

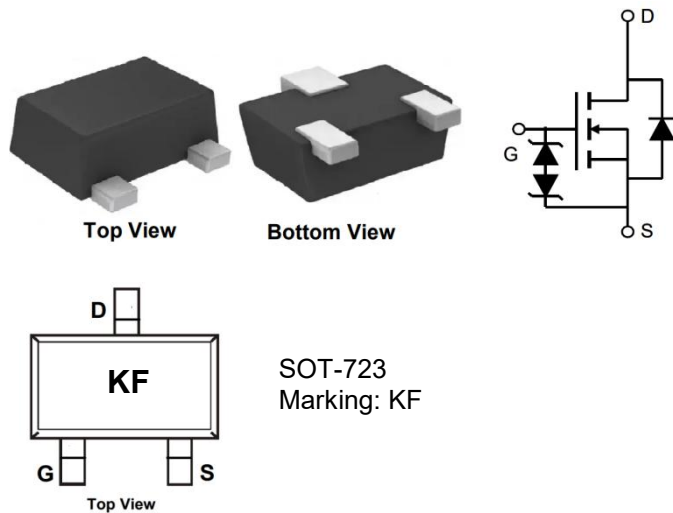
N-Channel Enhancement Mode MOSFET

Features

- Advanced Trench Process Technology
- Low Threshold Voltage
- Fast Switching Speed
- Halogen-Free & Lead-Free
- N-Channel Switch with Low $R_{DS(on)}$

Application

- Load Switch for Portable Devices
- Voltage controlled small signal switch



SOT-723
Marking: KF

Absolute Maximum Ratings (at $T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	0.75	A
Peak Drain Current, Pulsed ¹⁾	I_{DM}	1.8	A
Power Dissipation ²⁾	P_{tot}	0.15	W
Operating Junction	T_J	-55~150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55~150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient ²⁾	$R_{\theta JA}$	833	$^\circ\text{C}/\text{W}$

Note:

¹⁾ Pulse width $\leq 100\mu\text{s}$, duty cycle $\leq 1\%$, limited by T_{jmax} .

²⁾ Device mounted on FR-4 substrate PC board, 2ozcopper, with 1-inch square copper plate in still air.

Characteristics at T_a = 25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I _D = 250 μA	BV _{DSS}	20			V
Drain-Source Leakage Current at V _{DS} = 20 V, V _{GS} = 0 V	I _{DSS}			1	μA
Gate Leakage Current at V _{GS} = ± 10 V, V _{DS} = 0 V	I _{GSS}			±10	μA
Gate-Source Threshold Voltage at V _{DS} = V _{GS} , I _D = 250 μA	V _{GS(th)}	0.35		1.1	V
Drain-Source On-State Resistance at V _{GS} = 4.5 V, I _D = 0.65 A at V _{GS} = 2.5 V, I _D = 0.45 A at V _{GS} = 1.8 V, I _D = 0.25 A	R _{DS(on)}		170 230 350	330 400 750	mΩ
DYNAMIC PARAMETERS					
Forward Transconductance at V _{DS} = 10 V, I _D = 800mA	g _{fs}		1.6		S
Input Capacitance at V _{GS} = 0 V, V _{DS} = 16 V, f = 1 MHz	C _{iss}		79		pF
Output Capacitance at V _{GS} = 0 V, V _{DS} = 16 V, f = 1 MHz	C _{oss}		13		pF
Reverse Transfer Capacitance at V _{GS} = 0 V, V _{DS} = 16 V, f = 1 MHz	C _{rss}		9		pF
Gate charge total at V _{DS} = 10 V, I _D = 0.9 A, V _{GS} = 4.5 V	Q _g		1		nC
Gate to Source Charge at V _{DS} = 10 V, I _D = 0.9 A, V _{GS} = 4.5 V	Q _{gs}		0.28		nC
Gate to Drain Charge at V _{DS} = 10 V, I _D = 0.9 A, V _{GS} = 4.5 V	Q _{gd}		0.22		nC
Turn-On Delay Time at V _{GS} = 4.5 V, V _{DS} = 10 V, I _D = 0.5 A, R _g = 10 Ω	t _{d(on)}		6.7		nS
Turn-On Rise Time at V _{GS} = 4.5 V, V _{DS} = 10 V, I _D = 0.5 A, R _g = 10 Ω	t _r		4.8		nS
Turn-Off Delay Time at V _{GS} = 4.5 V, V _{DS} = 10 V, I _D = 0.5 A, R _g = 10 Ω	t _{d(off)}		17.3		nS
Turn-Off Fall Time at V _{GS} = 4.5 V, V _{DS} = 10 V, I _D = 0.5 A, R _g = 10 Ω	t _f		7.4		nS
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I _S = 150 mA, V _{GS} = 0 V	V _{DS}			1.2	V
Body Diode Reverse Recovery Time at I _F = 3.6 A, di/dt = 100 A / μs	t _{rr}		7.5		nS
Body Diode Reverse Recovery Charge at I _F = 3.6 A, di/dt = 100 A / μs	Q _{rr}		2.5		nC

