60V Dual N-Channel MOSFETs

PDC68C4T

General Description

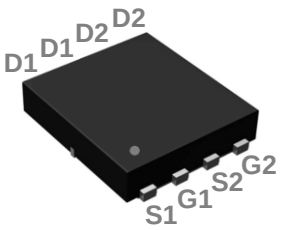
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

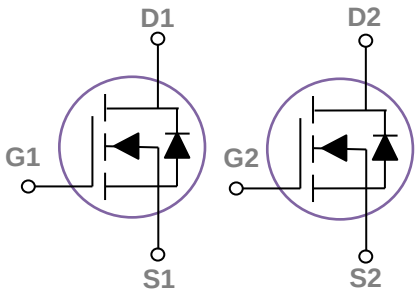
BVDSS	RDSON	ID
60V	105mΩ	8.5A

Features

- *60V,8.5A, RDS(ON) =105mΩ @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℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	8.5	A
	Drain Current – Continuous (T_C=100℃)	5.4	A
I_{DM}	Drain Current – Pulsed[1]	34	A
EAS	Single Pulse Avalanche Energy[2]	2	mJ
IAS	Single Pulse Avalanched Current[2]	6.4	A
P_D	Power Dissipation (T_C=25℃)	18	W
	Power Dissipation – Derate above 25℃	0.15	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	6.8	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	60	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=60V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=48V , V_{GS}=0V , T_J=125℃	---	---	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=2A	---	85	105	mΩ
		V_{GS}=4.5V , I_D=1.5A	---	100	130	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.7	2.5	V
gfs	Forward Transconductance	V_{DS}=10V , I_D=1A	---	2.7	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=30V , V_{GS}=10V , I_D=4A	---	4.3	6.5	nC
Q_{gs}	Gate-Source Charge[3,4]		---	0.4	3	
Q_{gd}	Gate-Drain Charge[3,4]		---	0.8	3	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=30V , V_{GS}=10V , R_G=6Ω , I_D=4A	---	1	2	ns
T_r	Rise Time[3,4]		---	2.5	4	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	3	5	
T_f	Fall Time[3,4]		---	4	6	
C_{iss}	Input Capacitance	V_{DS}=30V , V_{GS}=0V , F=1MHz	---	205	310	pF
C_{oss}	Output Capacitance		---	20	30	
C_{rss}	Reverse Transfer Capacitance		---	12	20	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	5.3	---	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	---	---	8.5	A
I_{SM}	Pulsed Source Current[3]		---	---	17	A
V_{SD}	Diode Forward Voltage[3]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
T_{rr}	Reverse Recovery Time	V_R=50V, I_S=4A , di/dt=100A/μs, T_J=25℃	---	15	---	ns
Q_{rr}	Reverse Recovery Charge		---	10	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=30V,V_{GS}=10V,L=0.1mH,I_{AS}=6.4A.,R_G=25Ω,Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

