

## **General Description**

The WSP6064 is the highest performance trench N-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The WSP6064 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**

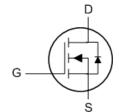
BVDSS	RDSON	ID
60V	$33$ m $\Omega$	6.8A

## **Applications**

- 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 60		V
$V_{GS}$	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25℃	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	6.8	Α
I <sub>D</sub> @T <sub>C</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	4.5	Α
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	24	Α
EAS	Single Pulse Avalanche Energy <sup>3</sup>	12	mJ
I <sub>AS</sub>	Avalanche Current	16	Α
P <sub>D</sub> @T <sub>A</sub> =25℃	Total Power Dissipation⁴	2.5	W
T <sub>STG</sub>	Storage Temperature Range -55 to 150		$^{\circ}$
TJ	Operating Junction Temperature Range	-55 to 150	$^{\circ}$

#### **Thermal Data**

Symbol	Parameter	Тур.	Max.	Unit
$R_{ heta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	-ambient <sup>1</sup> 90		°C/W
$R_{ heta JC}$	Thermal Resistance Junction-Case <sup>1</sup>		50	°C/W



# Electrical Characteristics (T<sub>J</sub>=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	60			V
$\triangle BV_{DSS}/\triangle T_{J}$	BVDSS Temperature Coefficient	Reference to 25°C , I <sub>D</sub> =1mA		0.044		V/°C
В	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V , I <sub>D</sub> =6.3A		33	45	mΩ
R <sub>DS(ON)</sub>	Static Dialii-Source Off-Resistance	V <sub>GS</sub> =4.5V , I <sub>D</sub> =4A		37	50	
$V_{GS(th)}$	Gate Threshold Voltage	\/ -\/   -250\	1.0	2.0	3.0	V
$\triangle V_{GS(th)}$	V <sub>GS(th)</sub> Temperature Coefficient	$V_{GS}=V_{DS}$ , $I_D=250uA$		-4.8		mV/℃
,	Drain Source Leakage Current	V <sub>DS</sub> =48V , V <sub>GS</sub> =0V , T <sub>J</sub> =25℃			1	uA
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =48V , V <sub>GS</sub> =0V , T <sub>J</sub> =55°C			5	
I <sub>GSS</sub>	Gate-Source Leakage Current	$V_{GS}$ = $\pm 20V$ , $V_{DS}$ = $0V$			±100	nA
gfs	Forward Transconductance	V <sub>DS</sub> =5V , I <sub>D</sub> =4A		28.3		S
$R_{g}$	Gate Resistance	V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz		2.5	5	Ω
Qg	Total Gate Charge (10V)	V <sub>DS</sub> =48V , V <sub>GS</sub> =10V , I <sub>D</sub> =6.3A		14	20	
$Q_{gs}$	Gate-Source Charge			2.6		nC
$Q_{gd}$	Gate-Drain Charge			2.2		
T <sub>d(on)</sub>	Turn-On Delay Time			8	15	
Tr	Rise Time	$V_{DD}$ =30V , $V_{GEN}$ =10V , $R_G$ =6 $\Omega$		6	11	20
T <sub>d(off)</sub>	Turn-Off Delay Time	I <sub>D</sub> =4A ,R <sub>L</sub> =30Ω	23	42	ns	
T <sub>f</sub>	Fall Time			6	11	
C <sub>iss</sub>	Input Capacitance			670	940	
Coss	Output Capacitance	V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , f=1MHz		70	91	pF
C <sub>rss</sub>	Reverse Transfer Capacitance			35	64	

## **Guaranteed Avalanche Characteristics**

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
EAS	Single Pulse Avalanche Energy <sup>5</sup>	V <sub>DD</sub> =25V , L=0.1mH , I <sub>AS</sub> =12A	10			mJ

## **Diode Characteristics**

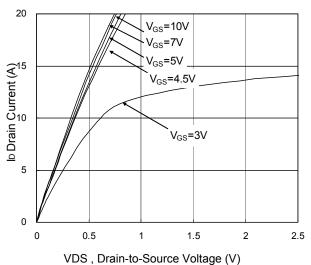
Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
Is	Continuous Source Current <sup>1,6</sup>	V =V =0V Force Current			2.5	Α
I <sub>SM</sub>	Pulsed Source Current <sup>2,6</sup>	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current			24	Α
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25℃			1.1	V
t <sub>rr</sub>	Reverse Recovery Time			20		nS
Q <sub>rr</sub>	Reverse Recovery Charge	I==6.3A , dI/dt=100A/ $\mu$ s , T $_{J}$ =25 $^{\circ}$ C		18		nC

