FETek Technology Corp.

N-Ch and P-Ch Fast Switching MOSFETs

★ Green Device Available
★ Super Low Gate Charge
★ Excellent Cdv/dt effect decline
★ Advanced high cell density Trench technology

Product Summary

BVDSS	RDSON	ID
20V	55mΩ	3.5A
-20V	100mΩ	-2.5A

Description

The FKQ2903 is the high performance complementary N-ch and P-ch MOSFETs with high cell density, which provide excellent RDSON and gate charge for most of the small power switching and load switch applications.

The FKQ2903 meet the RoHS and Green Product requirement with full function reliability approved.

TSOP6 Pin Configuration
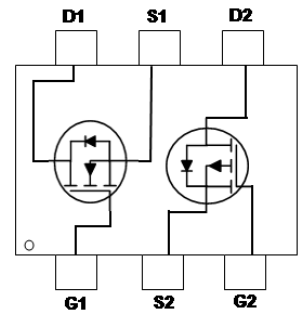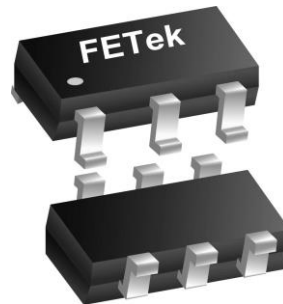
Absolute Maximum Ratings

Symbol	Parameter	Rating N-Channel Steady State	Rating P-Channel Steady State	Units
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-Source Voltage	±12	±12	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	3.5	-2.5	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	3	-2	A
I_{DM}	Pulsed Drain Current[2]	15	-10	A
P_D@T_A=25℃	Total Power Dissipation[3]	1.14	1.14	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction-ambient [1]	---	110	℃/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=3A	---	---	55	mΩ
		V_{GS}=2.5V , I_D=2A	---	---	75	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.4	---	1.2	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=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=3A	---	10.5	---	S
Q_g	Total Gate Charge (4.5V)		---	4.6	---	nC
Q_{gs}	Gate-Source Charge	V_{DS}=15V , V_{GS}=4.5V , I_D=3A	---	0.7	---	
Q_{gd}	Gate-Drain Charge		---	1.5	---	
$T_{d(on)}$	Turn-On Delay Time		---	1.6	---	ns
T_r	Rise Time	V_{DD}=10V , V_{GS}=4.5V , R_G=3.3Ω	---	42	---	
$T_{d(off)}$	Turn-Off Delay Time	I_D=3A	---	14	---	
T_f	Fall Time		---	7	---	
C_{iss}	Input Capacitance		---	310	---	pF
C_{oss}	Output Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	49	---	
C_{rss}	Reverse Transfer Capacitance		---	35	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	1.5	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 ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
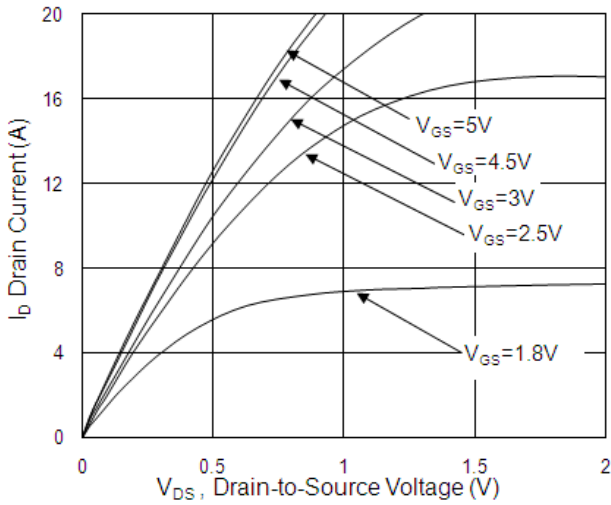
Typical Characteristics

