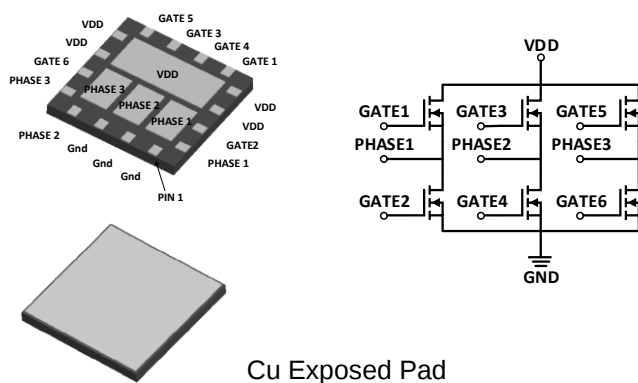


General Description

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.

DFN6X6 6 IN 1 Pin Configuration



BVDSS	RDS(ON)	ID
30V	8.5mΩ	42A

Features

- 30V,42A, $R_{DS(ON)} = 8.5m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

Applications

- 3-PHASE 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 ($T_c=25^\circ\text{C}$)	42	A
	Drain Current – Continuous ($T_c=100^\circ\text{C}$)	26.6	A
I_{DM}	Drain Current – Pulsed ¹	168	A
EAS	Single Pulse Avalanche Energy ²	45	mJ
IAS	Single Pulse Avalanche Current ²	30	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	24.7	W
	Power Dissipation – Derate above 25°C	0.20	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	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	5.06	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)
Static State 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
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(ON)}$	Static Drain-Source On-Resistance ³	$V_{GS}=10V, I_D=16A$	---	7	8.5	$m\Omega$
		$V_{GS}=4.5V, I_D=8A$	---	10	13	$m\Omega$
$V_{GS(th)}$	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	---	$mV/^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=10V, I_D=8A$	---	9.5	---	S

Dynamic Characteristics

Q_g	Total Gate Charge ^{3, 4}	$V_{DS}=15V, V_{GS}=10V, I_D=20A$	---	16.7	33	nC
Q_{gs}	Gate-Source Charge ^{3, 4}		---	4.5	8	
Q_{gd}	Gate-Drain Charge ^{3, 4}		---	1.3	2.6	
$T_{d(on)}$	Turn-On Delay Time ^{3, 4}	$V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega$ $I_D=15A$	---	4.8	9	ns
T_r	Rise Time ^{3, 4}		---	12.5	24	
$T_{d(off)}$	Turn-Off Delay Time ^{3, 4}		---	27.6	52	
T_f	Fall Time ^{3, 4}		---	8.2	16	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1MHz$	---	850	1700	pF
C_{oss}	Output Capacitance		---	133	260	
C_{rss}	Reverse Transfer Capacitance		---	78	160	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	2.7	5.4	Ω

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	$V_{DD}=25V, L=0.1mH, I_{AS}=15A$	12	---	---	mJ

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	42	A
I_{SM}	Pulsed Source Current ³		---	---	84	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	$V_{GS}=0V, I_S=10A, di/dt=100A/\mu s$	---	8.1	---	ns
Q_{rr}	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	1.6	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=30A, R_G=25\Omega$, 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.

