



SPC4539A

N & P Pair Enhancement Mode MOSFET

DESCRIPTION

The SPC4539A is the N- and P-Channel 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 and provide superior switching performance. These devices are particularly suited for low voltage applications such as notebook computer power management and other battery powered circuits where high-side switching , low in-line power loss, and resistance to transients are needed.

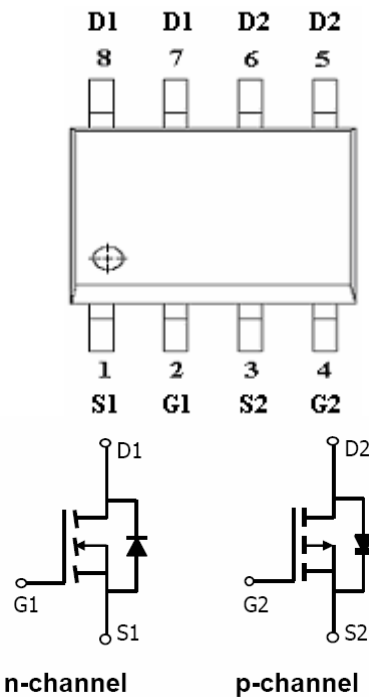
FEATURES

- ◆ N-Channel
 - 30V/6.8A, $R_{DS(ON)} = 42m\Omega @ V_{GS} = 10V$
 - 30V/5.6A, $R_{DS(ON)} = 54m\Omega @ V_{GS} = 4.5V$
- ◆ P-Channel
 - 30V/-5.7A, $R_{DS(ON)} = 70m\Omega @ V_{GS} = -10V$
 - 30V/-4.4A, $R_{DS(ON)} = 105m\Omega @ V_{GS} = -4.5V$
- ◆ Super high density cell design for extremely low $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOP – 8P package design

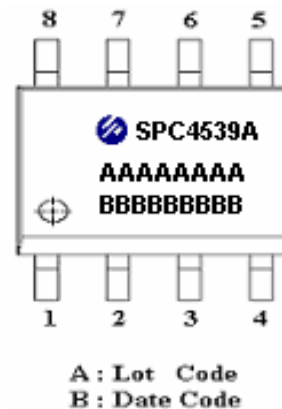
APPLICATIONS

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

PIN CONFIGURATION(SOP – 8P)



PART MARKING





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PIN DESCRIPTION

| 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 Number | Package | Part Marking |
|--------------|---------|--------------|
| SPC4539AS8RG | SOP- 8P | SPC4539A |
| SPC4539AS8TG | SOP- 8P | SPC4539A |

※ SPC4539AS8RG : 13" Tape Reel ; Pb – Free

※ SPC4539AS8TG : Tube ; Pb – Free

ABSOLUTE MAXIMUM RATINGS

($T_A=25^{\circ}\text{C}$ Unless otherwise noted)

| Parameter | Symbol | Typical | | Unit | |
|---|-----------------|--------------------------|-----------|--------------------|-----------------------------|
| | | N-Channel | P-Channel | | |
| Drain-Source Voltage | V_{DSS} | 30 | -30 | V | |
| Gate –Source Voltage | V_{GSS} | ± 20 | ± 20 | V | |
| Continuous Drain Current($T_J=150^{\circ}\text{C}$) | I_D | $T_A=25^{\circ}\text{C}$ | 6.8 | -6.2 | A |
| | | $T_A=70^{\circ}\text{C}$ | 5.6 | -4.6 | |
| Pulsed Drain Current | I_{DM} | 30 | -30 | A | |
| Continuous Source Current(Diode Conduction) | I_S | 2.3 | -2.3 | A | |
| Power Dissipation | P_D | $T_A=25^{\circ}\text{C}$ | 2.5 | 2.8 | W |
| | | $T_A=70^{\circ}\text{C}$ | 1.6 | 1.8 | |
| Operating Junction Temperature | T_J | -55/150 | | $^{\circ}\text{C}$ | |
| Storage Temperature Range | T_{STG} | -55/150 | | $^{\circ}\text{C}$ | |
| Thermal Resistance-Junction to Ambient | $R_{\theta JA}$ | $T \leq 10\text{sec}$ | 50 | 52 | $^{\circ}\text{C}/\text{W}$ |
| | | Steady State | 80 | 80 | |