Electrical Characteristics Curves

Fig. 1 - Output Characteristics

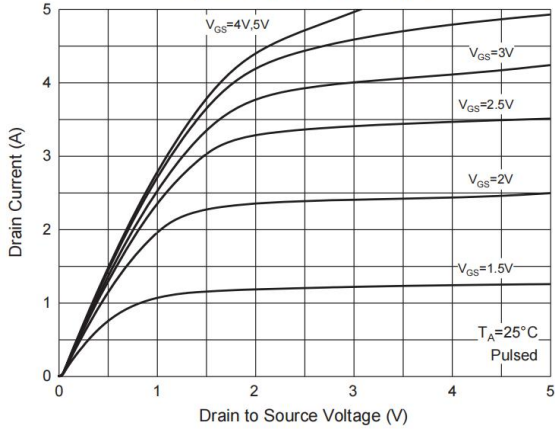


Fig. 2 - Transfer Characteristics

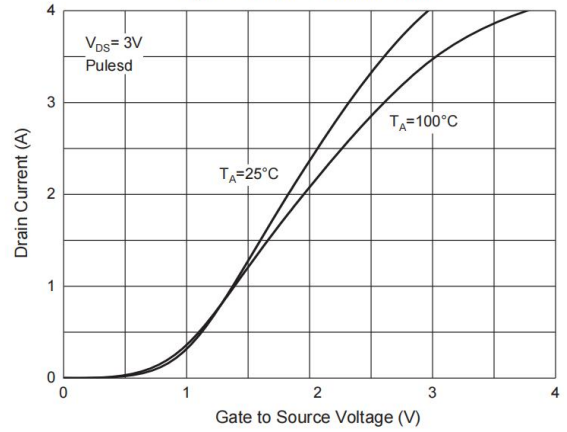


Fig. 3 - $R_{DS(ON)} - I_D$

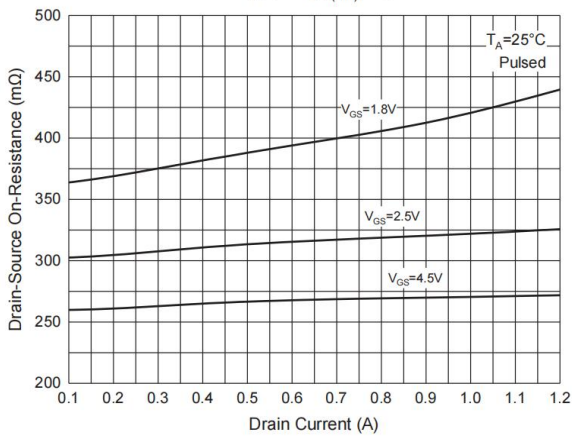


Fig. 4 - $R_{DS(ON)} - V_{GS}$

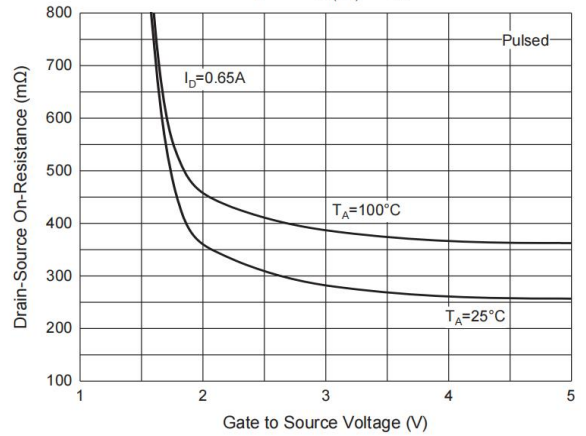


Fig. 5 - $I_S - V_{SD}$

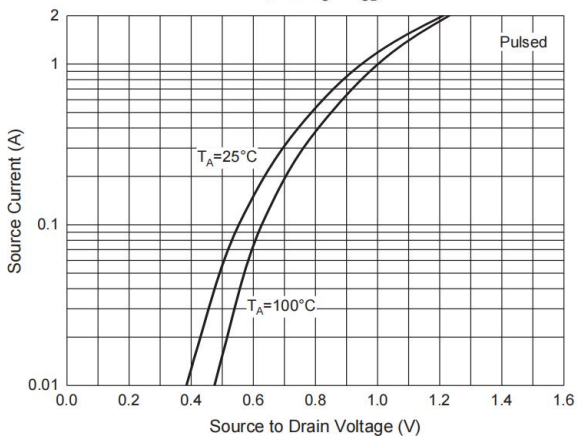
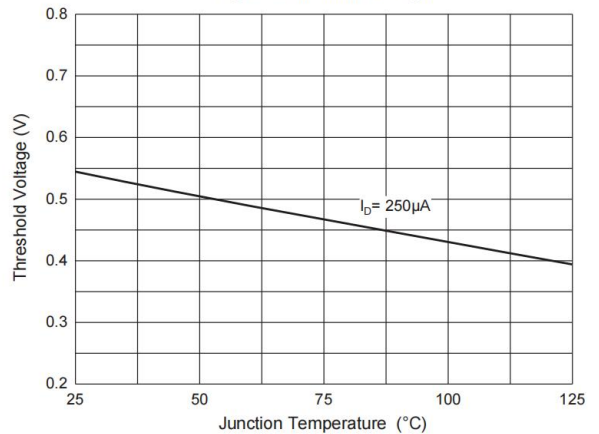


