## General Description

The WSP09N10T is the highest performance trench Dual N-Ch MOSFET with extreme high cell density,which provide excellent RDSON and gate charge for most of the synchronous buck converter applications . The WSP09N10T 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

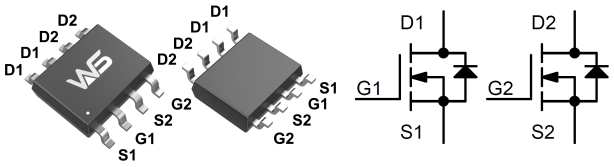
## Product Summery

| BVDSS | RDSON | ID |
|---|---|---|
| 100V | 70mΩ | 5.8A |

## 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] | 5.8 | A |
| $I_D$@$T_C$=70℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 4.7 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 25 | A |
| EAS | Single Pulse Avalanche Energy[3] | 25 | mJ |
| $I_{AS}$ | Avalanche Current | 10 | A |
| $P_D$@$T_A$=25℃ | Total Power Dissipation[3] | 2.5 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient [1](t≤10s) | --- | 50 | ℃/W |
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient[1] (steady state) | --- | 90 | ℃/W |

## Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | 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/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=3.5A | --- | 70 | 100 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=3A | --- | 90 | 120 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.2 | 2 | 3.0 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -4.57 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=2A | --- | 20 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 2.5 | --- | Ω |
| $Q_g$ | Total Gate Charge (10V) | $V_{DS}$=30V , $V_{GS}$=10V , $I_D$=3.5A | --- | 16 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 2.5 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 3.0 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=30V , $V_{GS}$=10V , $R_G$=6Ω $I_D$=1A, $R_L$=30Ω | --- | 11 | --- | ns |
| $T_r$ | Rise Time | | --- | 6 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 27 | --- | |
| $T_f$ | Fall Time | | --- | 5 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=30V , $V_{GS}$=0V , f=1MHz | --- | 740 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 45 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 24 | --- | |

## Guaranteed Avalanche Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| EAS | Single Pulse Avalanche Energy[5] | $V_{DD}$=25V , L=0.5mH , $I_{AS}$=10A | 20 | --- | --- | mJ |

## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,6] | $V_G$=$V_D$=0V , Force Current | --- | --- | 3 | A |
| $I_{SM}$ | Pulsed Source Current[2,6] | | --- | --- | 14 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=3A , $T_J$=25℃ | --- | --- | 1.1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=3A , dI/dt=100A/μs , $T_J$=25℃ | --- | 27 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 36 | --- | nC |

Note :
1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper, t<10sec.
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=0.5mH,$I_{AS}$=10A
4.The power dissipation is limited by 150℃ junction temperature
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

