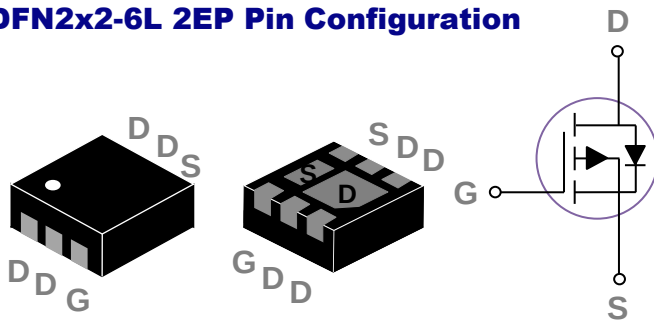


General Description

These P-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.

DFN2x2-6L 2EP Pin Configuration



BVDSS	RDS(on)	ID
-40V	48mΩ	-5A

Features

- -40V, -5A, $R_{DS(ON)} = 48m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

Applications

- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	-5	A
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	-3.2	A
I_{DM}	Drain Current – Pulsed ¹	-20	A
EAS	Single Pulse Avalanche Energy ²	31	mJ
IAS	Single Pulse Avalanche Current ²	25	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	2	W
	Power Dissipation – Derate above 25°C	16.1	mW/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

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

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-40	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	-0.03	---	$V/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-40V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-32V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$	---	---	-10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V$, $I_D=-2A$	---	40	48	$m\Omega$
		$V_{GS}=-4.5V$, $I_D=-1.5A$	---	60	78	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.2	-1.6	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4	---	$mV/^\circ\text{C}$
g_{fs}	Forward Transconductance	$V_{DS}=-10V$, $I_D=-3A$	---	5	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2, 3}	$V_{DS}=-20V$, $V_{GS}=-10V$, $I_D=-2A$	---	13	19	nC
Q_{gs}	Gate-Source Charge ^{2, 3}		---	1.5	2.3	
Q_{gd}	Gate-Drain Charge ^{2, 3}		---	3.1	4.6	
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}	$V_{DD}=-20V$, $V_{GS}=-10V$, $R_G=6\Omega$ $I_D=-2A$	---	6.3	10	ns
T_r	Rise Time ^{2, 3}		---	7.2	11	
$T_{d(off)}$	Turn-Off Delay Time ^{2, 3}		---	46	69	
T_f	Fall Time ^{2, 3}		---	14	21	
C_{iss}	Input Capacitance	$V_{DS}=-20V$, $V_{GS}=0V$, $F=1MHz$	---	825	1240	pF
C_{oss}	Output Capacitance		---	68	102	
C_{rss}	Reverse Transfer Capacitance		---	50	75	

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	---	---	-5	A
I_{SM}	Pulsed Source Current		---	---	-10	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ\text{C}$	---	---	-1	V
t_{rr}	Reverse Recovery Time	$V_R=-30V$, $I_S=-2A$	---	30	---	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	15	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=25A$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

