

General Description

The WSP06N10 is the highest performance trench N-Ch MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The WSP06N10 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available

Product Summery

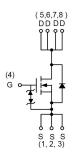
| BVDSS | RDSON | ID |
|-------|-------|------|
| 100V | 85mΩ | 4.5A |

Applications

- High Frequency Point-of-Load Synchronous s Small power switching for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

SOP-8 Pin Configuration





Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|-------------------------------------|--|------------|---------------|
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-Source Voltage | ±20 | V |
| I _D @T _C =25℃ | Continuous Drain Current, V _{GS} @ 10V ¹ | 4.5 | Α |
| I _D @T _C =70℃ | Continuous Drain Current, V _{GS} @ 10V ¹ | 2.8 | Α |
| I _{DM} | Pulsed Drain Current ² | 14 | А |
| EAS | Single Pulse Avalanche Energy ³ | 30 | mJ |
| I _{AS} | Avalanche Current | 5 | Α |
| P _D @T _A =25℃ | Total Power Dissipation ³ | 2.5 | W |
| T _{STG} | Storage Temperature Range | -55 to 150 | ${\mathbb C}$ |
| TJ | Operating Junction Temperature Range | -55 to 150 | $^{\circ}$ |

Thermal Data

| Symbol | Parameter | Тур. | Max. | Unit |
|-----------------|--|------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient ¹ | | 50 | °C/W |
| $R_{	heta JC}$ | Thermal Resistance Junction-Case ¹ | | 25 | °C/W |

N-Ch MOSFET

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

| Symbol | Parameter | Conditions | Min. | Тур. | Max. | Unit |
|--------------------------------------|--|--|-------|-------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V , I _D =250uA | 100 | | | V |
| $\triangle BV_{DSS}/\triangle T_{J}$ | BVDSS Temperature Coefficient | Reference to 25℃ , I _D =1mA | | 0.098 | | V/℃ |
| D | Static Drain-Source On-Resistance ² | V _{GS} =10V , I _D =4.5A | | 85 | 105 | mΩ |
| R _{DS(ON)} | Static Drain-Source On-Nesistance | V _{GS} =4.5V , I _D =2A | | 135 | 175 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 1.5 | 2 | 2.5 | V |
| $\triangle V_{GS(th)}$ | V _{GS(th)} Temperature Coefficient | VGS-VDS , ID -230UA | | -4.57 | | mV/℃ |
| | Drain Source Leakage Current | V_{DS} =80V , V_{GS} =0V , T_J =25 $^{\circ}$ C | | | 1 | — uA |
| I _{DSS} | Drain-Source Leakage Current | V_{DS} =80V , V_{GS} =0V , T_J =55 $^{\circ}$ C | | | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V_{GS} = $\pm 20V$, V_{DS} = $0V$ | | | ±100 | nA |
| gfs | Forward Transconductance | V_{DS} =5 V , I_{D} =2 A | | 20 | | S |
| R_g | Gate Resistance | V _{DS} =0V , V _{GS} =0V , f=1MHz | | 2 | 4 | Ω |
| Q_g | Total Gate Charge (10V) | V _{DS} =50V , V _{GS} =10V , I _D =4.5A | | 21 | | |
| Q_gs | Gate-Source Charge | | | 4.9 | | nC |
| Q_gd | Gate-Drain Charge | | | 5.8 | | |
| T _{d(on)} | Turn-On Delay Time | | | 13 | 24 | |
| Tr | Rise Time | V_{DD} =30V , V_{GS} =10V , R_G =6 Ω | | 10 | 19 | |
| T _{d(off)} | Turn-Off Delay Time | I _D =1A, R _L =30Ω | 32 60 | ns | | |
| T _f | Fall Time | | | 16 | 30 | 1 |
| Ciss | Input Capacitance | V _{DS} =30V , V _{GS} =0V , f=1MHz | | 940 | | |
| C _{oss} | Output Capacitance | | | 80 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 50 | | |

Guaranteed Avalanche Characteristics

| Symbol | Parameter | Conditions | Min. | Тур. | Max. | Unit |
|--------|--|--|------|------|------|------|
| EAS | Single Pulse Avalanche Energy ⁵ | V _{DD} =25V , L=0.3mH , I _{AS} =5A | 25 | | | mJ |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Тур. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I _S | Continuous Source Current ^{1,6} | V _G =V _D =0V , Force Current | | | 3 | Α |
| I _{SM} | Pulsed Source Current ^{2,6} | | | | 14 | Α |
| V_{SD} | Diode Forward Voltage ² | V_{GS} =0V , I_{S} =3A , T_{J} =25 $^{\circ}$ C | | | 1.1 | V |
| t _{rr} | Reverse Recovery Time | IF=3A,dI/dt=100A/μs,Tյ=25℃ | | 44 | | nS |
| Q _{rr} | Reverse Recovery Charge | | | 80 | | nC |

Note:

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, t<10sec.
- 2.The data tested by pulsed , pulse width \leq 300us , duty cycle \leq 2%
- 3.The EAS data shows Max. rating . The test condition is V_{DD} =25V, V_{GS} =10V,L=0.3mH, I_{AS} =5A
- 5.The Min. value is 100% EAS tested guarantee.
- 6. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.





