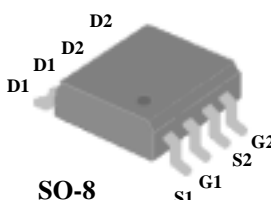


- ▼ Simple Drive Requirement
- ▼ Low On-resistance
- ▼ Fast Switching

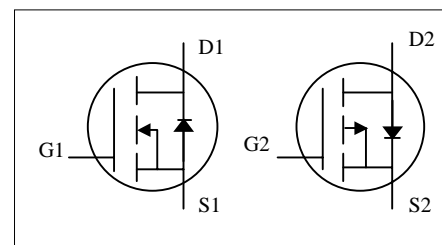


| | | |
|------|--------------|--------------|
| N-CH | BV_{DSS} | 30V |
| | $R_{DS(ON)}$ | 28m Ω |
| | I_D | 7A |
| P-CH | BV_{DSS} | -30V |
| | $R_{DS(ON)}$ | 50m Ω |
| | I_D | -5.3A |

Description

The Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

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



Absolute Maximum Ratings

| Symbol | Parameter | Rating | | Units |
|--------------------------|---------------------------------------|------------|-----------|---------------|
| | | N-channel | P-channel | |
| V_{DS} | Drain-Source Voltage | 30 | -30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | ± 20 | V |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current ³ | 7 | -5.3 | A |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current ³ | 5.8 | -4.7 | A |
| I_{DM} | Pulsed Drain Current ¹ | 20 | -20 | A |
| $P_D @ T_A = 25^\circ C$ | Total Power Dissipation | 2 | | W |
| | Linear Derating Factor | 0.016 | | W/ $^\circ C$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | | $^\circ C$ |

Thermal Data

| Symbol | Parameter | Value | Unit |
|---------------|--|-----------|--------------|
| $R_{thj-amb}$ | Thermal Resistance Junction-ambient ³ | Max. 62.5 | $^\circ C/W$ |


N-CH Electrical Characteristics @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|------------------------------|---|--|------|------|-----------|--------------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 30 | - | - | V |
| $\Delta BV_{DSS}/\Delta T_j$ | Breakdown Voltage Temperature Coefficient | Reference to 25°C , $I_D=1\text{mA}$ | - | 0.02 | - | $V/^\circ\text{C}$ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ² | $V_{GS}=10V, I_D=7A$ | - | - | 28 | $\text{m}\Omega$ |
| | | $V_{GS}=4.5V, I_D=5A$ | - | - | 42 | $\text{m}\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1 | - | 3 | V |
| g_{fs} | Forward Transconductance | $V_{DS}=10V, I_D=7A$ | - | 13 | - | S |
| I_{DSS} | Drain-Source Leakage Current ($T_j=25^\circ\text{C}$) | $V_{DS}=30V, V_{GS}=0V$ | - | - | 1 | μA |
| | Drain-Source Leakage Current ($T_j=70^\circ\text{C}$) | $V_{DS}=24V, V_{GS}=0V$ | - | - | 25 | μA |
| I_{GSS} | Gate-Source Leakage | $V_{GS}=\pm 20V$ | - | - | ± 100 | nA |
| Q_g | Total Gate Charge ² | $I_D=7A$ | - | 8.4 | - | nC |
| Q_{gs} | Gate-Source Charge | $V_{DS}=24V$ | - | 2.1 | - | nC |
| Q_{gd} | Gate-Drain ("Miller") Charge | $V_{GS}=4.5V$ | - | 4.7 | - | nC |
| $t_{d(on)}$ | Turn-on Delay Time ² | $V_{DS}=15V$ | - | 6 | - | ns |
| t_r | Rise Time | $I_D=1A$ | - | 5.2 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | $R_G=3.3\Omega, V_{GS}=10V$ | - | 18.8 | - | ns |
| t_f | Fall Time | $R_D=15\Omega$ | - | 4.4 | - | ns |
| C_{iss} | Input Capacitance | $V_{GS}=0V$ | - | 645 | - | pF |
| C_{oss} | Output Capacitance | $V_{DS}=25V$ | - | 150 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | $f=1.0\text{MHz}$ | - | 95 | - | pF |

