FETek Technology Corp.

★ Super Low $R_{DS(ON)}$
★ Green Device Available
★ Advanced Trench technology

Product Summary

BVDSS	RDSON	ID
-20V	5mΩ	-50A

Description

The FKCE2631 is the advanced trench P-ch MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery

DFN3.3x3.3 Pin Configuration
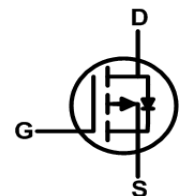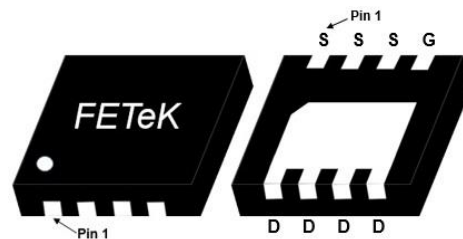
Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
$I_D@T_C=25℃$	Continuous Drain Current[1]	-50	A
$I_D@T_C=100℃$	Continuous Drain Current[1]	-39	A
I_{DM}	Pulsed Drain Current[2]	-200	A
EAS	Single Pulse Avalanche Energy[3]	80	mJ
I_{AS}	Avalanche Current	40	A
$P_D@T_C=25℃$	Total Power Dissipation[4]	83	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient [1]($t≦10S$)	---	20	℃/W
	Thermal Resistance Junction-ambient [1](Steady State)	---	55	℃/W
$R_{θJC}$	Thermal Resistance Junction-case [1]	---	1.5	℃/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	-20	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V , I_D=-20A	---	3.6	5	mΩ
		V_{GS}=-2.5V , I_D=-20A	---	4.7	6.5	mΩ
		V_{GS}=-1.8V , I_D=-20A	---	6.4	8.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.35	-0.5	-1.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-16V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-16V , V_{GS}=0V , T_J=125℃	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
