

2.5V Drive Nch+Nch MOS FET

UM5K1N

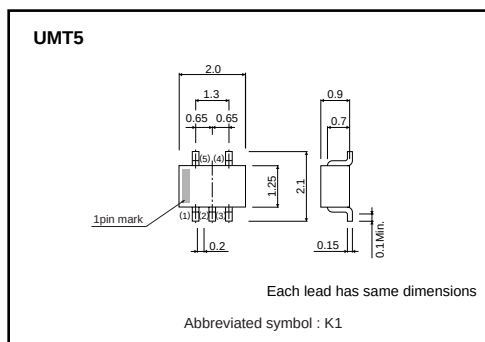
●Structure

Silicon N-channel MOS FET

●Features

- 1) Two 2SK3018 transistors in a single UMT package.
- 2) Mounting cost and area can be cut in half.
- 3) Low on-resistance.
- 4) Low voltage drive (2.5V) makes this device ideal for portable equipment.
- 5) Drive circuits can be simple.

●External dimensions (Unit : mm)



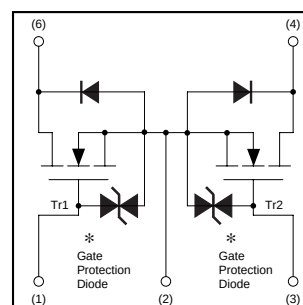
●Applications

Interfacing, switching (30V, 100mA)

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
UM5K1N		○

●Equivalent circuit



- (1) Tr1 Gate
(2) Source
(3) Tr2 Gate
(4) Tr2 Drain
(6) Tr1 Drain
- * A protection diode has been built in between the gate and the source to protect against static electricity when the product is in use. Use the protection circuit when rated voltages are exceeded.

●Absolute maximum ratings (Ta=25°C)

<It is the same ratings for Tr1 and Tr2.>

Parameter	Symbol	Limits	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	± 20	V
Drain current	Continuous	I_D	± 100 mA
	Pulsed	I_{DP}^{*1}	± 400 mA
Total power dissipation	P_D^{*2}	150	mW / TOTAL
		120	mW / ELEMENT
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

*1 $P_w \leq 10 \mu s$, Duty cycle $\leq 50\%$

*2 With each pin mounted on the recommended lands.

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th(ch-a)}^{*}$	833	°C / W / TOTAL
		1042	°C / W / ELEMENT

* With each pin mounted on the recommended lands.

Transistors

●Electrical characteristics (Ta=25°C)

<It is the same characteristics for Tr1 and Tr2.>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-source leakage	I_{GSS}	—	—	± 1	μA	$V_{GS}=\pm 20V$, $V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D=10\mu A$, $V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS}=30V$, $V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	0.8	—	1.5	V	$V_{DS}=3V$, $I_D=100\mu A$
Static drain-source on-state resistance	$R_{DS(on)}$	—	5	8	Ω	$I_D=10mA$, $V_{GS}=4V$
	$R_{DS(on)}$	—	7	13	Ω	$I_D=1mA$, $V_{GS}=2.5V$
Forward transfer admittance	$ Y_{fs} $	20	—	—	mS	$I_D=10mA$, $V_{DS}=3V$
Input capacitance	C_{iss}	—	13	—	pF	$V_{DS}=5V$
Output capacitance	C_{oss}	—	9	—	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	—	4	—	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$I_D=10mA$, $V_{DD}=5V$
Rise time	t_r	—	35	—	ns	$V_{GS}=5V$
Turn-off delay time	$t_{d(off)}$	—	80	—	ns	$R_L=500\Omega$
Fall time	t_f	—	80	—	ns	$R_G=10\Omega$

●Electrical characteristic curves

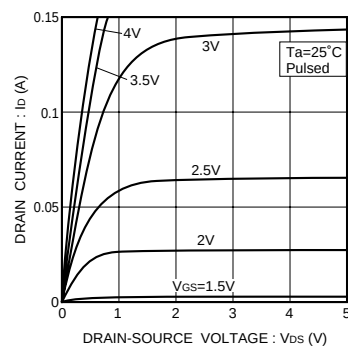


Fig.1 Typical output characteristics

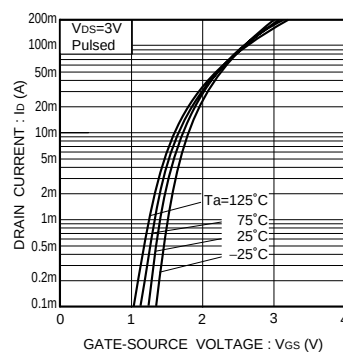


Fig.2 Typical transfer characteristics

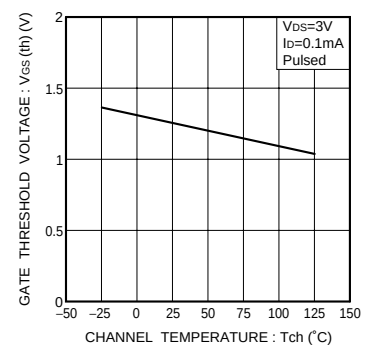


Fig.3 Gate threshold voltage vs. channel temperature

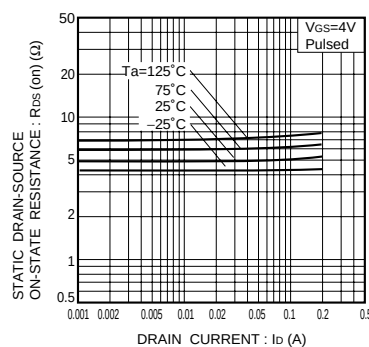


Fig.4 Static drain-source on-state resistance vs. drain current (I)

