

General Description

The WST3031 is the highest performance trench P-Ch MOSFET with extreme high cell density, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications.

The WST3031 meet the RoHS and Green Product requirement, with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

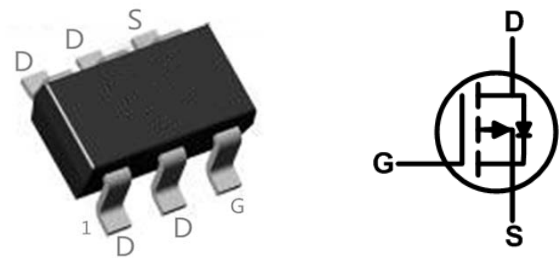
Product Summary

BVDSS	RDS(on)	ID
-12V	38mΩ	-4.4A

Applications

- Portable Equipment and Battery Powered Systems.
- Power Management in Notebook Computer

SOT- 23-6L Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-12	V
V _{GS}	Gate-Source Voltage	±8	V
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ -4.5V ¹	-4.4	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ -4.5V ¹	-3.5	A
I _{DM}	Pulsed Drain Current ²	-17.7	A
P _D @T _A =25°C	Total Power Dissipation ³	2.1	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-Ambient ¹	---	100	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	80	°C/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	-12	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.014	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-4.5V, I _D =-4.4A	---	38	60	mΩ
		V _{GS} =-2.5V, I _D =-3.5A	---	47	90	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.5	-0.7	-1.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	3.95	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-8V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-8V, V _{GS} =0V, T _J =55°C	---	---	-5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±8V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-3A	---	8	---	S
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-4.4A	---	5.2	---	nC
Q _{gs}	Gate-Source Charge		---	0.7	---	
Q _{gd}	Gate-Drain Charge		---	1.8	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-10V, V _{GEN} =-4.5V, R _G =6Ω, I _D =-1A, R _L =10Ω.	---	5.6	---	ns
T _r	Rise Time		---	13.2	---	
T _{d(off)}	Turn-Off Delay Time		---	21	---	
T _f	Fall Time		---	4.5	---	
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1MHz	---	357	---	pF
C _{oss}	Output Capacitance		---	72	---	
C _{rss}	Reverse Transfer Capacitance		---	61	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	-1	A
I _{SM}	Pulsed Source Current ^{2,4}		---	---	-17.7	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1	V
t _{rr}	Reverse Recovery Time	I _F =-4.4A, dI/dt=100A/μs, T _J =25°C	---	12	---	nS
Q _{rr}	Reverse Recovery Charge		---	6.6	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch²FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

