

N and P Channel Enhancement Mode Power MOSFET

Description

This Product uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

General Features

● **NMOS**

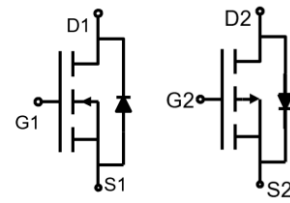
- V_{DS} 60V
- I_D (at $V_{GS} = 10V$) 6A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 35m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 45m Ω

● **PMOS**

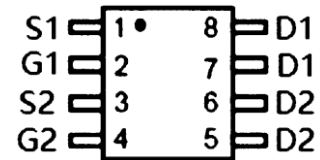
- V_{DS} -60V
- I_D (at $V_{GS} = -10V$) -6A
- $R_{DS(ON)}$ (at $V_{GS} = -10V$) < 45m Ω
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



Marking and pin assignment



SOP-8

| Device | Package | Marking | Packaging |
|-----------|---------|---------|--------------|
| G06NP06S2 | SOP-8双基 | G06NP06 | 4000pcs/Reel |

Absolute Maximum Ratings $T_C = 25^{\circ}C$, unless otherwise noted

| Parameter | Symbol | NMOS | PMOS | Unit |
|--|----------------|------------|------------|-------------|
| Drain-Source Voltage | V_{DS} | 60 | -60 | V |
| Continuous Drain Current | I_D | 6 | -6 | A |
| Pulsed Drain Current (note1) | I_{DM} | 24 | -24 | A |
| Gate-Source Voltage | V_{GS} | ± 20 | ± 20 | V |
| Power Dissipation | P_D | 2 | 2.5 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 To 150 | -55 To 150 | $^{\circ}C$ |

Thermal Resistance

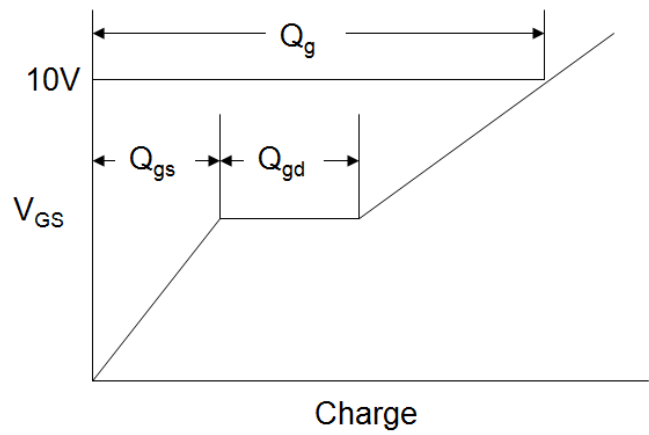
| Parameter | Symbol | NMOS | PMOS | Unit |
|---|------------|------|------|---------------|
| Thermal Resistance, Junction-to-Ambient | R_{thJA} | 62.5 | 50 | $^{\circ}C/W$ |

| NMOS Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted | | | | | | |
|---|---------------|--|-------|------|-----------|------------|
| Parameter | Symbol | Test Conditions | Value | | | Unit |
| | | | Min. | Typ. | Max. | |
| Static Parameters | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 60 | -- | -- | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 60V, V_{GS} = 0V, T_J = 25^\circ\text{C}$ | -- | -- | 1 | μA |
| Gate-Source Leakage | I_{GSS} | $V_{GS} = \pm 20V$ | -- | -- | ± 100 | nA |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1.0 | 1.5 | 2.5 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 6A$ | -- | 30 | 35 | m Ω |
| | | $V_{GS} = 4.5V, I_D = 4A$ | -- | 33 | 45 | |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=6A$ | -- | 12.5 | -- | S |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0V,$ $V_{DS} = 30V,$ $f = 1.0\text{MHz}$ | -- | 1350 | -- | pF |
| Output Capacitance | C_{oss} | | -- | 54 | -- | |
| Reverse Transfer Capacitance | C_{rss} | | -- | 51 | -- | |
| Total Gate Charge | Q_g | $V_{DS} = 30V,$ $I_D = 5A,$ $V_{GS} = 10V$ | -- | 22 | -- | nC |
| Gate-Source Charge | Q_{gs} | | -- | 3.3 | -- | |
| Gate-Drain Charge | Q_{gd} | | -- | 5.2 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD} = 30V,$ $I_D = 5A,$ $R_G = 3\Omega$ | -- | 5.2 | -- | ns |
| Turn-on Rise Time | t_r | | -- | 3 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 17 | -- | |
| Turn-off Fall Time | t_f | | -- | 2.5 | -- | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Body Diode Voltage | V_{SD} | $T_J = 25^\circ\text{C}, I_{SD} = 6A, V_{GS} = 0V$ | -- | -- | 1.2 | V |
| Continuous Body Diode Current | I_S | $T_C = 25^\circ\text{C}$ | -- | -- | 6 | A |

