FETek Technology Corp.

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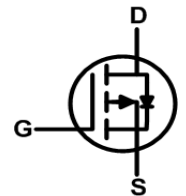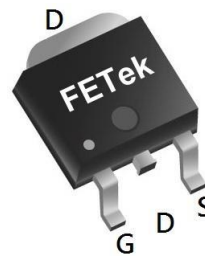- ★ Advanced high cell density Trench technology

Product Summary

BVDSS	RDSON	ID
-30V	7.2mΩ	-70A

Description

The FKD3031 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 FKD3031 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[1,6]	-70	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ -10V[1,6]	-50	A
I_{DM}	Pulsed Drain Current[2]	-200	A
EAS	Single Pulse Avalanche Energy[3]	80	mJ
I_{AS}	Avalanche Current	-40	A
P_D@T_C=25°C	Total Power Dissipation[4]	90	W
T_{STG}	Storage Temperature Range	-55 to 175	°C
T_J	Operating Junction Temperature Range	-55 to 175	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient [1](t≦10S)	---	20	°C/W
	Thermal Resistance Junction-ambient [1](Steady State)	---	50	°C/W
$R_{θJC}$	Thermal Resistance Junction-case [1]	---	1.6	°C/W

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
R$_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V$_{GS}$=-10V , I$_D$=-20A	---	6	7.2	mΩ
		V$_{GS}$=-4.5V , I$_D$=-15A	---	9.5	12	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1.2	---	-2.5	V
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$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA
Rg	Gate Resistance	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	1.2	----	Ω
Q$_g$	Total Gate Charge (-10V)	V$_{DS}$=-15V , V$_{GS}$=-10V , I$_D$=-18A	---	60	---	nC
Q$_{gs}$	Gate-Source Charge		---	9	---	
Q$_{gd}$	Gate-Drain Charge		---	15	---	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=-15V , V$_{GS}$=-10V , R$_G$=3.3Ω, I$_D$=-20A	---	17	---	ns
T$_r$	Rise Time		---	40	---	
T$_{d(off)}$	Turn-Off Delay Time		---	55	---	
T$_f$	Fall Time		---	13	---	
C$_{iss}$	Input Capacitance	V$_{DS}$=-25V , V$_{GS}$=0V , f=1MHz	---	3450	---	pF
C$_{oss}$	Output Capacitance		---	255	---	
C$_{rss}$	Reverse Transfer Capacitance		---	140	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current[1,5]	V$_G$=V$_D$=0V , Force Current	---	---	-70	A
V$_{SD}$	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25℃	---	---	-1.2	V
t$_{rr}$	Reverse Recovery Time	I$_F$=-20A , di/dt=100A/μs ,	---	22	---	nS
Q$_{rr}$	Reverse Recovery Charge	T$_J$=25℃	---	72	---	nC

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 ≦ 300us , duty cycle ≦ 2%
3. The EAS data shows Max. rating . The test condition is V$_{DD}$=-50V,V$_{GS}$=-10V,L=0.1mH,I$_{AS}$=-40A
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
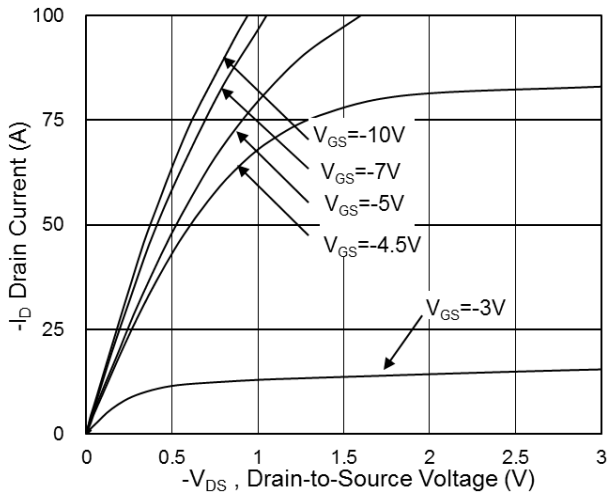6. The maximum current rating is package limited.

