



30V P-Channel MOSFETs

General Description

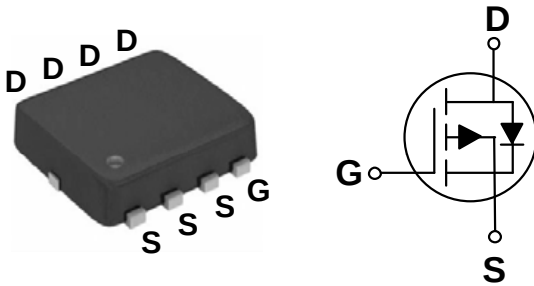
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
-30 V	8.5 m Ω	-50 A

Features

- -30V, -50A, $R_{DS(ON)}=8.5m\Omega @V_{GS}= -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

PPAK3X3 Pin Configuration



Applications

- MB / VGA / V_{CORE}
- POL Applications
- LED Application
- Load Switch

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 ($T_C=25^\circ\text{C}$)	-50	A
	Drain Current - Continuous ($T_C=100^\circ\text{C}$)	-32	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-200	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	59	W
	Power Dissipation - Derate above 25°C	0.47	W/ $^\circ\text{C}$
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ\text{C}$
Marking Code		PC8P5 , DC3903	

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	---	2.1	$^\circ\text{C/W}$

**P3MPC8P5****30V P-Channel MOSFETs****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
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

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V$, $I_D=-10A$	---	7.1	8.5	m Ω
		$V_{GS}=-4.5V$, $I_D=-8A$	---	11.5	14	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.2	-1.6	-2.5	V
gfs	Forward Transconductance	$V_{DS}=-10V$, $I_D=-10A$	---	14	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge (NOTE 2、3)	$V_{DS}=-15V$, $V_{GS}=-4.5V$, $I_D=-10A$	---	35	56	nC
Q_{gs}	Gate-Source Charge (NOTE 2、3)		---	10.8	16	
Q_{gd}	Gate-Drain Charge (NOTE 2、3)		---	10.6	16	
$T_{d(on)}$	Turn-On Delay Time (NOTE 2、3)	$V_{DD}=-15V$, $V_{GS}=-10V$, $R_G=6\Omega$, $I_D=-1A$	---	24.5	38	nS
T_r	Rise Time (NOTE 2、3)		---	10.5	16	
$T_{d(off)}$	Turn-Off Delay Time (NOTE 2、3)		---	156.8	230	
T_f	Fall Time (NOTE 2、3)		---	50	75	
C_{iss}	Input Capacitance	$V_{DS}=-15V$, $V_{GS}=0V$, $F=1\text{MHz}$	---	3300	4800	pF
C_{oss}	Output Capacitance		---	410	700	
C_{rss}	Reverse Transfer Capacitance		---	280	500	
R_g	Gate resistance	$V_{GS}=0V$, $V_{DS}=0V$, $F=1\text{MHz}$	---	8.5	12	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-50	A
I_{SM}	Pulsed Source Current		---	---	-100	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^{\circ}\text{C}$	---	---	-1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.



