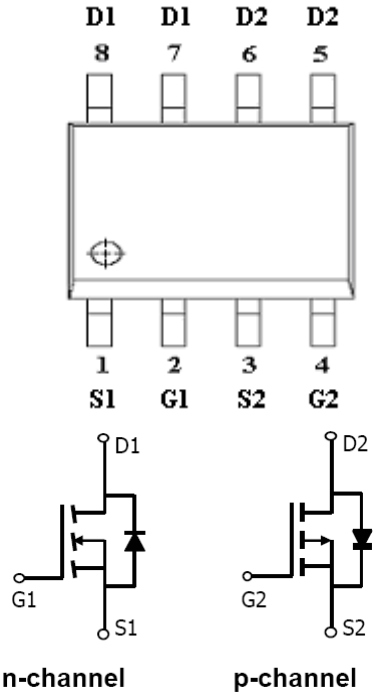
# SPC4539
## N & P Pair Enhancement Mode MOSFET

### DESCRIPTION
The SPC4539 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,$R_{DS(ON)}$=34mΩ@$V_{GS}$=10V
  30V/5.6A,$R_{DS(ON)}$=46mΩ@$V_{GS}$=4.5V
- P-Channel
  -30V/-5.7A,$R_{DS(ON)}$=60mΩ@$V_{GS}$=-10V
  -30V/-4.4A,$R_{DS(ON)}$=80mΩ@$V_{GS}$=-4.5V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOP–8 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–8)




### PART MARKING


A : Lot Code
B : Date Code

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## N & P Pair Enhancement Mode MOSFET

**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 |
|---|---|---|
| SPC4539S8RGB | SOP-8 | SPC4539 |
| SPC4539S8TGB | SOP-8 | SPC4539 |

※ SPC4539S8RGB : 13” Tape Reel ; Pb – Free ; Halogen – Free
※ SPC4539S8TGB : Tube ; Pb – Free ; Halogen – Free

**ABSOULTE MAXIMUM RATINGS**

($T_A$=25℃ 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℃) | $T_A$=25℃ | $I_D$ | 6.8 | -6.2 | A |
| | $T_A$=70℃ | | 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 | $T_A$=25℃ | $P_D$ | 2.5 | 2.8 | W |
| | $T_A$=70℃ | | 1.6 | 1.8 | |
| Operating Junction Temperature | | $T_J$ | -55/150 | | ℃ |
| Storage Temperature Range | | $T_{STG}$ | -55/150 | | ℃ |
| Thermal Resistance-Junction to Ambient | T ≤ 10sec | $R_{\theta JA}$ | 50 | 52 | ℃/W |
| | Steady State | | 80 | 80 | |

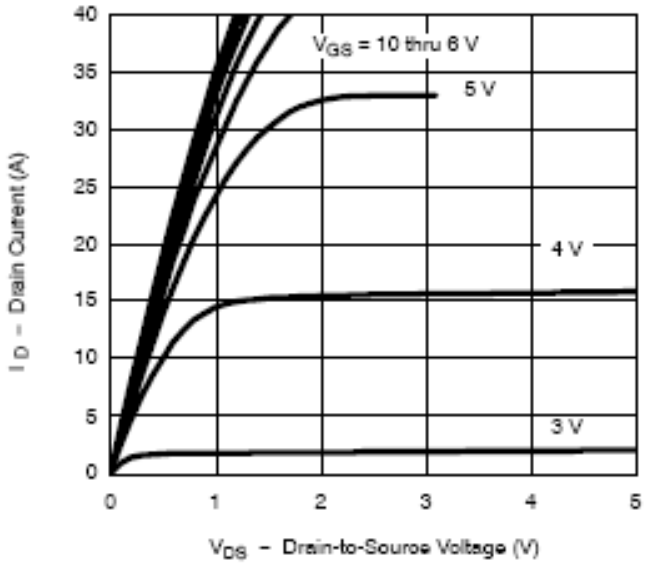
## ELECTRICAL CHARACTERISTICS

($T_A$=25℃ Unless otherwise noted)

