



**General Description**

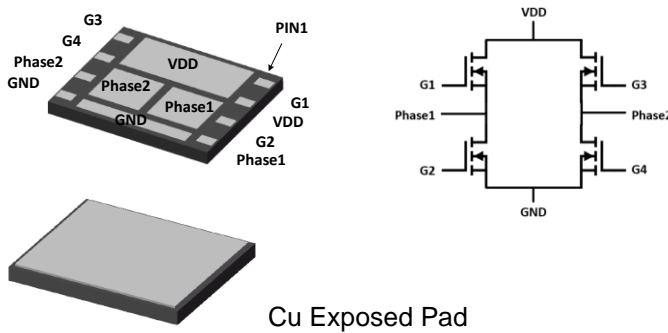
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
30V	8mΩ	45A

**Features**

- 30V,45A,  $R_{DS(ON)} = 8m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

**DFN5X6 4 IN 1 Pin Configuration**



**Applications**

- Full Bridge Applications

**Absolute Maximum Ratings**  $T_c=25^\circ C$  unless otherwise noted

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ C$ )	45	A
	Drain Current – Continuous ( $T_c=100^\circ C$ )	28.5	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	180	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	45	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	30	A
$P_D$	Power Dissipation ( $T_c=25^\circ C$ )	27.2	W
	Power Dissipation – Derate above $25^\circ C$	0.22	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	4.6	$^\circ C/W$

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)****Static State Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.04	---	V/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>3</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =16A	---	6.5	8	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A	---	9.5	12	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2	1.6	2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-4	---	mV/°C
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =8A	---	9.5	---	S

**Dynamic Characteristics**

Q <sub>g</sub>	Total Gate Charge <sup>3, 4</sup>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	16.7	33	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3, 4</sup>		---	4.5	8	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3, 4</sup>		---	1.3	2.6	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>3, 4</sup>	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω I <sub>D</sub> =15A	---	4.8	9	ns
T <sub>r</sub>	Rise Time <sup>3, 4</sup>		---	12.5	24	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>3, 4</sup>		---	27.6	52	
T <sub>f</sub>	Fall Time <sup>3, 4</sup>		---	8.2	16	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, F=1MHz	---	850	1700	pF
C <sub>oss</sub>	Output Capacitance		---	133	260	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	78	160	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	2.7	5.4	Ω

**Guaranteed Avalanche Energy**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	V <sub>DD</sub> =25V, L=0.1mH, I <sub>AS</sub> =15A	12	---	---	mJ

**Drain-Source Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	45	A
I <sub>SM</sub>	Pulsed Source Current <sup>3</sup>		---	---	90	A
V <sub>SD</sub>	Diode Forward Voltage <sup>3</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> =10A, di/dt=100A/μs	---	8.1	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25°C	---	1.6	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=30A, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