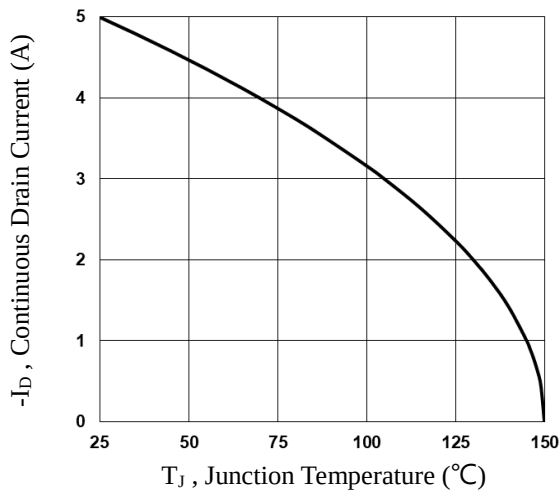


Fig.1 Continuous Drain Current vs. T_j

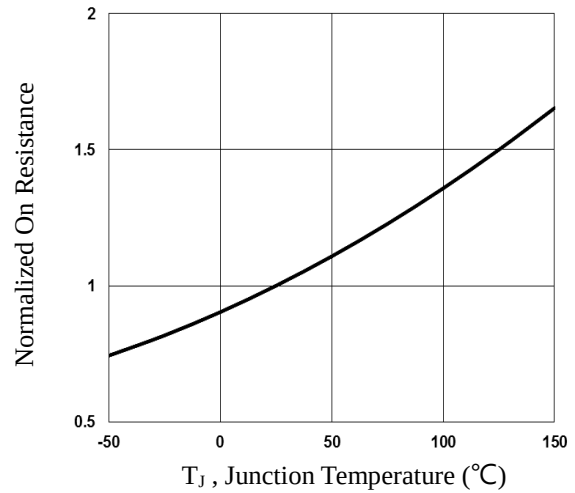


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

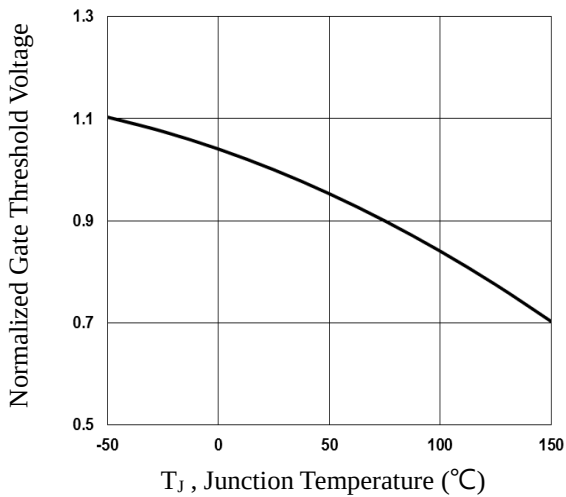


Fig.3 Normalized V_{th} vs. T_j

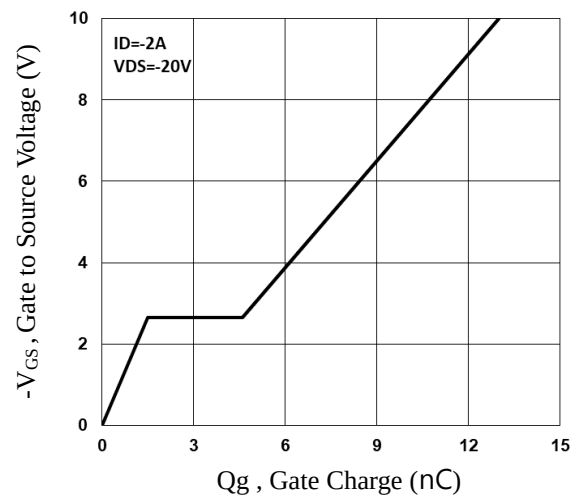


Fig.4 Gate Charge Waveform

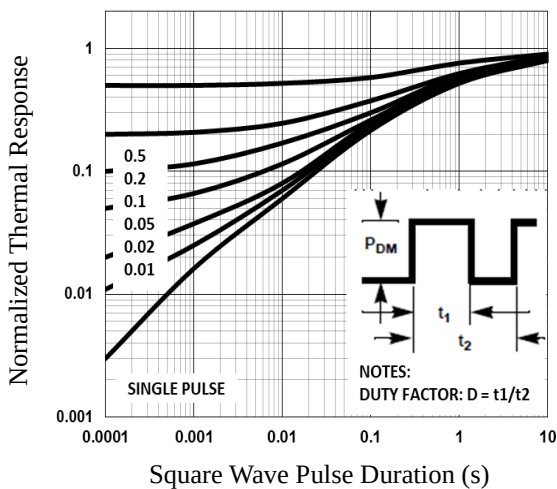