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ELECTRICAL CHARACTERISTICS

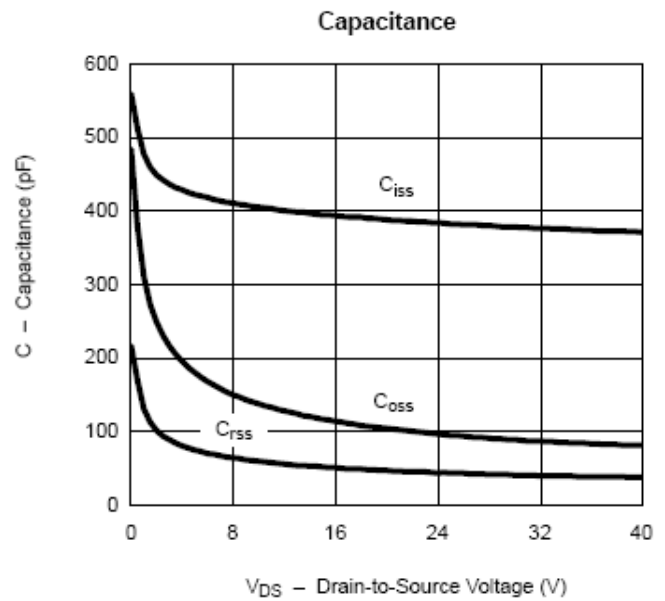
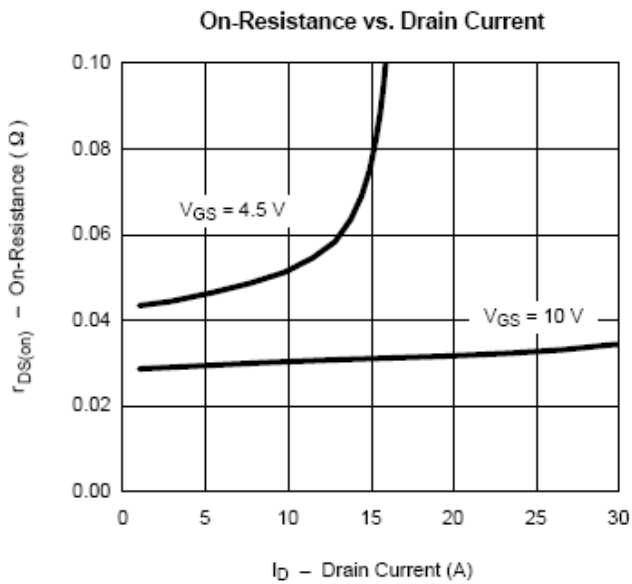
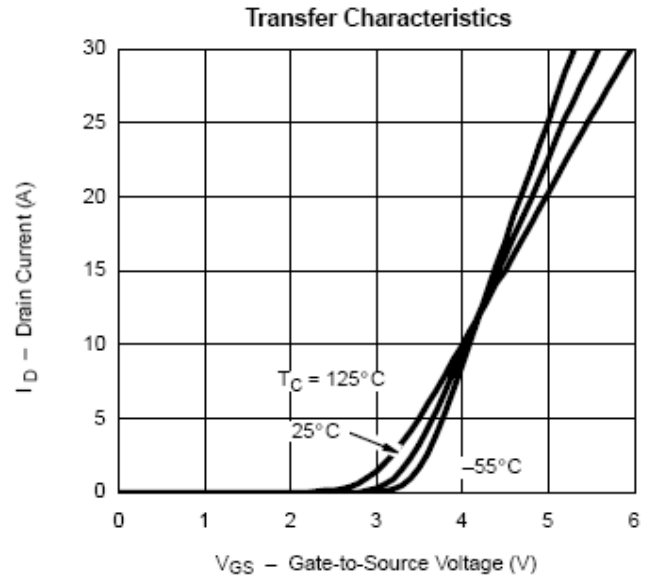
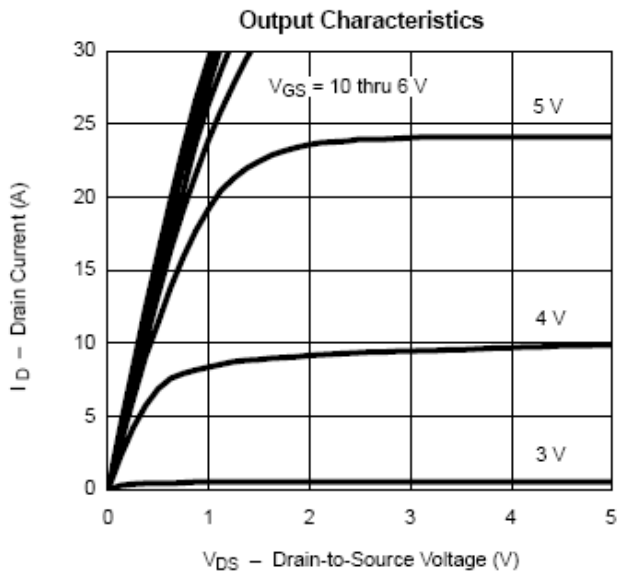
(TA=25°C Unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit | |
|---------------------------------|----------------------|---|------|------|-------|-------|----|
| Static | | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} =0V, I _D = 250uA | N-Ch | 30 | | V | |
| | | V _{GS} =0V, I _D =-250uA | P-Ch | -30 | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250uA | N-Ch | 1.0 | 3.0 | | |
| | | V _{DS} =V _{GS} , I _D =-250uA | P-Ch | -1.0 | -3.0 | | |
| Gate Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} =±20V | N-Ch | | ±100 | nA | |
| | | V _{DS} =0V, V _{GS} =±20V | P-Ch | | ±100 | | |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 24V, V _{GS} =0V | N-Ch | | 1 | uA | |
| | | V _{DS} =-24V, V _{GS} =0V | P-Ch | | -1 | | |
| | | V _{DS} = 24V, V _{GS} =0V T _J =55°C | N-Ch | | 5 | | |
| | | V _{DS} =-24V, V _{GS} =0V T _J =55°C | P-Ch | | -5 | | |
| On-State Drain Current | I _{D(on)} | V _{DS} ≥ 5V, V _{GS} = 10V | N-Ch | 30 | | A | |
| | | V _{DS} ≤ -5V, V _{GS} =-10V | P-Ch | -30 | | | |