Rg	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	5	---	Ω
Q_g	Total Gate Charge (10V)		---	76	---	nC
Q_{gs}	Gate-Source Charge	V_{DS}=-15V , V_{GS}=-10V , I_D=-20A	---	9	---	
Q_{gd}	Gate-Drain Charge		---	13.7	---	
$T_{d(on)}$	Turn-On Delay Time		---	12	---	ns
T_r	Rise Time	V_{DD}=-15V , V_{GS}=-10V , R_G=3Ω,	---	10.7	---	
$T_{d(off)}$	Turn-Off Delay Time	I_D=-20A	---	55.4	---	
T_f	Fall Time		---	15.2	---	
C_{iss}	Input Capacitance		---	4307	---	pF
C_{oss}	Output Capacitance	V_{DS}=-10V , V_{GS}=0V , f=1MHz	---	501	---	
C_{rss}	Reverse Transfer Capacitance		---	321	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-50	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 ,	---	55	---	nS
Q_{rr}	Reverse Recovery Charge	T_J=25℃	---	365	---	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 $\leqq$ 300us , duty cycle $\leqq$ 2%
3. The EAS data shows Max. rating . The test condition is V_{DD}=-25V,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.
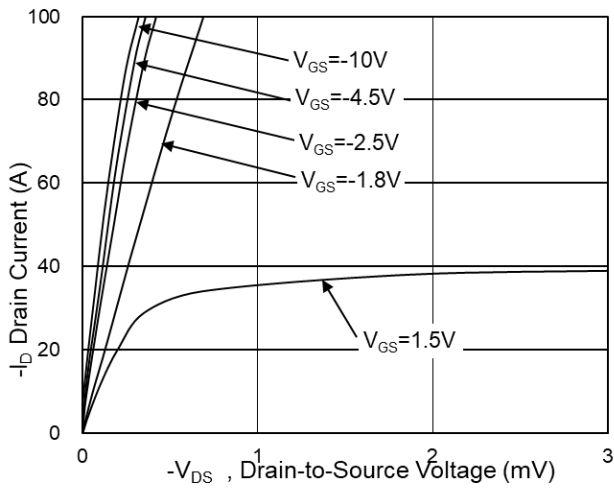
Typical Characteristics
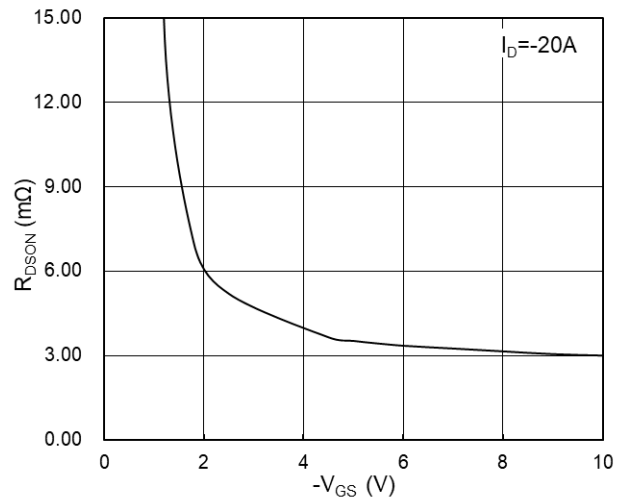
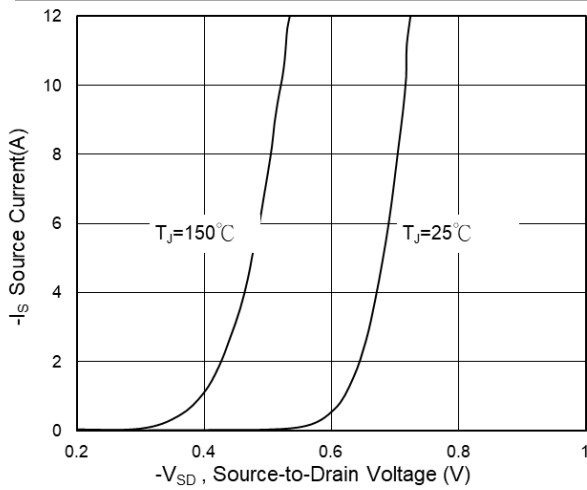**Fig.1 Typical Output Characteristics**

