General Description

The WST2011 is the highest performance trench P-ch MOSFETs with extreme high cell density , which provide excellent R_{DSON} and gate charge for most of the small power switching and load switch applications.

The WST2011 meet the RoHS and Green Product requirement with full function reliability approved.

Features

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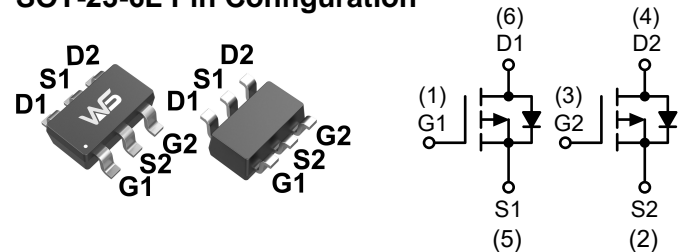- Excellent CdV/dt effect decline
- Green Device Available

Product Summery

BV_{DSS}	R_{DSON}	I_D
-20V	80mΩ	-3.2A

Applications

- High Frequency Point-of-Load Synchronous Small power switching for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

SOT-23-6L Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V_{DS}	Drain-Source Voltage	-20		V
V_{GS}	Gate-Source Voltage	±12		V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-3.6	-3.2	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-2.6	-2.4	A
I_{DM}	Pulsed Drain Current[2]	-12		A
P_D@T_A=25℃	Total Power Dissipation[3]	1.7	1.4	W
P_D@T_A=70℃	Total Power Dissipation[3]	1.2	0.9	W
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-Ambient [1]	---	125	℃/W
$R_{θJA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	---	95	℃/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	---	80	℃/W

Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=-250uA	-20	---	---	V
△BV$_{DSS}$/△T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=-1mA	---	-0.011	---	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=-4.5V , I$_D$=-2A	---	80	85	mΩ
		V$_{GS}$=-2.5V , I$_D$=-1A	---	95	115	
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-0.5	-1.0	-1.5	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	3.95	---	mV/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=-16V , V$_{GS}$=0V , T$_J$=25℃	---	---	-1	uA
		V$_{DS}$=-16V , V$_{GS}$=0V , T$_J$=55℃	---	---	-5	
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±12V , V$_{DS}$=0V	---	---	±100	nA
gfs	Forward Transconductance	V$_{DS}$=-5V , I$_D$=-2A	---	8.5	---	S
Q$_g$	Total Gate Charge (-4.5V)	V$_{DS}$=-15V , V$_{GS}$=-4.5V , I$_D$=-2A	---	3.3	11.3	nC
Q$_{gs}$	Gate-Source Charge		---	1.1	1.7	
Q$_{gd}$	Gate-Drain Charge		---	1.1	2.9	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=-15V , V$_{GS}$=-4.5V , R$_G$=3.3Ω, I$_D$=-2A	---	7.2	---	ns
T$_r$	Rise Time		---	9.3	---	
T$_{d(off)}$	Turn-Off Delay Time		---	3.6	---	
T$_f$	Fall Time		---	15.4	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , f=1MHz	---	750	---	pF
C$_{oss}$	Output Capacitance		---	95	---	
C$_{rss}$	Reverse Transfer Capacitance		---	68	---	

