



General Description

AFC4569WS, N & P Pair enhancement mode MOSFET, uses Advanced Trench Technology to provide excellent RDS(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

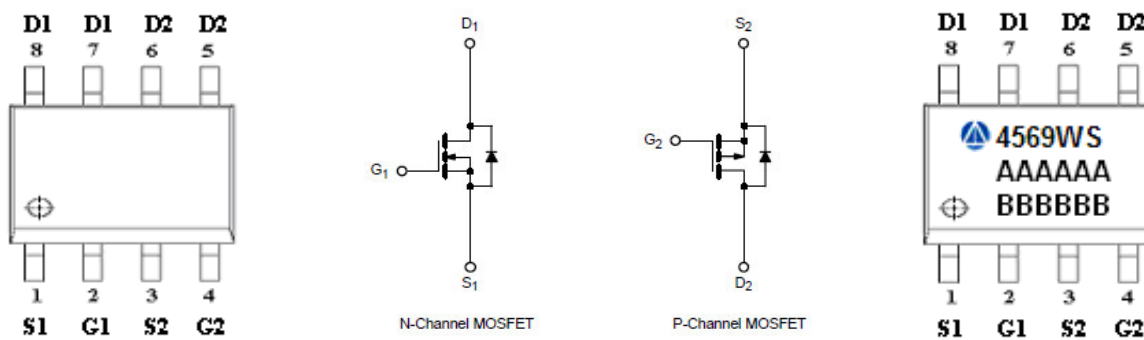
N-Channel

- 60V/8A, $R_{DS(ON)} = 36m\Omega @ V_{GS} = 10V$
- 60V/6A, $R_{DS(ON)} = 40m\Omega @ V_{GS} = 4.5V$

P-Channel

- -60V/-8.0A, $R_{DS(ON)} = 60m\Omega @ V_{GS} = -10V$
- -60V/-6.0A, $R_{DS(ON)} = 72m\Omega @ V_{GS} = -4.5V$

Pin Description (SOP-8P)



Application

- Low Current DC/DC Conversion
- Load Switch
- CCFL Inverter
- Power Management in Notebook Computer

Pin Define

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1 | S1 | Source 1 |
| 2 | G1 | Gate 1 |
| 3 | S2 | Source 2 |
| 4 | G2 | Gate 2 |
| 5 | D2 | Drain 2 |
| 6 | D2 | Drain 2 |
| 7 | D1 | Drain 1 |
| 8 | D1 | Drain 1 |

Ordering Information

| Part Ordering No. | Part Marking | Package | Unit | Quantity |
|-------------------|--------------|---------|-------------|----------|
| AFC4569WSS8RG | 4569WS | SOP-8P | Tape & Reel | 2500 EA |

- ※ A Lot code
- ※ B Date code
- ※ AFC4569WSS8RG : 13" Tape & Reel ; Pb- Free ; Halogen- Free



Absolute Maximum Ratings (N-Channel)

(T_A=25°C Unless otherwise noted)

| Parameter | Symbol | Typical | Unit |
|---|------------------|----------------------|------|
| Drain-Source Voltage | V _{DSS} | 60 | V |
| Gate –Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current(T _J =150°C) | I _D | T _A =25°C | 8 |
| | | T _A =70°C | 6 |
| Pulsed Drain Current | I _{DM} | 20 | A |
| Continuous Source Current(Diode Conduction) | I _S | 1.5 | A |
| Power Dissipation | P _D | T _A =25°C | 2.8 |
| | | T _A =70°C | 1.8 |
| Operating Junction Temperature | T _J | 150 | °C |
| Storage Temperature Range | T _{STG} | -55/150 | °C |
| Thermal Resistance-Junction to Ambient | R _{θJA} | 62.5 | °C/W |

Electrical Characteristics (N-Channel)

