

RoHS Compliant Product
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Description

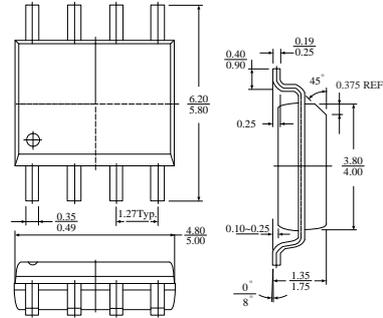
The SSG4501 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The SOP-8 package is universally preferred for all commercial industrial surface mount application and suited for low voltage applications such as DC/DC converters.

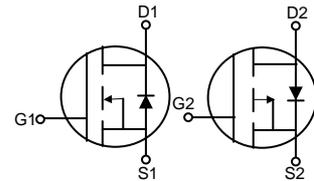
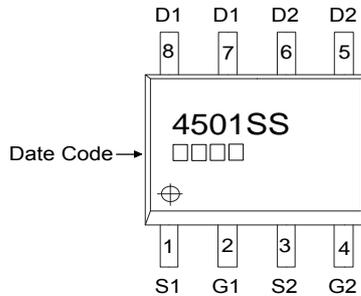
Features

- * Simple Drive Requirement
- * Lower On-resistance
- * Fast Switching Performance

SOP-8



Dimensions in millimeters



Absolute Maximum Ratings

| Parameter | Symbol | Ratings | | Unit |
|--|---------------------------------------|----------|------|------|
| | | | | |
| Drain-Source Voltage | V _{DS} | 30 | -30 | V |
| Gate-Source Voltage | V _{GS} | ±20 | ±20 | V |
| Continuous Drain Current ³ | I _D @T _A =25 °C | 7 | -5.3 | A |
| Continuous Drain Current ³ | I _D @T _A =70 °C | 5.8 | -4.7 | A |
| Pulsed Drain Current ¹ | I _{DM} | 20 | -20 | A |
| Total Power Dissipation | P _D @T _A =25 °C | 2.0 | | W |
| Linear Derating Factor | | 0.016 | | W/°C |
| Operating Junction and Storage Temperature Range | T _j , T _{stg} | -55~+150 | | °C |

Thermal Data

| Parameter | Symbol | Ratings | Unit |
|--|--------------------|---------|------|
| Thermal Resistance Junction-ambient ³ | R _{thj-a} | 62.5 | °C/W |

Electrical Characteristics N Channel($T_j=25^\circ\text{C}$ Unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|---|-----------------------------|------|------|-----------|---------------------|---|
| Drain-Source Breakdown Voltage | BV_{DSS} | 30 | - | - | V | $V_{GS}=0V, I_D=250\mu A$ |
| Breakdown Voltage Temp. Coefficient | $\Delta BV_{DS}/\Delta T_j$ | - | 0.02 | - | V/ $^\circ\text{C}$ | Reference to 25°C , $I_D=1mA$ |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1.0 | - | 3.0 | V | $V_{DS}=V_{GS}, I_D=250\mu A$ |
| Gate-Source Leakage Current | I_{GSS} | - | - | ± 100 | nA | $V_{GS}=\pm 20V$ |
| Drain-Source Leakage Current ($T_j=25^\circ\text{C}$) | I_{DSS} | - | - | 1 | μA | $V_{DS}=30V, V_{GS}=0$ |
| Drain-Source Leakage Current ($T_j=70^\circ\text{C}$) | | - | - | 25 | μA | $V_{DS}=24V, V_{GS}=0$ |
| Static Drain-Source On-Resistance ² | $R_{DS(ON)}$ | - | - | 28 | m Ω | $V_{GS}=10V, I_D=7A$ |
| | | - | - | 42 | | $V_{GS}=4.5V, I_D=5A$ |
| Total Gate Charge ² | Q_g | - | 8.4 | - | nC | $I_D=7A$ $V_{DS}=24V$ $V_{GS}=4.5V$ |
| Gate-Source Charge | Q_{gs} | - | 2.1 | - | | |
| Gate-Drain ("Miller") Charge | Q_{gd} | - | 4.7 | - | | |
| Turn-on Delay Time ² | $T_{d(ON)}$ | - | 6 | - | nS | $V_{DD}=15V$ $I_D=1A$ $V_{GS}=10V$ $R_G=3.3\Omega$ $R_D=15\Omega$ |
| Rise Time | T_r | - | 5.2 | - | | |
| Turn-off Delay Time | $T_{d(OFF)}$ | - | 18.8 | - | | |
| Fall Time | T_f | - | 4.4 | - | | |
| Input Capacitance | C_{iss} | - | 645 | - | pF | $V_{GS}=0V$ $V_{DS}=25V$ $f=1.0MHz$ |
| Output Capacitance | C_{oss} | - | 150 | - | | |
| Reverse Transfer Capacitance | C_{rss} | - | 95 | - | | |
| Forward Transconductance | G_{fs} | - | 13 | - | S | $V_{DS}=10V, I_D=7A$ |

Source-Drain Diode

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|--|----------|------|------|------|------|---|
| Forward On Voltage ² | V_{SD} | - | - | 1.2 | V | $I_S=7A, V_{GS}=0V, T_j=25^\circ\text{C}$ |
| Continuous Source Current (Body Diode) | I_S | - | - | 1.67 | A | $V_D=V_G=0V, V_S=1.2V$ |

Notes: 1.Pulse width limited by Max. junction temperature.

