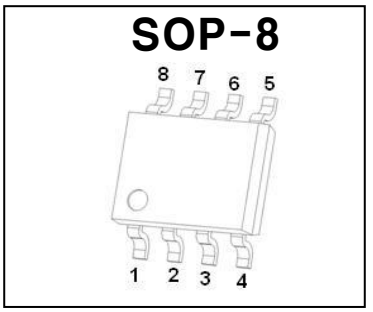
P Channel MOS FET

$V_{(BR)DSS}$	$R_{DS(on)}$MAX	I_D
-20V	8.5mΩ@-4.5V	-14A
	12mΩ@-2.5V	
	15mΩ@-1.8V	



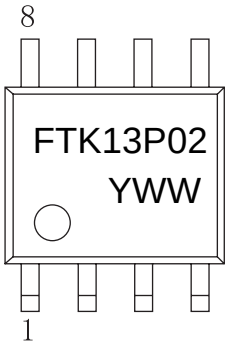
FEATURE

- High Density Cell Design for Ultra Low Rdson
- Fully Characterized Avalanche Voltage and Current
- Good Stablility and Uniformity With High E_{AS}
- Excellent Package for Good Heat Dissipation

APPLICATION

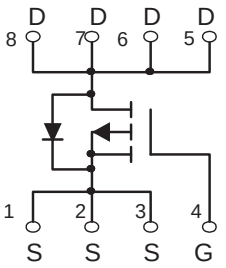
- Load Switch
- Battery Protection

MARKING



FTK13P02 = Device code
Solid dot = Pin1 indicator
YWW = Date Code

Equivalent Circuit



ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	- 20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current	I_D	-14	A
Pulsed Drain Current (note 1)	I_{DM}	-56	A
Power Dissipation	P_D	1.4	W
Thermal Resistance,Junction-to-ambient(note 2)	$R_{\theta JA}$	89.29	℃/W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55~+150	℃

MOSFET ELECTRICAL CHARACTERISTICS

T_a=25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=-250uA	-20	---	---	V
BVDSS temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=-1mA	---	-0.01	---	V/°C
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250uA	-0.3	-0.6	-1.0	V
Drain-source leakage current	I_{DSS}	V_{DS}=-20 V, V_{GS}=0V, T_J = 25°C	---	---	-1	μA
		V_{DS}=-16 V, V_{GS}=0V, T_J = 125°C	---	---	-10	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=12 V, V_{DS}=0 V	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-12 V, V_{DS}=0 V	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=-4.5V, I_D=-10A	---	6.5	8.5	mΩ
		V_{GS}=-2.5V, I_D=-8A	---	9	12	mΩ
		V_{GS}=-1.8V, I_D=-5A	---	12	15	mΩ
Forward transconductance	g_{fs}	V_{DS} =-10V , I_D=-5A	---	20	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = -15V, V_{GS} = 0 V, F = 1MHz	---	4060	8000	pF
Output capacitance	C_{oss}		---	520	1000	
Reverse transfer capacitance	C_{rss}		---	400	800	
Turn-on delay time (note 2,3)	$t_{d(on)}$	V_{DD} = -10V,V_{GS}=-4.5V, I_D = -1A R_G = 25Ω	---	13.2	26	ns
Rise time (note 2,3)	t_r		---	68	120	
Turn-off delay time (note 2,3)	$t_{d(off)}$		---	160	320	
Fall time (note 2,3)	t_f		---	154	300	
Gate charge characteristics						
Gate to source charge (note 2,3)	Q_{gs}	V_{DS}=-10 V, I_D=-5A, V_{GS}= -4.5 V	---	7.2	14	nC
Gate to drain charge (note 2,3)	Q_{gd}		---	10.2	20	
Gate charge total (note 2,3)	Q_g		---	44.4	80	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0 V, Force Current	---	---	-14	A
Pulsed Source Current	I_{SM}		---	---	-28	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-1A, T_J=25℃	---	---	-1	V

Notes:

1: Repetitive Rating: Pulse width limited by maximum junction temperature.

2: Pulse Test：Pulse Width ≤300μ s, Duty Cycle≤ 2%.