| Drain-Source On-Resistance | R _{DS(on)} | V _{GS} = 10V, I _D = 6.8A | N-Ch | | 0.030 | 0.042 | Ω |
| | | V _{GS} =-10V, I _D =-5.7A | P-Ch | | 0.060 | 0.070 | |
| | | V _{GS} = 4.5V, I _D = 5.6A | N-Ch | | 0.040 | 0.054 | |
| | | V _{GS} =-4.5V, I _D =-4.4A | P-Ch | | 0.095 | 0.105 | |
| Forward Transconductance | g _{fs} | V _{DS} = 15V, I _D =-5.9A | N-Ch | | 15 | S | |
| | | V _{DS} =-15V, I _D =-5.0A | P-Ch | | 9 | | |
| Diode Forward Voltage | V _{SD} | I _S = 1.7A, V _{GS} =0V | N-Ch | | 0.8 | 1.2 | V |
| | | I _S =-1.7A, V _{GS} =0V | P-Ch | | -0.8 | -1.2 | |
| Dynamic | | | | | | | |
| Total Gate Charge | Q _g | N-Channel V _{DS} =15V, V _{GS} =10V, I _D = 7.2A | N-Ch | | 13 | 20 | nC |
| Gate-Source Charge | Q _{gs} | | P-Ch | | 15 | 25 | |
| Gate-Drain Charge | Q _{gd} | P-Channel V _{DS} =-15V, V _{GS} =-10V, I _D = -5.0A | N-Ch | | 2.3 | | |
| | | | P-Ch | | 4 | | |
| Turn-On Time | t _{d(on)} | N-Channel V _{DD} =15V, R _L =15Ω I _D =1.0A, V _{GEN} =10V R _G =6Ω | N-Ch | | 6 | 12 | nS |
| | | | P-Ch | | 7 | 15 | |
| | N-Ch | | | 14 | 25 | | |
| | P-Ch | | | 10 | 20 | | |
| Turn-Off Time | t _{d(off)} | P-Channel V _{DD} =-15V, R _L =15Ω I _D =-1.0A, V _{GEN} =-10V R _G =6Ω | N-Ch | | 30 | 60 | |
| | | | P-Ch | | 40 | 80 | |
| | t _f | | N-Ch | | 5 | 10 | |
| | | | P-Ch | | 20 | 40 | |



