



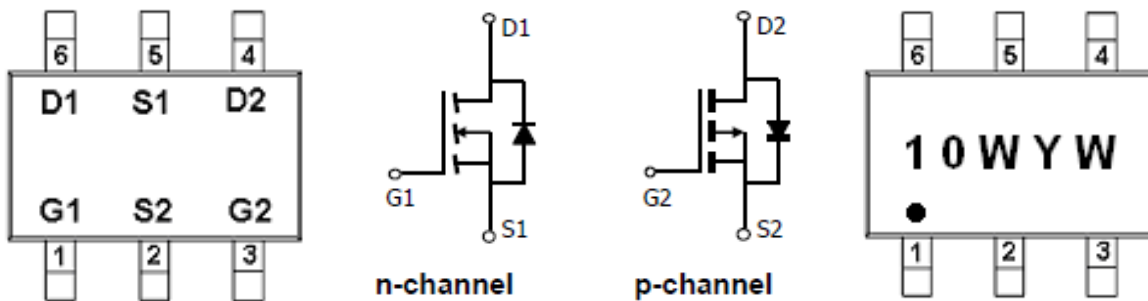
### General Description

AFC6610W, N & P Pair 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

- N-Channel  
100V/2.3A,  $R_{DS(ON)}=310m\Omega@V_{GS}=10V$   
100V/1.8A,  $R_{DS(ON)}=320m\Omega@V_{GS}=4.5V$
- P-Channel  
-100V/-1.0A,  $R_{DS(ON)}=650m\Omega@V_{GS}=-10V$   
-100V/-0.5A,  $R_{DS(ON)}=700m\Omega@V_{GS}=-4.5V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOT-23-6L package design

### Pin Description (SOT-23-6L)



### Application

- LED Backlight
- DC/DC Converter
- Load Switch for Portable Applications

### Pin Define

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1   | G1     | Gate 1      |
| 2   | S2     | Source 2    |
| 3   | G2     | Gate 2      |
| 4   | D2     | Drain 2     |
| 5   | S1     | Source 1    |
| 6   | D1     | Drain1      |

### Ordering Information

| Part Ordering No. | Part Marking | Package   | Unit        | Quantity |
|-------------------|--------------|-----------|-------------|----------|
| AFC6610WS26RG     | 10WYW        | SOT-23-6L | Tape & Reel | 3000 EA  |

- ※ 10W parts code
- ※ Y year code ( 0 ~ 9 )
- ※ W week code ( A ~ Z = 1 ~ 26 / a ~ z = 27 ~ 52 )
- ※ AFC6610WS26RG : 7" Tape & Reel ; Pb- Free ; Halogen -Free



### Absolute Maximum Ratings

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

| Parameter                                       | Symbol           | Value                |           | Unit |
|-------------------------------------------------|------------------|----------------------|-----------|------|
|                                                 |                  | N-Channel            | P-Channel |      |
| Drain-Source Voltage                            | V <sub>DSS</sub> | 100                  | -100      | V    |
| Gate –Source Voltage                            | V <sub>GSS</sub> | ±20                  | ±20       | V    |
| Continuous Drain Current(T <sub>J</sub> =150°C) | I <sub>D</sub>   | T <sub>A</sub> =25°C | -2.3      | A    |
|                                                 |                  | T <sub>A</sub> =70°C | -1.8      |      |
| Pulsed Drain Current                            | I <sub>DM</sub>  | -4                   | -4        | A    |
| Continuous Source Current(Diode Conduction)     | I <sub>S</sub>   | -1.5                 | -1.5      | A    |
| Power Dissipation                               | P <sub>D</sub>   | T <sub>A</sub> =25°C | 2.0       | W    |
|                                                 |                  | T <sub>A</sub> =70°C | 1.3       |      |
| 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> | 120                  |           | °C/W |