Source-Drain Diode

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



P-CH Electrical Characteristics @T_j=25°C(unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|-------------------------------------|---|---|------|--------|------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =-250uA | -30 | - | - | V |
| ΔBV _{DSS} /ΔT _j | Breakdown Voltage Temperature Coefficient | Reference to 25°C, I _D =-1mA | - | -0.028 | - | V/°C |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =-10V, I _D =-5.3A | - | - | 50 | mΩ |
| | | V _{GS} =-4.5V, I _D =-4.2A | - | - | 90 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =-250uA | -1 | - | -3 | V |
| g _{fs} | Forward Transconductance | V _{DS} =-10V, I _D =-5.3A | - | 8.5 | - | S |
| I _{DSS} | Drain-Source Leakage Current (T _j =25°C) | V _{DS} =-30V, V _{GS} =0V | - | - | -1 | uA |
| | Drain-Source Leakage Current (T _j =70°C) | V _{DS} =-24V, V _{GS} =0V | - | - | -25 | uA |
| I _{GSS} | Gate-Source Leakage | V _{GS} = ± 20V | - | - | ±100 | nA |
| Q _g | Total Gate Charge ² | I _D =-5.3A | - | 20 | - | nC |
| Q _{gs} | Gate-Source Charge | V _{DS} =-15V | - | 3.5 | - | nC |
| Q _{gd} | Gate-Drain ("Miller") Charge | V _{GS} =-10V | - | 2 | - | nC |
| t _{d(on)} | Turn-on Delay Time ² | V _{DS} =-15V | - | 12 | - | ns |
| t _r | Rise Time | I _D =-1A | - | 20 | - | ns |
| t _{d(off)} | Turn-off Delay Time | R _G =6Ω, V _{GS} =-10V | - | 45 | - | ns |
| t _f | Fall Time | R _D =15Ω | - | 27 | - | ns |
| C _{iss} | Input Capacitance | V _{GS} =0V | - | 790 | - | pF |
| C _{oss} | Output Capacitance | V _{DS} =-15V | - | 440 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | f=1.0MHz | - | 120 | - | pF |

Source-Drain Diode

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|-----------------|--|--|------|------|-------|-------|
| I _S | Continuous Source Current (Body Diode) | V _D =V _G =0V , V _S =-1.2V | - | - | -1.67 | A |
| V _{SD} | Forward On Voltage ² | T _j =25°C, I _S =-2.6A, V _{GS} =0V | - | - | -1.2 | V |

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse width ≤300us , duty cycle ≤2%.
- 3.Surface mounted on 1 in² copper pad of FR4 board ; 135°C/W when mounted on Min. copper pad.