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TYPICAL CHARACTERISTICS (NMOS)

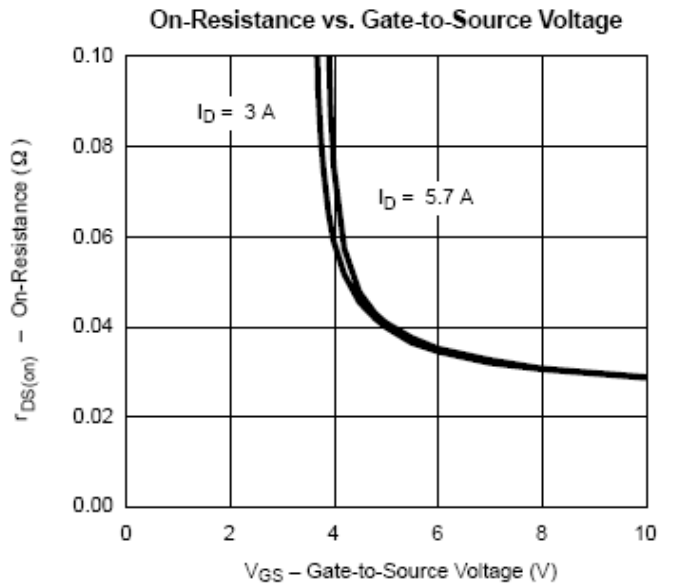
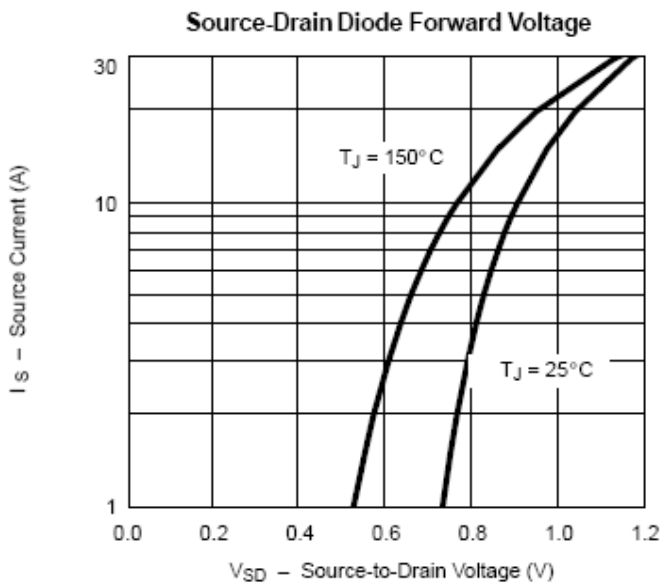
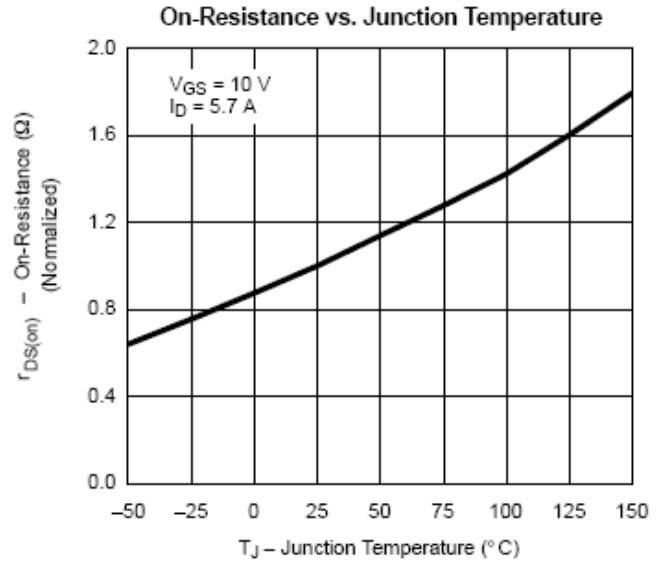
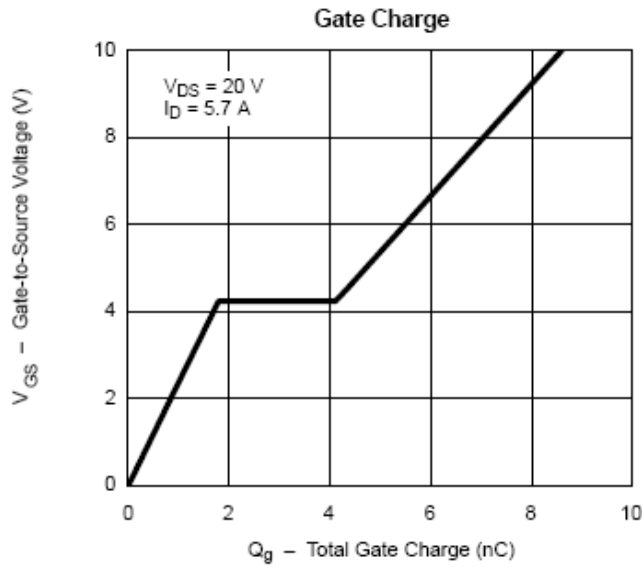