### Electrical Characteristics ( N-Channel )

(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                                                                      | 100  |      |      | V    |
| Gate Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA                                                        | 1.0  |      | 2.0  |      |
| Gate Leakage Current            | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                                                      |      |      | ±100 | nA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =80V, V <sub>GS</sub> =0V                                                                       |      |      | 1    | uA   |
|                                 |                      | V <sub>DS</sub> =80V, 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                                                                     | 5    |      |      | A    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =2.3A                                                                      |      |      | 310  | mΩ   |
|                                 |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =1.8A                                                                     |      |      | 320  |      |
| Forward Transconductance        | g <sub>FS</sub>      | V <sub>DS</sub> =20V, I <sub>D</sub> =1.5A                                                                      |      | 2    |      | S    |
| Diode Forward Voltage           | V <sub>SD</sub>      | I <sub>S</sub> =1.3A, V <sub>GS</sub> =0V                                                                       |      | 0.85 | 1.2  | V    |
| <b>Dynamic</b>                  |                      |                                                                                                                 |      |      |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =50V, V <sub>GS</sub> =4.5V<br>I <sub>D</sub> ≡1.6A                                             |      | 2.8  | 5.8  | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                                                                 |      | 0.75 |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                                                                 |      | 1.4  |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =50V, V <sub>GS</sub> =0V<br>f=1MHz                                                             |      | 200  |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                                                                 |      | 22   |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                                                                 |      | 13   |      |      |
| Turn-On Time                    | t <sub>d(on)</sub>   | V <sub>DD</sub> =50V, R <sub>L</sub> =39Ω<br>I <sub>D</sub> ≡1.3A, V <sub>GEN</sub> =4.5V<br>R <sub>G</sub> =1Ω |      | 25   | 50   | ns   |
|                                 | t <sub>r</sub>       |                                                                                                                 |      | 20   | 50   |      |
| Turn-Off Time                   | t <sub>d(off)</sub>  |                                                                                                                 |      | 15   | 30   |      |
|                                 | t <sub>f</sub>       |                                                                                                                 |      | 10   | 25   |      |



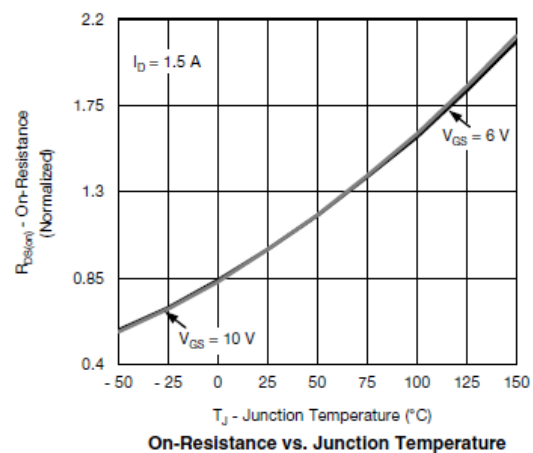
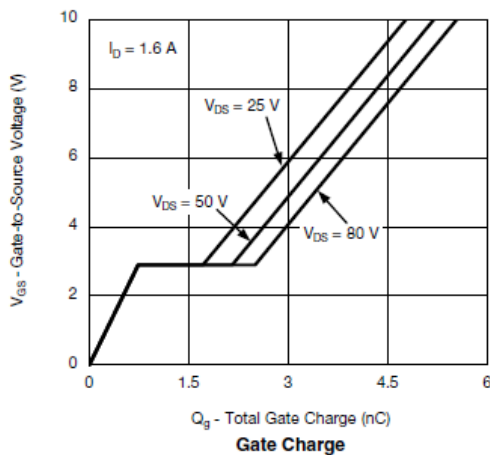
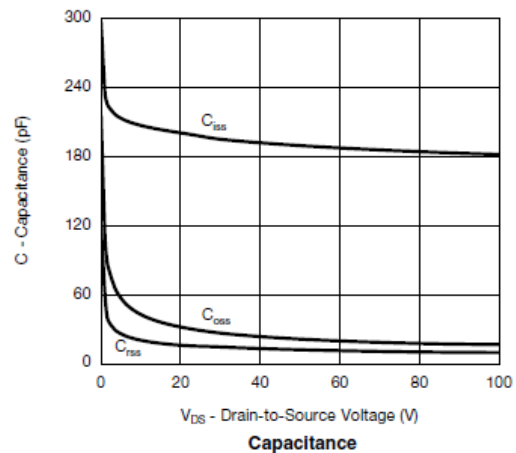
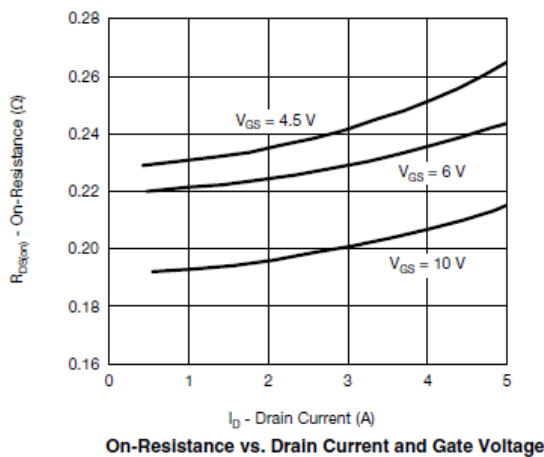
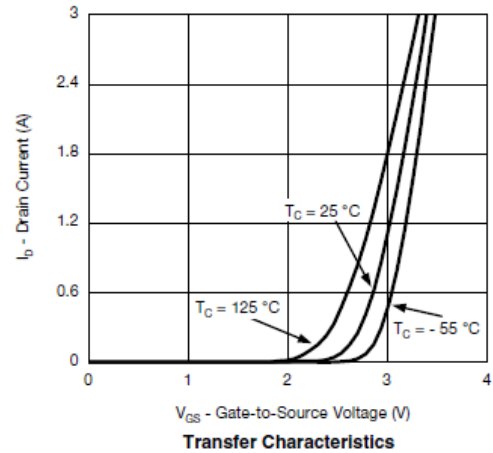
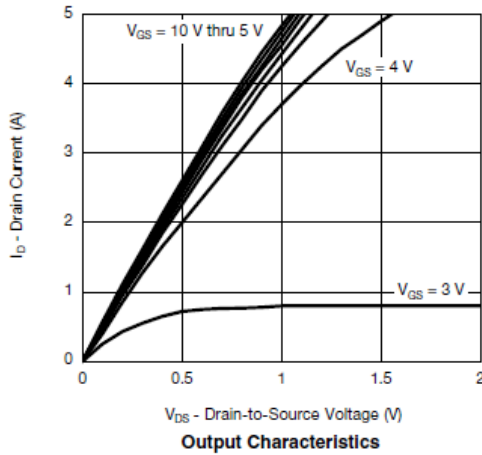
### Electrical Characteristics ( P-Channel )