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G

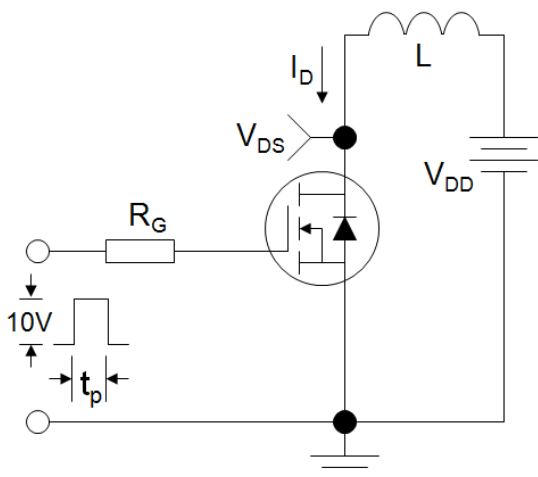
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



NMOS Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

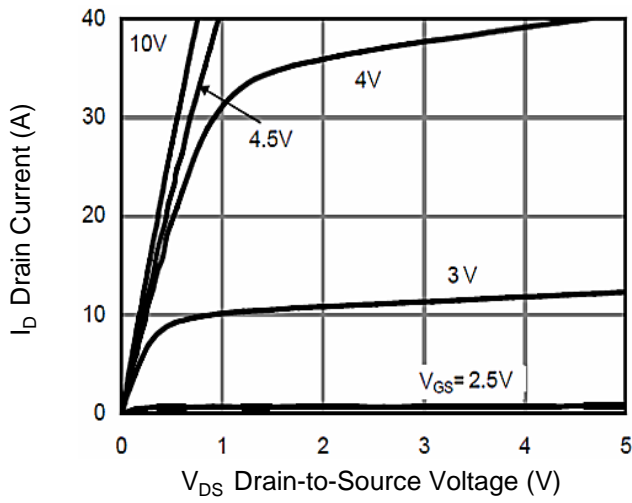


Figure 2. Transfer Characteristics

