



## General Description

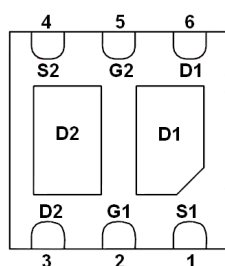
AFN2920W, N-Channel enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent  $R_{DS(ON)}$ , low gate charge.

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

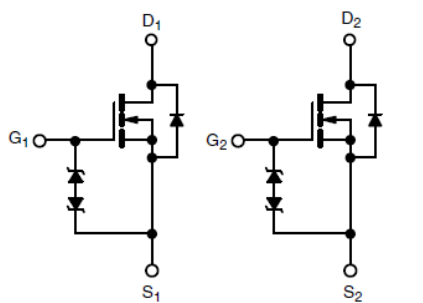
## Features

- $I_D=5.0A, R_{DS(ON)}=19m\Omega@V_{GS}=4.5V$
- $I_D=4.6A, R_{DS(ON)}=23m\Omega@V_{GS}=2.5V$
- $I_D=4.2A, R_{DS(ON)}=34m\Omega@V_{GS}=1.8V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- ESD protection
- DFN2X2-6L package design

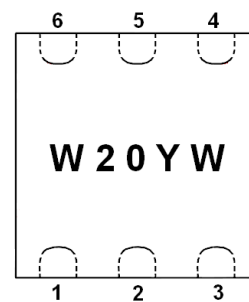
## Pin Description ( DFN2X2-6L )



BOTTOM VIEW



N-Channel MOSFET N-Channel MOSFET



TOP VIEW

## Application

- Load Switch with Low Voltage Drop
- Load Switch for 1.2 V/1.5 V/1.8 V Power Lines
- Smart Phones, Tablet PCs, Portable Media Players

## Pin Define

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1   | S1     | Source1     |
| 2   | G1     | Gate1       |
| 3   | D2     | Drain2      |
| 4   | S2     | Source2     |
| 5   | G2     | Gate2       |
| 6   | D1     | Drain1      |

## Ordering Information

| Part Ordering No. | Part Marking | Package   | Unit        | Quantity |
|-------------------|--------------|-----------|-------------|----------|
| AFN2920WFN226RG   | W20YW        | DFN2X2-6L | Tape & Reel | 4000 EA  |

- ※ W20 parts code
- ※ Y year code
- ※ W week code ( A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52 )
- ※ AFN2920WFN226RG : 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> | 20                   | V    |
| Gate –Source Voltage                            | V <sub>GSS</sub> | ±12                  | V    |
| Continuous Drain Current(T <sub>J</sub> =150°C) | I <sub>D</sub>   | T <sub>C</sub> =25°C | 4.5  |
|   |                  | T <sub>C</sub> =70°C | 4.5  |
| Pulsed Drain Current                            | I <sub>DM</sub>  | 20                   | A    |
| Continuous Source Current(Diode Conduction)     | I <sub>S</sub>   | 1.6                  | A    |
| Power Dissipation                               | P <sub>D</sub>   | T <sub>C</sub> =25°C | 7.8  |
|   |                  | T <sub>C</sub> =70°C | 5.0  |
| 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> | 52                   | °C/W |
| Thermal Resistance-Junction to Case(Drian)      | R <sub>θJC</sub> | 12.5                 |      |

