

General Description

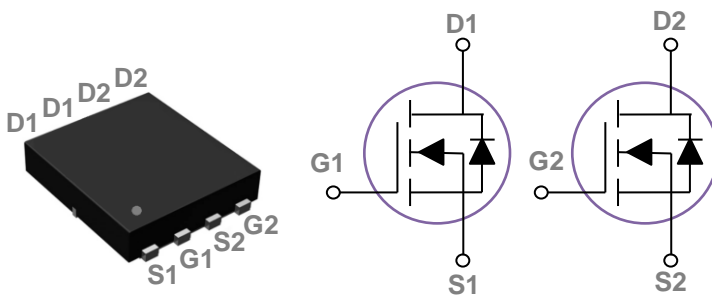
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
65V	13mΩ	45A

Features

- 65V,45A, RDS(ON) =13mΩ @VGS = 10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

PPAK5x6 Dual Pin Configuration



Applications

- Motor Drive
- Power Tools
- LED Lighting

Absolute Maximum Ratings Tc=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	65	V
V _{GS}	Gate-Source Voltage	+20/-12	V
I _D	Drain Current – Continuous (T _C =25°C)	45	A
	Drain Current – Continuous (T _C =100°C)	28.5	A
I _{DM}	Drain Current – Pulsed ¹	180	A
EAS	Single Pulse Avalanche Energy ²	20	mJ
IAS	Single Pulse Avalanched Current ²	20	A
P _D	Power Dissipation (T _C =25°C)	67	W
	Power Dissipation – Derate above 25°C	0.54	W/°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	---	62	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	1.86	°C/W

Electrical Characteristics (T_J=25 °C, unless otherwise noted)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	65	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.03	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =48V, V _{GS} =0V, T _J =85°C	---	---	10	uA
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 =20A	---	11	13	mΩ
		V _{GS} =4.5V, I _D =15A	---	18	23	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1	1.5	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5	---	mV/°C
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =3A	---	8	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{3, 4}	V _{DS} =30V, V _{GS} =10V, I _D =20A	---	17.6	26	nC
Q _{gs}	Gate-Source Charge ^{3, 4}		---	2.7	4.1	
Q _{gd}	Gate-Drain Charge ^{3, 4}		---	6.3	9.5	
T _{d(on)}	Turn-On Delay Time ^{3, 4}	V _{DD} =30V, V _{GS} =10V, R _G =3.3Ω I _D =1A	---	10	20	ns
T _r	Rise Time ^{3, 4}		---	13.5	27	
T _{d(off)}	Turn-Off Delay Time ^{3, 4}		---	28	56	
T _f	Fall Time ^{3, 4}		---	20	40	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, F=1MHz	---	945	1890	pF
C _{oss}	Output Capacitance		---	275	550	
C _{rss}	Reverse Transfer Capacitance		---	26	52	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	0.9	---	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	---	---	55	A
I _{SM}	Pulsed Source Current ³		---	---	110	A
V _{SD}	Diode Forward Voltage ³	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V
T _{rr}	Reverse Recovery Time	V _{GS} =10V, I _S =20A,	---	26	---	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs, T _J =25°C	---	30	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=48V, V_{GS}=10V, L=0.1mH, I_{AS}=20A., R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