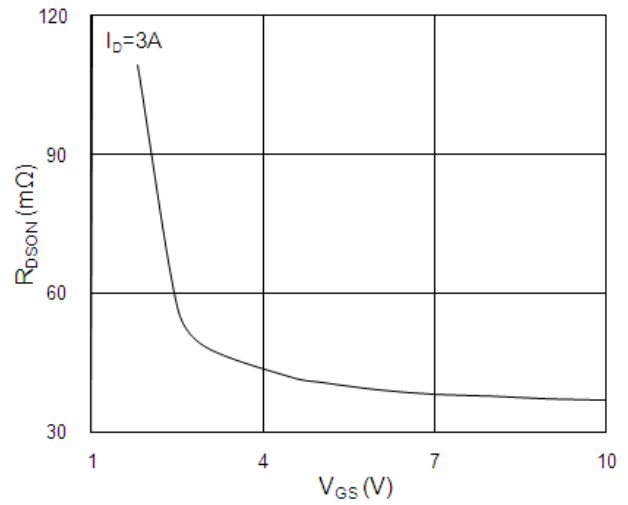**Fig.1 Typical Output Characteristics**
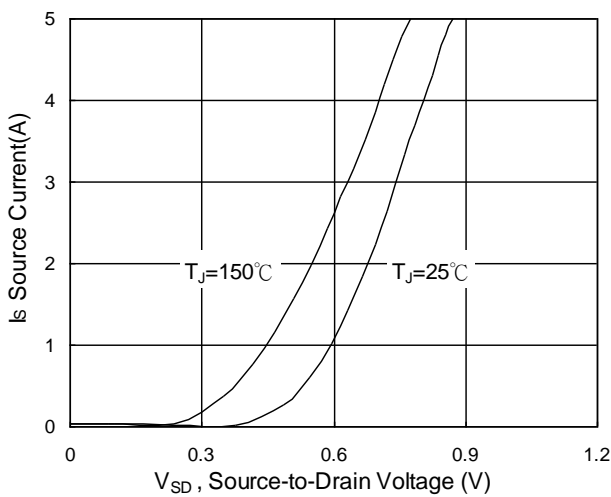
Fig.2 On-Resistance vs G-S Voltage

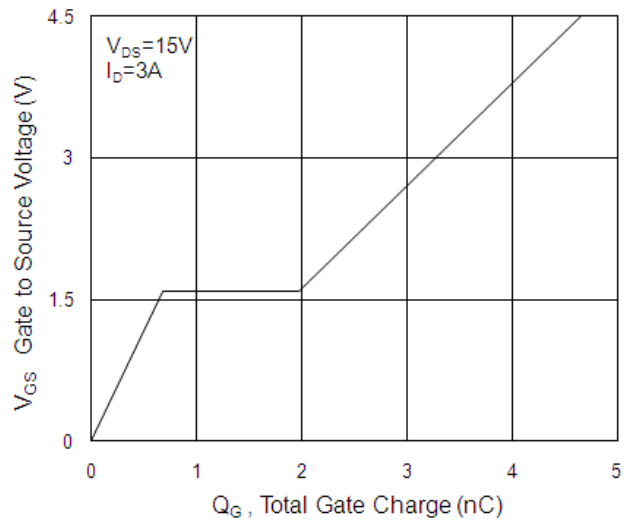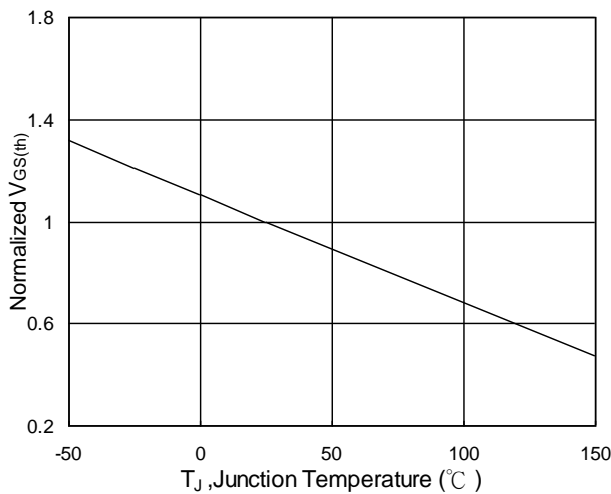**Fig.3 Source Drain Forward Characteristics**

