

N- and P-Channel 30-V (D-S) MOSFET

GENERAL DESCRIPTION

The ME4542 is the N- and P-Channel logic enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching, and low in-line power loss are needed in a very small outline surface mount package.

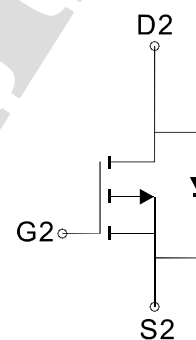
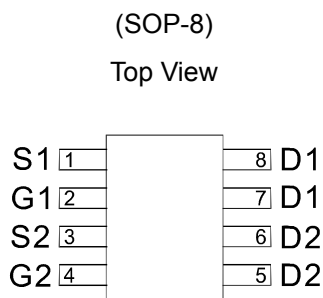
FEATURES

- 30V/6.9A, $R_{DS(ON)}=25m\Omega@V_{GS}=10V$ (N-Ch)
- 30V/5.8A, $R_{DS(ON)}=40m\Omega@V_{GS}=4.5V$ (N-Ch)
- -30V/-6.1A, $R_{DS(ON)}=35m\Omega@V_{GS}=-10V$ (P-Ch)
- -30V/-5.1A, $R_{DS(ON)}=58m\Omega@V_{GS}=-4.5V$ (P-Ch)
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC

PIN CONFIGURATION



N-Channel MOSFET

P-Channel MOSFET

Absolute Maximum Ratings (TA=25°C Unless Otherwise Noted)

| Parameter | | Symbol | N-Channel | | P-Channel | | Unit |
|--|---------|------------------|------------|----|-----------|----|------|
| Drain-Source Voltage | | V_{DSS} | 30 | | -30 | | V |
| Gate-Source Voltage | | V_{GSS} | ±20 | | ±20 | | V |
| Continuous Drain Current (t _J =150°C) | TA=25°C | I _D | 6.9 | | -6.1 | | A |
| | TA=70°C | | 5.5 | | -4.9 | | |
| Pulsed Drain Current | | I _{DM} | 30 | | -30 | | A |
| Continuous Source Current (Diode Conduction) | | I _S | 1.7 | | -1.7 | | A |
| Avalanche Energy with Single Pulse | | EAS | 10 | | 20 | | mJ |
| Maximum Power Dissipation | TA=25°C | P _D | 2.0 | | | | W |
| | TA=70°C | | 1.3 | | | | |
| Operating Junction Temperature | | T _J | -55 to 150 | | | | °C |
| Thermal Resistance-Junction to Ambient* | | R _{θJA} | Steady | 75 | Steady | 65 | °C/W |
| | | | 10sec | 47 | 10sec | 35 | |
| Thermal Resistance-Junction to Case | | R _{θJC} | 44 | | 30 | | °C/W |