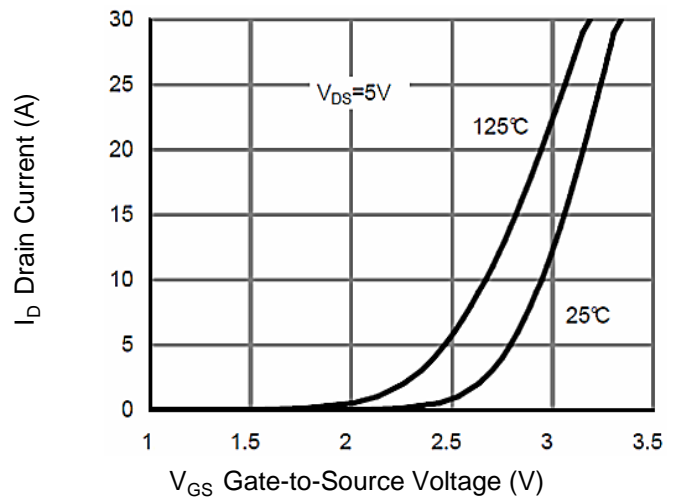


Figure 3. Drain-Source On-Resistance

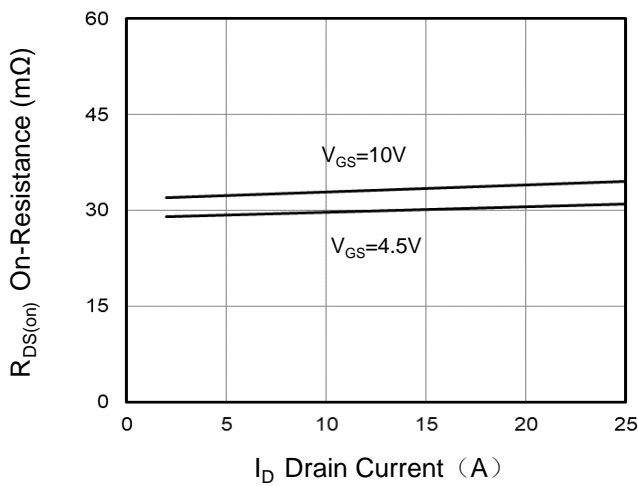


Figure 4. Gate Charge

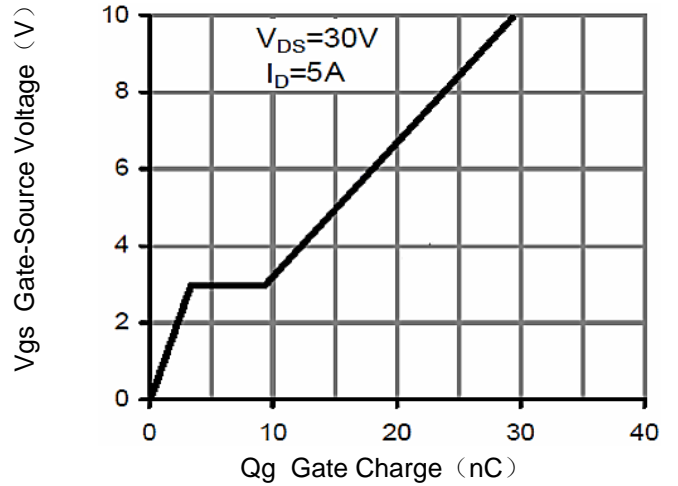


Figure 5. Capacitance

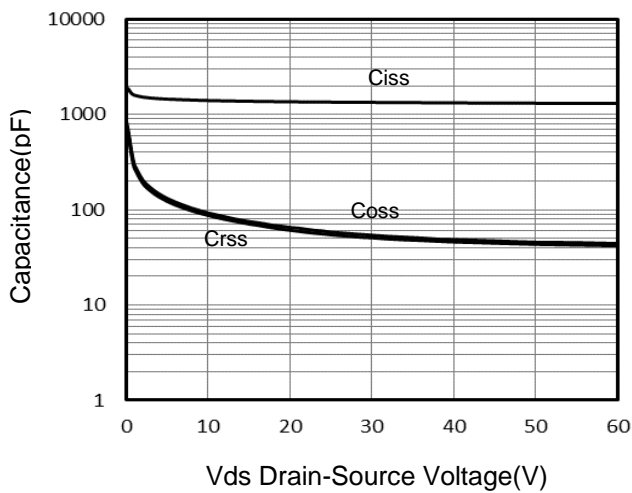
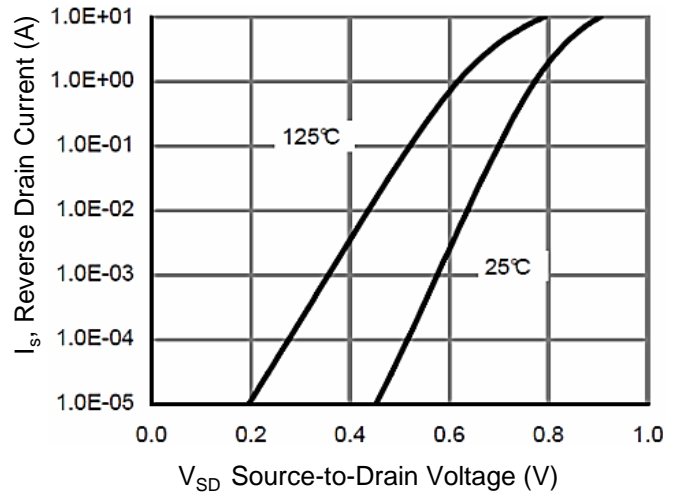