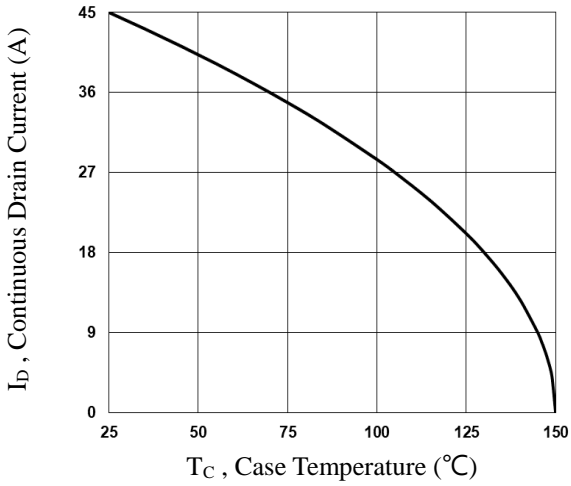


Fig.1 Continuous Drain Current vs.  $T_c$

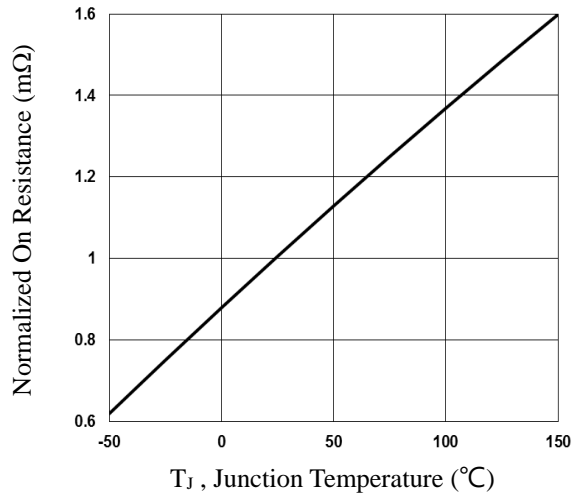


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$

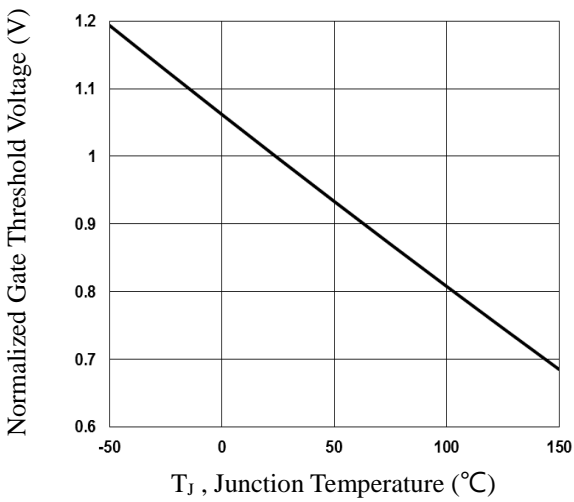


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

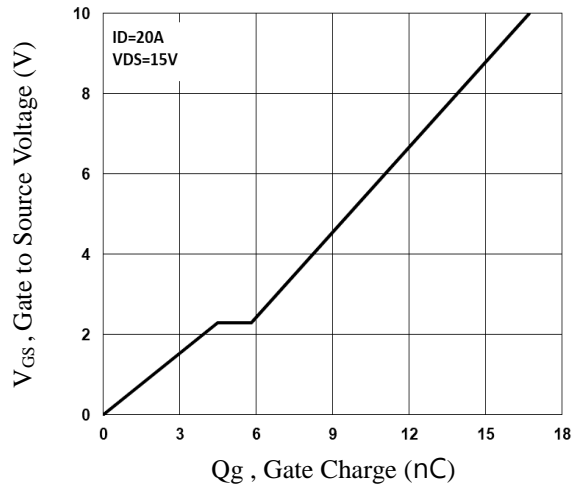


Fig.4 Gate Charge Waveform

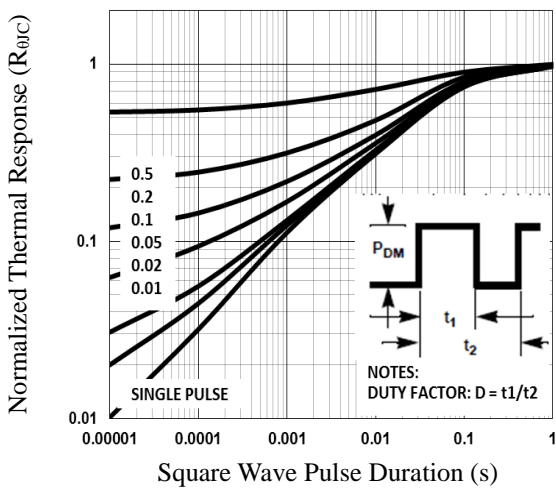


Fig.5 Normalized Transient Impedance

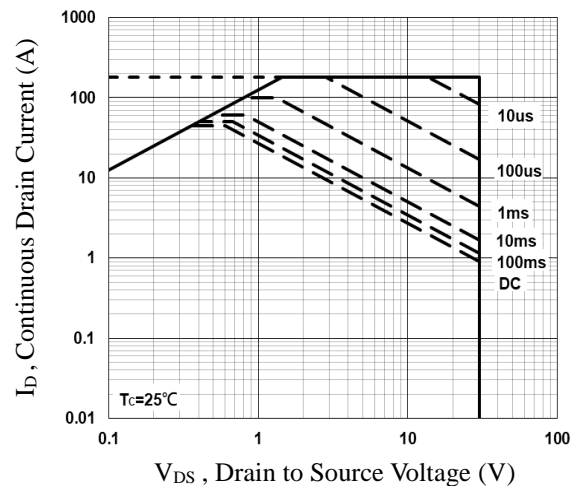
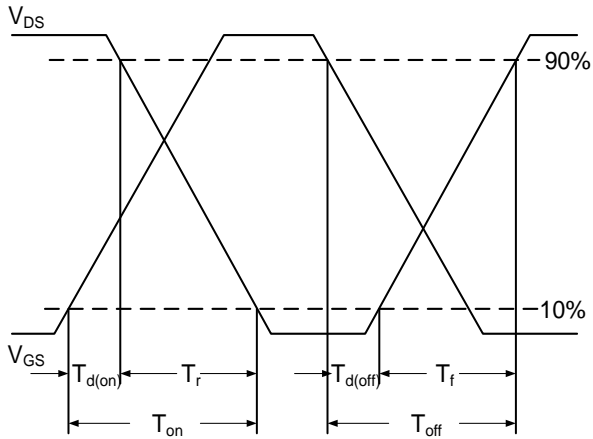
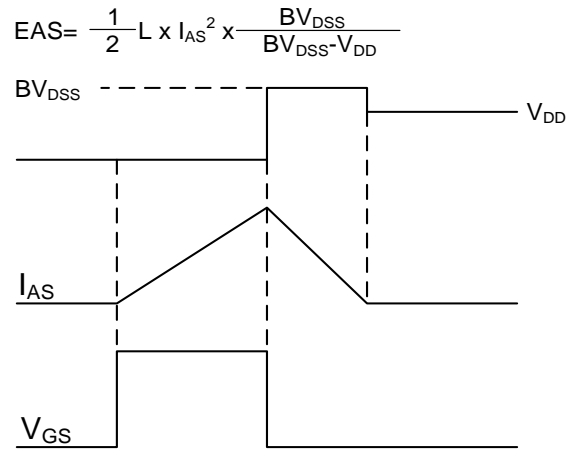