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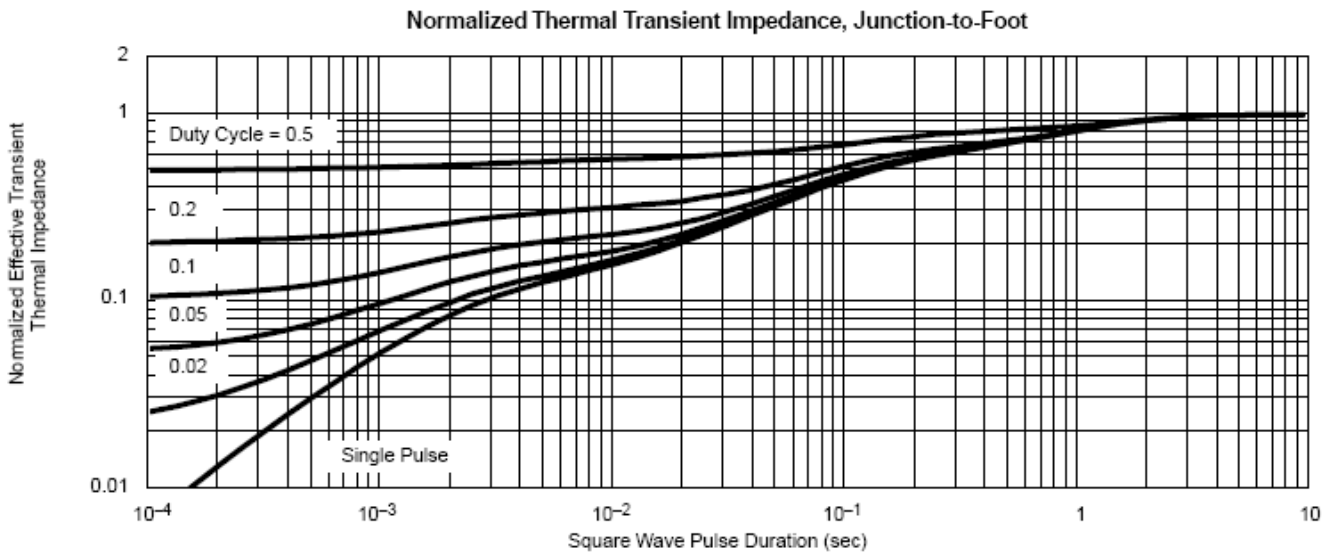
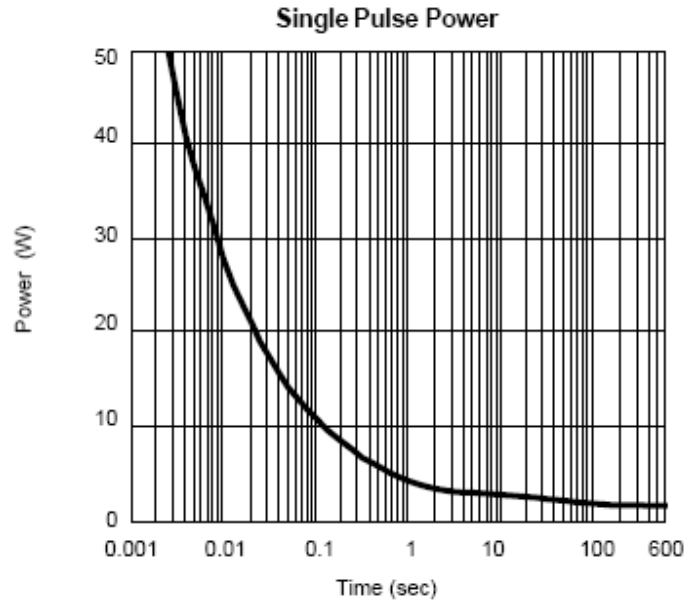
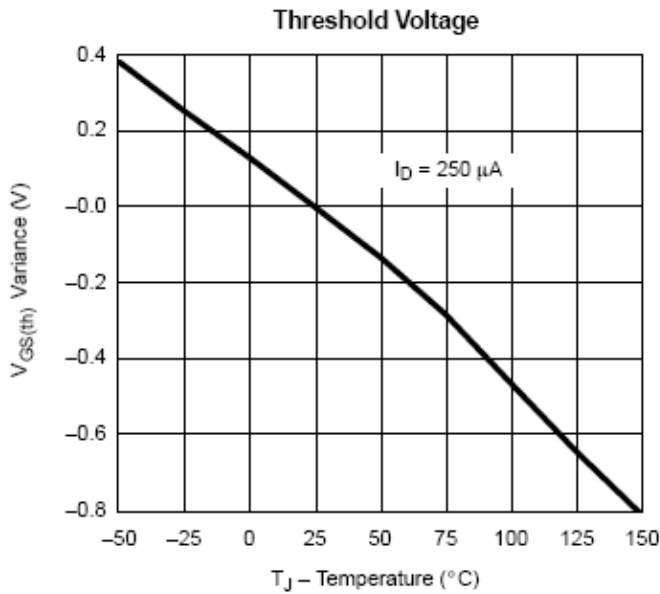
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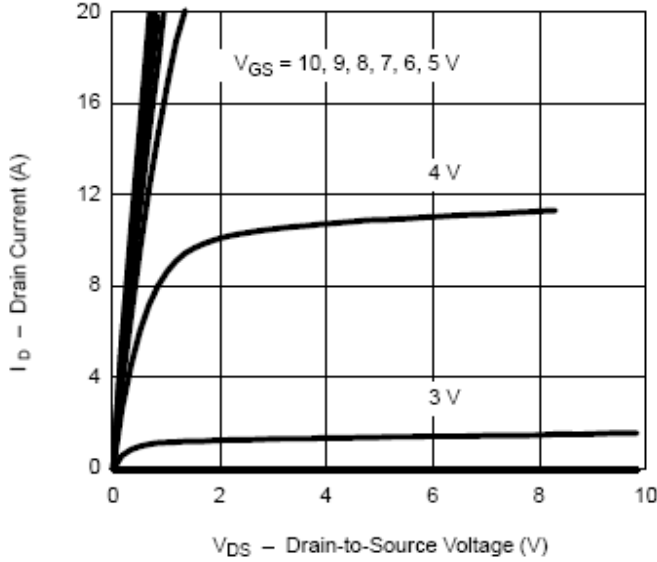




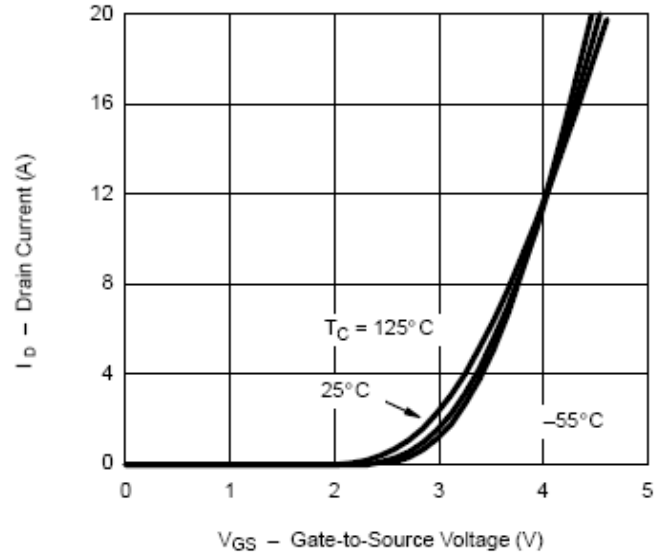
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TYPICAL CHARACTERISTICS (PMOS)