Figure 6. Source-Drain Diode Forward



NMOS Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

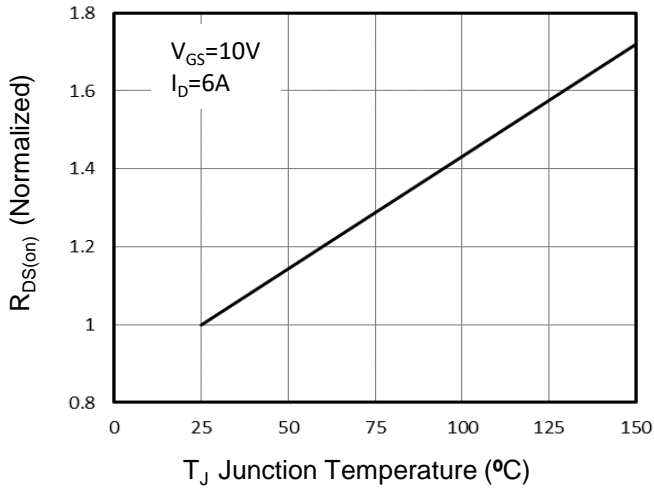


Figure 8. Safe Operation Area

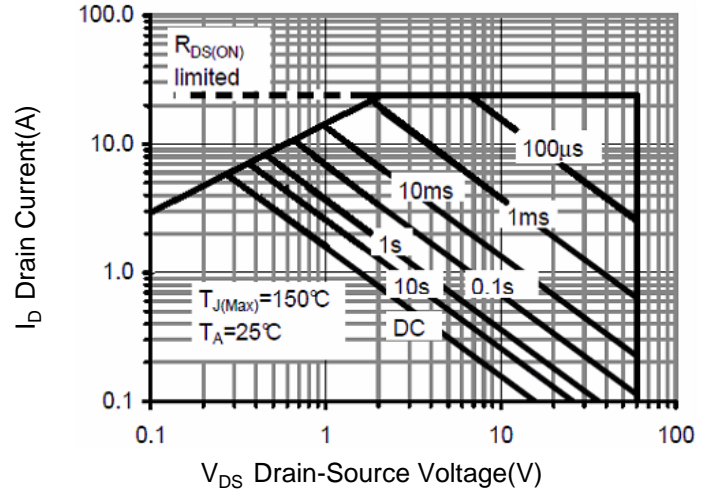
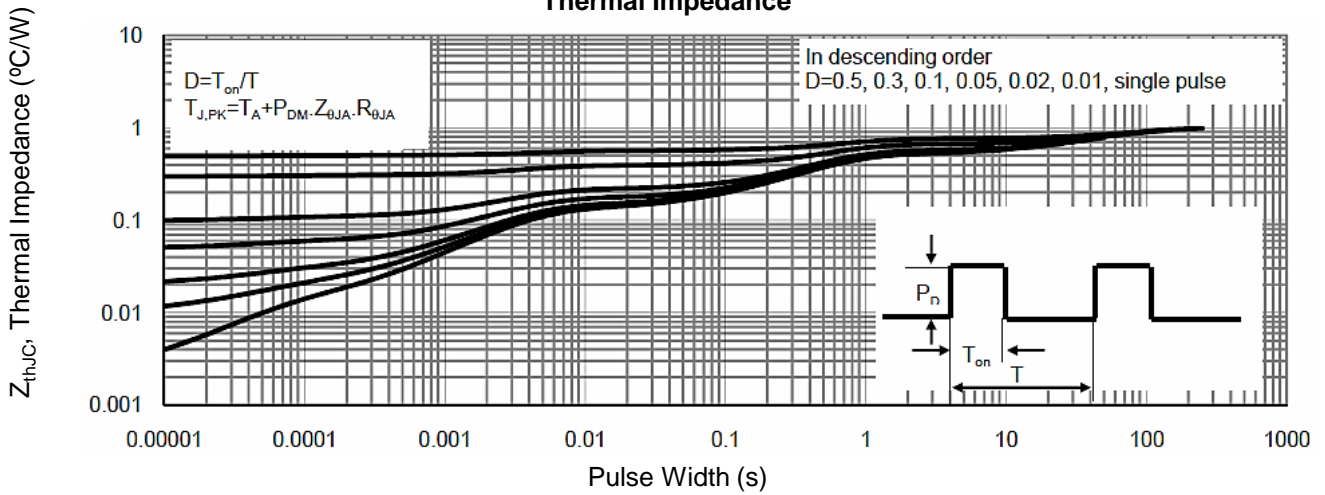


Figure 9. Normalized Maximum Transient Thermal Impedance

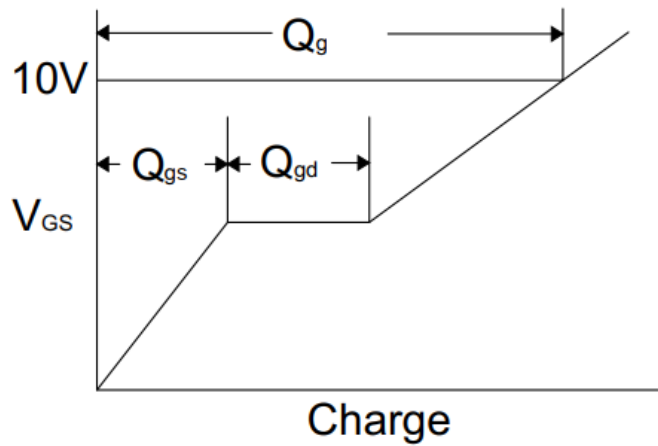
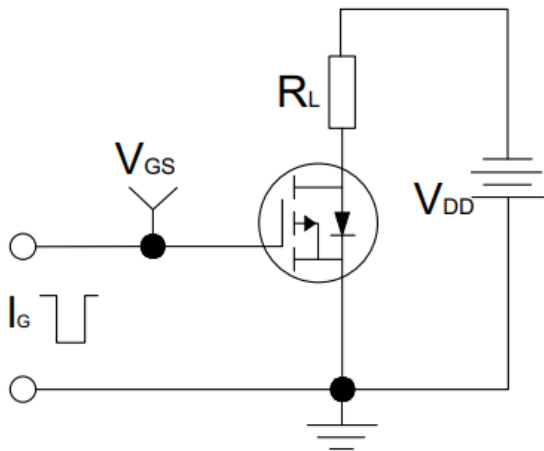