Fig.6 Maximum Safe Operation Area



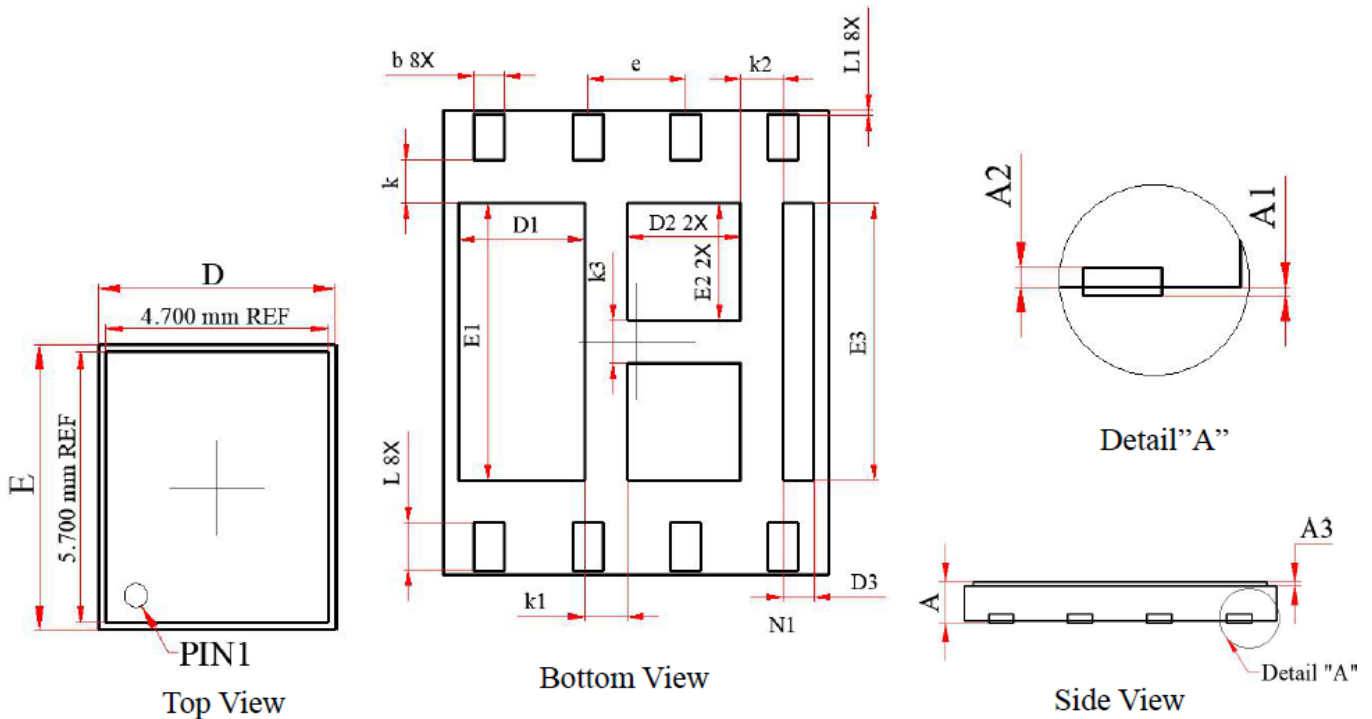
**Fig.7 Switching Time Waveform**



**Fig.8 EAS Waveform**



## 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

