

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

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

Product Summary

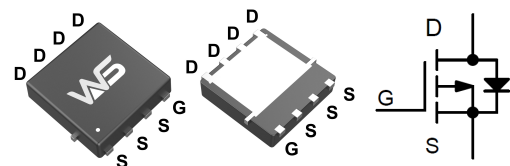
VDS	RDS(ON)	ID
-30	18mΩ	-20A

Application

Lithium battery protection

Wireless impact

Mobile phone fast charging

DFN3X3-8-EP Pin Configuration

Absolute Maximum Ratings (T_c=25°C 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} @ -10V ₁	TC=25°C	-20
	Continuous Drain Current, V _{GS} @ -10V ₁	TC=100°C	-13
I _{DM}	Pulsed Drain Current ₂	-80	A
EAS	Single Pulse Avalanche Energy ₃	16	mJ
I _{AS}	Avalanche Current	-17	A
PD	Total Power Dissipation ₄	TC=25°C	16.6
	Total Power Dissipation ₄	TA=25°C	1.67
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-Ambient ₁	7.53	°C/W

Electrical Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-30	32	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.022	---	V/°C
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
ΔVGS(th)	VGS(th) Temperature Coefficient		---	4.6	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-24V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =55°C	---	---	-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
Q _{gs}	Gate-Source Charge		---	6.3	---	
Q _{gd}	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°C	---	---	-1.2	V
trr	Reverse Recovery Time	I _F =-15A, dI/dt=100A/μs, T _J =25°C	---	7	---	nS
Q _{rr}	Reverse Recovery Charge		---	6.3	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² 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°C 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