*The device mounted on 1in2 FR4 board with 2 oz copper

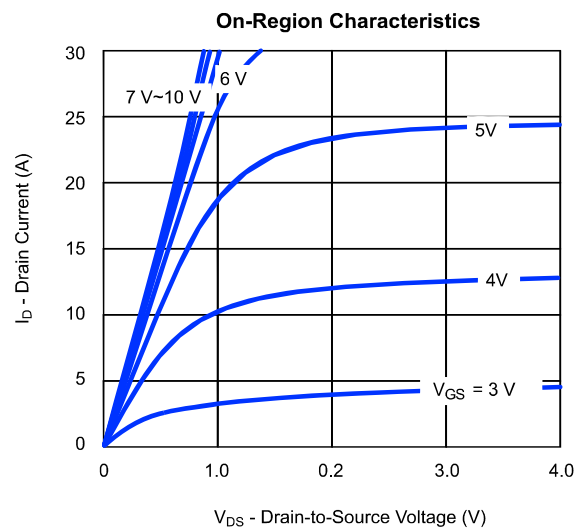
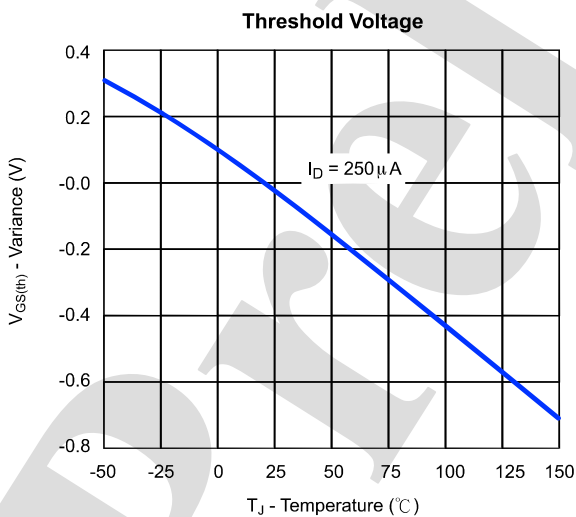
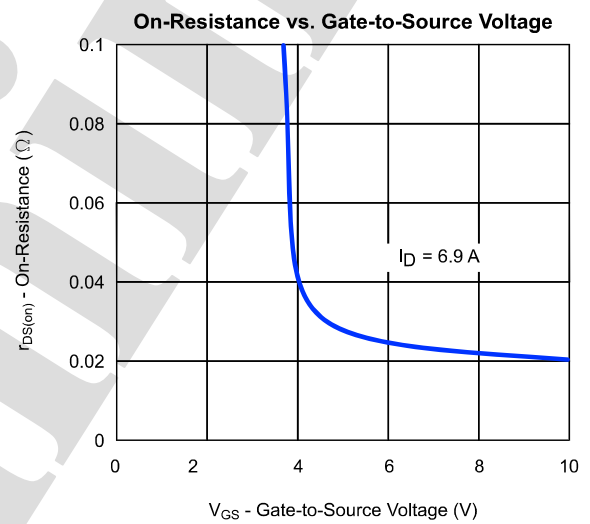
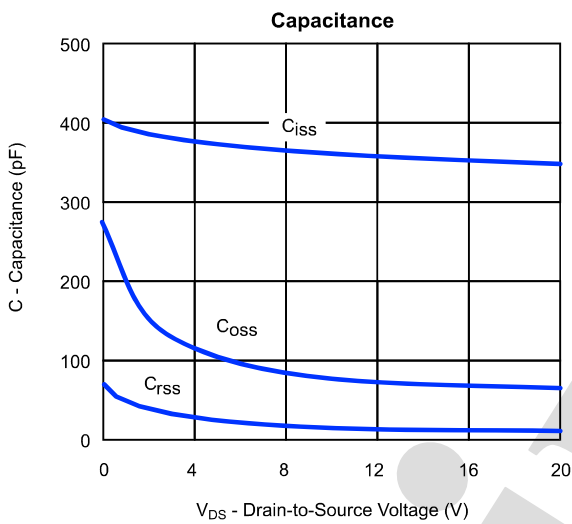
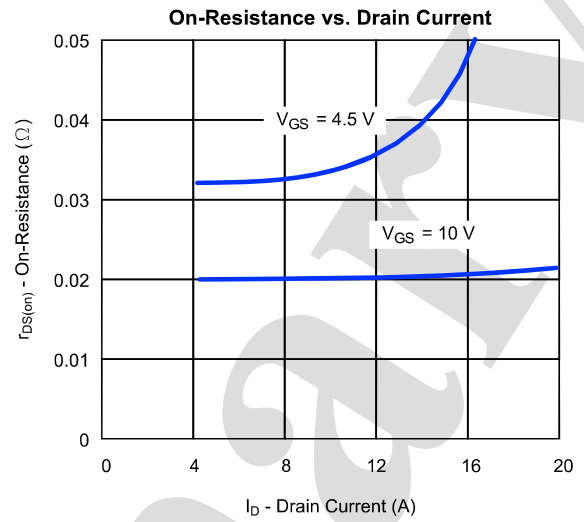
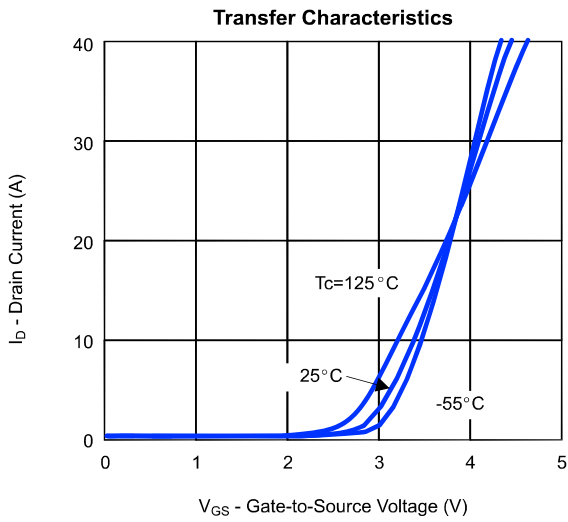
N- and P-Channel 30-V (D-S) MOSFET