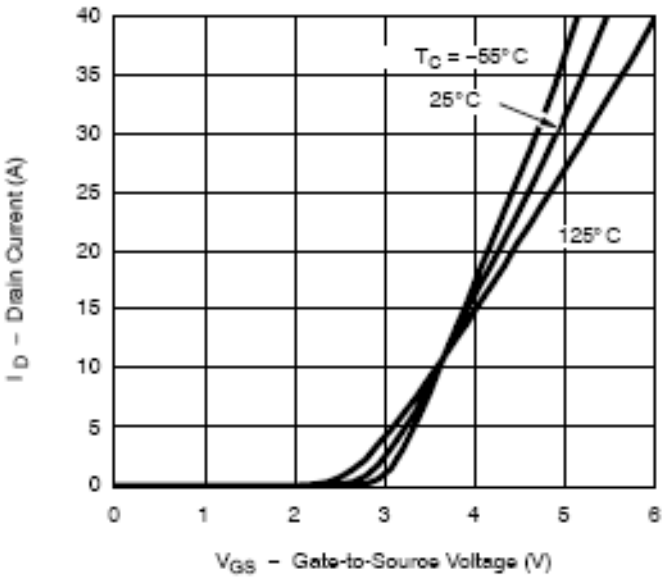
| Parameter | Symbol | Conditions | | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **Static** | | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V,$I_D$= 250uA | N-Ch | 30 | | | V |
| | | $V_{GS}$=0V,$I_D$=-250uA | P-Ch | -30 | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=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℃ | N-Ch | | | 5 | |
| | | $V_{DS}$=-24V,$V_{GS}$=0V $T_J$=55℃ | 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 | | 0.026 | 0.034 | Ω |
| | | $V_{GS}$=-10V,$I_D$=-5.7A | P-Ch | | 0.045 | 0.060 | |
| | | $V_{GS}$= 4.5V,$I_D$= 5.6A | N-Ch | | 0.036 | 0.046 | |
| | | $V_{GS}$=-4.5V,$I_D$=-4.4A | P-Ch | | 0.060 | 0.080 | |
| Forward Transconductance | gfs | $V_{DS}$=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 , $I_D$=5.9A P-Channel $V_{DS}$=-15V,$V_{GS}$=-10V , $I_D$=-5.0A | N-Ch | | 13 | 20 | nC |
| | | | P-Ch | | 15 | 25 | |
| Gate-Source Charge | $Q_{gs}$ | | N-Ch | | 2.3 | | |
| | | | P-Ch | | 4 | | |
| Gate-Drain Charge | $Q_{gd}$ | | N-Ch | | 2 | | |
| | | | P-Ch | | 2 | | |
| Turn-On Time | $t_{d(on)}$ | N-Channel $V_{DD}$=15V,$R_L$=15Ω $I_D$=1.0A,$V_{GEN}$=10V,$R_G$=6Ω P-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 | |
| | $t_r$ | | N-Ch | | 14 | 25 | |
| | | | P-Ch | | 10 | 20 | |
| Turn-Off Time | $t_{d(off)}$ | | N-Ch | | 30 | 60 | |
| | | | P-Ch | | 40 | 80 | |
| | $t_f$ | | N-Ch | | 5 | 10 | |
| | | | P-Ch | | 20 | 40 | |

