

General Description

The WSD2012DN25 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 WSD2012DN25 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

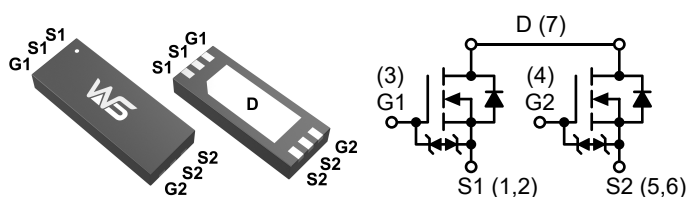
Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D
20V	7.0mΩ	11A

Applications

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

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
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 4.5V^1$	11	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current, $V_{GS} @ 4.5V^1$	9	A
I_{DM}	Pulsed Drain Current ²	95	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation ³	1.7	W
$P_D@T_A=70^{\circ}C$	Total Power Dissipation ³	1.0	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹ (Steady State)	---	75	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹ (t<10S)	---	40	$^{\circ}C/W$

Electrical Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C, $I_D=1mA$	---	0.022	---	V/°C
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=4.5V, I_D=5.5A$	5.0	7.0	9.5	mΩ
		$V_{GS}=2.5V, I_D=5.5A$	6.8	9.0	13	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.3	0.65	1.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-2.32	---	mV/°C
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=16V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	μA
		$V_{DS}=16V, V_{GS}=0V, T_J=55^\circ C$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	±10	μA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=10A$	---	65	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	2500	---	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=10V, V_{GS}=4.5V, I_D=5.5A$	10	12.5	15	nC
Q_{gs}	Gate-Source Charge		---	5.5	---	
Q_{gd}	Gate-Drain Charge		---	6.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=10V, V_{GS}=10V, R_G=1\Omega, I_D=1A, R_L=10\Omega$	---	1.1	---	μs
T_r	Rise Time		---	2.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	7	---	
T_f	Fall Time		---	7.4	---	
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1MHz$	1000	1256	1511	pF
C_{oss}	Output Capacitance		150	220	295	
C_{rss}	Reverse Transfer Capacitance		100	168	238	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V, \text{Force Current}$	---	---	3	A
I_{SM}	Pulsed Source Current ^{2,4}		---	---	45	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	0.58	1.0	V
t_{rr}	Reverse Recovery Time	$I_F=10A, dI/dt=500A/\mu s, T_J=25^\circ C$	---	11	---	nS
Q_{rr}	Reverse Recovery Charge		---	15	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, $t<10\text{sec}$.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 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

