

General Description

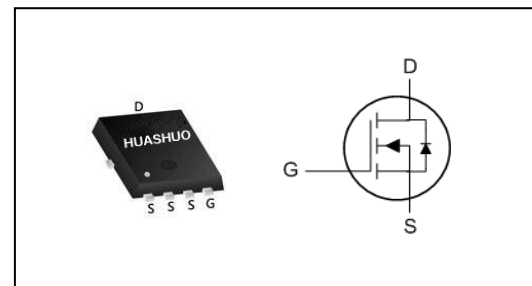
- 100% UIS Tested
- Advanced Trench Technology
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

Product Summary

| | | |
|------------------|-----|------------|
| V_{DS} | 30 | V |
| $R_{DS(ON),typ}$ | 1.8 | m Ω |
| I_D | 85 | A |

Applications

- Power Management in Desktop Computer
- DC/DC Converters

PRPAK5X6 Pin Configuration

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|-----------------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D@T_C=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | 85 | A |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | 67 | A |
| I_{DM} | Pulsed Drain Current ² | 250 | A |
| EAS | Single Pulse Avalanche Energy ³ | 151 | mJ |
| I_{AS} | Avalanche Current | 55 | A |
| $P_D@T_C=25^\circ C$ | Total Power Dissipation ⁴ | 48 | W |
| 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 | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | --- | 50 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 2.6 | $^\circ C/W$ |

N-Ch 30V Fast Switching MOSFETs
Electrical Characteristics ($T_J=25\text{ }^\circ\text{C}$, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|--|------|------|-----------|------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 30 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ² | $V_{GS}=10V, I_D=20A$ | --- | 1.8 | 2.2 | m Ω |
| | | $V_{GS}=4.5V, I_D=20A$ | --- | 2.5 | 3.6 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.2 | 1.6 | 2.2 | V |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=24V, V_{GS}=0V, T_J=25^\circ C$ | --- | --- | 1 | uA |
| | | $V_{DS}=24V, V_{GS}=0V, T_J=55^\circ C$ | --- | --- | 5 | |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| g_{fs} | Forward Transconductance | $V_{DS}=5V, I_D=20A$ | --- | 91 | --- | S |
| R_g | Gate Resistance | $V_{DS}=0V, V_{GS}=0V, f=1MHz$ | --- | 1.7 | --- | Ω |
| Q_g | Total Gate Charge (4.5V) | $V_{DS}=15V, V_{GS}=10V, I_D=20A$ | --- | 21 | --- | nC |
| Q_{gs} | Gate-Source Charge | | --- | 12.5 | --- | |
| Q_{gd} | Gate-Drain Charge | | --- | 14.5 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega, I_D=20A$ | --- | 12 | --- | ns |
| T_r | Rise Time | | --- | 6 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 38.5 | --- | |
| T_f | Fall Time | | --- | 11.5 | --- | |
| C_{iss} | Input Capacitance | $V_{DS}=15V, V_{GS}=0V, f=1MHz$ | --- | 3032 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 1588 | --- | |
| C_{riss} | Reverse Transfer Capacitance | | --- | 207 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------|--|-------------------------------------|------|------|------|------|
| I_S | Continuous Source Current ^{1,6} | $V_G=V_D=0V$, Force Current | --- | --- | 85 | A |
| V_{SD} | Diode Forward Voltage ² | $V_{GS}=0V, I_S=1A, T_J=25^\circ C$ | --- | --- | 1.2 | V |

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=55A$
- 4.The power dissipation is limited by 150 $^\circ C$ junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
- 6.Package limitation current is 85A.

