

Transistors

2.5V Drive Nch+Nch MOS FET

UM6K1N

●Structure

Silicon N-channel MOS FET


●Features

- 1) Two 2SK3018 transistors in a single UMT package.
- 2) The MOS FET elements are independent, eliminating mutual interference.
- 3) Mounting cost and area can be cut in half.
- 4) Low On-resistance.
- 5) Low voltage drive (2.5V drive) makes this device ideal for portable equipment.

●Applications

Interfacing, switching (30V, 100mA)

●Packaging specifications

Type	Package	Taping
	Code	TN
	Basic ordering unit (pieces)	3000
UM6K1N		

●Absolute maximum ratings (Ta=25°C)

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

Parameter	Symbol	Limits	Unit	
Drain-source voltage	V_{DSS}	30	V	
Gate-source voltage	V_{GSS}	± 20	V	
Drain current	Continuous	I_D	± 100	mA
	Pulsed	I_{DP}^{*1}	± 400	mA
Total power dissipation	P_D^{*2}	150	mW	
Channel temperature	T_{ch}	150	°C	
Range of storage temperature	T_{stg}	-55 to +150	°C	

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

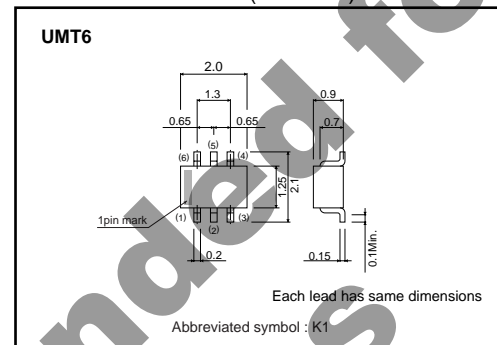
*2 With each pin mounted on the recommended lands.

●Thermal resistance

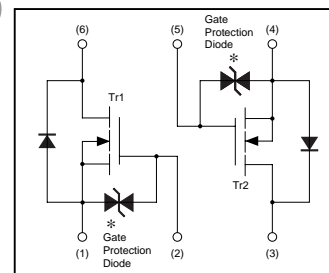
Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th(ch-a)}^*$	833	°C / W / TOTAL
		1042	°C / W / ELEMENT

* With each pin mounted on the recommended lands.

●External dimensions (Unit : mm)



●Inner circuit



- (1) Tr1 Source
 (2) Tr1 Gate
 (3) Tr1 Drain
 (4) Tr2 Source
 (5) Tr2 Gate
 (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.

Transistors

●Electrical characteristics (Ta=25°C)

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	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}	-	-	1.0	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	$I_D=10mA, V_{GS}=4V$
		-	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	$V_{DD}=5V$
Rise time	t_r	-	35	-	ns	$I_D=10mA$
Turn-off delay time	$t_{d(off)}$	-	80	-	ns	$V_{GS}=5V$
Fall time	t_f	-	80	-	ns	$R_L=500\Omega$ $R_G=10\Omega$

●Electrical characteristic curves

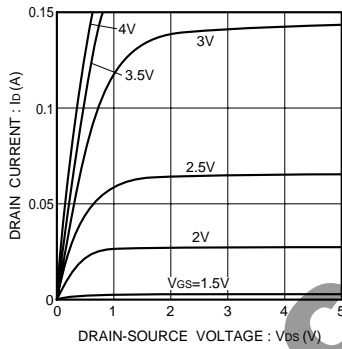


Fig.1 Typical Output Characteristics

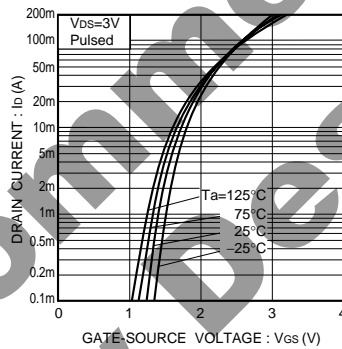


Fig.2 Typical Transfer Characteristics

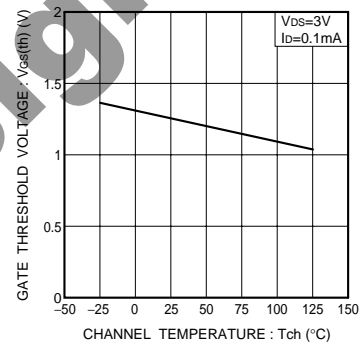


Fig.3 Gate Threshold Voltage vs. Channel Temperature

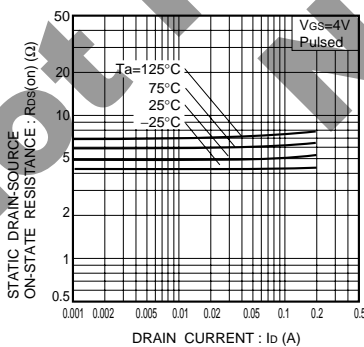


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current (I)