(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> =-250μA                                                                         | -100 |       |      | V    |
| Gate Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                                           | -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> =-80V, V <sub>GS</sub> =0V                                                                          |      |       | -1   | μA   |
|                                 |                      | V <sub>DS</sub> =-80V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =85°C                                                  |      |       | -30  |      |
| On-State Drain Current          | I <sub>D(on)</sub>   | V <sub>DS</sub> ≤ -15V, V <sub>GS</sub> =-10V                                                                       | -1.6 |       |      | A    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-10V, I <sub>D</sub> =-1.0A                                                                        |      | 600   | 650  | mΩ   |
|                                 |                      | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-0.5A                                                                       |      | 620   | 700  |      |
| Forward Transconductance        | g <sub>FS</sub>      | V <sub>DS</sub> =-15V, I <sub>D</sub> =-0.5A                                                                        |      | 2.8   |      | S    |
| Diode Forward Voltage           | V <sub>SD</sub>      | I <sub>S</sub> =-0.5A, V <sub>GS</sub> =0V                                                                          |      | -0.75 | -1.3 | V    |
| <b>Dynamic</b>                  |                      |                                                                                                                     |      |       |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =-75V, V <sub>GS</sub> =-10V<br>I <sub>D</sub> =-0.5A                                               |      | 9     | 20   | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                                                                     |      | 2.5   |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                                                                     |      | 3.5   |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V<br>f=1MHz                                                                |      | 450   | 650  | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                                                                     |      | 50    |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                                                                     |      | 30    |      |      |
| Turn-On Time                    | t <sub>d(on)</sub>   | V <sub>DD</sub> =-75V, R <sub>L</sub> =75Ω<br>I <sub>D</sub> =-1.0A, V <sub>GEN</sub> =-10V<br>R <sub>G</sub> =6.0Ω |      | 10    | 20   | ns   |
|                                 | t <sub>r</sub>       |                                                                                                                     |      | 15    | 30   |      |
| Turn-Off Time                   | t <sub>d(off)</sub>  |                                                                                                                     |      | 20    | 40   |      |
|                                 | t <sub>f</sub>       |                                                                                                                     |      | 15    | 30   |      |