Typical Characteristics
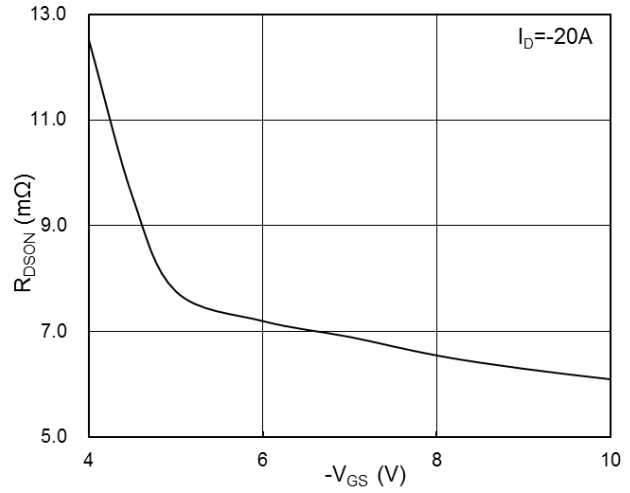
Fig.1 Typical Output Characteristics
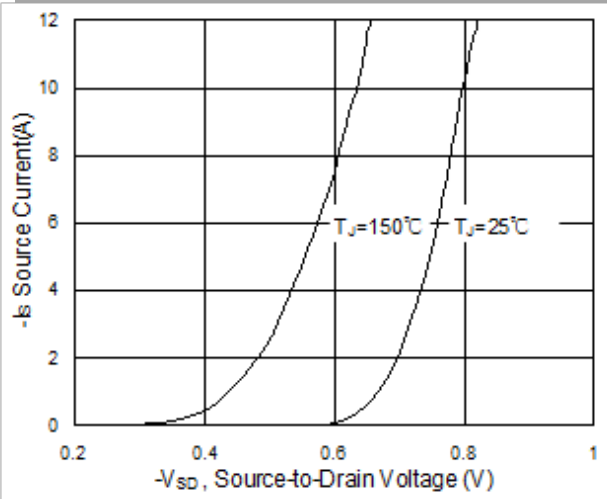
Fig.2 On-Resistance vs. Gate-Source Voltage
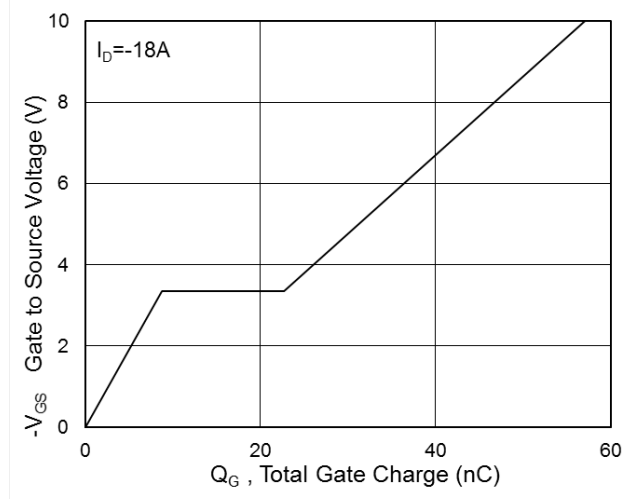
Fig.3 Forward Characteristics of Reverse

