30V N-Channel MOSFETs

PDB3910L

General Description

These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BVDSS	RDSON	ID
30V	13mΩ	10A

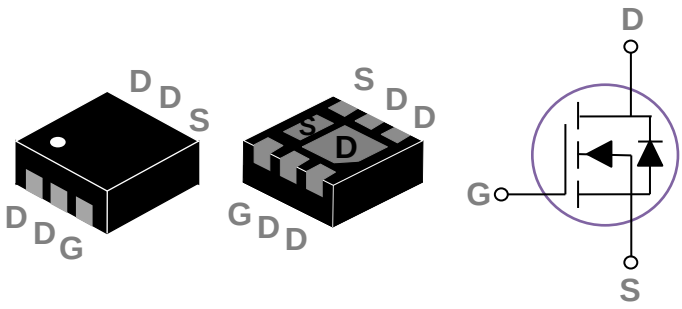
Features

- *30V,10A, RDS(ON) =13mΩ @VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

- *MB / VGA / Vcore*
- *POL Applications*
- *SMPS 2nd SR*

DFN2x2-6L 2EP Pin Configuration



Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_A=25℃)	10	A
	Drain Current – Continuous (T_A=70℃)	8	A
I_{DM}	Drain Current – Pulsed[1]	40	A
EAS	Single Pulse Avalanche Energy[2]	13	mJ
IAS	Single Pulse Avalanched Current[2]	16	A
P_D	Power Dissipation (T_A=25℃)	2.01	W
	Power Dissipation – Derate above 25℃	0.016	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	30	---	---	V
△BV_{DSS}/△T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.04	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V , V_{GS}=0V , T_J=25℃	---	---	1	μA
		V_{DS}=24V , V_{GS}=0V , T_J=125℃	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V_{GS}=10V , I_D=6A	---	10.2	13	mΩ
		V_{GS}=4.5V , I_D=4A	---	13.3	18	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250μA	1.2	1.8	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/℃

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=15V , V_{GS}=10V , I_D=5A	---	10.7	16	nC
Q_{gs}	Gate-Source Charge[3,4]		---	1.7	2.6	
Q_{gd}	Gate-Drain Charge[3,4]		---	2.5	5	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=15V , V_{GS}=10V , R_G=6Ω I_D=5A	---	3.8	6	ns
T_r	Rise Time[3,4]		---	10	15	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	22	33	
T_f	Fall Time[3,4]		---	6.6	10	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	---	750	1150	pF
C_{oss}	Output Capacitance		---	120	180	
C_{rss}	Reverse Transfer Capacitance		---	90	140	
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	2.8	---	Ω

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	V_{DD}=25V, L=0.1mH, I_{AS}=4A	0.8	---	---	mJ

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	10	A
I_{SM}	Pulsed Source Current[3]		---	---	20	A
V_{SD}	Diode Forward Voltage[3]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	V_R=30V, I_S=10A di/dt=100A/μs, T_J=25℃	---	120	---	ns
Q_{rr}	Reverse Recovery Charge		---	175	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=16A.,R_G=25Ω,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300μs , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

