

-60V P Channel Enhancement MOSFET

Description

The FTK3651 is the new generation trench P-ch MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications

Features

- High - speed switching
- Excellent gate charge x $R_{DS(ON)}$ product (FOM)
- for extremely low $R_{DS(ON)}$
- Lead-Free, Halogen-Free; RoHS Compliant

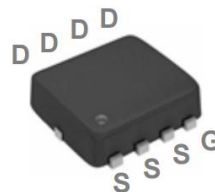
Applications

- Motor Drive
- Load Switch
- Power Tools
- LED Lighting

V_{DSS}	-60V
I_D	-14A
$R_{DS(ON)}$	55mΩ @ $V_{GS} = -10V$

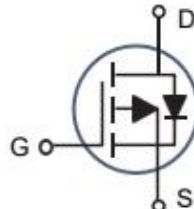
Outline

PDFN3.3x3.3-8L Pin Configuration



Equivalent

- (1,2,3)Source
(4)Gate
(5,6,7,8)Drain



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
FTK3651DFN33	PDFN3.3x3.3-8L	FTK3651	5000

Absolute Maximum Ratings

Parameter	Symbol	N	Units
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous ^(Note2)	I_D	$T_C = 25^\circ C$	A
		$T_C = 70^\circ C$	A
-Pulsed ^(Note 1· Note 2)	I_{DM}	-56	A
Single Pulse Avalanche Energy ^(Note 3)	E_{AS}	32	mJ
Maximum Power Dissipation	P_D	$T_C = 25^\circ C$	W
		$T_C = 70^\circ C$	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	62	°C /W
Thermal Resistance Junction-Case	$R_{\theta JC}$	3.8	°C/W

**-60V P Channel Enhancement MOSFET****Electrical Characteristics** ($T_C=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V , I _D =250uA	-60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -60V , V _{GS} =0V			-1	uA
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =-250uA	-1.0	-1.8	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V , I _D =-8A		55	65	mΩ
		V _{GS} =-4.5V , I _D =-5A		70	85	mΩ
Forward Transconductance	g _{FS}	V _{GS} =-10V , I _D =-3A		7		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C _{ISS}	V _{DS} =-30V , V _{GS} =0 V , f =1.0MHz		850		pF
Output Capacitance	C _{OSS}			65		pF
Reverse Transfer Capacitance	C _{RSS}			40		pF
Total Gate Charge	Q _g	V _{DS} =-30V , I _D =-3A , V _{GS} =-10V		15.5		nC
Gate-Source Charge	Q _{gs}			2.8		nC
Gate-Drain Charge	Q _{gd}			3.9		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =-30V , I _D =-1A , V _{GS} =-10V , R _{GEN} =6Ω		7.9		ns
Rise Time	tr			28.6		ns
Turn-Off Delay Time	t _{D(OFF)}			50.1		ns
Fall Time	tf			14.8		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =-10A			-1.0	V

Notes:

- 1、Pulse Test Width < 300us, Duty Cycle < 2%
- 2、Drain current limited by maximum junction temperature.
- 3、Guaranteed by design, not subject to production testing.
- 4、tating $T_j=25^{\circ}\text{C}$, $L=0.5mH$, $V_{DD}=-30V$

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Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. T_C