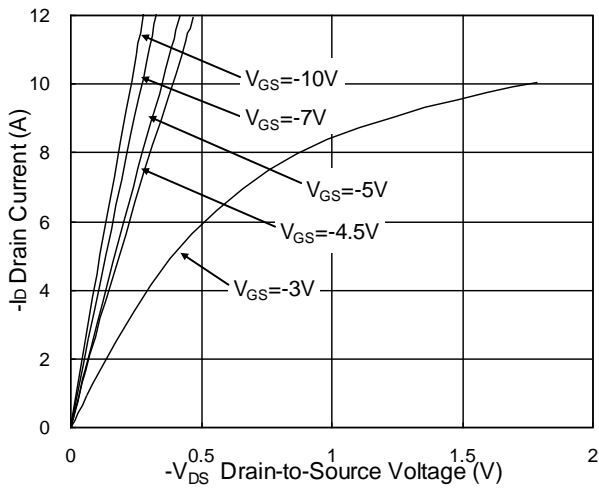


Fig.1 Typical Output Characteristics

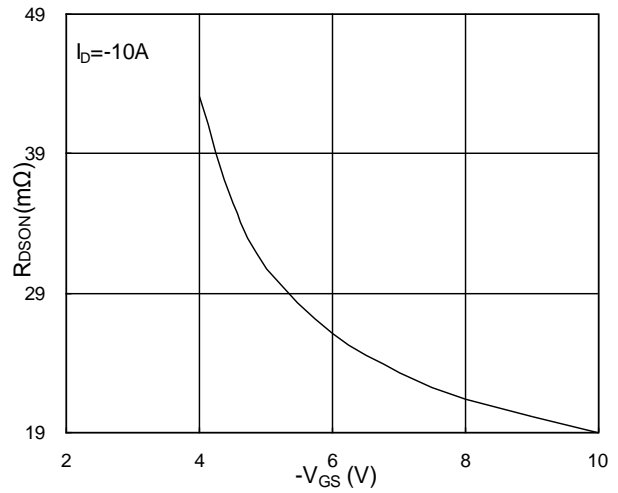


Fig.2 On-Resistance v.s Gate-Source

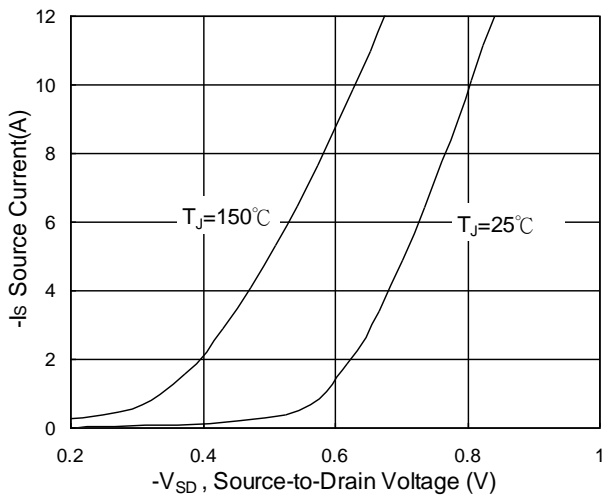


Fig.3 Forward Characteristics of Reverse

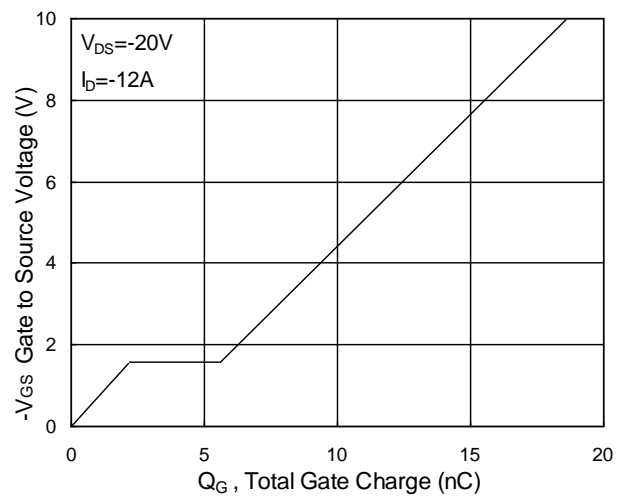


Fig.4 Gate-Charge Characteristics

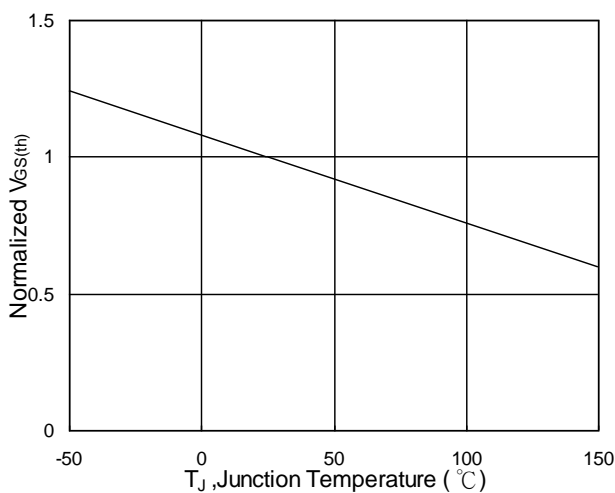


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

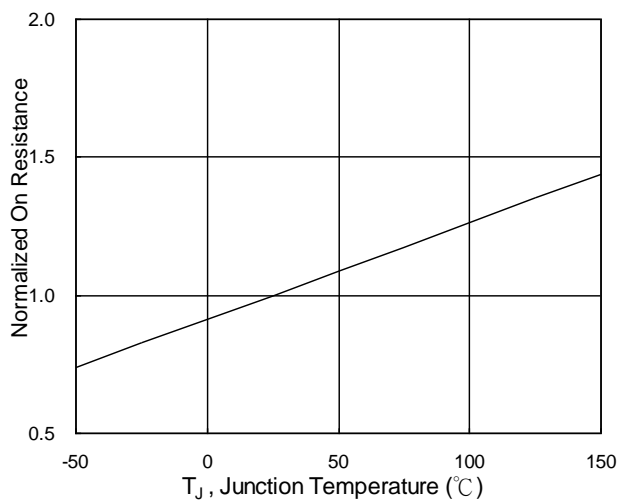


