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.

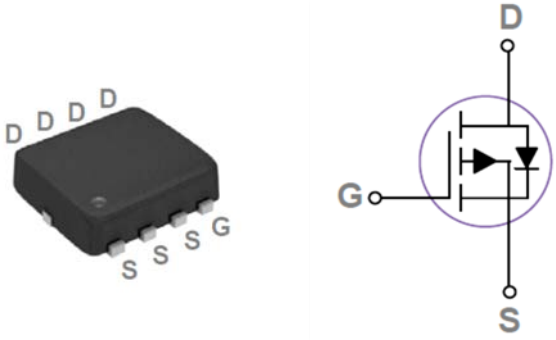
Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max.	I_D
-30 V	15 mΩ	-30 A

Features

- -30 V, -30 A, $R_{DS(ON)}$ Max. = 15 mΩ @ V_{GS} = -10 V
- Fast switching
- Green Device Available
- Suit for -4.5 V Gate Drive Applications

PPAK3 x 3 Pin Configuration



Applications

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

Absolute Maximum Ratings (Tc = 25℃ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±17	V
I_D	Drain Current – Continuous (T_C = 25℃)	-30	A
	Drain Current – Continuous (T_C = 100℃)	-19	A
I_{DM}	Drain Current – Pulsed[1]	-120	A
P_D	Power Dissipation (T_C = 25℃)	23	W
	Power Dissipation – Derate above 25℃	0.18	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		5.4	℃/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} = 0 V , I_D = -250 μA	-30			V
$\triangle BV_{DSS}/\triangle T$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D = -1 mA		-0.03		V/C
I_{DSS}	Drain-Source Leakage Current	V_{DS} = -30 V, V_{GS} = 0 V ,T_J = 25℃			-1	μA
		V_{DS} = -24 V, V_{GS} = 0 V, T_J = 85℃			-10	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = -10 V, I_D = -8 A		13	15	mΩ
		V_{GS} = -4.5 V, I_D = -6 A		17	20	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS} , I_D = -250 μA	-1.0	-1.6	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			4		mV/℃
gfs	Forward Transconductance	V_{DS} = -10 V, I_D = -8 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 V, V_{GS} = -4.5 V, I_D = -8 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} = -15V, V_{GS} = -10 V , R_G = 6 Ω, I_D = -1 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 V, V_{GS} = 0 V, F = 1 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 V, Force Current			-30	A
I_{SM}	Pulsed Source Current				-120	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V, I_S = 1 A, T_J = 25℃			-1	V

Note :