Characteristics Curves

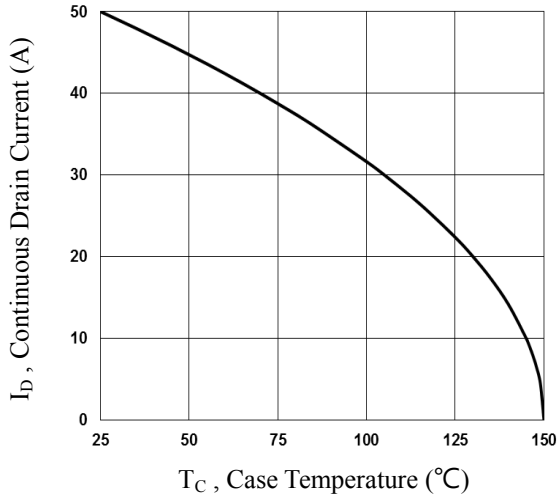


Fig.1 Continuous Drain Current vs. T_C

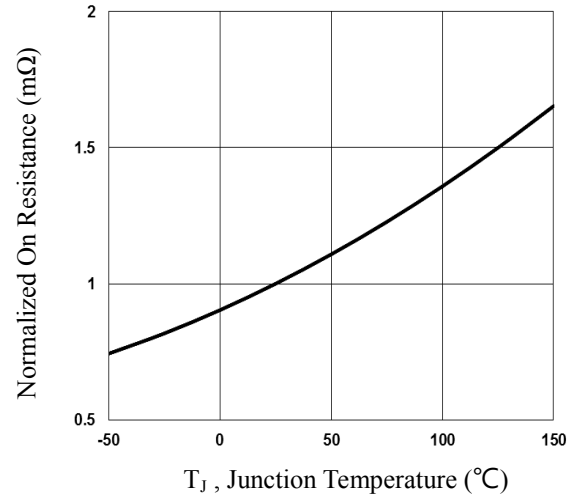


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

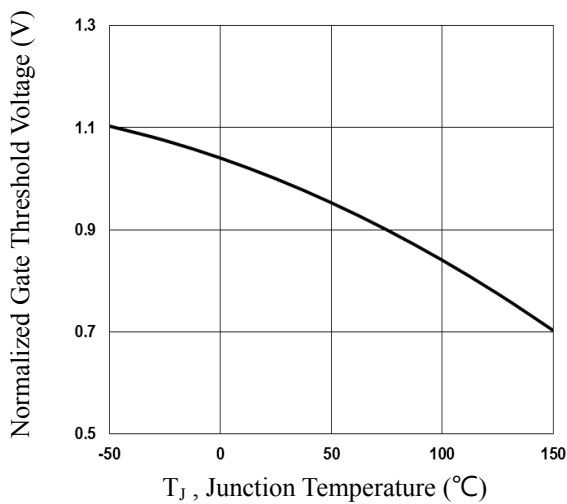


Fig.3 Normalized V_{th} vs. T_J

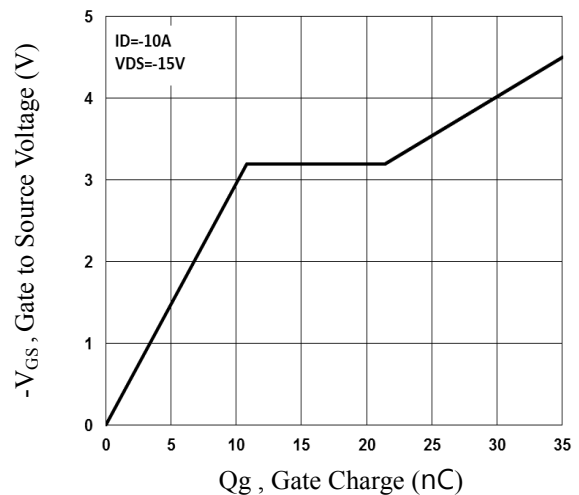


Fig.4 Gate Charge Waveform

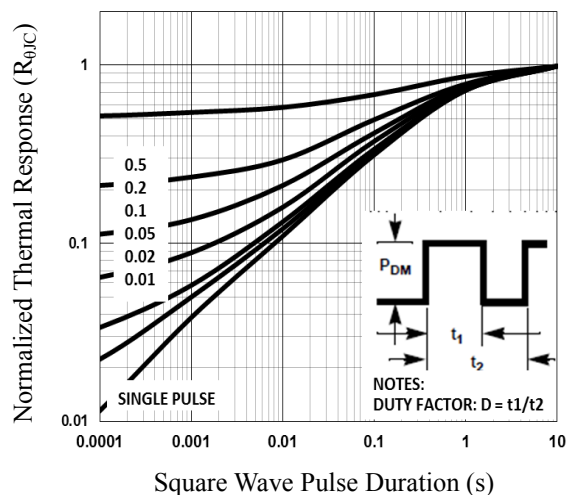


Fig.5 Normalized Transient Impedance

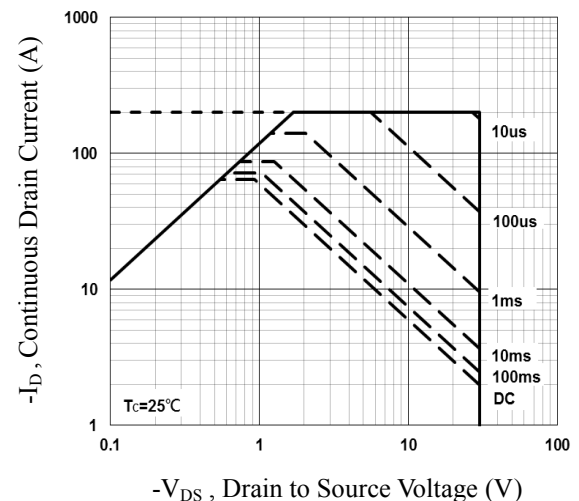


Fig.6 Maximum Safe Operation Area



Characteristics Curves

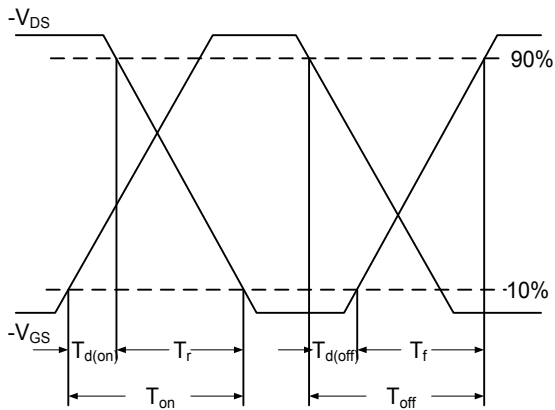


Fig.7 Switching Time Waveform