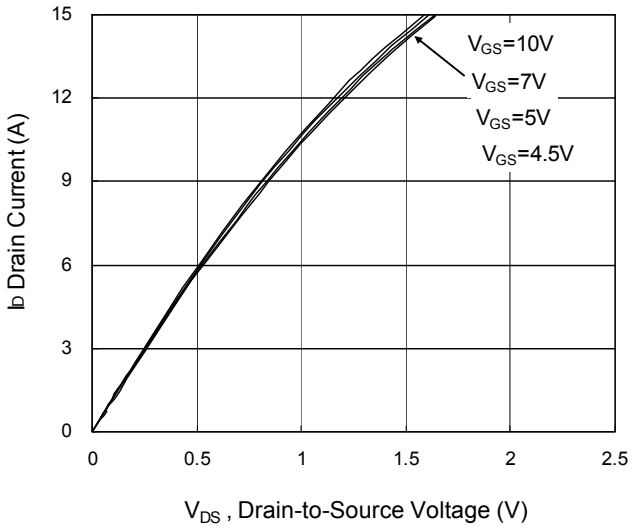



Fig.1 Typical Output Characteristics

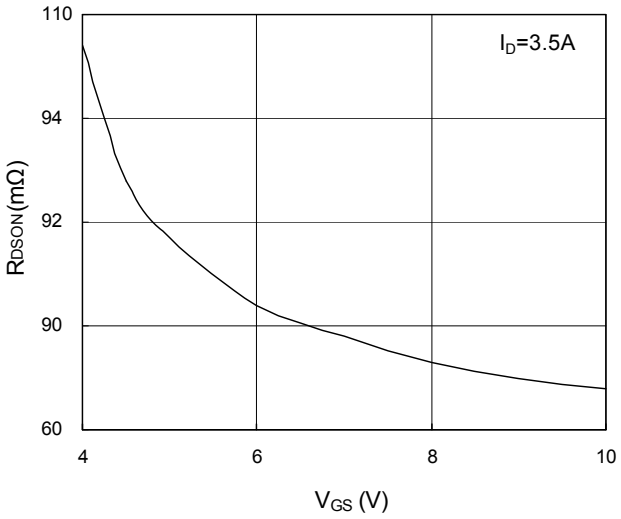



Fig.2 On-Resistance vs. Gate-Source

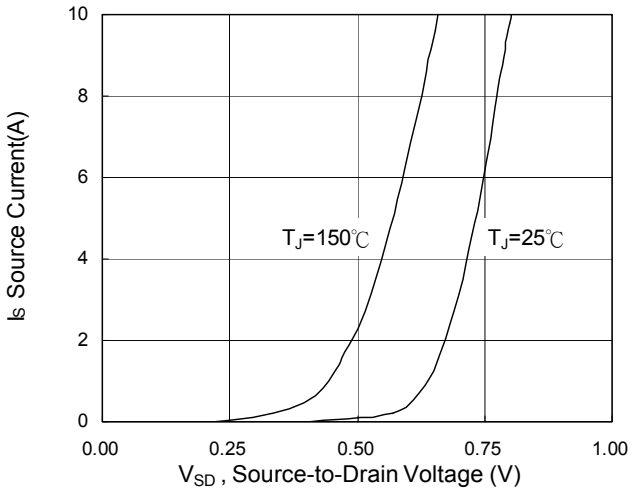



Fig.3 Forward Characteristics Of Reverse

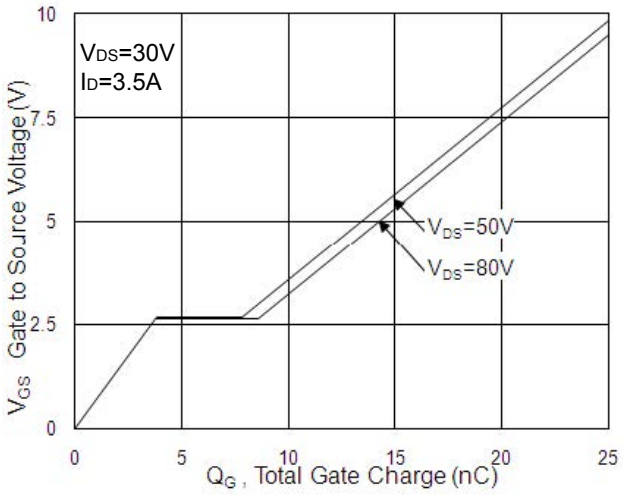



Fig.4 Gate-Charge Characteristics

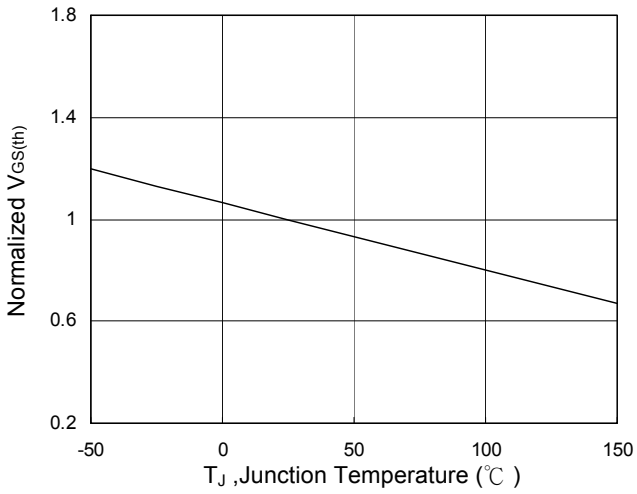



Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$

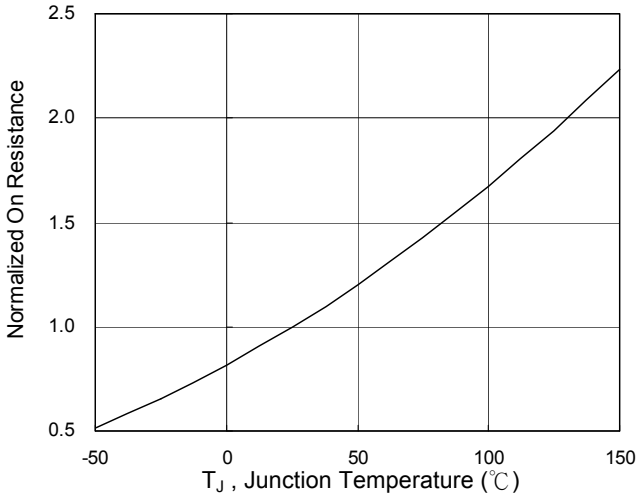



Fig.6 Normalized $R_{DSON}$ vs. $T_J$

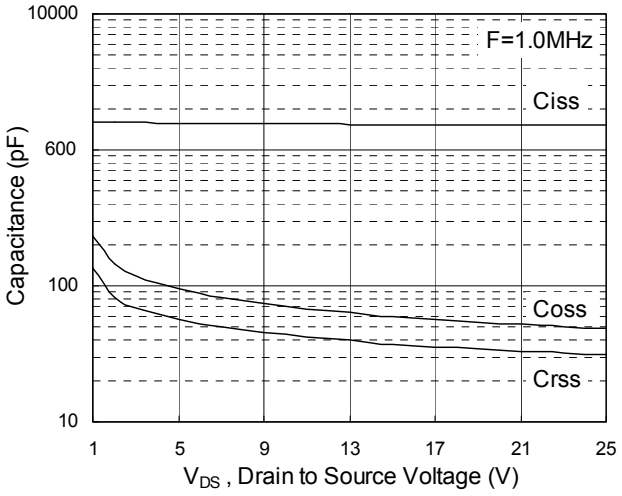



Fig.7 Capacitance

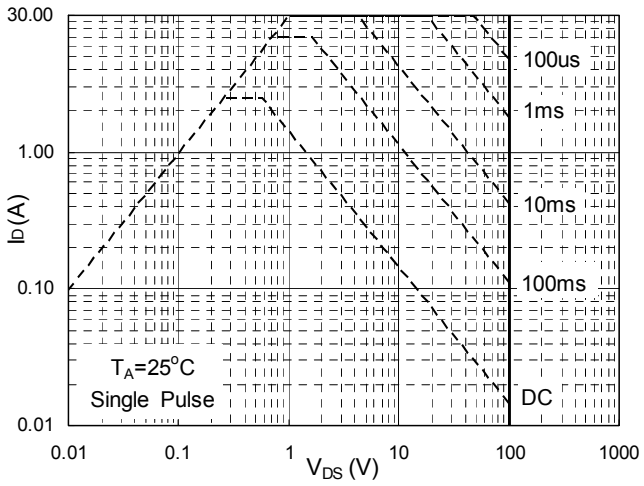



Fig.8 Safe Operating Area

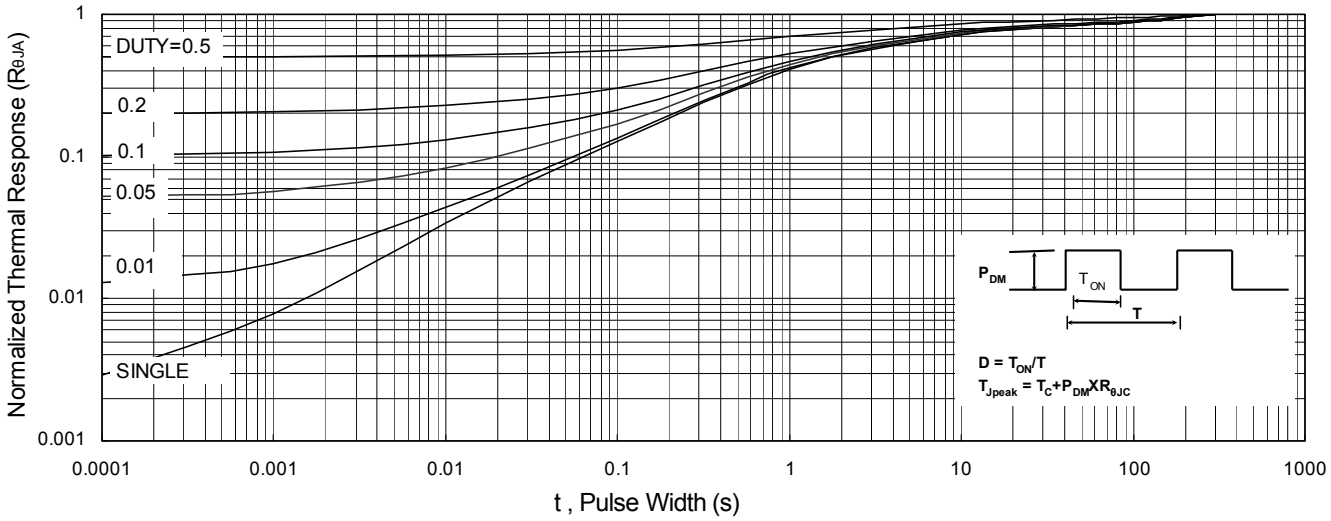



Fig.9 Normalized Maximum Transient Thermal Impedance

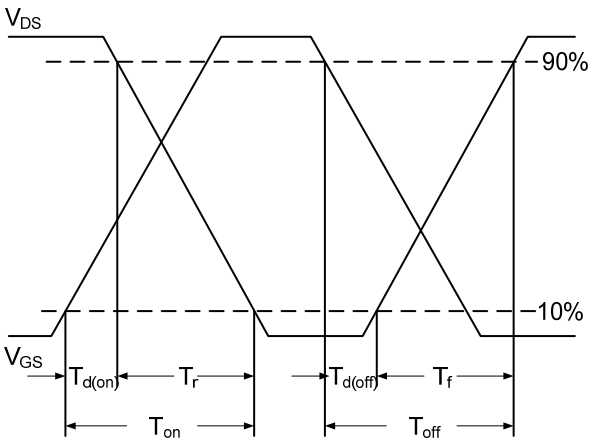



Fig.10 Switching Time Waveform

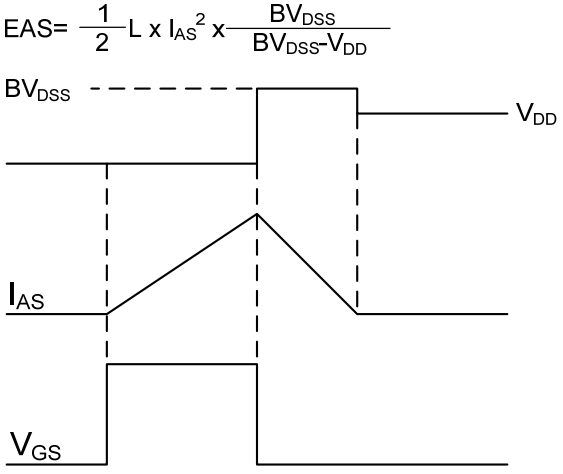



Fig.11 Unclamped Inductive Switching Waveform