(T_A=25°C Unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit |
|---------------------------------|----------------------|---|------|-----|------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} =0V, I _D =250uA | 60 | | | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250uA | 1.0 | | 2.0 | |
| Gate Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} =±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =48V, V _{GS} =0V | | | 1 | uA |
| | | V _{DS} =48V, V _{GS} =0V T _J =85°C | | | 5 | |
| On-State Drain Current | I _{D(on)} | V _{DS} ≥ 5V, V _{GS} =10V | 20 | | | A |
| Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =10V, I _D =8A | | 28 | 36 | mΩ |
| | | V _{GS} =4.5V, I _D =6A | | 32 | 40 | |
| Forward Transconductance | g _{FS} | V _{DS} =15V, I _D =15A | | 20 | | S |
| Diode Forward Voltage | V _{SD} | I _S =2.0A, V _{GS} =0V | | 0.8 | 1.3 | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q _g | V _{DS} =30V, V _{GS} =4.5V I _D ≅8A | | 6.5 | 13 | nC |
| Gate-Source Charge | Q _{gs} | | | 3 | | |
| Gate-Drain Charge | Q _{gd} | | | 3 | | |
| Input Capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V f=1MHz | | 680 | | pF |
| Output Capacitance | C _{oss} | | | 150 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 60 | | |
| Turn-On Time | t _{d(on)} | V _{DD} =30V, R _L =1.3Ω I _D ≅8A, V _{GEN} =10V R _G =6Ω | | 8 | 15 | ns |
| | t _r | | | 15 | 30 | |
| Turn-Off Time | t _{d(off)} | | | 30 | 60 | |
| | t _f | | | 25 | 50 | |



Absolute Maximum Ratings (P-Channel)

(T_A=25°C Unless otherwise noted)

| Parameter | Symbol | Typical | Unit |
|---|------------------|----------------------|------|
| Drain-Source Voltage | V _{DSS} | -60 | V |
| Gate –Source Voltage | V _{GSS} | ±20 | V |
| Continuous Drain Current(T _J =150°C) | I _D | T _A =25°C | -8.0 |
| | | T _A =70°C | -6.0 |
| Pulsed Drain Current | I _{DM} | -20 | A |
| Continuous Source Current(Diode Conduction) | I _S | -1.7 | A |
| Power Dissipation | P _D | T _A =25°C | 2.8 |
| | | T _A =70°C | 1.8 |
| Operating Junction Temperature | T _J | 150 | °C |
| Storage Temperature Range | T _{STG} | -55/150 | °C |
| Thermal Resistance-Junction to Ambient | R _{θJA} | 62.5 | °C/W |

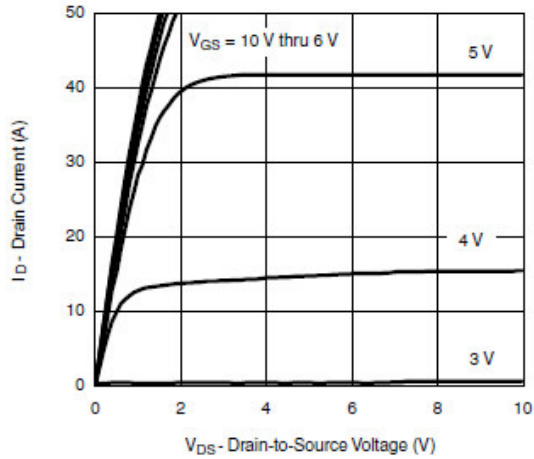
Electrical Characteristics (P-Channel)

(T_A=25°C Unless otherwise noted)

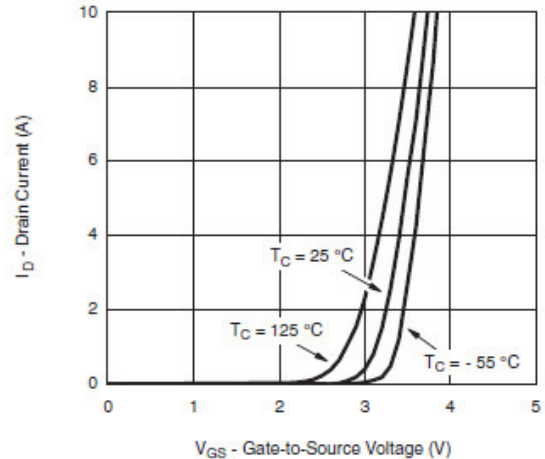
| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit |
|---------------------------------|----------------------|--|------|------|------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} =0V, I _D = -250uA | -60 | | | V |
| Gate Threshold Voltage | V _{G(th)} | V _{DS} =V _{GS} , I _D = -250uA | -1.0 | | -2.5 | |
| Gate Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = -48V, V _{GS} =0V | | | -1 | uA |
| | | V _{DS} = -48V, V _{GS} =0V T _J =85°C | | | -20 | |
| On-State Drain Current | I _{D(on)} | V _{DS} ≥ -5V, V _{GS} = -10V | -20 | | | A |
| Drain-Source On-Resistance | R _{DS(on)} | V _{GS} = -10V, I _D =-8A | | 52 | 60 | mΩ |
| | | V _{GS} = -4.5V, I _D =-6A | | 61 | 72 | |
| Forward Transconductance | g _{FS} | V _{DS} = -15V, I _D = -3.2A | | 12 | | S |
| Diode Forward Voltage | V _{SD} | I _S = -3A, V _{GS} =0V | | -0.8 | -1.3 | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q _g | V _{DS} =-30V, V _{GS} =-10V I _D = -8A | | 25 | 40 | nC |
| Gate-Source Charge | Q _{gs} | | | 5 | | |
| Gate-Drain Charge | Q _{gd} | | | 8 | | |
| Input Capacitance | C _{iss} | V _{DS} =-25V, V _{GS} =0V f=1MHz | | 1200 | 2000 | pF |
| Output Capacitance | C _{oss} | | | 140 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 90 | | |
| Turn-On Time | t _{d(on)} | V _{DD} =-30V, R _L =3.0Ω I _D =-8A, V _{GEN} =-10V R _G =2.5Ω | | 10 | 20 | ns |
| | t _r | | | 10 | 20 | |
| Turn-Off Time | t _{d(off)} | | | 45 | 80 | |
| | t _f | | | 25 | 40 | |