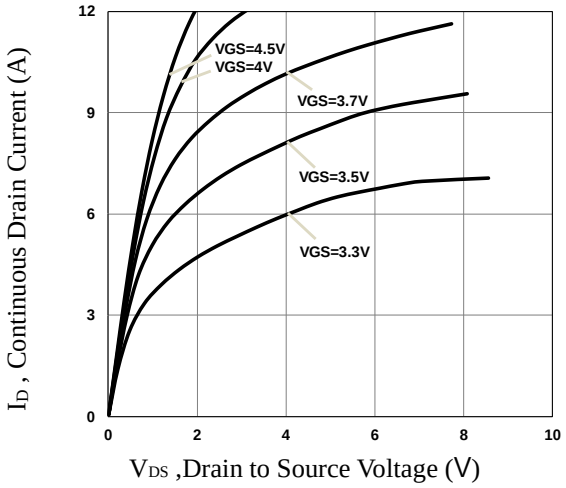


Fig.1 Typical Output Characteristics

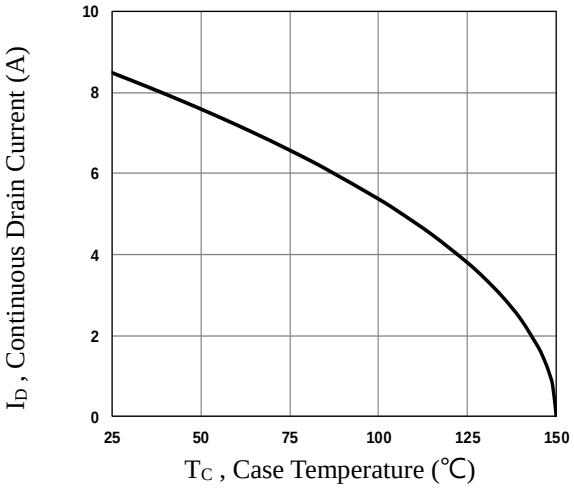


Fig.2 Continuous Drain Current vs. T_C

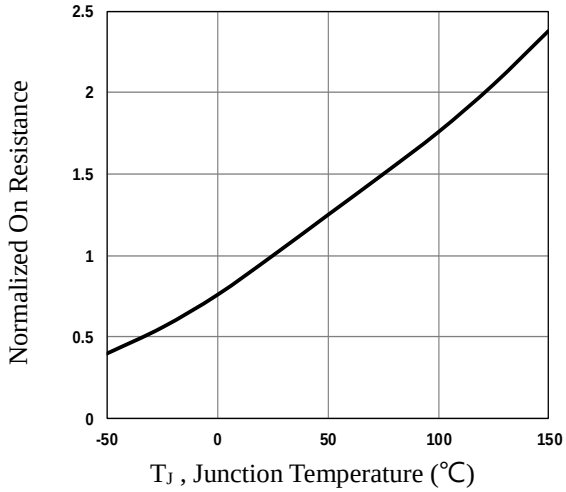


Fig.3 Normalized RDSON vs. T_J

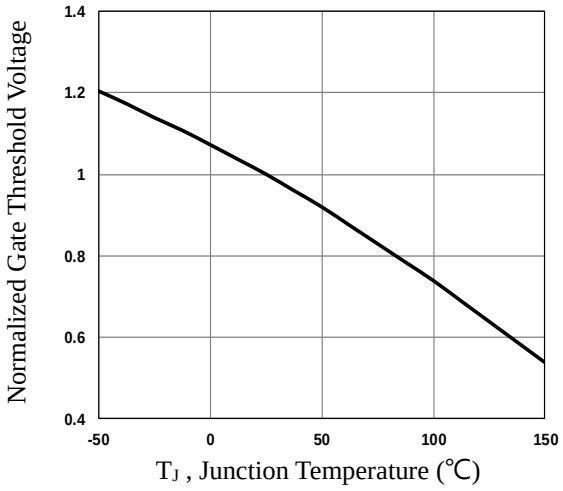


Fig.4 Normalized V_{th} vs. T_J