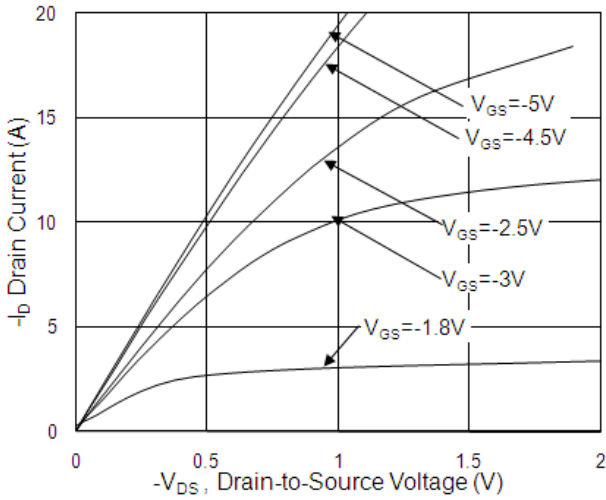


Fig.1 Typical Output Characteristics

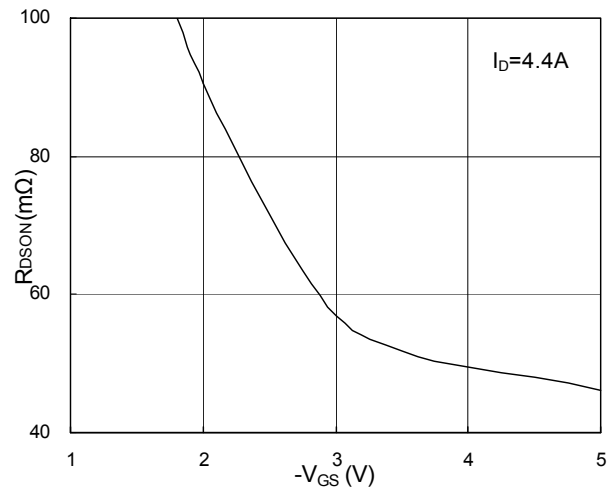


Fig.2 On-Resistance vs. G-S Voltage

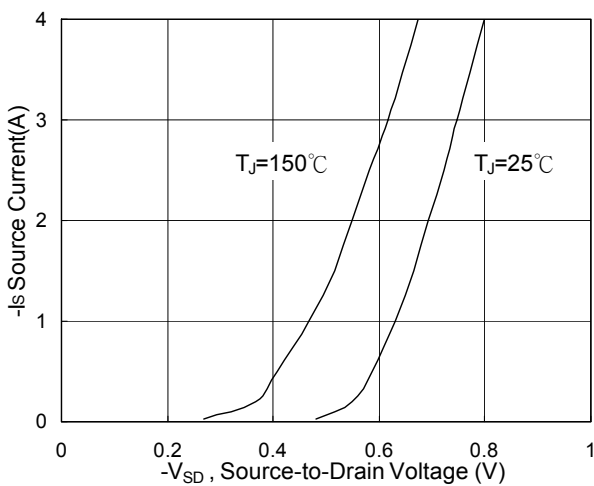


Fig.3 Forward Characteristics of Reverse

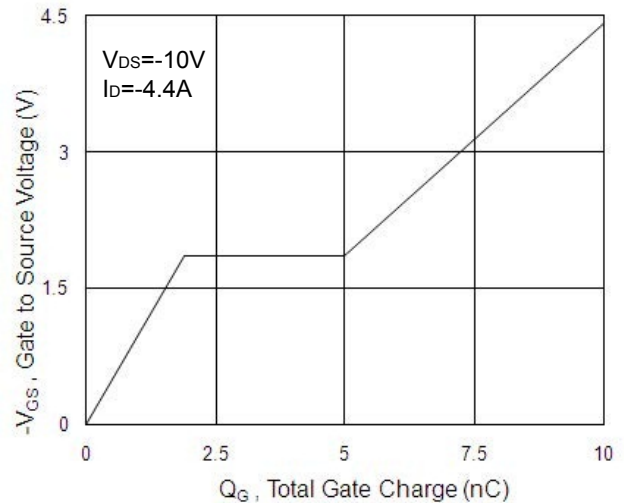


Fig.4 Gate-charge Characteristics