**TYPICAL CHARACTERISTICS ( NMOS )**

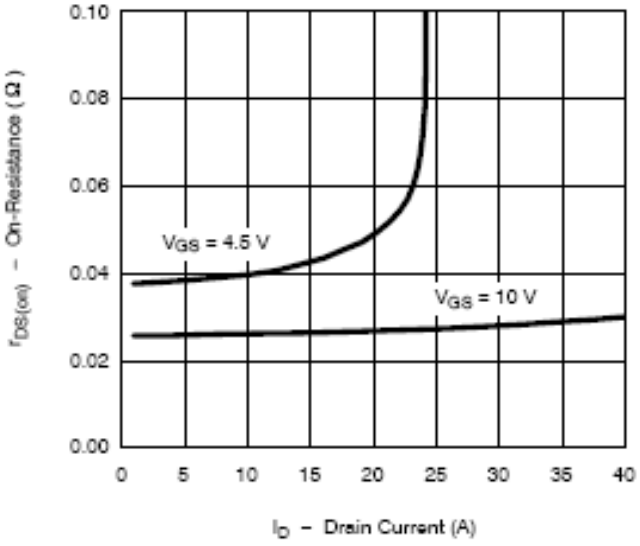
Output Characteristics



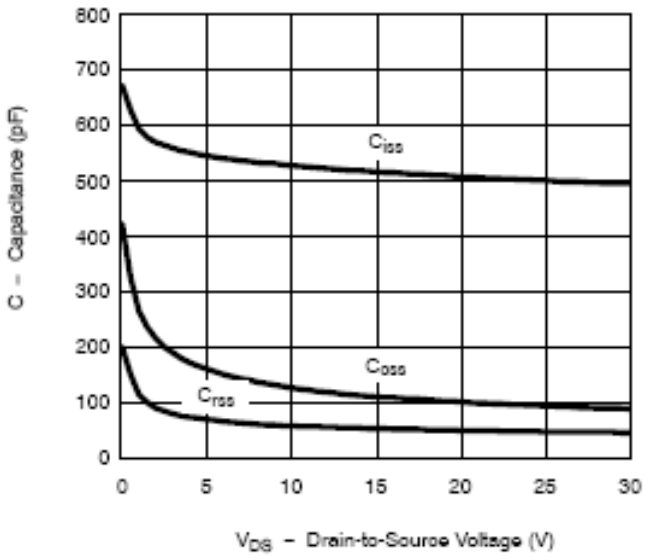

Transfer Characteristics




On-Resistance vs. Drain Current

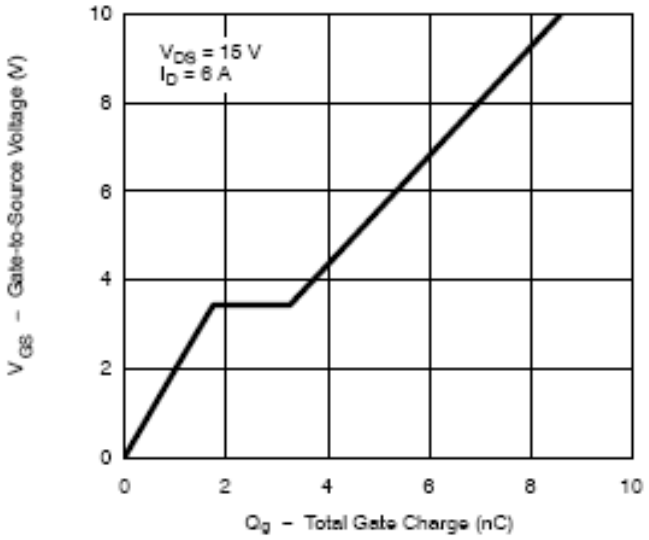



Capacitance