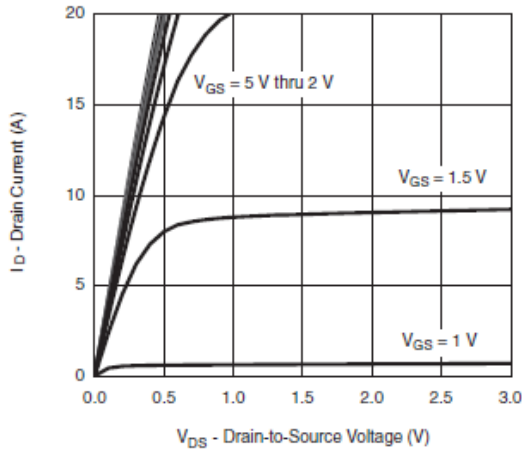
### Electrical Characteristics

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

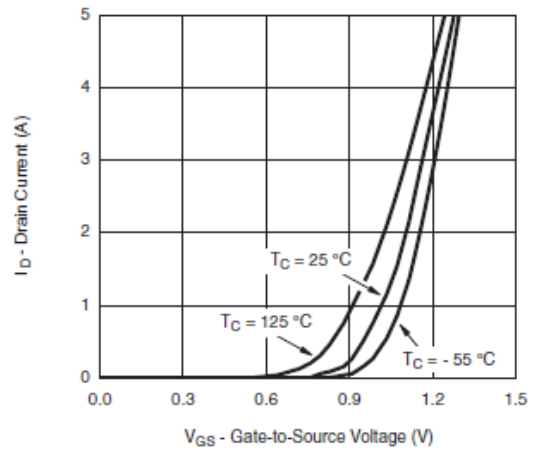
| Parameter                       | Symbol               | Conditions   | Min. | Typ  | Max. | Unit |
|---------------------------------|----------------------|--|------|------|------|------|
| <b>Static</b>                   |                      |  |      |      |      |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA   | 20   |      |      | V    |
| Gate Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA   | 0.4  |      | 1.0  |      |
| Gate Leakage Current            | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V   |      |      | ±10  | uA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =16V, V <sub>GS</sub> =0V  |      |      | 1    | uA   |
|                                 |                      | V <sub>DS</sub> =16V, 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> =4.5V  | 15   |      |      | A    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5.0A  |      | 15   | 19   | mΩ   |
|                                 |                      | V <sub>GS</sub> =2.5V, I <sub>D</sub> =4.6A  |      | 18   | 23   |      |
|                                 |                      | V <sub>GS</sub> =1.8V, I <sub>D</sub> =4.2A  |      | 27   | 34   |      |
| Forward Transconductance        | g <sub>FS</sub>      | V <sub>DS</sub> =6V, I <sub>D</sub> =5A  |      | 28   |      | S    |
| Diode Forward Voltage           | V <sub>SD</sub>      | I <sub>S</sub> =1.5A, V <sub>GS</sub> =0V  |      | 0.85 | 1.2  | V    |
| <b>Dynamic</b>                  |                      |  |      |      |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =6V, V <sub>GS</sub> =4.5V<br>I <sub>D</sub> ≅5.0A   |      | 6.0  | 12   | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |  |      | 0.8  |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |  |      | 0.8  |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =6V, V <sub>GS</sub> =0V<br>f=1MHz   |      | 620  |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |  |      | 180  |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |  |      | 100  |      |      |
| Turn-On Time                    | t <sub>d(on)</sub>   | V <sub>DD</sub> =10V, R <sub>L</sub> =5.5Ω<br>I <sub>D</sub> ≅3.6A, V <sub>GEN</sub> =4.5V<br>R <sub>G</sub> =6Ω |      | 10   | 20   | ns   |
|                                 | t <sub>r</sub>       |  |      | 10   | 20   |      |
| Turn-Off Time                   | t <sub>d(off)</sub>  |  |      | 25   | 40   |      |
|                                 | t <sub>f</sub>       |  |      | 10   | 20   |      |