Typical Characteristics

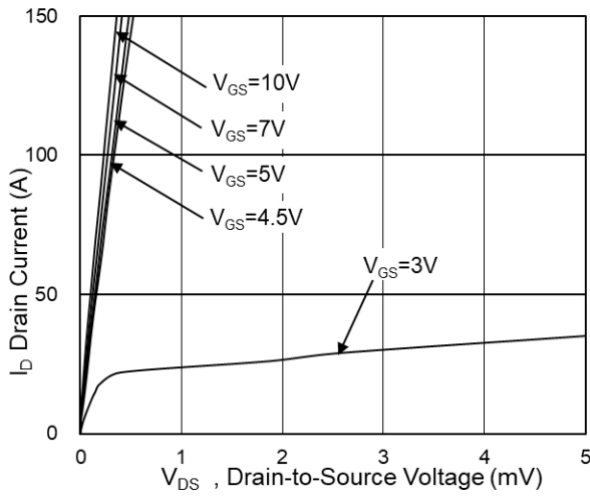


Fig.1 Typical Output Characteristics

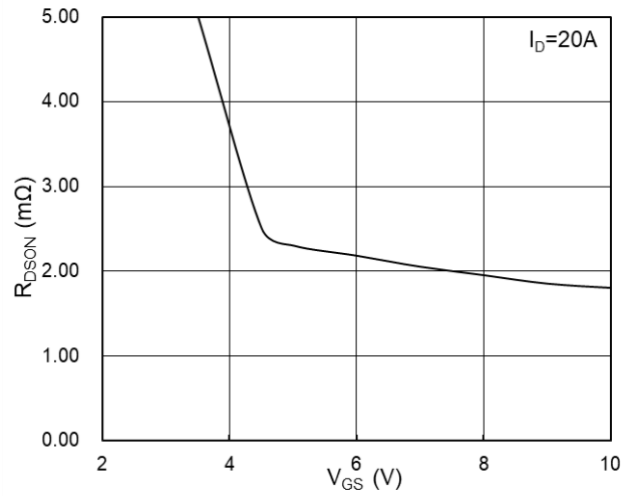


Fig.2 On-Resistance vs G-S Voltage

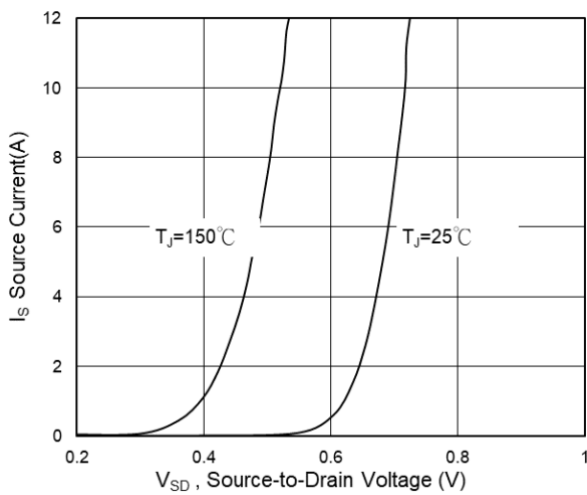


Fig.3 Source Drain Forward Characteristics

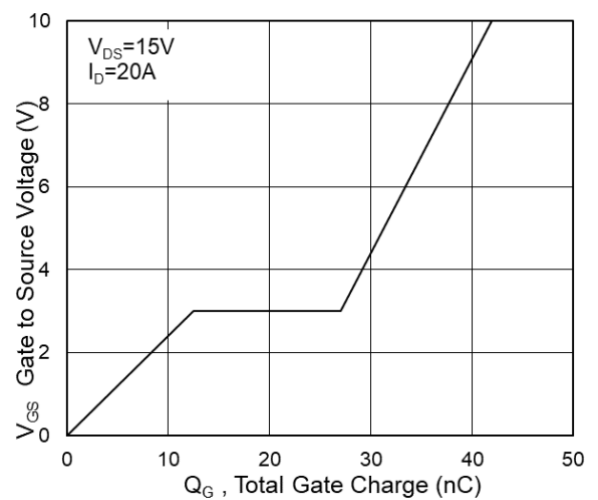