3: Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Continuous Drain Current vs. T_c

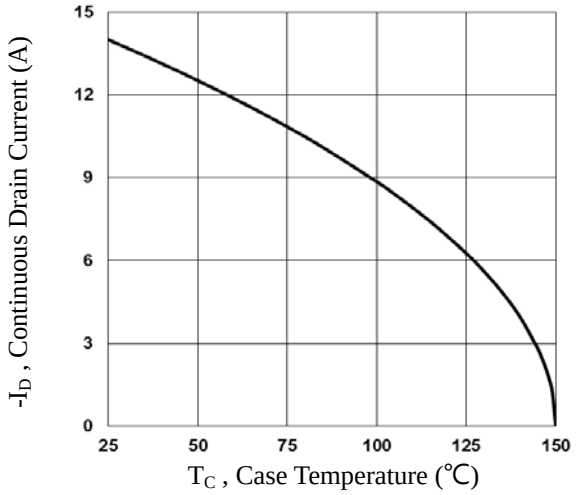


Figure 2. Normalized RDSON vs. T_J

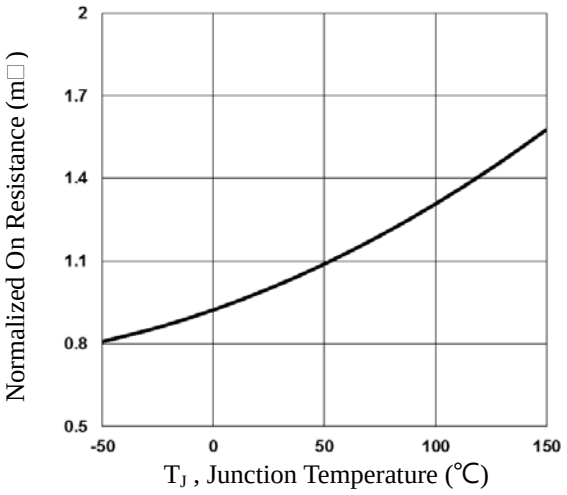


Figure 3. Normalized V_{th} vs.T_J

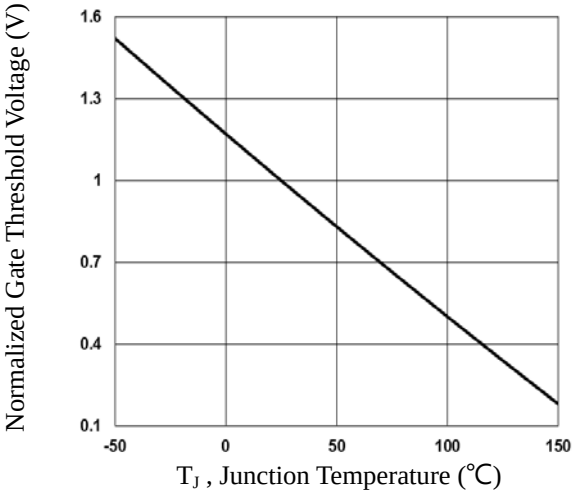


Figure 4. Gate Charge Waveform

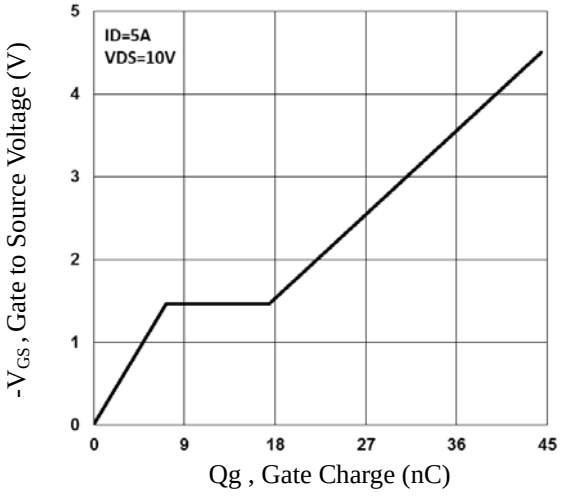


Figure 5. Normalized Transient Impedance

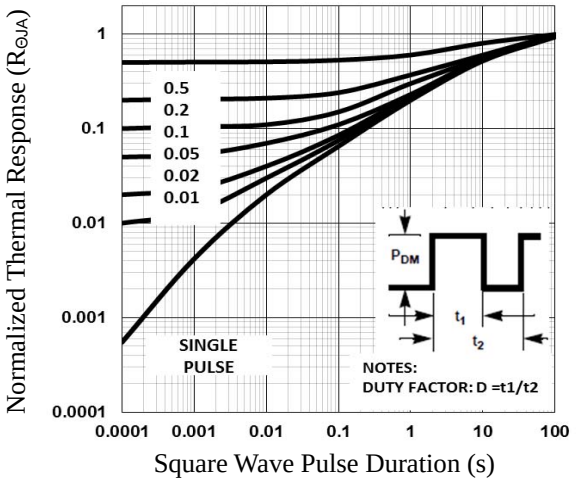
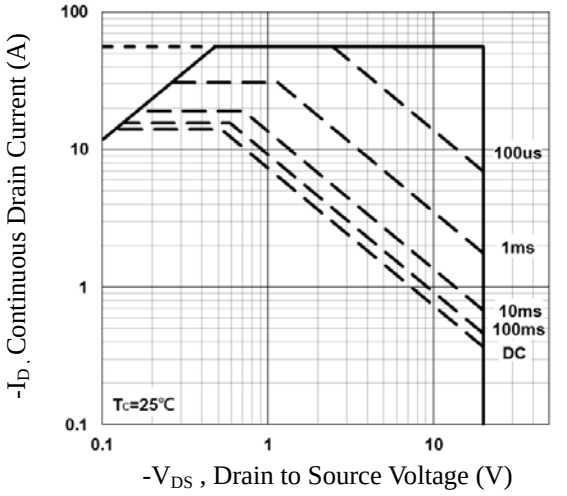
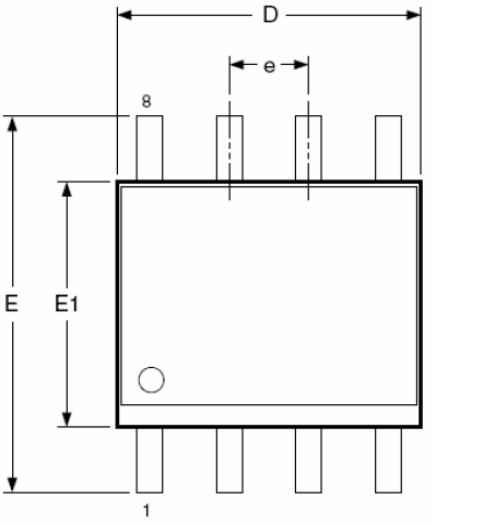


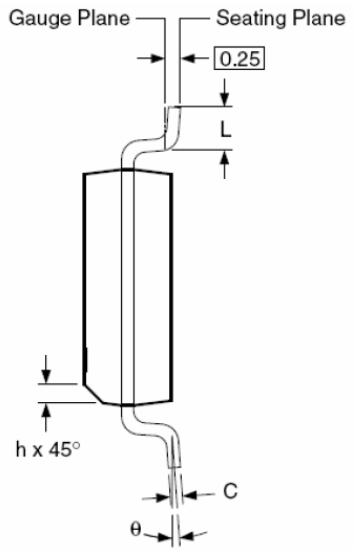
Figure 6. Maximum Safe Operation Area

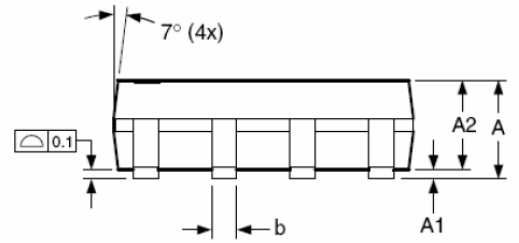


SOP-8 PACKAGE INFORMATION

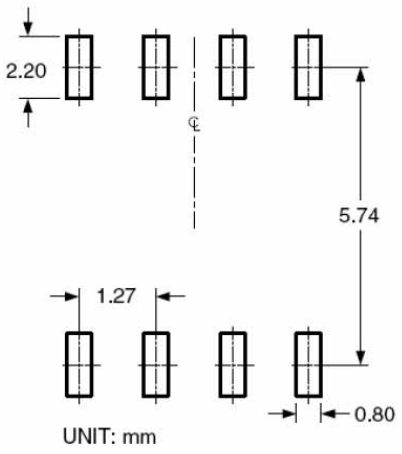
Dimensions in Millimeters (UNIT:mm)







RECOMMENDED LAND PATTERN



Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	1.35	1.65	1.75
A1	0.10	—	0.25
A2	1.25	1.50	1.65
b	0.31	—	0.51
c	0.17	—	0.25
D	4.80	4.90	5.00
E1	3.80	3.90	4.00
e	1.27 BSC		
E	5.80	6.00	6.20
h	0.25	—	0.50
L	0.40	—	1.27
θ	0°	—	8°

Dimensions in inches

Symbols	Min.	Nom.	Max.
A	0.053	0.065	0.069
A1	0.004	—	0.010
A2	0.049	0.059	0.065
b	0.012	—	0.020
c	0.007	—	0.010
D	0.189	0.193	0.197
E1	0.150	0.154	0.157
e	0.050 BSC		
E	0.228	0.236	0.244
h	0.010	—	0.020
L	0.016	—	0.050
θ	0°	—	8°

NOTES:

1. All dimensions are in millimeters.
2. Dimensions are inclusive of plating
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.