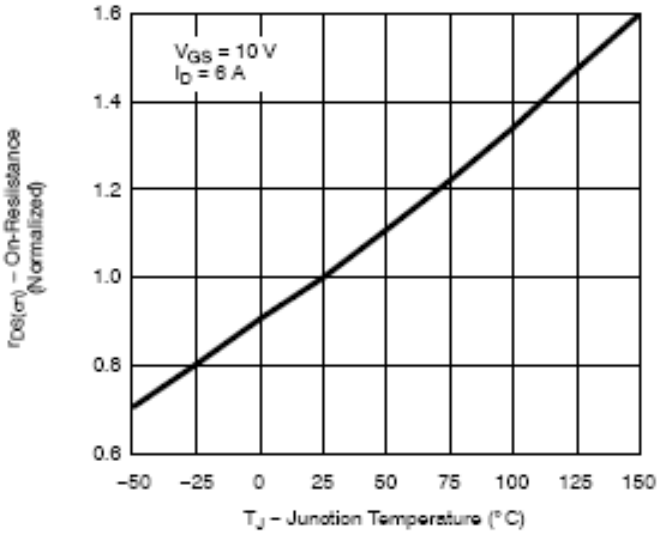


**TYPICAL CHARACTERISTICS ( NMOS )**

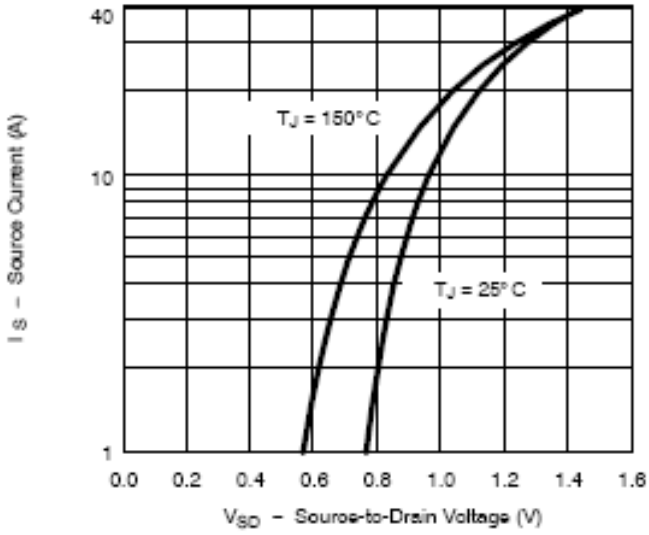
Gate Charge



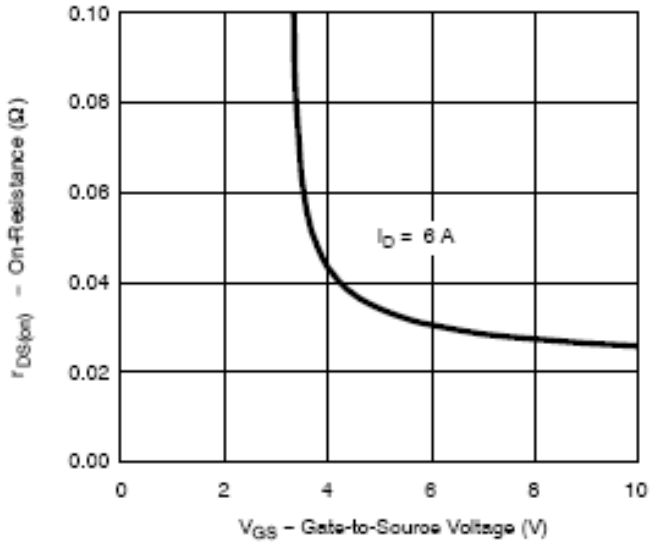

On-Resistance vs. Junction Temperature




Source-Drain Diode Forward Voltage




On-Resistance vs. Gate-to-Source Voltage