Electrical Characteristics (TA=25°C Unless Otherwise Specified)

| Symbol | Parameter | Limit | Min | Typ | Max | Unit | |
|---------------------|----------------------------------|---|--------------|-------------|-------------|--------------|----|
| STATIC | | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250 μA V _{DS} =V _{GS} , I _D =-250 μA | N-Ch P-Ch | 1.0 -1.0 | 1.5 -1.5 | 3.0 -3.0 | V |
| I _{GSS} | Gate Leakage Current | V _{DS} =0V, V _{GS} =±20V | N-Ch P-Ch | | | ±100 ±100 | nA |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =30V, V _{GS} =0V V _{DS} =-30V, V _{GS} =0V | N-Ch P-Ch | | | 1 -1 | μA |
| | | V _{DS} =30V, V _{GS} =0V, T _J =55°C V _{DS} =-30V, V _{GS} =0V, T _J =55°C | N-Ch P-Ch | | | 25 -25 | |
| I _{D(ON)} | On-State Drain Current | V _{DS} ≥5V, V _{GS} =10V V _{DS} ≤-5V, V _{GS} =-10V | N-Ch P-Ch | 20 -20 | | | A |
| R _{DS(ON)} | Drain-Source On-State Resistance | V _{GS} =10V, I _D =6.9A V _{GS} =-10V, I _D =-6.1A | N-Ch P-Ch | | 21 30 | 25 35 | mΩ |
| | | V _{GS} =4.5V, I _D =5.8A V _{GS} =-4.5V, I _D =-5.1A | N-Ch P-Ch | | 32 48 | 40 58 | |
| V _{SD} | Diode Forward Voltage | I _S =1.7A, V _{GS} =0V I _S =-1.7A, V _{GS} =0V | N-Ch P-Ch | | 0.8 -0.8 | 1.2 -1.2 | V |
| DYNAMIC | | | | | | | |
| Q _g | Total Gate Charge | N-Channel V _{DS} =15V, V _{GS} =10V, I _D =6.9A P-Channel V _{DS} =-15V, V _{GS} =-10V, I _D =-6.1A | N-Ch P-Ch | | 12 21 | 15 25 | nC |
| Q _{gs} | Gate-Source Charge | | N-Ch P-Ch | | 2 4 | | |
| Q _{gd} | Gate-Drain Charge | | N-Ch P-Ch | | 2.5 6 | | |
| C _{iss} | Input Capacitance | N-Channel V _{DS} =15V, V _{GS} =0V, f=1MHz P-Channel V _{DS} =15V, V _{GS} =0V, f=1MHz | N-Ch P-Ch | | 360 840 | 420 980 | pF |
| C _{oss} | Output Capacitance | | N-Ch P-Ch | | 70 120 | | |
| C _{rss} | Reverse Transfer Capacitance | | N-Ch P-Ch | | 17 32 | | |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | N-Ch P-Ch | | 0.5 6 | | Ω |
| t _{d(on)} | Turn-On Delay Time | N-Channel V _{DD} =15V, R _L =15Ω I _D =1A, V _{GEN} =10V, R _G =6Ω P-Channel V _{DD} =-15V, R _L =15Ω I _D =-1A, V _{GEN} =-10V, R _G =6Ω | N-Ch P-Ch | | 9.3 32 | 13 41 | ns |
| t _r | Turn-On Rise Time | | N-Ch P-Ch | | 14 13 | 18 17 | |
| t _{d(off)} | Turn-Off Delay Time | | N-Ch P-Ch | | 32 58 | 41 75 | |
| t _f | Turn-Off Fall Time | | N-Ch P-Ch | | 3.2 6.8 | 5 9 | |

