

Portable Equipment Application.

Notebook Application.

Features

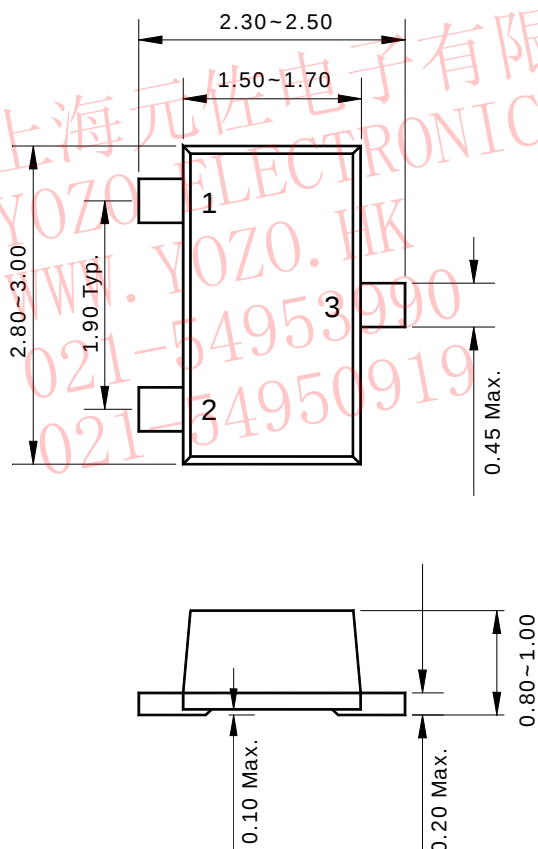
- Low $V_{GS(th)}$: $V_{GS(th)} = 0.6 \sim 1.2V$
- Small footprint due to small package
- Low $R_{DS(on)}$: $R_{DS(on)} = 19m\Omega$ (Typ.)

Ordering Information

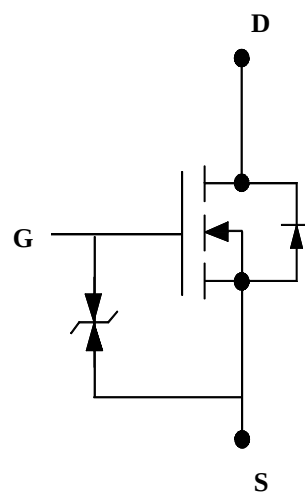
Type NO.	Marking	Package Code
STK004SF	K04	SOT-23F

Outline Dimensions

unit : mm



Block Diagram



PIN Connections

1. Gate
2. Source
3. Drain

Absolute maximum ratings

(Ta=25°C)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	20	V
Gate-source voltage	V_{GSS}	± 12	V
Drain current (DC) **	I_D	4.2	A
Drain current (Pulsed) *	I_{DP}	16.8	A
Total Power dissipation **	P_D	0.35	W
Avalanche current (Single) ②	I_{AS}	4.2	A
Single pulsed avalanche energy ②	E_{AS}	27	mJ
Avalanche current (Repetitive) ①	I_{AR}	4.2	A
Repetitive avalanche energy ①	E_{AR}	2.5	mJ
Junction temperature	T_J	150	°C
Storage temperature range	T_{stg}	-55 ~ 150	

* Limited by maximum junction temperature

** Device mounted on a glass-epoxy board

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-ambient	$R_{th(J-a)}$ **	-	357	°C/W

N-CH Electrical Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$I_D = 250\mu A, V_{GS} = 0$	20	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 250\mu A, V_{DS} = V_{GS}$	0.6	-	1.2	V
Drain-source cut-off current	I_{DSS}	$V_{DS} = 20V, V_{GS} = 0V$	-	-	1	μA
Gate leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 12V$	-	-	± 10	μA
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 2.1A$	-	19	40	$m\Omega$
		$V_{GS} = 2.5V, I_D = 2.1A$	-	27	45	$m\Omega$
Forward transfer conductance ④	g_{fs}	$V_{DS} = 2V, I_D = 4.2A$	-	22	-	S
Input capacitance	C_{iss}	$V_{GS} = 0V, V_{DS} = 10V,$ $f = 1MHz$	-	390	590	pF
Output capacitance	C_{oss}		-	90	135	
Reverse transfer capacitance	C_{rss}		-	40	60	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 10V, I_D = 4.2A$ $R_G = 10\Omega$ ③④	-	2.0	-	ns
Rise time	t_r		-	1.9	-	
Turn-off delay time	$t_{d(off)}$		-	2.8	-	
Fall time	t_f		-	1.9	-	
Total gate charge	Q_g	$V_{DD} = 10V, V_{GS} = 4.5V$ $I_D = 4.2A$ ③④	-	4.0	6.0	nC
Gate-source charge	Q_{gs}		-	1.0	1.5	
Gate-drain charge	Q_{gd}		-	1.6	2.4	