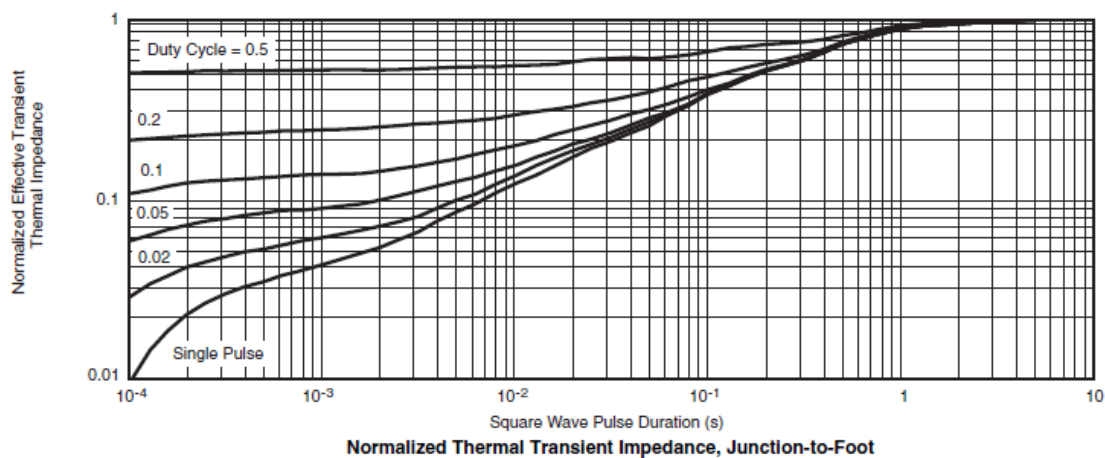
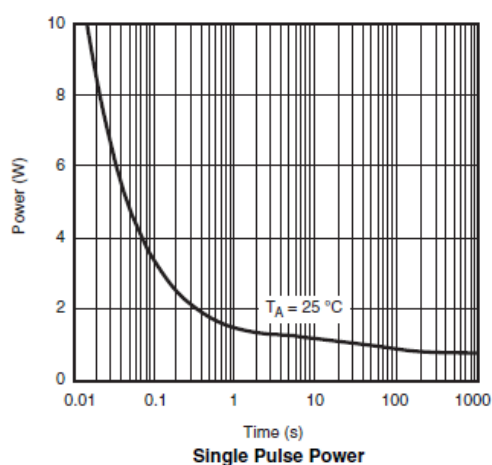
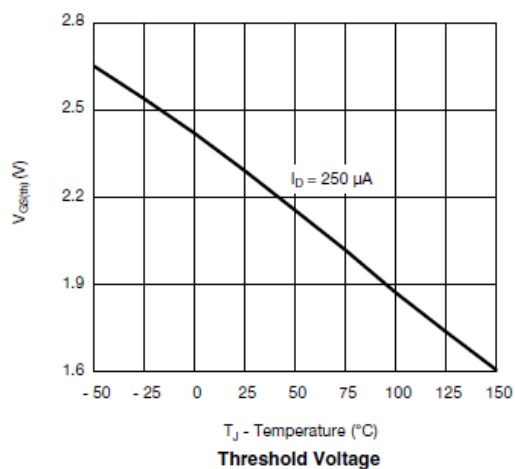
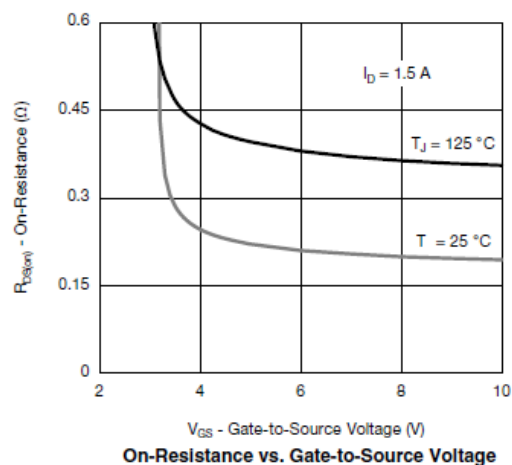
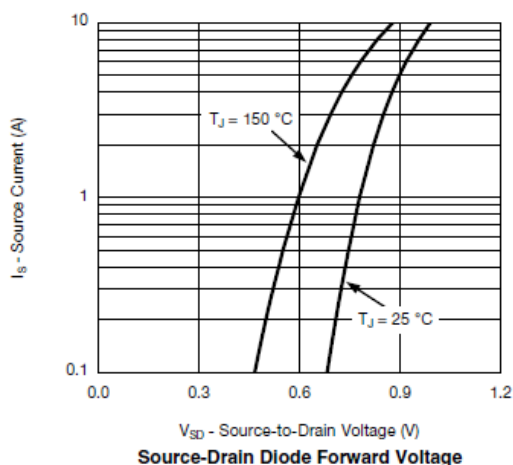


### Typical Characteristics ( N-Channel )





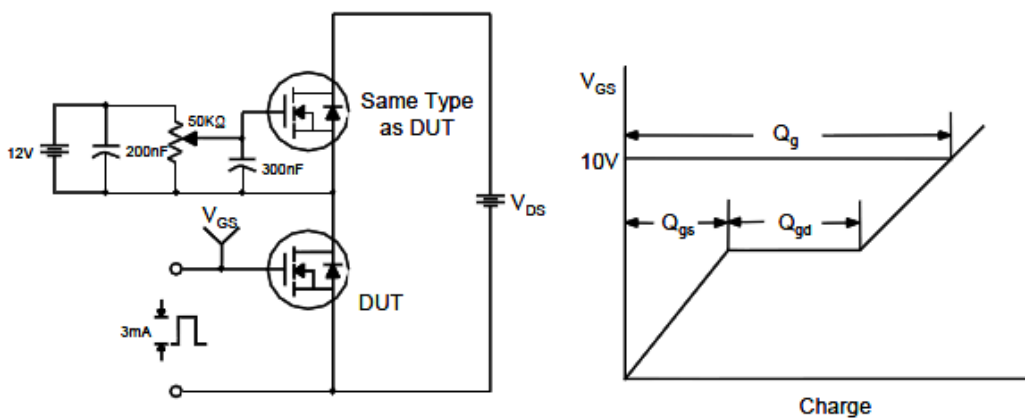
### Typical Characteristics ( N-Channel )



