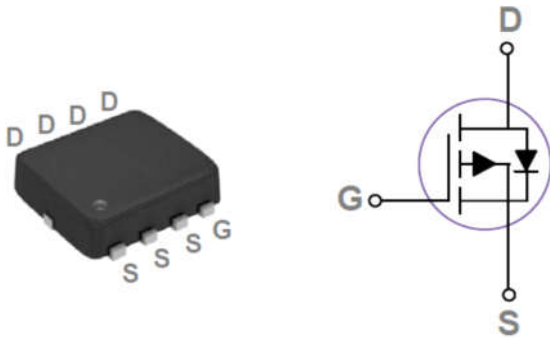


30V P-Channel MOSFETs

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.

PPAK3 x 3 Pin Configuration



Product Summary

BV_{DSS}	$R_{DS(ON)}$ Typ.	I_D
-30 V	17 m Ω	-30 A

Features

- -30 V, -30 A, $R_{DS(ON)}$ Typ. = 17 m Ω @ $V_{GS} = -4.5$ V
- Fast switching
- Green Device Available
- Suit for -4.5 V Gate Drive Applications

Applications

- MB / VGA / Vcore
- POL Applications
- Load Switch
- LED applications

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	± 12	V
I_D	Drain Current – Continuous ($T_C = 25^\circ\text{C}$)	-30	A
	Drain Current – Continuous ($T_C = 100^\circ\text{C}$)	-19	A
I_{DM}	Drain Current – Pulsed ¹	-120	A
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	23	W
	Power Dissipation – Derate above 25°C	0.18	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient		62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case		5.4	$^\circ\text{C}/\text{W}$

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	$V_{GS} = 0\text{ V}$, $I_D = -250\ \mu\text{A}$	-30			V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D = -1\ \text{mA}$		-0.03		V/C
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = -30\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_J = 25^\circ\text{C}$			-1	μA
		$V_{DS} = -24\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_J = 85^\circ\text{C}$			-10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 12\ \text{V}$, $V_{DS} = 0\ \text{V}$			± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = -4.5\ \text{V}$, $I_D = -6\ \text{A}$		17	20	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = -250\ \mu\text{A}$	-1.0	-1.5	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			4		mV/ $^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS} = -10\ \text{V}$, $I_D = -8\ \text{A}$		10.5		S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge ^{2, 3}	$V_{DS} = -15\ \text{V}$, $V_{GS} = -4.5\ \text{V}$, $I_D = -8\ \text{A}$		14.6	21	nC
Q_{gs}	Gate-Source Charge ^{2, 3}			4.1	6	
Q_{gd}	Gate-Drain Charge ^{2, 3}			6.3	9	
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}	$V_{DD} = -15\ \text{V}$, $V_{GS} = -4.5\ \text{V}$, $R_G = 6\ \Omega$, $I_D = -1\ \text{A}$		9	17	nS
T_r	Rise Time ^{2, 3}			21.8	41	
$T_{d(off)}$	Turn-Off Delay Time ^{2, 3}			59.8	114	
T_f	Fall Time ^{2, 3}			14.4	27	
C_{iss}	Input Capacitance	$V_{DS} = -15\ \text{V}$, $V_{GS} = 0\ \text{V}$, $F = 1\ \text{MHz}$		1730	2510	pF
C_{oss}	Output Capacitance			180	260	
C_{rss}	Reverse Transfer Capacitance			125	180	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G = V_D = 0\ \text{V}$, Force Current			-30	A
I_{SM}	Pulsed Source Current				-120	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\ \text{V}$, $I_S = 1\ \text{A}$, $T_J = 25^\circ\text{C}$			-1	V

Note :

