

30V N Channel Enhancement MOSFET

Description

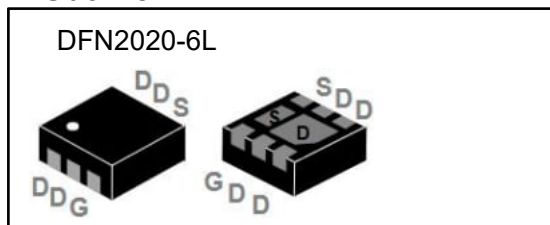
The FTK2438DFN22 is the new generation trench N-ch MOSFET has been designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high efficiency power management applications

V_{DSS}	30V
I_D	10A
$R_{DS(ON)}$	9.8mΩ @ $V_{GS}=10V$
$R_{DS(ON)}$	13.5mΩ @ $V_{GS}=4.5V$

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

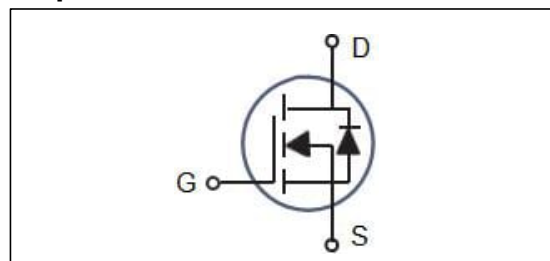
Outline



Applications

- PWM Application
- Power Management
- Load switch

Equivalent



Packaging specifications

Part No.	Package	Marking	Basic ordering unit.(pcs)
FTK2438DFN22	DFN2020-6L	RM2438TN	3000

Absolute Maximum Ratings

Parameter		Symbol	Limit	Units
Drain-Source Voltage		V _{DS}	30	V
Gate-Source Voltage		V _{GS}	±20	V
Drain Current-Continuous ^(Note2)	T _C =25°C	I _D	10	A
	T _C =70°C		7.9	A
-Pulsed ^(Note 1、 Note 2)		I _{DM}	40	A
Maximum Power Dissipation	T _C =25°C	P _D	2	W
	T _C =70°C		1.6	W
Operating Junction and Storage Temperature Range		T _J , T _{STG}	-55 to 150	°C
Thermal Resistance Junction-Ambient		R _{θJA}	62	°C /W
Thermal Resistance Junction-Case		R _{θJC}	24	°C/W

**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	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V , 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	1.6	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =6A		9.8	13	mΩ
		V _{GS} =4.5V , I _D =4A		13.5	16	mΩ
Forward Transconductance	g _{FS}	V _{GS} =10V , I _D =2A		9		S
DYNAMIC CHARACTERISTICS Note4						
Input Capacitance	C _{ISS}	V _{DS} =15V , V _{GS} =0 V , f =1.0MHz		1060		pF
Output Capacitance	C _{OSS}			120		pF
Reverse Transfer Capacitance	C _{RSS}			100		pF
Total Gate Charge	Q _g	V _{DS} =15V , I _D =5A , V _{GS} =10V		13		nC
Gate-Source Charge	Q _{gs}			2.2		nC
Gate-Drain Charge	Q _{gd}			3.3		nC
SWITCHING CHARACTERISTICS Note4						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =15V , I _D =5A , V _{GS} =10V , R _{GEN} =3Ω		3.3		ns
Rise Time	tr			11		ns
Turn-Off Delay Time	t _{D(OFF)}			20		ns
Fall Time	tf			6.6		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Diode Forward Voltage	V _{SD}	V _{GS} =0V , I _S =5A			1.2	V

Notes:

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

Typical Performance Characteristics

Fig.1 Continuous Drain Current vs. TC

T_C , Case Temperature ($^{\circ}\text{C}$)

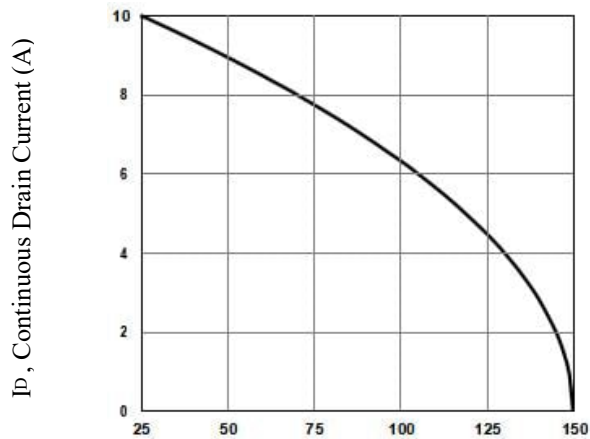


Fig.2 Normalized RDSON vs. TJ

T_J , Junction Temperature ($^{\circ}\text{C}$)

