General Description

The WSD2010DN25 is the highest performance trench N-Channel MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the small power switching and load switch applications.

The WSD2010DN25 meet the RoHS and Green Product requirement with full function reliability approved.

Product Summery

BV_{DSS}	R_{DSON}	I_D
20V	6.0mΩ	11A

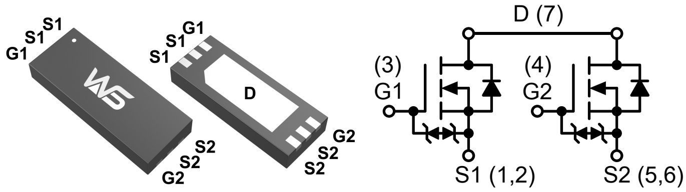
Applications

- Power management in portable and battery operated products
- DC-DC Power System
- ESD:2KV

Features

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

DFN2X5-6S Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
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]	11	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 4.5V[1]	7.5	A
I_{DM}	Pulsed Drain Current[2]	38	A
P_D@T_A=25℃	Total Power Dissipation[3]	1.5	W
P_D@T_A=70℃	Total Power Dissipation[3]	1.0	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] (Steady State)	---	127	℃/W
$R_{θJA}$	Thermal Resistance Junction-ambient [1] (t<10S)	---	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
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.022	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=5.5A	---	6.0	7.5	mΩ
		V_{GS}=2.5V , I_D=5.5A	---	7.3	9.9	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.5	0.7	1.0	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-2.32	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=16V , V_{GS}=0V , T_J=25℃	---	---	1	μA
		V_{DS}=16V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±10	μA
gfs	Forward Transconductance	V_{DS}=5V , I_D=10A	---	30	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	11	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=10V , V_{GS}=4.5V , I_D=5.5A	---	23.2	26	nC
Q_{gs}	Gate-Source Charge		---	1.9	5.5	
Q_{gd}	Gate-Drain Charge		---	4.8	9.2	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=10V , V_{GS}=10V , R_G=1Ω, I_D=1A ,RL=10Ω	---	8	15	ns
T_r	Rise Time		---	20	36	
$T_{d(off)}$	Turn-Off Delay Time		---	935	1583	
T_f	Fall Time		---	410	738	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , f=1MHz	---	1470	1920	pF
C_{oss}	Output Capacitance		---	258	---	
C_{rss}	Reverse Transfer Capacitance		---	202	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	2	A
I_{SM}	Pulsed Source Current[2,4]		---	---	38	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=5.5A,dI/dt=100A/μs , T_J=25℃	---	445	---	nS
Q_{rr}	Reverse Recovery Charge		---	2175	---	nC

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 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