| PMOS Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted | | | | | | |
|---|---------------|---|-------|------|-----------|------------|
| Parameter | Symbol | Test Conditions | Value | | | Unit |
| | | | Min. | Typ. | Max. | |
| Static Parameters | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$ | -60 | -- | -- | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = -60V, V_{GS} = 0V, T_J = 25^\circ\text{C}$ | -- | -- | -1 | μA |
| Gate-Source Leakage | I_{GSS} | $V_{GS} = \pm 20V$ | -- | -- | ± 100 | nA |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = -250\mu A$ | -1.5 | -2.5 | -3.5 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = -10V, I_D = -5A$ | -- | 37 | 45 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS} = -5V, I_D = -5A$ | -- | 9 | -- | S |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0V,$ $V_{DS} = -30V,$ $f = 1.0\text{MHz}$ | -- | 2610 | -- | pF |
| Output Capacitance | C_{oss} | | -- | 114 | -- | |
| Reverse Transfer Capacitance | C_{rss} | | -- | 111 | -- | |
| Total Gate Charge | Q_g | $V_{DD} = -30V,$ $I_D = -5A,$ $V_{GS} = -10V$ | -- | 25 | -- | nC |
| Gate-Source Charge | Q_{gs} | | -- | 4 | -- | |
| Gate-Drain Charge | Q_{gd} | | -- | 7 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD} = -30V,$ $I_D = -5A,$ $R_G = 6\Omega$ | -- | 15 | -- | ns |
| Turn-on Rise Time | t_r | | -- | 58 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 30 | -- | |
| Turn-off Fall Time | t_f | | -- | 36 | -- | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | $T_C = 25^\circ\text{C}$ | -- | -- | -6 | A |
| Body Diode Voltage | V_{SD} | $T_J = 25^\circ\text{C}, I_{SD} = -5A, V_{GS} = 0V$ | -- | -- | -1.2 | V |

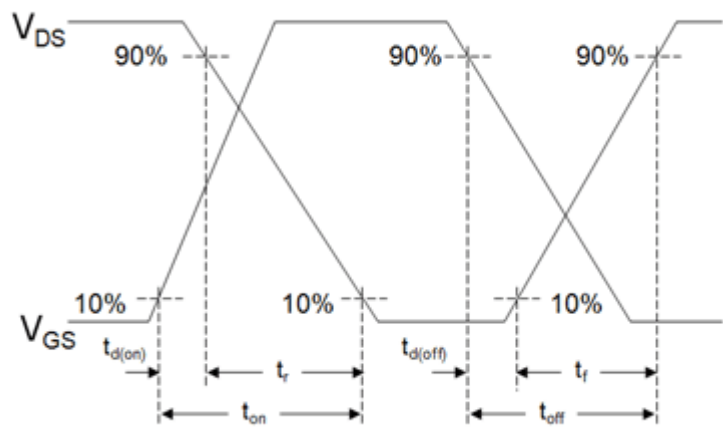
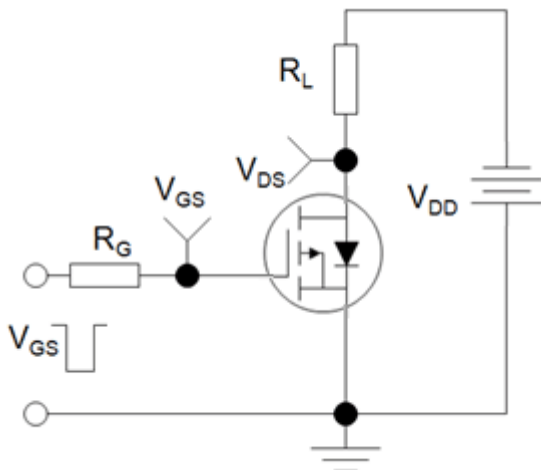
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G

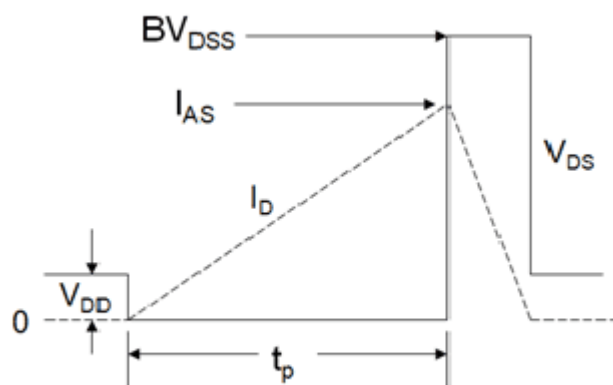
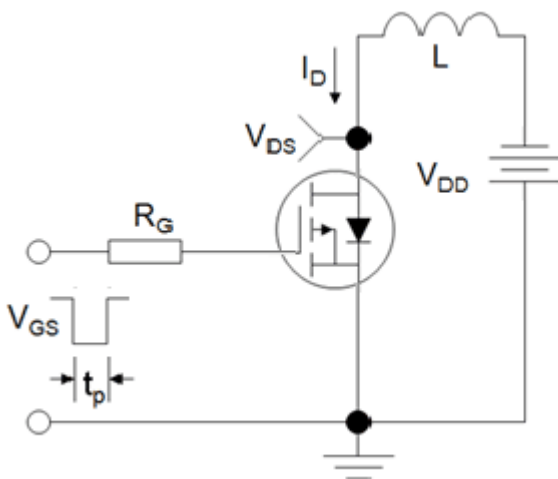
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