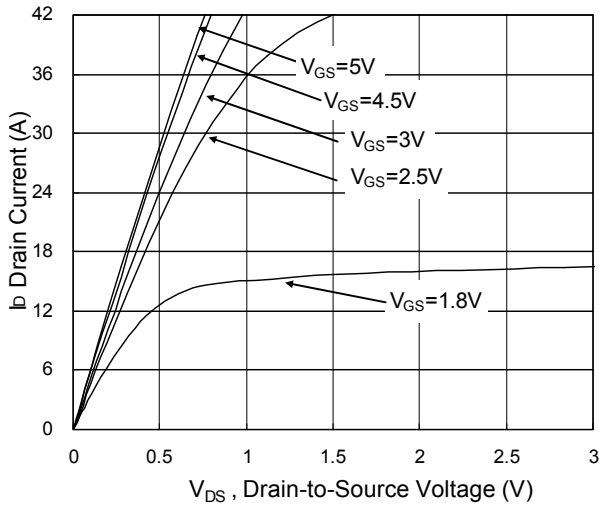


Fig.1 Typical Output Characteristics

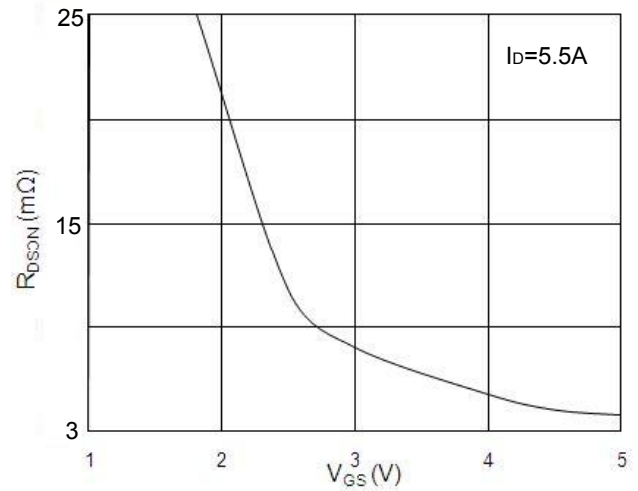


Fig.2 On-Resistance vs. Gate-Source

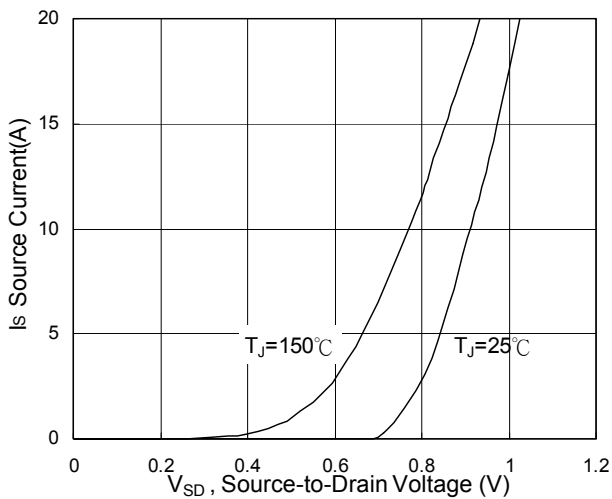


Fig.3 Forward Characteristics Of Reverse