Diode Characteristics

| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current[1,4]	V$_G$=V$_D$=0V , Force Current	---	---	-1.0	A
I$_{SM}$	Pulsed Source Current[2,4]		---	---	-12	A
V$_{SD}$	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25℃	---	---	-1.1	V
t$_{rr}$	Reverse Recovery Time	I$_F$=-2A , dI/dt=100A/μs , T$_J$=25℃	---	19	---	nS
Q$_{rr}$	Reverse Recovery Charge		---	14	---	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 power dissipation is limited by 150℃ 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.
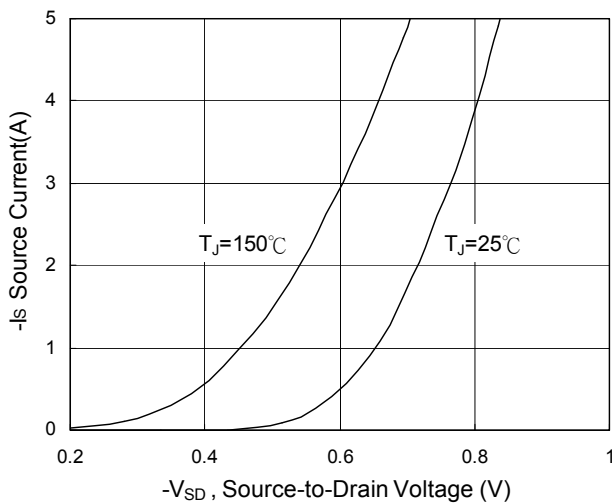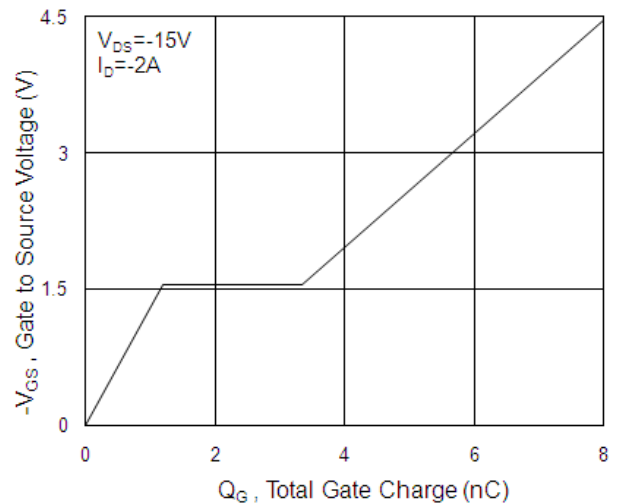
Typical Characteristics
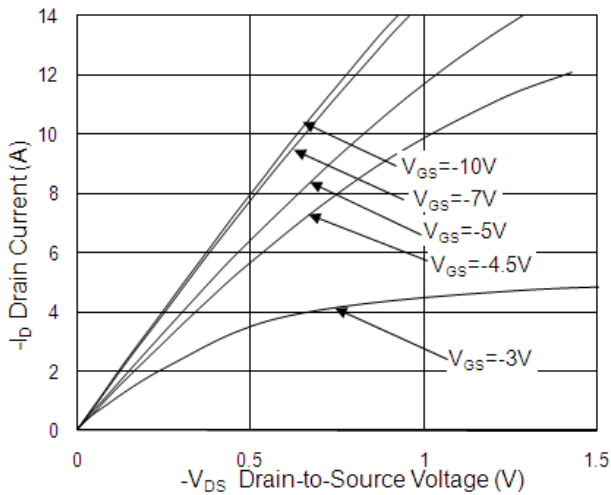
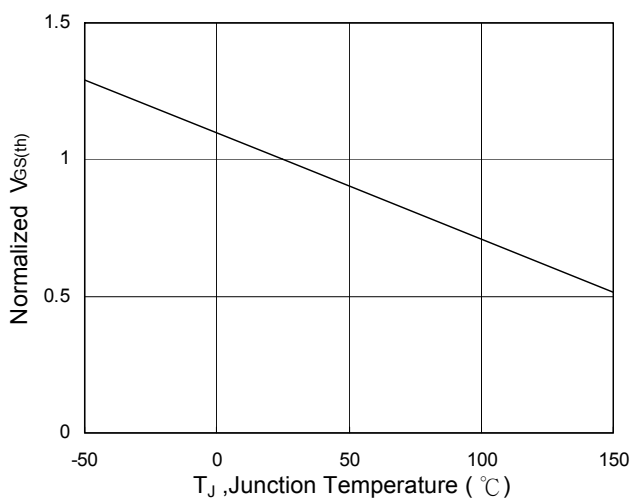