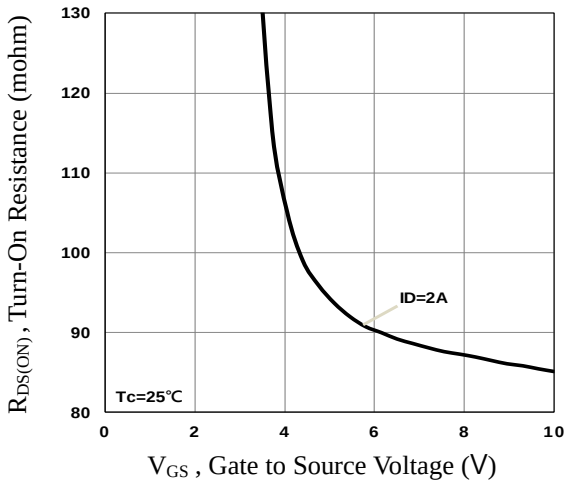


Fig.5 Turn-On Resistance vs. V_{GS}

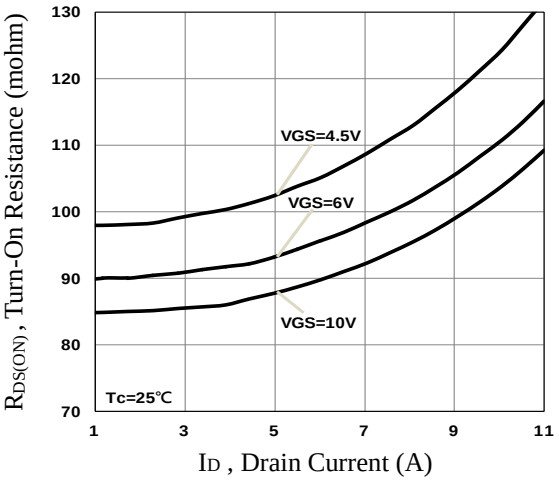


Fig.6 Turn-On Resistance vs. ID

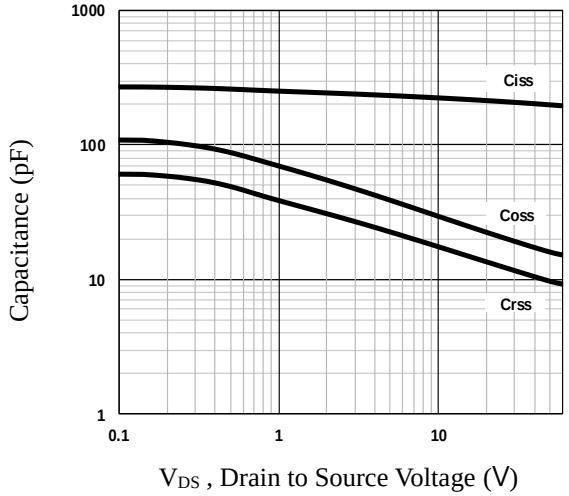


Fig.7 Capacitance Characteristics

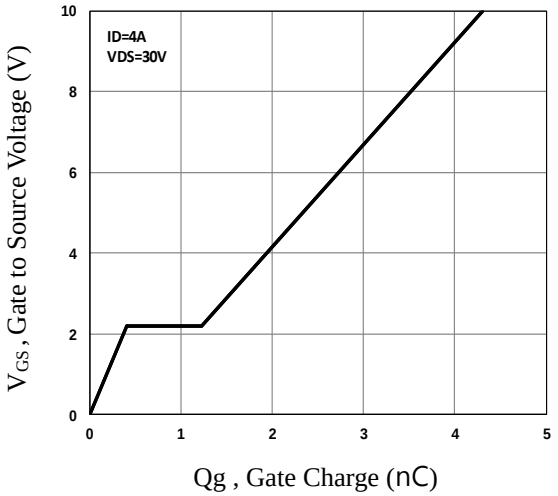


Fig.8 Gate Charge Characteristics

