Description

The WSD30L20DN uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 4.5V.This device is suitable for use as a Battery protection or in other Switching application

Product Summery

VDS	RDS(ON)	ID
-30	18.8mΩ	-20A

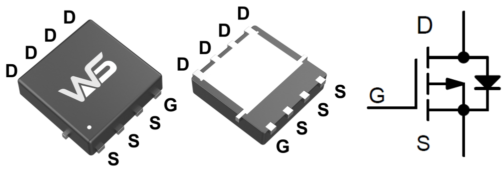
Application

Lithium battery protection

Wireless impact

Mobile phone fast charging

DFN3X3-8-EP Pin Configuration



Features

1,High density cell design for ultra low Rdson

2,Fully characterized avalanche voltage and current

3,Good stability and uniformity with high EAS

4,Excellent package for good heat dissipation

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter		Rating	Units
V_{DS}	Drain-Source Voltage		-30	V
V_{GS}	Gate-Source Voltage		±20	V
ID	Continuous Drain Current, V_{GS} @ -10V1	TC=25℃	-20	A
	Continuous Drain Current, V_{GS} @ -10V1	TC=100℃	-13	A
I_{DM}	Pulsed Drain Current2		-80	A
EAS	Single Pulse Avalanche Energy3		16	mJ
I_{AS}	Avalanche Current		-17	A
PD	Total Power Dissipation4	TC=25℃	16.6	W
	Total Power Dissipation4	TA=25℃	1.67	W
T_{STG}	Storage Temperature Range		-55 to 150	℃
T_J	Operating Junction Temperature Range		-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient 1		7.53	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-30	32	---	V
△BVDSS/△TJ	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.022	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-10A	---	18.8	25	mΩ
		V_{GS}=-4.5V , I_D=-5A	---	30.5	40	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	-1.7	-2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.6	---	mV/℃
IDSS	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	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	8.9	---	Ω
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-15A	---	19	---	nC
Qgs	Gate-Source Charge		---	6.3	---	
Qgd	Gate-Drain Charge		---	4.5	---	
Td(on)	Turn-On Delay Time	V_{DD}=-15V, V_{GS}=-10V , R_G=3.3Ω, I_D=-15A	---	6	---	ns
T_r	Rise Time		---	5	---	
Td(off)	Turn-Off Delay Time		---	25	---	
T_f	Fall Time		---	7	---	
Ciss	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	900	---	pF
Coss	Output Capacitance		---	140	---	
Crss	Reverse Transfer Capacitance		---	120	---	
IS	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-20	A
ISM	Pulsed Source Current		---	---	-80	A
VSD	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V
trr	Reverse Recovery Time	IF=-15A , dI/dt=100A/μs , T_J=25℃	---	7	---	nS
Q_{rr}	Reverse Recovery Charge		---	6.3	---	nC

Note :

1.The data tested by surface mounted on a 1 $inch^2$ FR-4 board with 2OZ copper.

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}=-24V,V_{GS}=-10V,L=0.1mH,I_{AS}=-17A