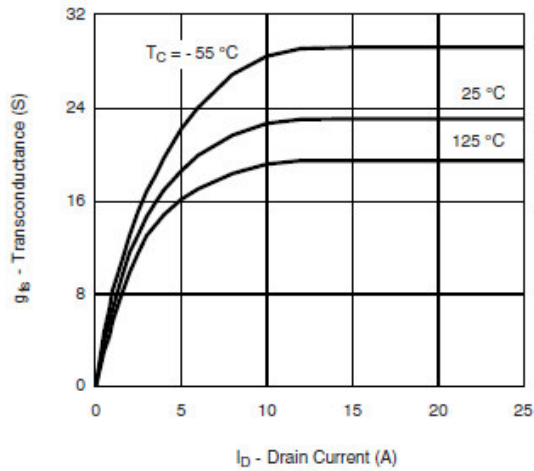
Typical Characteristics (N-Channel)



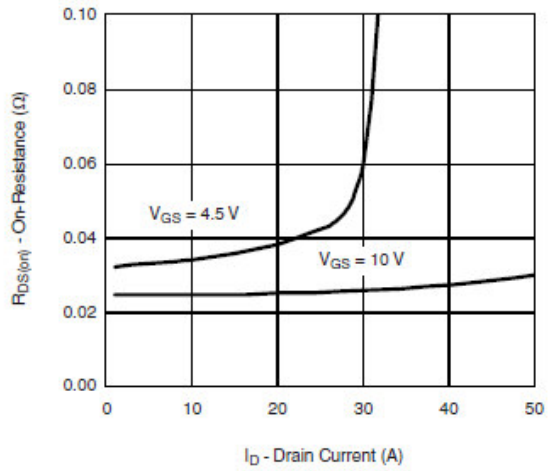
Output Characteristics



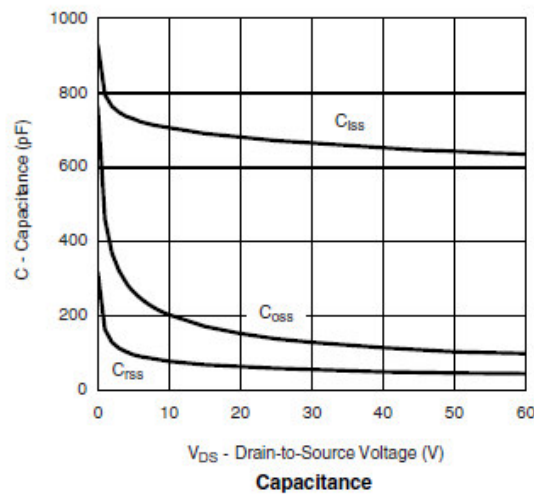
Transfer Characteristics



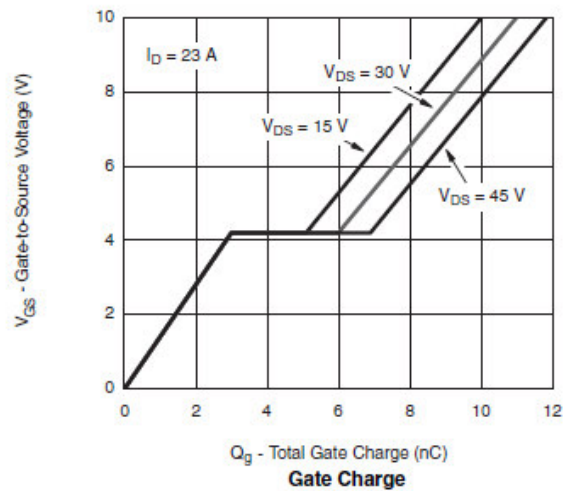