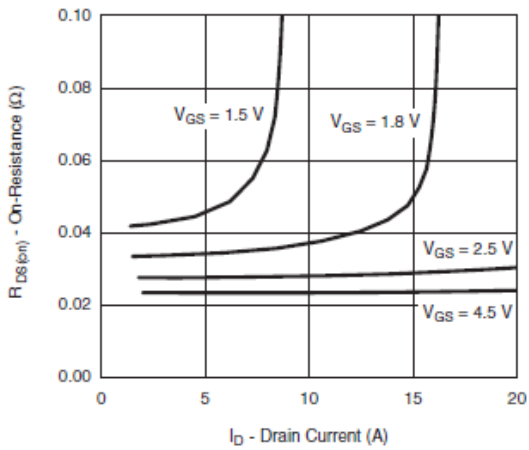
## Typical Characteristics



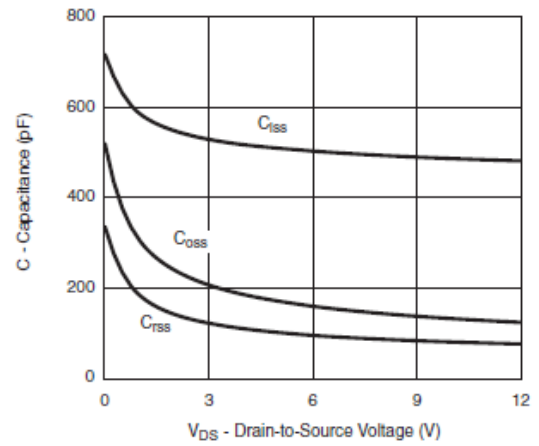
Output Characteristics



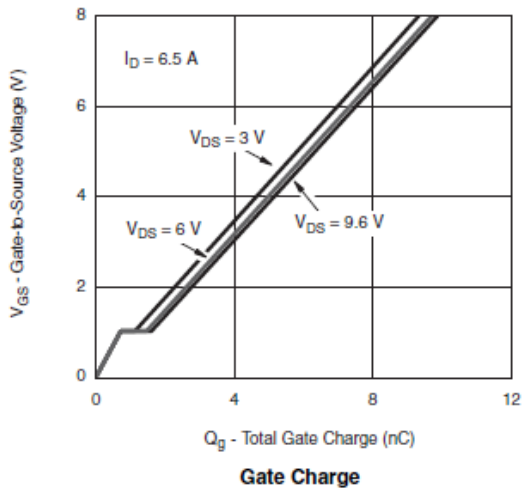
Transfer Characteristics



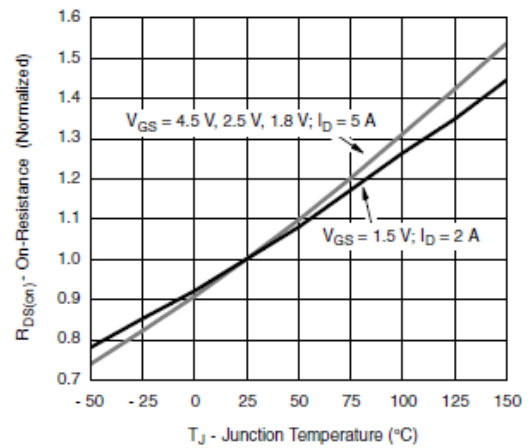
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