4.The power dissipation is limited by 150℃ junction temperature

5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

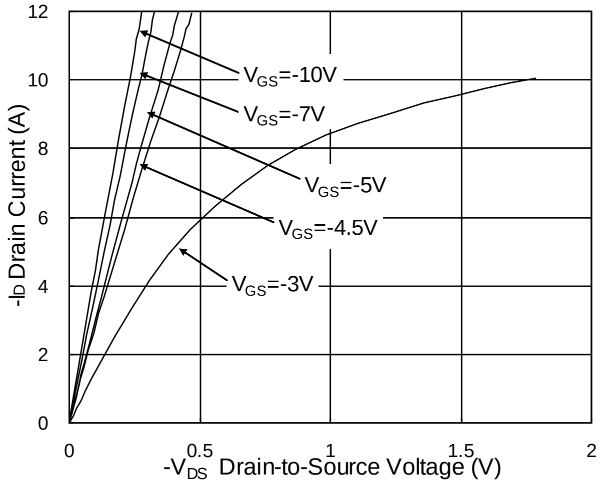


Fig.1 Typical Output Characteristics

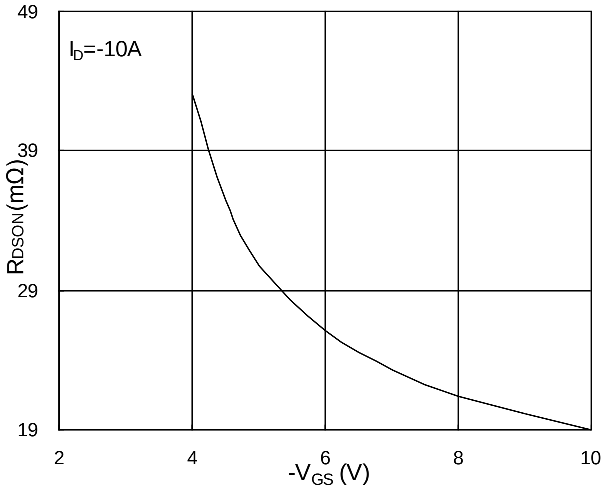


Fig.2 On-Resistance v.s Gate-Source

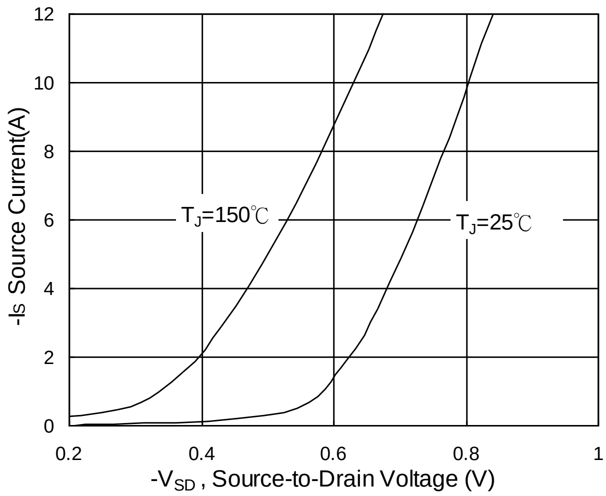


Fig.3 Forward Characteristics of Reverse