Fig.1 Typical Output Characteristics
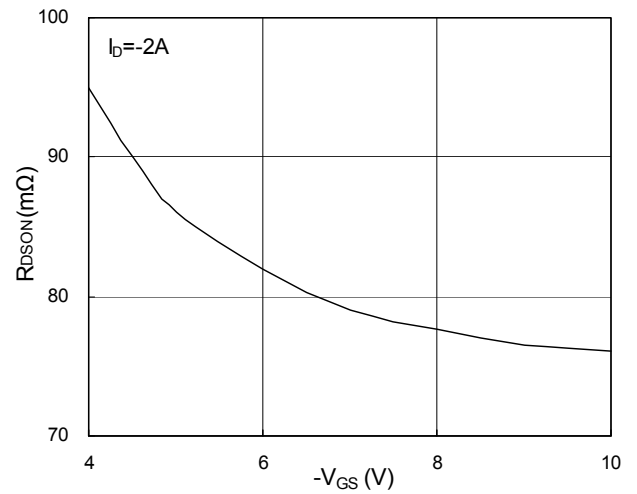
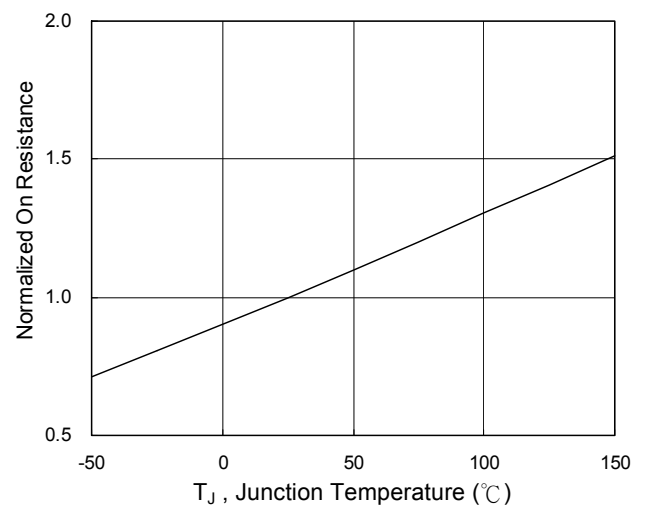**Fig.2 On-Resistance vs. G-S Voltage**
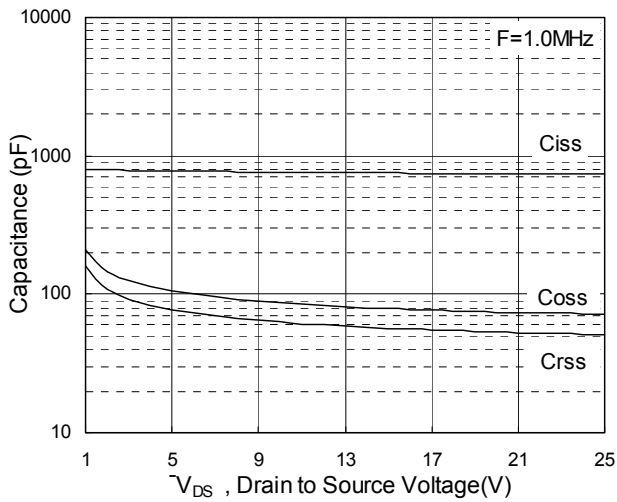