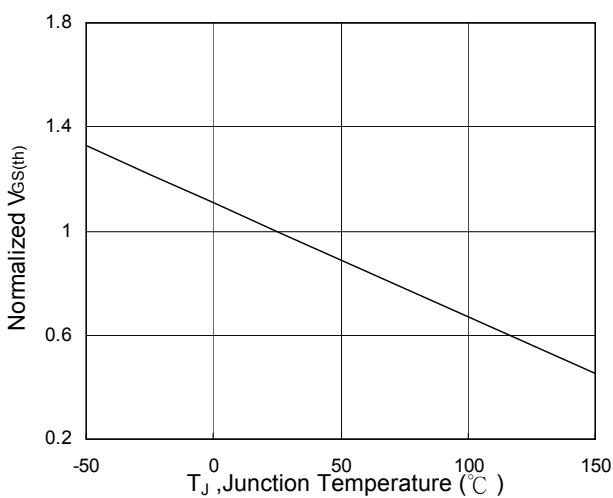


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

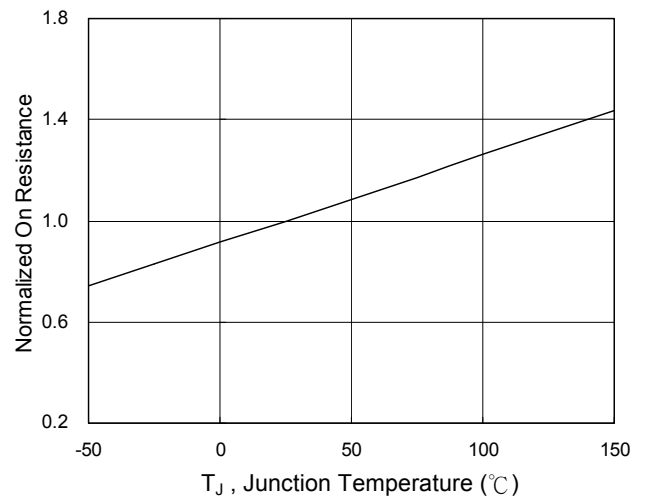


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

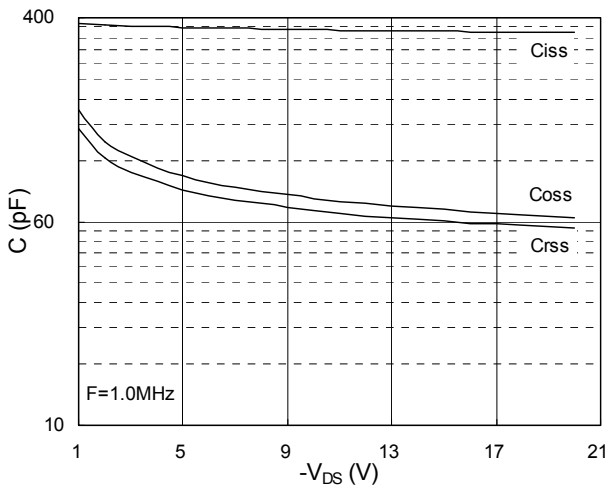


Fig.7 Capacitance

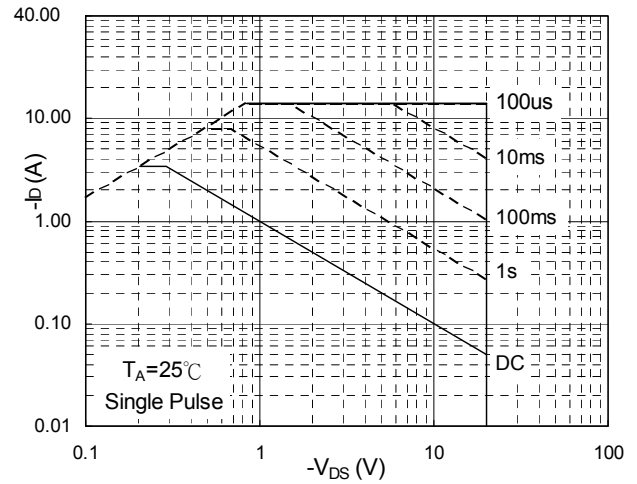