Source-Drain Diode Ratings and Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Source current	I_S	Integral reverse diode in the MOSFET	-	-	0.5	A
Source current (Plused) ①	I_{SM}		-	-	2.0	
Forward voltage ④	V_{SD}	$V_{GS} = 0V, I_S = 0.5A$	-	0.7	1.2	V
Reverse recovery time	t_{rr}	$I_S = 0.5A, V_{DD} = 10V$ $di_S/dt = 100A/\mu s$	-	57	-	ns
Reverse recovery charge	Q_{rr}		-	240	-	μC

Note ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
 ② $L = 2.0mH, I_{AS} = 4.2A, V_{DD} = 10V, R_G = 25\Omega$
 ③ Pulse Test : Pulse Width < 300 μs , Duty cycle $\leq 2\%$
 ④ Essentially independent of operating temperature

N-CH Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

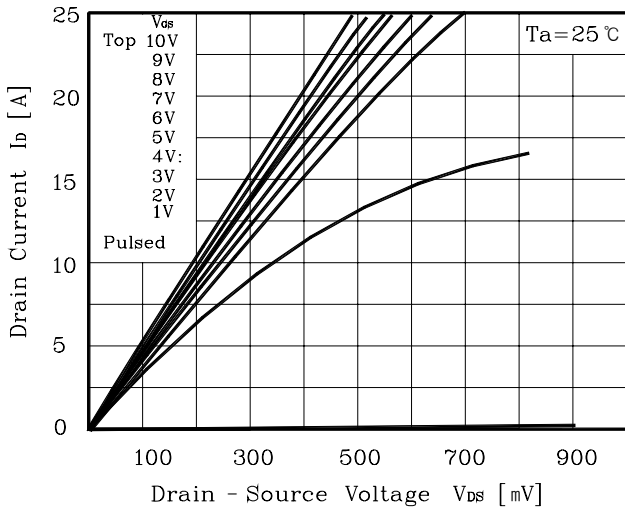


Fig. 2 $I_D - V_{GS}$

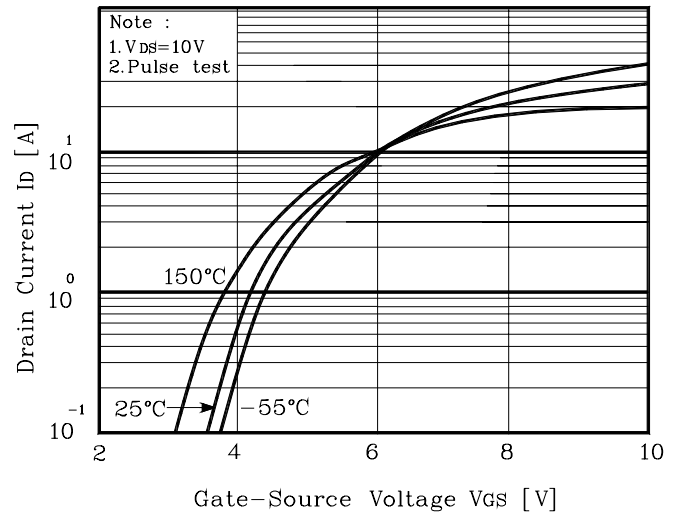


Fig. 3 $R_{DS(on)} - I_D$

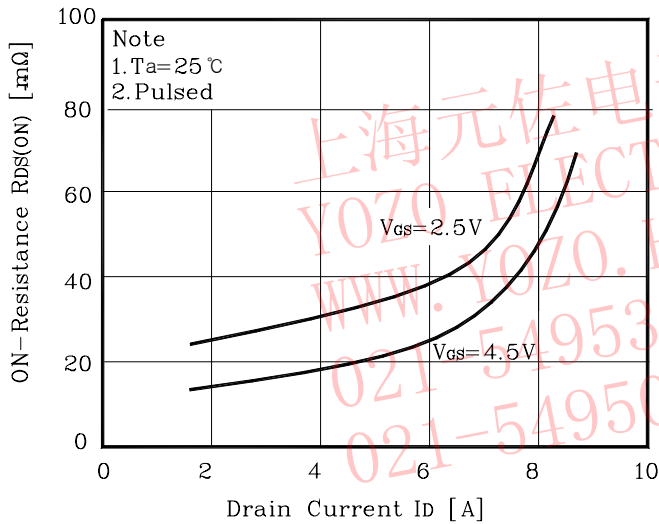


Fig. 4 $I_S - V_{SD}$

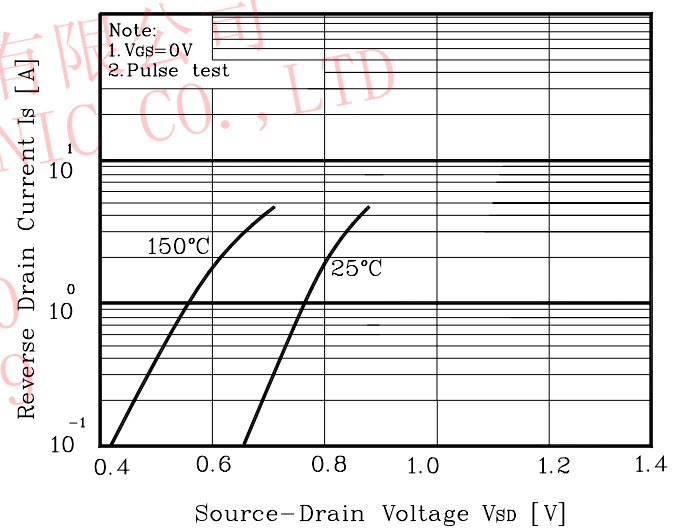


Fig. 5 Capacitance - V_{DS}

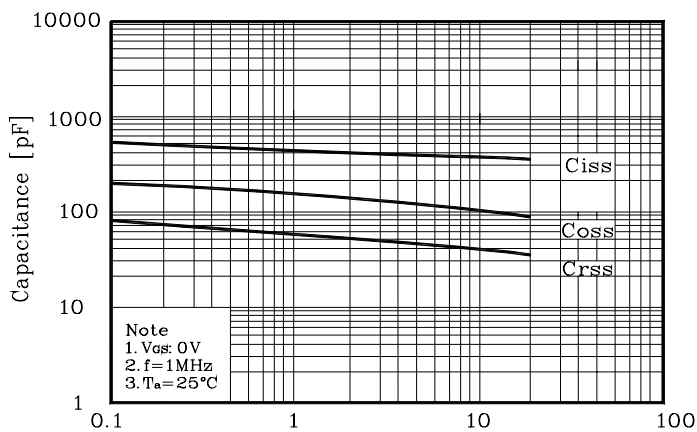