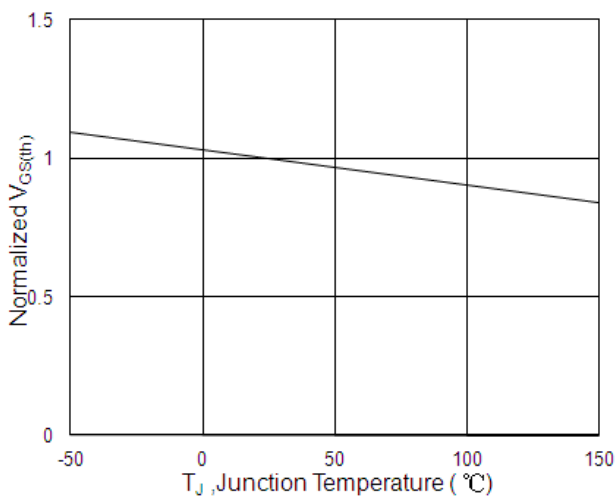**Fig.4 Gate-Charge Characteristics**

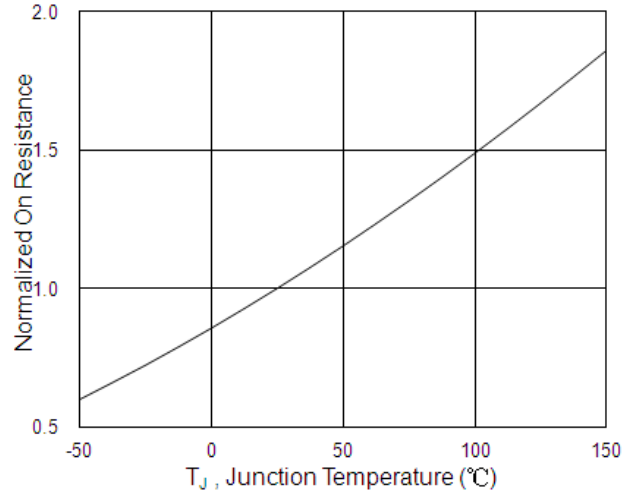**Fig.5 Normalized -$V_{GS(th)}$ vs. T_J**

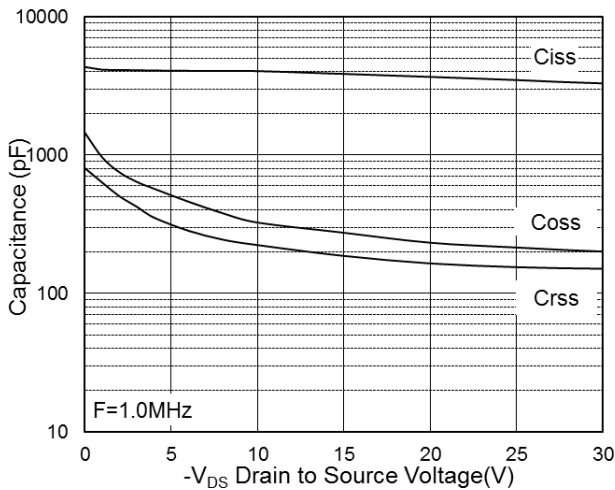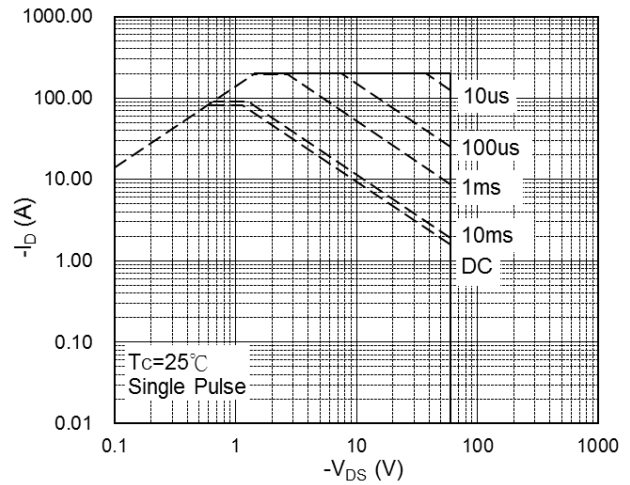**Fig.6 Normalized R_{DSON} vs. T_J**
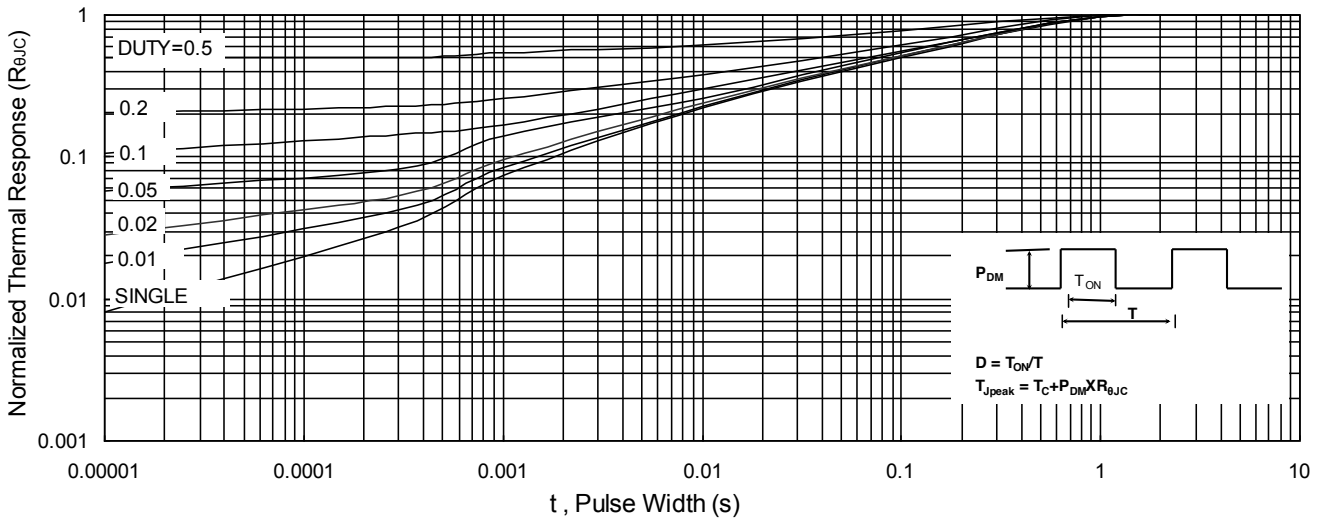
Fig.7 Capacitance

