub>   | T <sub>A</sub> =25°C | 3.5  |
|   |                  | T <sub>A</sub> =70°C | 2.2  |
| Operating Junction Temperature                  | T <sub>J</sub>   | 150                  | °C   |
| Storage Temperature Range                       | T <sub>STG</sub> | -55/150              | °C   |
| Thermal Resistance-Junction to Ambient          | R <sub>θJA</sub> | 36                   | °C/W |

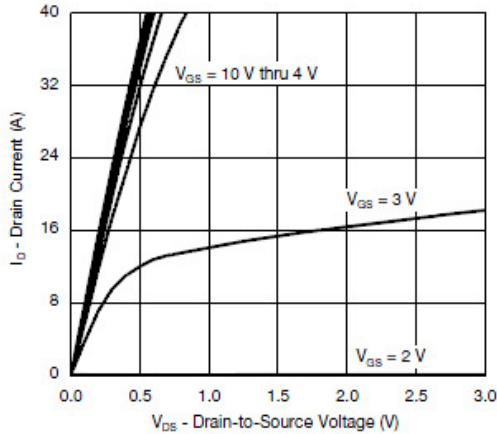
**Electrical Characteristics**

(T<sub>A</sub>=25°C Unless otherwise noted)

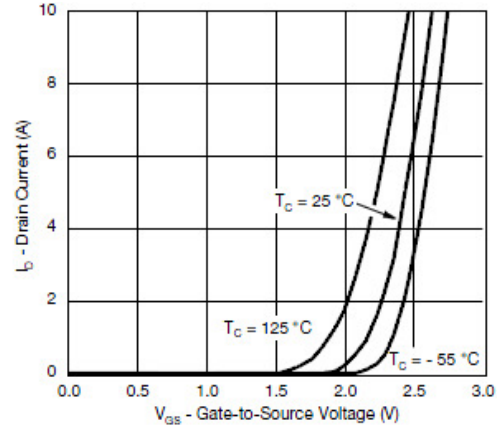
| Parameter                       | Symbol               | Conditions   | Min. | Typ  | Max. | Unit |
|---------------------------------|----------------------|--|------|------|------|------|
| <b>Static</b>                   |                      |  |      |      |      |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA   | 30   |      |      | V    |
| Gate Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA   | 1.0  |      | 2.5  |      |
| Gate Leakage Current            | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V   |      |      | ±100 | nA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V  |      |      | 1    | uA   |
|                                 |                      | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =85°C  |      |      | 10   |      |
| On-State Drain Current          | I <sub>D(on)</sub>   | V <sub>DS</sub> ≥ 5V, V <sub>GS</sub> =10V   | 20   |      |      | A    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A   |      | 11   | 15   | mΩ   |
|                                 |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.0A  |      | 14   | 20   |      |
| Forward Transconductance        | g <sub>FS</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =7.4A   |      | 24   |      | S    |
| Diode Forward Voltage           | V <sub>SD</sub>      | I <sub>S</sub> =3.0A, V <sub>GS</sub> =0V  |      | 0.85 | 1.3  | V    |
| <b>Dynamic</b>                  |                      |  |      |      |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V<br>I <sub>D</sub> ≡11A   |      | 5    | 10   | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |  |      | 1.5  |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |  |      | 1.7  |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V<br>f=1MHz  |      | 560  |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |  |      | 125  |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |  |      | 55   |      |      |
| Turn-On Time                    | t <sub>d(on)</sub>   | V <sub>DD</sub> =15V, R <sub>L</sub> =1.7Ω<br>I <sub>D</sub> ≡8.8A, V <sub>GEN</sub> =4.5V<br>R <sub>G</sub> =1Ω |      | 12   | 25   | ns   |
|                                 | t <sub>r</sub>       |  |      | 12   | 25   |      |
| Turn-Off Time                   | t <sub>d(off)</sub>  |  |      | 15   | 30   |      |
|                                 | t <sub>f</sub>       |  |      | 10   | 20   |      |



