FETek Technology Corp.

P-Ch 30V Fast Switching MOSFETs

★ 100% EAS Guaranteed
★ Green Device Available
★ Super Low Gate Charge
★ Excellent CdV/dt effect decline
★ Advanced high cell density Trench technology

Product Summary

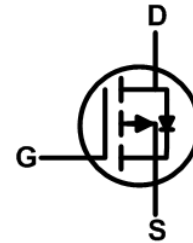| BVDSS	RDSON	ID
-30V	30mΩ	-27A

Description

The FKD3113 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The FKD3113 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ -10V[1]	-27	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ -10V[1]	-17	A
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ -10V[1]	-6.8	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ -10V[1]	-5.5	A
I_{DM}	Pulsed Drain Current[2]	-54	A
EAS	Single Pulse Avalanche Energy[3]	45	mJ
I_{AS}	Avalanche Current	-30	A
P_D@T_C=25°C	Total Power Dissipation[4]	31.3	W
P_D@T_A=25°C	Total Power Dissipation[4]	2	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	4	°C/W

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Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=-250uA	-30	---	---	V
$\triangle$BV$_{DSS}$/$\triangle$T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=-1mA	---	-0.021	---	V/℃
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=-10V , I$_D$=-12A	---	---	30	mΩ
		V$_{GS}$=-4.5V , I$_D$=-6A	---	---	55	
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1.0	---	-2.5	V
$\triangle$V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	-4.2	---	mV/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=-24V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=-24V , V$_{GS}$=0V , T$_J$=55℃	---	---	5	
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=$\pm$20V , V$_{DS}$=0V	---	---	$\pm$100	nA
gfs	Forward Transconductance	V$_{DS}$=-5V , I$_D$=-12A	---	15	---	S
R$_g$	Gate Resistance	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	15	---	Ω
Q$_g$	Total Gate Charge (-4.5V)	V$_{DS}$=-20V , V$_{GS}$=-4.5V , I$_D$=-12A	---	9.8	---	nC
Q$_{gs}$	Gate-Source Charge		---	2.2	---	
Q$_{gd}$	Gate-Drain Charge		---	3.4	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=-24V , V$_{GS}$=-10V , R$_G$=3.3Ω, I$_D$=-1A	---	16.4	---	ns
T$_r$	Rise Time		---	20.2	---	
T$_{d(off)}$	Turn-Off Delay Time		---	55	---	
T$_f$	Fall Time		---	10	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , f=1MHz	---	930	---	pF
C$_{oss}$	Output Capacitance		---	148	---	
C$_{rss}$	Reverse Transfer Capacitance		---	115	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current[1,5]	V$_G$=V$_D$=0V , Force Current	---	---	-27	A
I$_{SM}$	Pulsed Source Current[2,5]		---	---	-54	A
V$_{SD}$	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25℃	---	---	-1.2	V