N-Channel

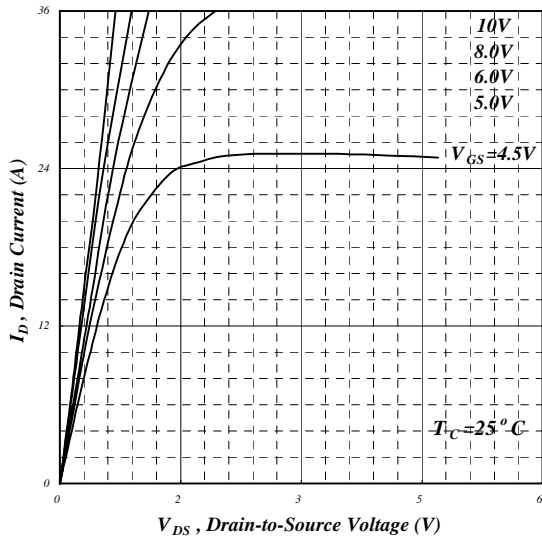


Fig 1. Typical Output Characteristics

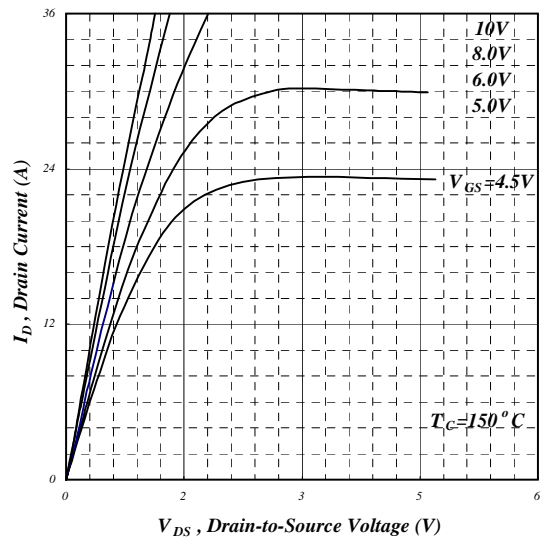


Fig 2. Typical Output Characteristics

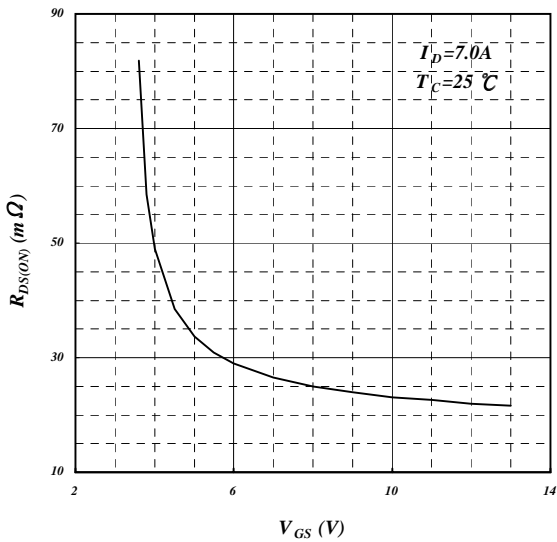


Fig 3. On-Resistance v.s. Gate Voltage

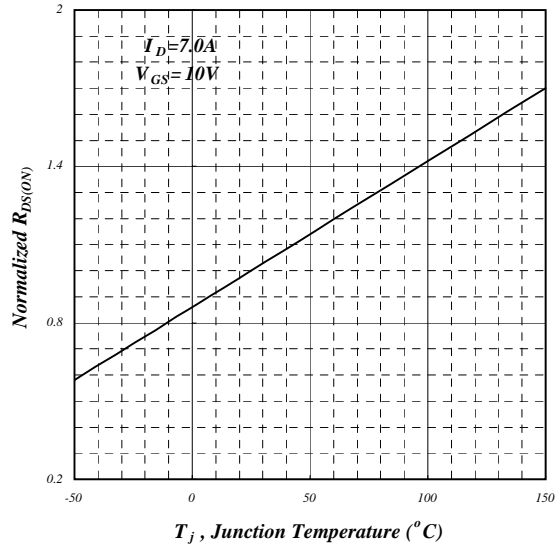


Fig 4. Normalized On-Resistance v.s. Junction Temperature



N-Channel

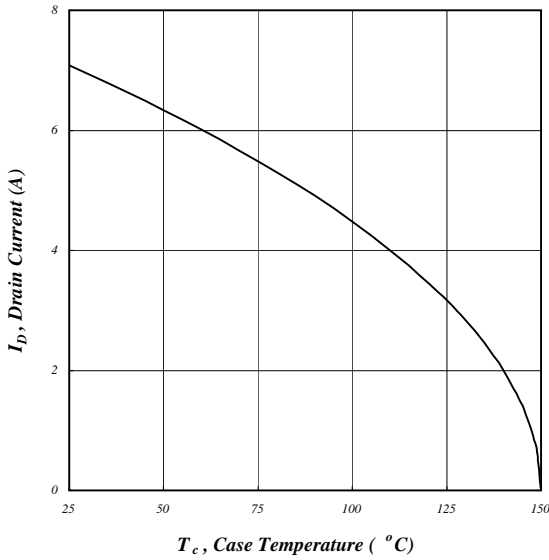


Fig 5. Maximum Drain Current v.s. Case Temperature