PMOS Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

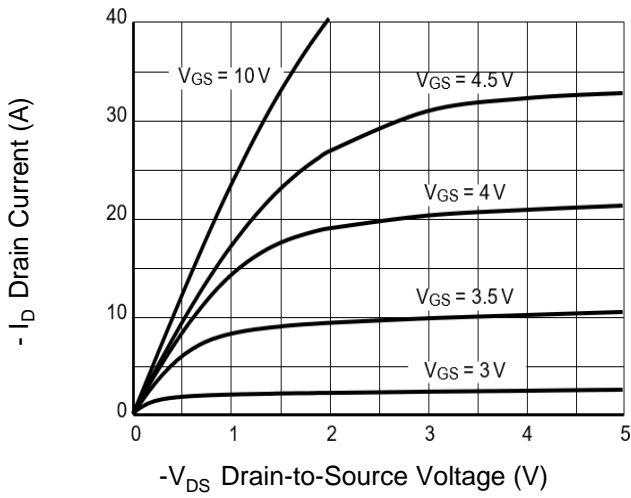


Figure 2. Transfer Characteristics

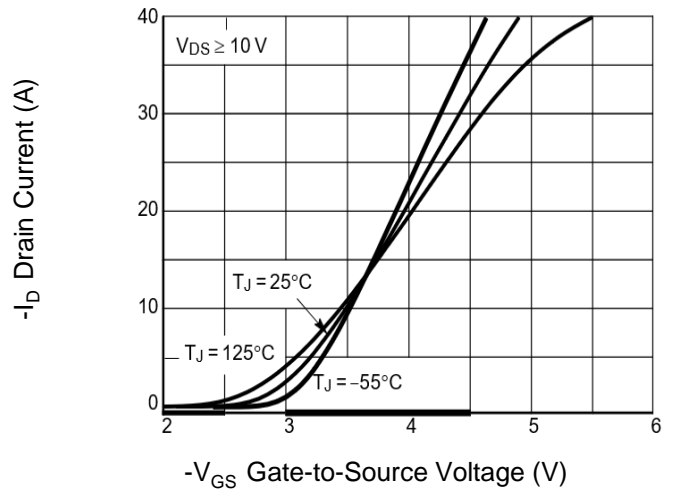


Figure 3. Rds(on)-Drain Current

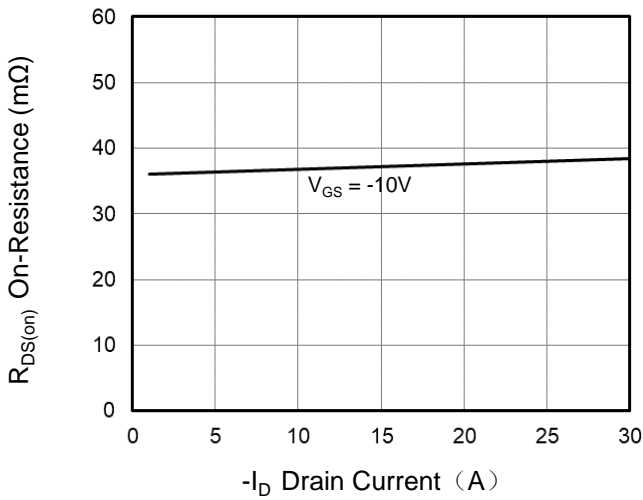


Figure 4. Gate Charge

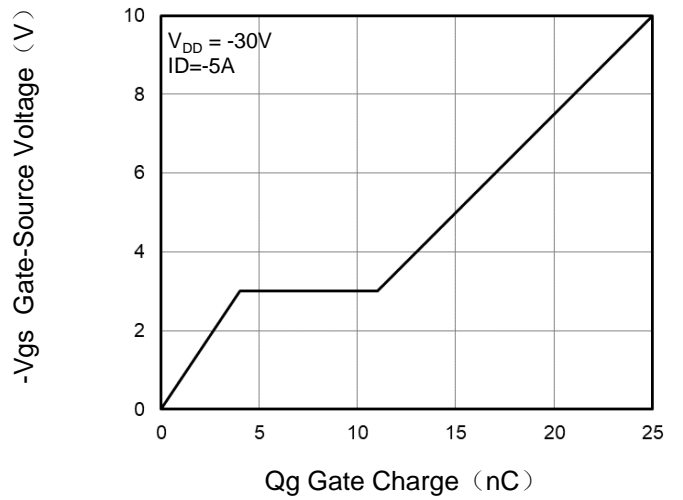


Figure 5. Capacitance

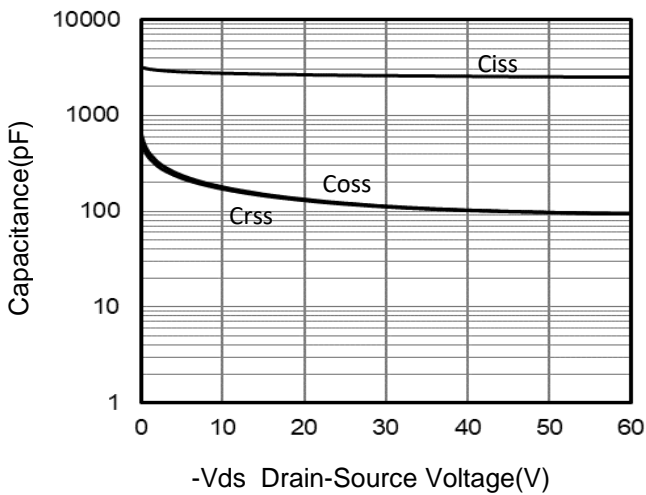
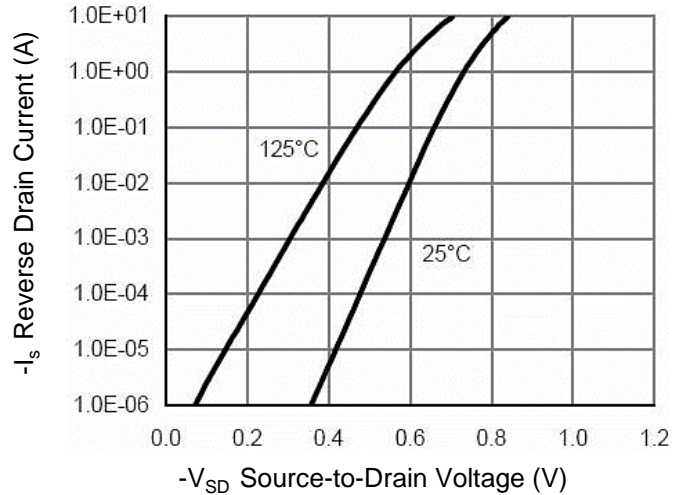