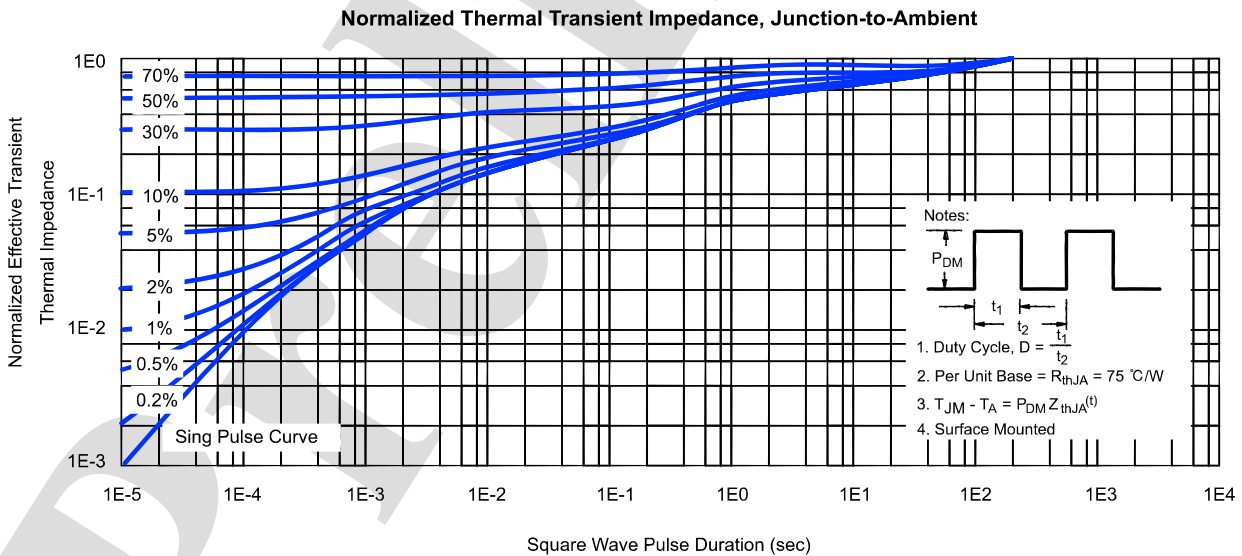
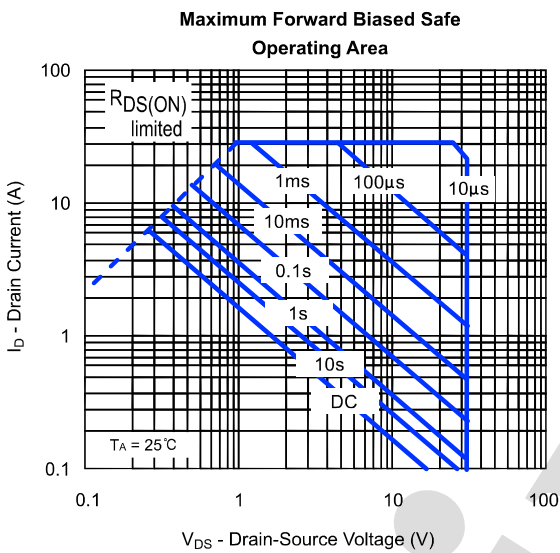
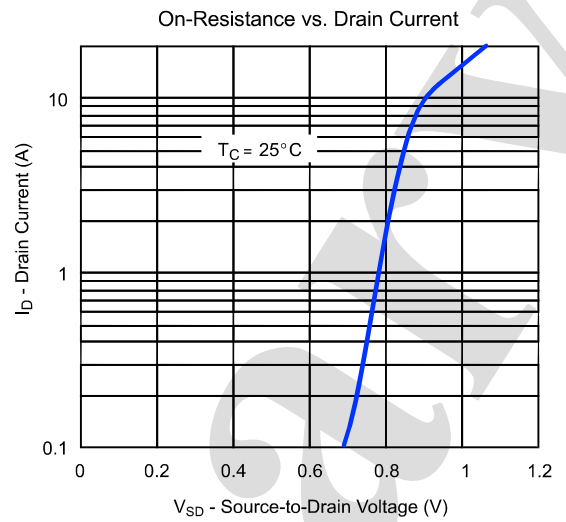
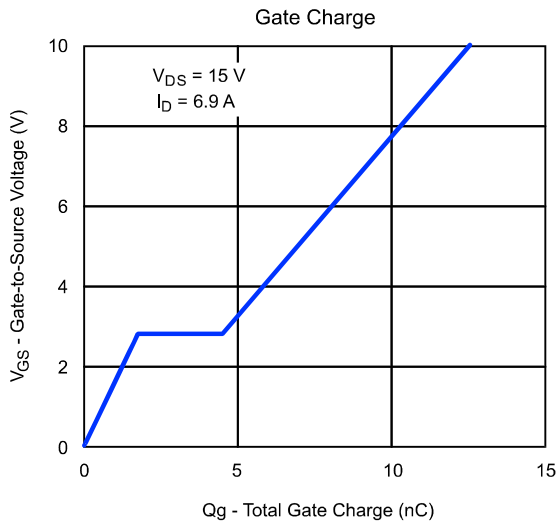
Typical Characteristics (T_J = 25°C Noted)