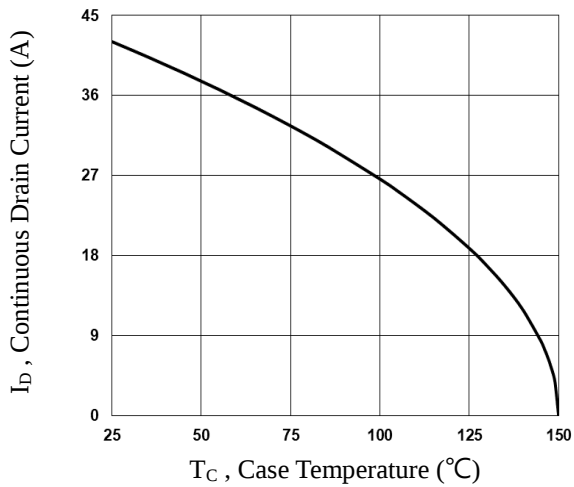


Fig.1 Continuous Drain Current vs. T_c

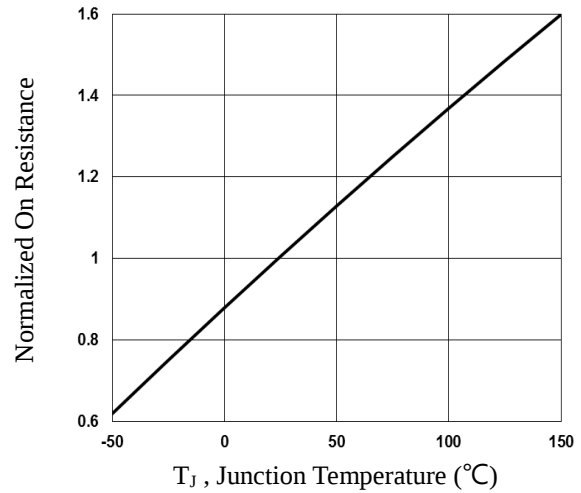


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

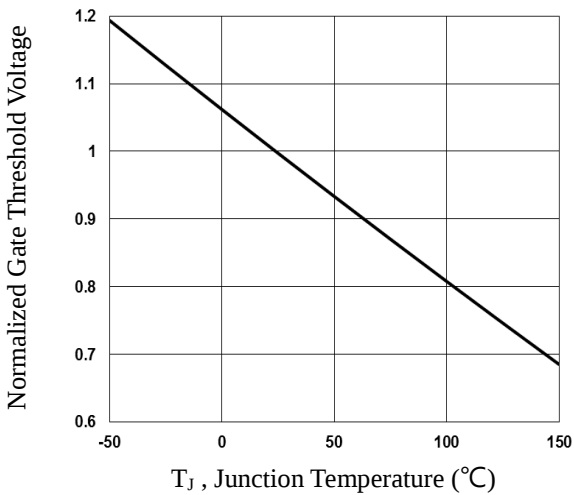


Fig.3 Normalized V_{th} vs. T_J

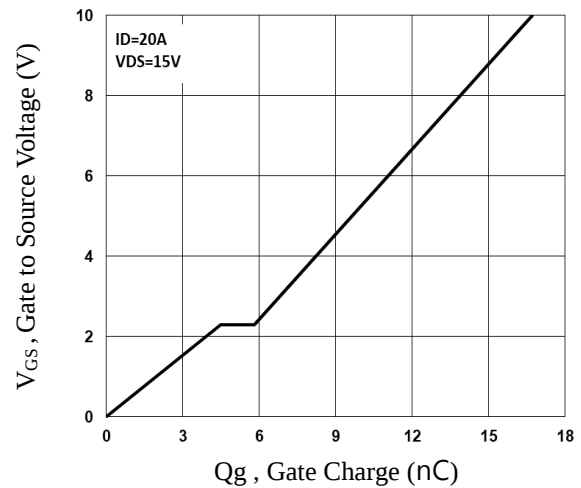


Fig.4 Gate Charge Waveform

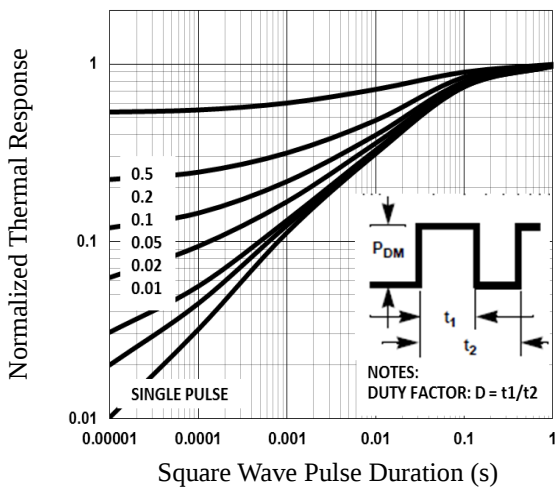


Fig.5 Normalized Transient Impedance

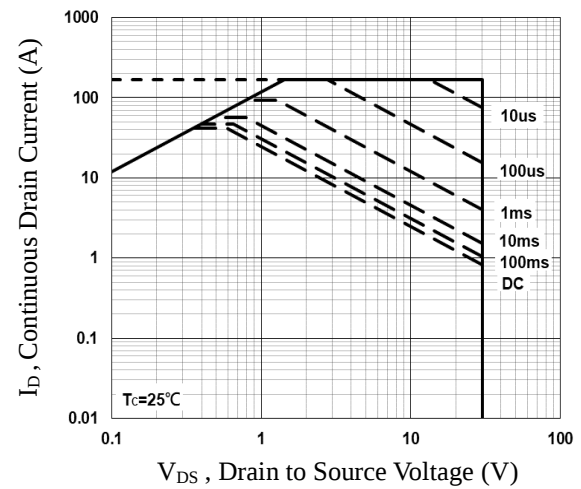


Fig.6 Maximum Safe Operation Area

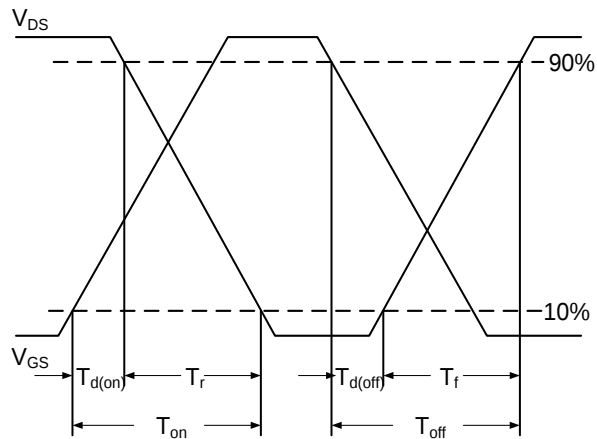


Fig.7 Switching Time Waveform