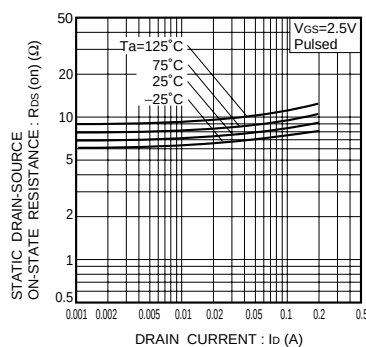


Fig.5 Static drain-source on-state resistance vs. drain current (II)

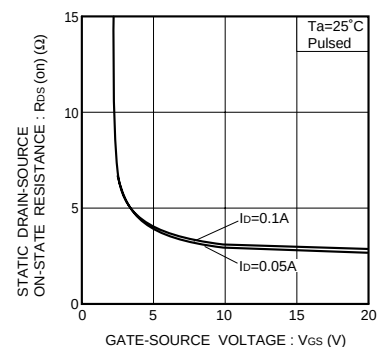


Fig.6 Static drain-source on-state resistance vs. gate-source voltage

Transistors

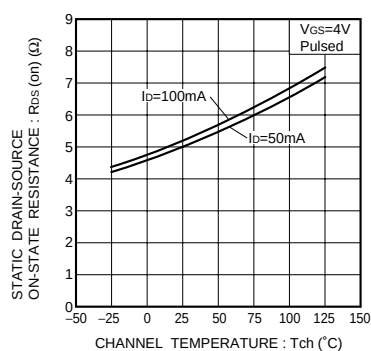


Fig.7 Static drain-source on-state resistance vs. channel temperature

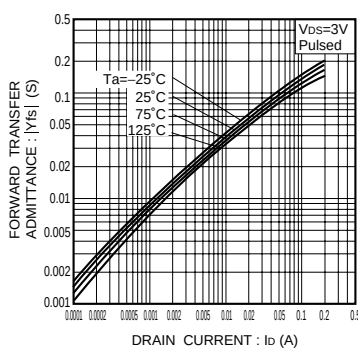


Fig.8 Forward transfer admittance vs. drain current

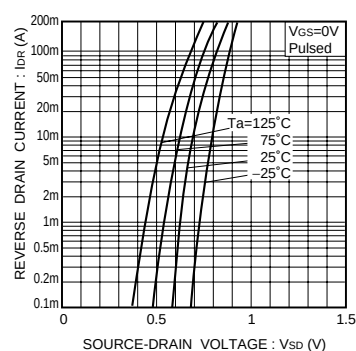


Fig.9 Reverse drain current vs. source-drain voltage (I)

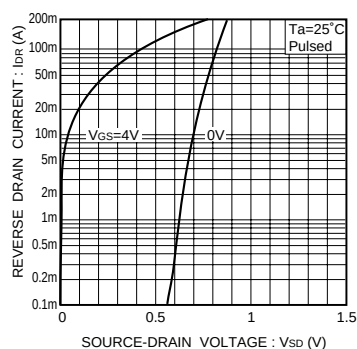


Fig.10 Reverse drain current vs. source-drain voltage (II)

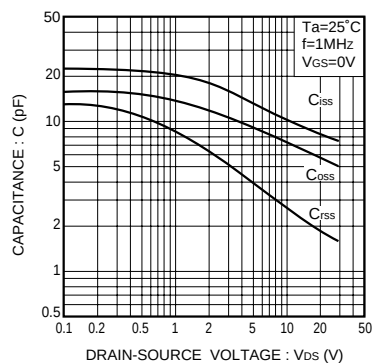


Fig.11 Typical capacitance vs. drain-source voltage

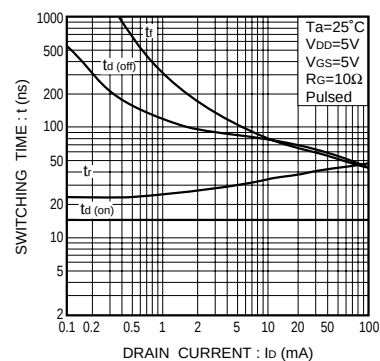


Fig.12 Switching characteristics (See Figures 13 and 14 for the measurement circuit and resultant waveforms)

●Switching characteristics measurement circuit

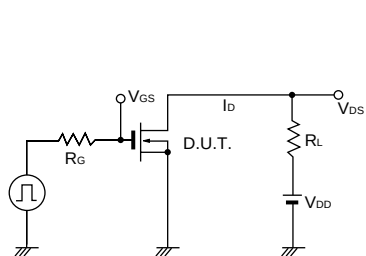


Fig.13 Switching time measurement circuit

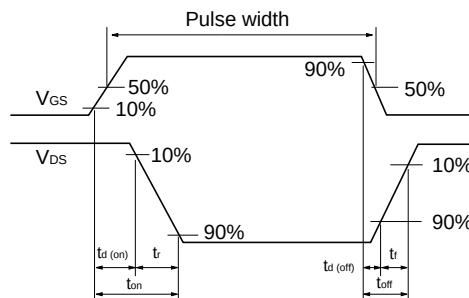


Fig.14 Switching time waveforms

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