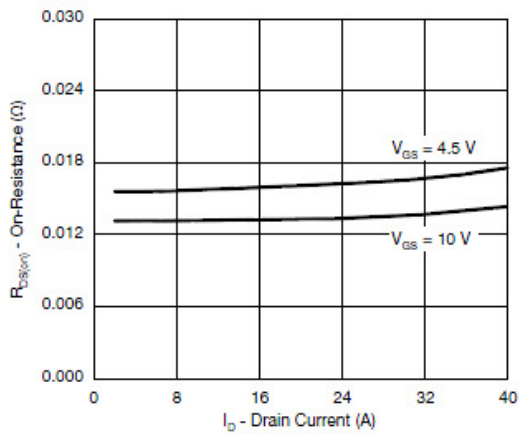
## Typical Characteristics



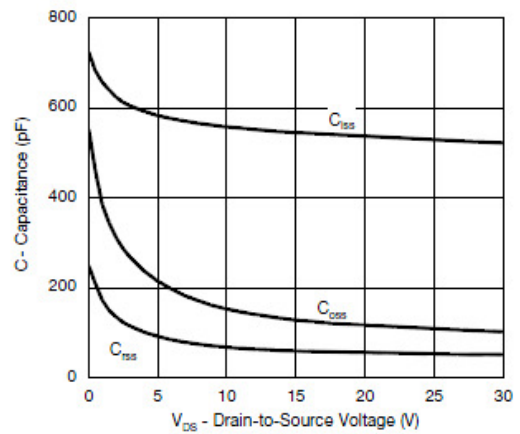
Output Characteristics



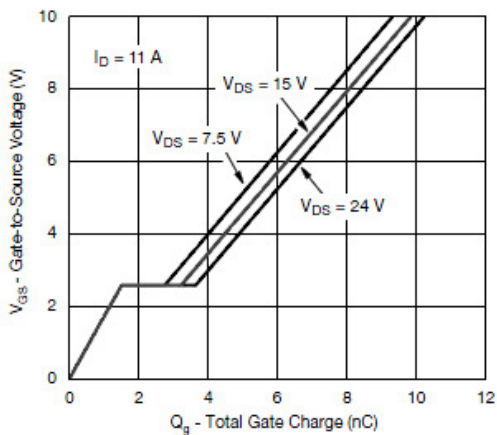
Transfer Characteristics



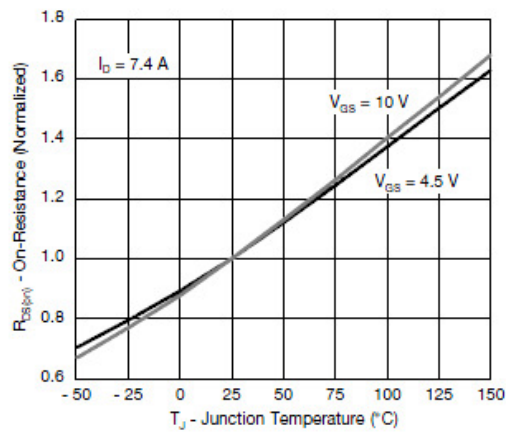
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