Fig. 6 - Threshold Voltage



Test Circuits

Fig.1-1 Switching times test circuit

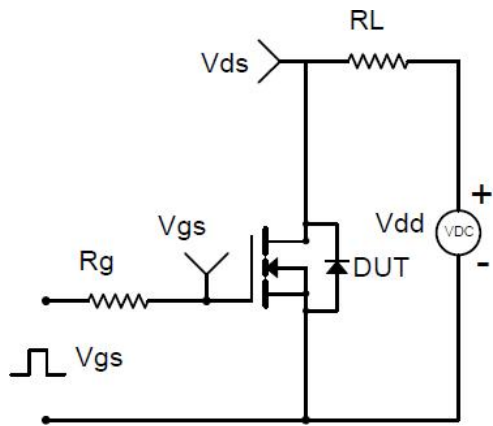


Fig.1-2 Switching Waveform

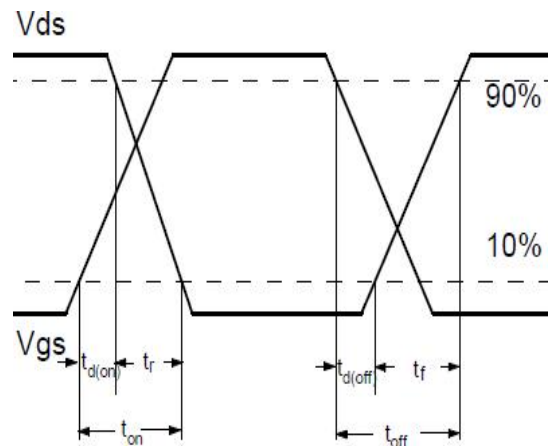


Fig.2-1 Gate charge test circuit