Transconductance



On-Resistance vs. Drain Current



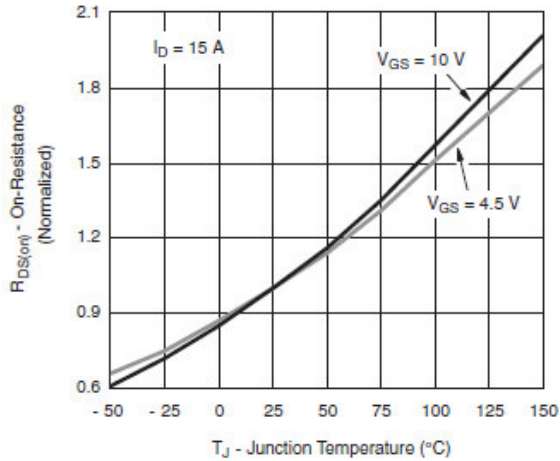
Capacitance



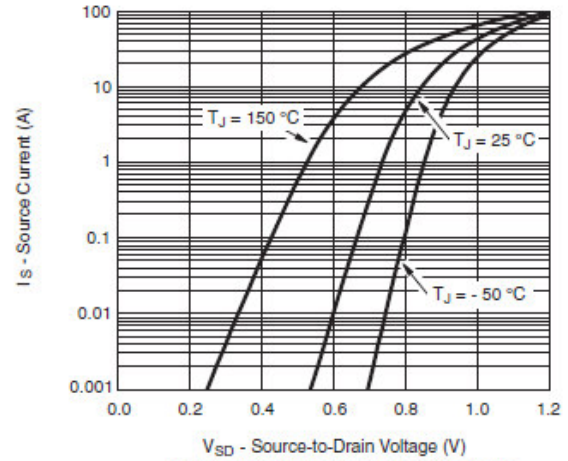
Gate Charge



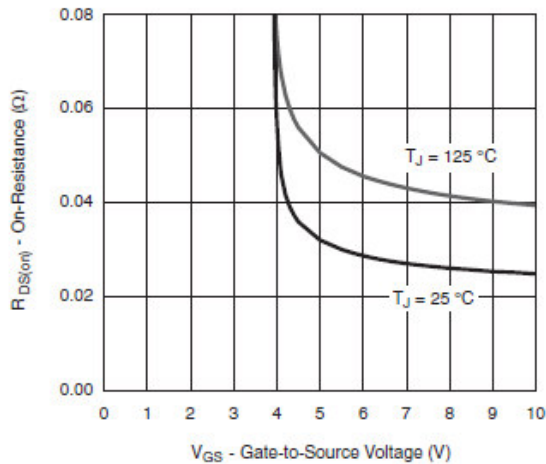
Typical Characteristics (N-Channel)