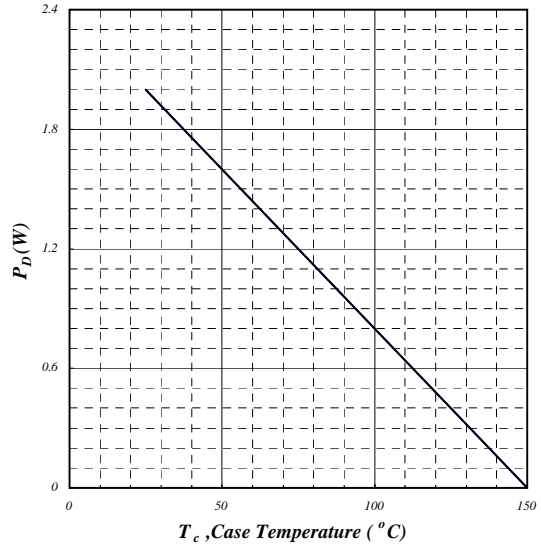


Fig 6. Typical Power Dissipation

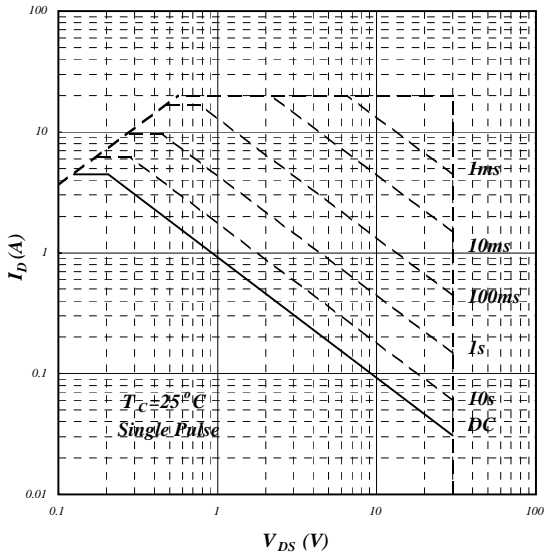


Fig 7. Maximum Safe Operating Area

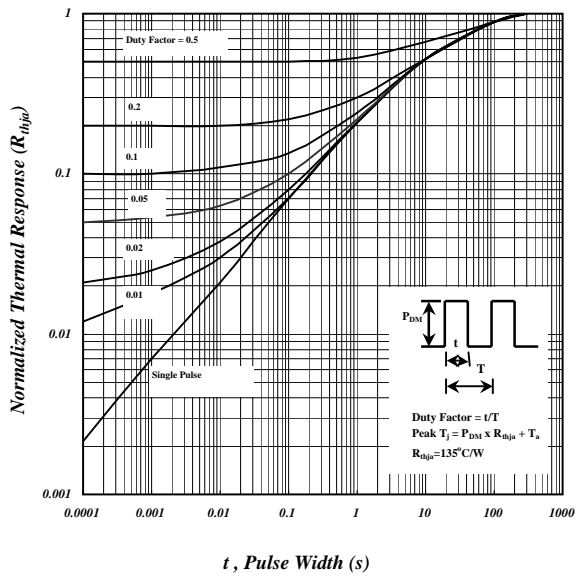


Fig 8. Effective Transient Thermal Impedance



N-Channel

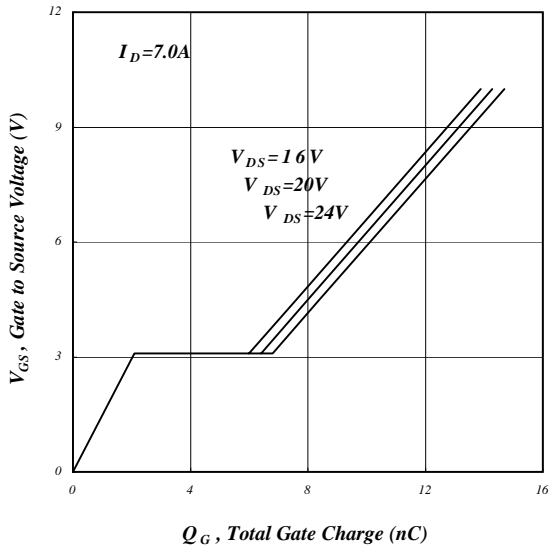


Fig 9. Gate Charge Characteristics

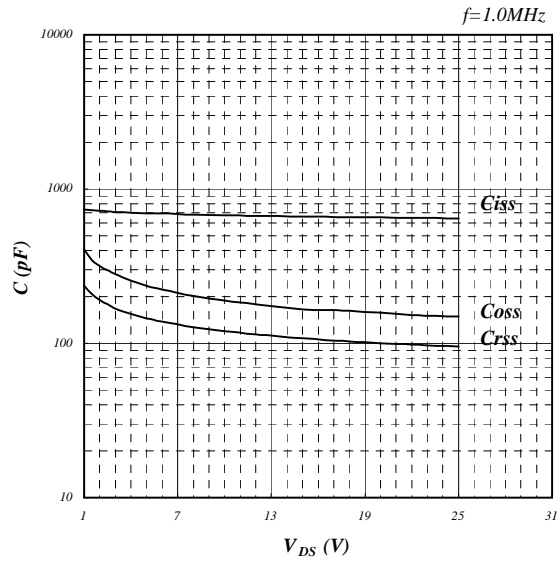


Fig 10. Typical Capacitance Characteristics

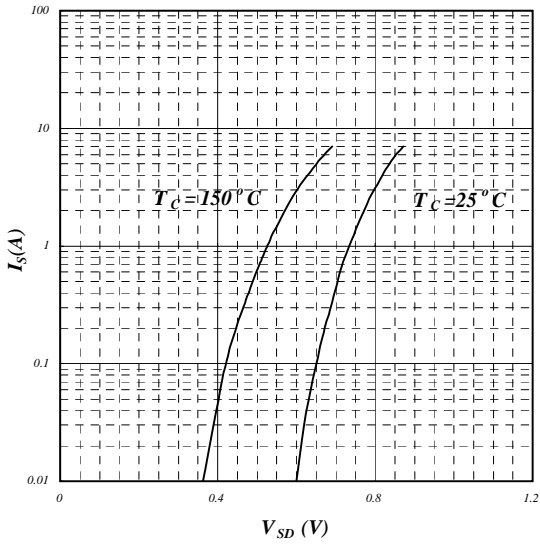