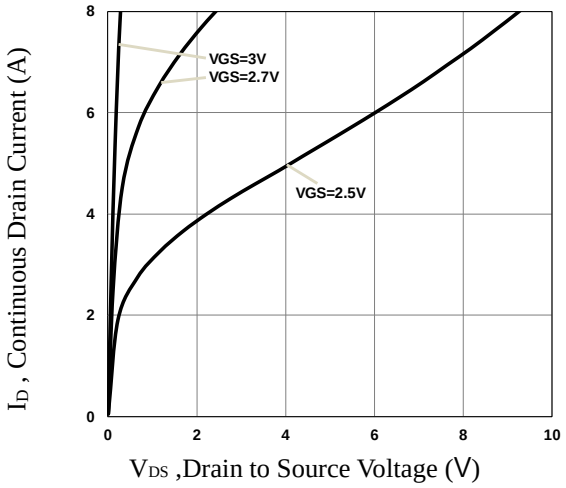


Fig.1 Typical Output Characteristics

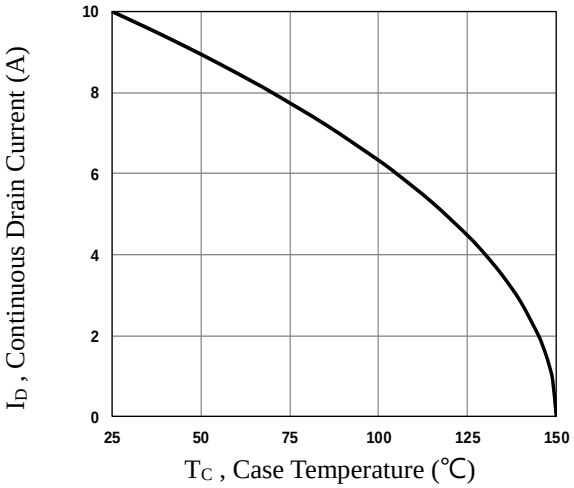


Fig.2 Continuous Drain Current vs. T_C

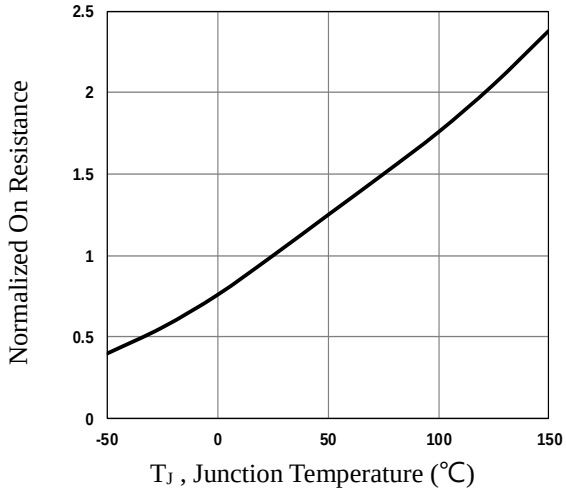


Fig.3 Normalized RDSON vs. T_J

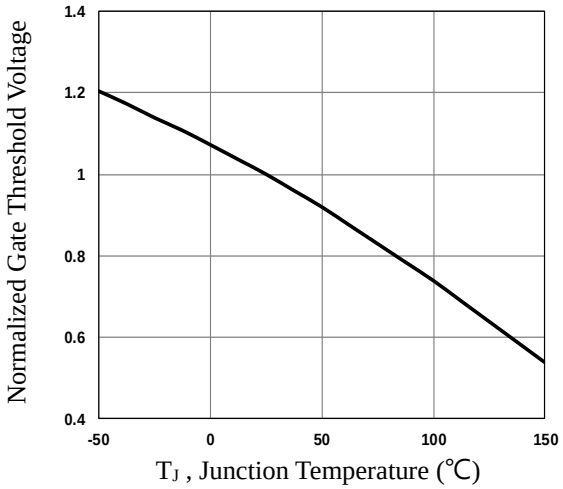


Fig.4 Normalized V_{th} vs. T_J

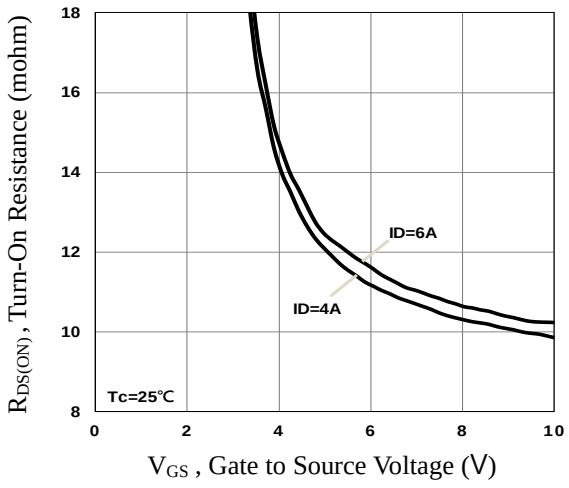


Fig.5 Turn-On Resistance vs. V_{GS}

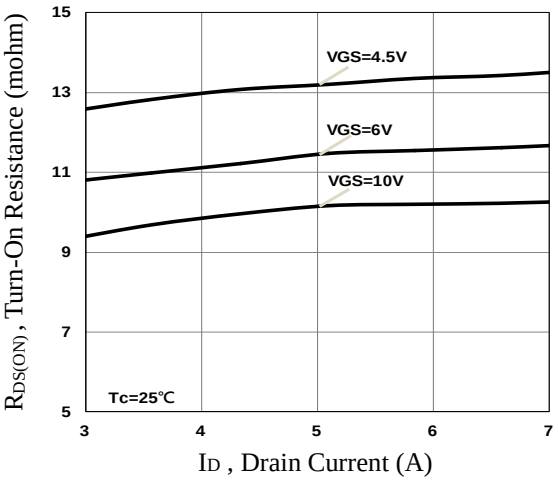


Fig.6 Turn-On Resistance vs. ID

