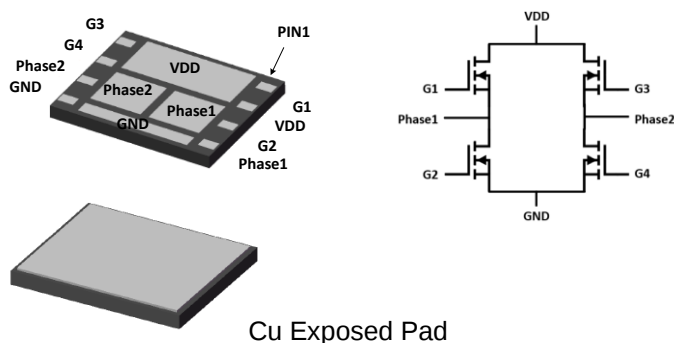


General Description

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.

DFN5X6 4 IN 1 Pin Configuration



Features

- 30V,35A, $R_{DS(ON)} = 10.2m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

Applications

- Full Bridge Applications

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ 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 ($T_c=25^\circ\text{C}$)	35	A
	Drain Current – Continuous ($T_c=100^\circ\text{C}$)	22	A
I_{DM}	Drain Current – Pulsed ¹	140	A
EAS	Single Pulse Avalanche Energy ²	13	mJ
IAS	Single Pulse Avalanched Current ²	16	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	21.5	W
	Power Dissipation – Derate above 25°C	0.17	W/ $^\circ\text{C}$
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	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	5.8	$^\circ\text{C}/\text{W}$

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	$V_{GS}=0V$, $I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.04	---	$V/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=30V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$	---	---	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 ³	$V_{GS}=10V$, $I_D=10A$	---	8.4	10.2	$m\Omega$
		$V_{GS}=4.5V$, $I_D=5A$	---	11.6	15	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	1.8	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	$mV/^\circ\text{C}$
g_{fs}	Forward Transconductance	$V_{DS}=10V$, $I_D=3A$	---	6.4	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{3, 4}	$V_{DS}=15V$, $V_{GS}=10V$, $I_D=5A$	---	16.5	33	nC
Q_{gs}	Gate-Source Charge ^{3, 4}		---	2.3	5	
Q_{gd}	Gate-Drain Charge ^{3, 4}		---	3	6	
$T_{d(on)}$	Turn-On Delay Time ^{3, 4}	$V_{DD}=15V$, $V_{GS}=10V$, $R_G=6\Omega$ $I_D=1A$	---	3.8	7	ns
T_r	Rise Time ^{3, 4}		---	10	19	
$T_{d(off)}$	Turn-Off Delay Time ^{3, 4}		---	22	42	
T_f	Fall Time ^{3, 4}		---	6.6	13	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $F=1MHz$	---	620	900	pF
C_{oss}	Output Capacitance		---	85	125	
C_{rss}	Reverse Transfer Capacitance		---	60	90	
R_g	Gate resistance	$V_{GS}=0V$, $V_{DS}=0V$, $f=1MHz$	---	2.8	5.6	Ω

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	---	---	35	A
I_{SM}	Pulsed Source Current ³		---	---	70	A
V_{SD}	Diode Forward Voltage ³	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V$, $I_S=10A$, $di/dt=100A/\mu s$	---	---	---	nS
Q_{rr}	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	---	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=16A$, $R_G=25\Omega$, 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.