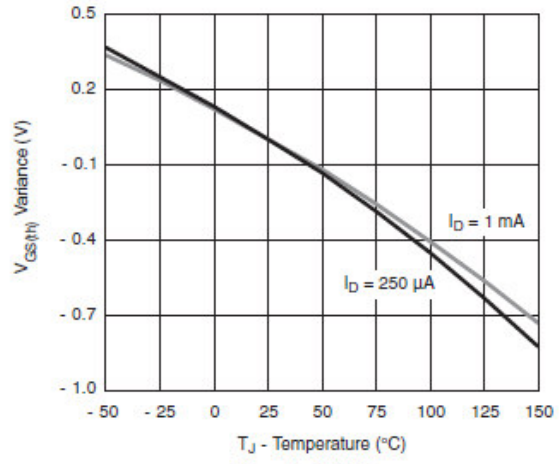
On-Resistance vs. Junction Temperature



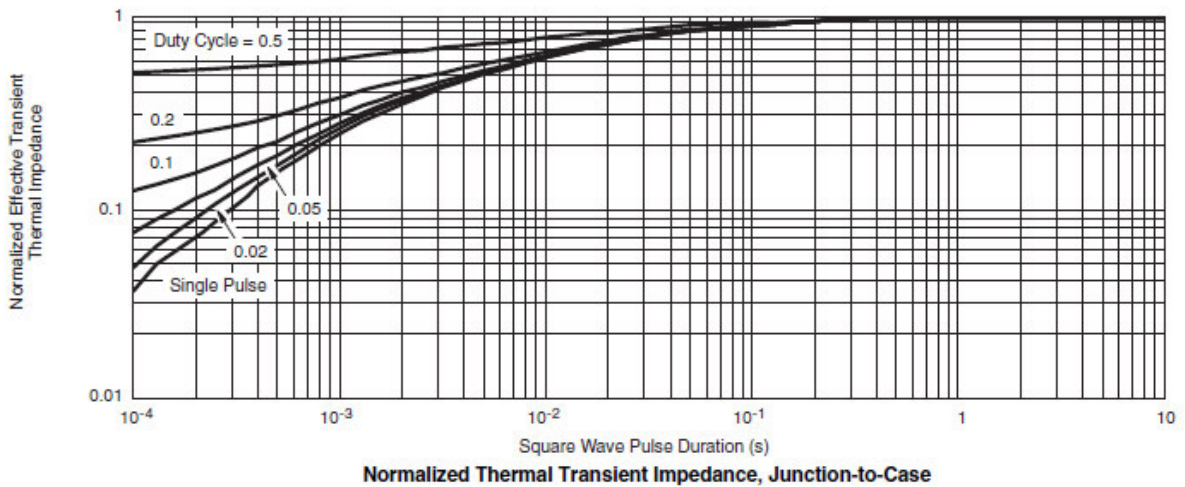
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



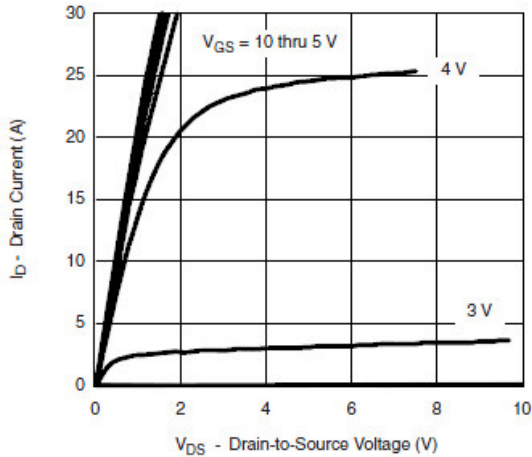
Threshold Voltage



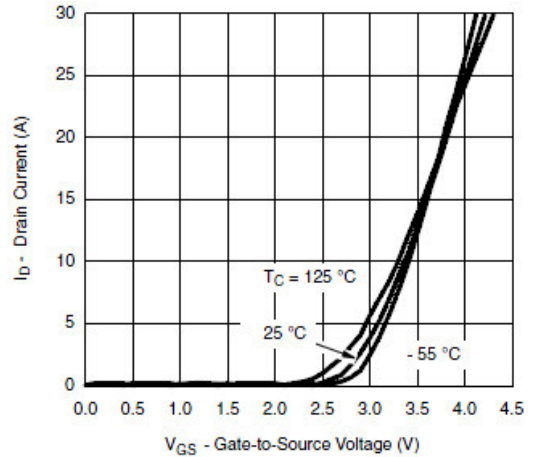
Normalized Thermal Transient Impedance, Junction-to-Case



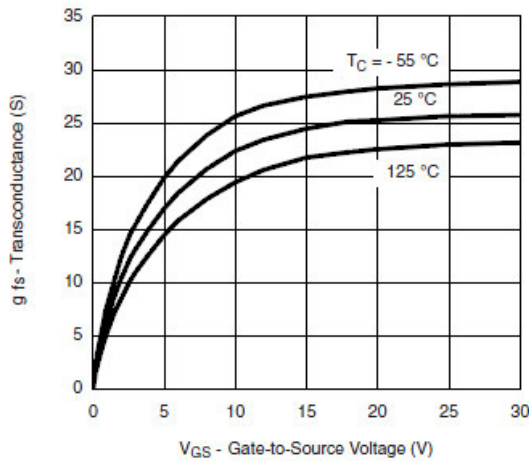
Typical Characteristics (P-Channel)



