

Description

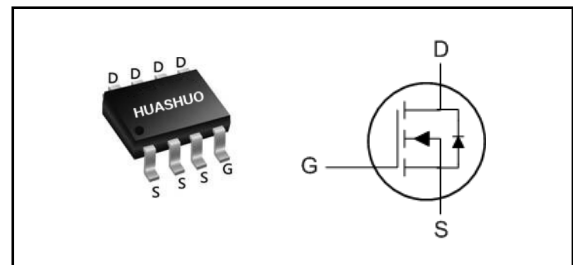
The HSM3006 is the high cell density trenched N-ch MOSFETs, which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications.

The HSM3006 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

Product Summary

| | | |
|-------------------------|----|----|
| V _{DS} | 30 | V |
| R _{DS(ON),max} | 6 | mΩ |
| I _D | 13 | A |

SOP8 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 _A =25°C | Continuous Drain Current, V _{GS} @ 10V ¹ | 13 | A |
| I _D @T _A =70°C | Continuous Drain Current, V _{GS} @ 10V ¹ | 10 | A |
| I _{DM} | Pulsed Drain Current ² | 65 | A |
| EAS | Single Pulse Avalanche Energy ³ | 105.8 | mJ |
| I _{AS} | Avalanche Current | 46 | A |
| P _D @T _A =25°C | Total Power Dissipation ⁴ | 1.5 | W |
| T _{STG} | Storage Temperature Range | -55 to 150 | °C |
| T _J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R _{θJA} | Thermal Resistance Junction-ambient ¹ | --- | 85 | °C/W |
| R _{θJC} | Thermal Resistance Junction-Case ¹ | --- | 25 | °C/W |



Electrical Characteristics (T_J=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------|--|---|------|-------|------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 30 | --- | --- | V |
| ΔBV _{DSS} /ΔT _J | BVDSS 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 =12A | --- | --- | 6 | mΩ |
| | | V _{GS} =4.5V, I _D =10A | --- | --- | 9 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.2 | --- | 2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -6.16 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =24V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =24V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =12A | --- | 47 | --- | 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} =4.5V, I _D =10A | --- | 21 | --- | nC |
| Q _{gs} | Gate-Source Charge | | --- | 7 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 6.9 | --- | |
| T _{d(on)} | Turn-On Delay Time | V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω I _D =10A | --- | 9.6 | --- | ns |
| T _r | Rise Time | | --- | 8.6 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 59 | --- | |
| T _f | Fall Time | | --- | 15.6 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 2295 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 267 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 210 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I _S | Continuous Source Current ^{1,5} | V _G =V _D =0V, Force Current | --- | --- | 13 | A |
| I _{SM} | Pulsed Source Current ^{2,5} | | --- | --- | 65 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _S =1A, T _J =25°C | --- | --- | 1.2 | V |
| t _{rr} | Reverse Recovery Time | I _F =10A, dI/dt=100A/μs, T _J =25°C | --- | 12 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | | --- | 4.8 | --- | nC |

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 ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=46A
- 4.The power dissipation is limited by 150°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.