Fig.4 Gate-Charge Characteristics

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

Fig.6 Normalized R_{DSON} vs T_J
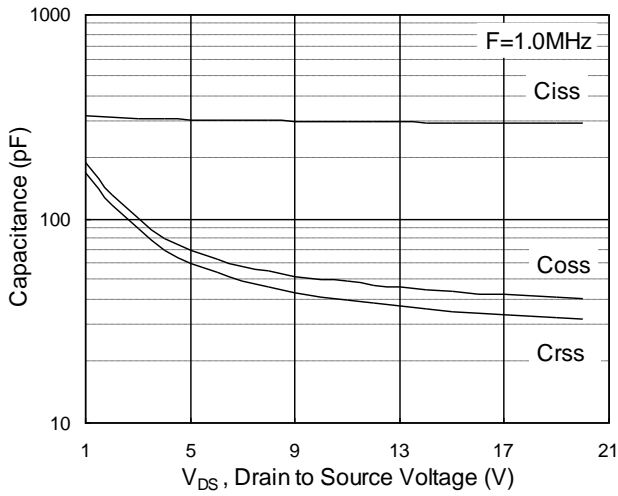
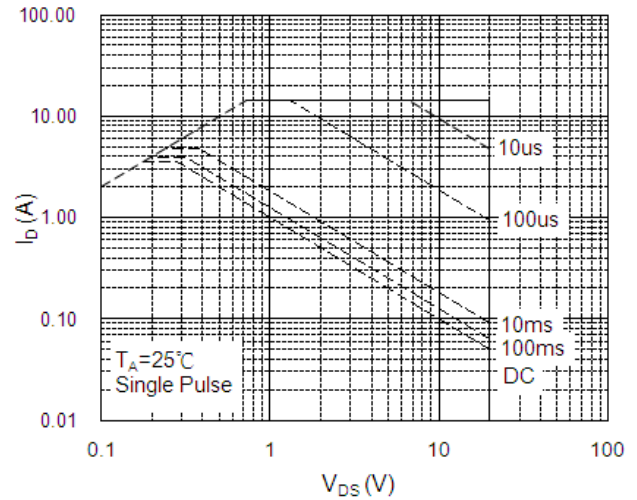FETek Technology Corp.