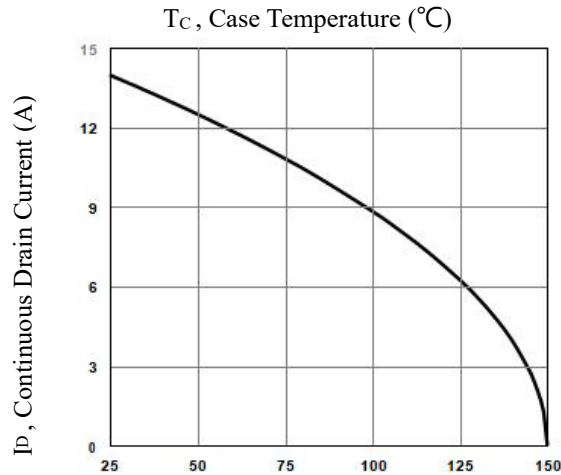


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

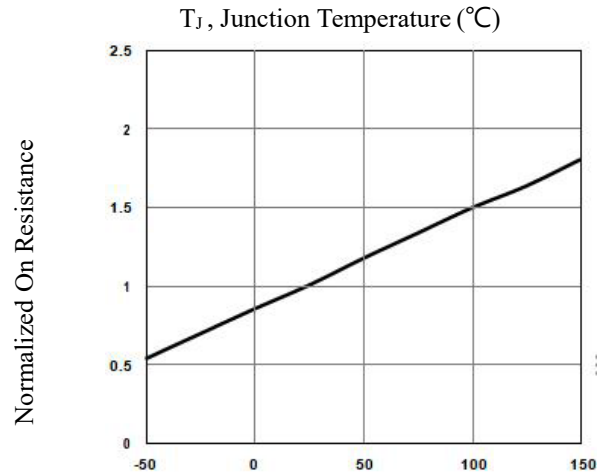


Fig.3 Normalized V_{th} vs. T_J

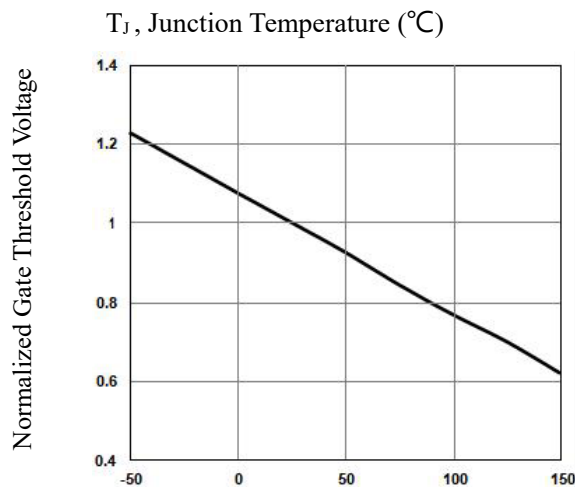


Fig.4 Gate Charge Waveform

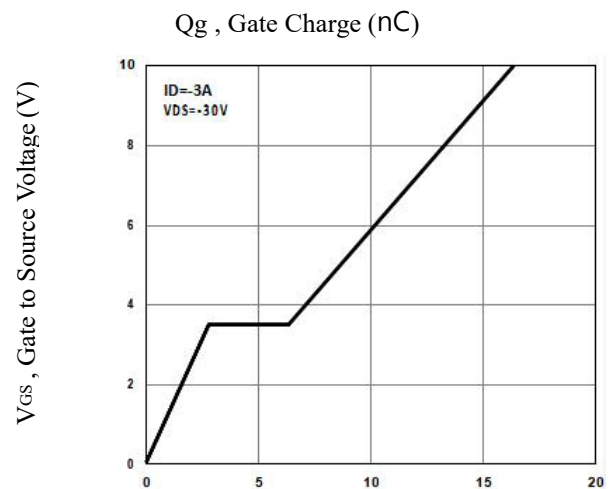


Fig.5 Normalized Transient Response

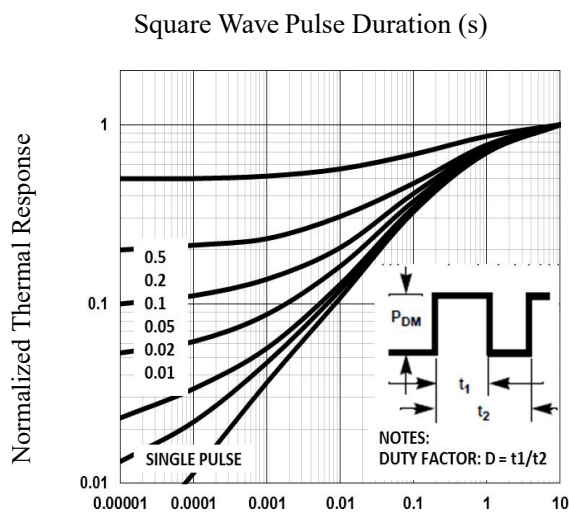
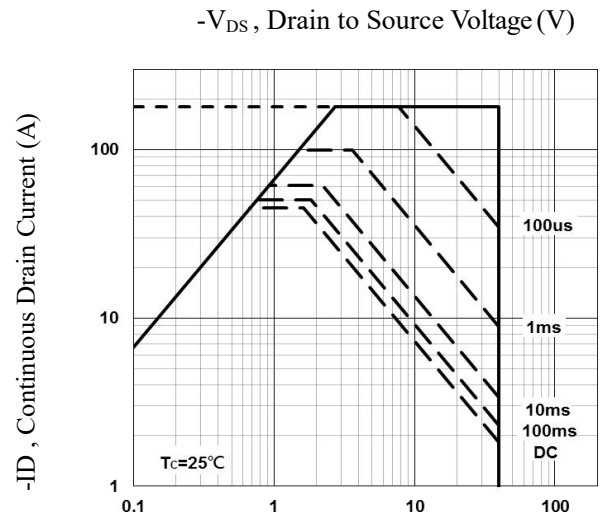