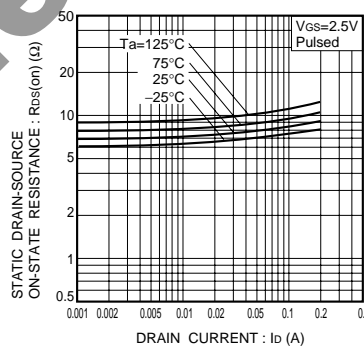


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current (II)

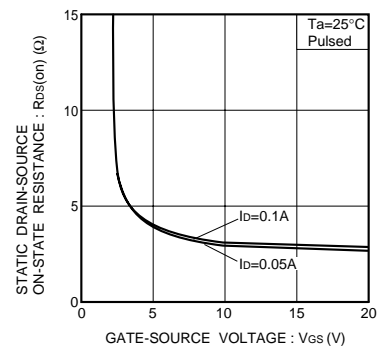


Fig.6 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

Transistors

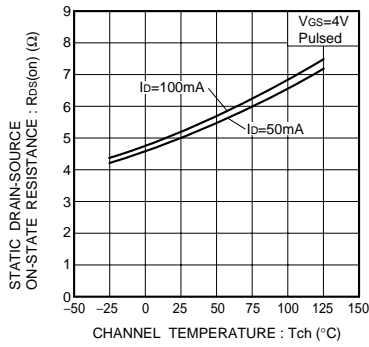


Fig.7 Static Drain-Source On-State Resistance vs. Channel Temperature

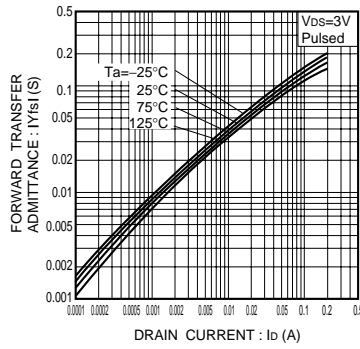


Fig.8 Forward Transfer Admittance vs. Drain Current

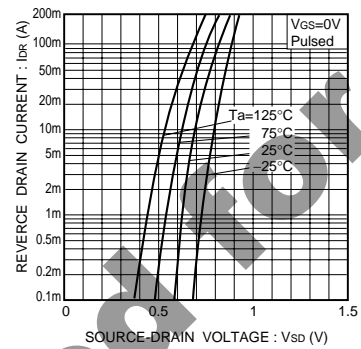


Fig.9 Reverse Drain Current vs. Source-Drain Voltage (I)

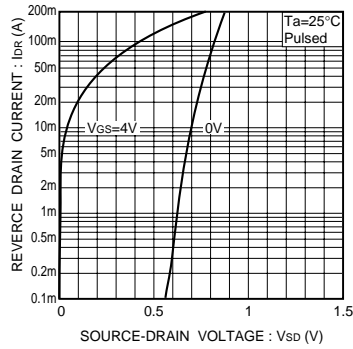


Fig.10 Reverse Drain Current vs. Source-Drain Voltage (II)

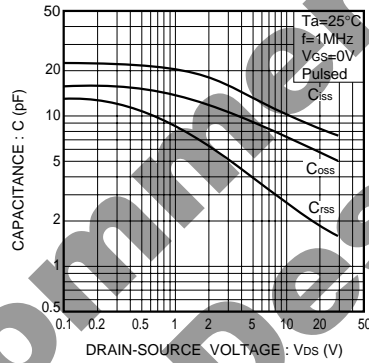


Fig.11 Typical Capacitance vs. Drain-Source Voltage

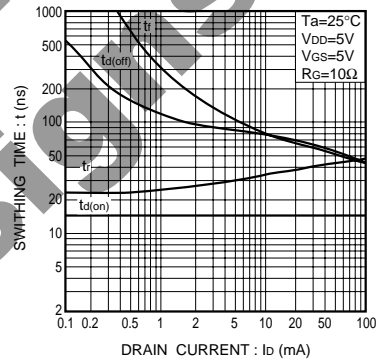


Fig.12 Switching Characteristics

● Switching characteristics measurement circuit

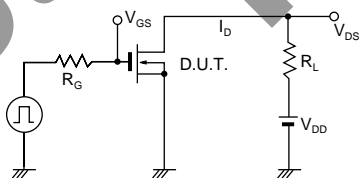


Fig.13 Switching Time Test Circuit

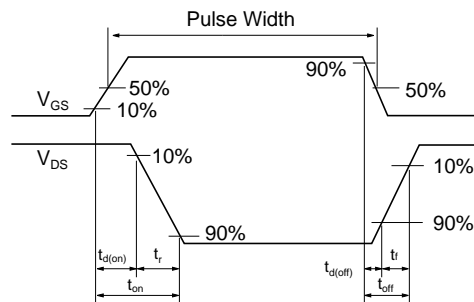


Fig.14 Switching Time Waveforms

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