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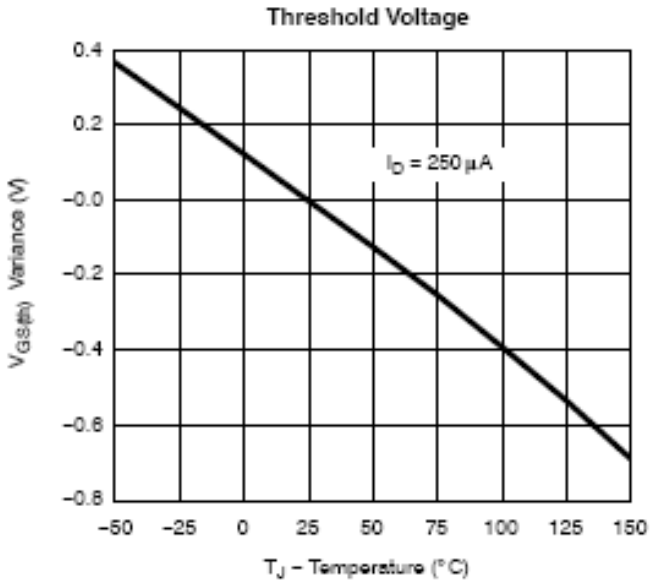
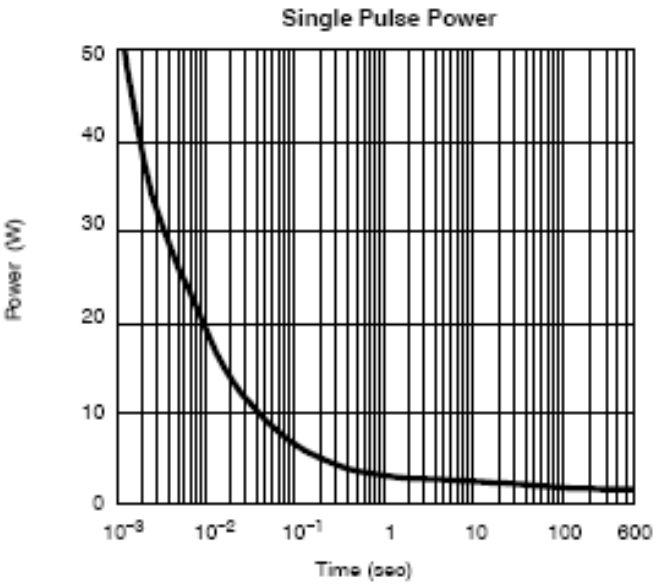
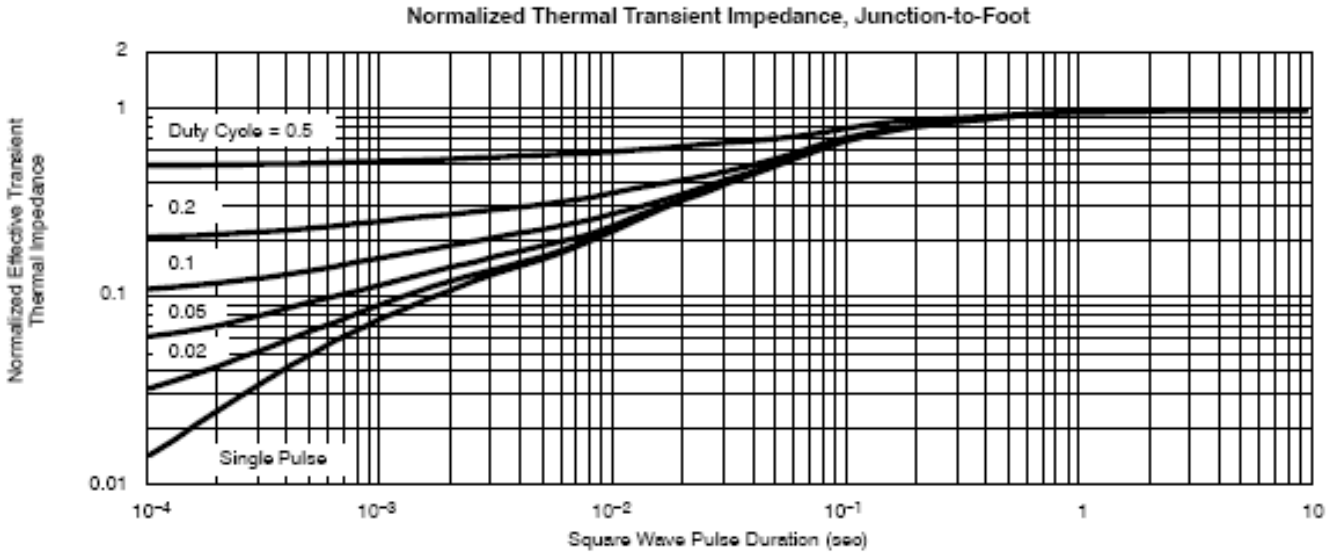
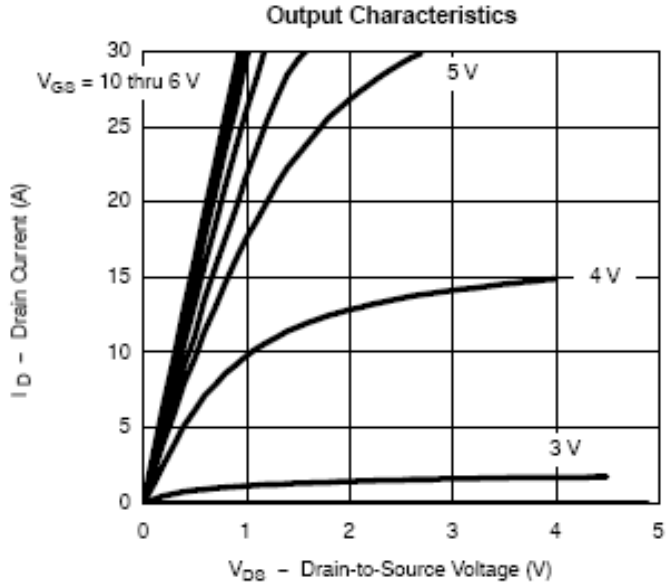
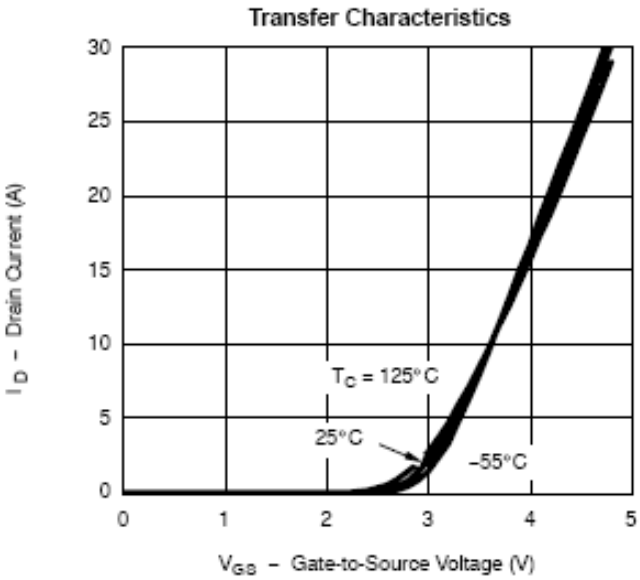