Note :
1.The data tested by surface mounted on a 1 inch[2] FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width $\leq$ 300us , duty cycle $\leq$ 2%
3.The EAS data shows Max. rating . The test condition is V$_{DD}$=-25V,V$_{GS}$=-10V,L=0.1mH,I$_{AS}$=-30A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as I$_D$ and I$_{DM}$, in real applications , should be limited by total power dissipation.
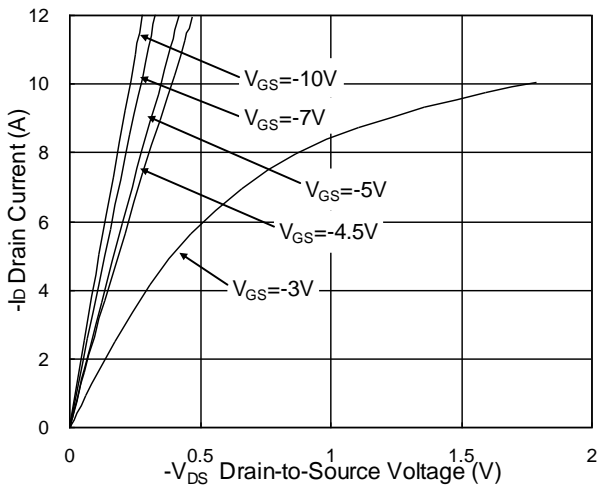
Typical Characteristics
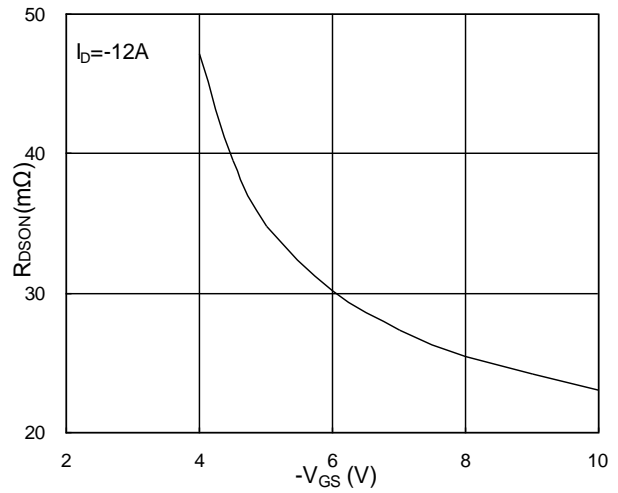
Fig.1 Typical Output Characteristics
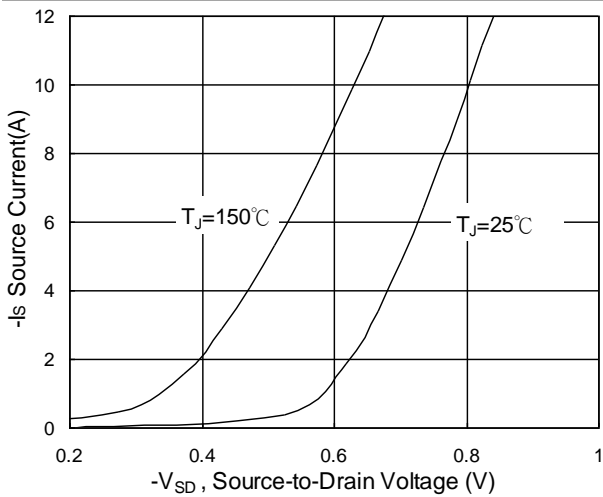
Fig.2 On-Resistance v.s Gate-Source

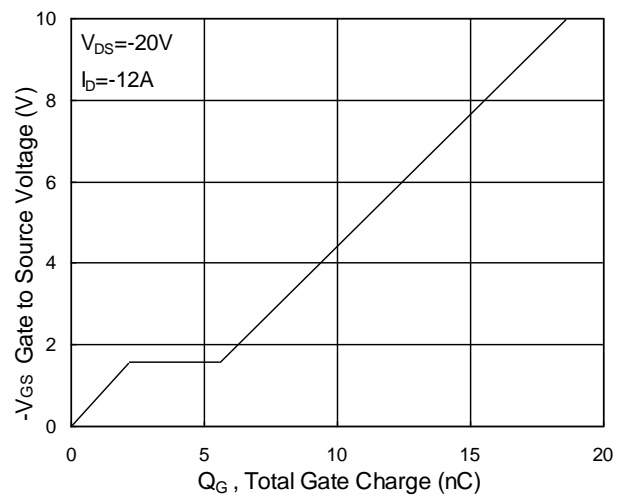**Fig.3 Forward Characteristics of Reverse**
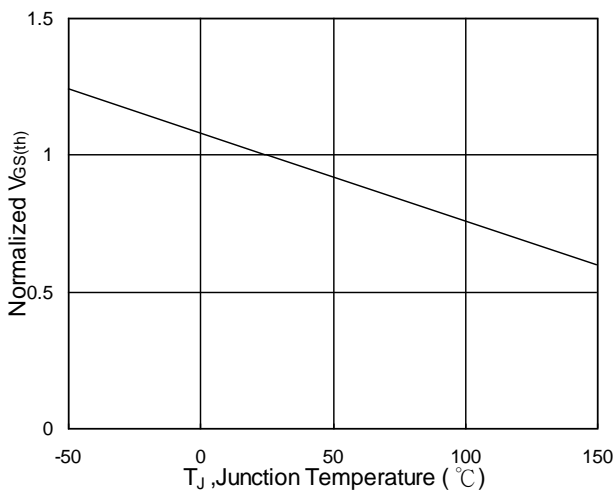
Fig.4 Gate-Charge Characteristics