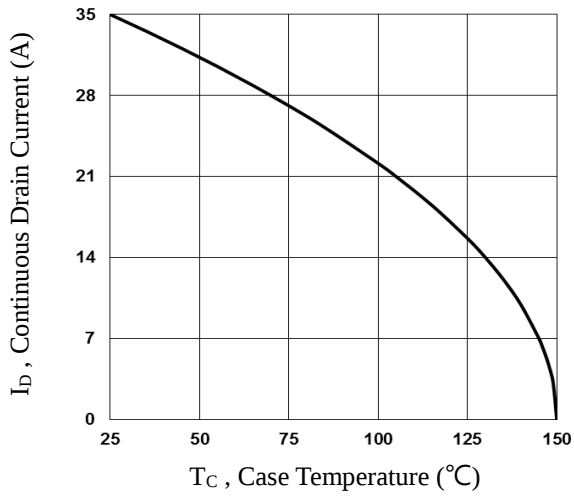


Fig.1 Continuous Drain Current vs. T_c

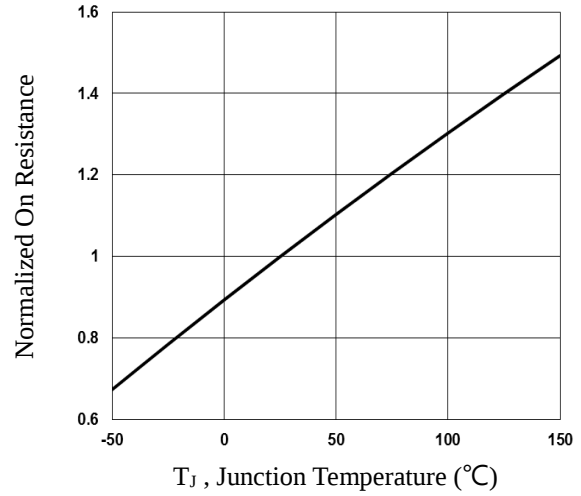


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

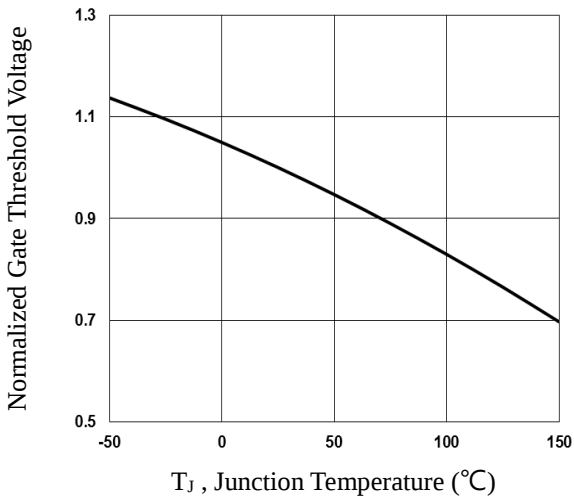


Fig.3 Normalized V_{th} vs. T_J

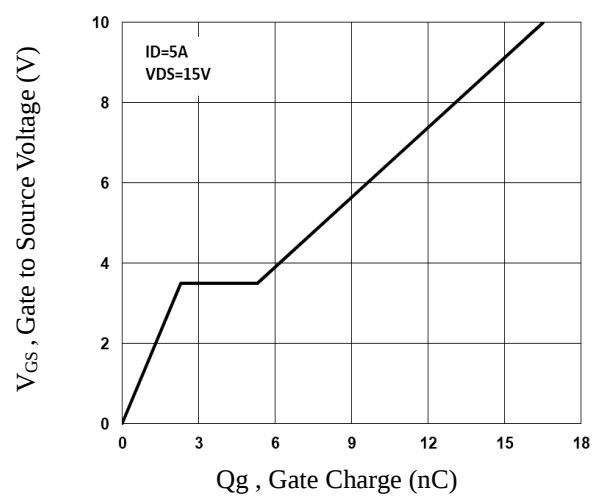


Fig.4 Gate Charge Waveform

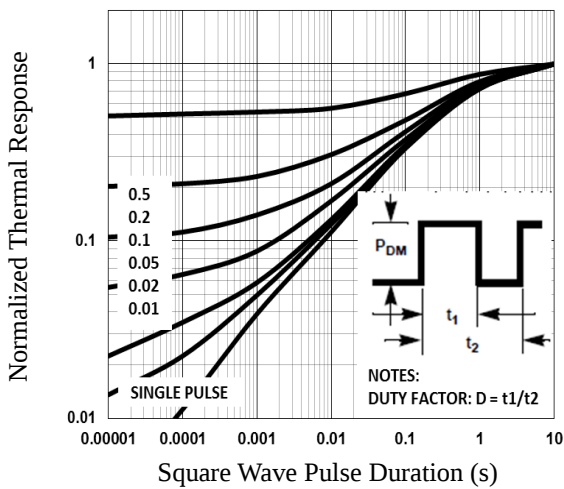


Fig.5 Normalized Transient Response

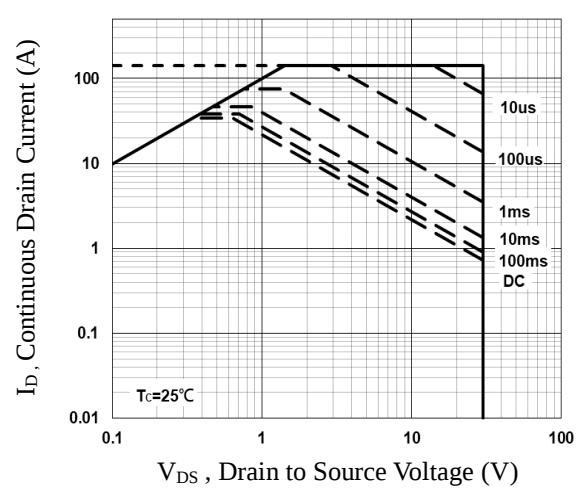


Fig.6 Maximum Safe Operation Area

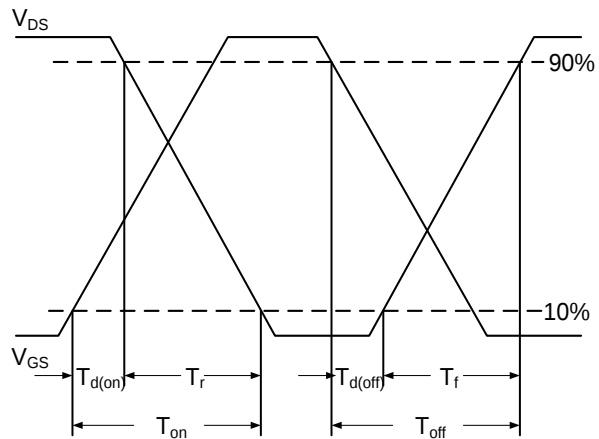


Fig.7 Switching Time Waveform

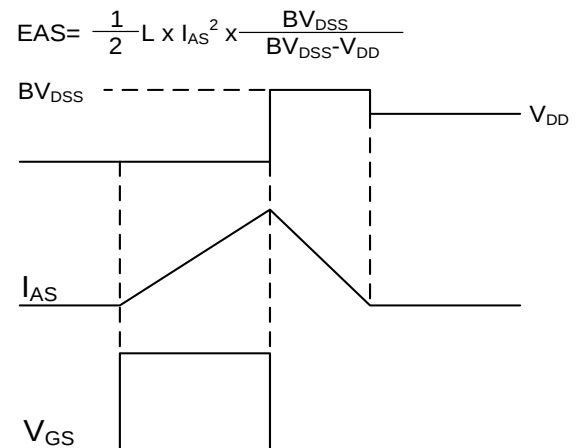