Fig.2 On-Resistance vs G-S Voltage
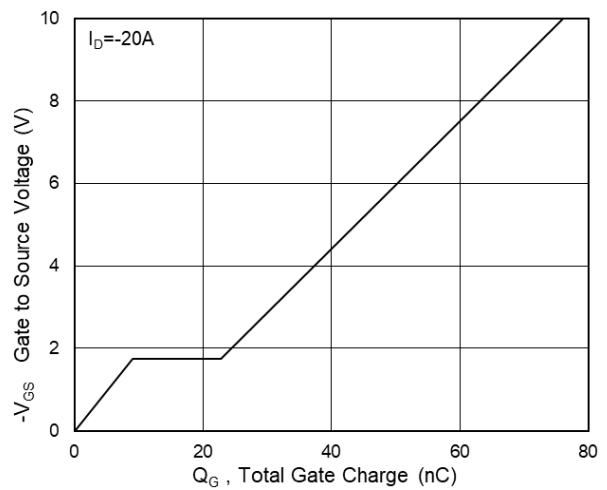
Fig.3 Source Drain Forward Characteristics

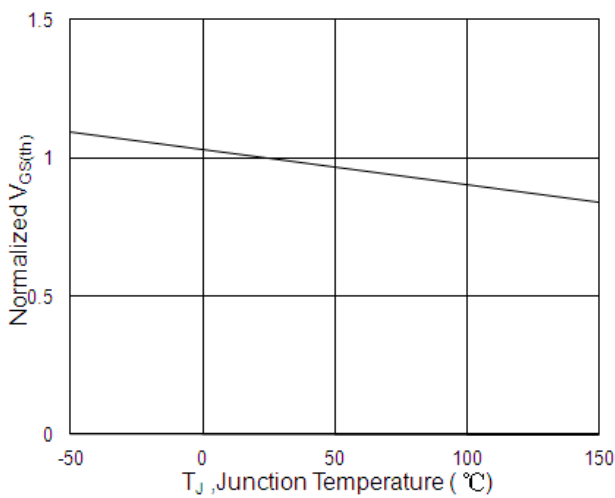**Fig.4 Gate-Charge Characteristics**

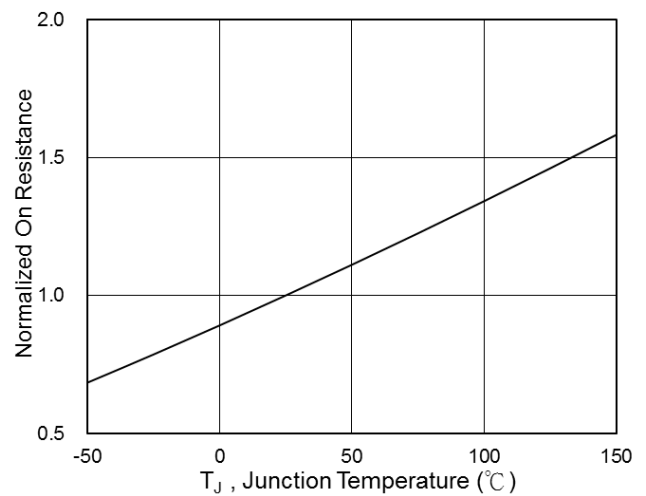**Fig.5 Normalized $V_{GS(th)}$ vs T_J**

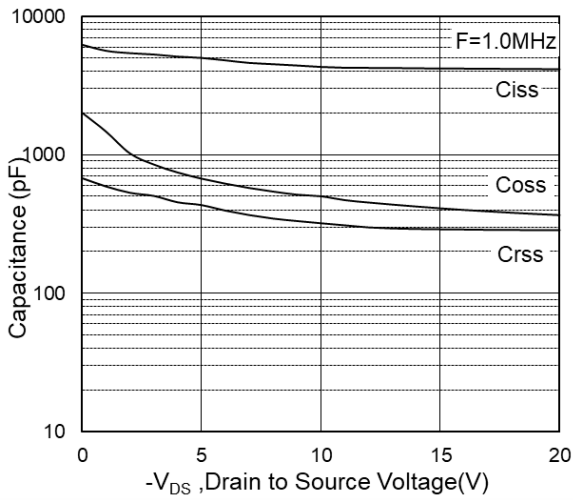**Fig.6 Normalized R_{DSON} vs T_J**

Fig.7 Capacitance
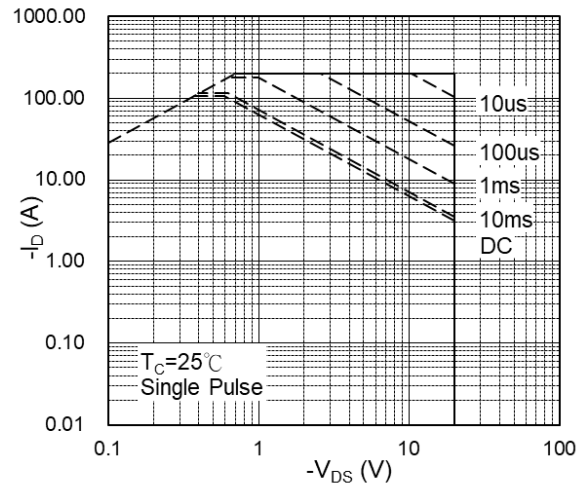