Fig 11. Forward Characteristic of Reverse Diode

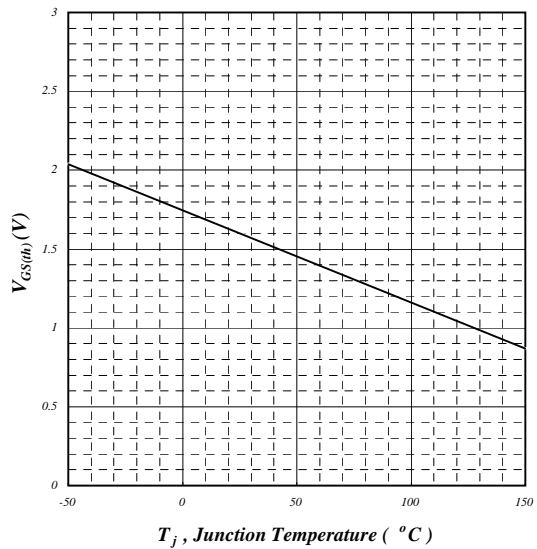


Fig 12. Gate Threshold Voltage v.s. Junction Temperature



N-Channel

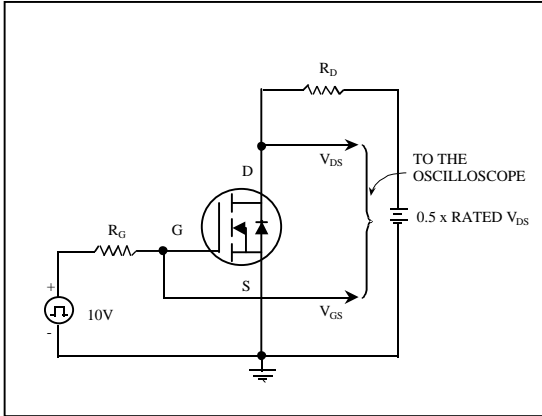


Fig 13. Switching Time Circuit

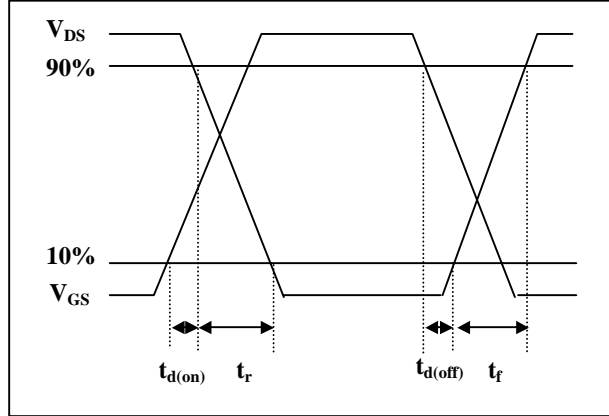


Fig 14. Switching Time Waveform

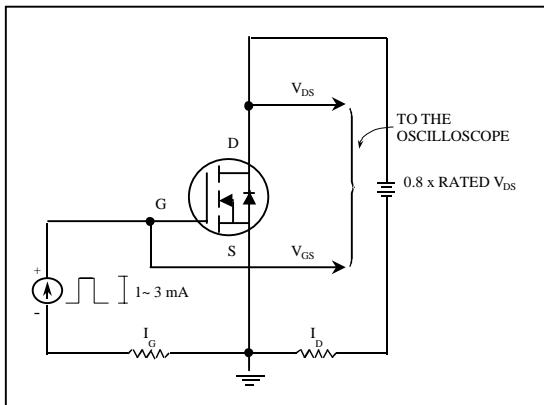


Fig 15. Gate Charge Circuit

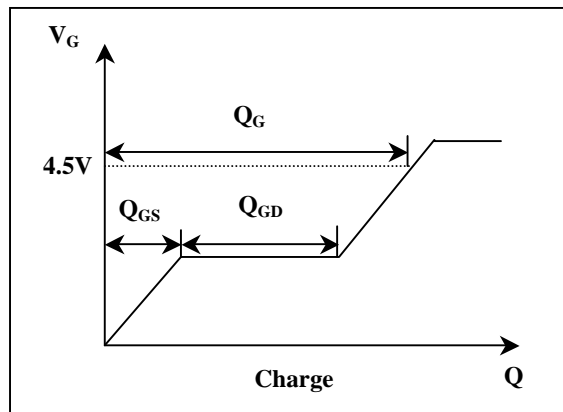


Fig 16. Gate Charge Waveform