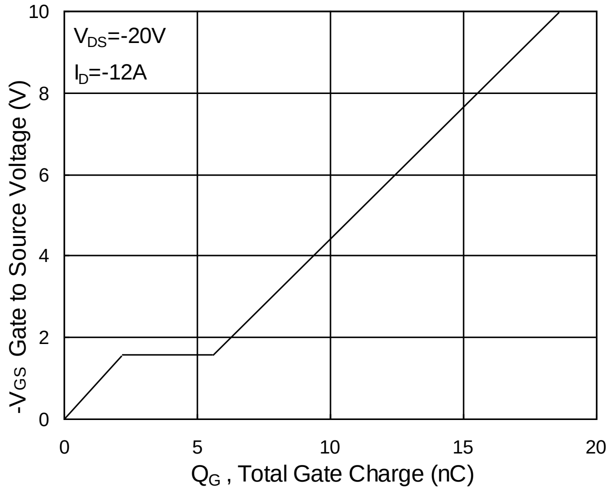


Fig.4 Gate-Charge Characteristics

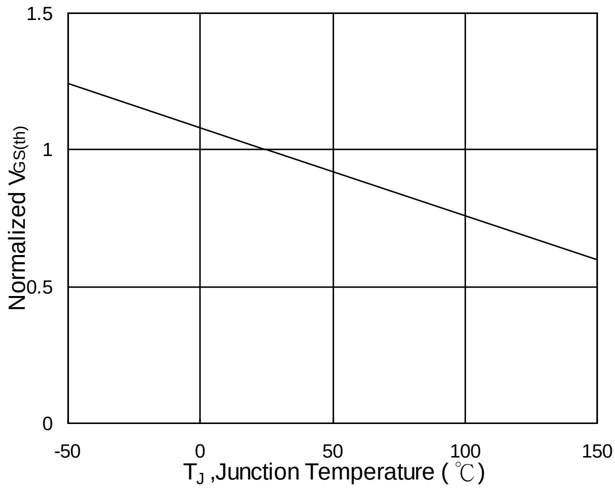


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

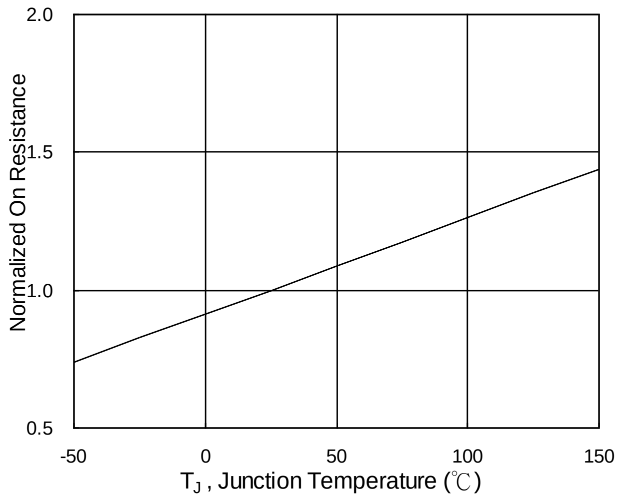


Fig.6 Normalized R_{DSON} v.s T_J

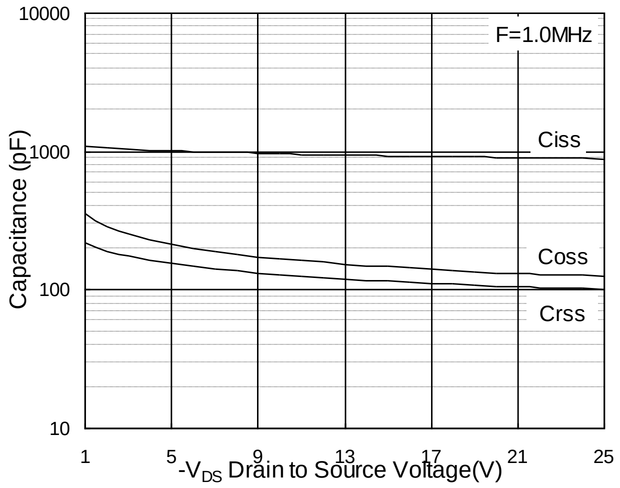


Fig.7 Capacitance

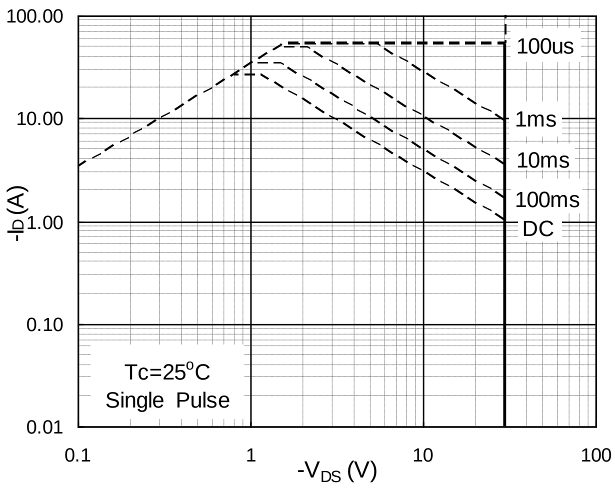


