General Description

The WSF30100 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 WSF30100 meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

Product Summery

BVDSS	RDSON	ID
30V	2.5mΩ	100A

Applications

- High Frequency Point-of-Load Synchronous Buck Converter
- Networking DC-DC Power System
- Power Tool Application

Features

Advanced high cell density Trench technology

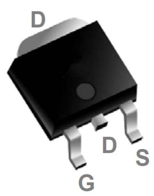
Super Low Gate Charge

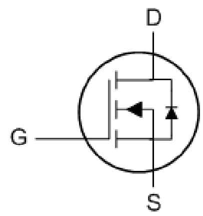
Excellent CdV/dt effect decline

100% EAS Guaranteed

Green Device Available

TO-252 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_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,7]	100	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,7]	80	A
I_{DM}	Pulsed Drain Current[2]	310	A
EAS	Single Pulse Avalanche Energy[3]	378	mJ
I_{AS}	Avalanche Current	70.2	A
P_D@T_C=25℃	Total Power Dissipation[4]	89.3	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	1.4	℃/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	
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.022	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	2.5	3	mΩ
		V_{GS}=10V , I_D=15A	---	3.2	4	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, I_D =250uA	1	1.5	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-6.1	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	2	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	10	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forwar Trd ansconductance	V_{DS}=5V , I_D=30A	---	60	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	0.9	1.8	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=10V , I_D=20A	---	56.9	---	nC
Q_{gs}	Gate-Source Charge		---	13.8	---	
Q_{gd}	Gate-Drain Charge		---	23.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω, I_D=1A	---	20.1	---	ns
T_r	Rise Time		---	6.3	---	
$T_{d(off)}$	Turn-Off Dela Ty ime		---	124.6	---	
T_f	TFall ime		---	15.8	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	5935	---	pF
C_{oss}	Output Capacitance		---	725	---	
C_{rss}	Reverse Transfer Capacitance		---	538	---	

Guaranteed Avalanche Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy[5]	V_{DD}=25V , L=0.1mH , I_{AS}=20A	69	---	---	mJ

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,6]	$V_G=V_D$=0V , Force Current	---	---	40	A
I_{SM}	Pulsed Source Current[2,6]		---	---	310	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=A , T_J=25℃	---	---	1.2	V

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=0.1mH,I_{AS}=20A

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.

7.Package limitation current is 100A.