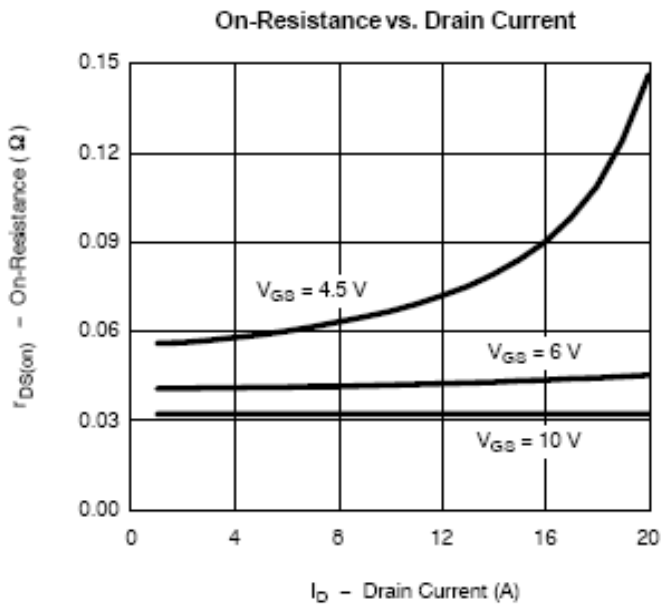



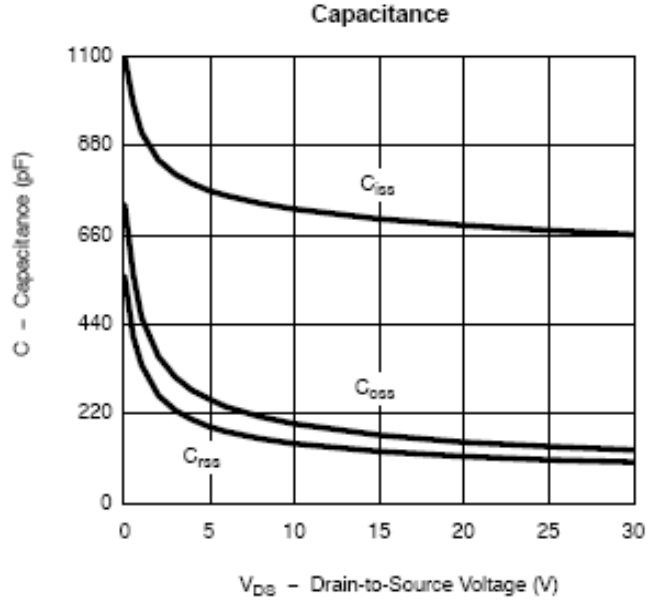



**TYPICAL CHARACTERISTICS ( PMOS )**



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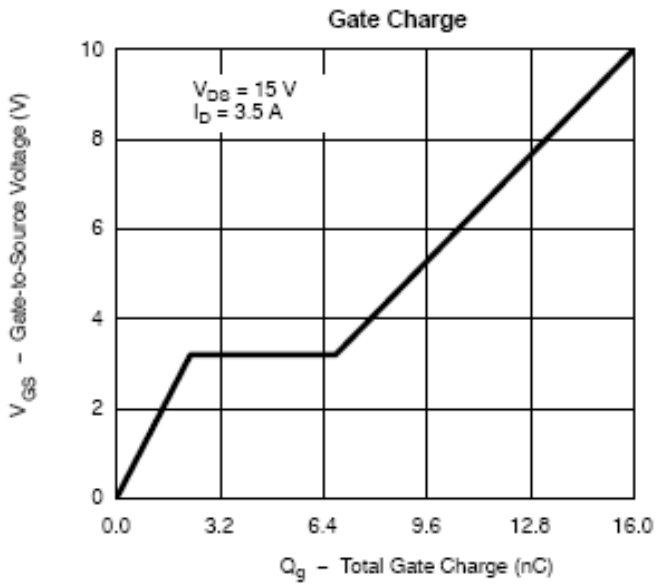