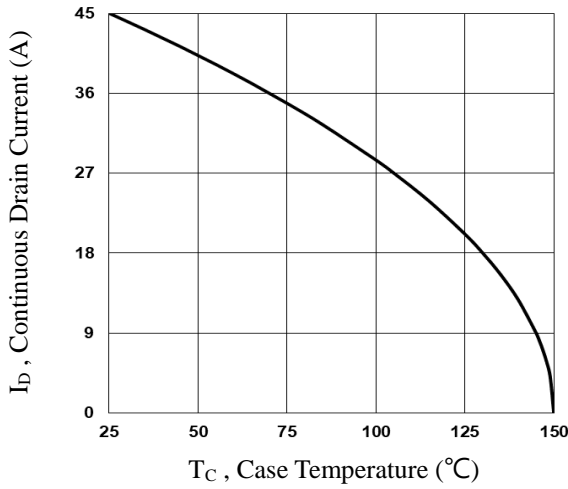


Fig.1 Continuous Drain Current vs. T_c

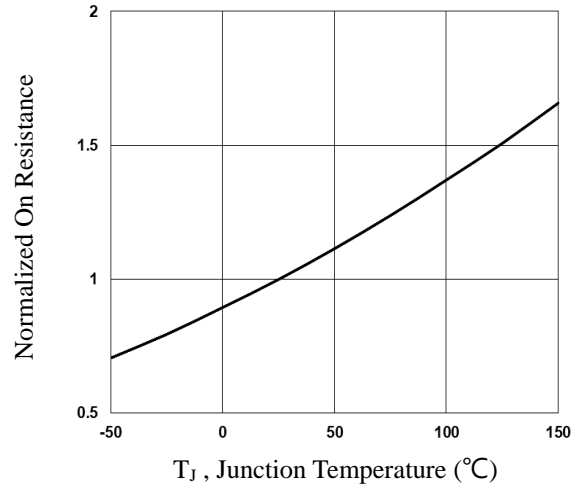


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

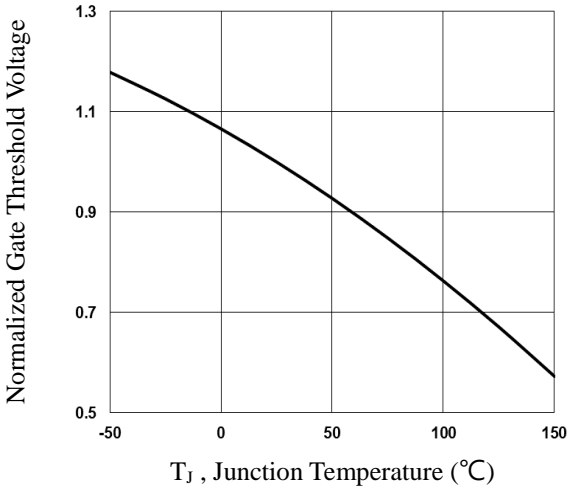


Fig.3 Normalized V_{th} vs. T_j

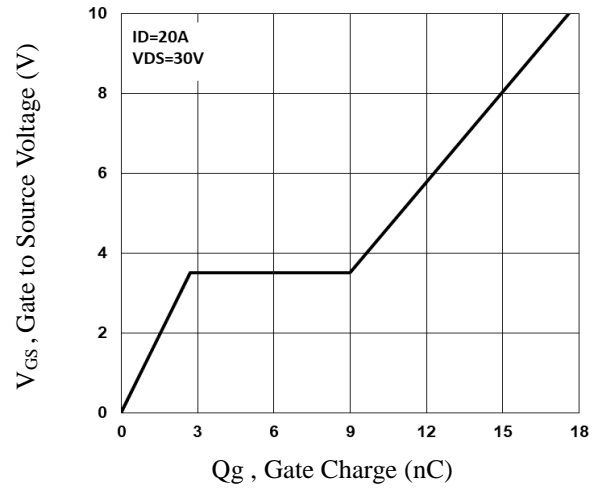