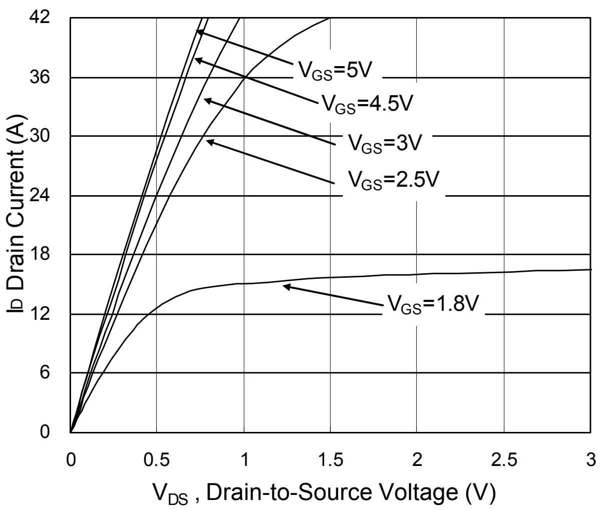


Fig.1 Typical Output Characteristics

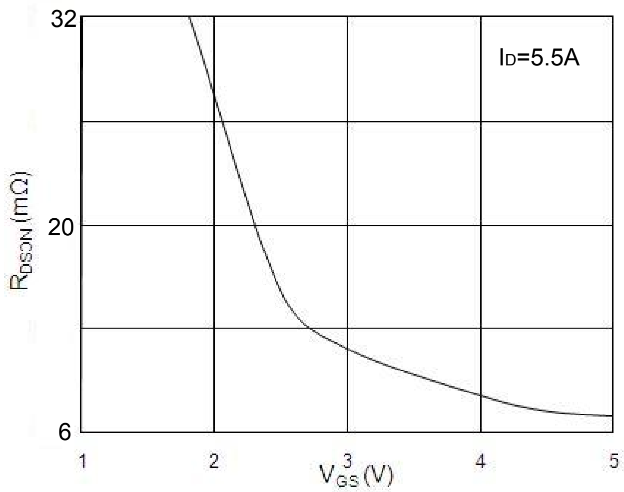


Fig.2 On-Resistance vs. Gate-Source

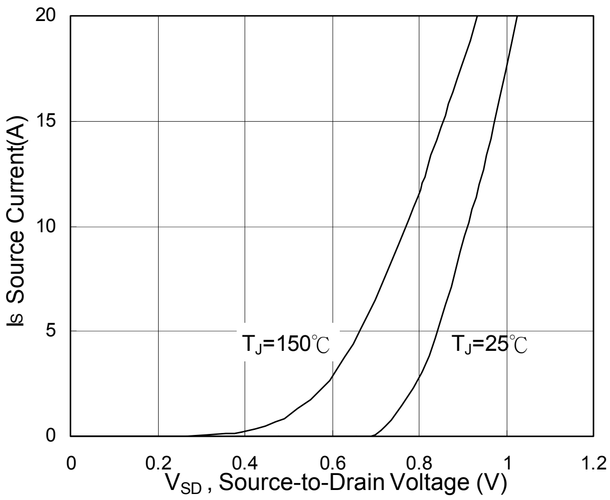


Fig.3 Forward Characteristics Of Reverse

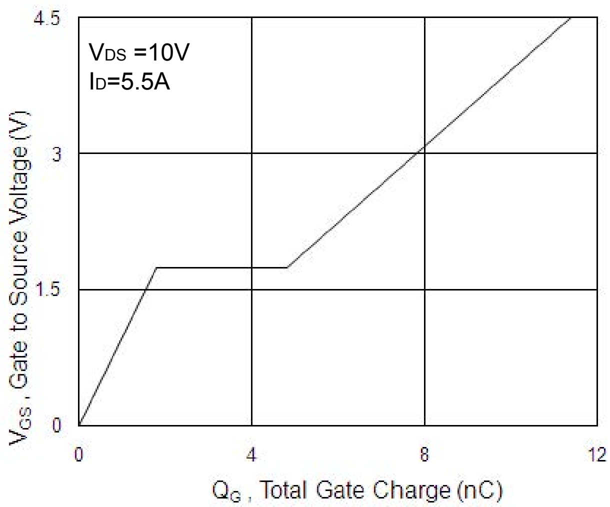


Fig.4 Gate-Charge Characteristics

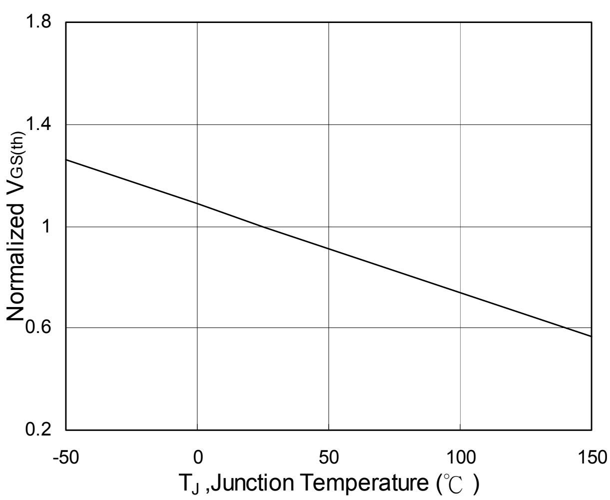


Fig.5 $V_{GS(th)}$ vs. T_J

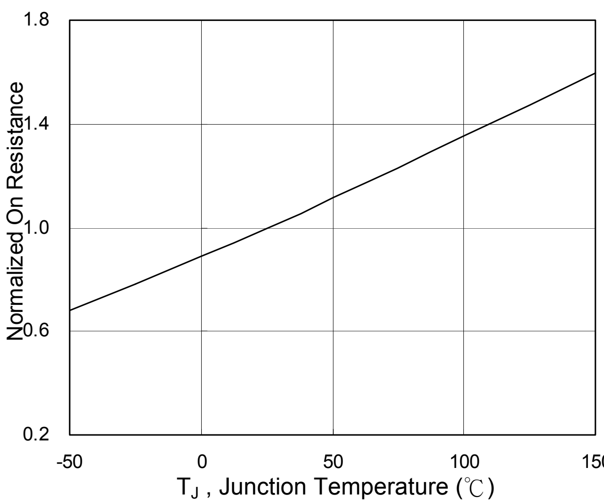


Fig.6 Normalized R_{DSON} vs. T_J

Typical Characteristics (Cont.)