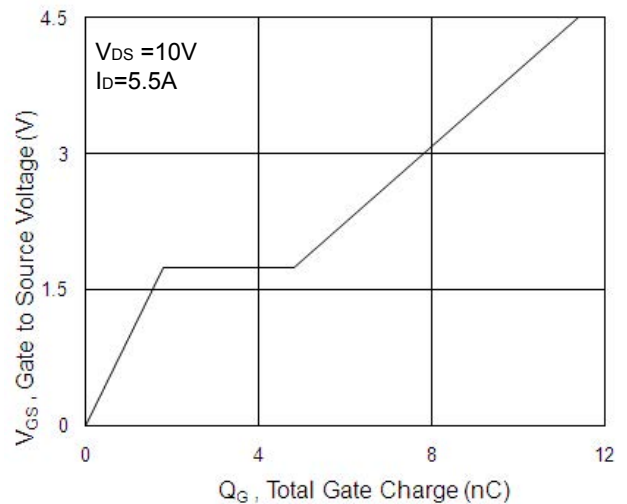


Fig.4 Gate-Charge Characteristics

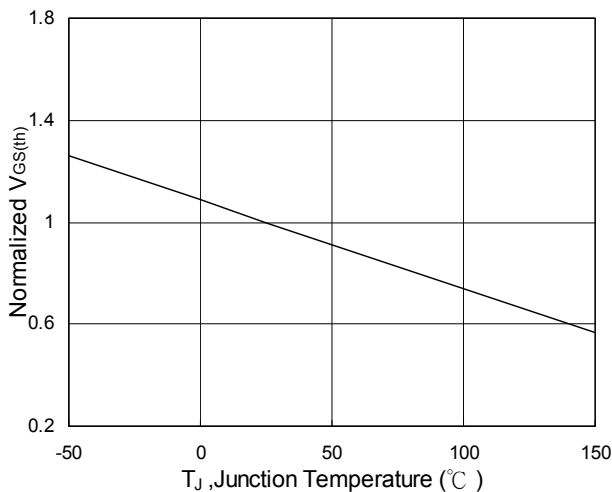


Fig.5 $V_{GS(th)}$ vs. T_J

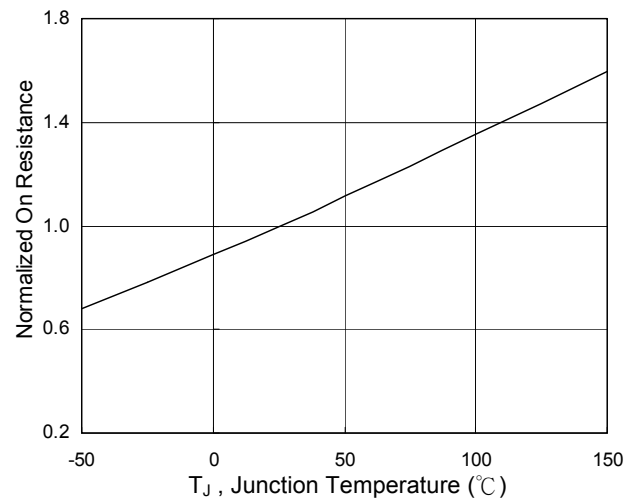
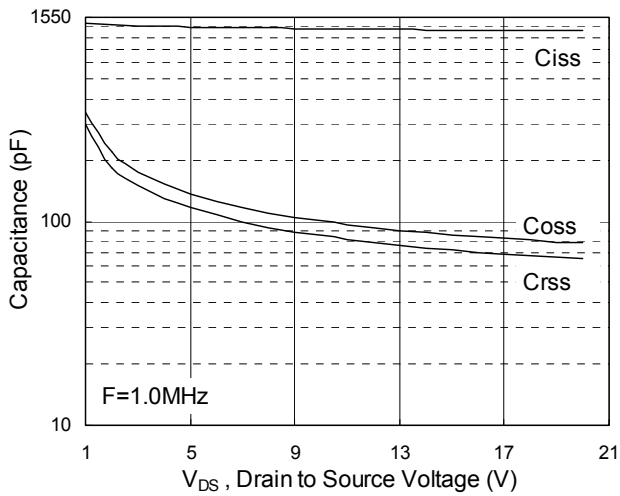
