WINSOK SEMICONDUCTOR

General Description

The WSP4886 is the highest performance trench N-ch MOSFET with extreme high cell density , which provide excellent RDSON and gate chargens for most of the synchronous buck converter   applications .

The WSP4886 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
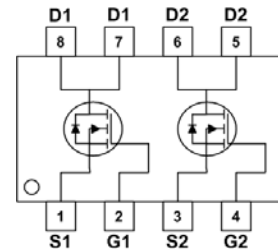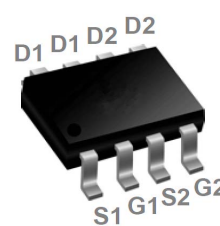- 100% EAS Guaranteed
- Green Device Available

Product Summery

BVDSS	RDSON	ID
30V	18mΩ	8.5A

Applicatio

- High Frequency Point-of-Load Synchronous Buck Converter 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	30	V
V_{GS}	Gate-Source Voltage	$\pm$20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	8.5	A
I_D@T_C=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	7.0	A
I_{DM}	Pulsed Drain Current[2]	40	A
EAS	Single Pulse Avalanche Energy[3]	20	mJ
I_{AS}	Avalanche Current	9	A
P_D@T_A=25℃	Total Power Dissipation[4]	2.0	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]	---	90	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	50	℃/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	30	---	---	V
△BV$_{DSS}$/△T$_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I$_D$=1mA	---	0.034	---	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=10V , I$_D$=8.8A	---	18	24	mΩ
		V$_{GS}$=4.5V , I$_D$=5A	---	24	28	
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =250uA	0.5	0.7	1.2	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	-5.8	---	mV/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=24V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=24V , 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$_D$=8.8A	---	6	---	S
R$_g$	Gate Resistance	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	1.7	2.5	Ω
Q$_g$	Total Gate Charge (4.5V)	V$_{DS}$=15V , V$_{GS}$=4.5V , I$_D$=8.8A	---	6	8.4	nC
Q$_{gs}$	Gate-Source Charge		---	1.5	---	
Q$_{gd}$	Gate-Drain Charge		---	2.5	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=15V , V$_{GEN}$=10V , R$_G$=6Ω I$_D$=1A,R$_L$=15Ω	---	6	8.8	ns
T$_r$	Rise Time		---	8.2	14	
T$_{d(off)}$	Turn-Off Delay Time		---	16	24	
T$_f$	Fall Time		---	4	8	
C$_{iss}$	Input Capacitance	V$_{DS}$=15V , V$_{GS}$=0V , f=1MHz	---	580	---	pF
C$_{oss}$	Output Capacitance		---	95	---	
C$_{rss}$	Reverse Transfer Capacitance		---	57	---	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy[5]	V$_{DD}$=25V , L=0.5mH , I$_{AS}$=9A	18	---	---	mJ

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current[1,6]	V$_G$=V$_D$=0V , Force Current	---	---	2	A
I$_{SM}$	Pulsed Source Current[2,6]		---	---	40	A
V$_{SD}$	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	1.1	V
t$_{rr}$	Reverse Recovery Time	I$_F$=8A , dI/dt=100A/μs , T$_J$=25℃	---	12	---	nS
Q$_{rr}$	Reverse Recovery Charge		---	3.5	---	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$_{AS}$=9A
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.
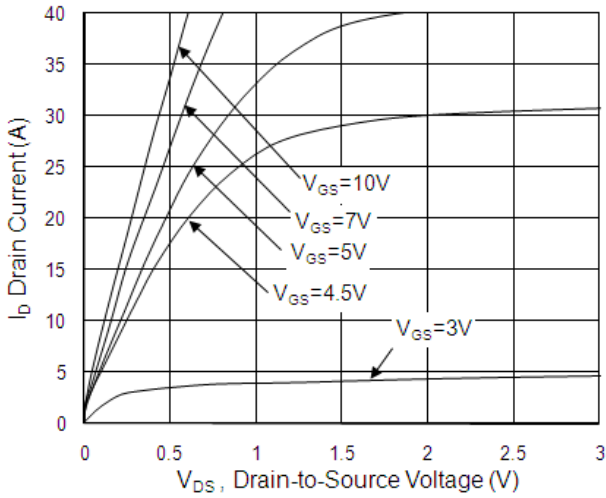
Typical Characteristics