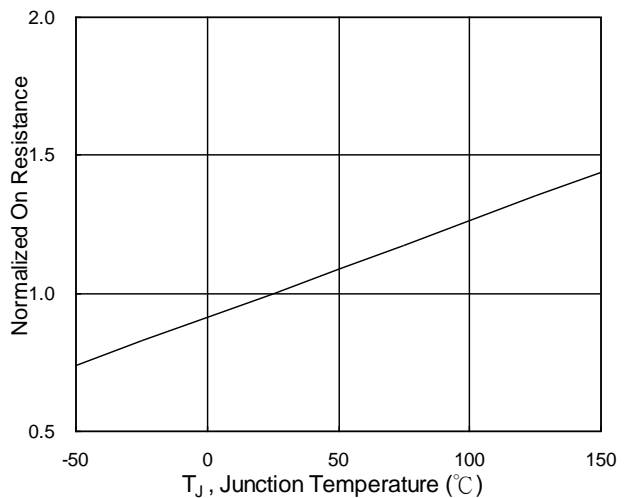**Fig.5 Normalized $V_{GS(th)}$ v.s T_J**

Fig.6 Normalized R_{DSON} v.s T_J
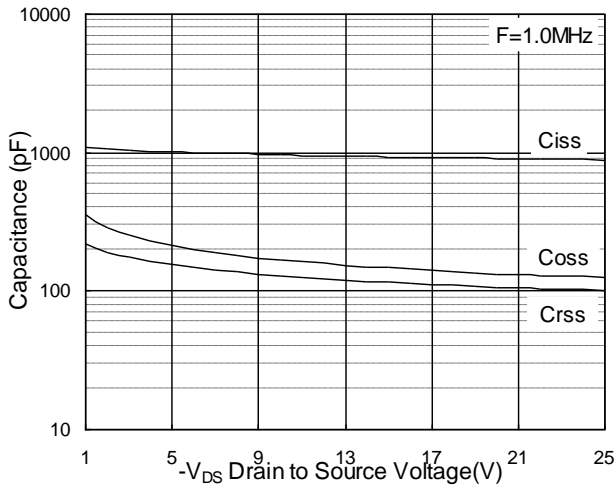
Fig.7 Capacitance
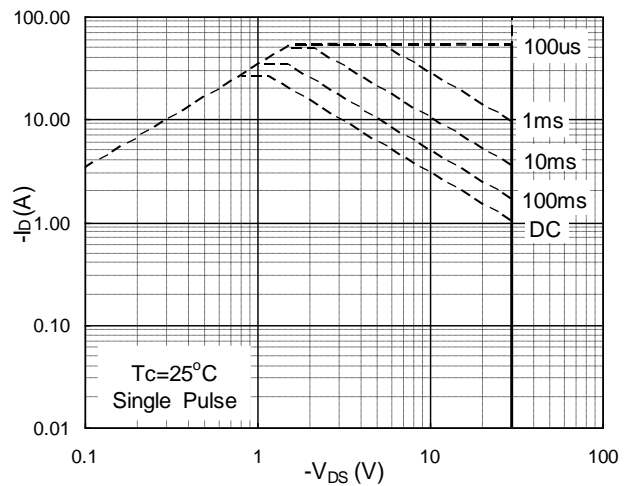
Fig.8 Safe Operating Area