2.Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

3.Surface mounted on 1 inch² copper pad of FR4 board; 135 $^\circ\text{C}/W$ when mounted on min. copper pad.

Electrical Characteristics P-Channel($T_j=25^\circ\text{C}$ Unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|---|-----------------------------|------|--------|-----------|---------------------|--|
| Drain-Source Breakdown Voltage | BV_{DSS} | -30 | - | - | V | $V_{GS}=0V, I_D=-250\mu A$ |
| Breakdown Voltage Temp. Coefficient | $\Delta BV_{DS}/\Delta T_j$ | - | -0.028 | - | V/ $^\circ\text{C}$ | Reference to $25^\circ\text{C}, I_D=-1mA$ |
| Gate Threshold Voltage | $V_{GS(th)}$ | -1.0 | - | -3.0 | V | $V_{DS}=V_{GS}, I_D=-250\mu A$ |
| Gate-Source Leakage Current | I_{GSS} | - | - | ± 100 | nA | $V_{GS}=\pm 20V$ |
| Drain-Source Leakage Current ($T_j=25^\circ\text{C}$) | I_{DSS} | - | - | -1 | μA | $V_{DS}=-30V, V_{GS}=0$ |
| Drain-Source Leakage Current ($T_j=70^\circ\text{C}$) | | - | - | -25 | μA | $V_{DS}=-24V, V_{GS}=0$ |
| Static Drain-Source On-Resistance ² | $R_{DS(ON)}$ | - | - | 50 | m Ω | $V_{GS}=-10V, I_D=-5.3A$ |
| | | - | - | 90 | | $V_{GS}=-4.5V, I_D=-4.2A$ |
| Total Gate Charge ² | Q_g | - | 20 | - | nC | $I_D=-5.3A$ $V_{DS}=-15V$ $V_{GS}=-10V$ |
| Gate-Source Charge | Q_{gs} | - | 3.5 | - | | |
| Gate-Drain ("Miller") Charge | Q_{gd} | - | 2 | - | | |
| Turn-on Delay Time ² | $T_{d(ON)}$ | - | 12 | - | nS | $V_{DS}=-15V$ $I_D=-1A$ $V_{GS}=-10V$ $R_G=6\ \Omega$ $R_D=15\ \Omega$ |
| Rise Time | T_r | - | 20 | - | | |
| Turn-off Delay Time | $T_{d(OFF)}$ | - | 45 | - | | |
| Fall Time | T_f | - | 27 | - | | |
| Input Capacitance | C_{iss} | - | 790 | - | pF | $V_{GS}=0V$ $V_{DS}=-15V$ $f=1.0MHz$ |
| Output Capacitance | C_{oss} | - | 440 | - | | |
| Reverse Transfer Capacitance | C_{rss} | - | 120 | - | | |
| Forward Transconductance | G_{fs} | - | 8.5 | - | S | $V_{DS}=-10V, I_D=-5.3A$ |

Source-Drain Diode

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|--|----------|------|------|-------|------|--|
| Forward On Voltage ² | V_{SD} | - | - | -1.2 | V | $I_S=-2.6A, V_{GS}=0V, T_j=25^\circ\text{C}$ |
| Continuous Source Current (Body Diode) | I_S | - | - | -1.67 | A | $V_D=V_G=0V, V_S=-1.2V$ |

Notes: 1.Pulse width limited by Max. junction temperature.

2.Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

3.Surface mounted on 1 inch² copper pad of FR4 board; 135 $^\circ\text{C}/W$ when mounted on min. copper pad.

