



# 30V P-Channel MOSFETs

## General Description

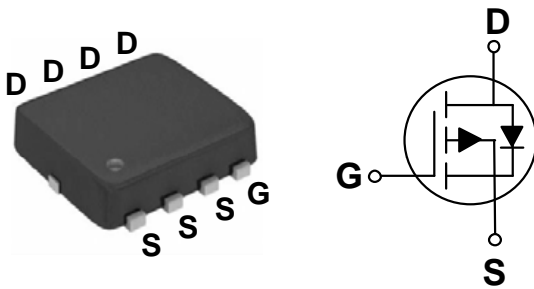
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

<b>BV<sub>DSS</sub></b>	<b>R<sub>DS(ON)</sub></b>	<b>I<sub>D</sub></b>
-30 V	8.5 mΩ	-50 A

## Features

- -30V, -50A, R<sub>DS(ON)</sub>=8.5mΩ @V<sub>GS</sub>= -10V
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

PPAK3X3 Pin Configuration



## Applications

- MB / VGA / V<sub>CORE</sub>
- POL Applications
- LED Application
- Load Switch

## Absolute Maximum Ratings T<sub>C</sub>=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current - Continuous (T <sub>C</sub> =25°C)	-50	A
	Drain Current - Continuous (T <sub>C</sub> =100°C)	-32	A
I <sub>DM</sub>	Drain Current - Pulsed (NOTE 1)	-200	A
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25°C)	59	W
	Power Dissipation - Derate above 25°C	0.47	W/°C
T <sub>J</sub>	Operating Junction Temperature Range	-50 to 150	°C
T <sub>STG</sub>	Storage Temperature Range	-50 to 150	°C
Marking Code		PC8P5 , DC3903	

## Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to Ambient	---	62	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction to Case	---	2.1	°C/W



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

#### Off 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
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

#### On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> = -10V , I <sub>D</sub> = -10A	---	7.1	8.5	mΩ
		V <sub>GS</sub> = -4.5V , I <sub>D</sub> = -8A	---	11.5	14	
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
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> = -10V , I <sub>D</sub> = -10A	---	14	---	S

#### Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge (NOTE 2、3)	V <sub>DS</sub> = -15V , V <sub>GS</sub> = -4.5V , I <sub>D</sub> = -10A	---	35	56	nC
Q <sub>gs</sub>	Gate-Source Charge (NOTE 2、3)		---	10.8	16	
Q <sub>gd</sub>	Gate-Drain Charge (NOTE 2、3)		---	10.6	16	
T <sub>d(on)</sub>	Turn-On Delay Time (NOTE 2、3)	V <sub>DD</sub> = -15V , V <sub>GS</sub> = -10V , R <sub>G</sub> = 6Ω , I <sub>D</sub> = -1A	---	24.5	38	nS
T <sub>r</sub>	Rise Time (NOTE 2、3)		---	10.5	16	
T <sub>d(off)</sub>	Turn-Off Delay Time (NOTE 2、3)		---	156.8	230	
T <sub>f</sub>	Fall Time (NOTE 2、3)		---	50	75	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -15V , V <sub>GS</sub> = 0V , F= 1MHz	---	3300	4800	pF
C <sub>OSS</sub>	Output Capacitance		---	410	700	
C <sub>rSS</sub>	Reverse Transfer Capacitance		---	280	500	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> = 0V , V <sub>DS</sub> = 0V , F= 1MHz	---	8.5	12	Ω

#### Drain-Source Diode Characteristics and Ratings

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	---	---	-50	A
I <sub>SM</sub>	Pulsed Source Current		---	---	-100	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> = 0V , I <sub>S</sub> = -1A , T <sub>J</sub> =25°C	---	---	-1	V