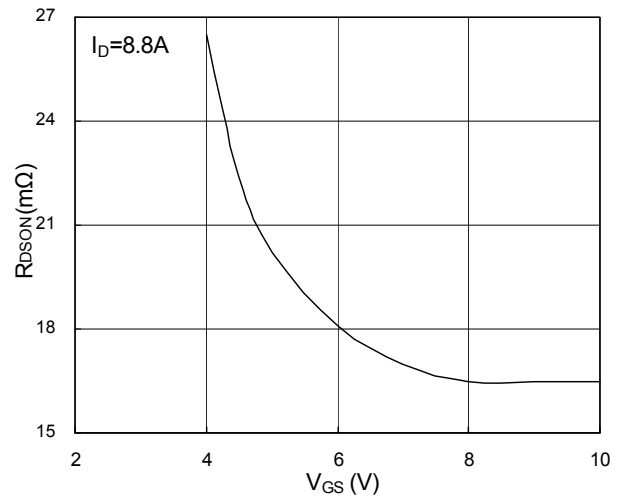**Fig.1 Typical Output Characteristics**
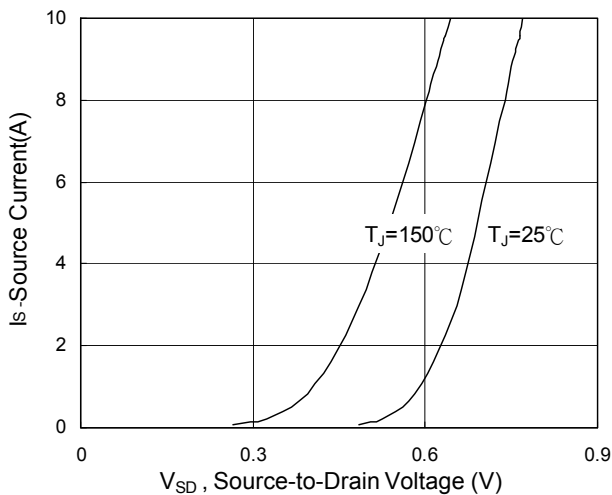
Fig.2 On-Resistance vs. G-S Voltage

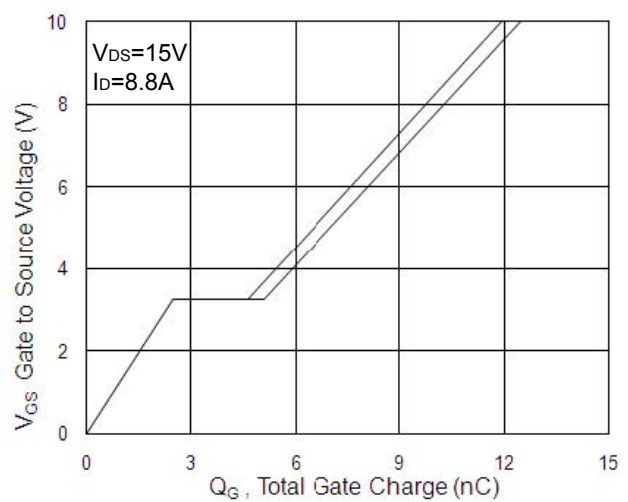**Fig.3 Forward Characteristics Of Reverse**
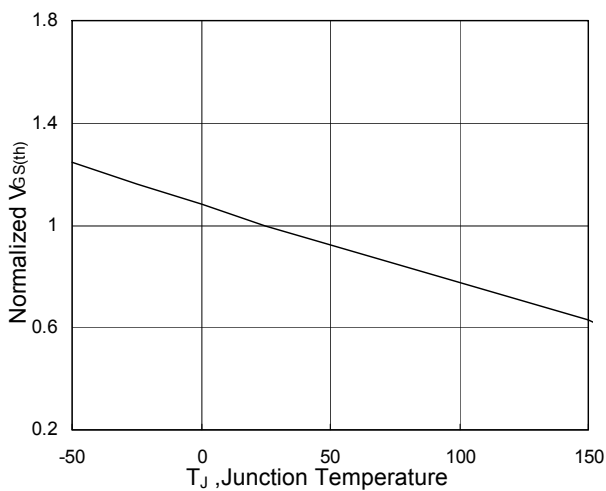
Fig.4 Gate-Charge Characteristics