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

Typical Characteristics

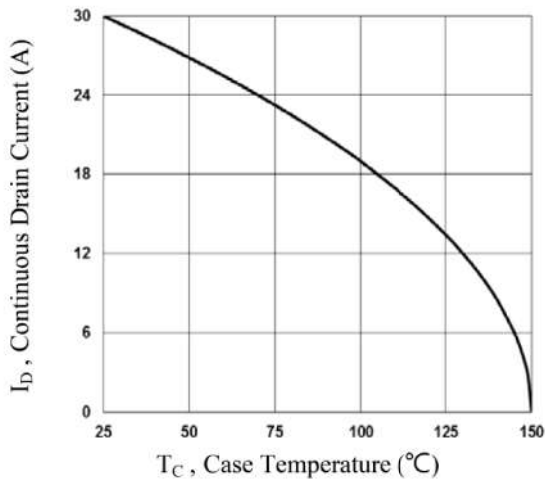


Fig.1 Continuous Drain Current vs. T_C

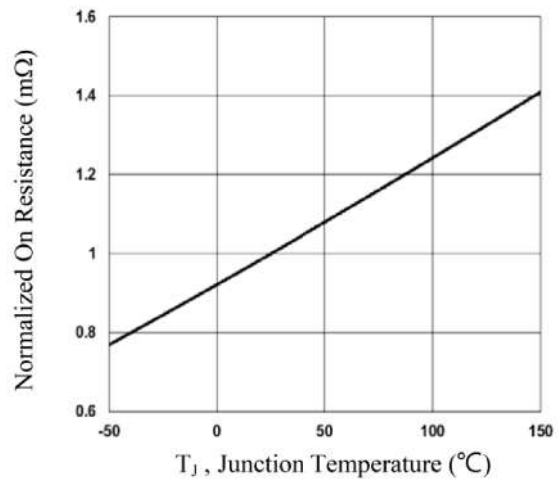


Fig.2 Normalized R_{DSON} vs. T_J

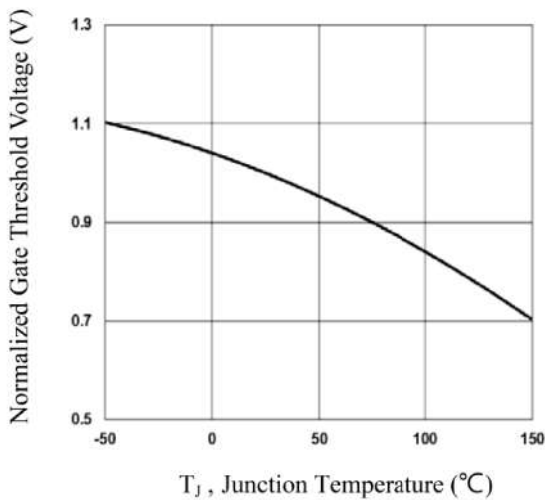


Fig.3 Normalized V_{th} vs. T_J

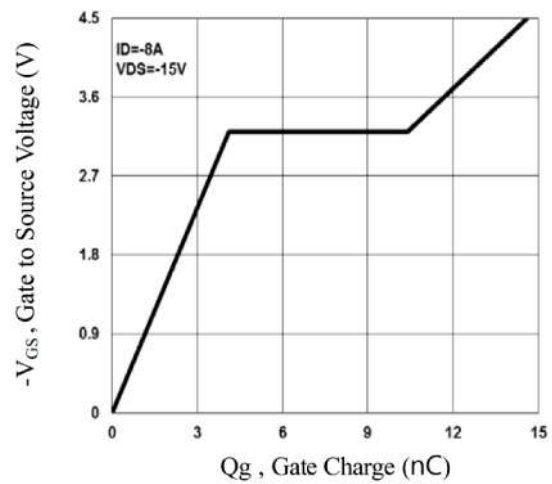


Fig.4 Gate Charge Waveform

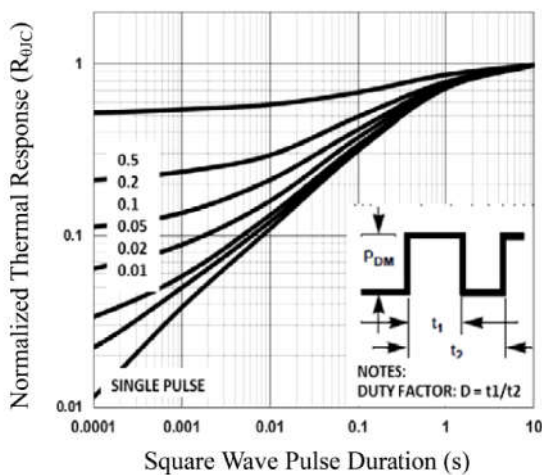


Fig.5 Normalized Transient Impedance

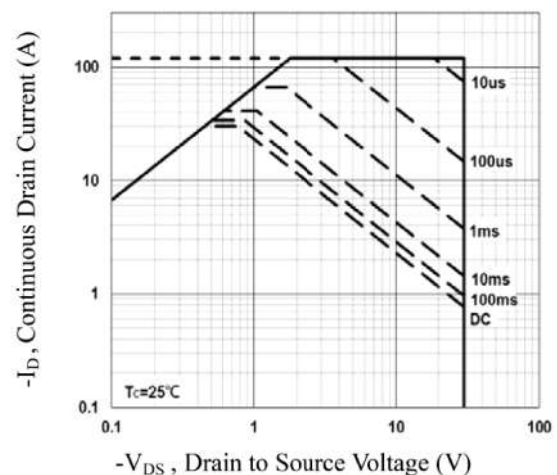


Fig.6 Maximum Safe Operation Area

Typical Characteristics (Continued)