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

Typical Characteristics

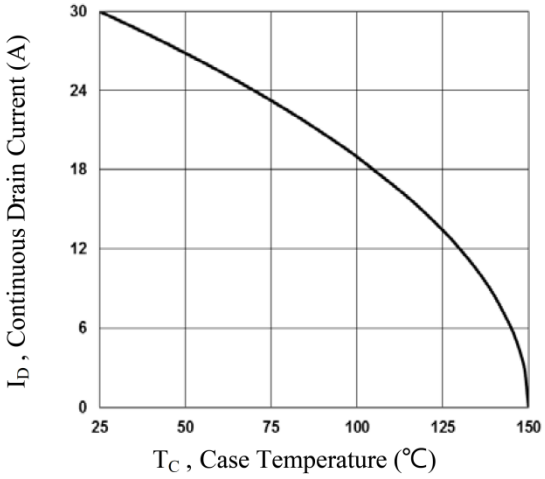


Fig.1 Continuous Drain Current vs. T_C

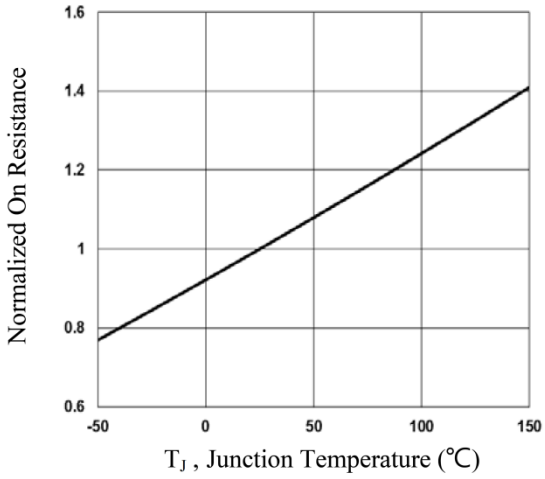


Fig.2 Normalized R_{DSON} vs. T_J

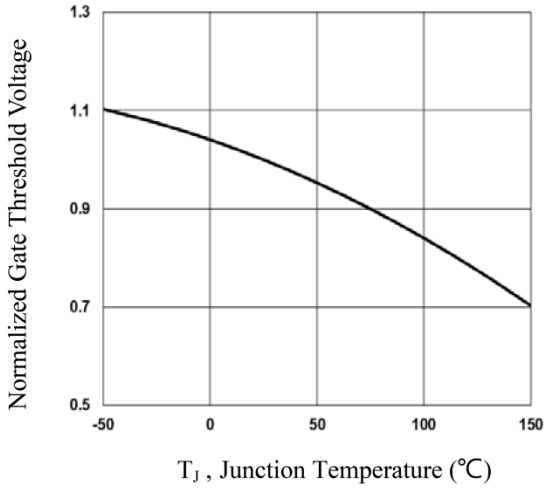


Fig.3 Normalized V_{th} vs. T_J

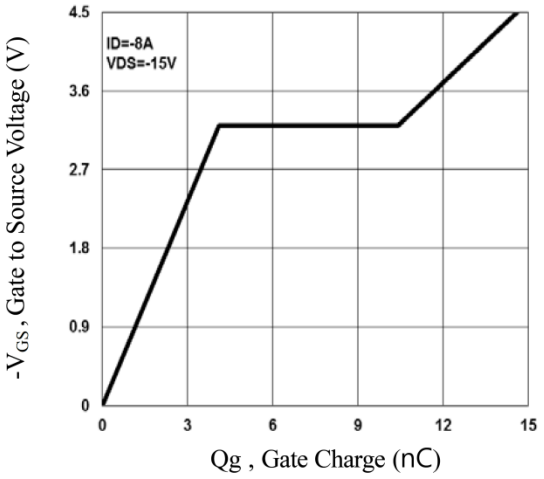


Fig.4 Gate Charge Waveform

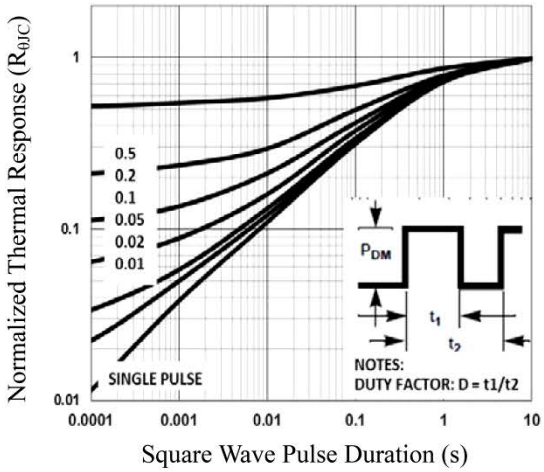


Fig.5 Normalized Transient Impedance

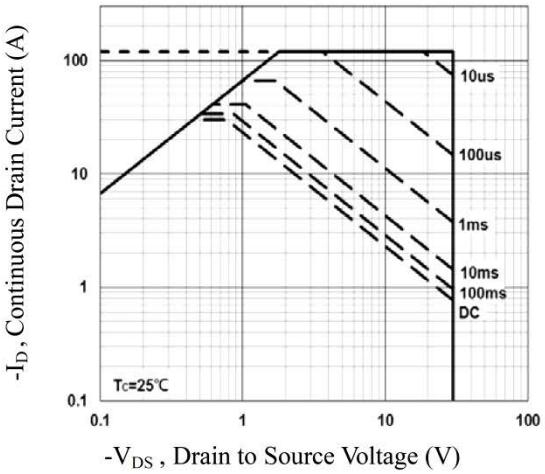


Fig.6 Maximum Safe Operation Area

Typical Characteristics (Continued)