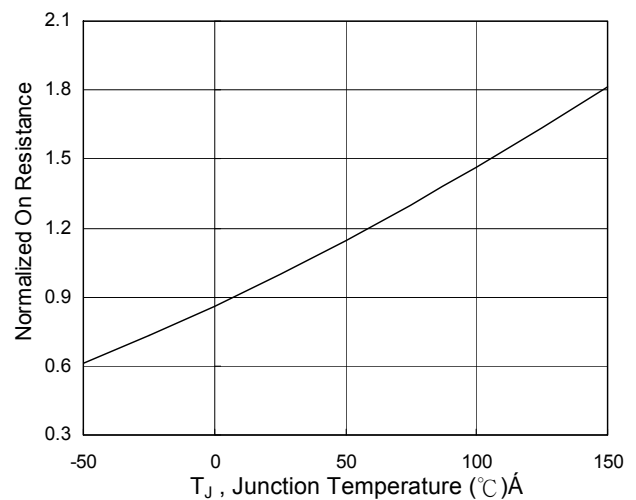**Fig.5 Normalized $V_{GS(th)}$ vs. T_J**

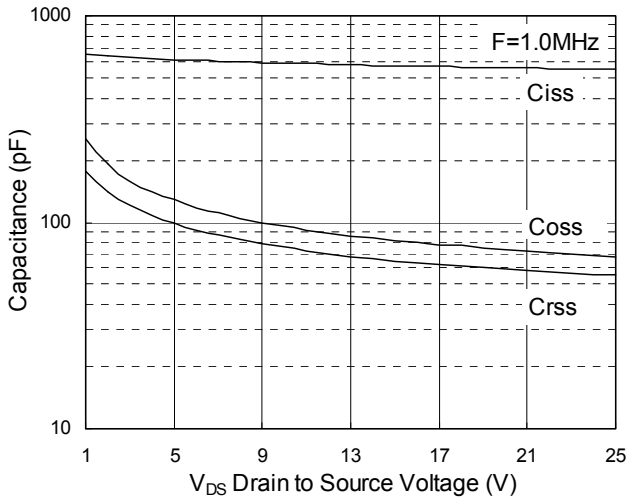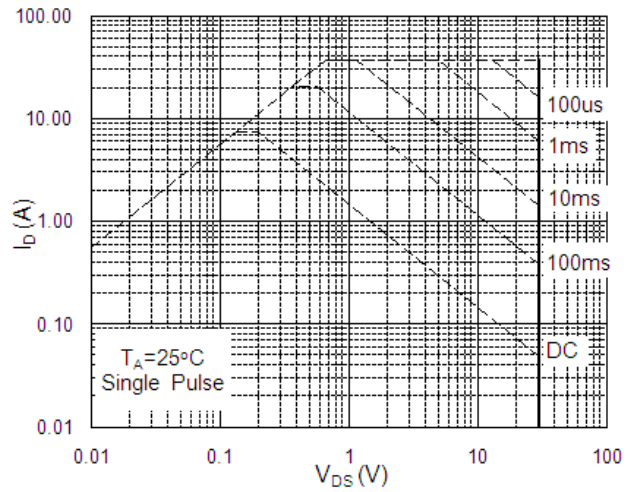**Fig.6 Normalized R_{DSON} vs. T_J**