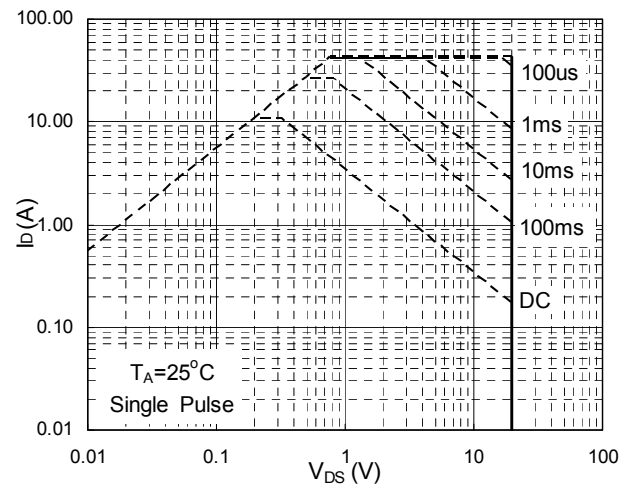
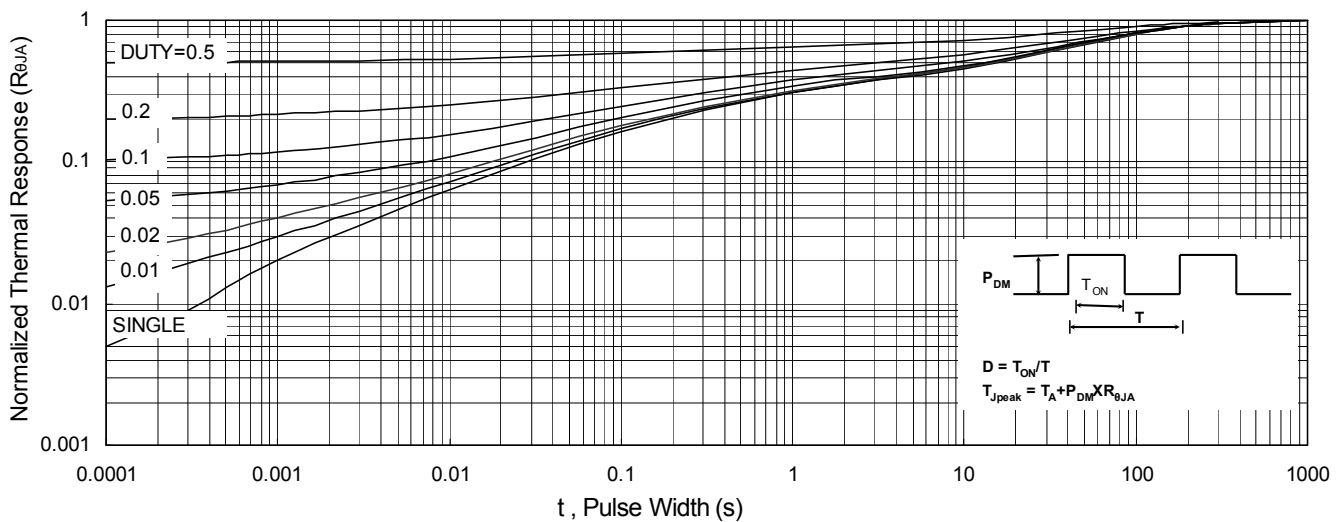
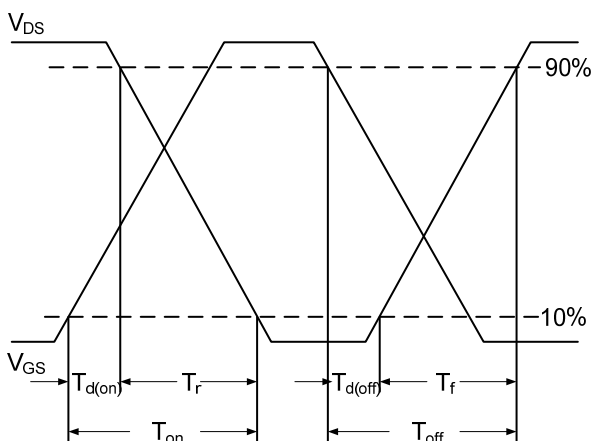
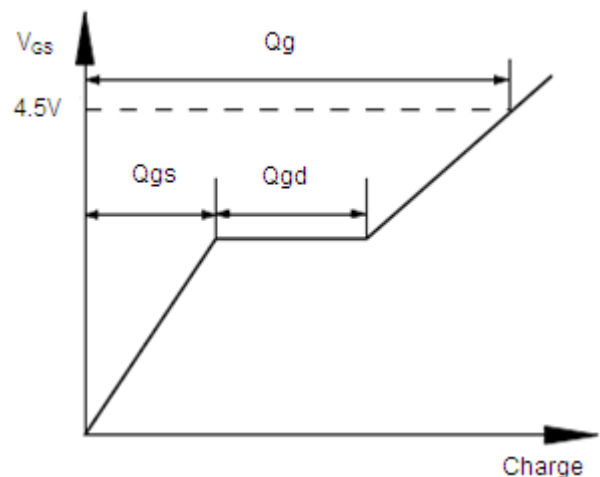
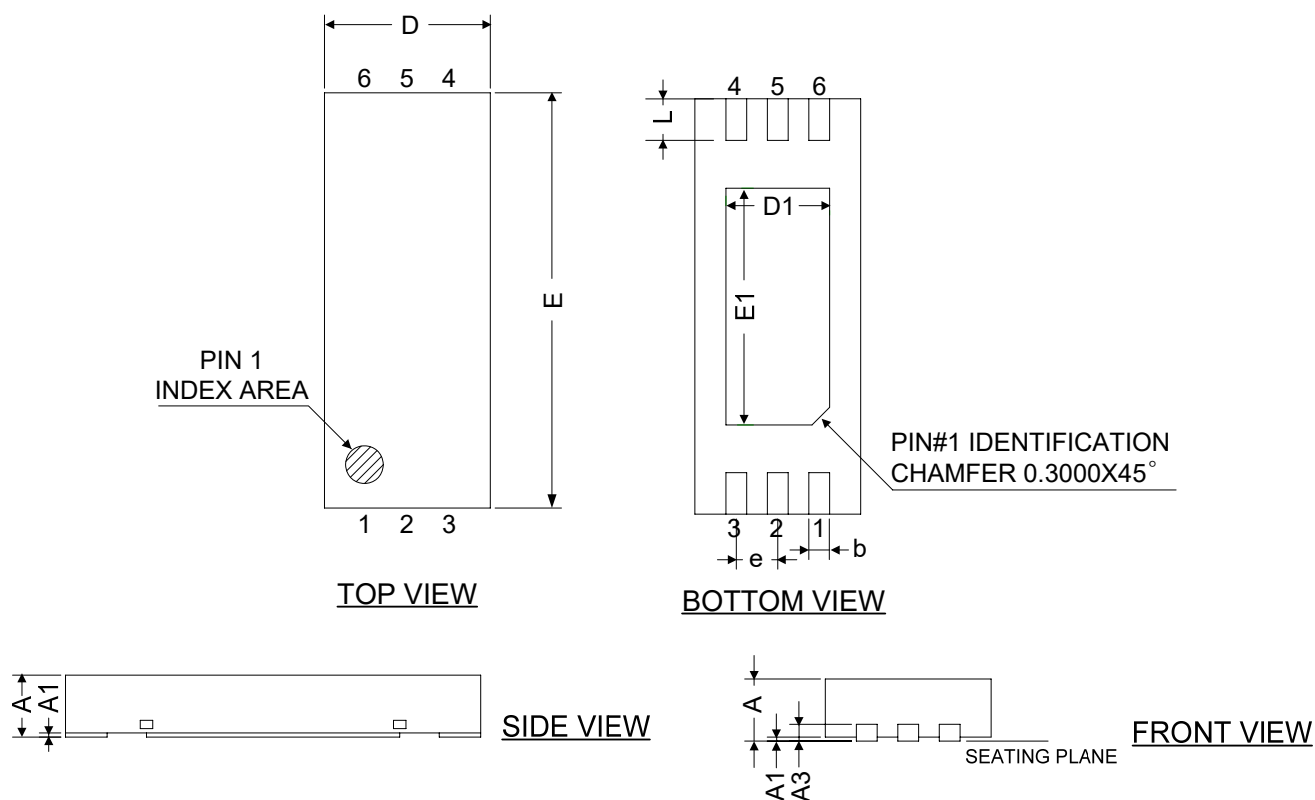


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics (Cont.)

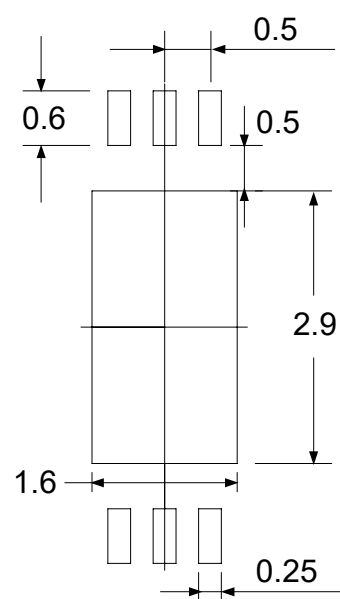

Fig.7 Capacitance

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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