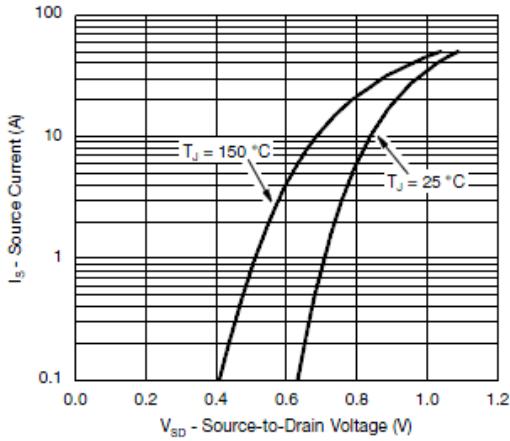
Gate Charge



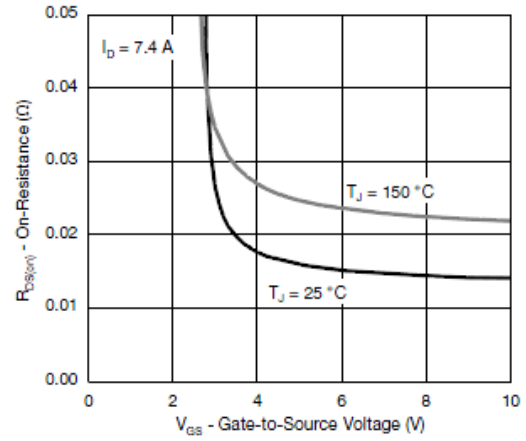
On-Resistance vs. Junction Temperature



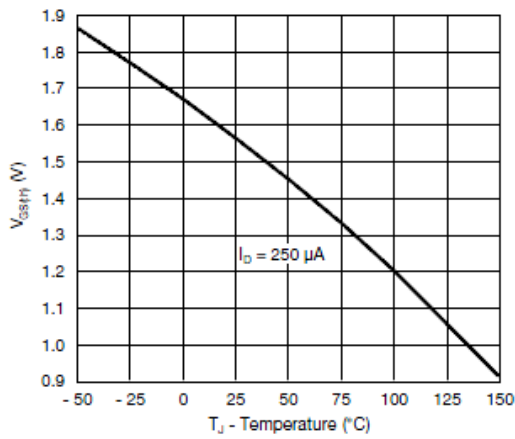
## Typical Characteristics



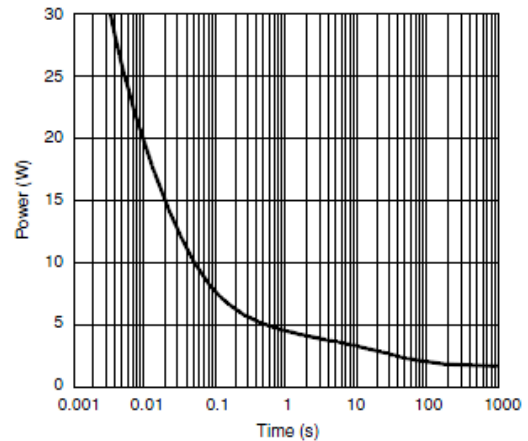
Source-Drain Diode Forward Voltage



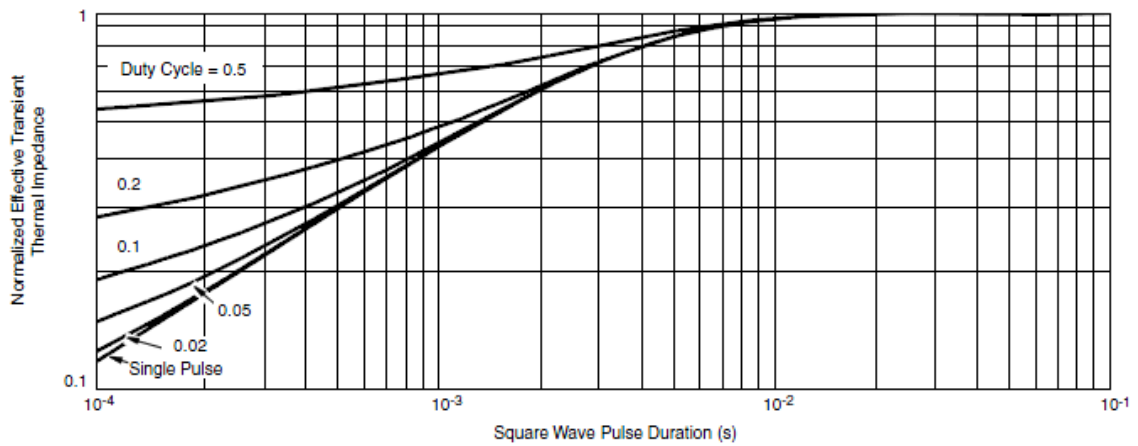
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power (Junction-to-Ambient)



Normalized Thermal Transient Impedance, Junction-to-Case



**Typical Characteristics**

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

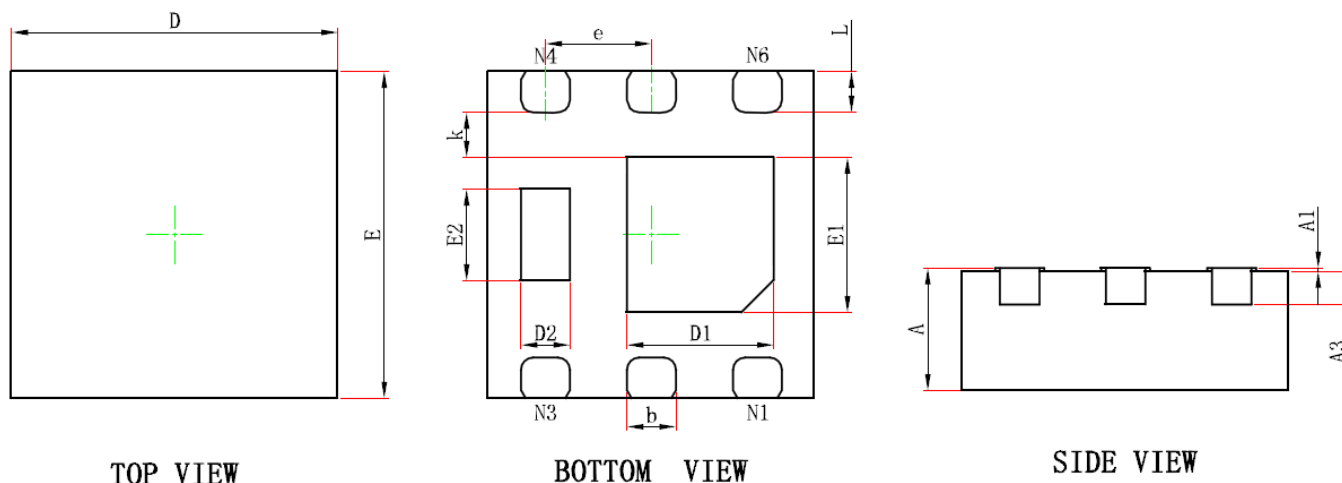


Unclamped Inductive Switching Test Circuit & Waveforms





**Package Information ( DFN2X2-6L )**



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.700                     | 0.800 | 0.028                | 0.031 |
| A1     | 0.000                     | 0.050 | 0.000                | 0.002 |
| A3     | 0.203REF.                 |       | 0.008REF.            |       |
| D      | 1.924                     | 2.076 | 0.076                | 0.082 |
| E      | 1.924                     | 2.076 | 0.076                | 0.082 |
| D1     | 0.800                     | 1.000 | 0.031                | 0.039 |
| E1     | 0.850                     | 1.050 | 0.033                | 0.041 |
| D2     | 0.200                     | 0.400 | 0.008                | 0.016 |
| E2     | 0.460                     | 0.660 | 0.018                | 0.026 |
| k      | 0.200MIN.                 |       | 0.008MIN.            |       |
| b      | 0.250                     | 0.350 | 0.010                | 0.014 |
| e      | 0.650TYP.                 |       | 0.026TYP.            |       |
| L      | 0.174                     | 0.326 | 0.007                | 0.013 |

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