Figure 6. Source-Drain Diode Forward



PMOS Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

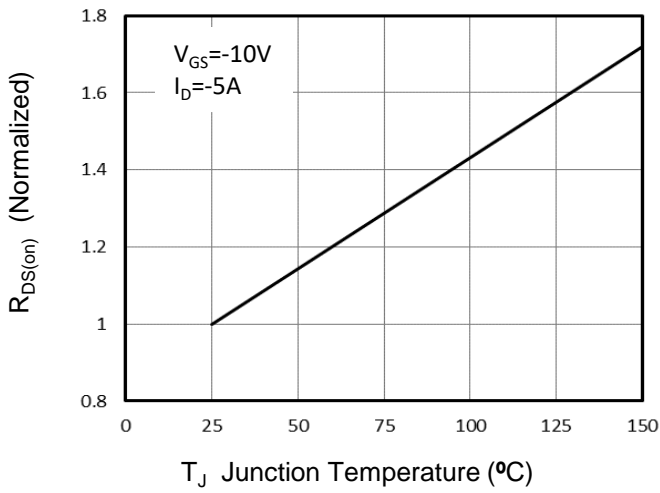


Figure 8. Safe Operation Area

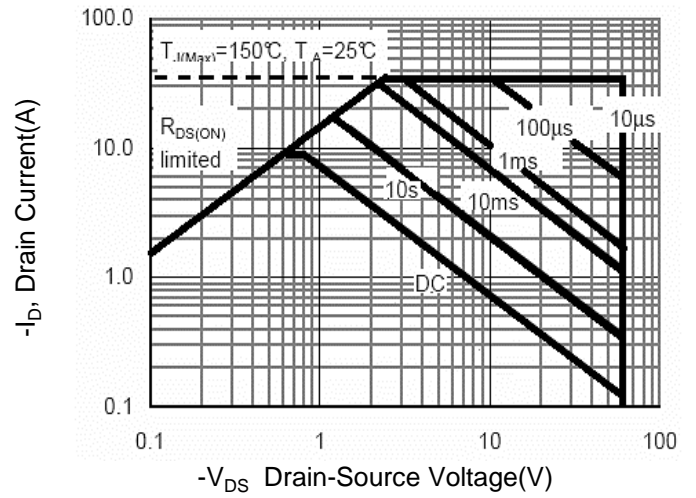
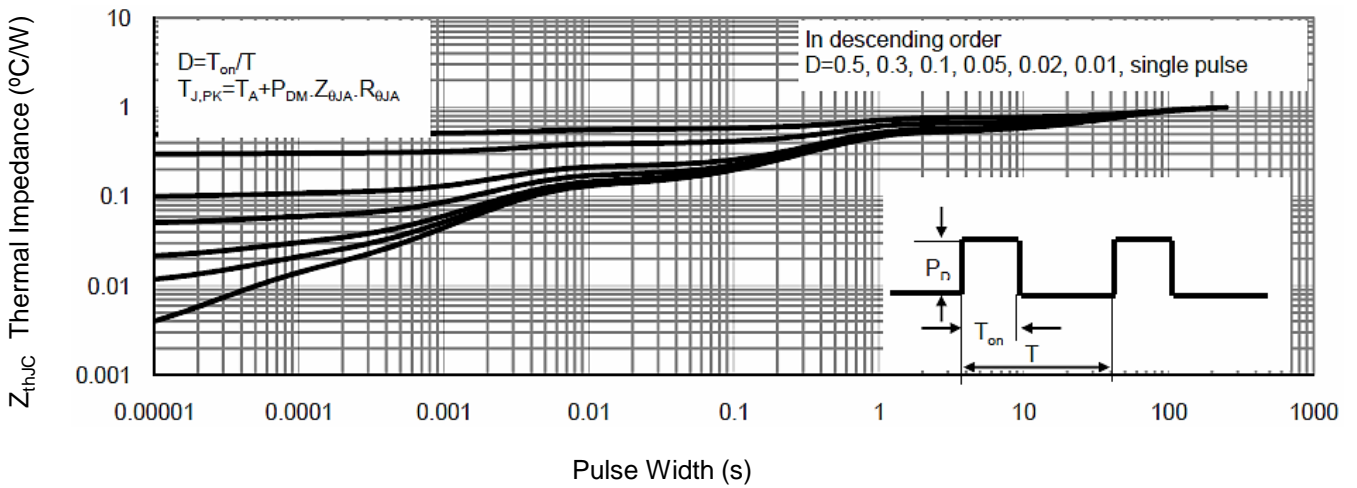
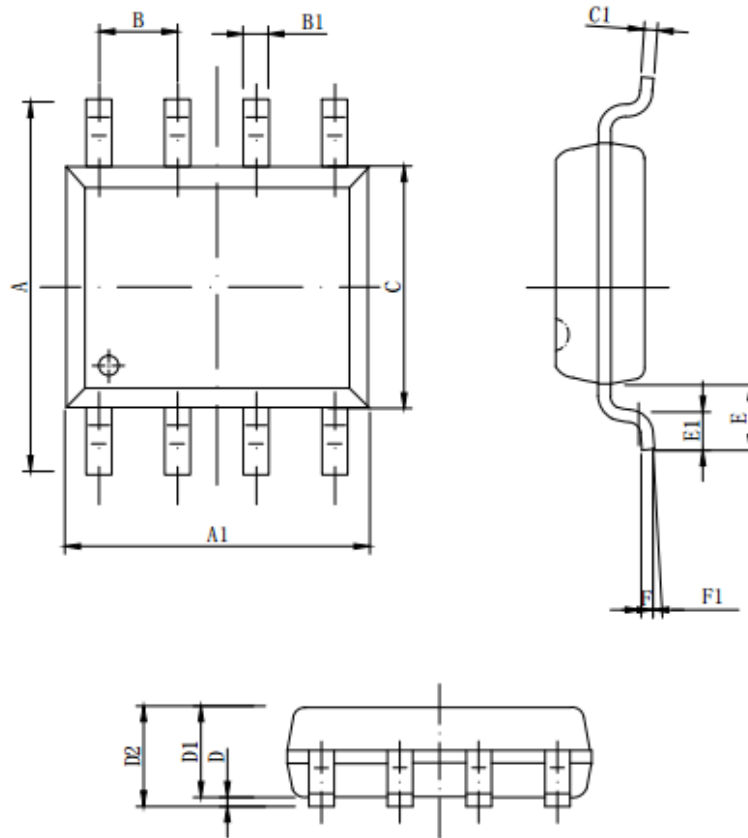


Figure 9. Normalized Maximum Transient Thermal Impedance



SOP-8 Package Information



| Symbol | Dimensions in Millimeters | | |
|--------|---------------------------|--------------------|--------------------|
| | MIN. | NOM. | MAX. |
| A | 5.800 | 6.000 | 6.200 |
| A1 | 4.800 | 4.900 | 5.000 |
| B | 1.270BSC | | |
| B1 | 0.35 ^{8x} | 0.40 ^{8x} | 0.45 ^{8x} |
| C | 3.780 | 3.880 | 3.980 |
| C1 | -- | 0.203 | 0.253 |
| D | 0.050 | 0.150 | 0.250 |
| D1 | 1.350 | 1.450 | 1.550 |
| D2 | 1.500 | 1.600 | 1.700 |
| D2 | 1.500 | 1.600 | 1.700 |
| E | 1.060REF | | |
| E1 | 0.400 | 0.700 | 0.100 |
| F | 0.250BSC | | |
| F1 | 2° | 4° | 6° |