Fig.7 Capacitance
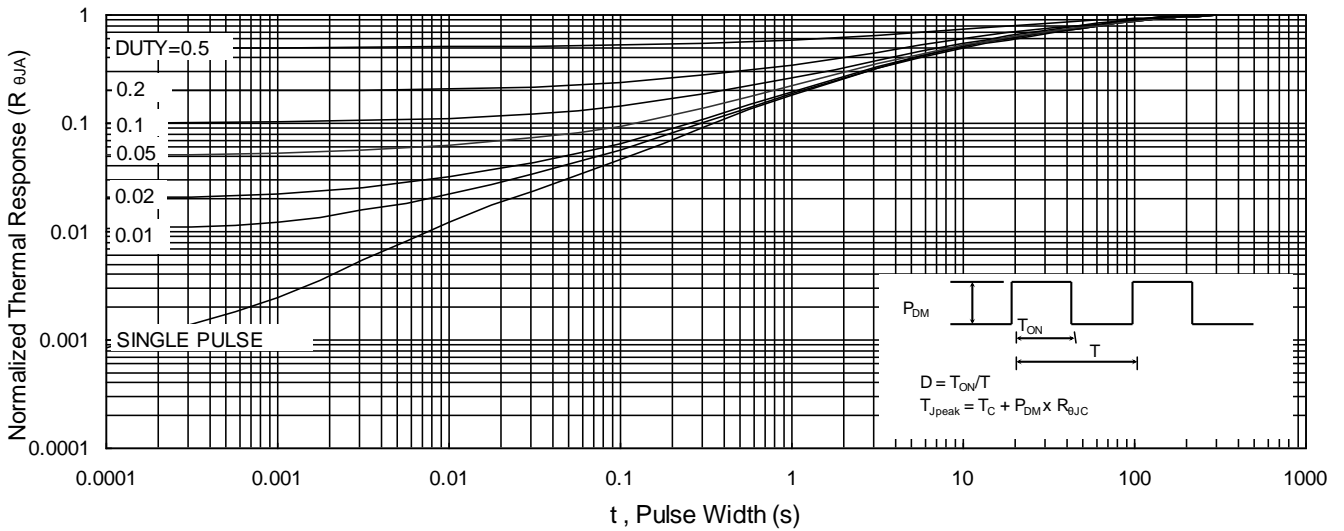

Fig.8 Safe Operating Area

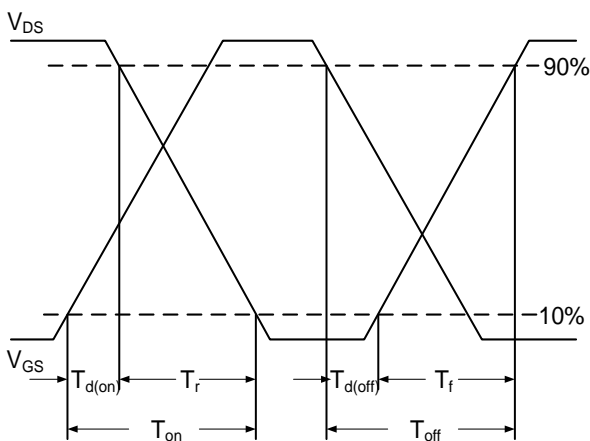**Fig.9 Normalized Maximum Transient Thermal Impedance**
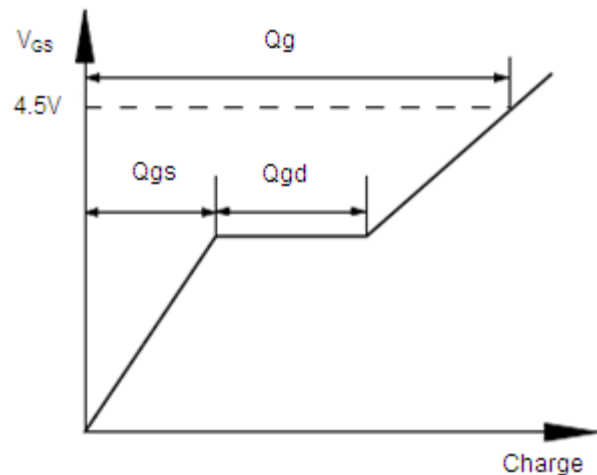

Fig.10 Switching Time Waveform

Fig.11 Gate Charge Waveform

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=-3A	---	---	100	mΩ
		V_{GS}=-2.5V , I_D=-2A	---	---	140	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.4	---	-1.2	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=55℃	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-3A	---	12.2	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-3A	---	10.1	---	nC
Q_{gs}	Gate-Source Charge		---	1.21	---	