Fig.7 Capacitance

Fig.8 Safe Operating Area
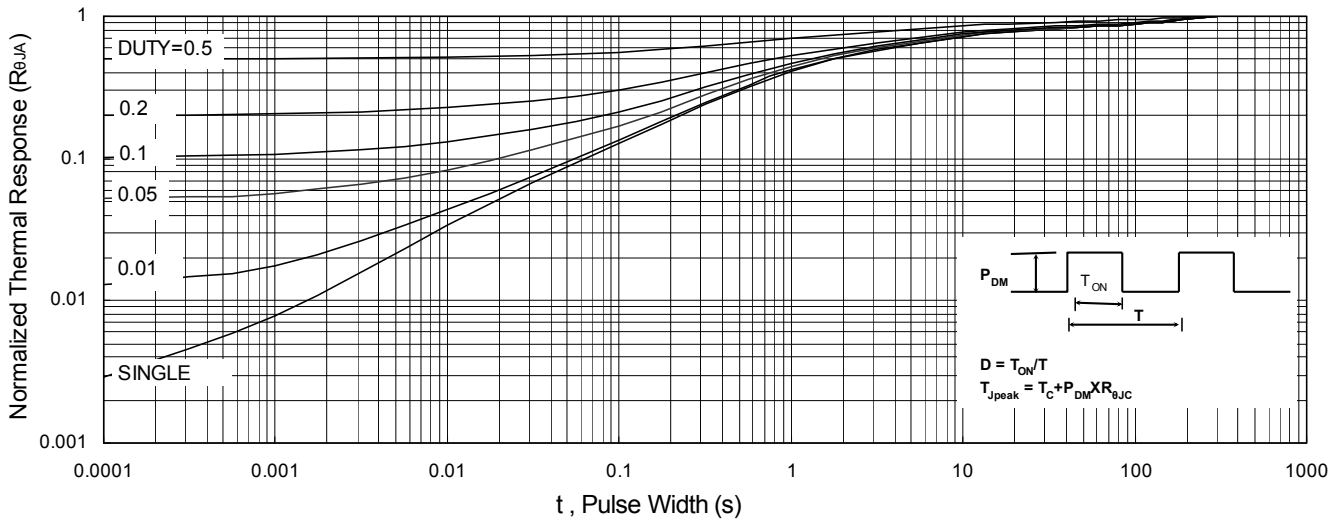
Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform
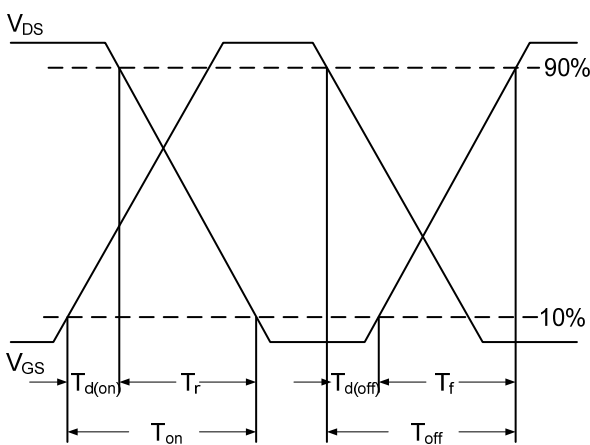
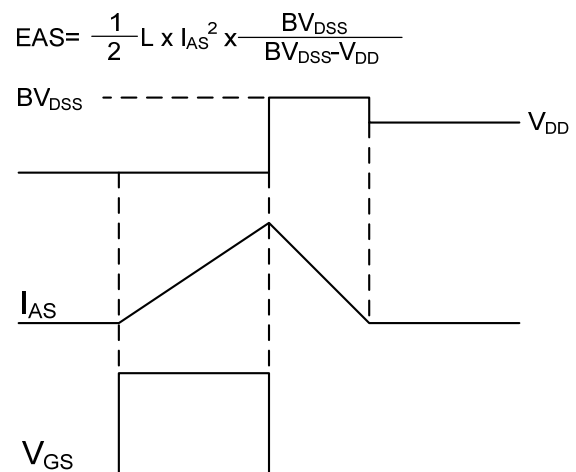$$EAS= \frac{1}{2}L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

Fig.11 Unclamped Inductive Switching Waveform

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