N-CHANNEL



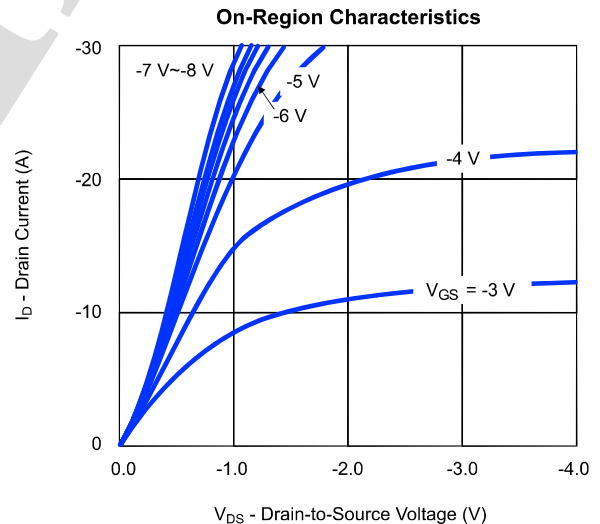
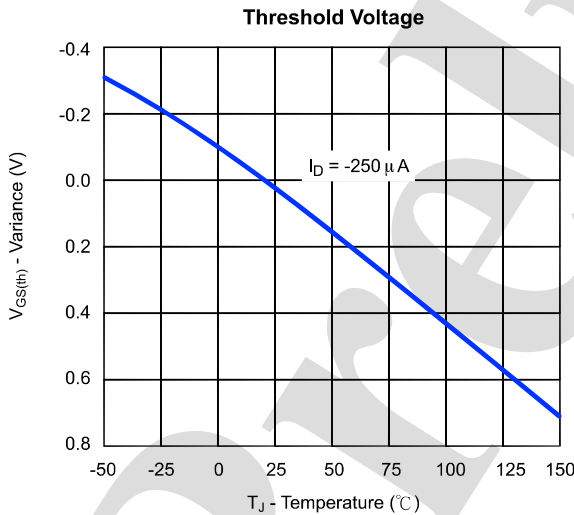
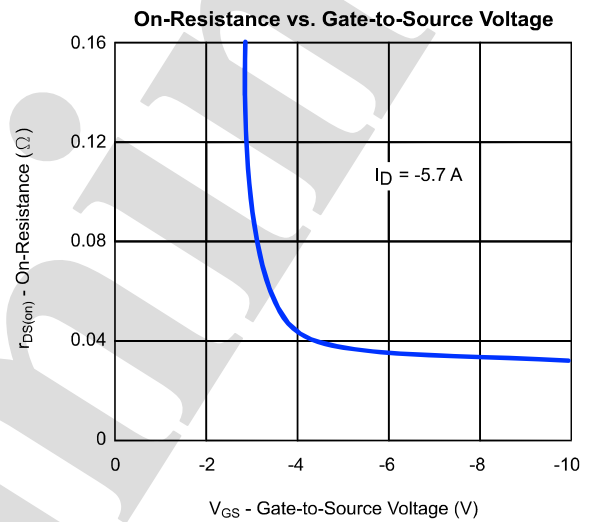