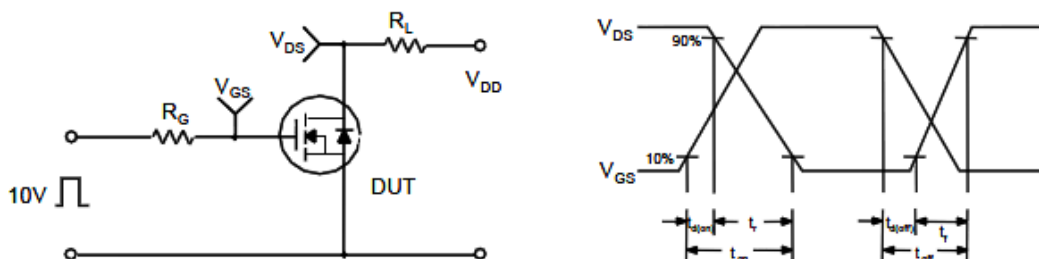


## Typical Characteristics ( N-Channel )

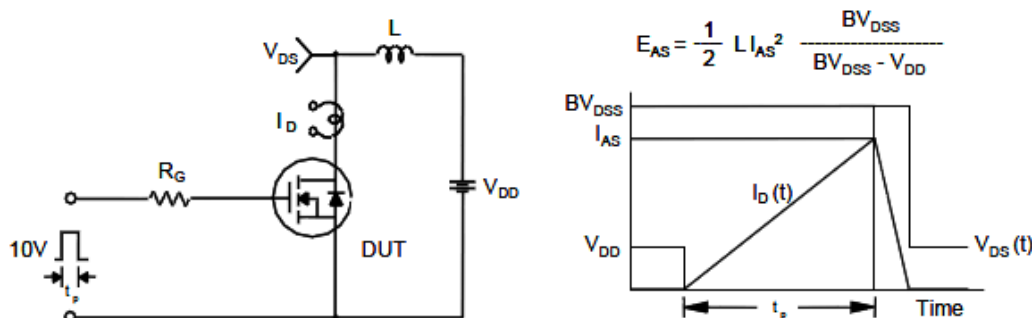
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