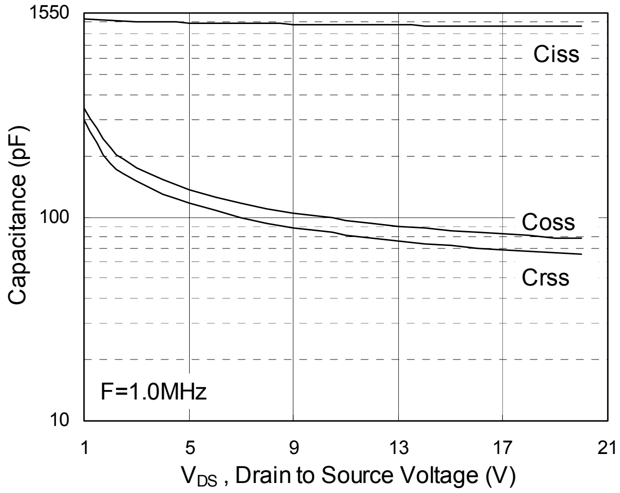


Fig.7 Capacitance

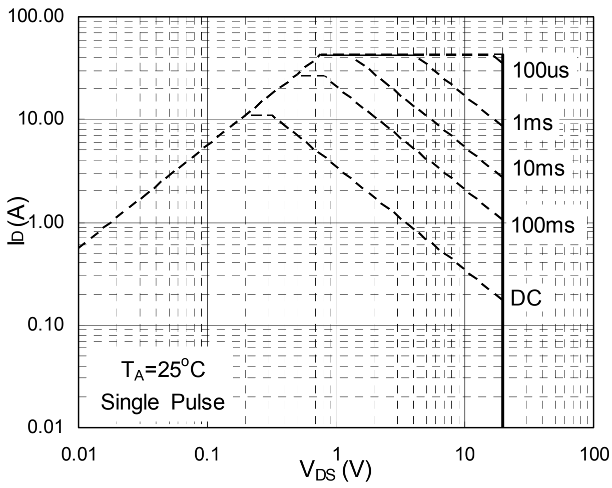


Fig.8 Safe Operating Area

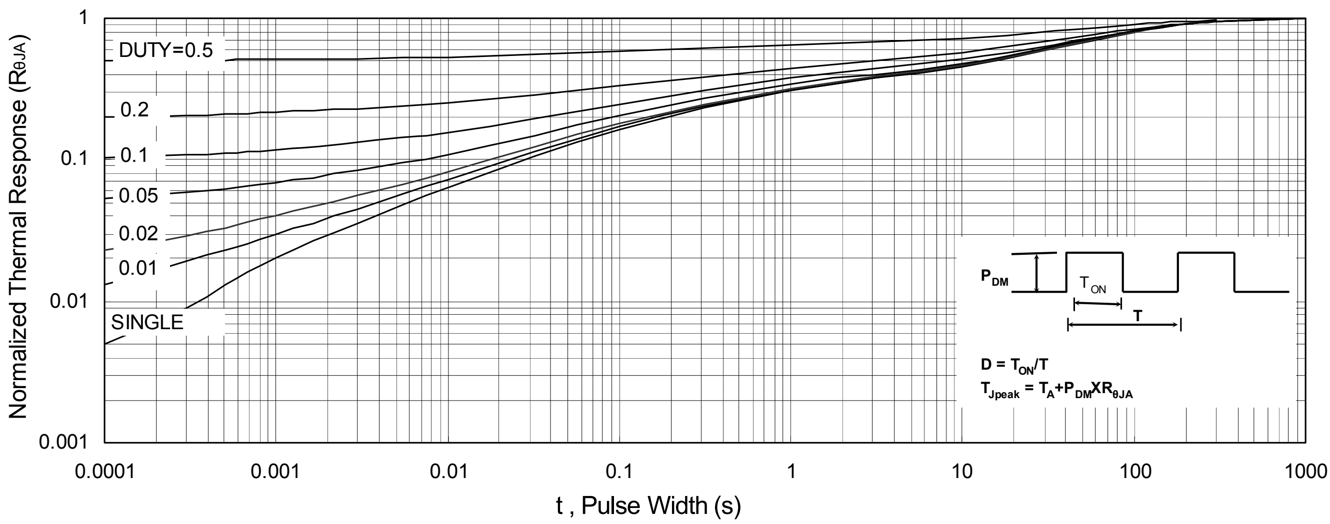


Fig.9 Normalized Maximum Transient Thermal Impedance

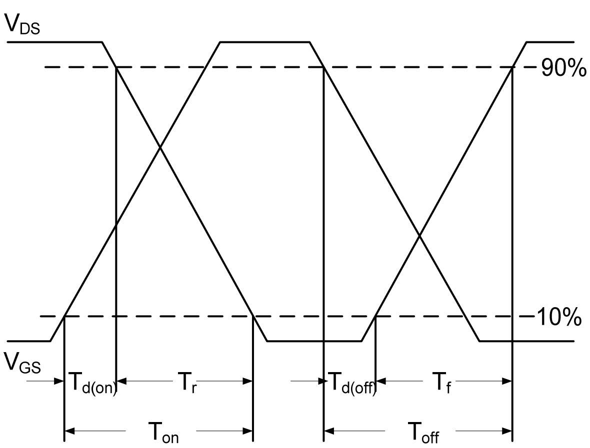