Fig.4 Gate Charge Waveform

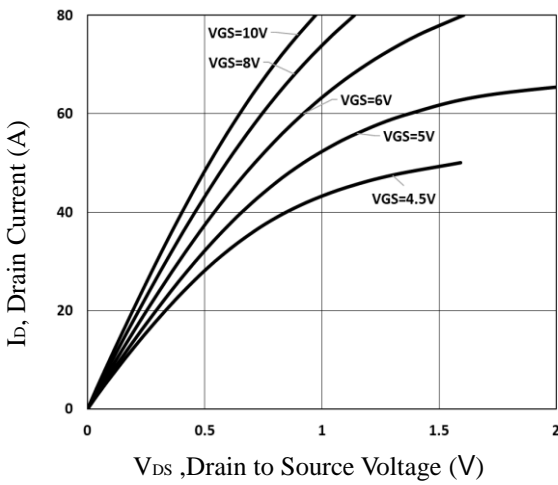


Fig.5 Typical Output Characteristics

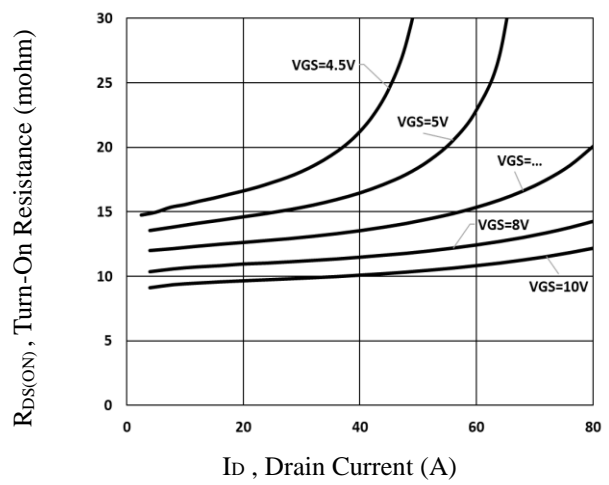


Fig.6 Turn-On Resistance vs. I_D

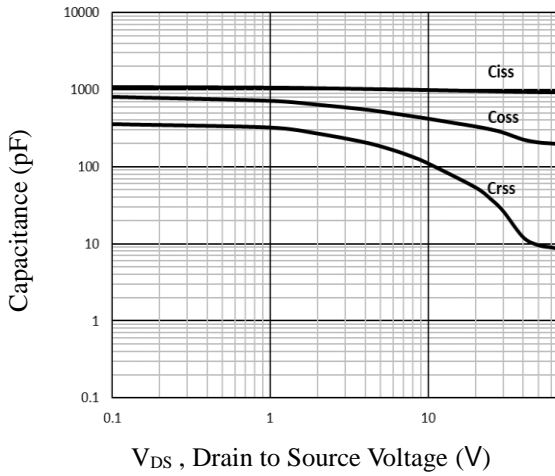


Fig.7 Capacitance Characteristics

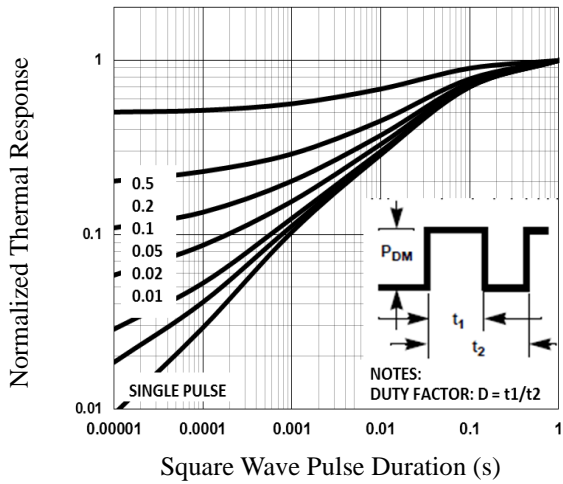