Characteristics Curve N-Channel

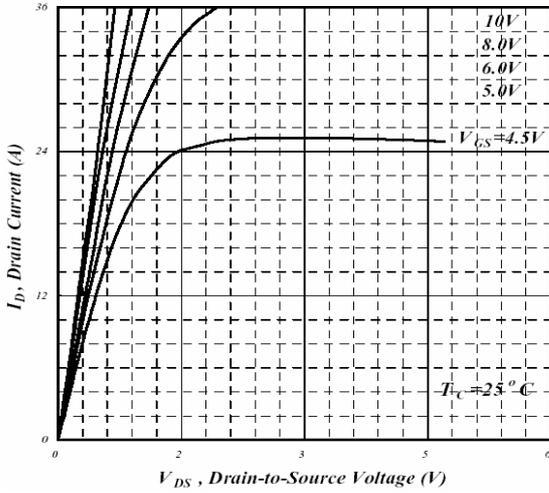


Fig 1. Typical Output Characteristics

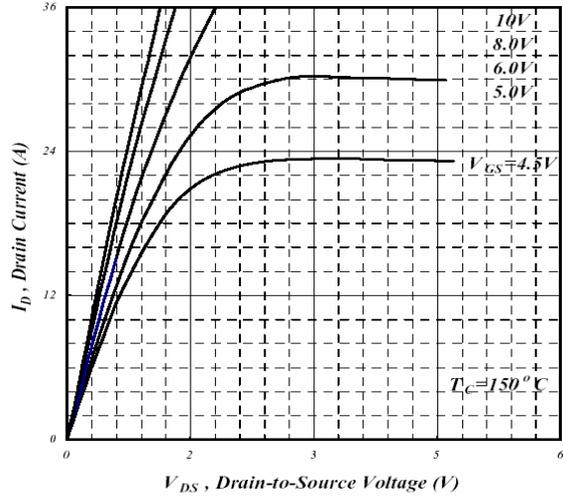


Fig 2. Typical Output Characteristics

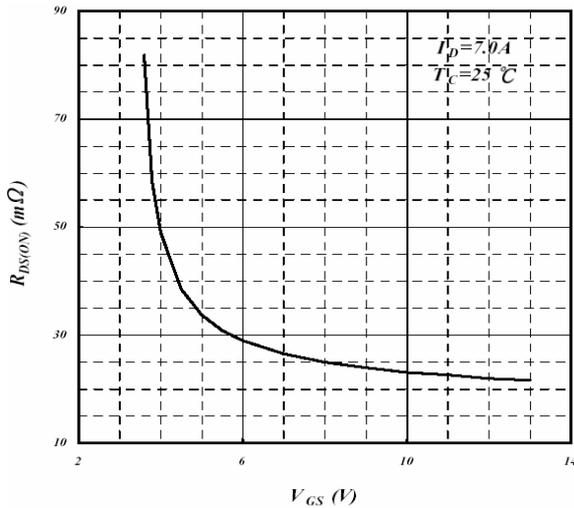


Fig 3. On-Resistance v.s. Gate Voltage

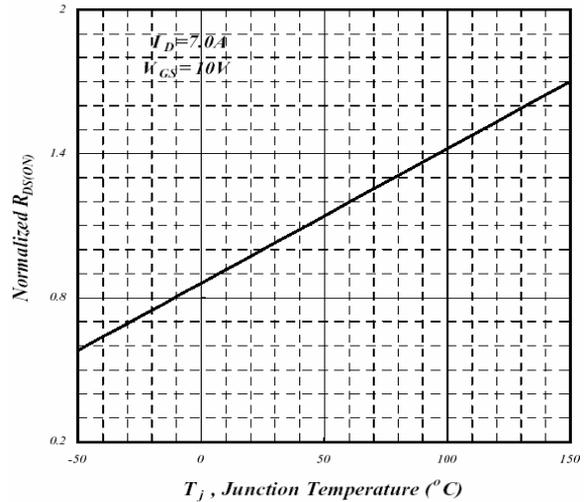


Fig 4. Normalized On-Resistance v.s. Junction Temperature

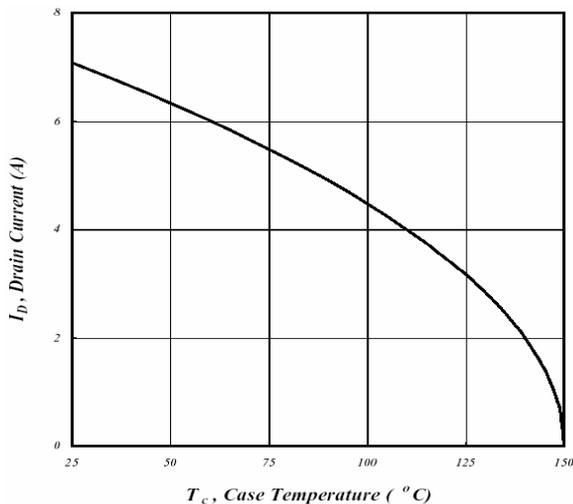


Fig 5. Maximum Drain Current v.s. Case Temperature