P-Channel

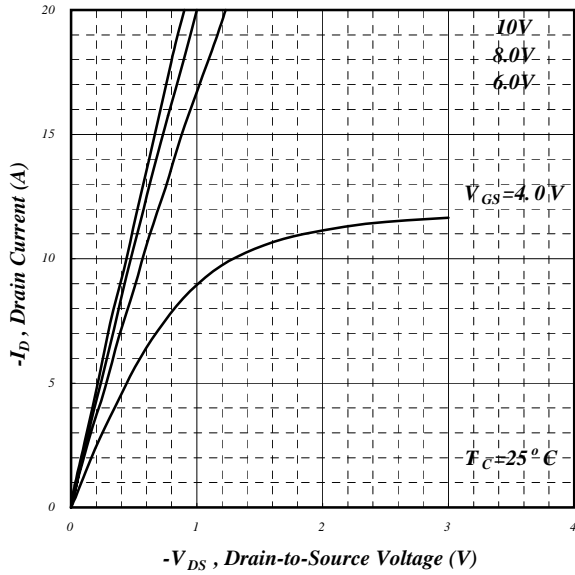


Fig 1. Typical Output Characteristics

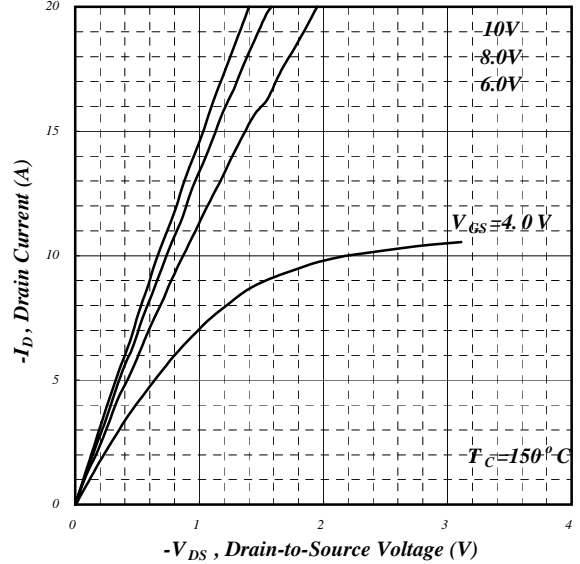


Fig 2. Typical Output Characteristics

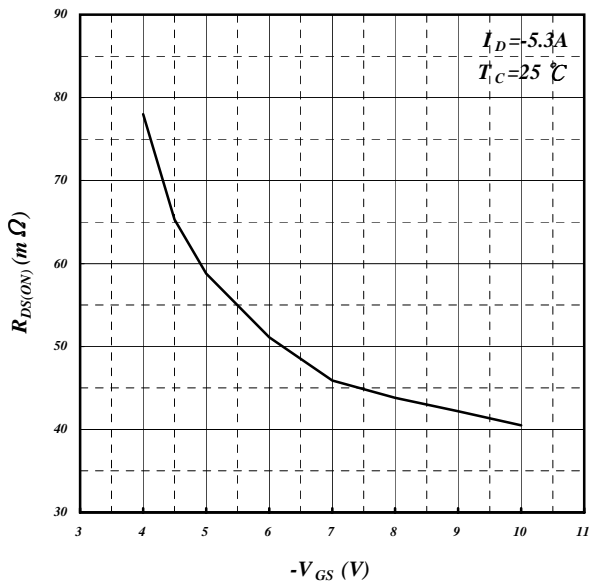


Fig 3. On-Resistance v.s. Gate Voltage

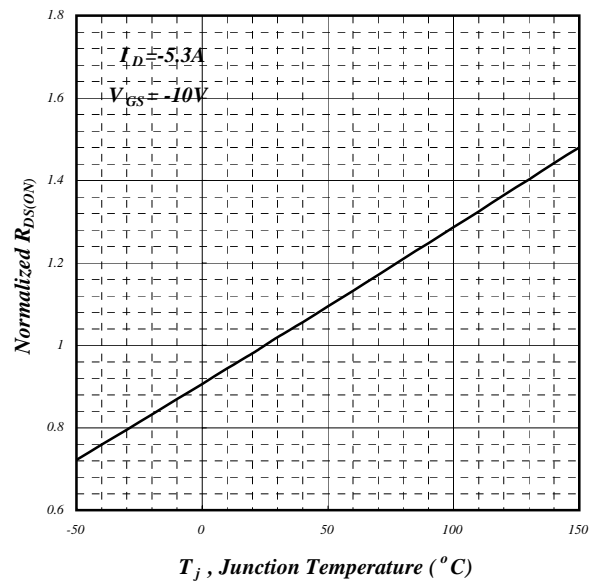


Fig 4. Normalized On-Resistance v.s. Junction Temperature



P-Channel

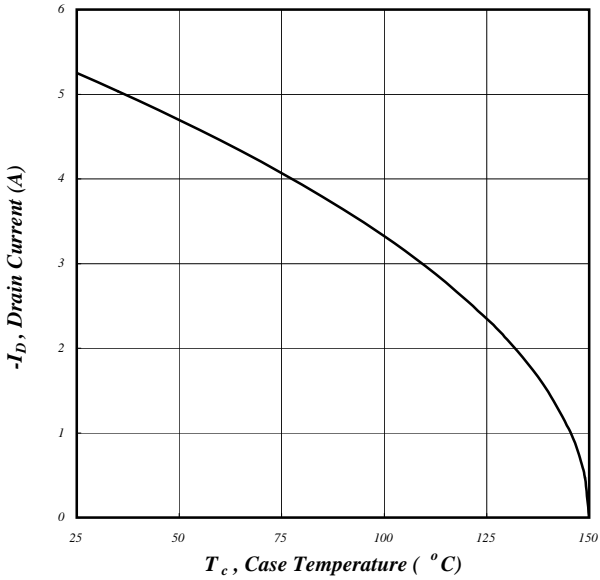


Fig 5. Maximum Drain Current v.s. Case Temperature