$$D = T_{ON}/T$$

$$T_J peak = T_C + P_{DM} \times R_{\theta JC}$$
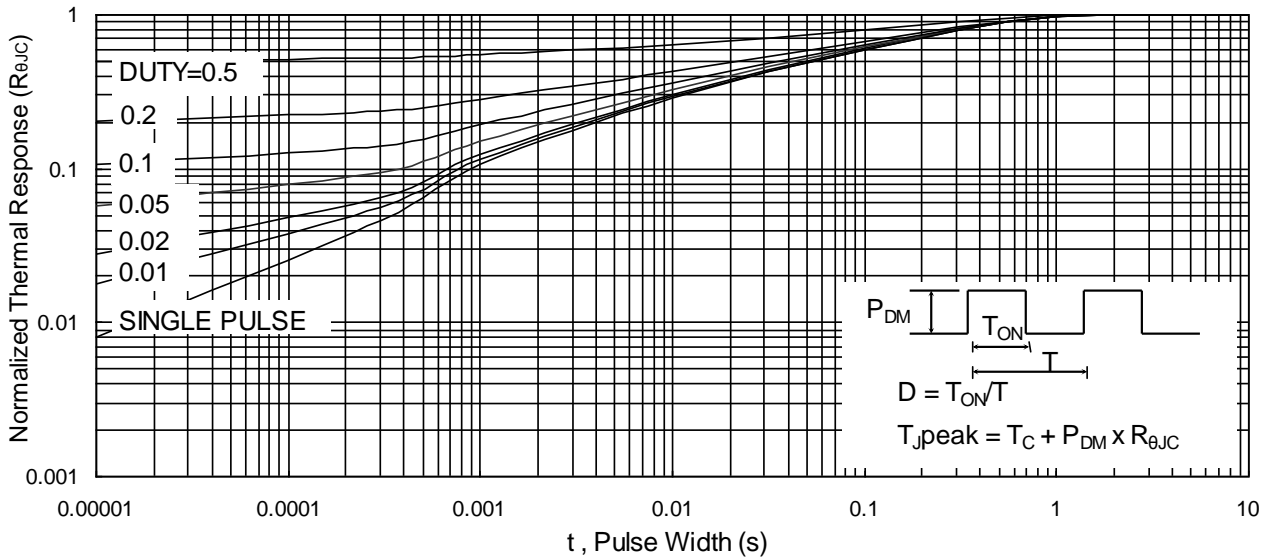
Fig.9 Normalized Maximum Transient Thermal Impedance
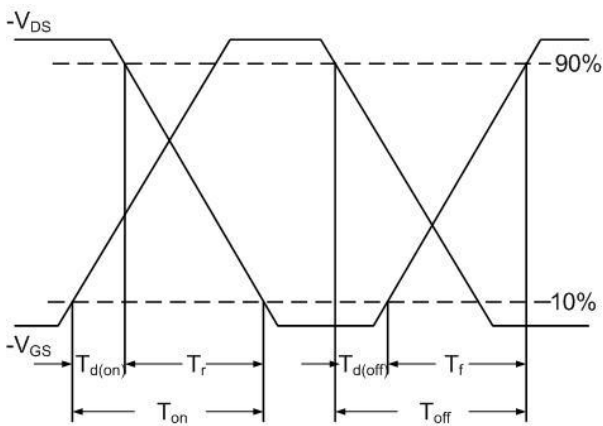
Fig.10 Switching Time Waveform

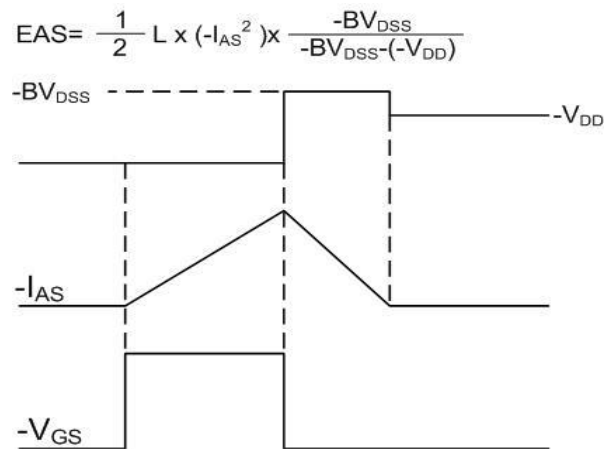$$EAS = \frac{1}{2} L \times (-I_{AS}{}^2) \times \frac{-BV_{DSS}}{-BV_{DSS}-(-V_{DD})}$$

Fig.11 Unclamped Inductive Switching Waveform