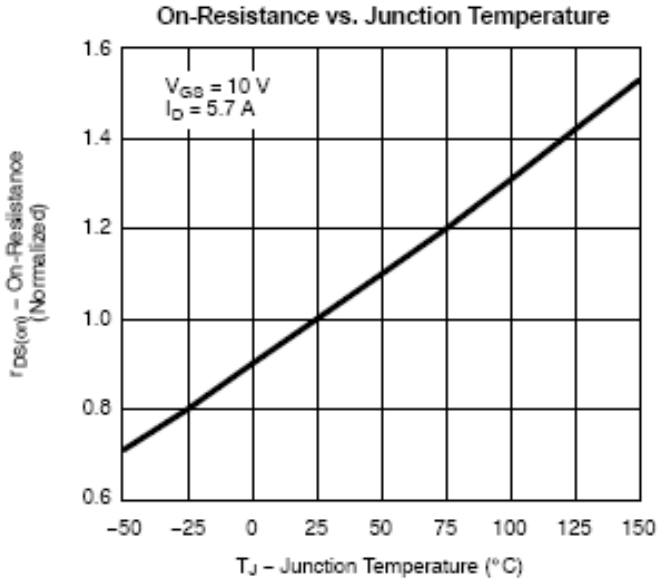


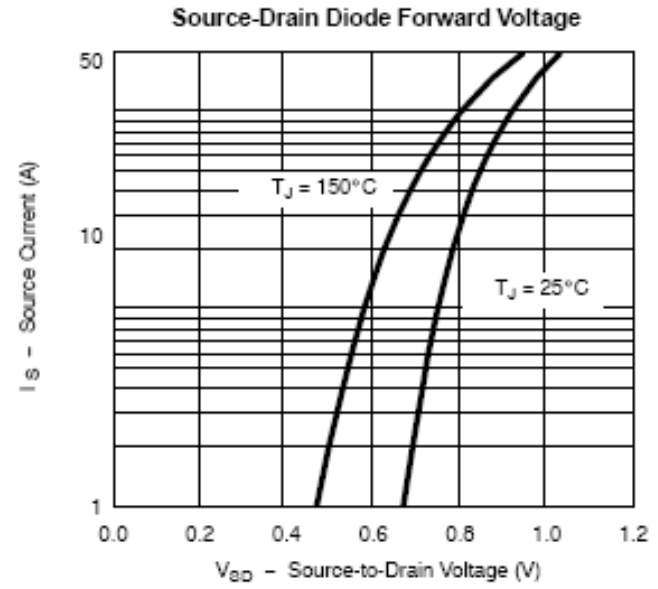


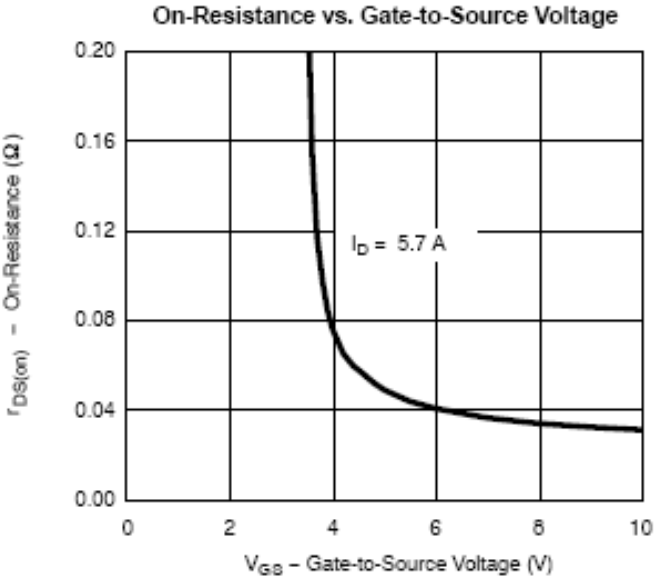

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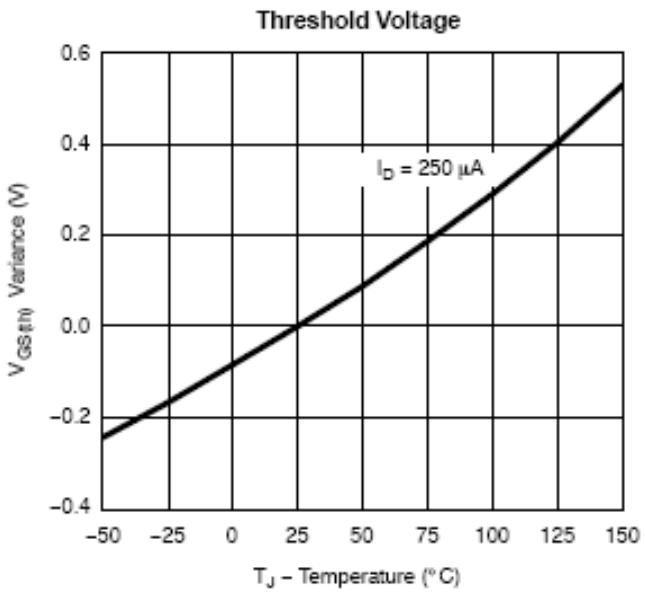