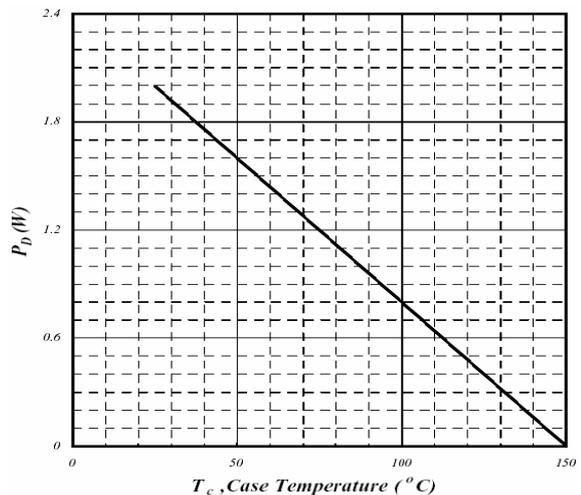


Fig 6. Type Power Dissipation

N-Channel

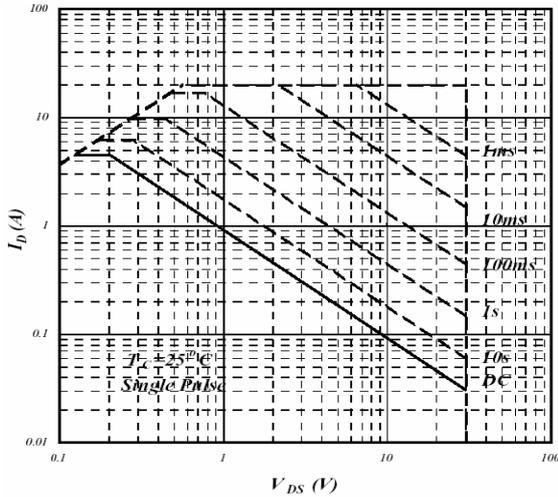


Fig 7. Maximum Safe Operating Area

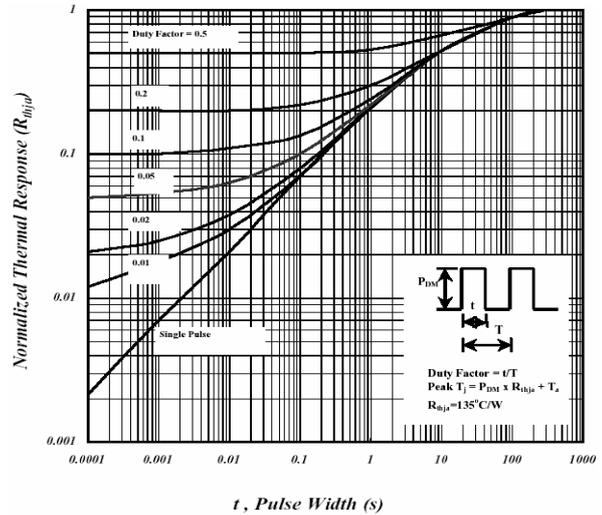


Fig 8. Effective Transient Thermal Impedance

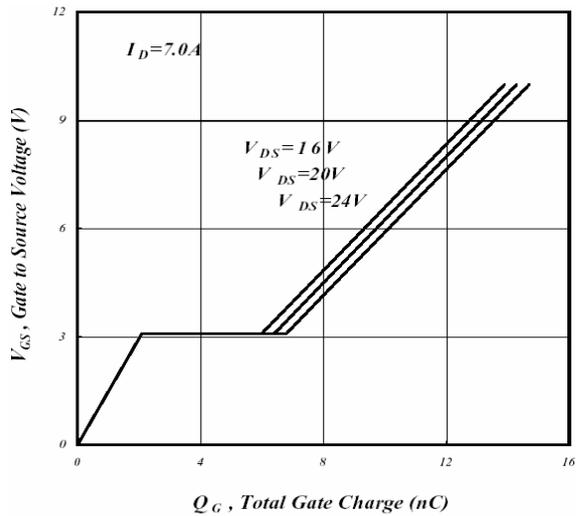


Fig 9. Gate Charge Characteristics

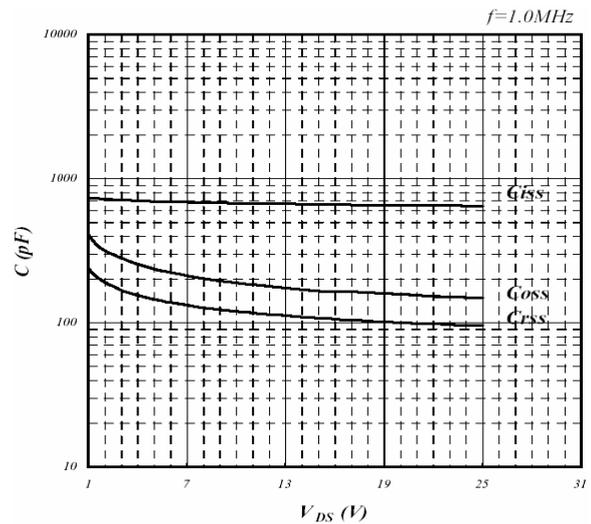


Fig 10. Typical Capacitance Characteristics

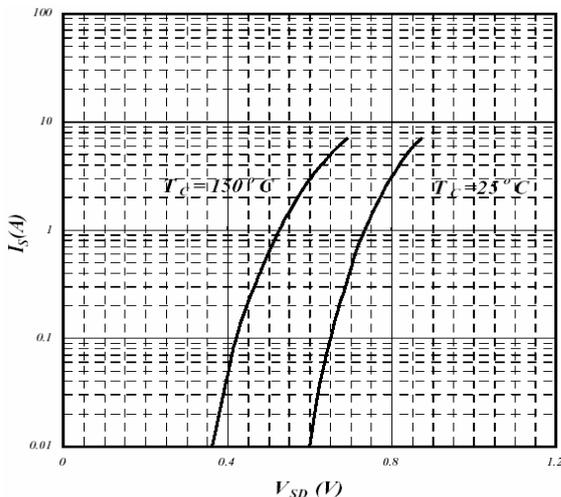