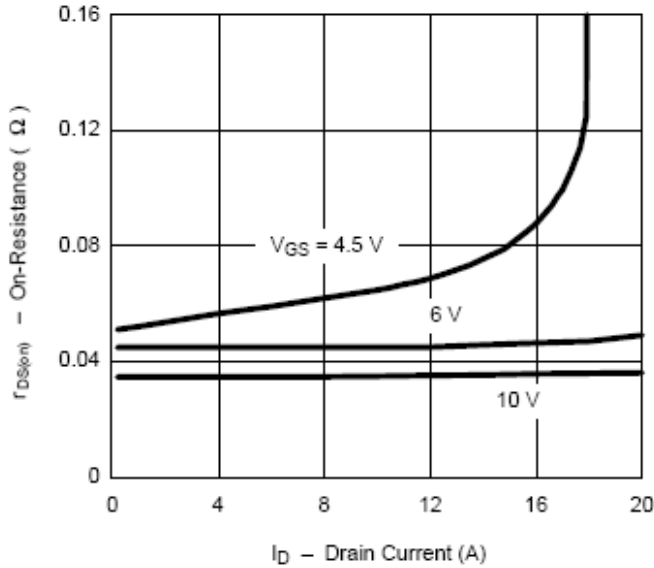
Output Characteristics



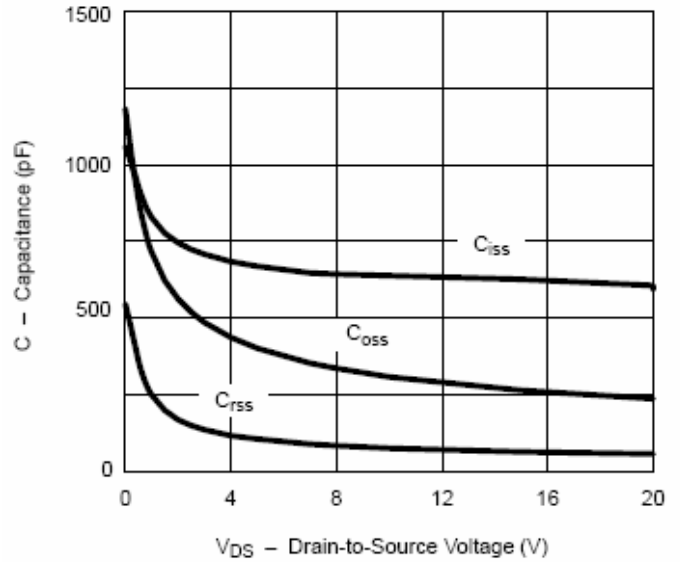
Transfer Characteristics



On-Resistance vs. Drain Current