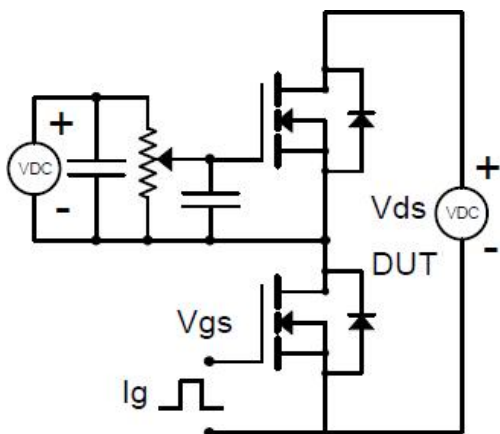


Fig.2-2 Gate charge waveform

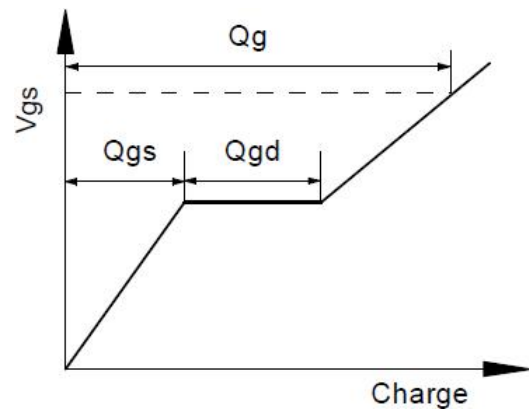


Fig.3-1 Avalanche test circuit

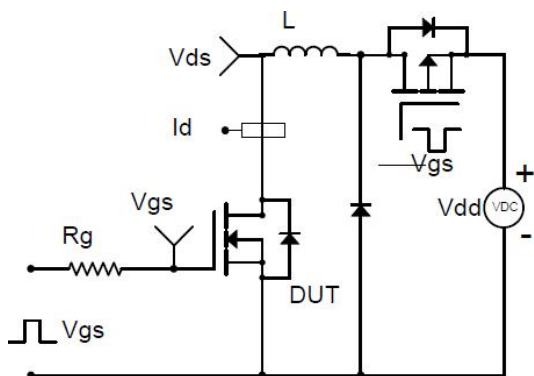
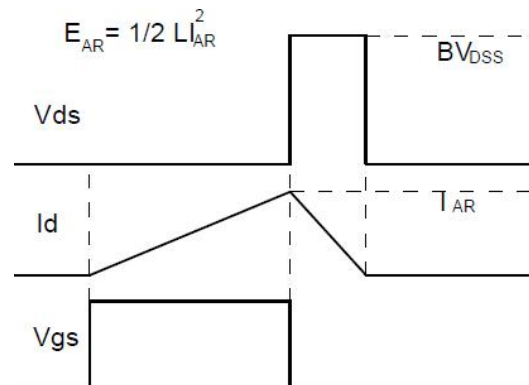
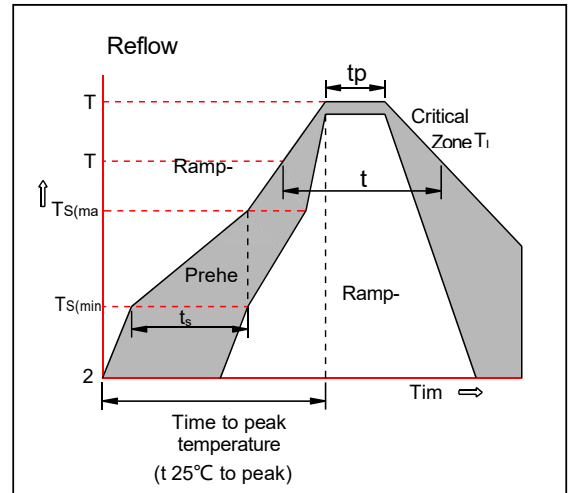