Fig.8 Safe Operating Area

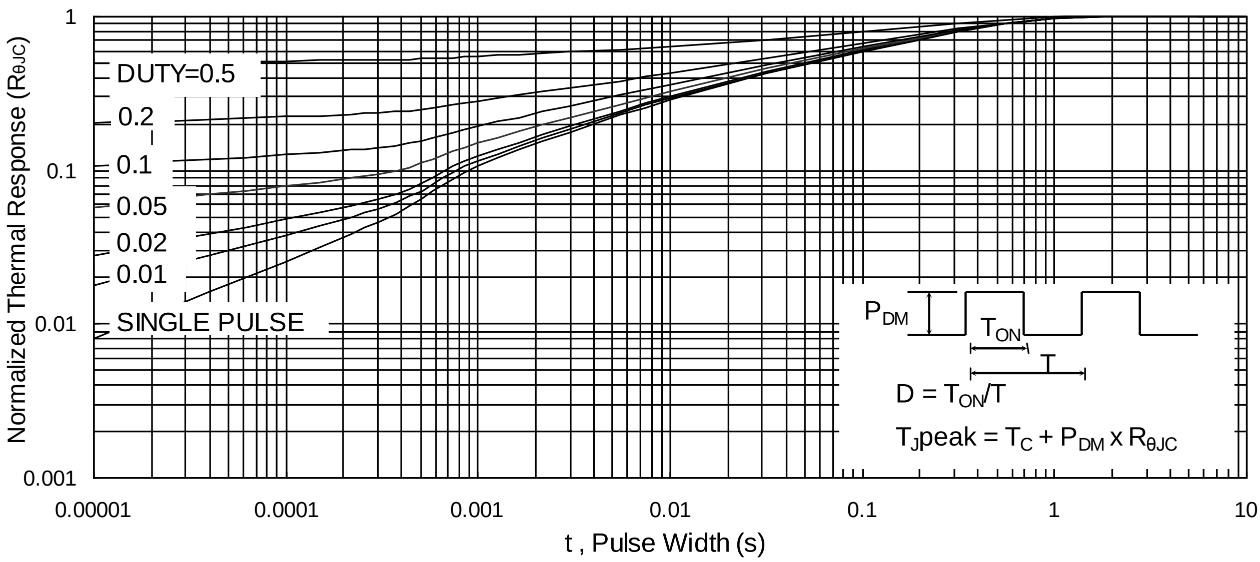


Fig.9 Normalized Maximum Transient Thermal Impedance

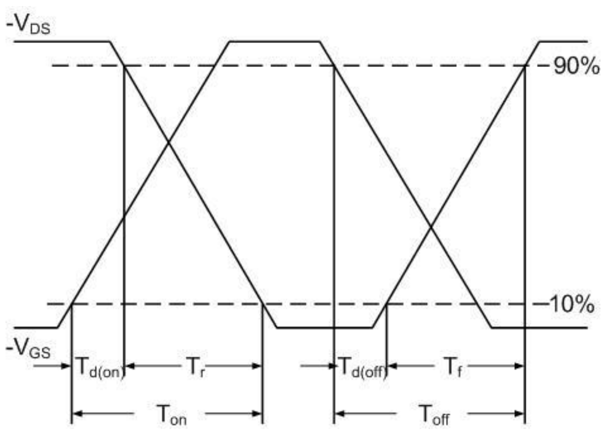


Fig.10 Switching Time Waveform

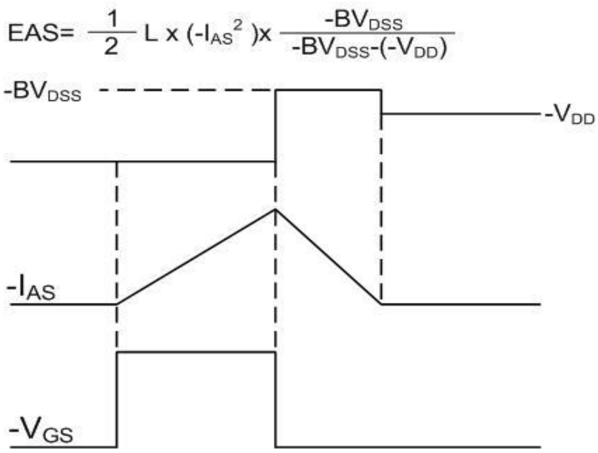


Fig.11 Unclamped Inductive Switching Waveform

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