Fig.3 Forward Characteristics Of Reverse
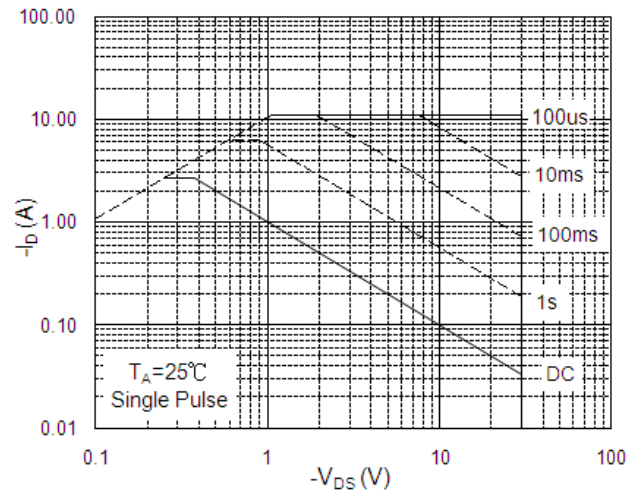

Fig.4 Gate-Charge Characteristics
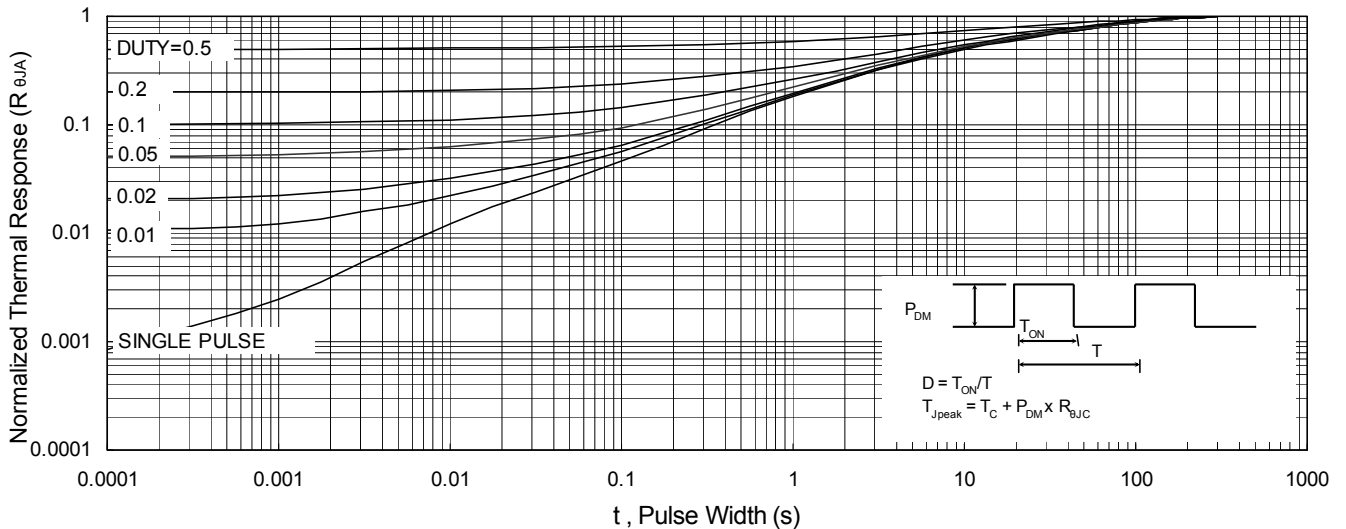

Fig.5 Normalized $V_{GS(th)}$ vs. T_J

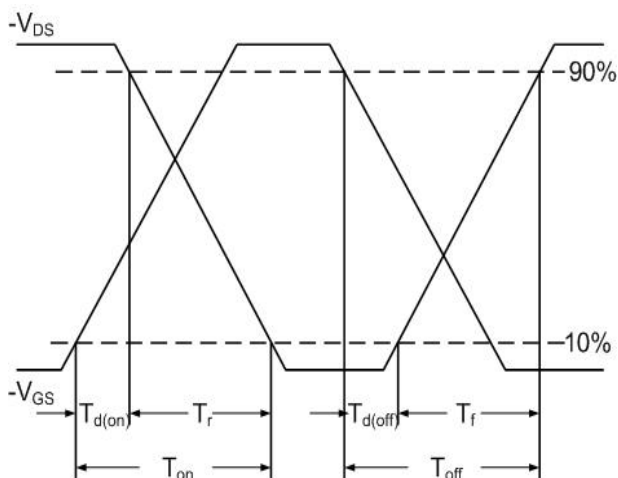**Fig.6 Normalized R_{DSON} vs. T_J**

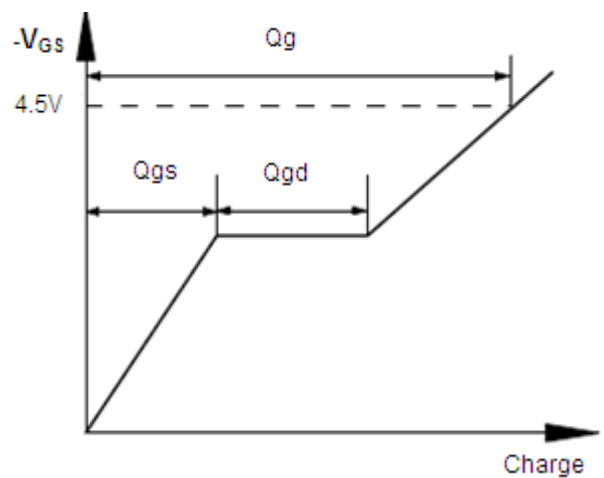**Fig.7 Capacitance**