Fig 11. Forward Characteristics of Reverse Diode

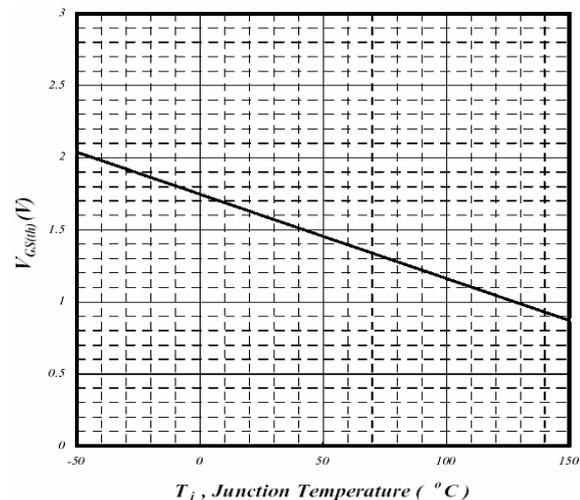


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

N-Channel

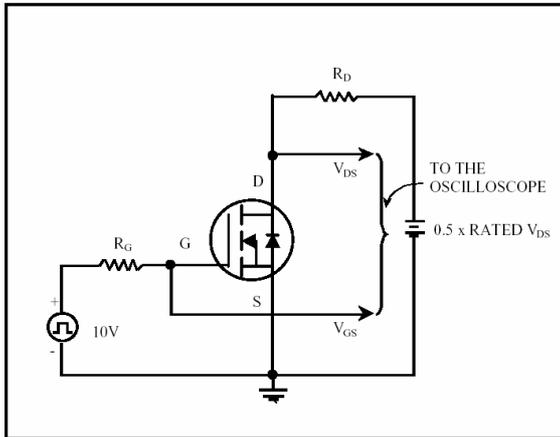


Fig 13. Switching Time Circuit

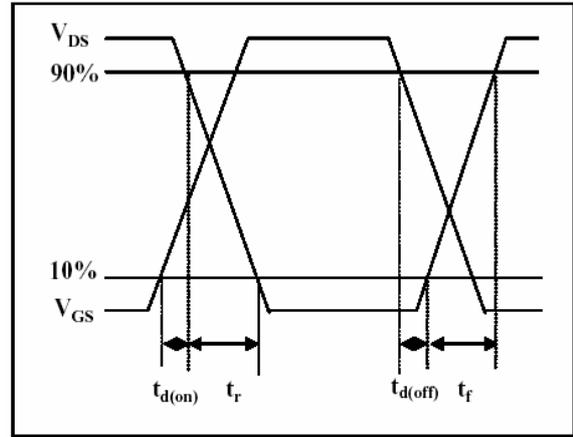


Fig 14. Switching Time Waveform

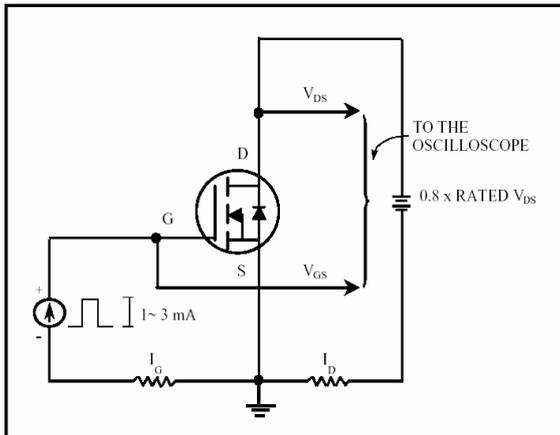


Fig 15. Gate Charge Circuit

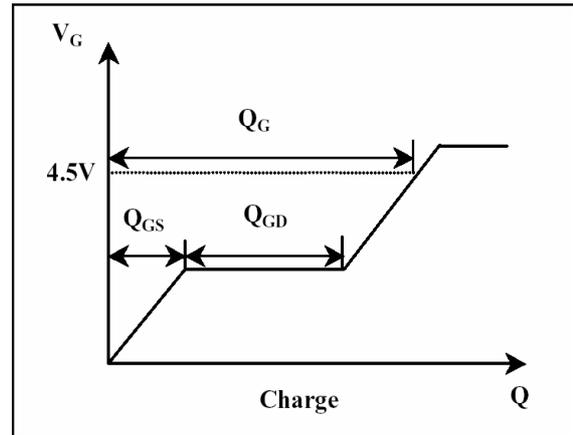


Fig 16. Gate Charge Waveform