Fig.8 Safe Operating Area

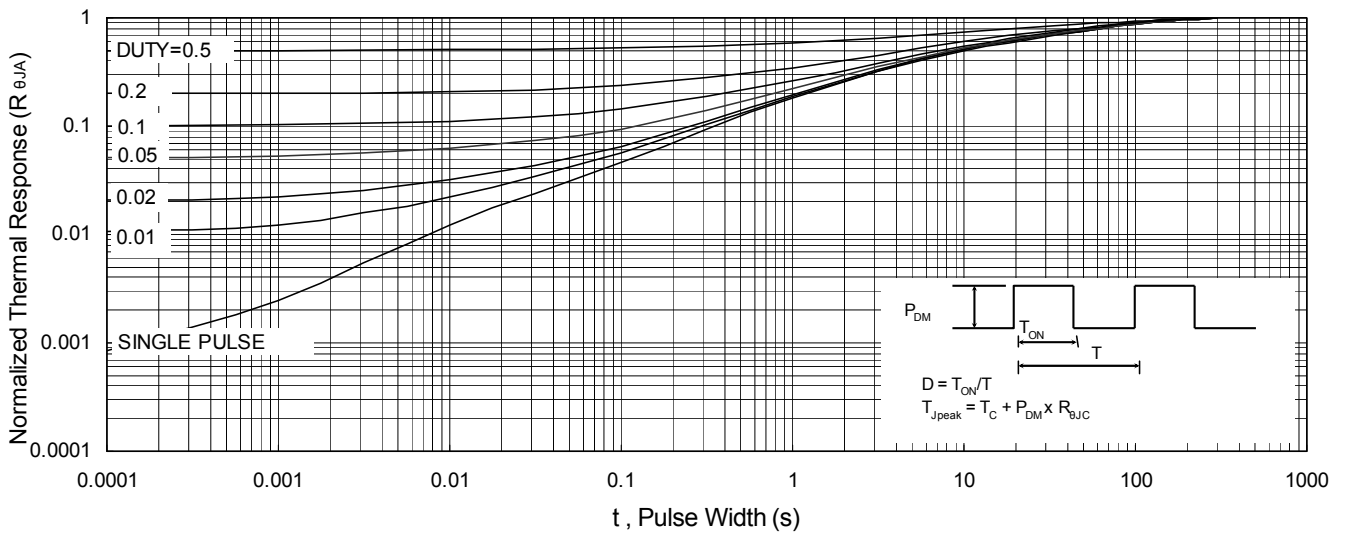


Fig.9 Normalized Maximum Transient Thermal Impedance

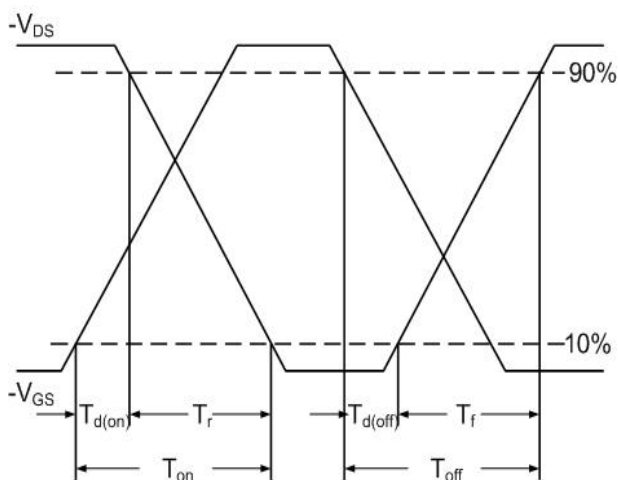


Fig.10 Switching Time Waveform

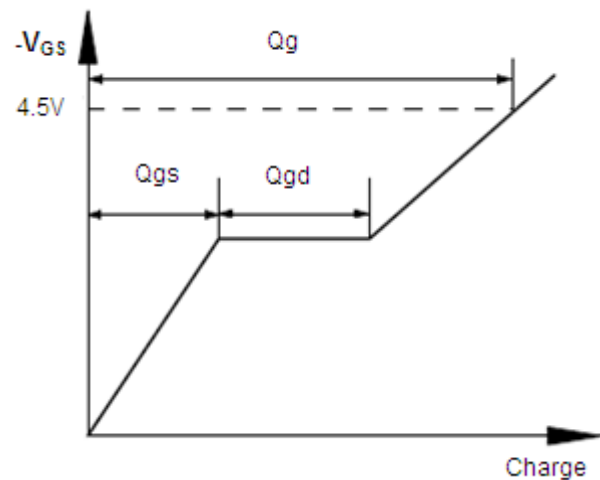


Fig.11 Gate Charge Waveform



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