#### NOTES :

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



Characteristics Curves

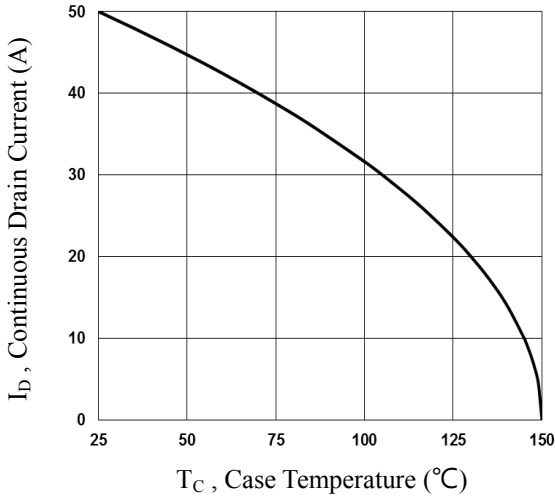


Fig.1 Continuous Drain Current vs.  $T_c$

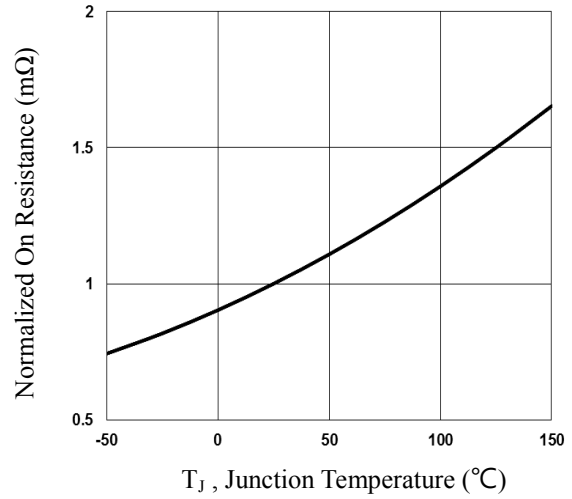


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$

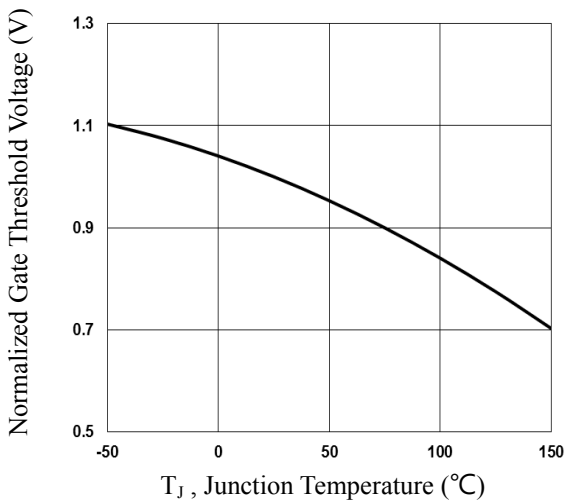


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

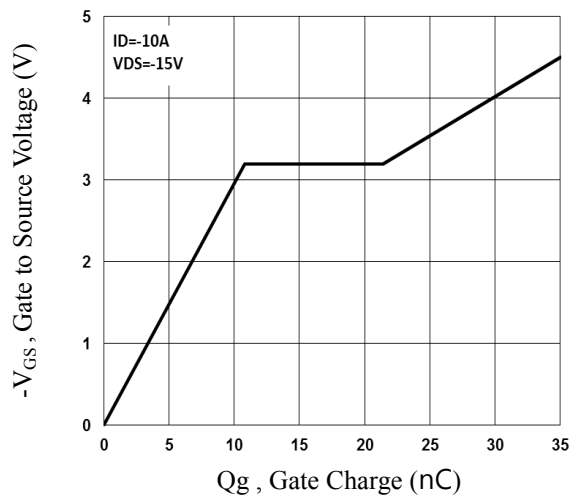


Fig.4 Gate Charge Waveform