Fig.8 Safe Operating Area

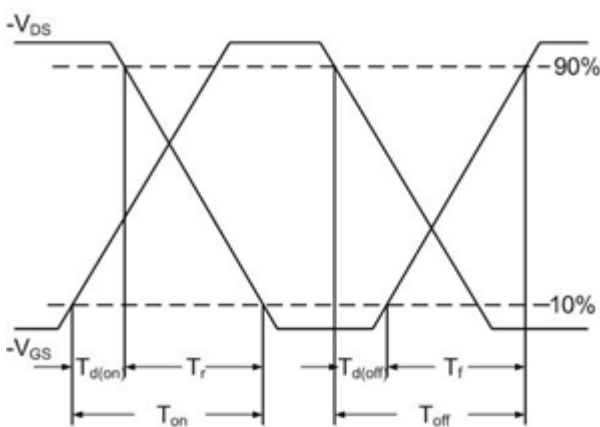**Fig.9 Normalized Maximum Transient Thermal Impedance**

Fig.10 Switching Time Waveform

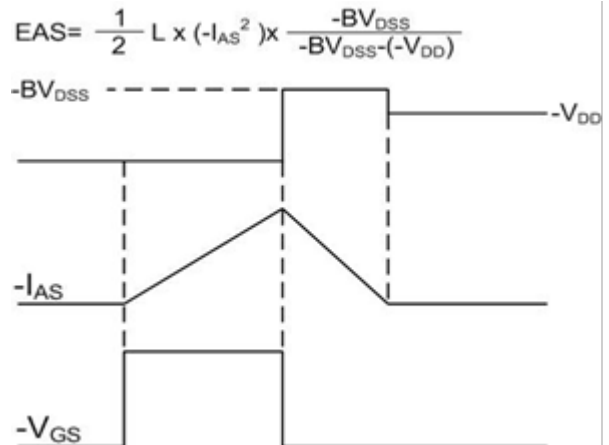$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS}-(-V_{DD})}$$

Fig.11 Unclamped Inductive Switching Waveform