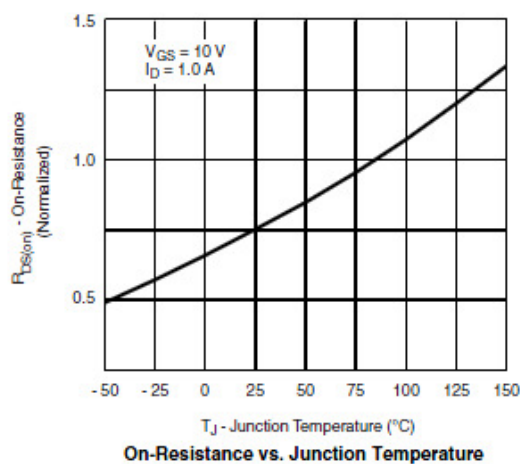
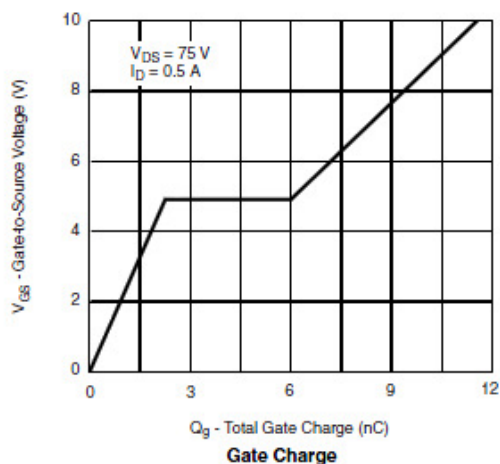
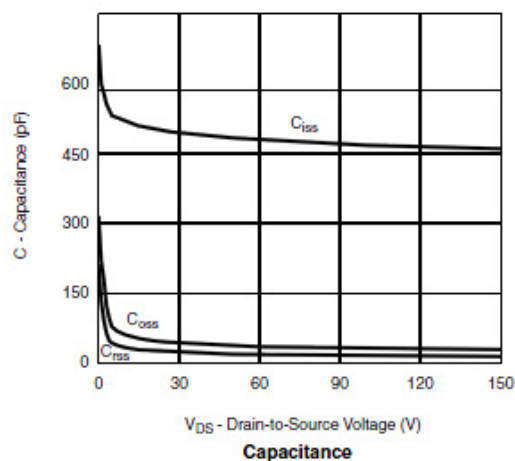
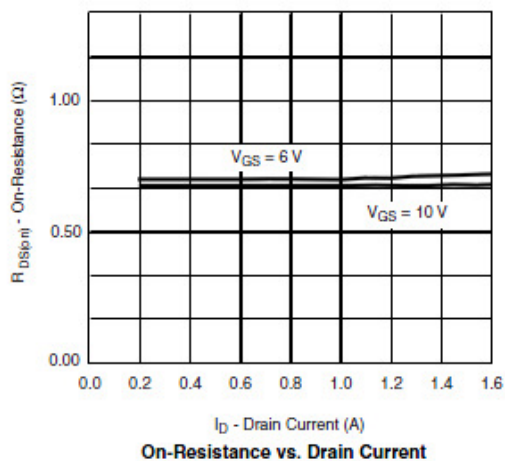
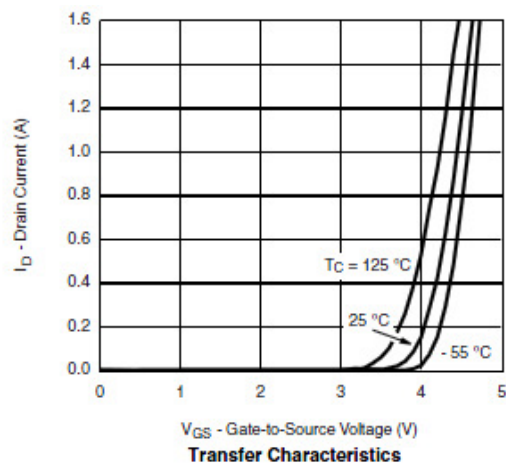
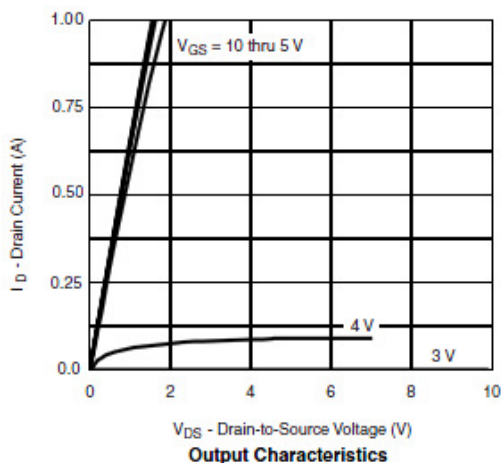