P-Channel

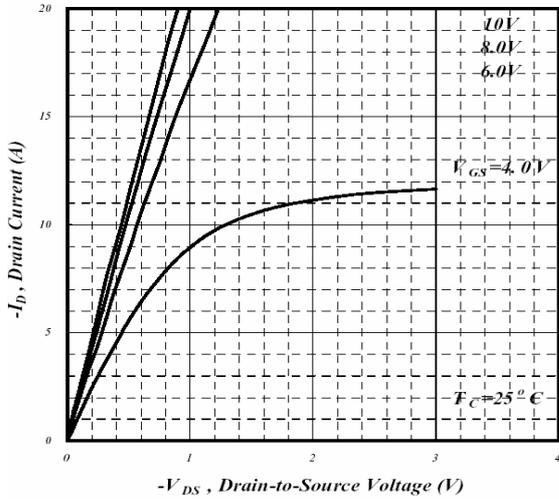


Fig 1. Typical Output Characteristics

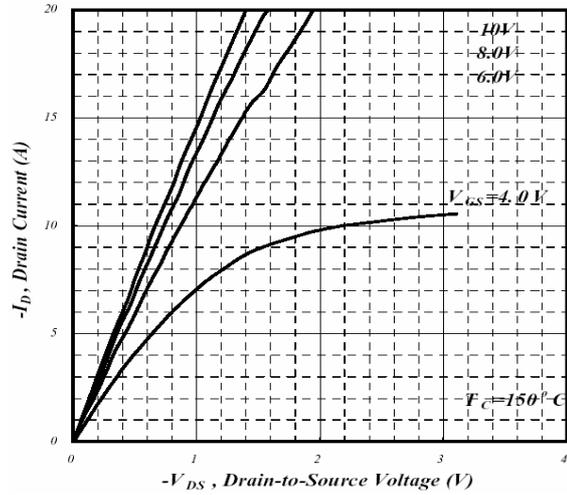


Fig 2. Typical Output Characteristics

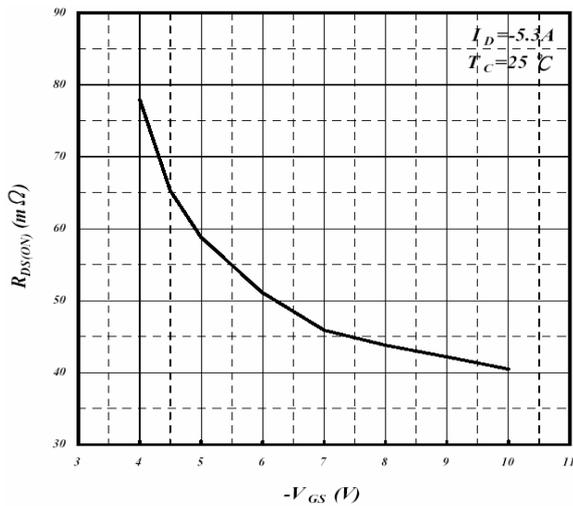


Fig 3. On-Resistance v.s. Gate Voltage

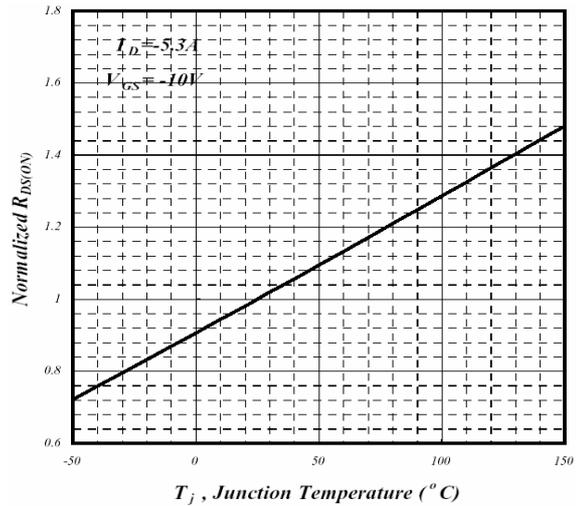


Fig 4. Normalized On-Resistance v.s. Junction Temperature

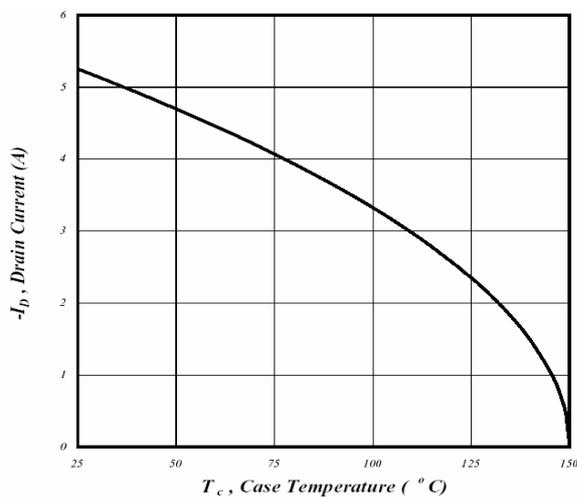


Fig 5. Maximum Drain Current v.s. Case Temperature