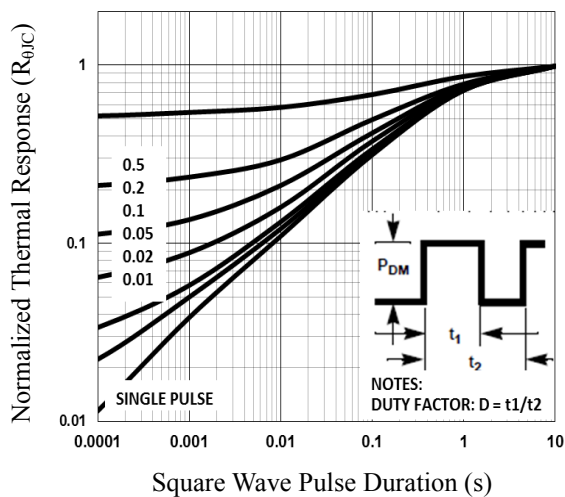


Fig.5 Normalized Transient Impedance

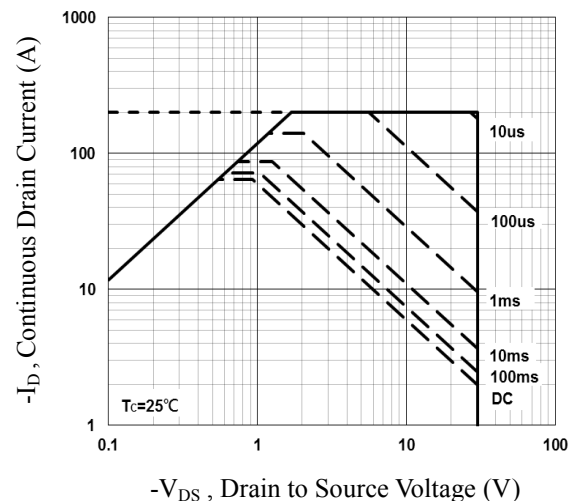


Fig.6 Maximum Safe Operation Area



Characteristics Curves

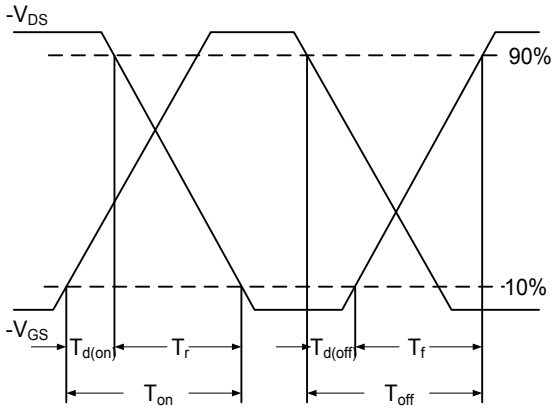


Fig.7 Switching Time Waveform

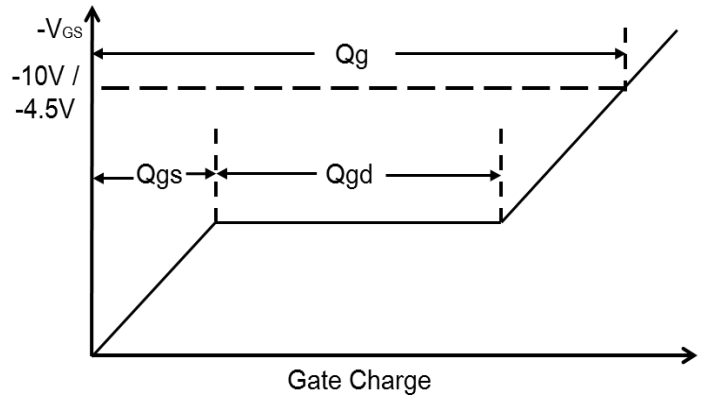
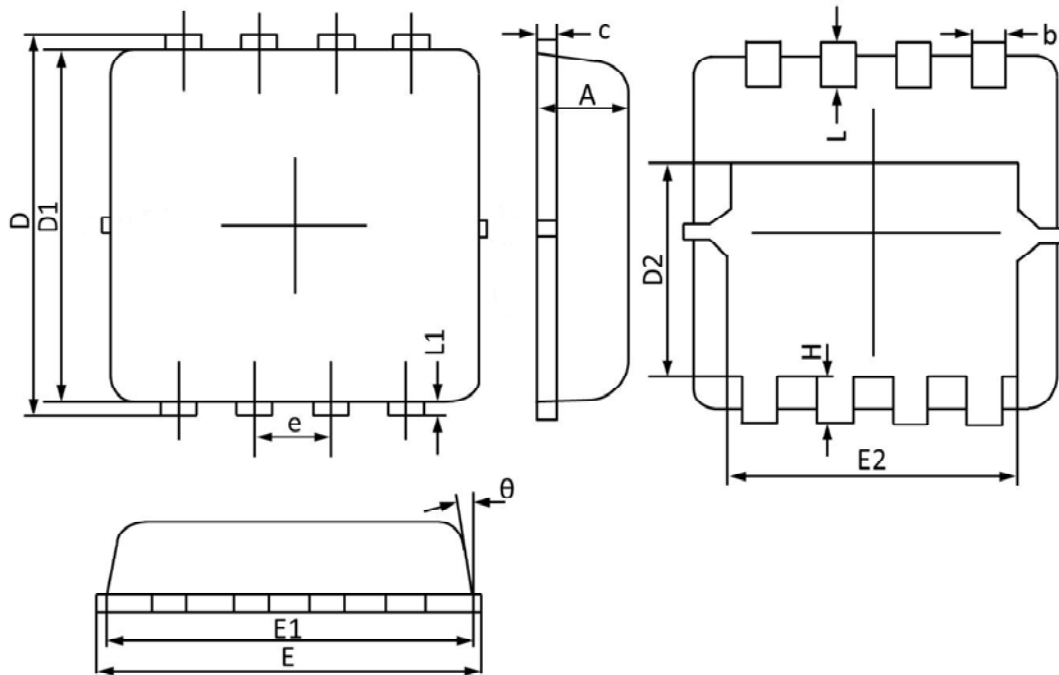


Fig.8 Gate Charge Waveform



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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