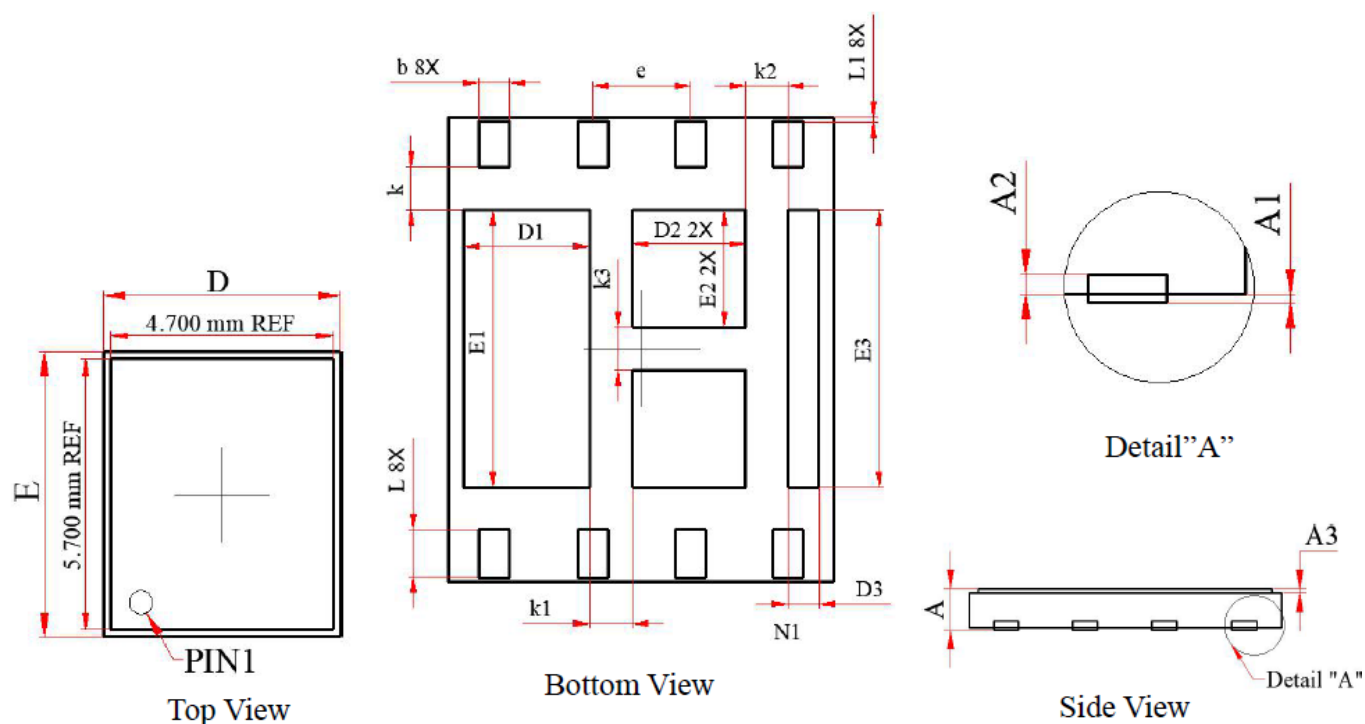


Fig.8 EAS Waveform

DFN5X6 4 IN 1 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	MIN	Normal	MAX		MIN	Normal	MAX
A	0.530	---	0.600	D3	0.300	0.400	0.500
A1	---	---	0.005	E3	3.500	3.600	3.700
A2	0.030	---	0.100	b	0.350	0.400	0.450
A3	0.050	---	0.100	L	0.550	0.600	0.650
D	4.900	5.000	5.100	L1	0.010	0.050	0.090
E	5.900	6.000	6.100	k	0.550 REF		
D1	1.525	1.625	1.725	k1	0.550 REF		
E1	3.500	3.600	3.700	k2	0.550 REF		
D2	1.375	1.475	1.575	k3	0.550 REF		
E2	1.425	1.525	1.625	e	1.27 BSC		

DFN5X6 4 IN 1 RECOMMENDED FOOTPRINT