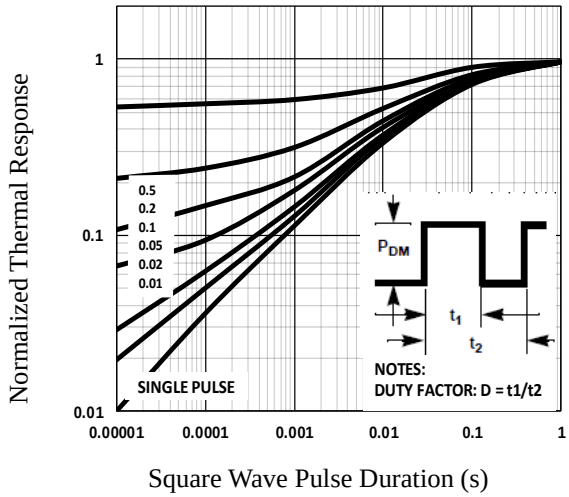


Fig.9 Normalized Transient Impedance

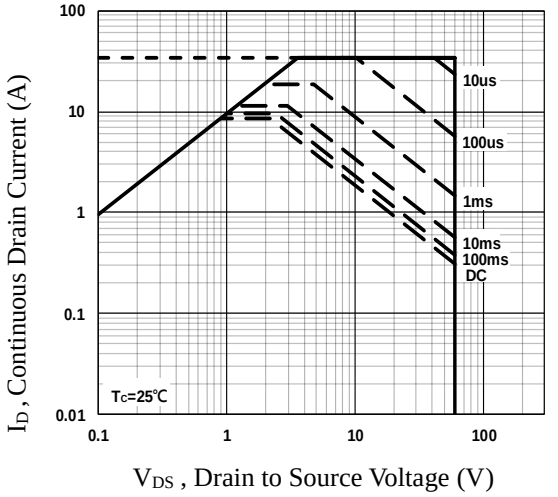


Fig.10 Maximum Safe Operation Area

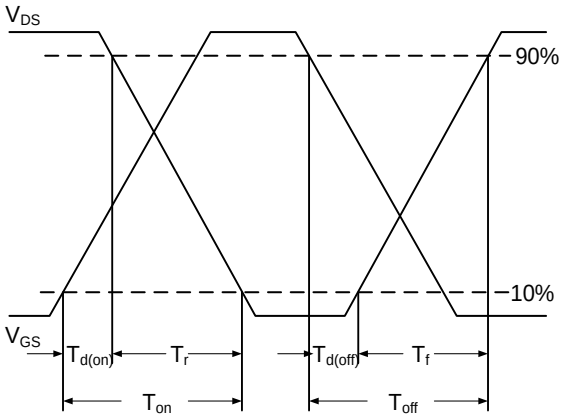


Fig.11 Switching Time Waveform

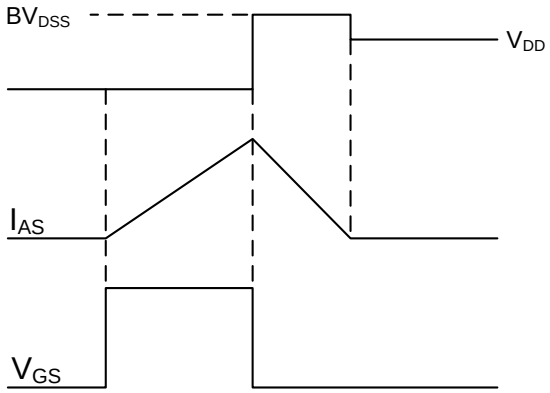
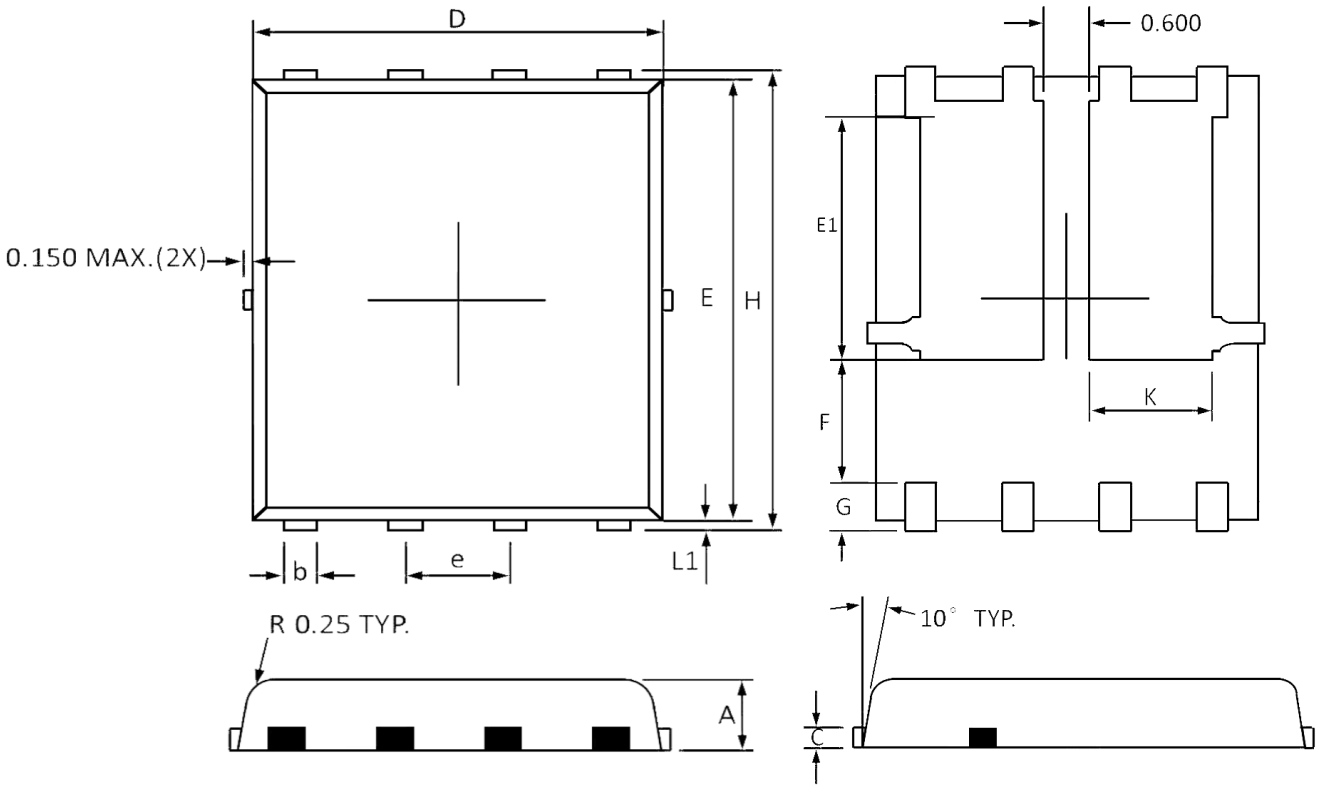