Q_{gd}	Gate-Drain Charge		---	2.46	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-10V , V_{GS}=-4.5V , R_G=3.3Ω I_D=-3A	---	5.6	---	ns
T_r	Rise Time		---	32.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	45.6	---	
T_f	Fall Time		---	29.2	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	677	---	pF
C_{oss}	Output Capacitance		---	82	---	
C_{rss}	Reverse Transfer Capacitance		---	73	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	-1.5	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	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 ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
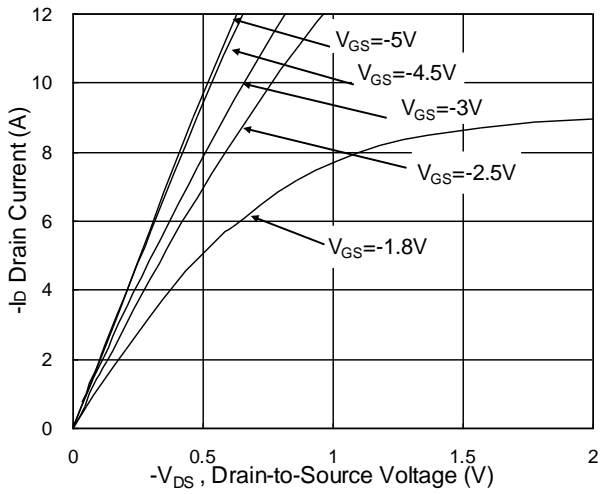
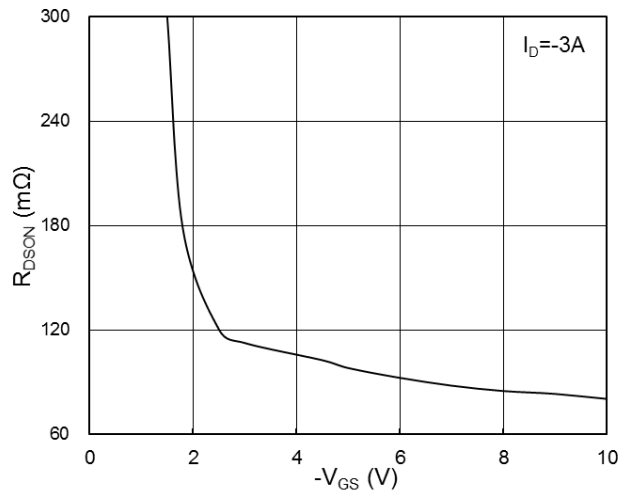## Typical Characteristics