N-Ch 30V Fast Switching MOSFETs

Typical Characteristics

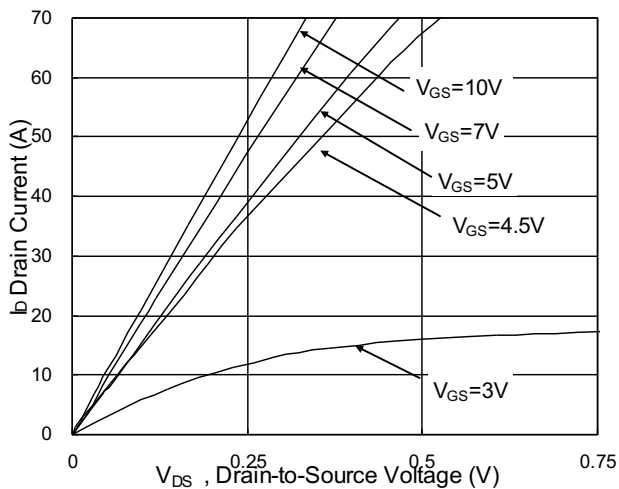


Fig.1 Typical Output Characteristics

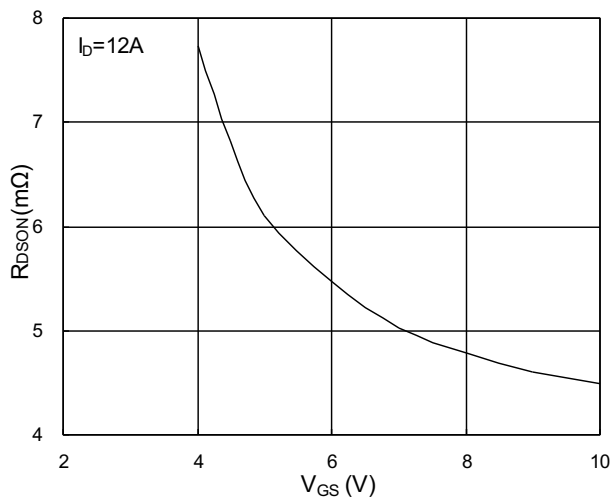


Fig.2 On-Resistance vs. Gate-Source

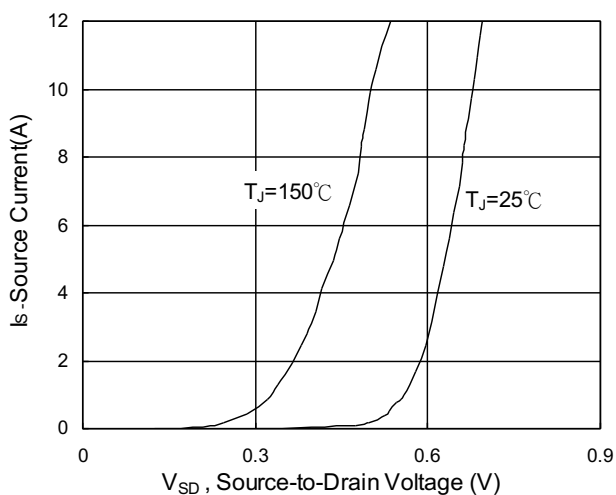


Fig.3 Forward Characteristics of Reverse

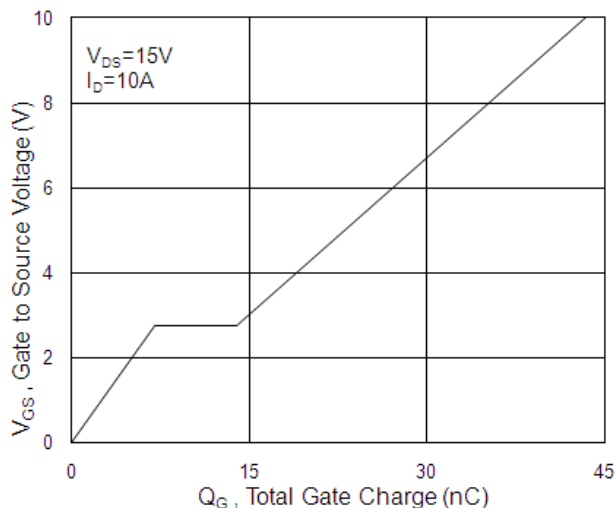


Fig.4 Gate-Charge Characteristics