Typical Characteristics

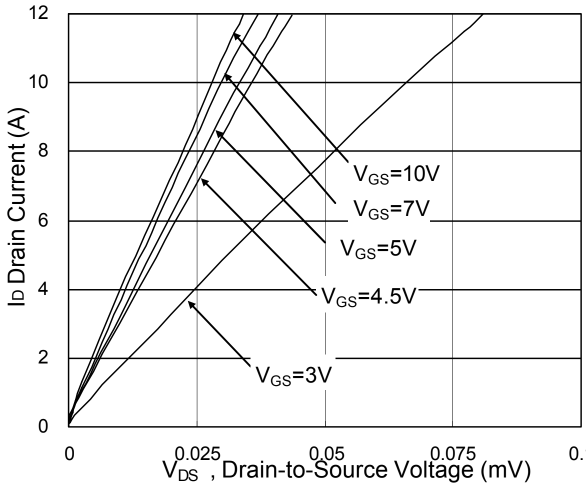


Fig.1 Typical Output Characteristics

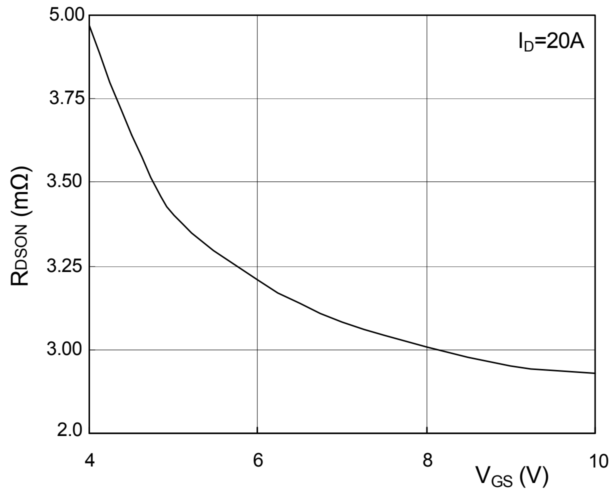


Fig.2 On-Resistance v.s Gate- Source

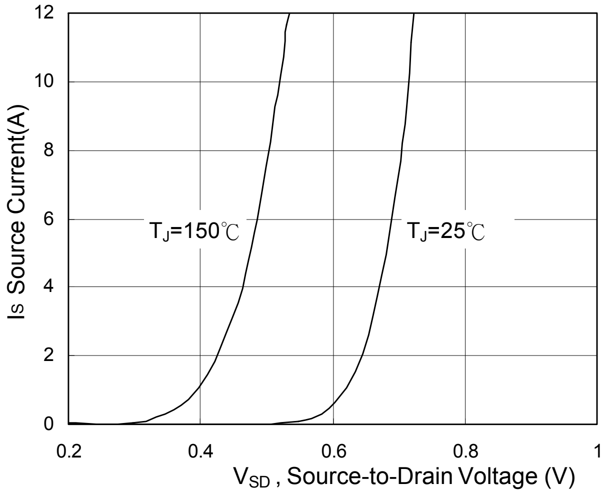


Fig.3 Forward Characteristics of Reverse

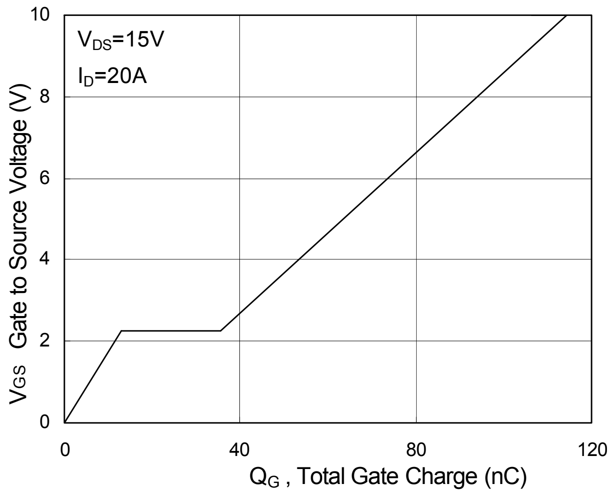


Fig.4 Gate-Charge Characteristics

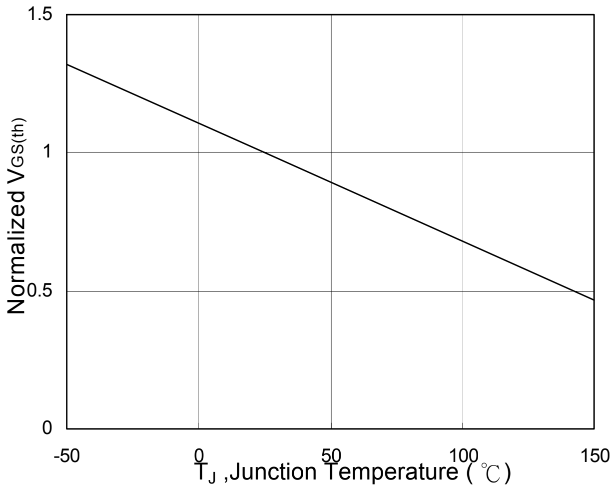


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

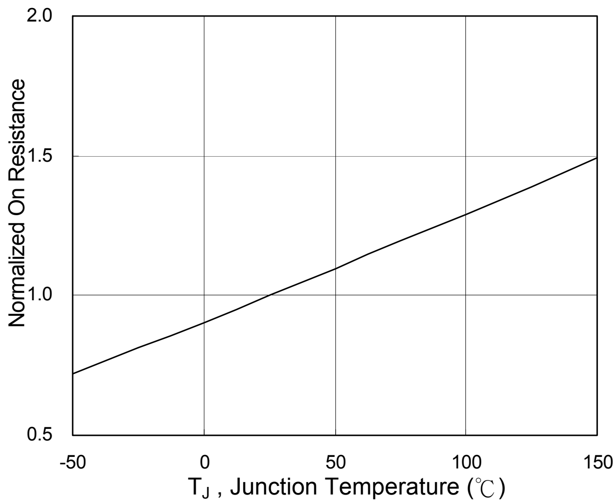