Fig.1 Typical Output Characteristics
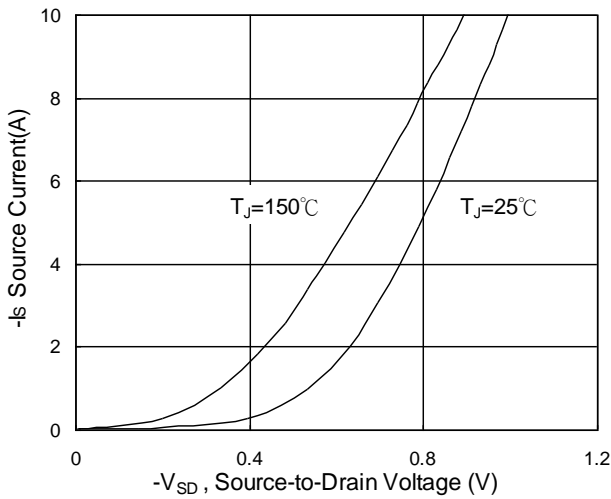

Fig.2 On-Resistance vs G-S Voltage

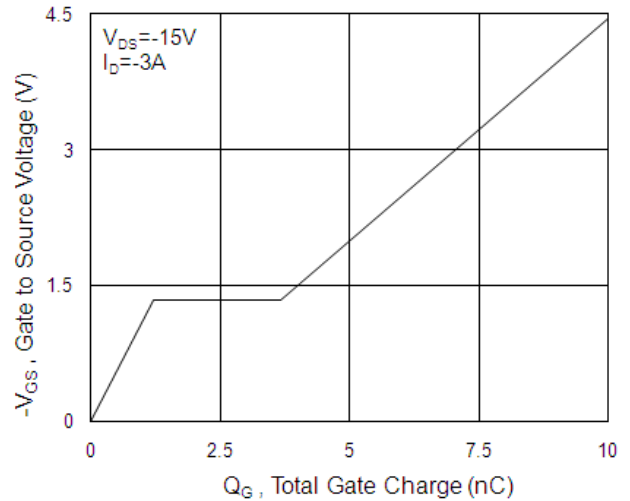**Fig.3 Source Drain Forward Characteristics**
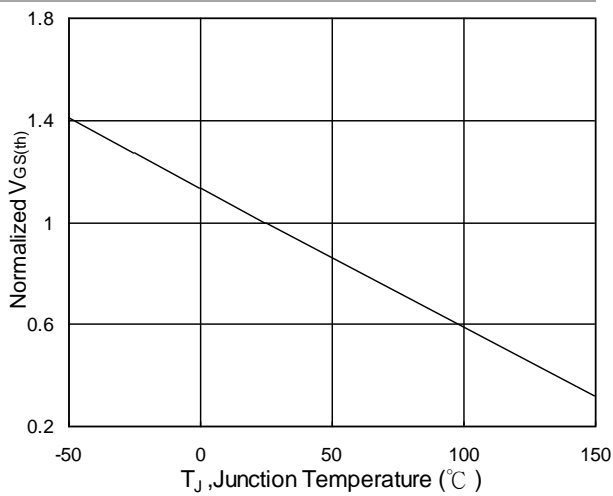