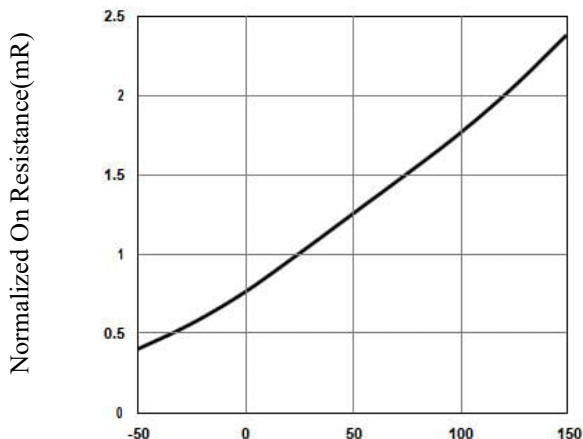


Fig.3 Normalized Vth vs. TJ

T_J , Junction Temperature ($^{\circ}\text{C}$)

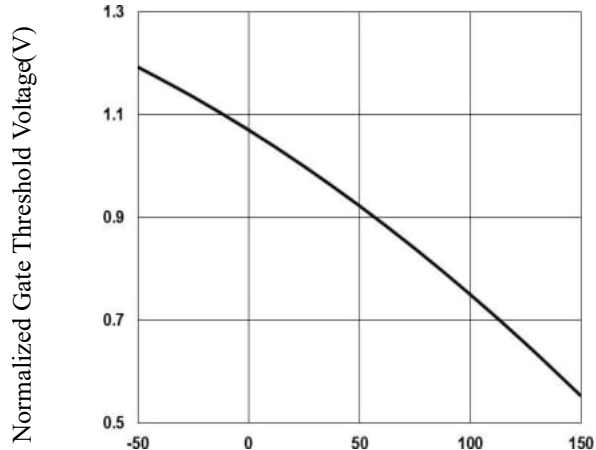


Fig.4 Gate Charge Waveform

Q_g , Gate Charge (nC)

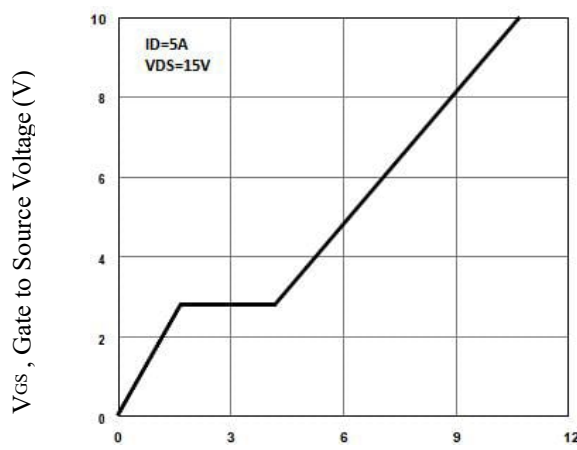


Fig.5 Normalized Transient Impedance

Square Wave Pulse Duration (s)

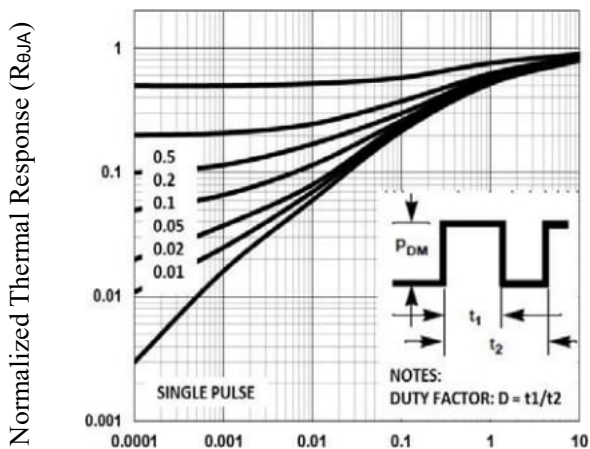


Fig.6 Maximum Safe Operation Area

V_{DS} , Drain to Source Voltage (V)