Fig.3-2 Avalanche waveform



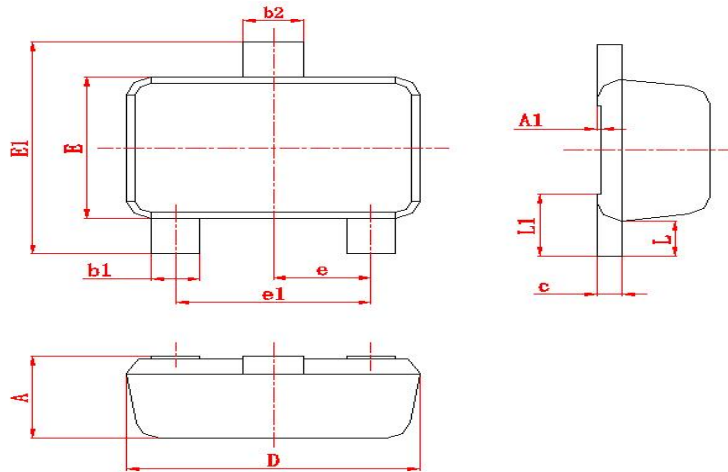
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C



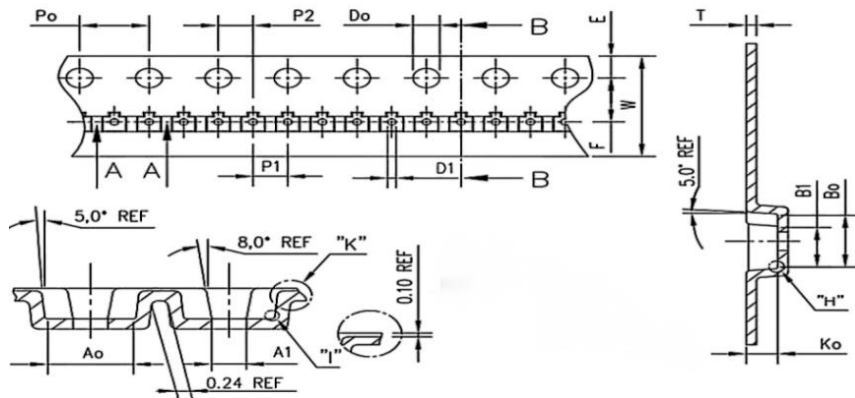
Package Outline Dimensions (Units: mm)

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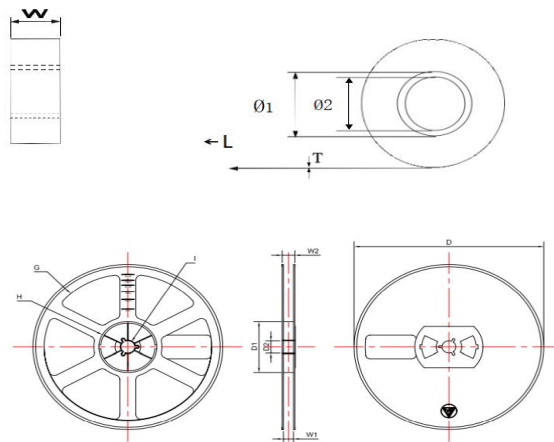
符号	尺寸		符号	尺寸		符号	尺寸	
	Min	Max		Min	Max		Min	Max
A	0.43	0.5	E1	1.15	1.25	b2	0.25	0.35
A1	0	0.05	e	(0.4)		c	0.08	0.15
D	1.15	1.25	e1	0.7	0.9	L	0.15	0.25
E	0.75	0.85	b1	0.15	0.25	L1	(0.3)	

Emboss Carrier Tape



UNIT	A0	A1	B0	B1	K0	P0	P1
mm	1.35	0.45	1.4	1.08	0.56	3.9	1.95
	1.41	0.55	1.5	1.18	0.66	4.1	2.05
UNIT	P2	E	F	W	T	D0	D1
mm	1.95	1.65	3.45	7.9	0.15	1.4	0.45
	2.05	1.85	3.55	8.3	0.25	1.6	0.55

Reel



Symbol	D	D1	D2	G	H	I	W1	W2
通用尺寸	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30
公差	±2	±1	±1	±1	±1	±1	±1	±1
Symbol	W	L	T	Ø1	Ø2			
通用尺寸	5.4mm	500m	53µm	92.0mm	76.2mm			
公差	±0.1	+3	±7	±0.2	+0.2-0			