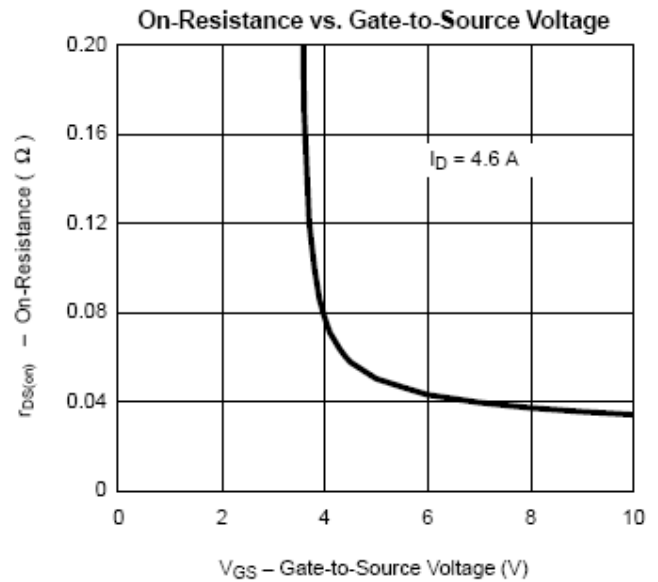
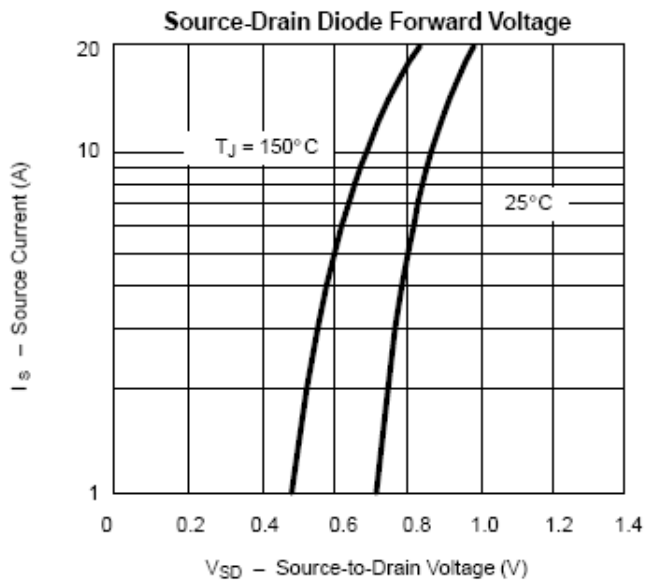
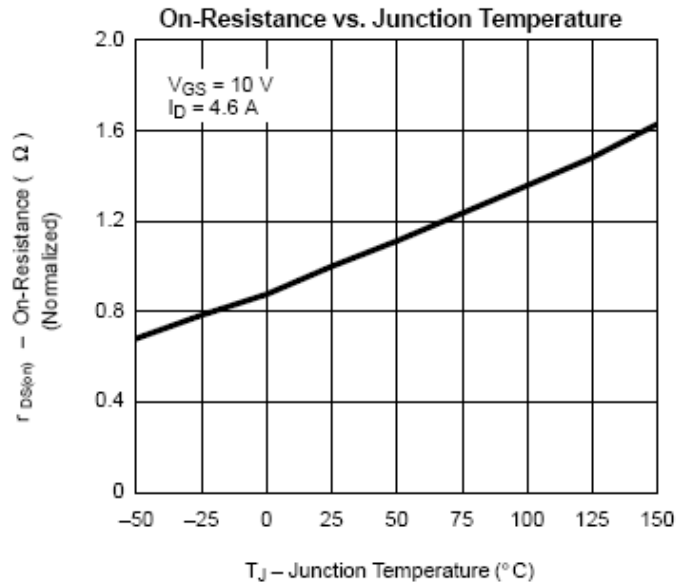
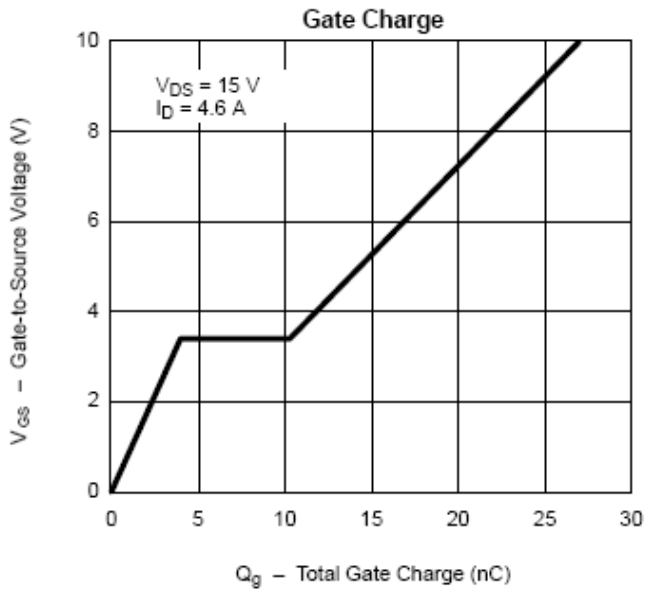
Capacitance