# Attention

1, Any and all Winsok power products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your Winsok power representative nearest you before using any Winsok power products described or contained herein in such applications.

2,Winsok power assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all Winsok power products described or contained herein.

3, Specifications of any and all Winsok power products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

4, Winsok power Semiconductor CO., LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

5,In the event that any or all Winsok power products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.



7, Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. Winsok power believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

8, Any and all information described or contained herein are subject to change without notice due to product/technology improvement,etc. When designing equipment, refer to the "Delivery Specification" for the Winsok power product that you Intend to use.

9, this catalog provides information as of Sep.2014. Specifications and information herein are subject to change without notice.

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for*** MOSFET ***category:***

***Click to view products by*** Winsok ***manufacturer:***

Other Similar products are found below :

IRFD120 JANTX2N5237 2SK2267(Q) BUK455-60A/B TK100A10N1,S4X(S MIC4420CM-TR VN1206L NDP4060 SI4482DY IRS2092STRPBF-EL IPS70R2K0CEAKMA1 TK31J60W5,S1VQ(O TK31J60W,S1VQ(O TK16J60W,S1VQ(O 2SK2614(TE16L1,Q) DMN1017UCP3-7 EFC2J004NUZTDG P85W28HP2F-7071 DMN1053UCP4-7 NTE2384 DMC2700UDMQ-7 DMN2080UCB4-7 DMN61D9UWQ-13 US6M2GTR DMN31D5UDJ-7 DMP22D4UFO-7B IPS60R3K4CEAKMA1 DMN1006UCA6-7 DMN16M9UCA6-7 STF5N65M6 IRF40H233XTMA1 STU5N65M6 DMN6022SSD-13 DMN13M9UCA6-7 DMTH10H4M6SPS-13 IPS60R360PFD7SAKMA1 DMN2990UFB-7B SSM3K35CT,L3F IPLK60R1K0PFD7ATMA1 2N7002W-G MCAC30N06Y-TP IPWS65R035CFD7AXKSA1 MCQ7328-TP SSM3J143TU,LXHF DMN12M3UCA6-7 PJMF280N65E1_T0_00201 PJMF380N65E1_T0_00201 PJMF280N60E1_T0_00201 PJMF600N65E1_T0_00201 PJMF900N65E1_T0_00201