Fig.6 Normalized R_{DSON} v.s T_J

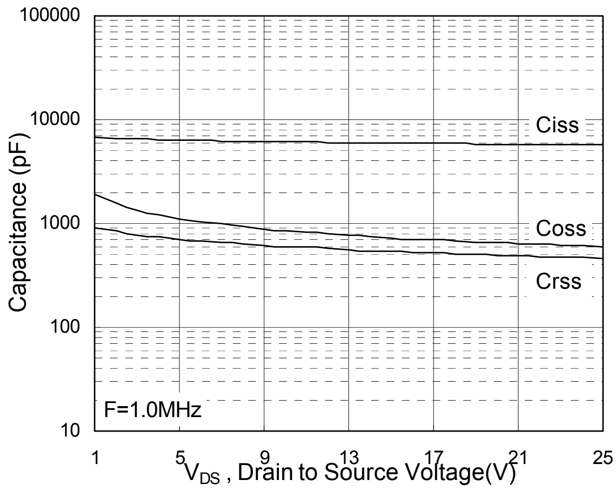


Fig.7 Capacitance

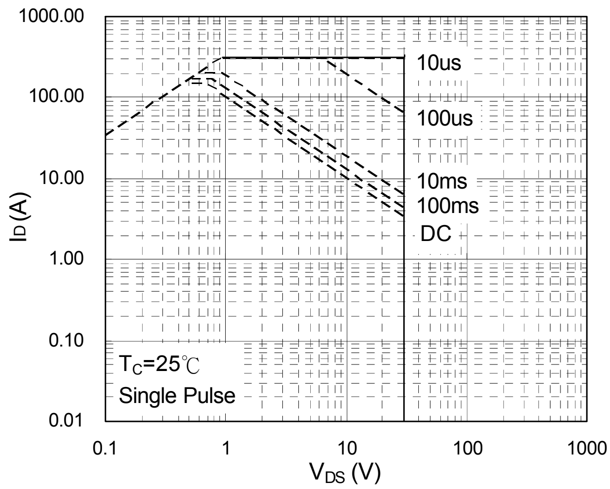


Fig.8 Safe Operating Area

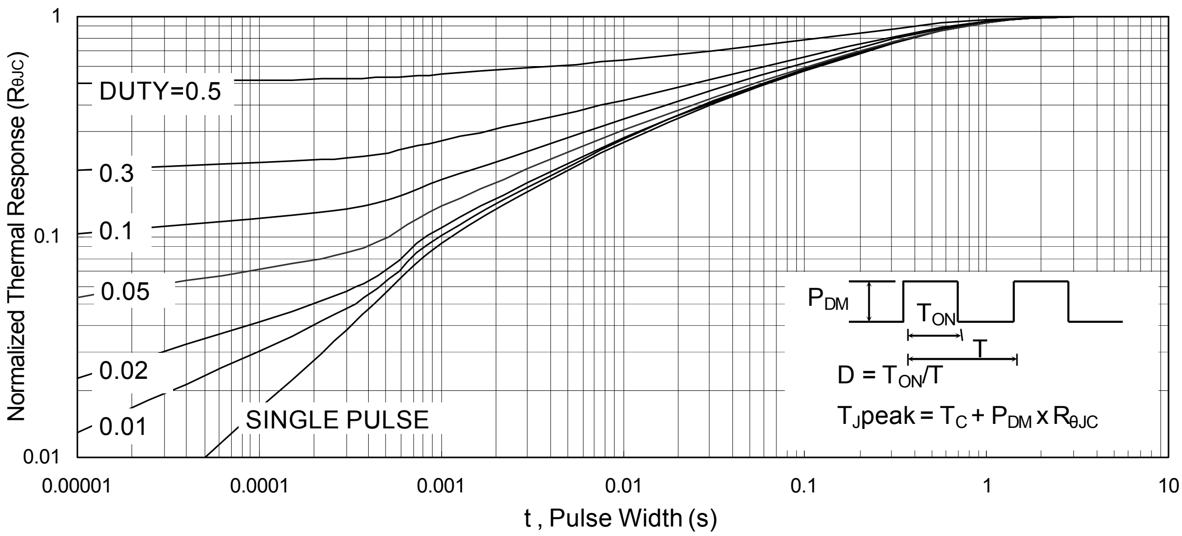


Fig.9 Normalized Maximum Transient Thermal Impedance

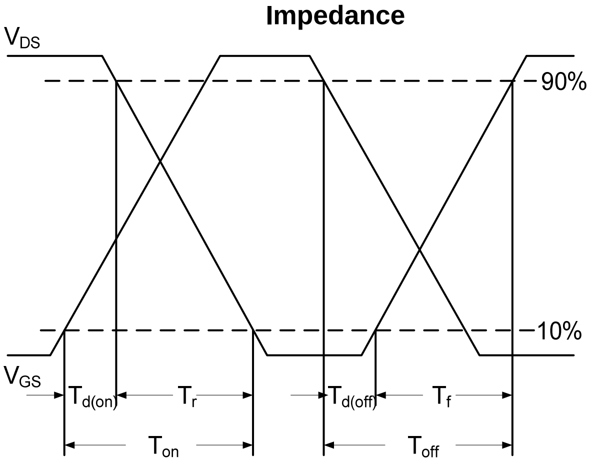


Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

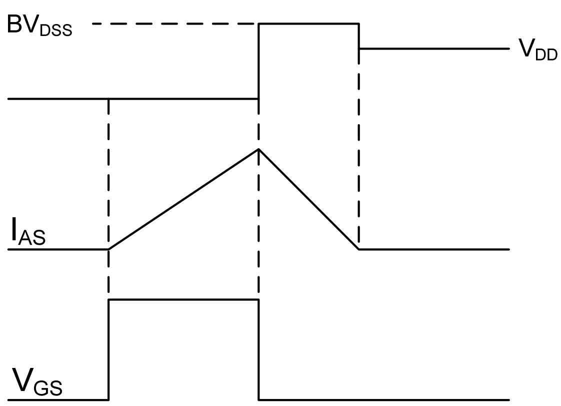


Fig.11 Unclamped Inductive Waveform

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