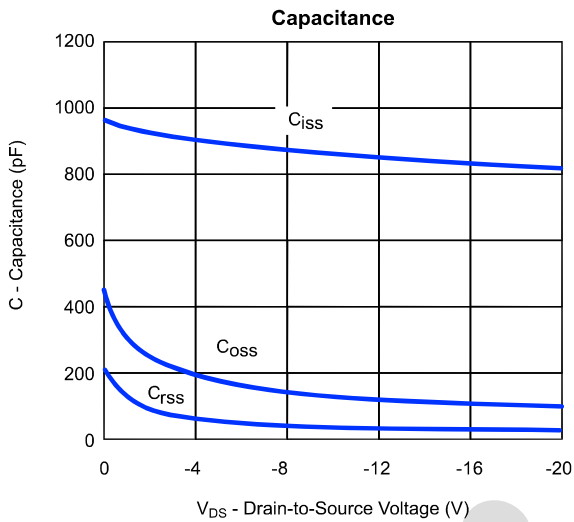
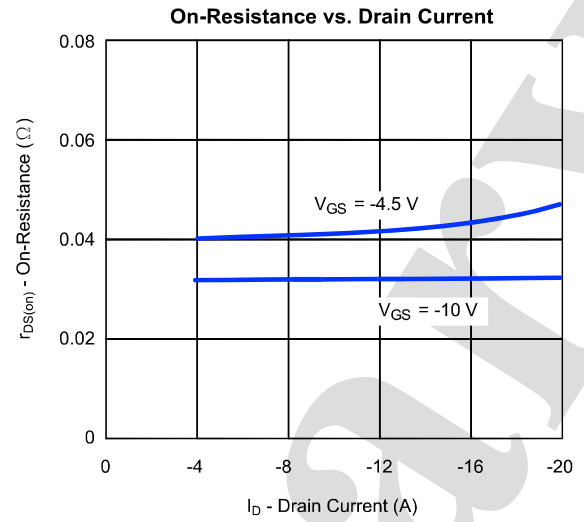
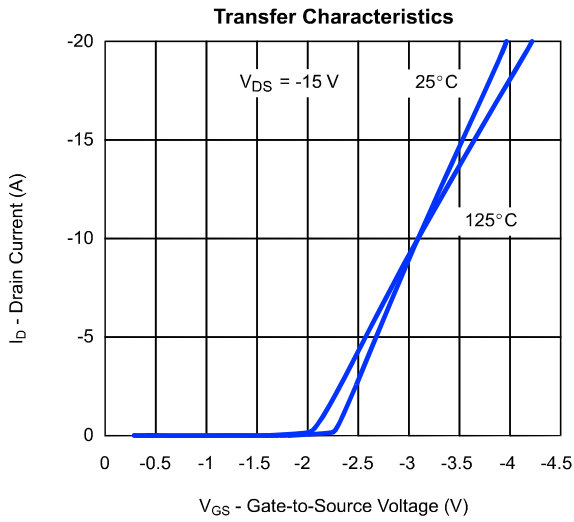
Typical Characteristics (T_J = 25°C Noted)