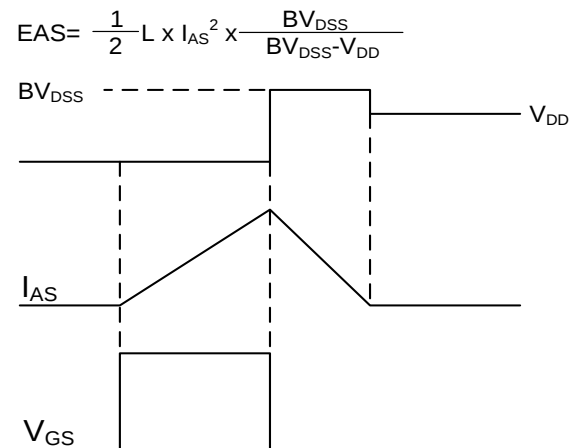
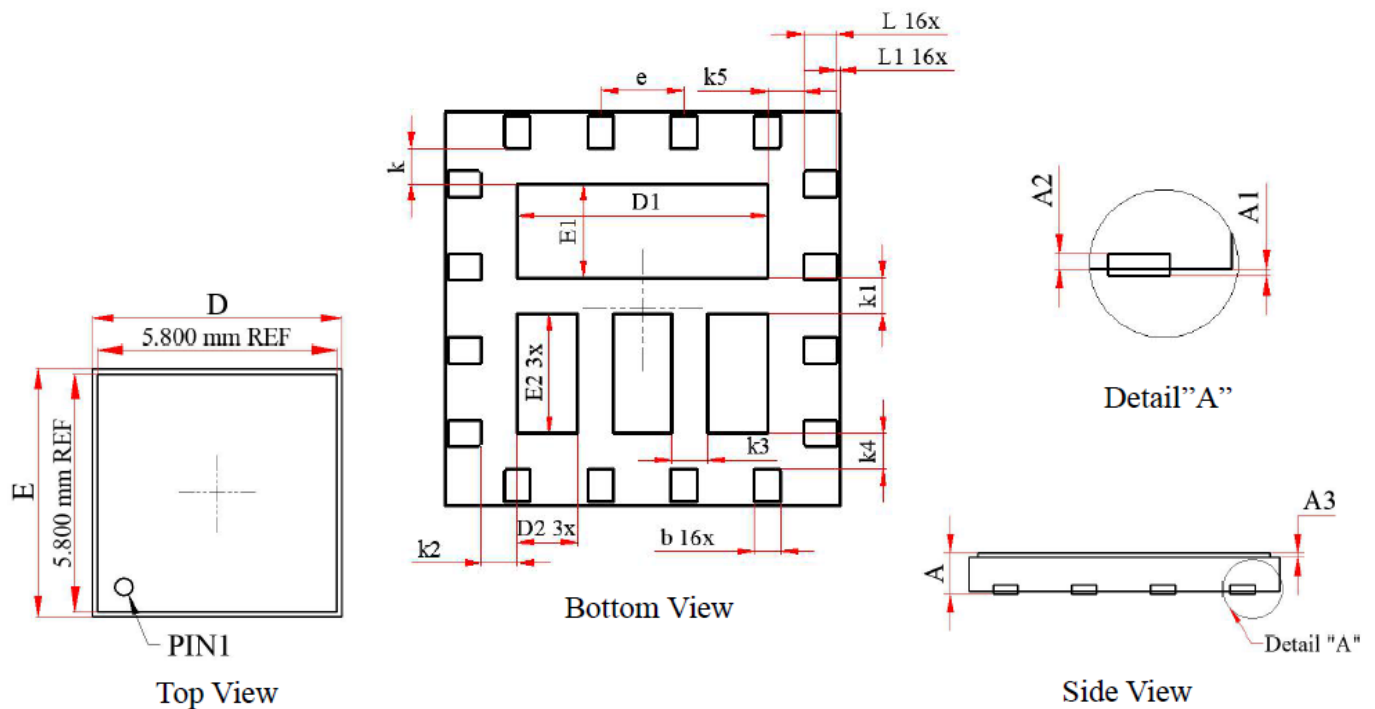


Fig.8 EAS Waveform

DFN6X6 6 IN 1 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	MIN	Normal	MAX		MIN	Normal	MAX
A	0.530	---	0.600	b	0.350	0.400	0.450
A1	---	---	0.005	L	0.450	0.500	0.550
A2	0.030	---	0.100	L1	0.010	0.050	0.090
A3	0.050	---	0.100	k	0.550 REF		
D	5.900	6.000	6.100	k1	0.550 REF		
E	5.900	6.000	6.100	k2	0.550 REF		
D1	3.700	3.800	3.900	k3	0.550 REF		
E1	1.325	1.425	1.525	k4	0.550 REF		
D2	0.800	0.900	1.000	k5	0.550 REF		
E2	1.725	1.825	1.925	e	1.27 BSC		

DFN6X6 6 IN 1 RECOMMENDED FOOTPRINT

