

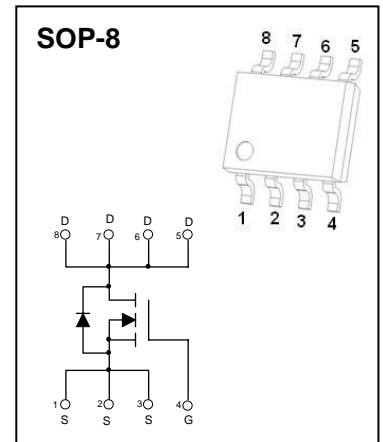
# N-Channel Power MOSFET

## DESCRIPTION

The FTK4406 combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . The device is ideal for load switch and battery protection applications

## APPLICATIONS

- Battery protection applications
- Load switch



## MARKING



Front side

Q4406= Device code  
 Solid dot=Pin1 indicator  
 Solid dot = Green molding compound device,  
 if none, the normal device  
 YY=Date Code

## MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted )

Parameter	Symbol	Limit	Unit
Drain- Source Voltage	$V_{DS}$	30	V
Gate- Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	10	A
Pulsed Drain Current	$I_{DM}$	40	A
Single Pulsed Avalanche Energy	$E_{AS}^{(1)}$	105	mJ
Power Dissipation	$P_D$	1.4	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	89	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature Range	stg	- 55 ~ +150	$^\circ\text{C}$
Lead Temperature for Soldering Purposes(1/8'' from case for 10s)	$T_L$	260	$^\circ\text{C}$

(1). $E_{AS}$  condition:  $V_{DD}=50\text{V}$ ,  $L=0.5\text{mH}$ ,  $R_G=25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

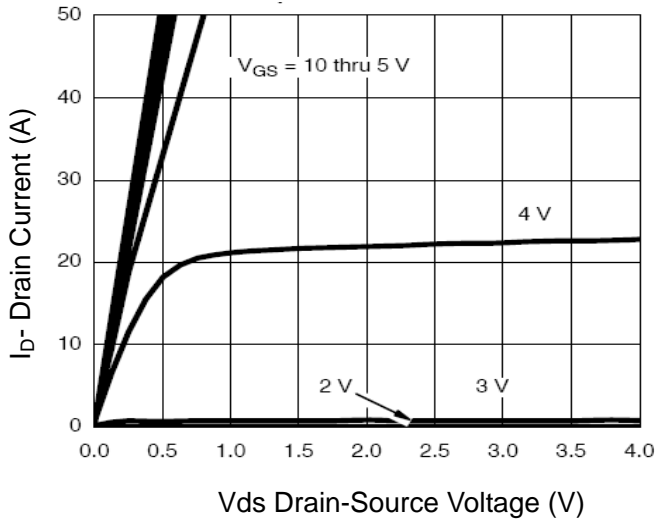
Electrical characteristics (T<sub>a</sub>=25 °C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Off characteristics</b>						
Drain - source breakdown voltage	V <sub>(BR) DSS</sub>	V <sub>GS</sub> = 0V, I <sub>b</sub> = 250μA	30			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V			1	μA
Gate - body leakage current	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V			±100	nA
<b>On characteristics (note1)</b>						
Gate - threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.0		3.0	V
Static drain - source on - state resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 12A		7.6	12	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A		11	16	mΩ
Forward transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 10A		15		S
<b>Dynamic characteristics (note 2)</b>						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1MHz		1550		pF
Output capacitance	C <sub>oss</sub>			300		
Reverse transfer capacitance	C <sub>rss</sub>			180		
<b>Switching characteristics (note 2)</b>						
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 5V, I <sub>D</sub> = 10A		13		nC
Gate - source charge	Q <sub>gs</sub>			5.5		
Gate - drain charge	Q <sub>gd</sub>			3.5		
Turn - on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 25V, I <sub>D</sub> = 1A, V <sub>GS</sub> = 10V, R <sub>G</sub> = 6Ω, R <sub>L</sub> = 6.7Ω		30		ns
Turn - on rise time	t <sub>r</sub>			20		
Turn - off delay time	t <sub>d(off)</sub>			100		
Turn - off fall time	t <sub>f</sub>			80		
Gate Resistance	R <sub>g</sub>	f = 1MHz, V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V,	0.8		2.4	Ω
<b>Drain-Source Diode Characteristics</b>						
Drain - source diode forward voltage(note1)	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 10A			1.2	V
Continuous drain - source diode forward current	I <sub>S</sub>				10	A
Pulsed drain - source diode forward current	I <sub>SM</sub>				40	A