Fig.5 Normalized Transient Impedance

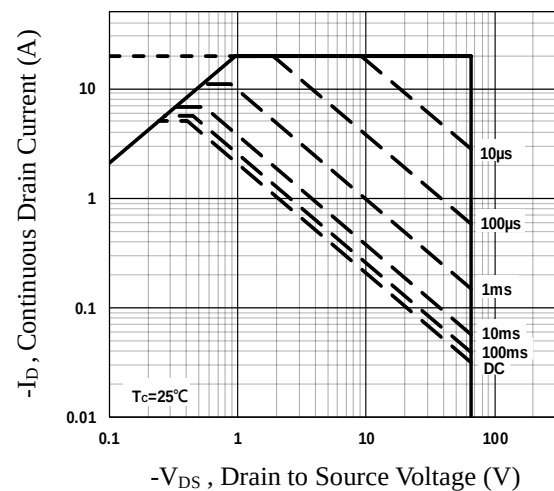


Fig.6 Maximum Safe Operation Area

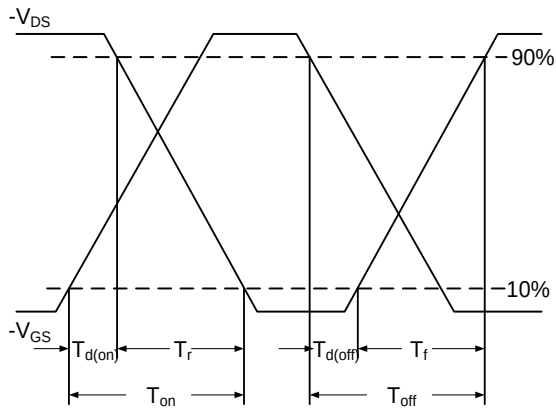


Fig.7 Switching Time Waveform

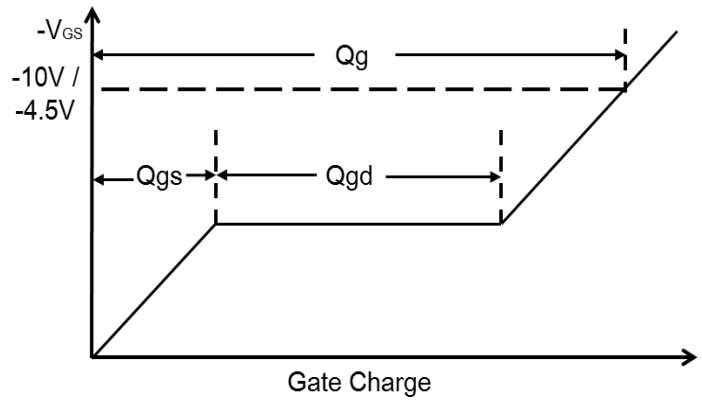
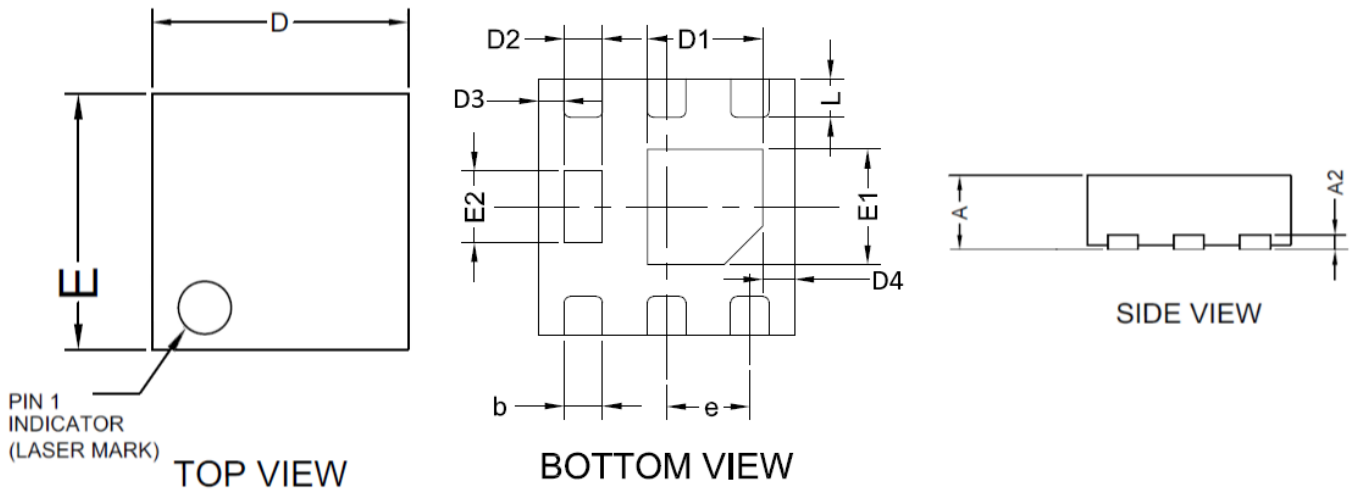


Fig.8 Gate Charge Waveform

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