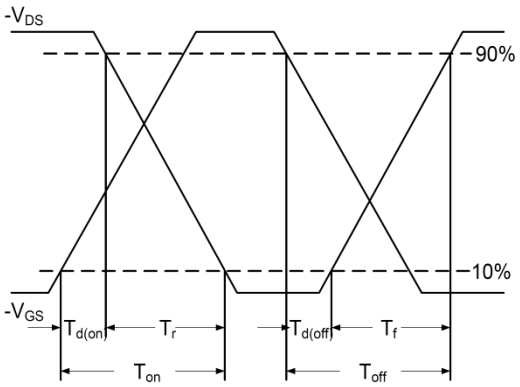


Fig.7 Switching Time Waveform

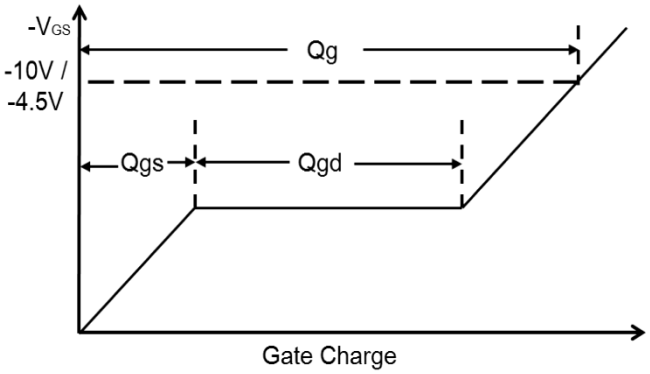
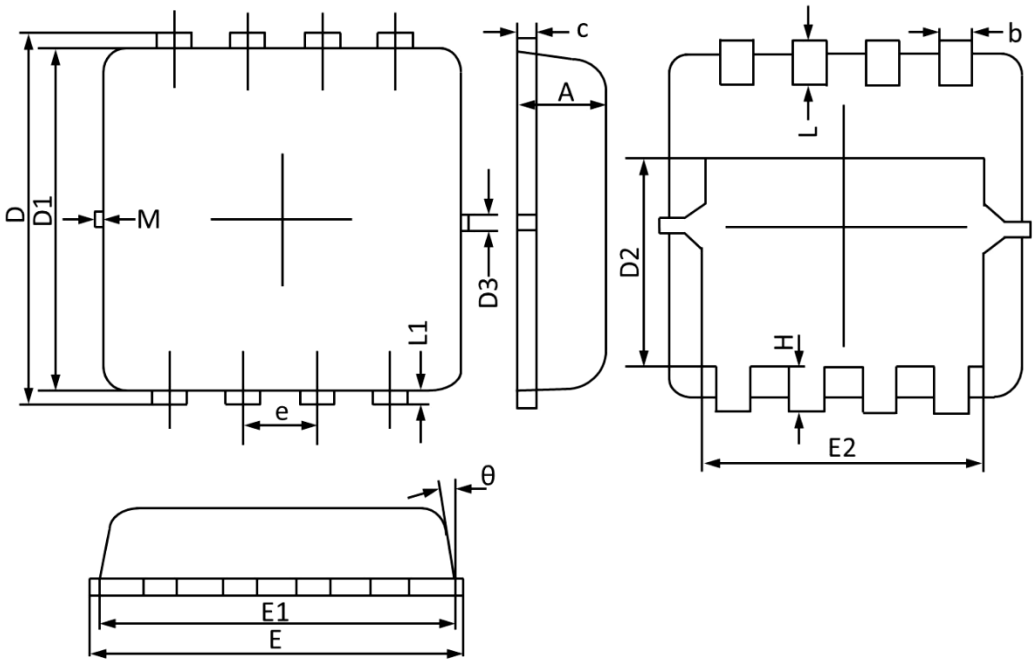


Fig.8 Gate Charge Waveform

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 1.2