Fig.8 Normalized Transient Response

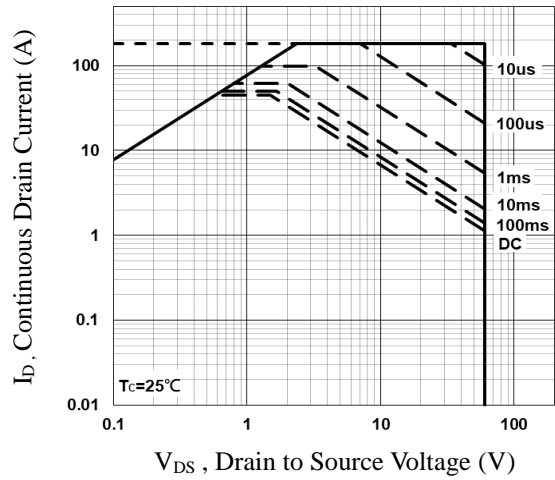


Fig.9 Maximum Safe Operation Area

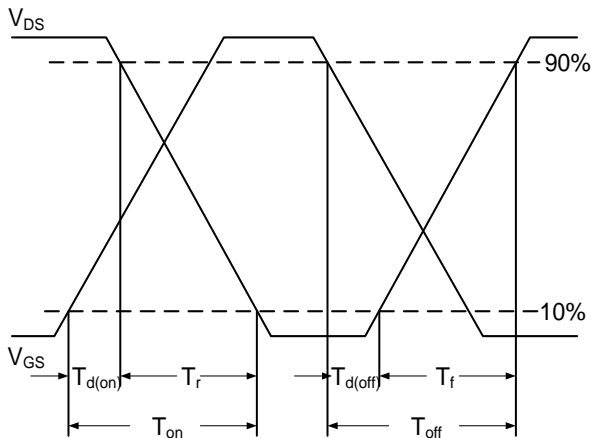


Fig.10 Switching Time Waveform

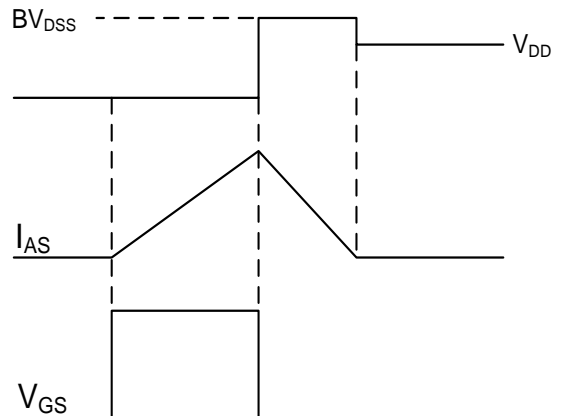
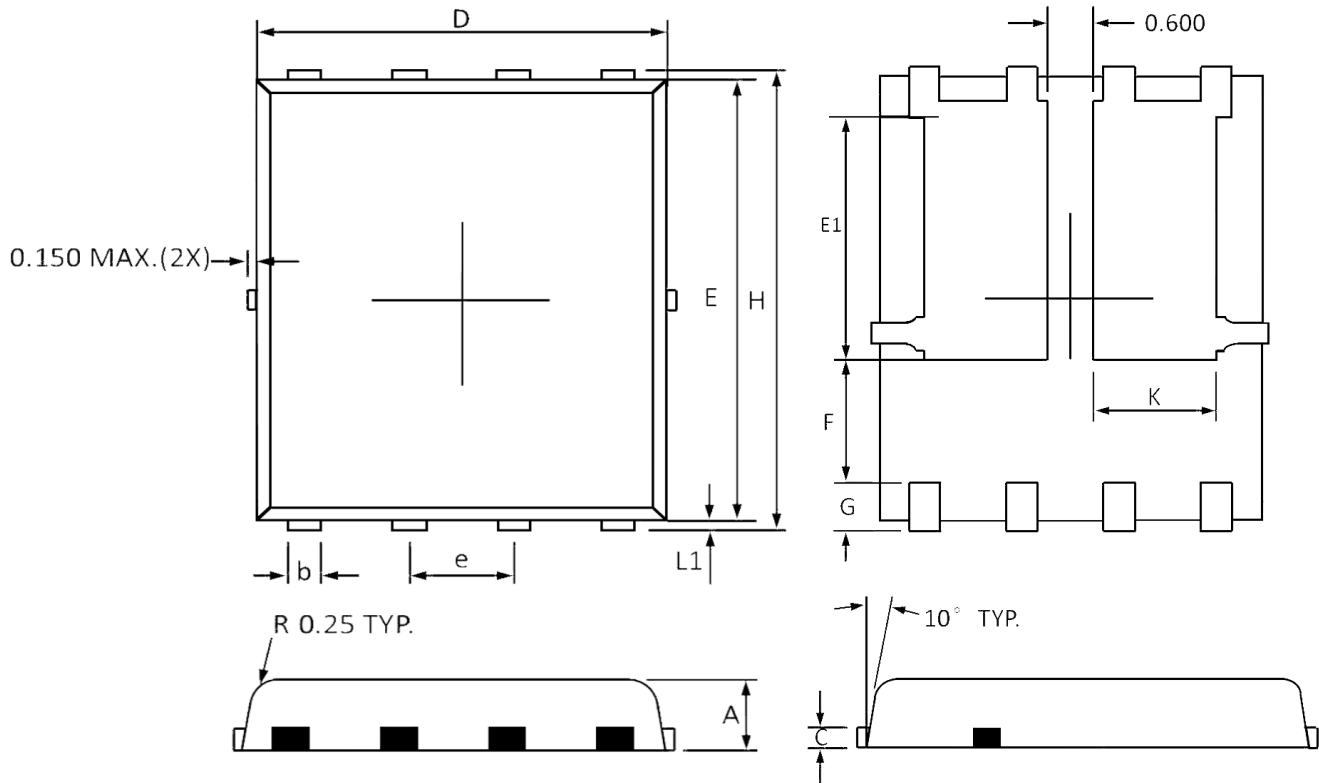