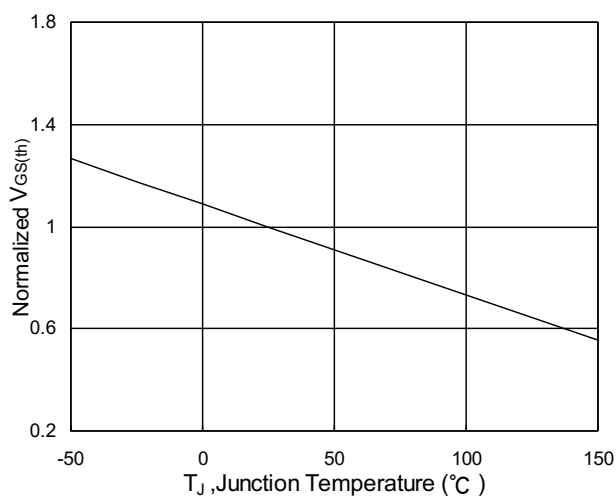


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

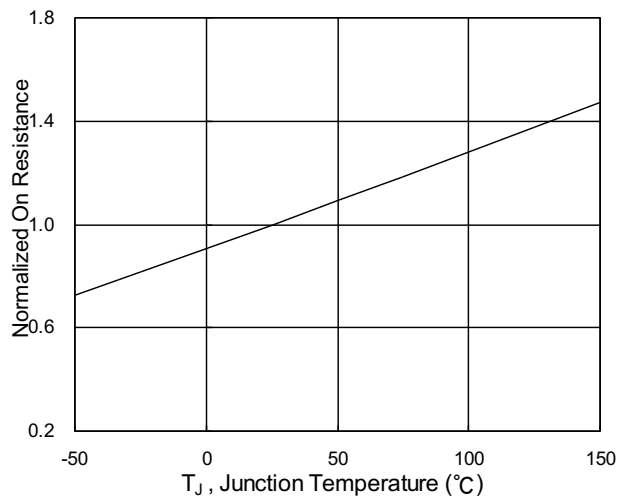


Fig.6 Normalized $R_{DS(on)}$ vs. T_J



N-Ch 30V Fast Switching MOSFETs

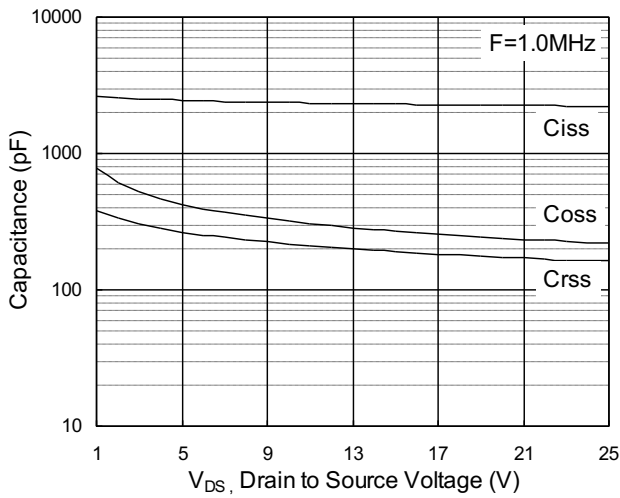


Fig.7 Capacitance

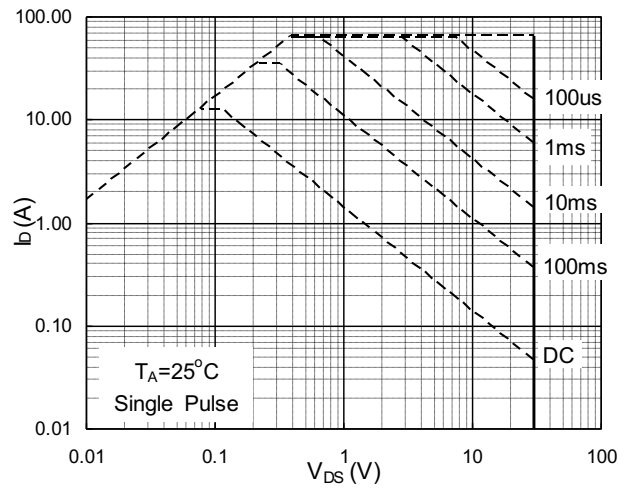


Fig.8 Safe Operating Area

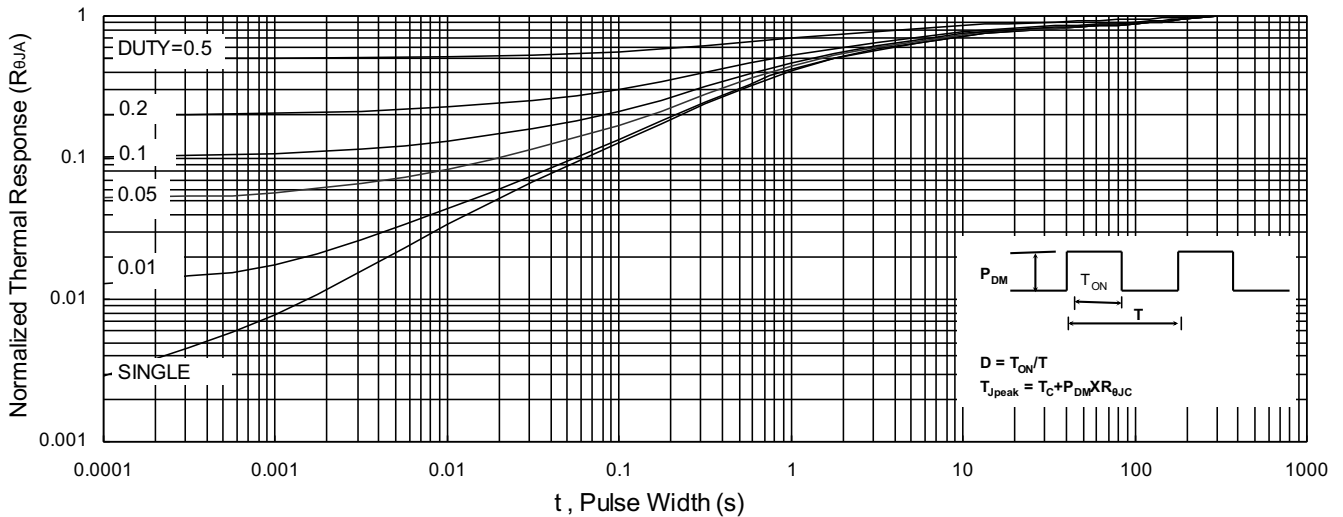