Fig.10 Switching Time Waveform

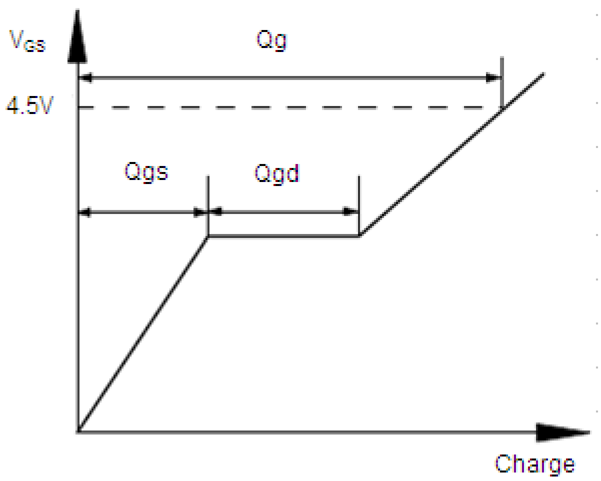
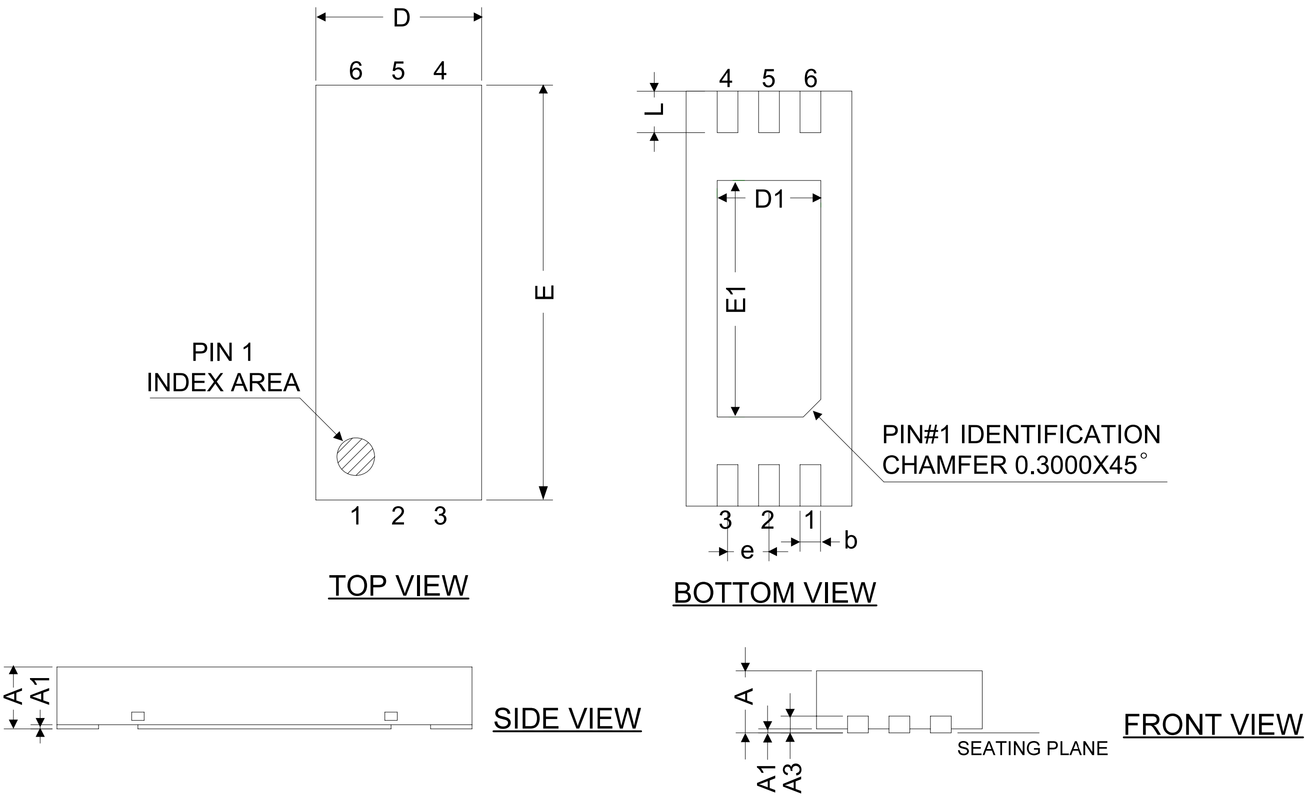


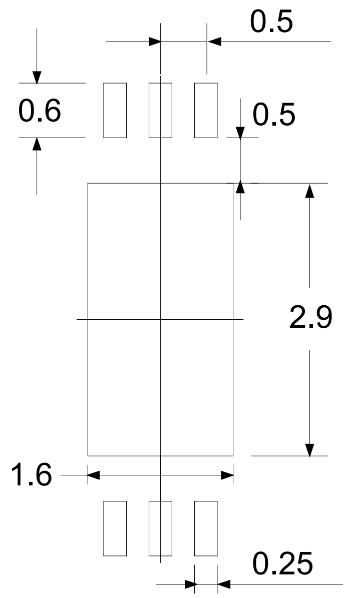
Fig.11 Gate Charge Waveform

Packaging information



SYMBOL	DFN2X5-6S			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
A3	0.10	0.203	0.004	0.008
b	0.20	0.30	0.008	0.012
D	1.90	2.10	0.075	0.083
D1	1.20	1.55	0.047	0.061
E	4.80	5.20	0.189	0.205
E1	2.60	2.95	0.102	0.116
e	0.50 BSC		0.020 BSC	
L	0.40	0.60	0.016	0.024

RECOMMENDED LAND PATTERN



UNIT: mm

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