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

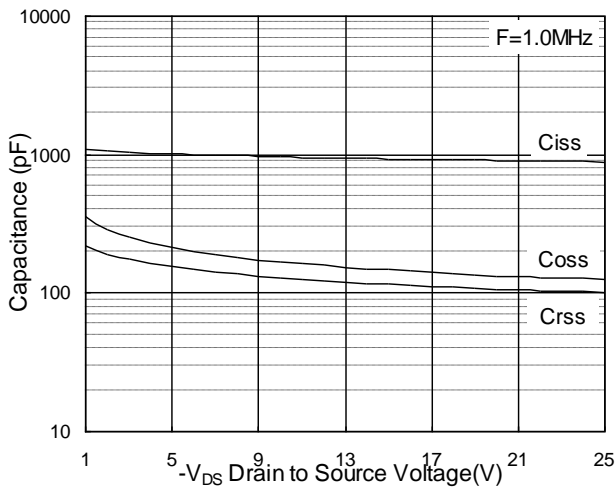


Fig.7 Capacitance

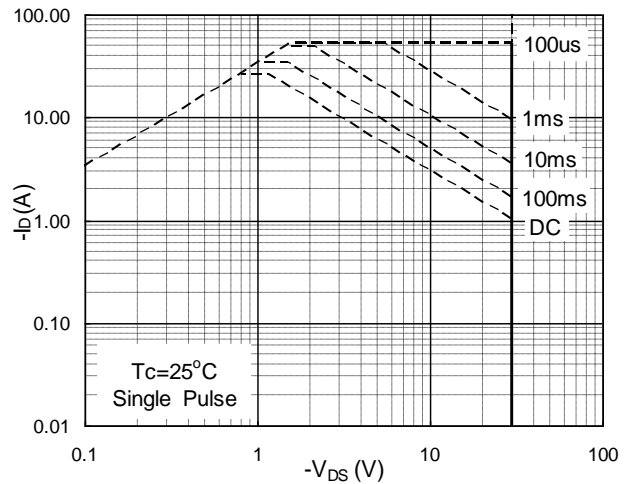


Fig.8 Safe Operating Area

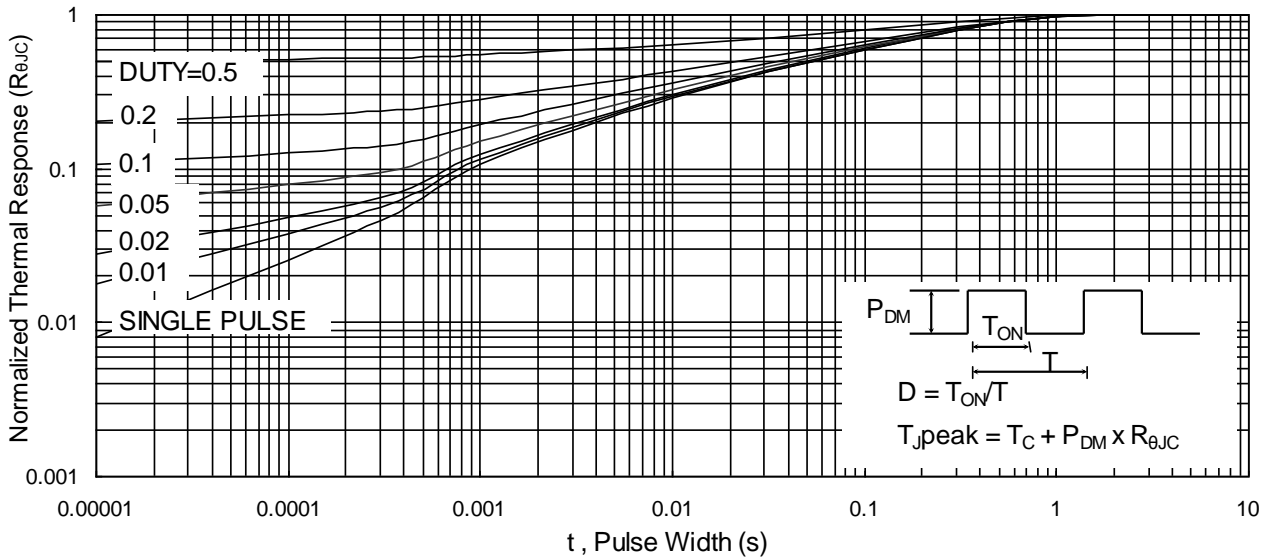


Fig.9 Normalized Maximum Transient Thermal Impedance

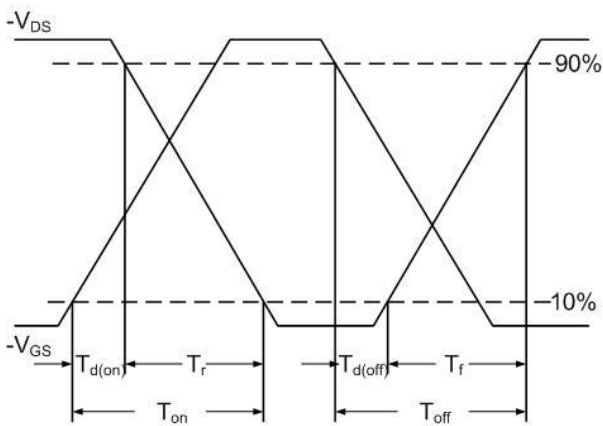


Fig.10 Switching Time Waveform

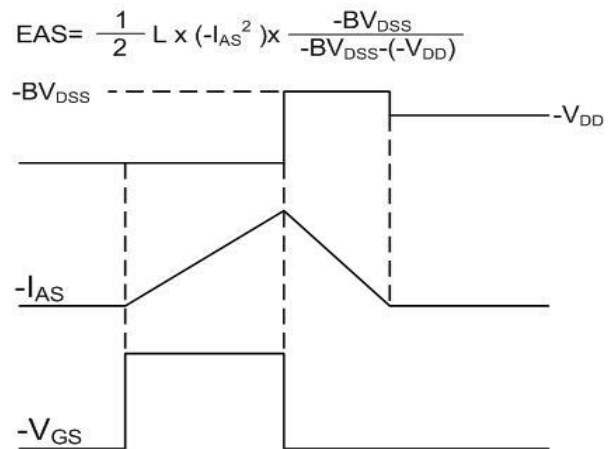


Fig.11 Unclamped Inductive Switching Waveform



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