Typical Characteristics

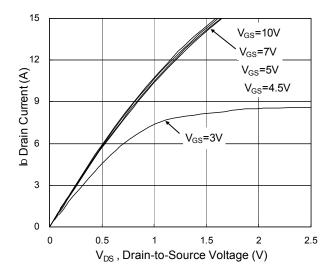


Fig.1 Typical Output Characteristics

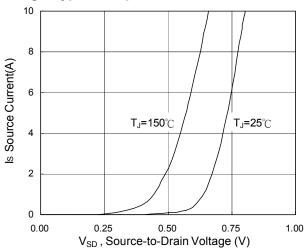


Fig.3 Forward Characteristics Of Reverse

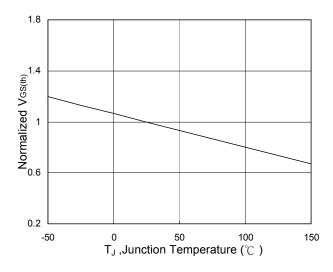


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

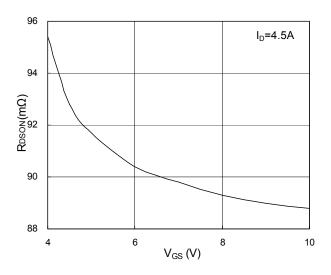


Fig.2 On-Resistance vs. Gate-Source

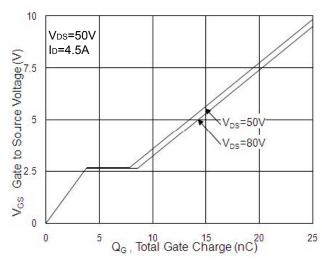


Fig.4 Gate-Charge Characteristics

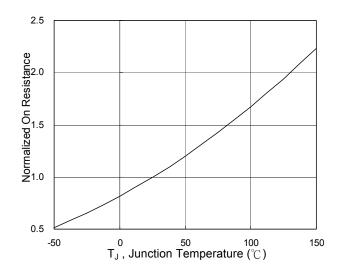
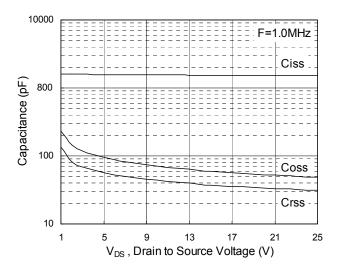


Fig.6 Normalized R_{DSON} vs. T_J





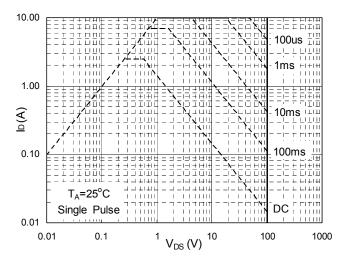


Fig.7 Capacitance

Fig.8 Safe Operating Area

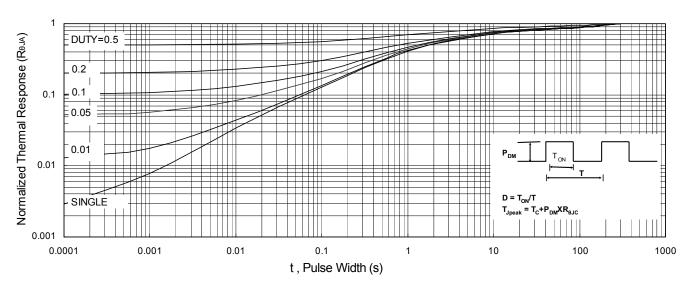


Fig.9 Normalized Maximum Transient Thermal Impedance

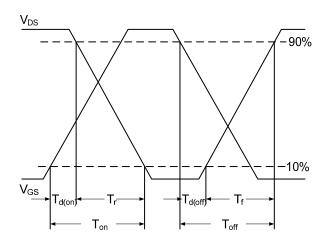


Fig.10 Switching Time Waveform

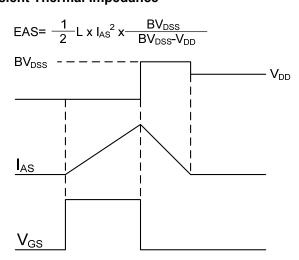


Fig.11 Unclamped Inductive Switching Waveform



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