Fig.4 Gate-Charge Characteristics

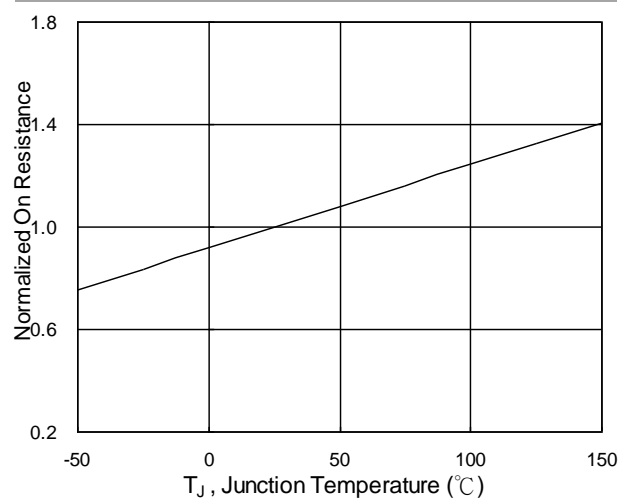**Fig.5 Normalized $V_{GS(th)}$ vs T_J**

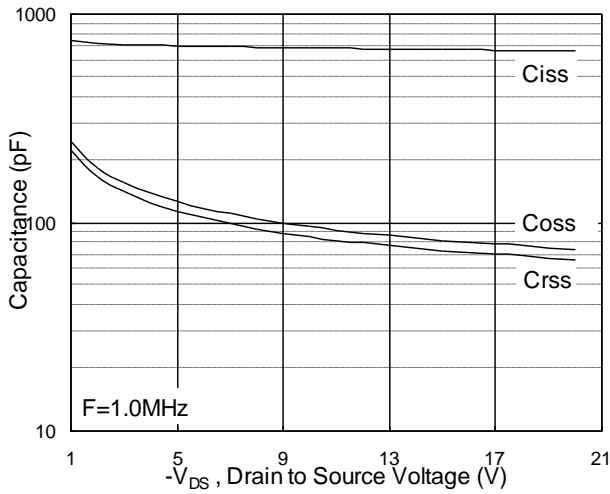**Fig.6 Normalized R_{DSON} vs T_J**

Fig.7 Capacitance
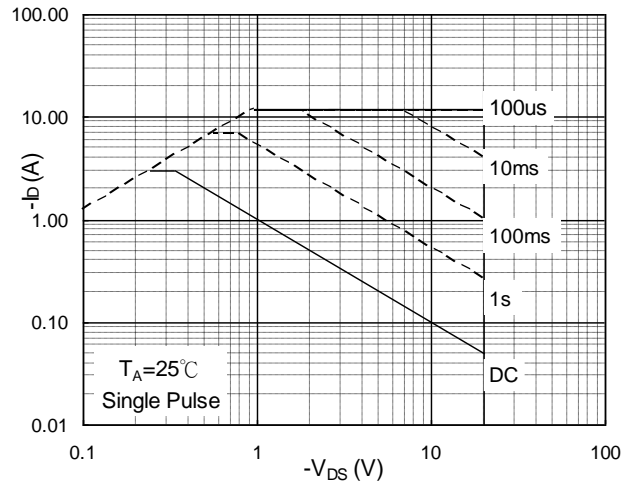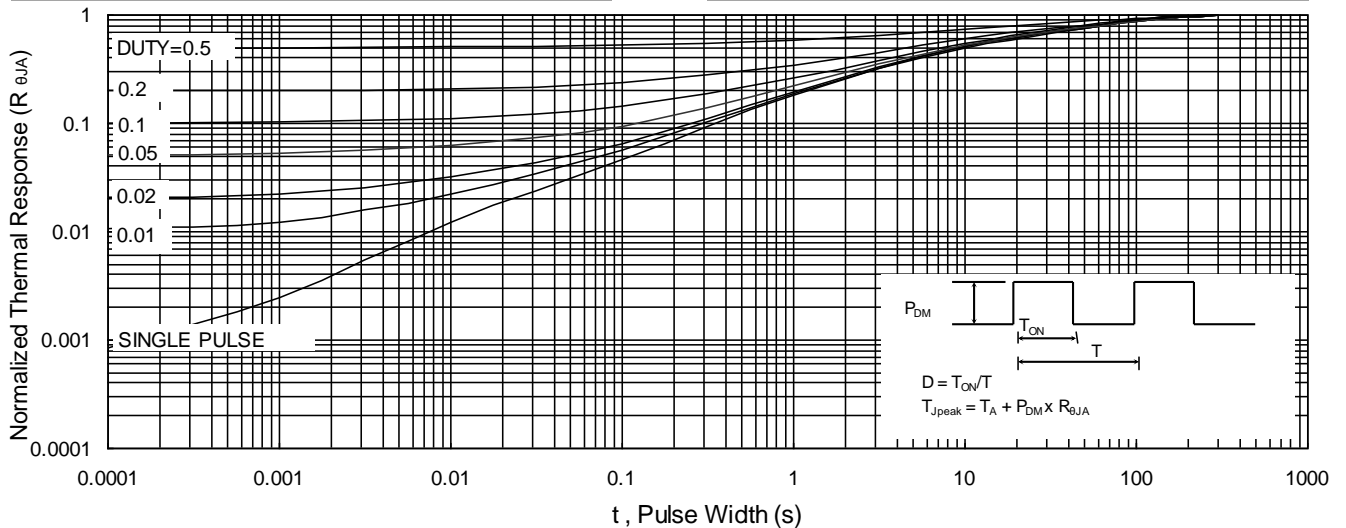
Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance
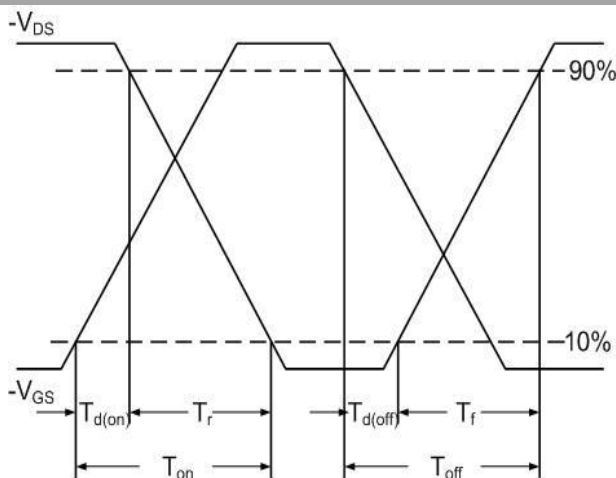
$$D = T_{ON}/T$$
$$T_{Jpeak} = T_A + P_{DM} \times R_{\theta JA}$$