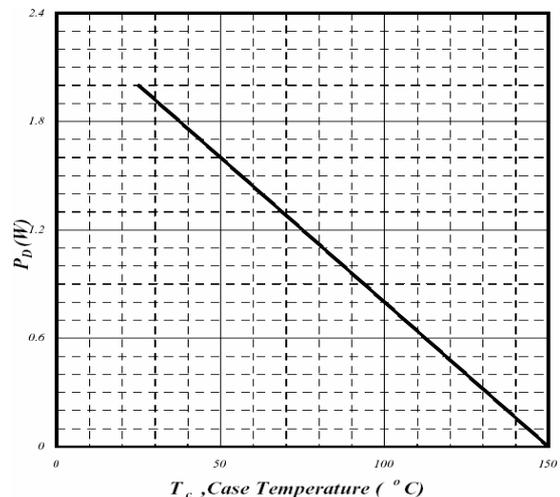


Fig 6. Type Power Dissipation

P-Channel

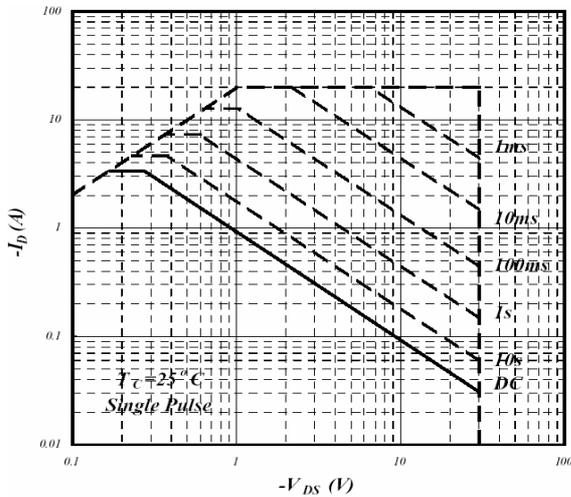


Fig 7. Maximum Safe Operating Area

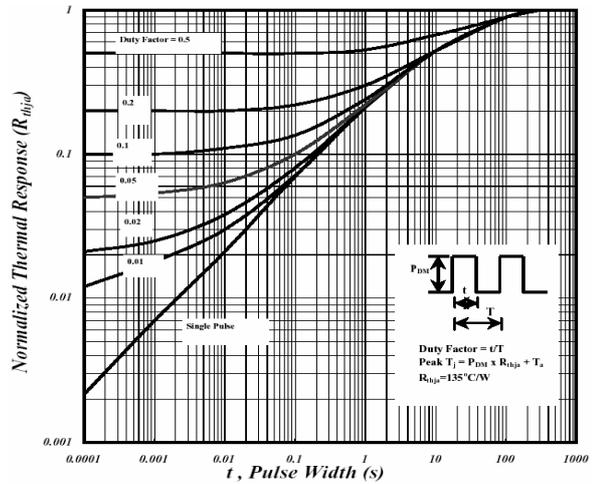


Fig 8. Effective Transient Thermal Impedance

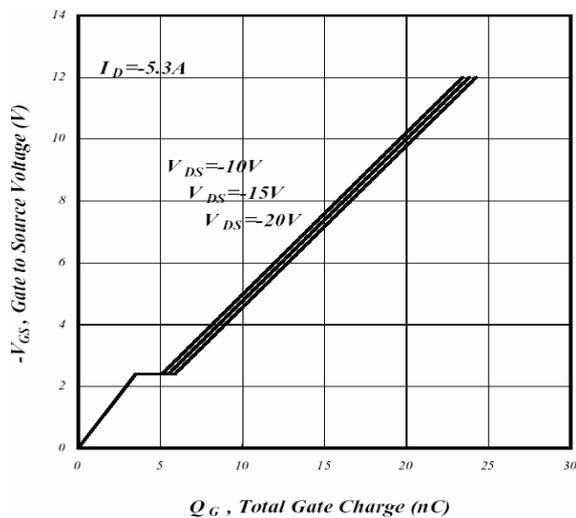


Fig 9. Gate Charge Characteristics

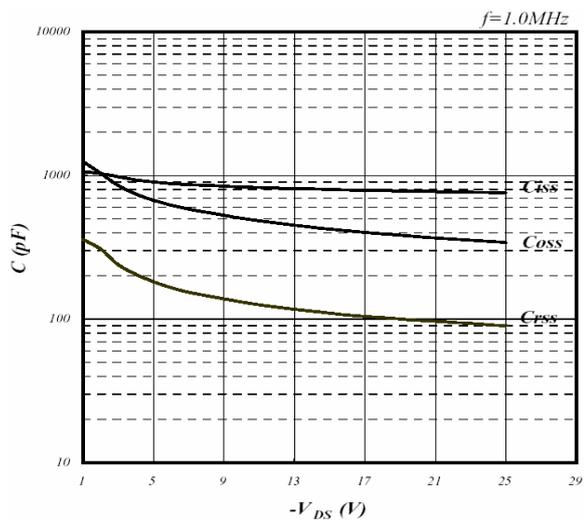


Fig 10. Typical Capacitance Characteristics

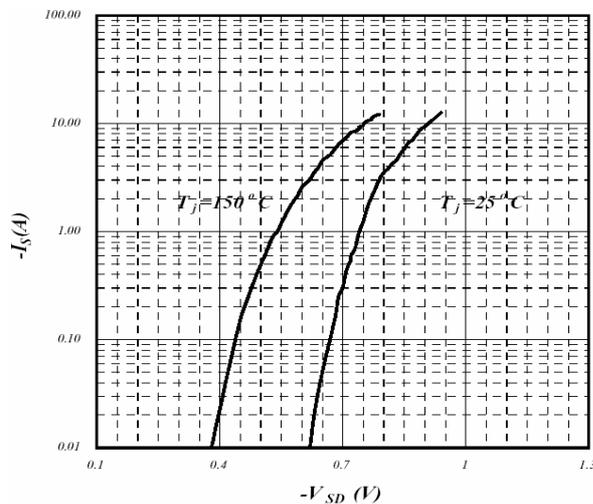