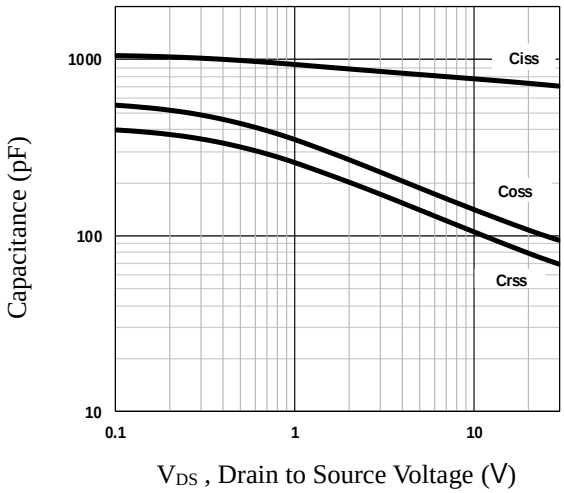


Fig.7 Capacitance Characteristics

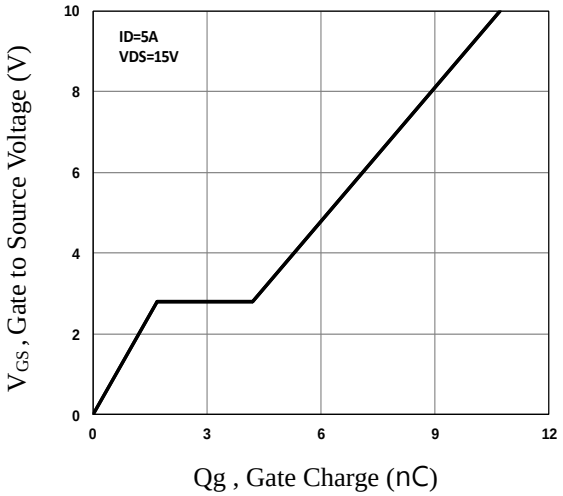


Fig.8 Gate Charge Characteristics

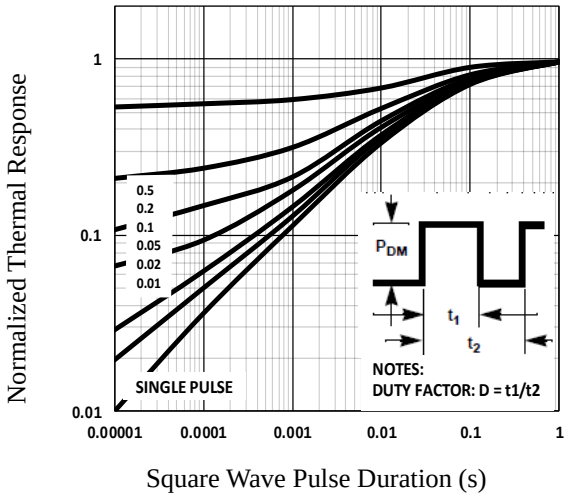


Fig.9 Normalized Transient Impedance

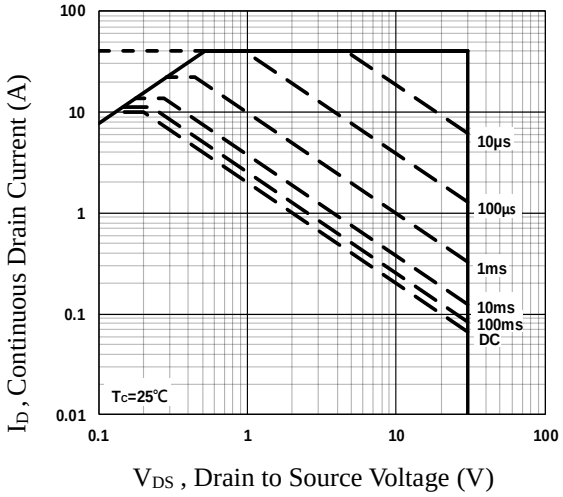


Fig.10 Maximum Safe Operation Area

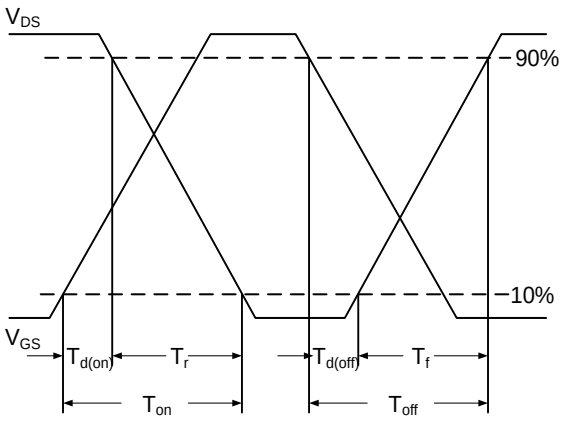


Fig.11 Switching Time Waveform

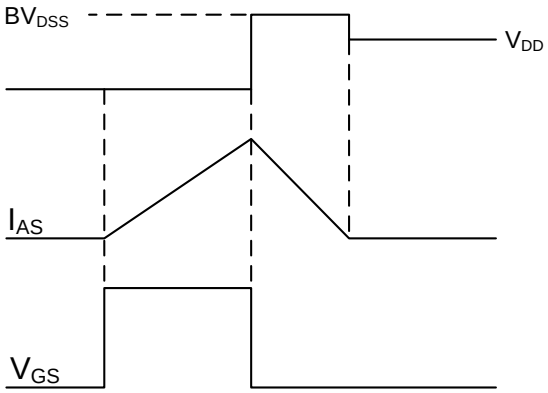
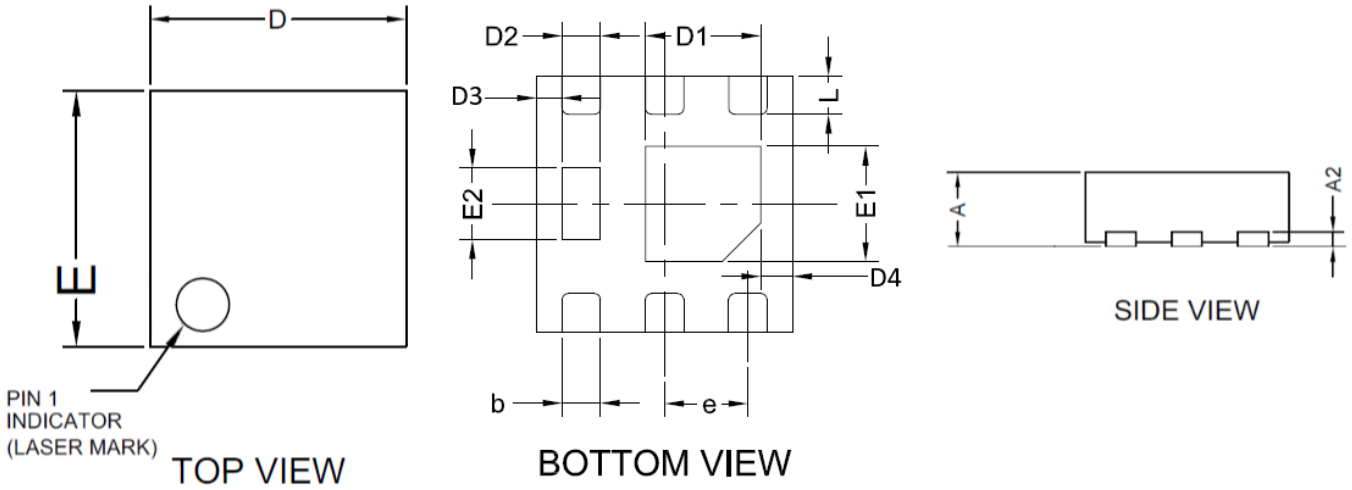


Fig.12 EAS Waveform

DFN2x2-6L 2EP PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.800	0.500	0.031	0.019
A2	0.250	0.145	0.010	0.006
b	0.350	0.250	0.014	0.010
D	2.100	1.900	0.083	0.075
D1	1.050	0.800	0.041	0.031
D2	0.430	0.250	0.017	0.010
D3	0.200BSC		0.008BSC	
D4	0.200BSC		0.008BSC	
E	2.100	1.900	0.083	0.075
E1	1.250	0.800	0.049	0.031
E2	0.750	0.460	0.029	0.018
e	0.650BSC		0.026BSC	
L	0.350	0.225	0.014	0.009

RECOMMENDED LAND PATTERN

DFN2X2-6L 2EP