Fig.6 Gate Charge Waveform I_D



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Figure 7a. Switching Test Circuit

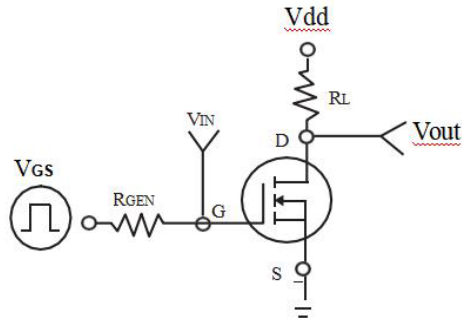


Figure 7b. Switching Waveforms

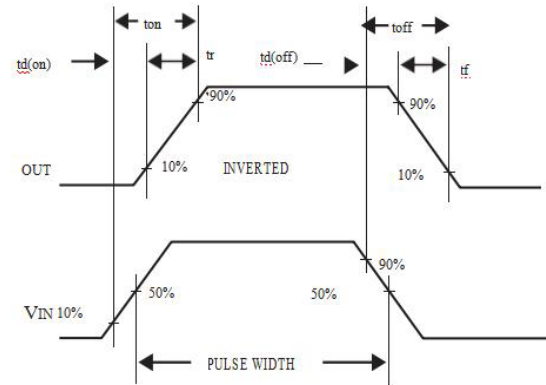


Figure 8 a.Unclamped Inductive Test Circuit

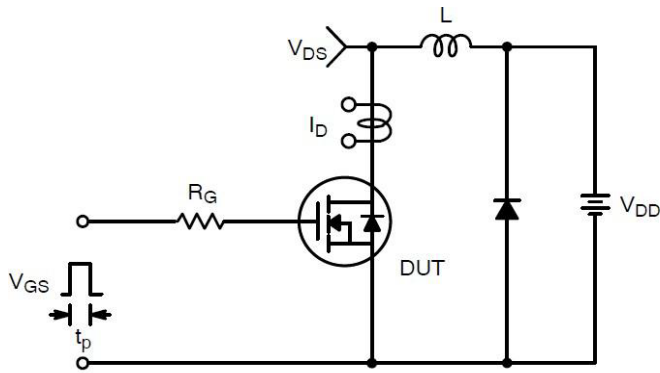
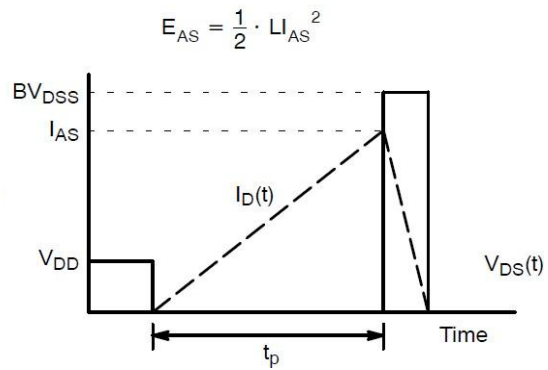
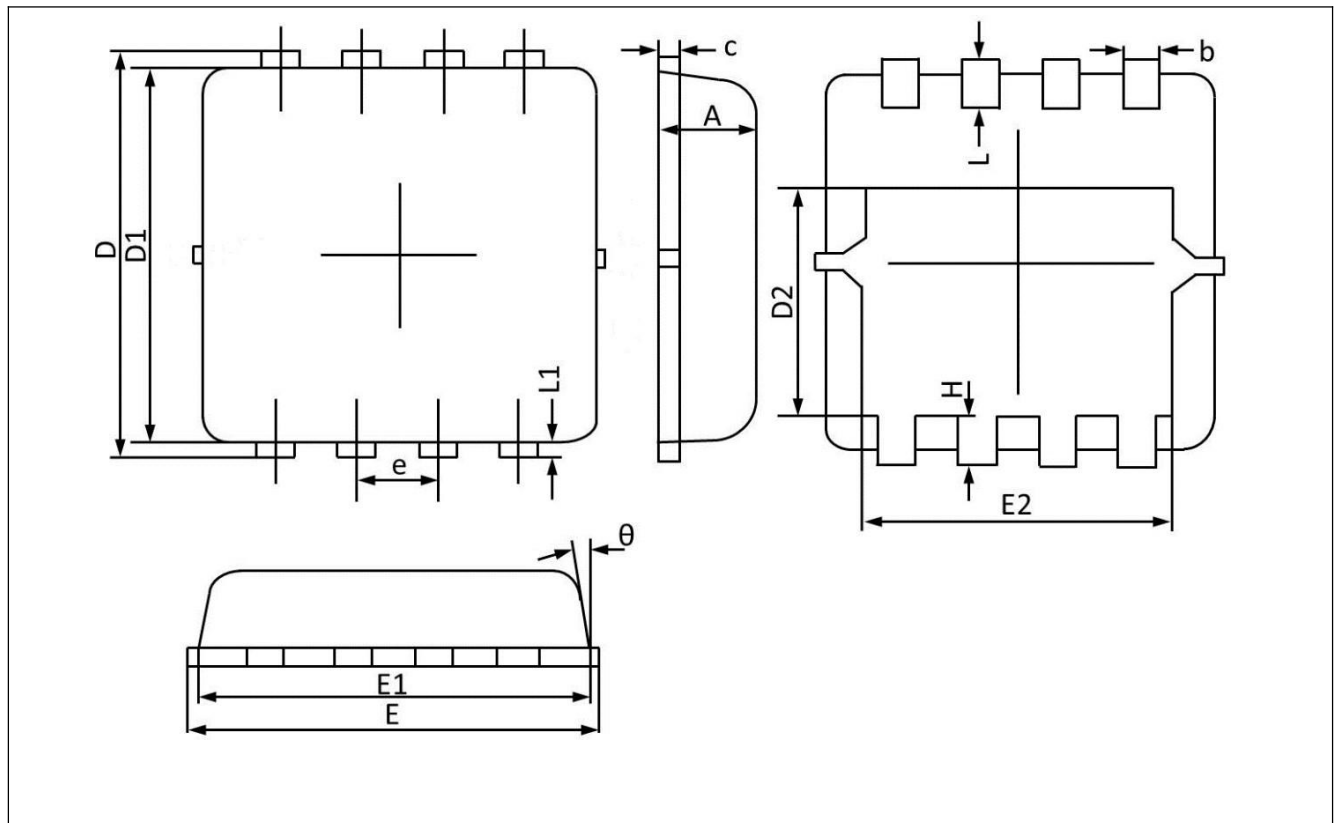


Figure 8 b.Unclamped Inductive Waveforms



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PDFN3.3x3.3 PACKAGE INFORMATION


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
b	0.350	0.250	0.014	0.010
c	0.250	0.100	0.010	0.004
D	3.500	3.050	0.138	0.120
D1	3.200	2.900	0.126	0.114
D2	1.950	1.350	0.077	0.053
E	3.400	3.000	0.134	0.118
E1	3.300	2.900	0.130	0.114
E2	2.600	2.350	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.750	0.300	0.030	0.012
L	0.600	0.300	0.024	0.012
L1	0.200	0.060	0.008	0.002
θ	14°	6°	14°	6°