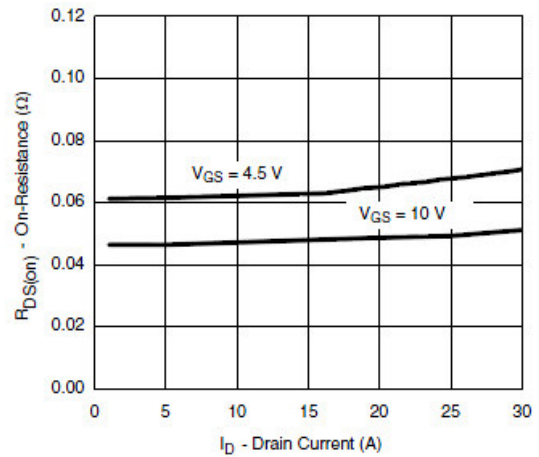
Output Characteristics



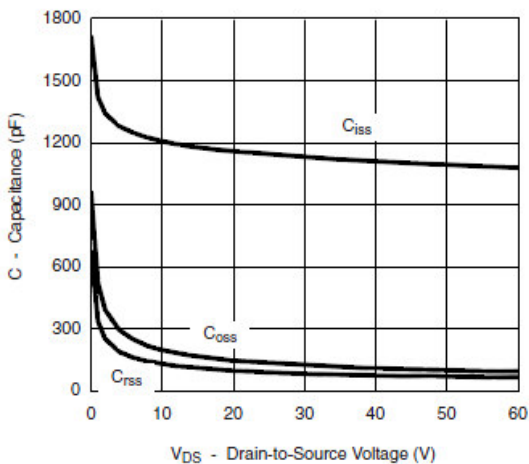
Transfer Characteristics



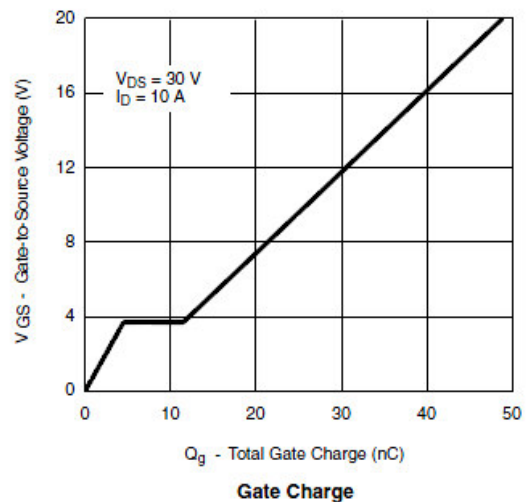
Transconductance



On-Resistance vs. Drain Current



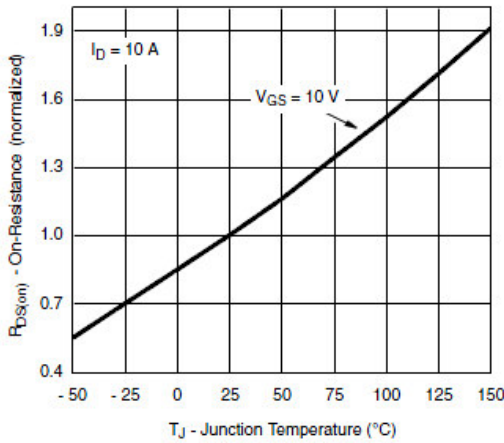
Capacitance



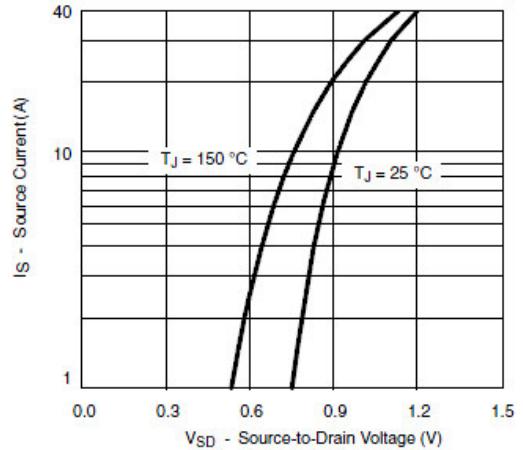
Gate Charge



Typical Characteristics (P-Channel)