Fig.4 Gate-Charge Characteristics

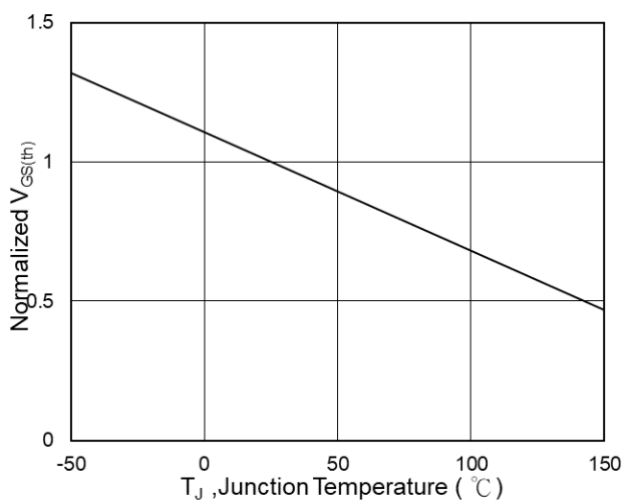


Fig.5 Normalized $V_{GS(th)}$ vs T_J

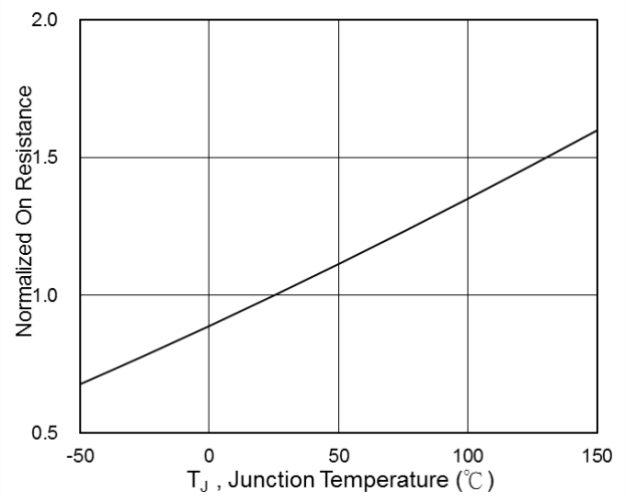


Fig.6 Normalized $R_{DS(on)}$ vs T_J

N-Ch 30V Fast Switching MOSFETs

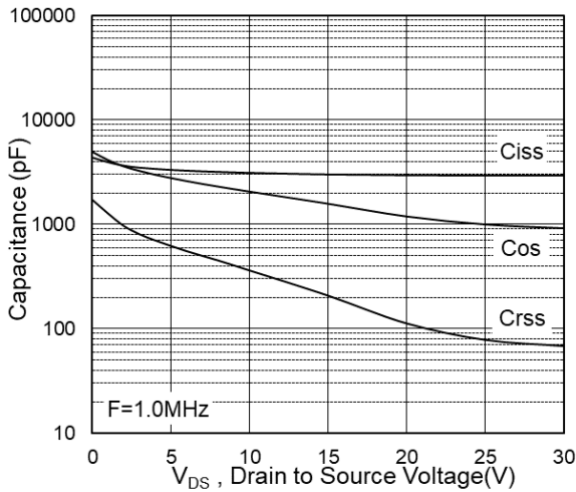


Fig.7 Capacitance