Unclamped Inductive Switching Test Circuit & Waveforms



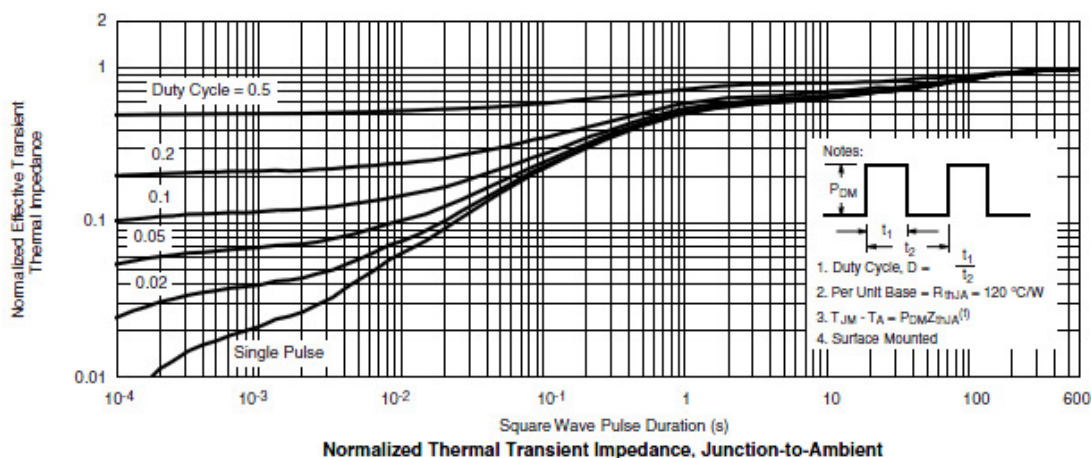
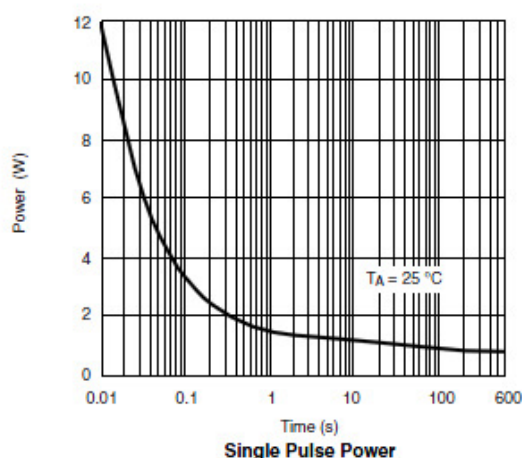
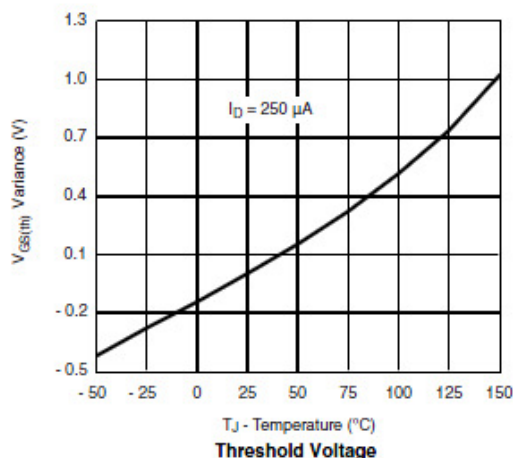
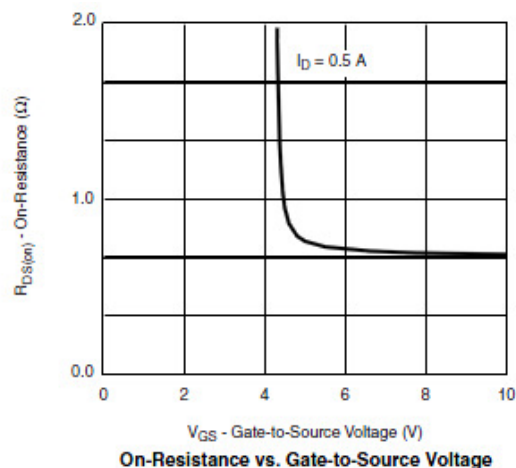
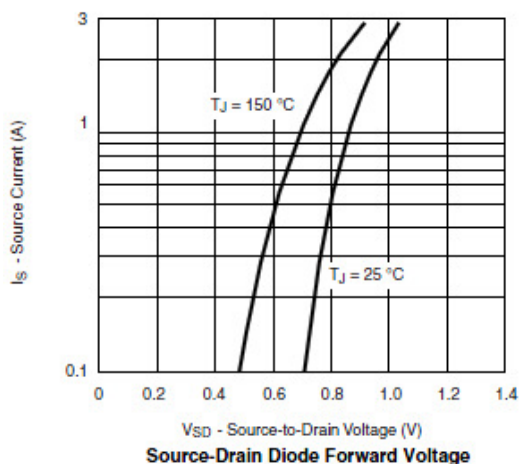


### Typical Characteristics ( P-Channel )





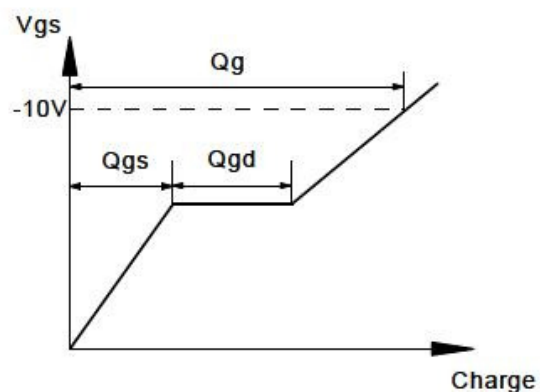
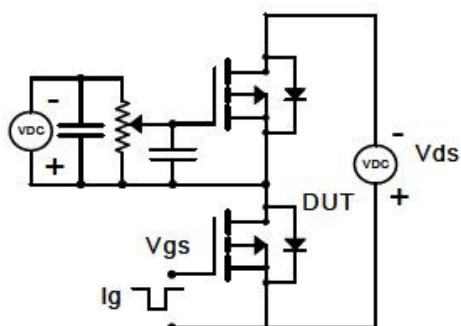
### Typical Characteristics ( P-Channel )



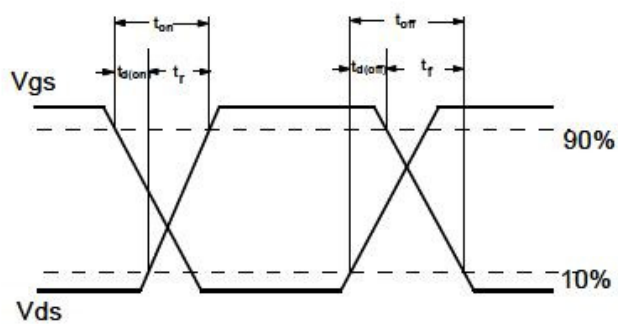
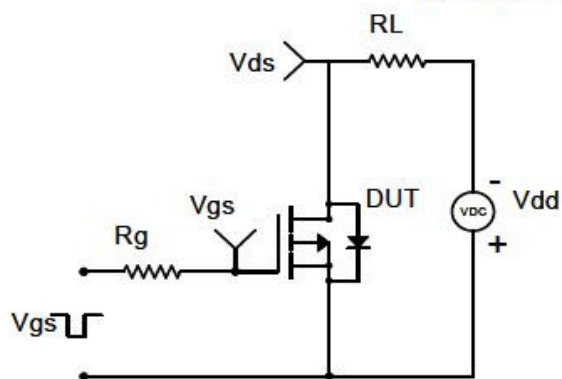