Fig.9 Normalized Maximum Transient Thermal Impedance

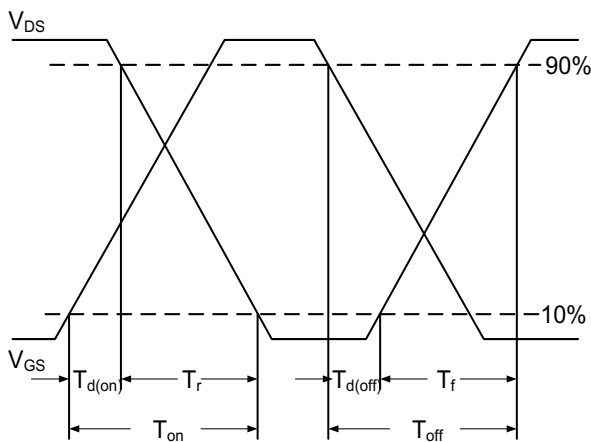


Fig.10 Switching Time Waveform

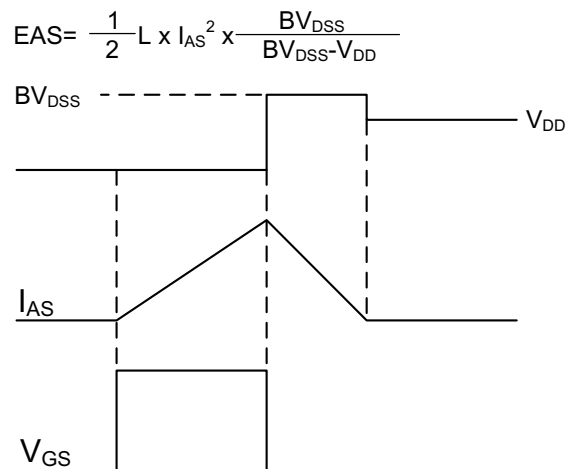


Fig.11 Unclamped Inductive Switching Waveform



Ordering Information

| Part Number | Package code | Packaging |
|-------------|--------------|----------------|
| HSM3006 | SOP-8 | 2500/Tape&Reel |