Fig.8 Safe Operating Area
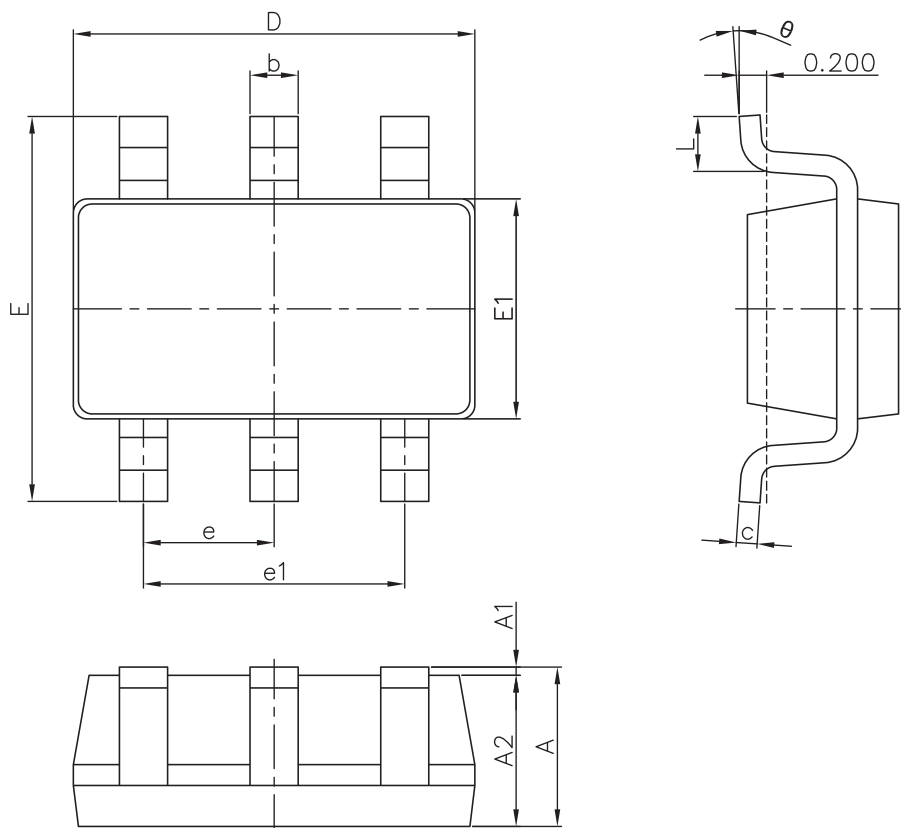

Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform

Fig.11 Gate Charge Waveform

Packaging information

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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