## Typical Characteristics

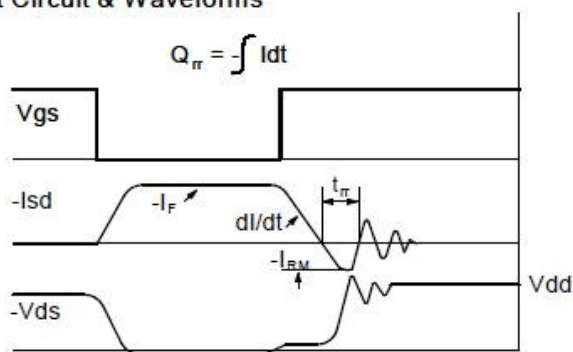
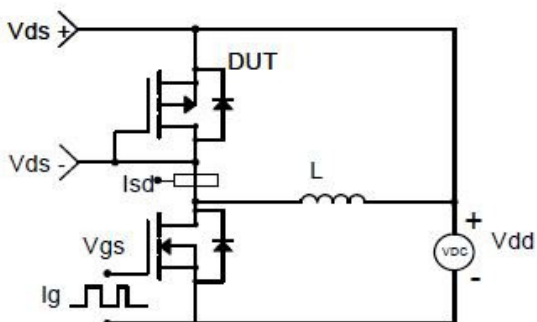
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

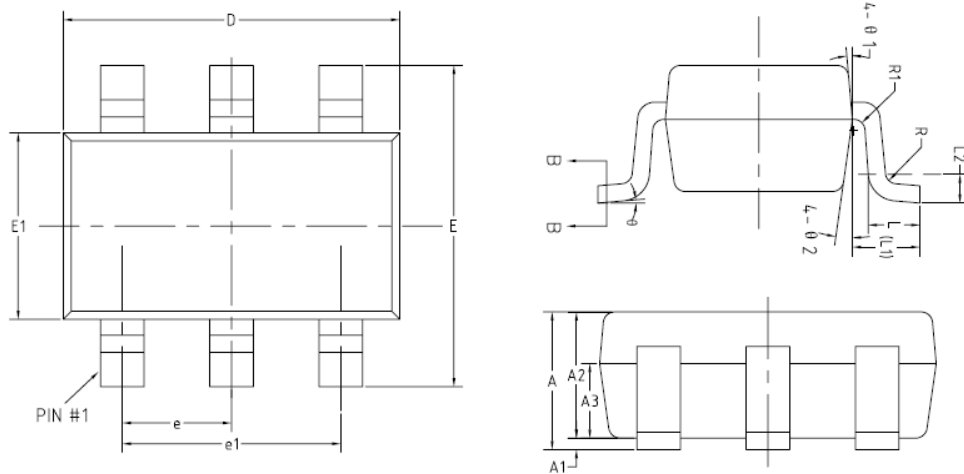


Diode Recovery Test Circuit & Waveforms





**Package Information (SOT-23-6L )**



(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN     | NOM  | MAX  |
|--------|---------|------|------|
| A      | —       | —    | 1.45 |
| A1     | 0       | —    | 0.15 |
| A2     | 0.90    | 1.10 | 1.30 |
| A3     | 0.60    | 0.65 | 0.70 |
| b      | 0.39    | —    | 0.49 |
| b1     | 0.38    | 0.40 | 0.45 |
| c      | 0.12    | —    | 0.19 |
| c1     | 0.11    | 0.13 | 0.15 |
| D      | 2.85    | 2.95 | 3.05 |
| E      | 2.60    | 2.80 | 3.00 |
| E1     | 1.55    | 1.65 | 1.75 |
| e      | 0.85    | 0.95 | 1.05 |
| e1     | 1.80    | 1.90 | 2.00 |
| L      | 0.35    | 0.45 | 0.60 |
| L1     | 0.59REF |      |      |
| L2     | 0.25BSC |      |      |
| R      | 0.05    | —    | —    |
| R1     | 0.05    | —    | 0.20 |
| θ      | 0°      | —    | 8°   |
| θ 1    | 8°      | 10°  | 12°  |
| θ 2    | 8°      | 10°  | 12°  |

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