Fig. 6 $V_{GS} - Q_G$

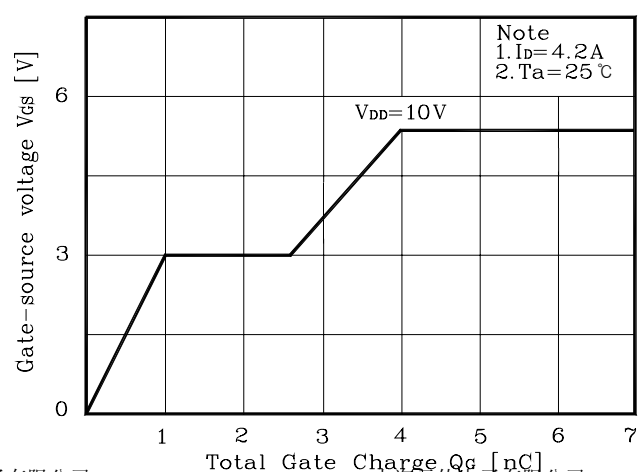


Fig. 7 $V_{DS} - T_J$

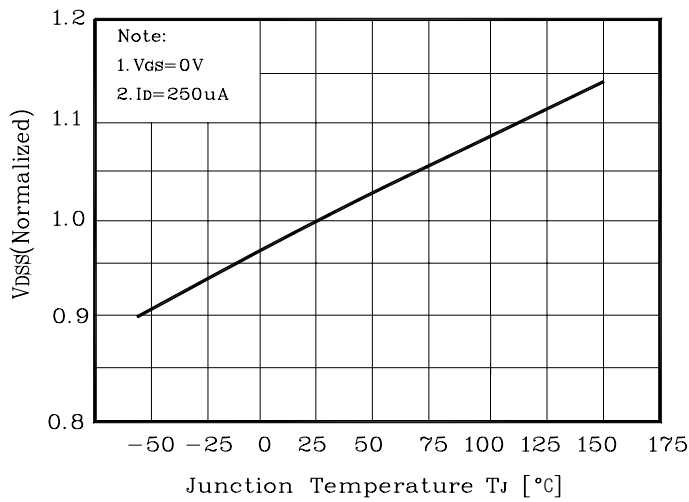


Fig. 8 $R_{DS(on)} - T_J$

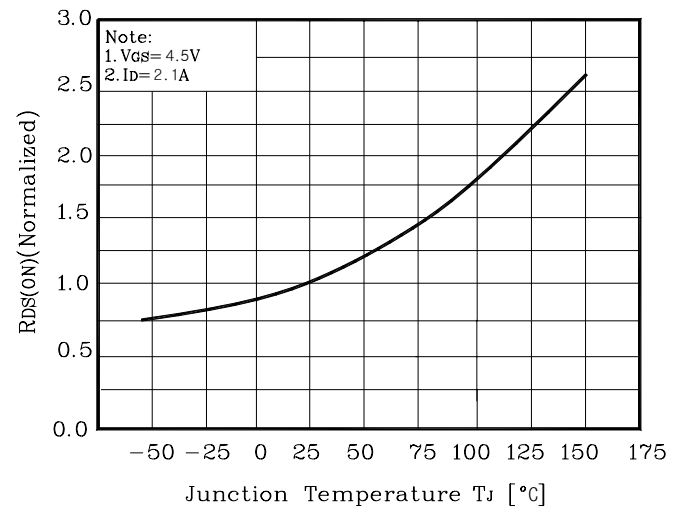


Fig. 9 $I_D - T_a$

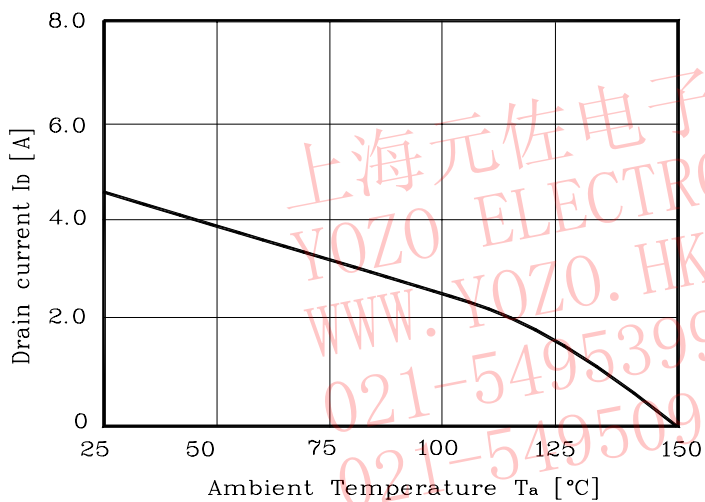


Fig. 10 Safe Operating Area

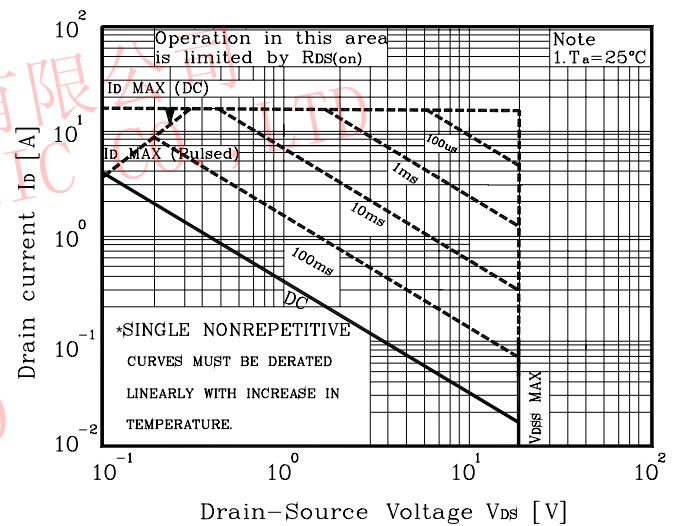
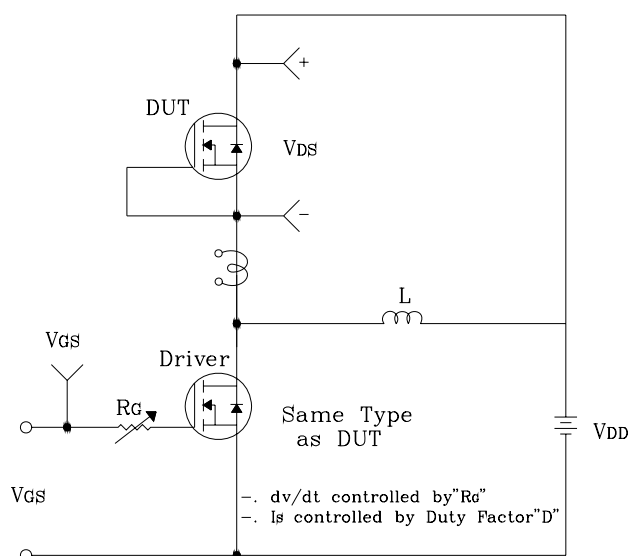


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



$$D = \frac{\text{Gate Pulse Width}}{\text{Gate Pulse Period}}$$