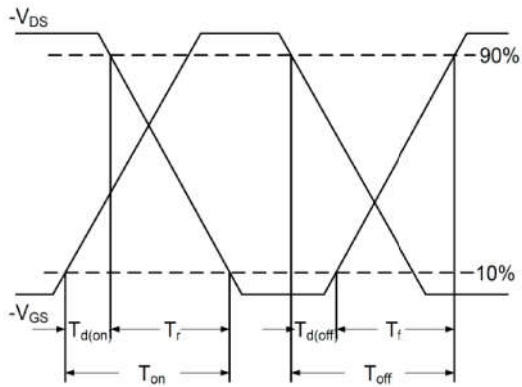


Fig.7 Switching Time Waveform

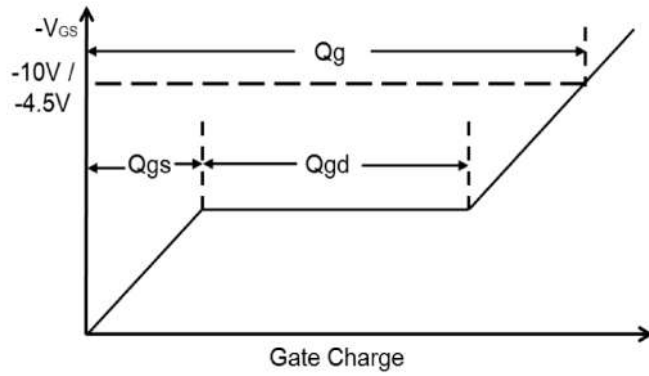
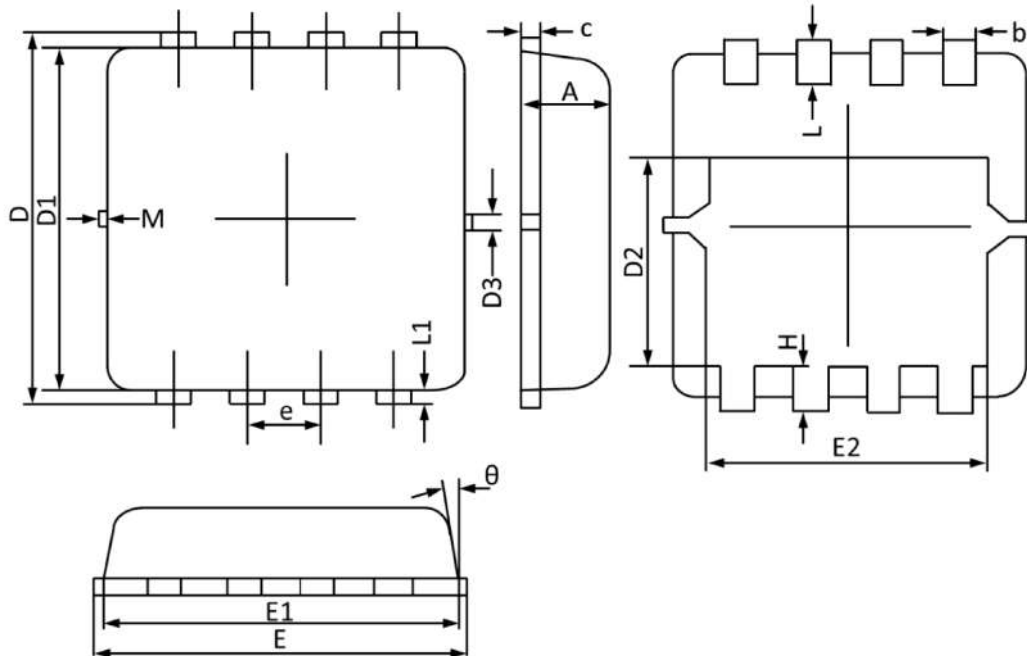


Fig.8 Gate Charge Waveform

Package Information

PPAK3 x 3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130 REF		0.005 REF	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
e	0.650 BSC		0.026 BSC	
H	0.300	0.500	0.011	0.019
L	0.300	0.500	0.011	0.019
L1	0.130 REF		0.005 REF	
θ	0°	12°	0°	12°
M	0.150 REF		0.006 REF	

V 1.0