Fig.10 Switching Time Waveform

Fig.11 Gate Charge Waveform

FETek Technology Corp.
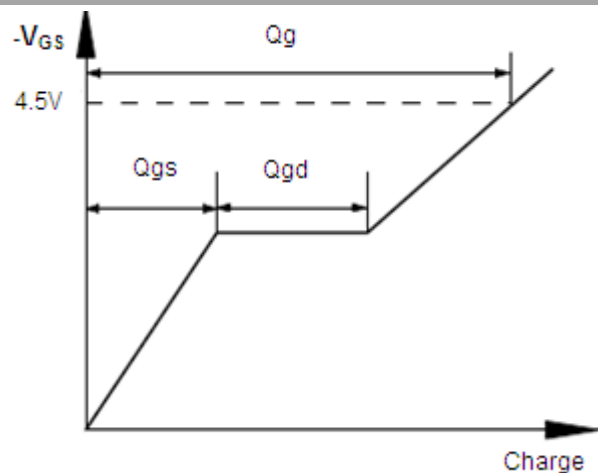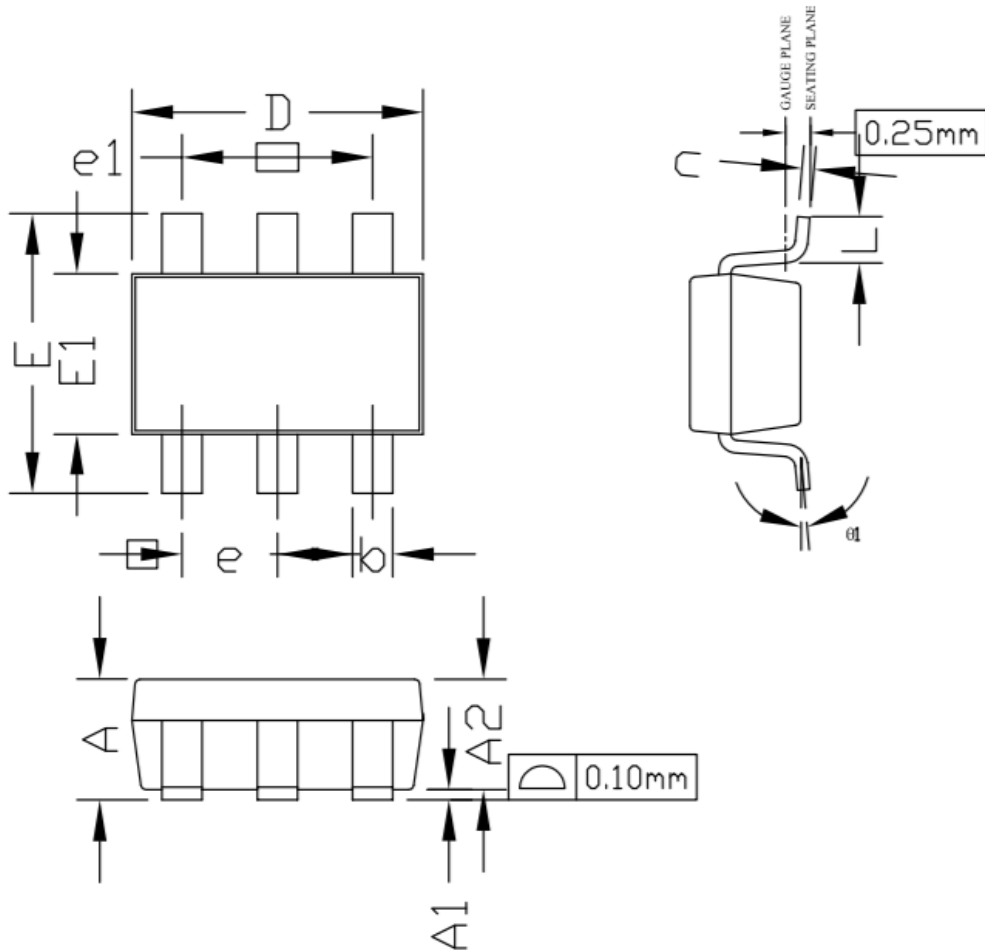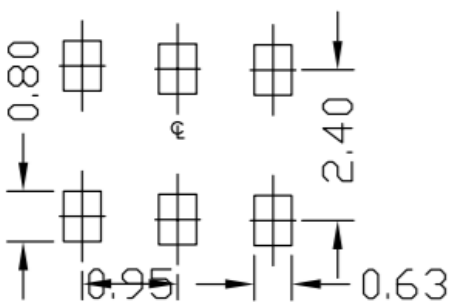
TSOP6 Package Outline Dimensions

RECOMMENDED LAND PATTERN

UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	—	1.25	0.031	—	0.049
A1	0.00	—	0.15	0.000	—	0.006
A2	0.70	1.10	1.20	0.028	0.043	0.047
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.08	0.13	0.20	0.003	0.005	0.008
D	2.70	2.90	3.10	0.106	0.114	0.122
E	2.50	2.80	3.10	0.098	0.110	0.122
E1	1.50	1.60	1.70	0.059	0.063	0.067
e	0.95 BSC.			0.037BSC.		
e1	1.90 BSC.			0.075 BSC.		
L	0.30	—	0.60	0.012	—	0.024
θ1	0°	—	8°	0°	—	8°