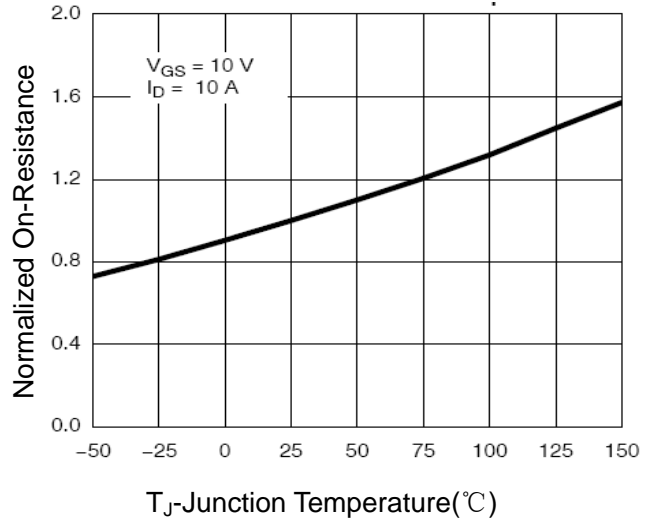
Notes:

1. Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.
2. Guaranteed by design, not subject to production testing.

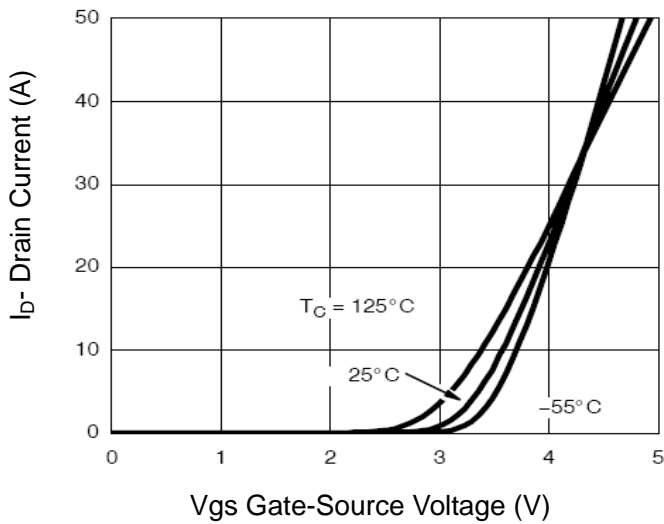
## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