Fig.8 Safe Operating Area
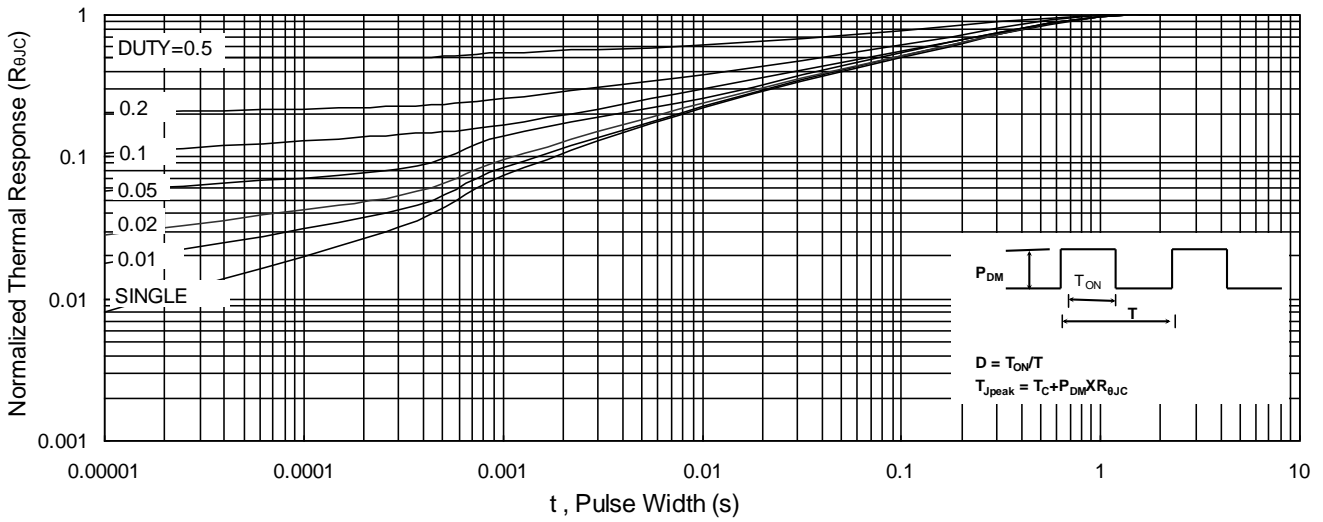
Fig.9 Normalized Maximum Transient Thermal Impedance

$$D = T_{ON}/T$$
$$T_{Jpeak} = T_C + P_{DM} \times R_{\theta JC}$$
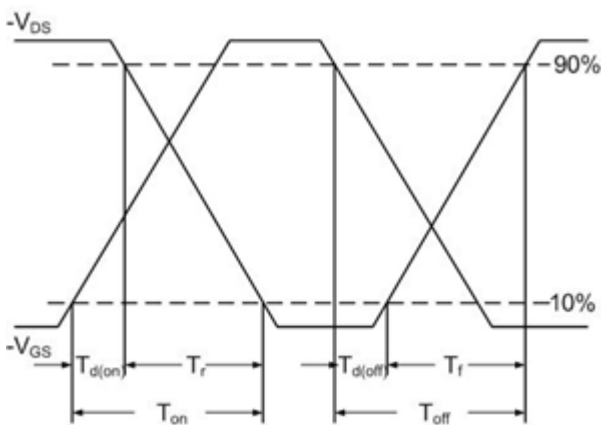
Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS} - (-V_{DD})}$$
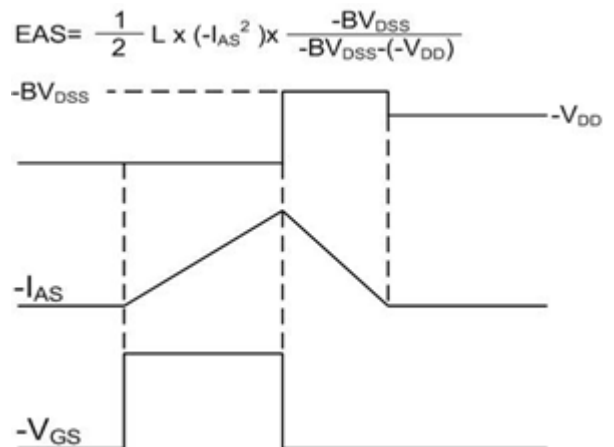
Fig.11 Unclamped Inductive Switching Waveform