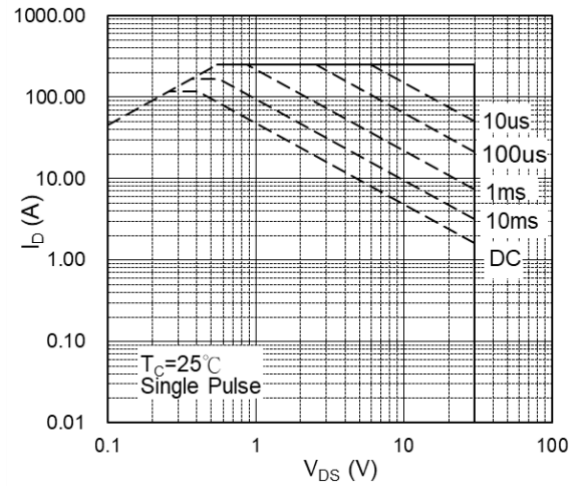


Fig.8 Safe Operating Area

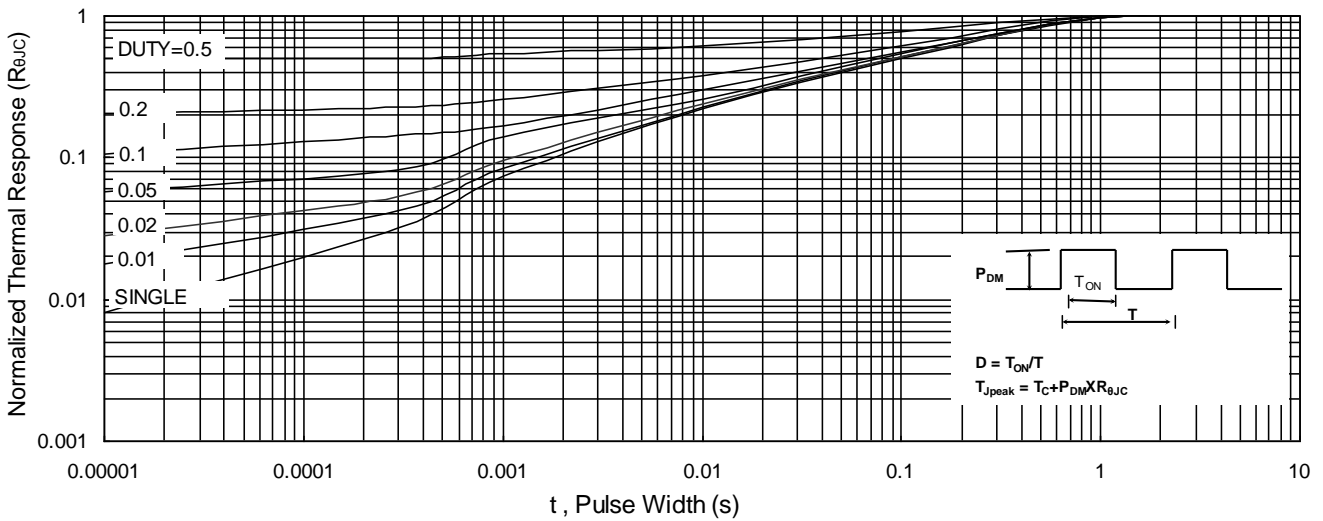


Fig.9 Normalized Maximum Transient Thermal Impedance

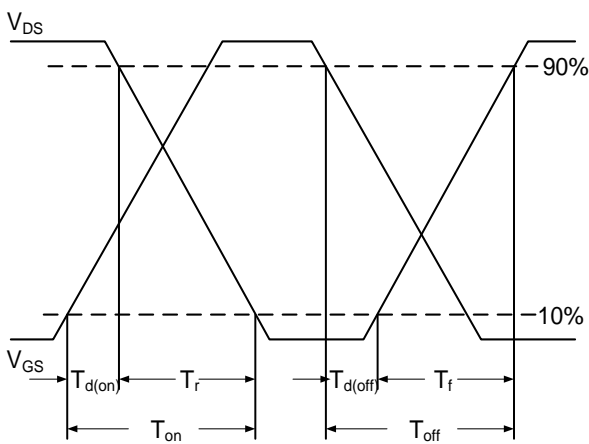


Fig.10 Switching Time Waveform

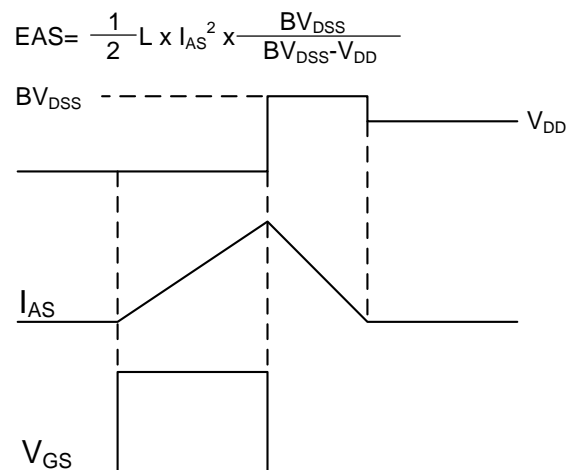


Fig.11 Unclamped Inductive Switching