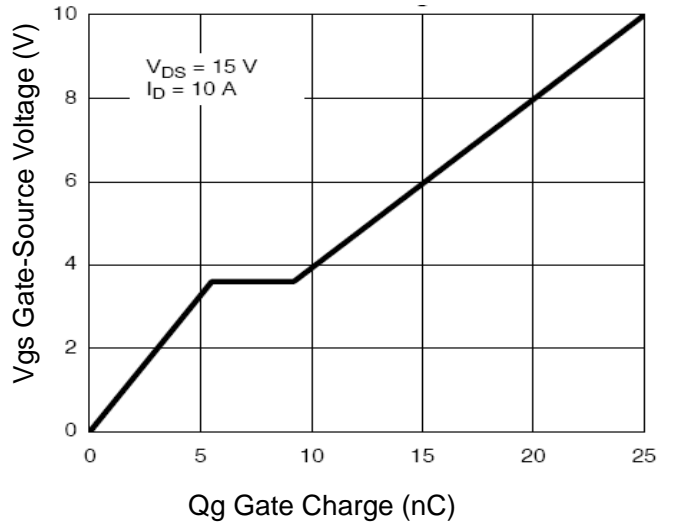
**Figure 1 Output Characteristics**



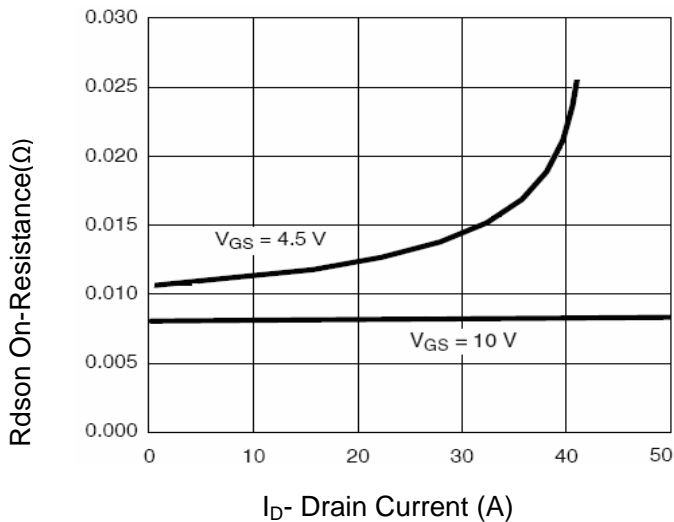
**Figure 4 Rdson-Junction Temperature**



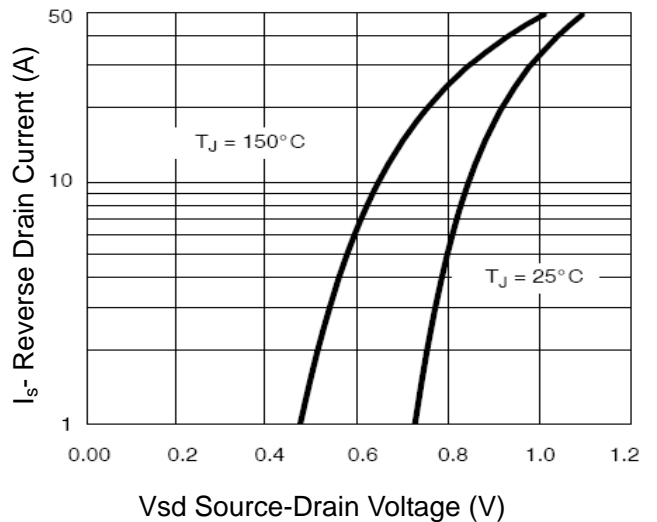
**Figure 2 Transfer Characteristics**



**Figure 5 Gate Charge**

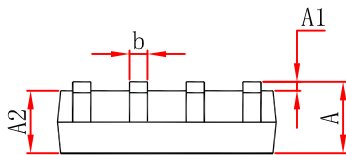
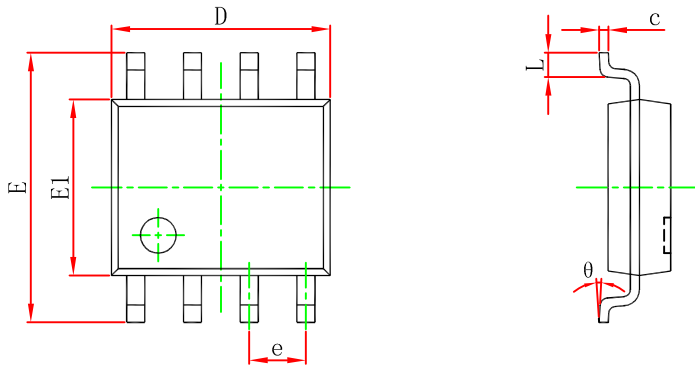


**Figure 3 Rdson- Drain Current**



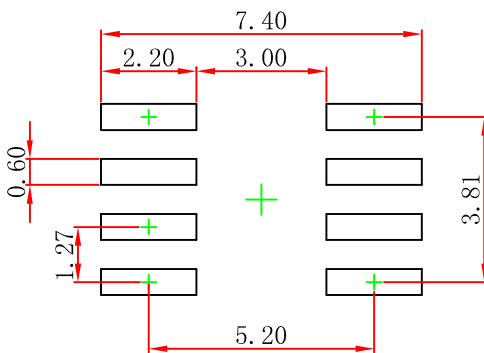
**Figure 6 Source- Drain Diode Forward**

## SOP- 8 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	---	1.750	---	0.069
A1	0.100	0.250	0.004	0.010
A2	1.250	1.500	0.049	0.059
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

## SOP- 8 Suggested Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.