DFN3.3x3.3 8L Outline

LAND PATTERN RECOMMENDATION
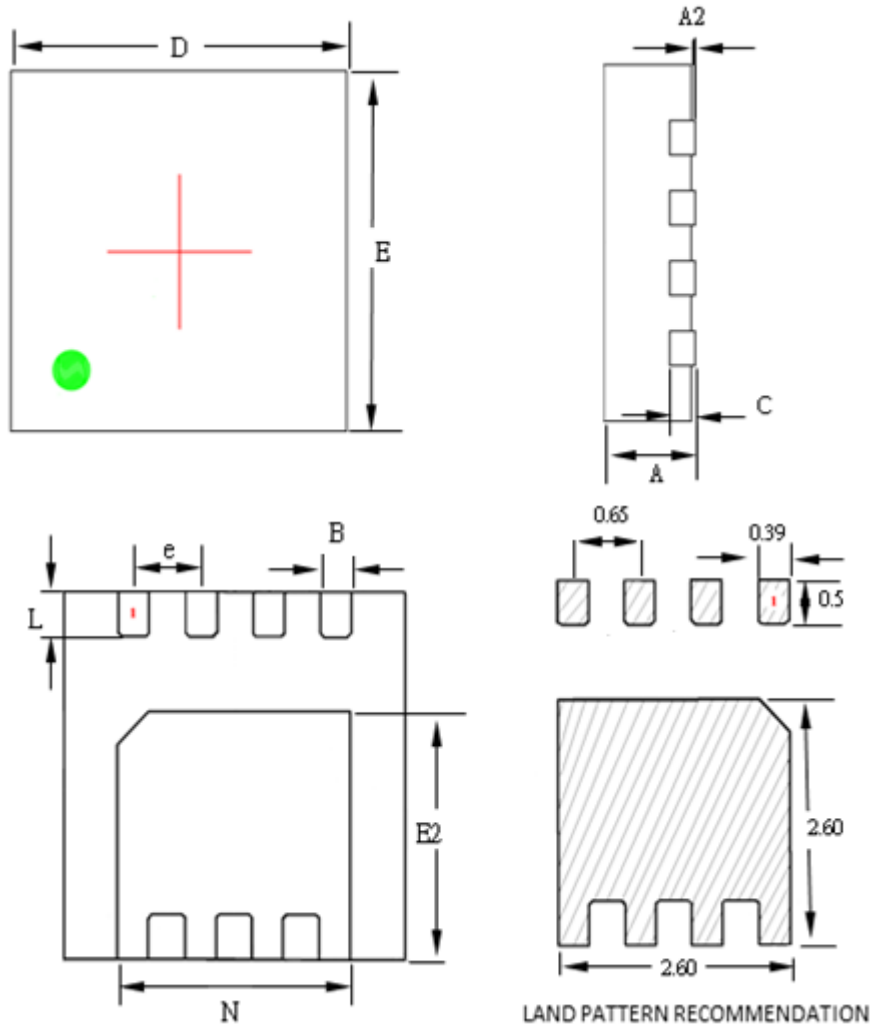
SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.031
A2	0.00	--	0.05	0.000	--	0.002
B	0.24	0.30	0.35	0.009	0.012	0.014
C	0.10	0.15	0.25	0.004	0.006	0.010
D	3.15	3.30	3.40	0.124	0.130	0.134
E	3.15	3.30	3.40	0.124	0.130	0.134
E2	2.15	2.25	2.35	0.085	0.089	0.093
L	0.35	0.40	0.45	0.014	0.016	0.018
N	2.10	2.25	2.35	0.083	0.089	0.093
e	--	0.65	--	--	0.026	--