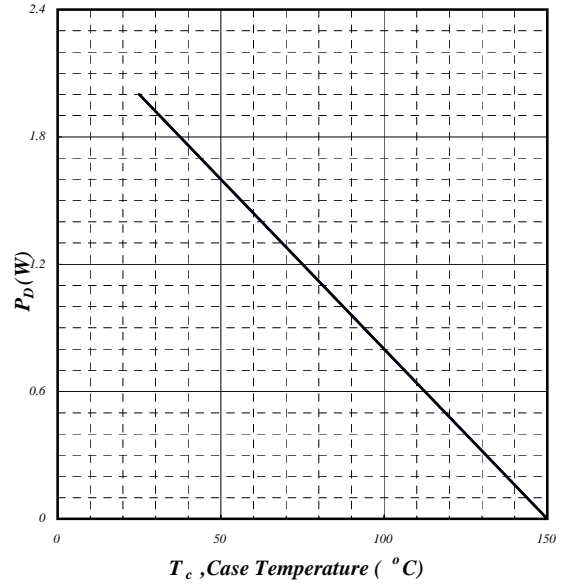


Fig 6. Typical Power Dissipation

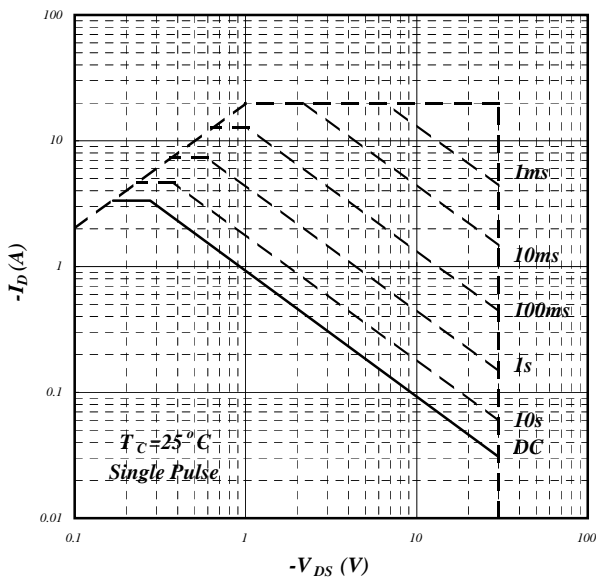


Fig 7. Maximum Safe Operating Area

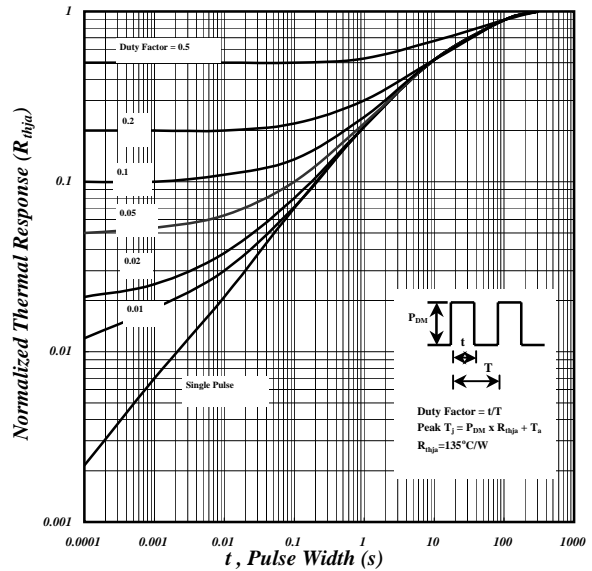


Fig 8. Effective Transient Thermal Impedance



P-Channel

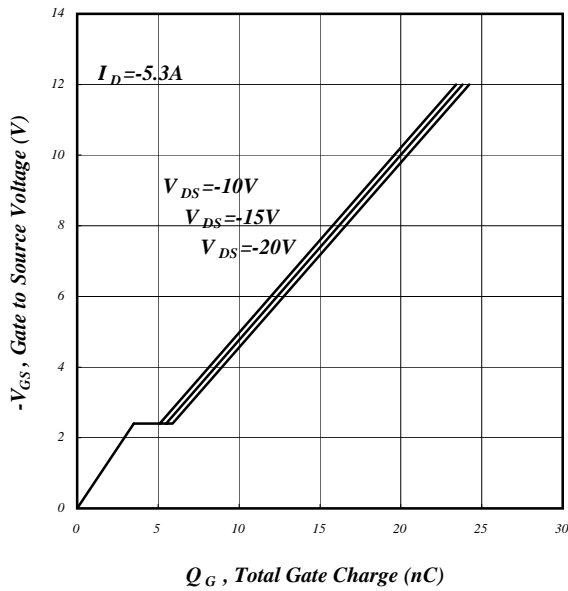


Fig 9. Gate Charge Characteristics

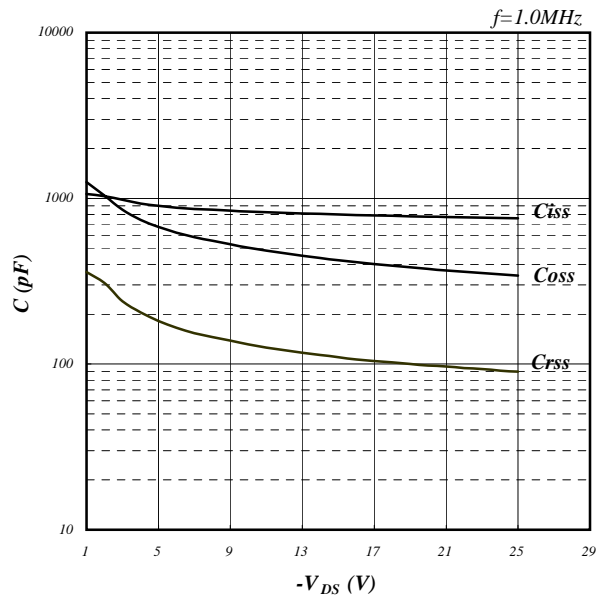


Fig 10. Typical Capacitance Characteristics

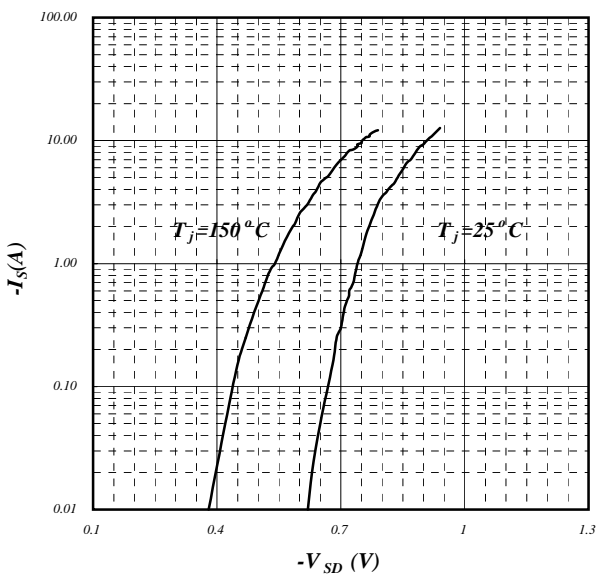