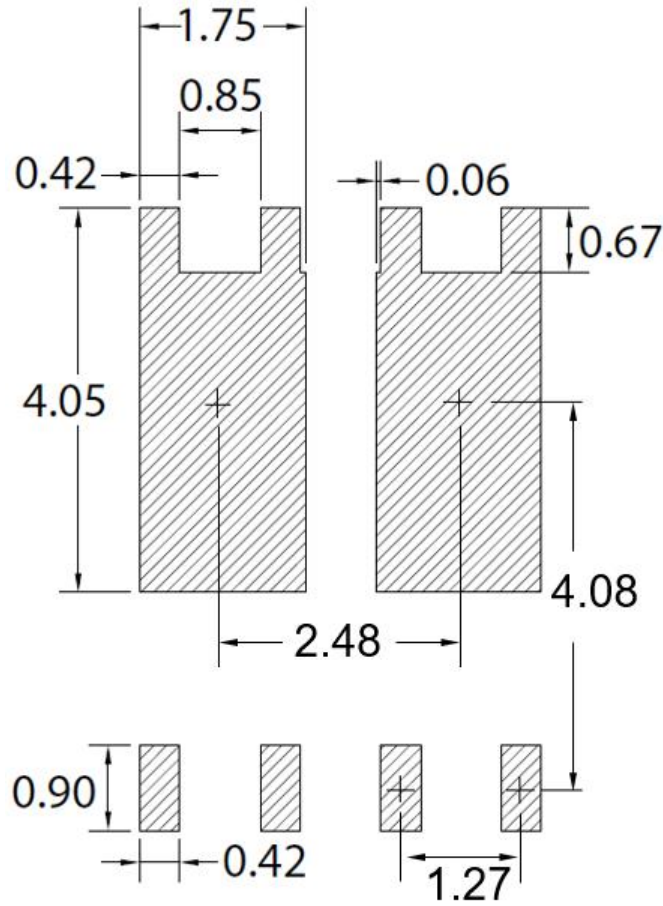
Fig.11 EAS Waveform

PPAK5x6 Dual PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.200	0.031	0.047
b	0.300	0.510	0.012	0.020
C	0.250 Ref		0.010 Ref	
D	4.800	5.400	0.189	0.213
E	5.450	5.960	0.215	0.235
E1	3.200	3.800	0.126	0.150
e	1.27 BSC		0.050 BSC	
F	1.000	1.900	0.039	0.075
G	0.380	0.800	0.015	0.031
H	5.850	6.300	0.230	0.248
L1	0.050	0.250	0.002	0.010
K	1.500	1.900	0.059	0.074

PPAK5X6 Dual RECOMMENDED LAND PATTERN



unit : mm