Fig 11. Forward Characteristics of Reverse Diode

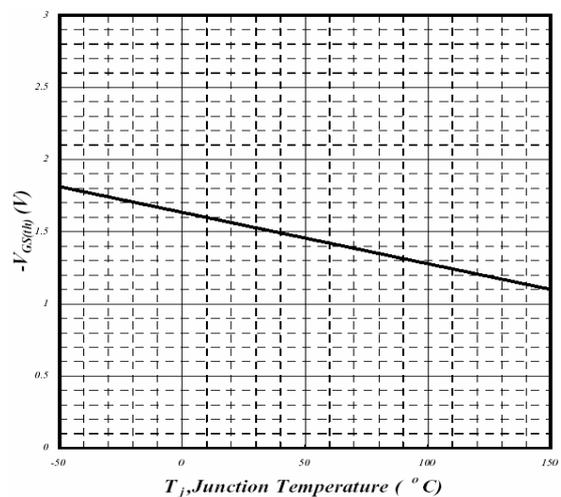


Fig 12. Gate Threshold Voltage v.s. Junction Temperature

P-Channel

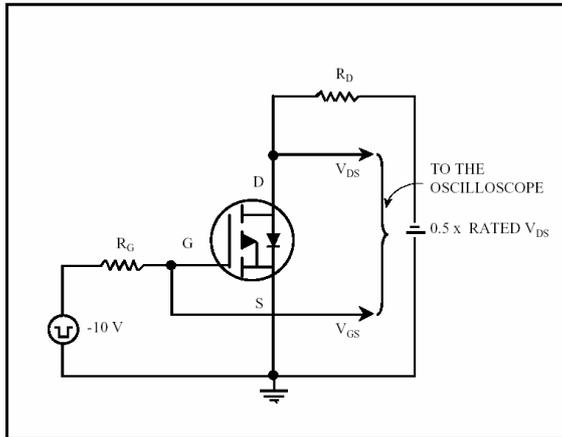


Fig 13. Switching Time Circuit

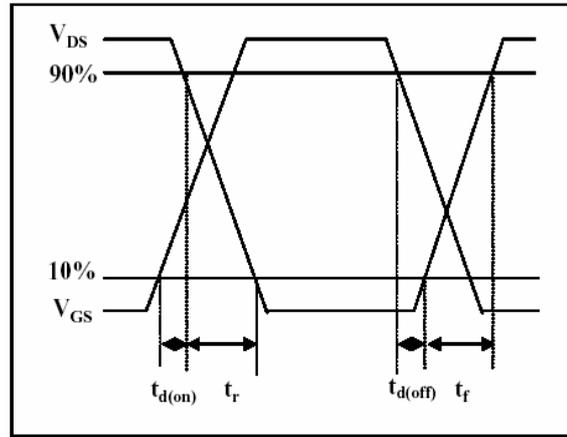


Fig 14. Switching Time Waveform

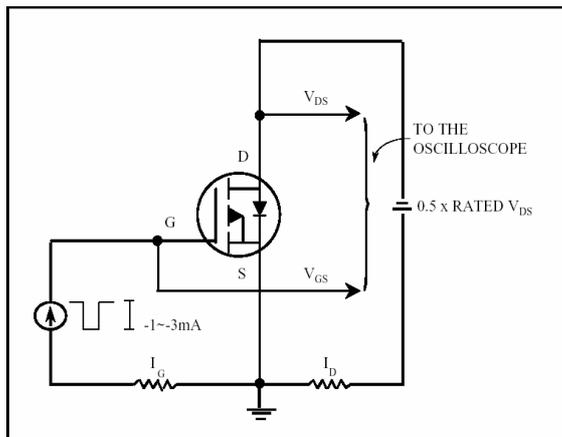


Fig 15. Gate Charge Circuit

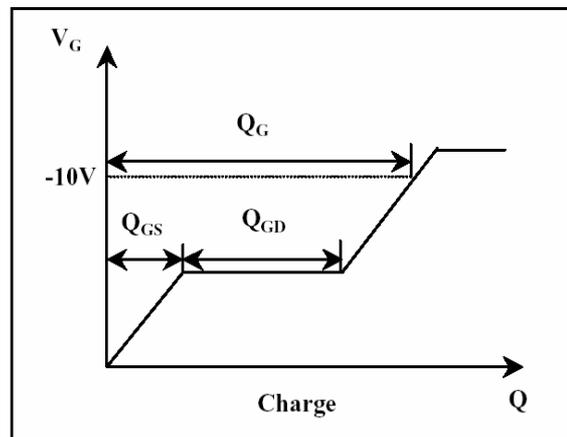


Fig 16. Gate Charge Waveform