N-CHANNEL



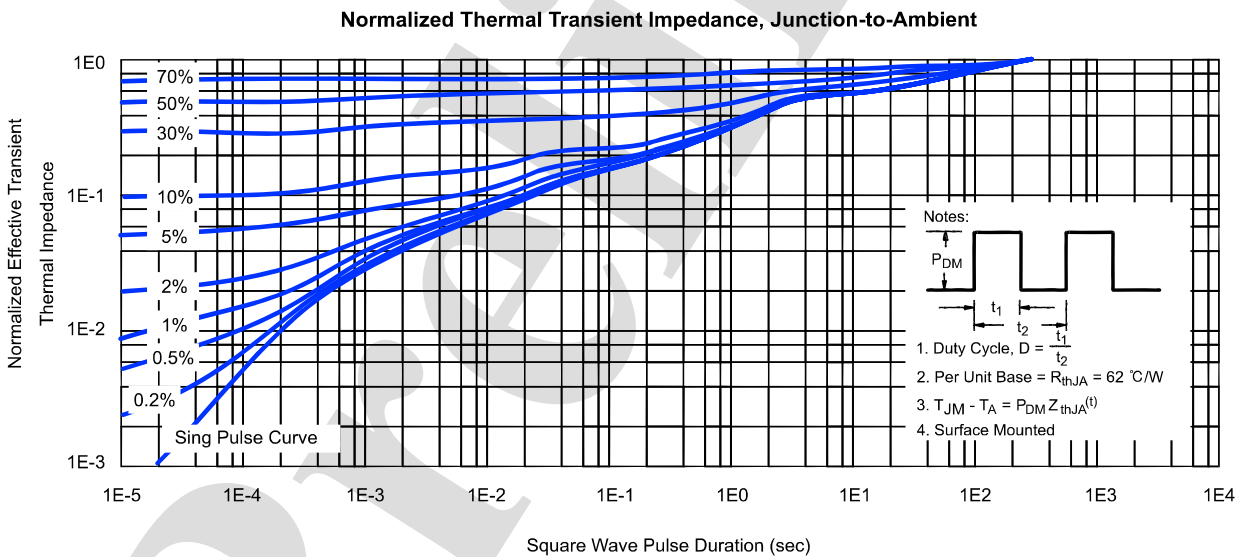
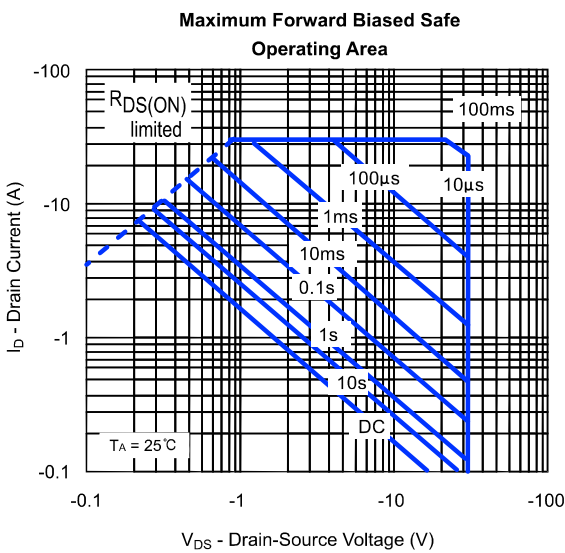
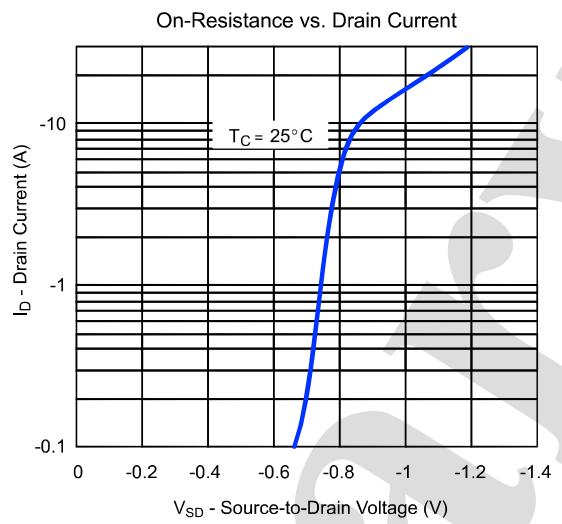
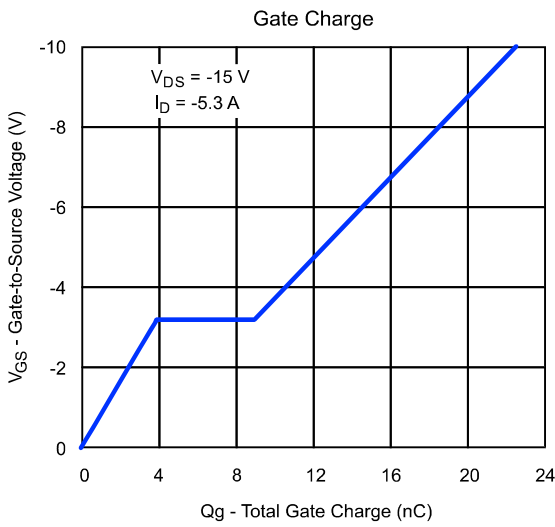
Typical Characteristics (T_J = 25°C Noted)