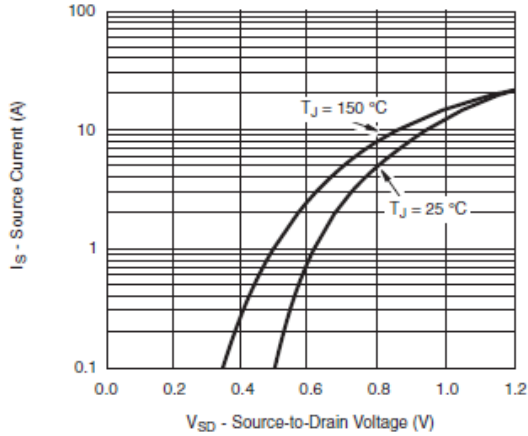
Gate Charge



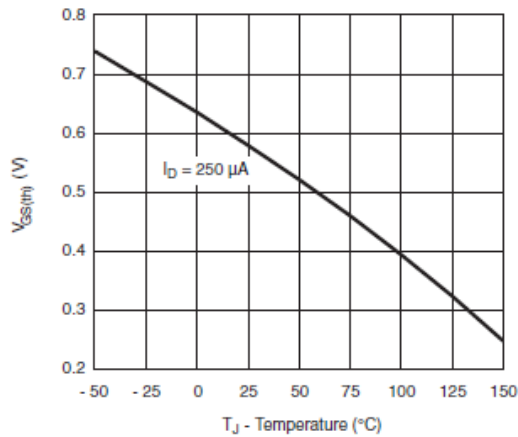
On-Resistance vs. Junction Temperature



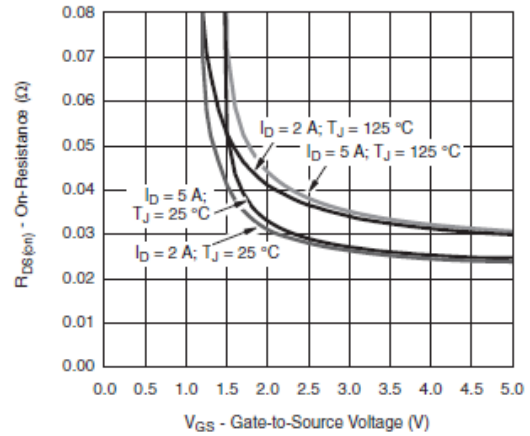
## Typical Characteristics



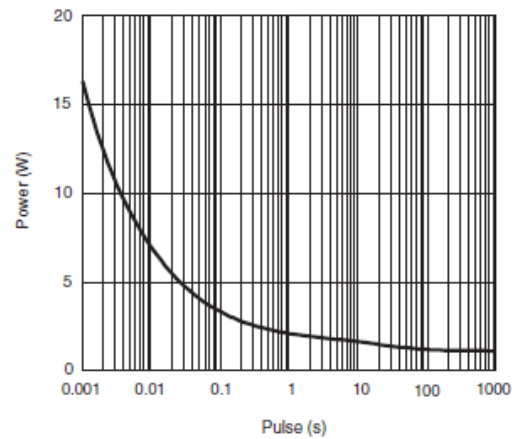
Source-Drain Diode Forward Voltage



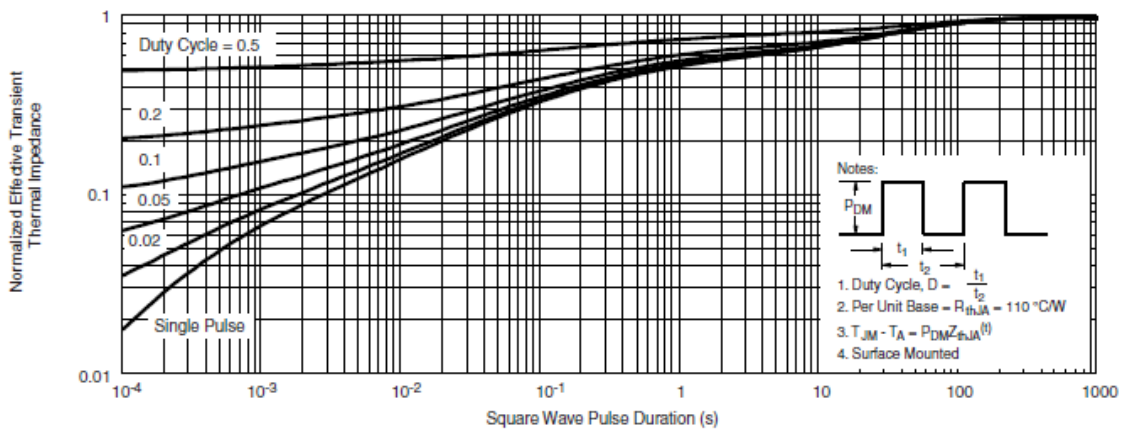
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power (Junction-to-Ambient)