Fig 11. Forward Characteristic of Reverse Diode

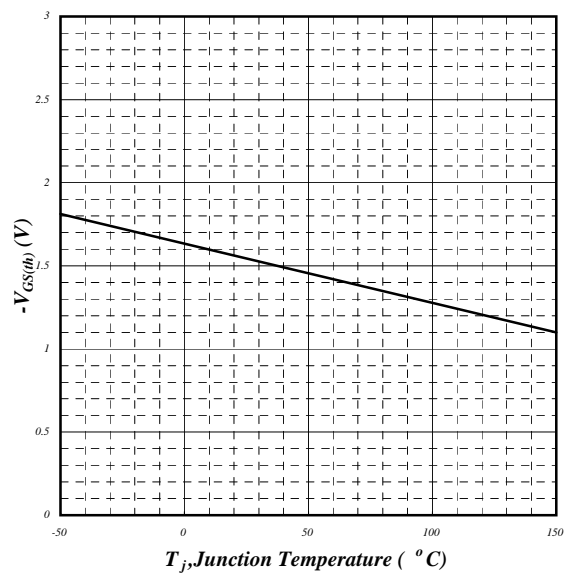


Fig 12. Gate Threshold Voltage v.s. Junction Temperature



P-Channel

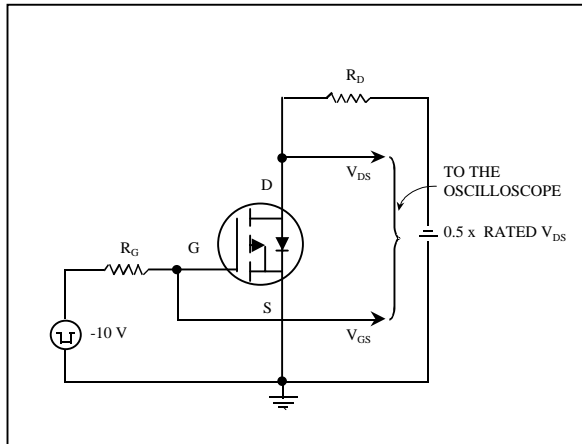


Fig 13. Switching Time Circuit

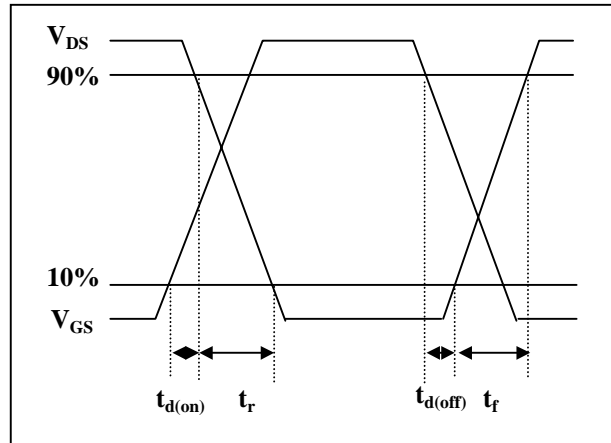


Fig 14. Switching Time Waveform

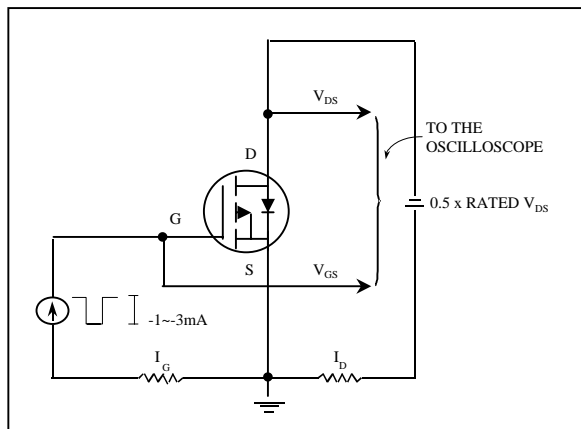


Fig 15. Gate Charge Circuit

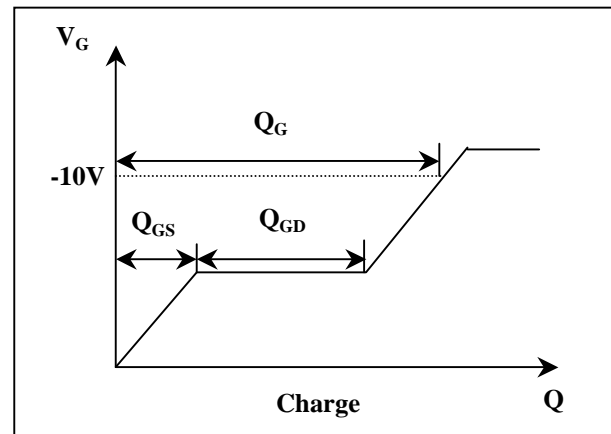


Fig 16. Gate Charge Waveform