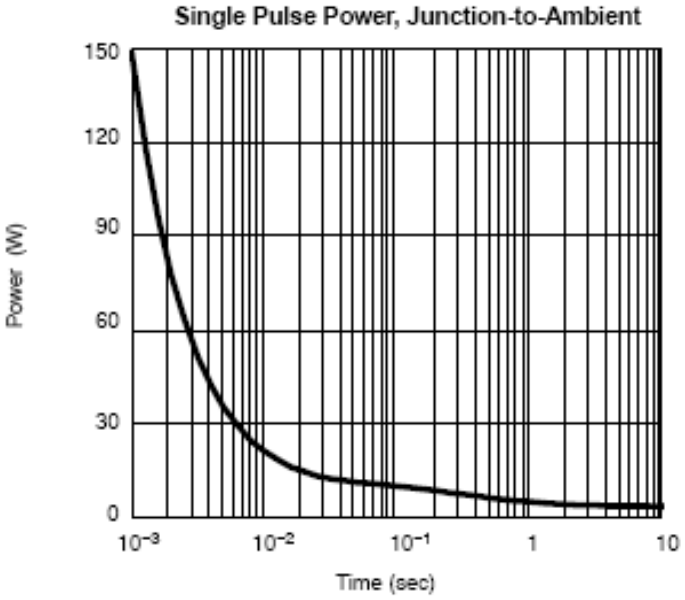


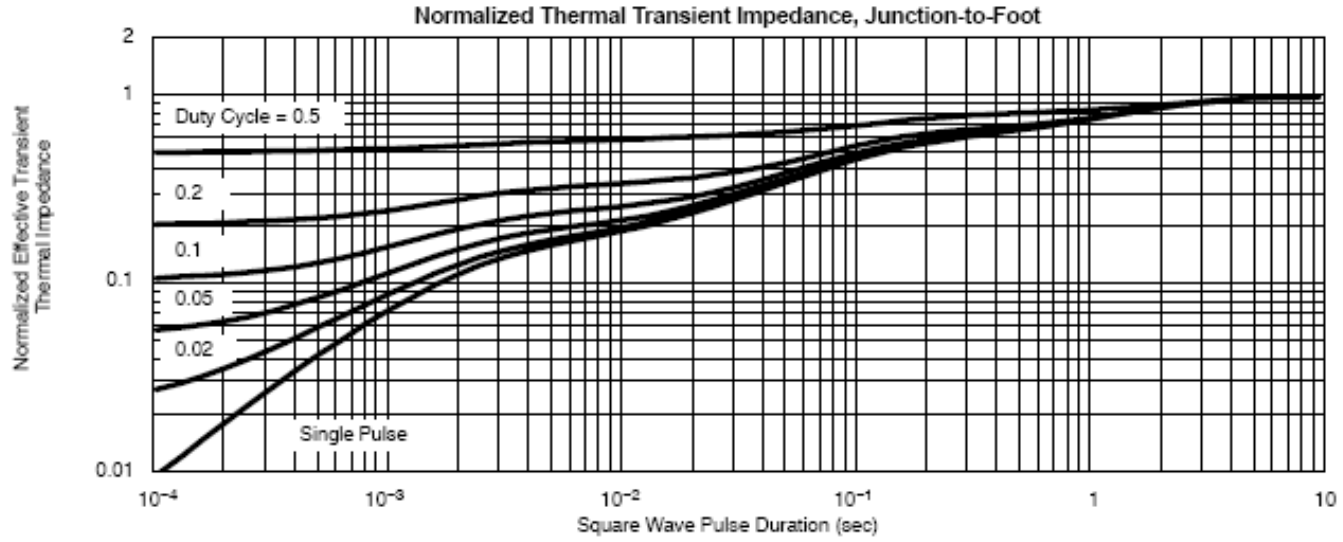

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