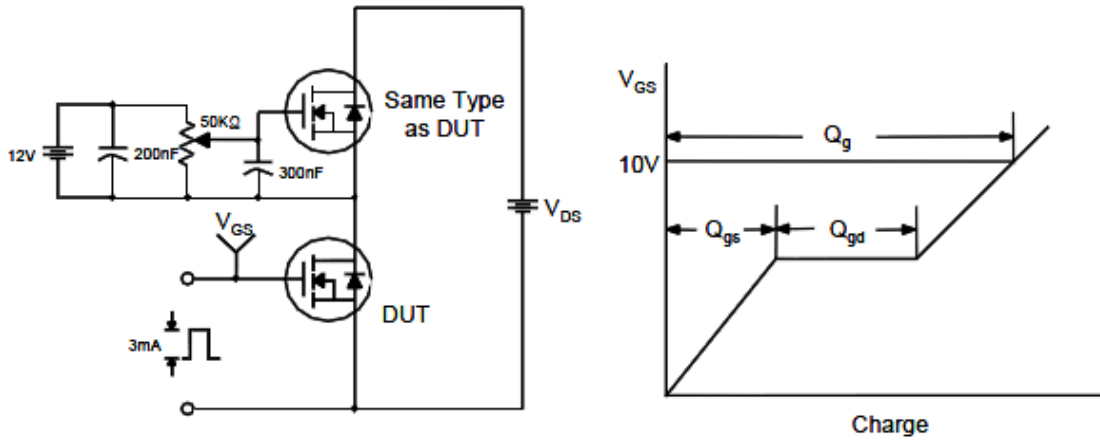


Normalized Thermal Transient Impedance, Junction-to-Ambient

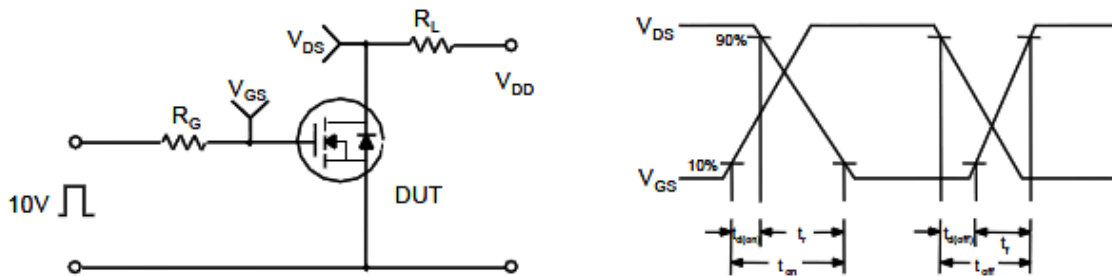


**Typical Characteristics**

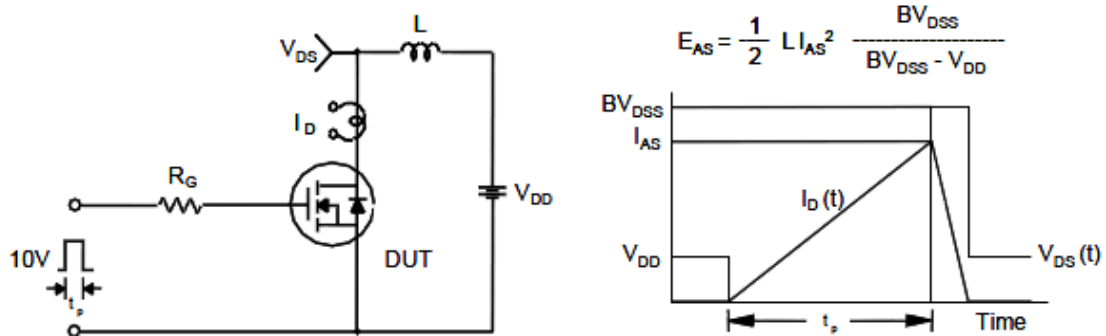
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

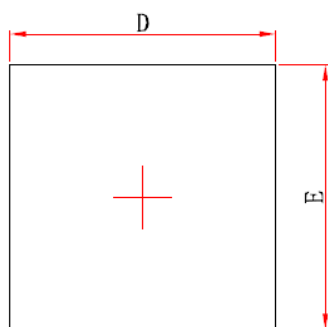


Unclamped Inductive Switching Test Circuit & Waveforms

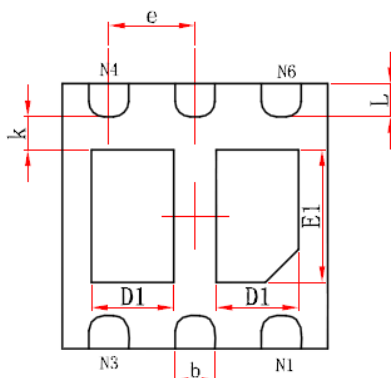




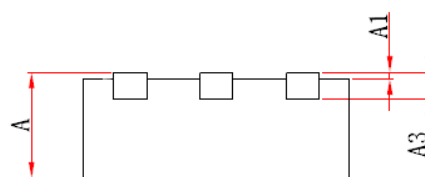
**Package Information ( DFN2X2-6L )**



**Top View**



**Bottom View**



**Side View**

| Symbol | Dimensions In Millimeters |             | Dimensions In Inches |             |
|--------|---------------------------|-------------|----------------------|-------------|
|        | Min.                      | Max.        | Min.                 | Max.        |
| A      | 0.700/0.800               | 0.800/0.900 | 0.028/0.031          | 0.031/0.035 |
| 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     | 0.520                     | 0.720       | 0.020                | 0.028       |
| E1     | 0.900                     | 1.100       | 0.035                | 0.043       |
| 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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