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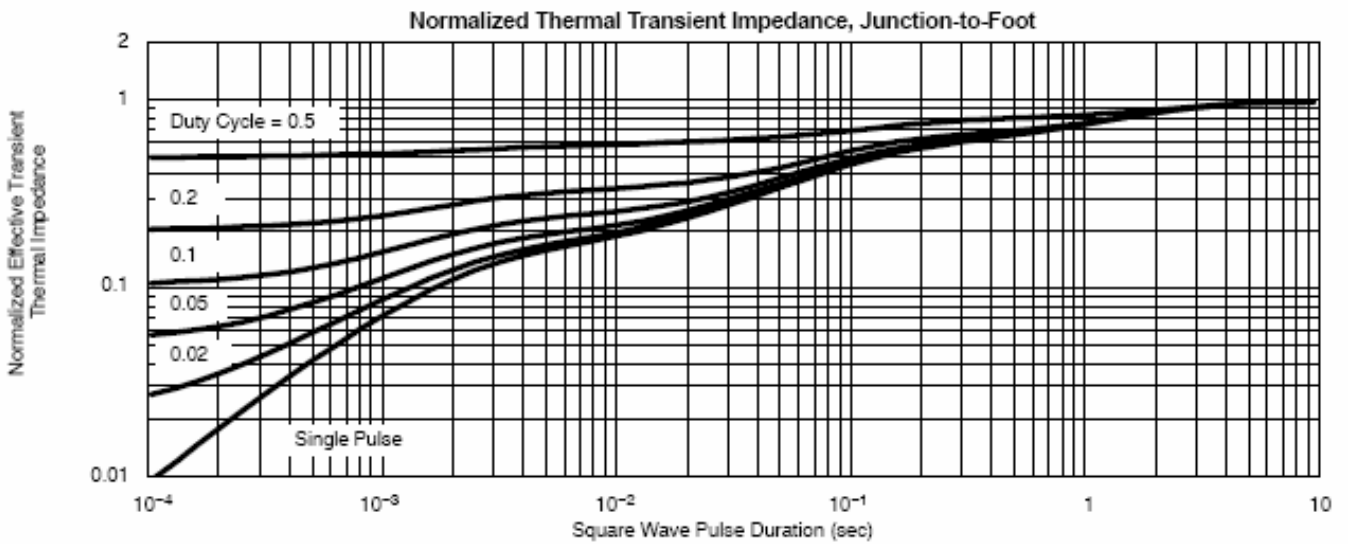
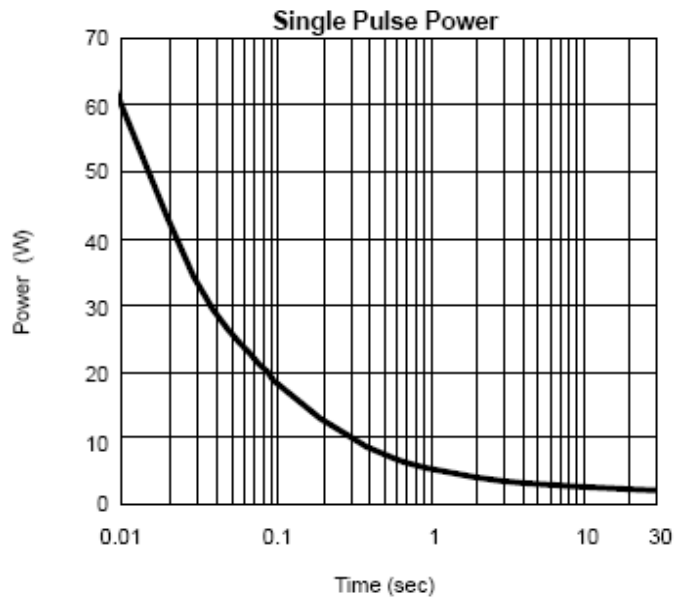
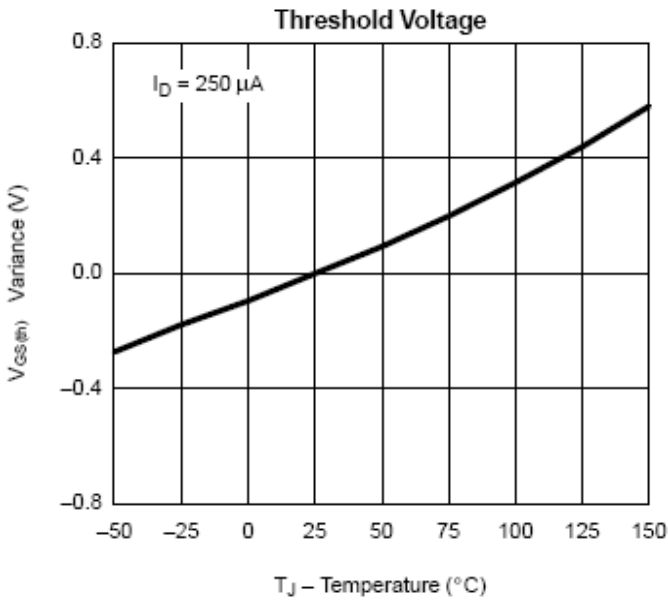
TYPICAL CHARACTERISTICS (PMOS)





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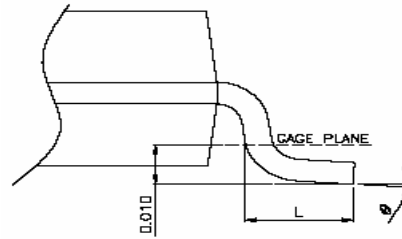
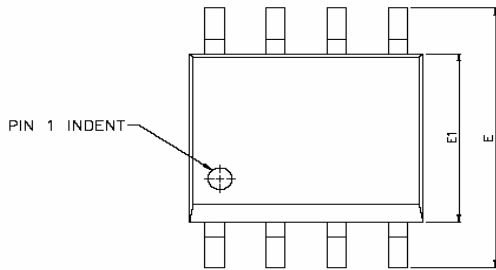
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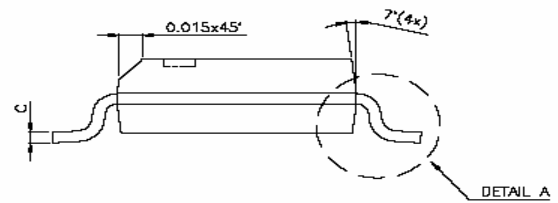
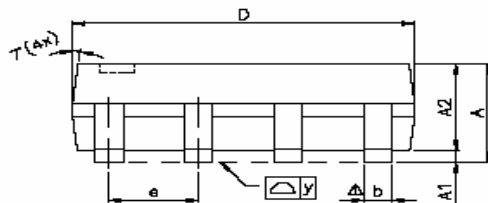


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SOP- 8 PACKAGE OUTLINE



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 |
| θ | 0° | — | 8° | 0° | — | 8° |



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