### Note:

- 1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, t<10 sec.
- 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=0.1mH,  $I_{AS}$ =12A
- 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** 

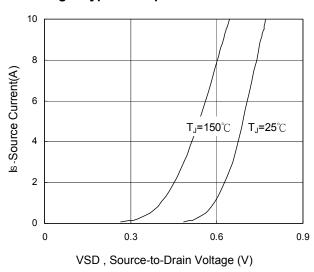


Fig.3 Forward Characteristics Of Reverse

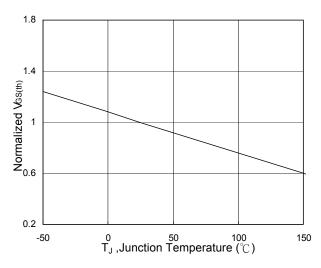


Fig.5 Normalized  $V_{\text{GS(th)}}$  vs.  $T_{\text{J}}$ 

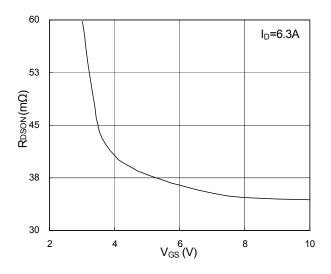


Fig.2 On-Resistance vs. Gate-Source

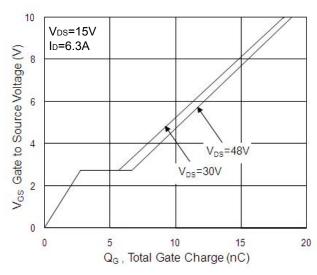


Fig.4 Gate-Charge Characteristics

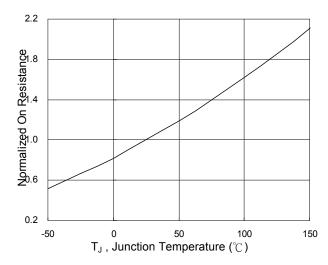
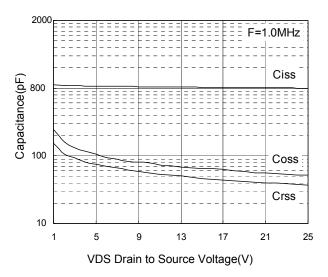


Fig.6 Normalized R<sub>DSON</sub> vs. T<sub>J</sub>





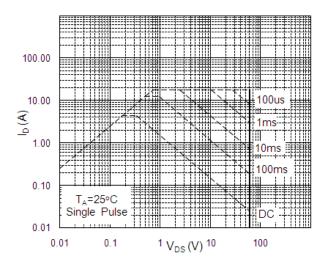


Fig.7 Capacitance

Fig.8 Safe Operating Area

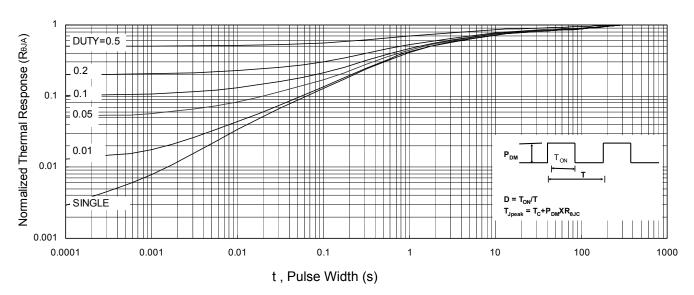


Fig.9 Normalized Maximum Transient Thermal Impedance

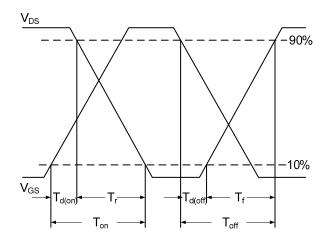


Fig.10 Switching Time Waveform

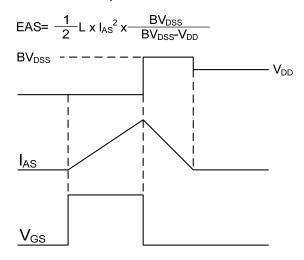


Fig.11 Unclamped Inductive Switching Waveform



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