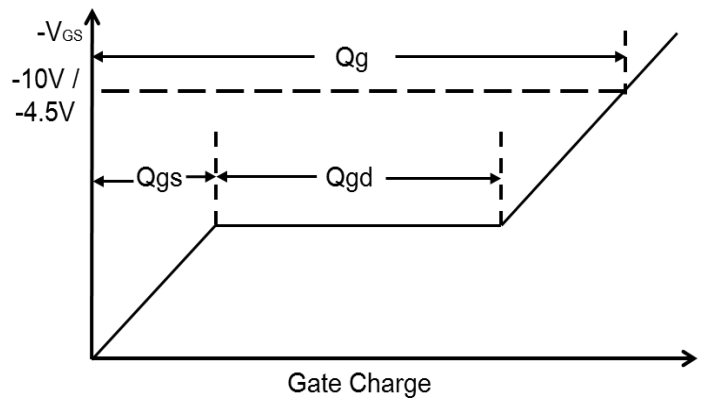
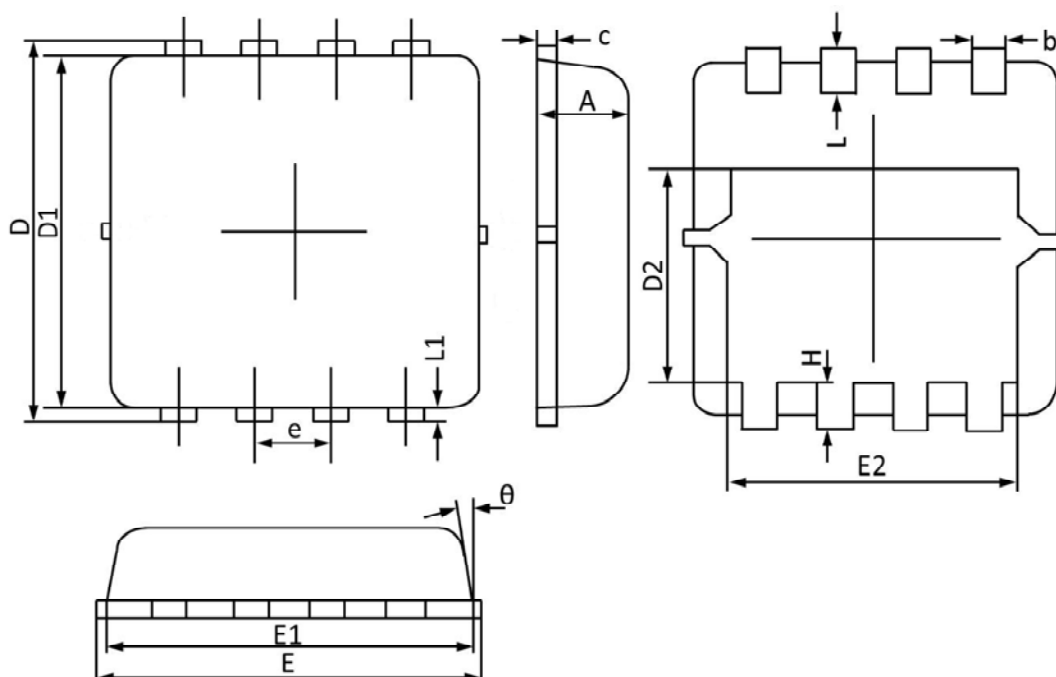


Fig.8 Gate Charge Waveform

**Package Outline Dimensions****PPAK3X3**

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
b	0.350	0.240	0.014	0.009
c	0.250	0.100	0.010	0.004
D	3.450	3.050	0.136	0.120
D1	3.200	2.900	0.126	0.114
D2	1.850	1.350	0.073	0.053
E	3.400	3.000	0.134	0.118
E1	3.250	2.900	0.128	0.114
E2	2.600	2.350	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.500	0.300	0.020	0.012
L	0.500	0.300	0.020	0.012
L1	0.200	0.070	0.008	0.003
θ	12°	0°	12°	0°



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