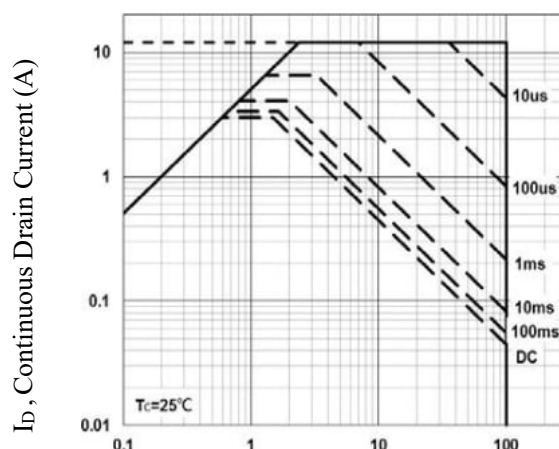


Figure 7a. Switching Test Circuit

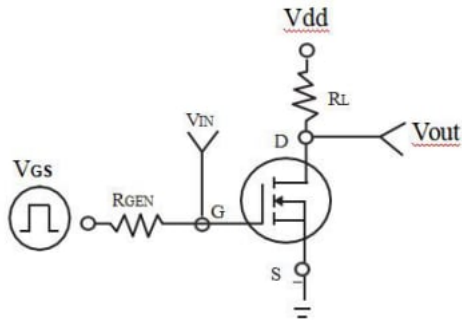


Figure 7b. Switching Waveforms

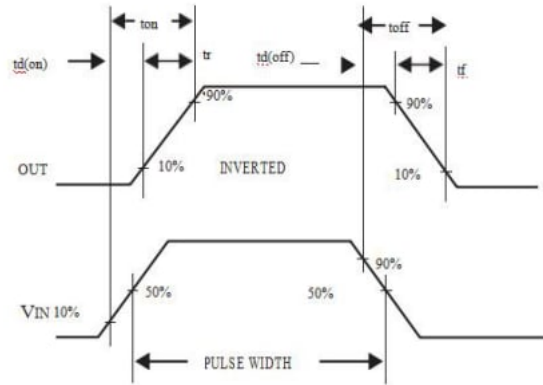


Figure 8 a.Unclamped Inductive Test Circuit

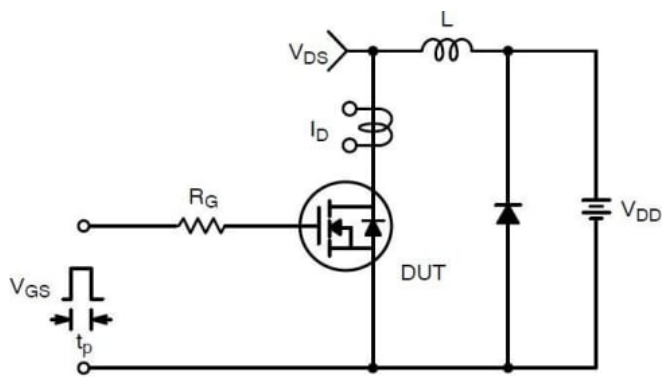
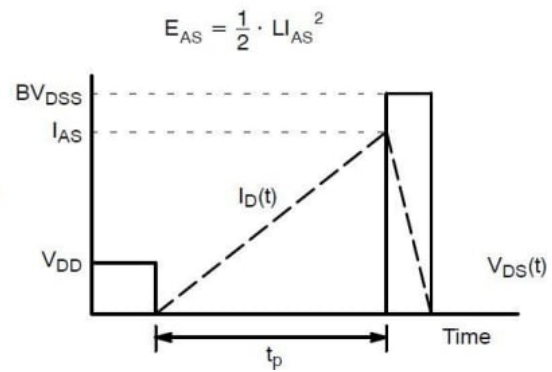
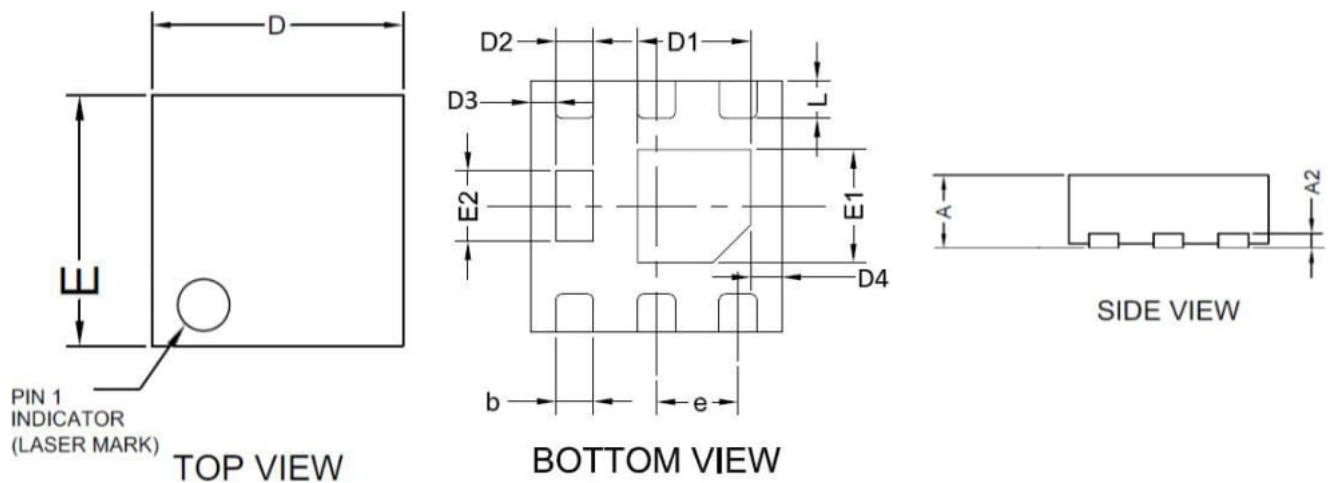


Figure 8 b.Unclamped Inductive Waveforms



DFN2x2-6L PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.800	0.500	0.031	0.019
A2	0.250	0.145	0.010	0.006
b	0.350	0.250	0.014	0.010
D	2.100	1.900	0.083	0.075
D1	1.050	0.800	0.041	0.031
D2	0.430	0.250	0.017	0.010
D3	0.200BSC		0.008BSC	
D4	0.200BSC		0.008BSC	
E	2.100	1.900	0.083	0.075
E1	1.250	0.800	0.049	0.031
E2	0.750	0.460	0.029	0.018
e	0.650BSC		0.026BSC	
L	0.350	0.225	0.014	0.009