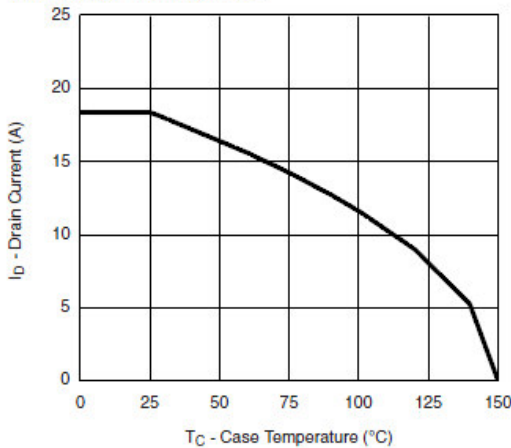


On-Resistance vs. Junction Temperature

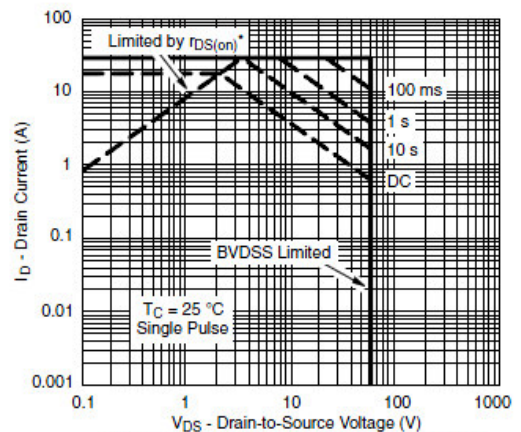


Source-Drain Diode Forward Voltage

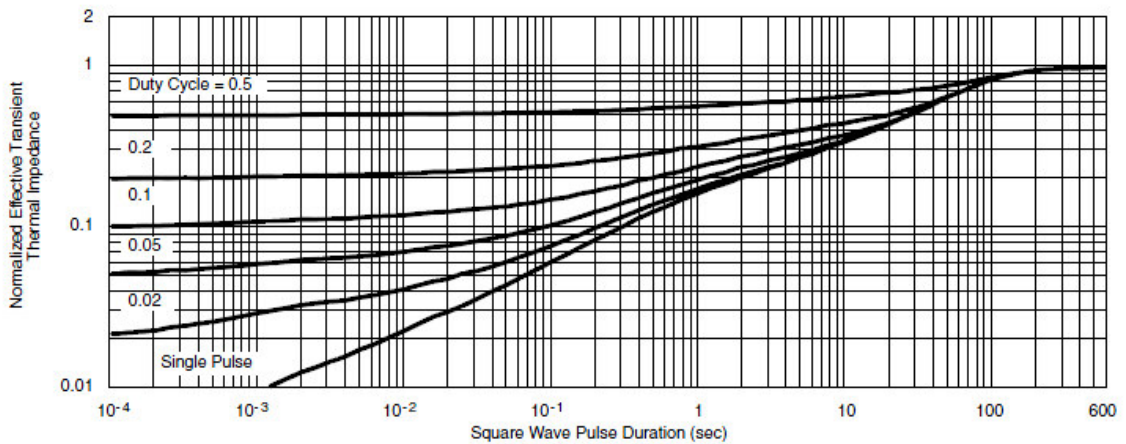
THERMAL RATINGS



Maximum Drain Current vs. Case Temperature



Safe Operating Area
* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified

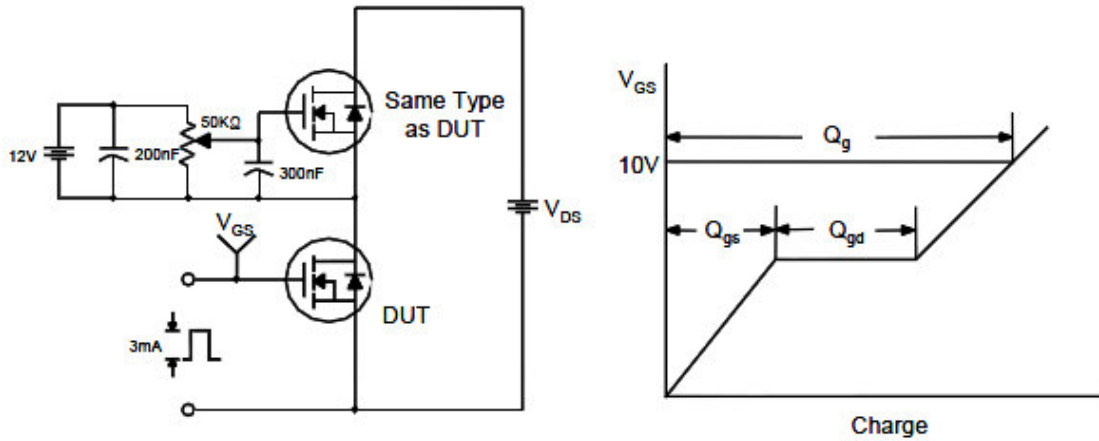


Normalized Thermal Transient Impedance, Junction-to-Ambient

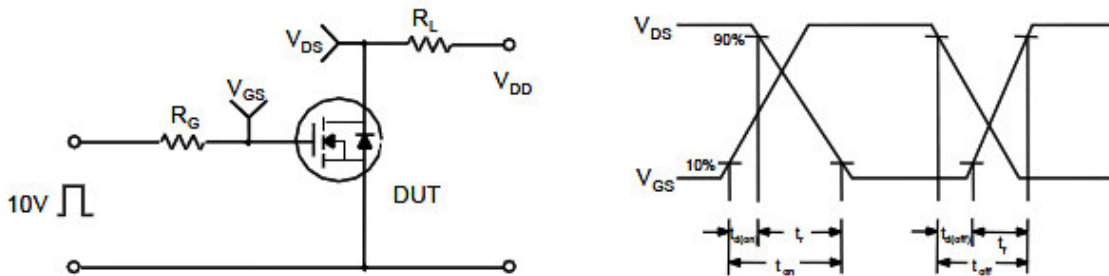


Typical Characteristics

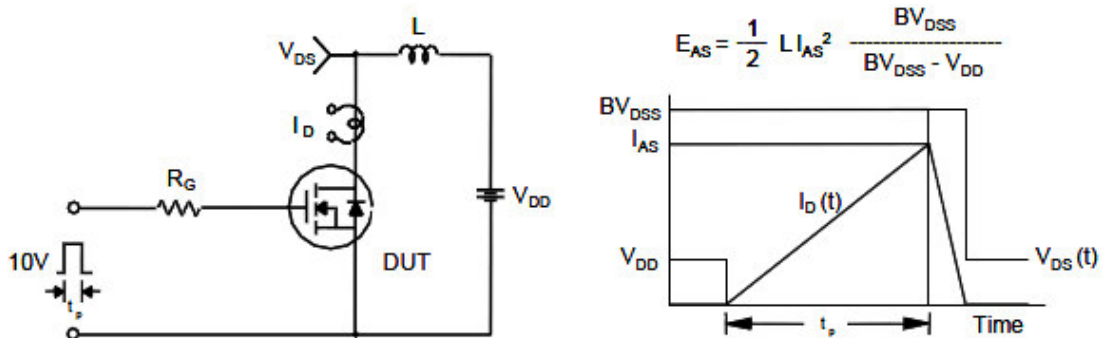
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

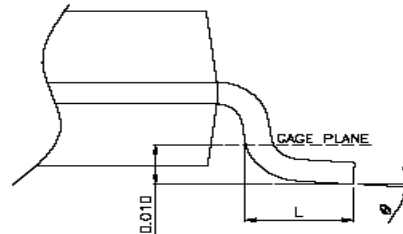
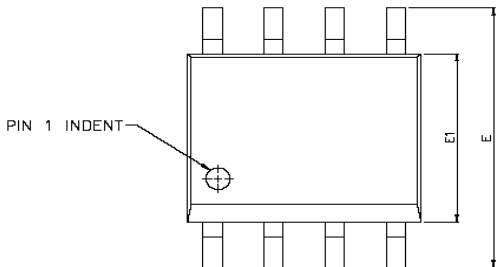


Unclamped Inductive Switching Test Circuit & Waveforms

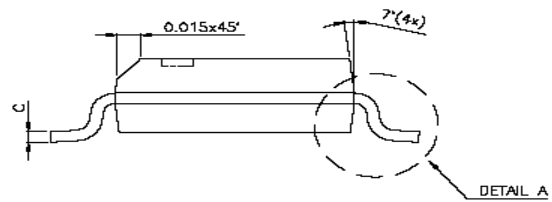
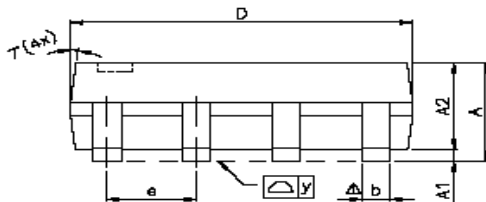




Package Information (SOP-8P)



DETAIL A



DETAIL A

| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---------------|---------------------------|------|-------|----------------------|-------|--------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.47 | 1.60 | 1.73 | 0.058 | 0.063 | 0.068 |
| A1 | 0.10 | — | 0.25 | 0.004 | — | 0.010 |
| A2 | — | 1.45 | — | — | 0.057 | — |
| b | 0.33 | 0.41 | 0.51 | 0.013 | 0.016 | 0.020 |
| C | 0.19 | 0.20 | 0.25 | 0.0075 | 0.008 | 0.0098 |
| D | 4.80 | 4.85 | 4.95 | 0.189 | 0.191 | 0.195 |
| E | 5.80 | 6.00 | 6.20 | 0.228 | 0.236 | 0.244 |
| E1 | 3.80 | 3.90 | 4.00 | 0.150 | 0.154 | 0.157 |
| e | — | 1.27 | — | — | 0.050 | — |
| L | 0.38 | 0.71 | 1.27 | 0.015 | 0.028 | 0.050 |
| Δ y | — | — | 0.076 | — | — | 0.003 |
| \varnothing | 0° | — | 8° | 0° | — | 8° |

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