P-CHANNEL

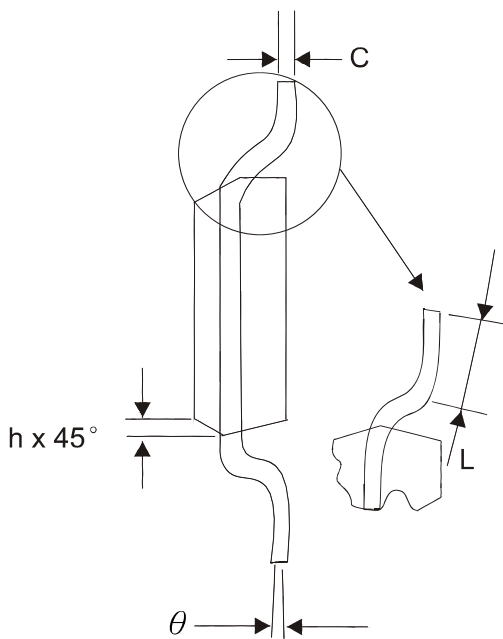
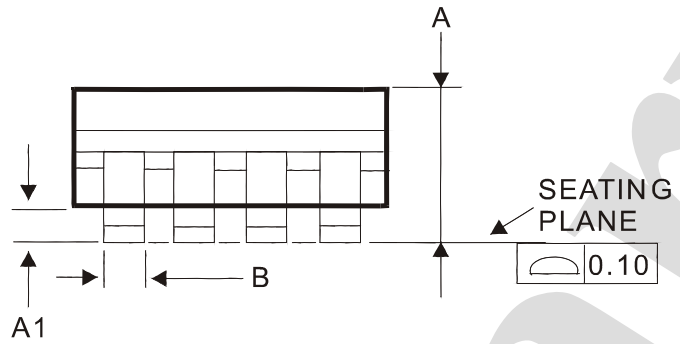
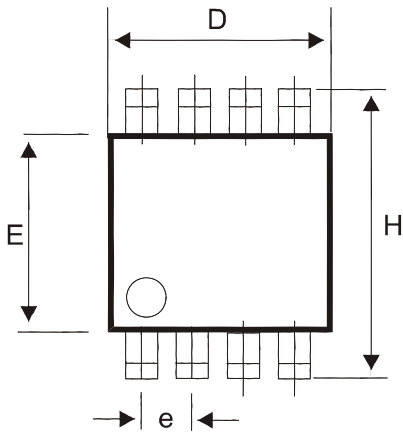


Typical Characteristics (T_J = 25°C Noted)

P-CHANNEL



SOP-8 Package Outline



| DIM | MILLIMETERS | |
|----------|-------------|------|
| | MIN | MAX |
| A | 1.35 | 1.75 |
| A1 | 0.10 | 0.25 |
| B | 0.35 | 0.49 |
| C | 0.18 | 0.25 |
| D | 4.80 | 5.00 |
| E | 3.80 | 4.00 |
| e | 1.27 BSC | |
| H | 5.80 | 6.20 |
| h | 0.25 | 0.50 |
| L | 0.40 | 1.25 |
| θ | 0° | 7° |