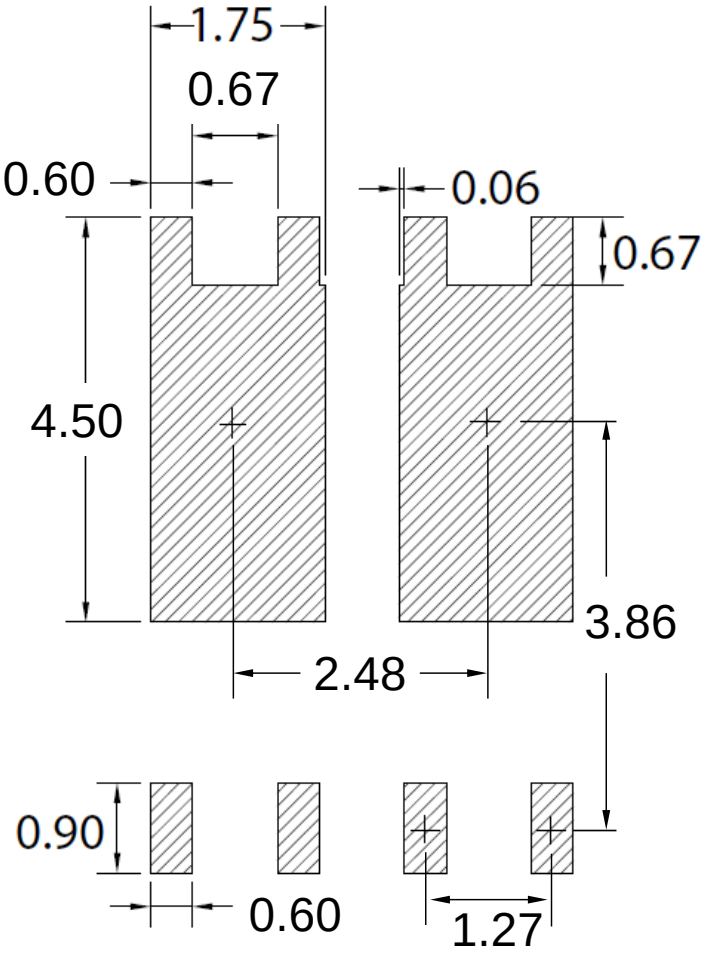
Fig.12 EAS Waveform

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