

## Transistors

## 1.8V Drive Nch+Nch MOSFET

## US6K4

## ●Structure

Silicon N-channel MOSFET

## ●Features

- 1) Two Nch MOSFETs are put in TUMT6 package.
- 2) High-speed switching, Low On-resistance.
- 3) 1.8V drive.

## ●Applications

Switching

## ●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
US6K4		○

## ●Absolute maximum ratings (Ta=25°C)

&lt;It is the same ratings for the Tr1 and Tr2&gt;

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DSS}$	20	V	
Gate-source voltage	$V_{GSS}$	$\pm 10$	V	
Drain current	Continuous	$I_D$	$\pm 1.5$	A
	Pulsed	$I_{DP}$ *1	$\pm 3.0$	A
Source current (Body diode)	Continuous	$I_S$	0.6	A
	Pulsed	$I_{SP}$ *1	2.4	A
Total power dissipation	$P_D$ *2	1.0	W / TOTAL	
		0.7	W / ELEMENT	
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  $\leq 1\%$ 

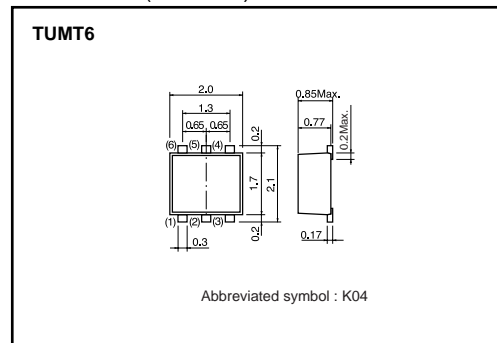
\*2 Mounted on a ceramic board

## ●Thermal resistance

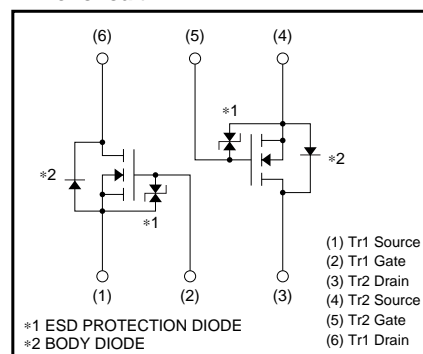
Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th(ch-a)}$ *	125	°C/W / TOTAL
		179	°C/W / ELEMENT

\* Mounted on a ceramic board

## ●Dimensions (Unit : mm)



## ●Inner circuit



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## ●Electrical characteristics (Ta=25°C)

&lt;It is the same characteristics for the Tr1 and Tr2&gt;

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I <sub>GSS</sub>	–	–	±10	μA	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR) DSS</sub>	20	–	–	V	I <sub>D</sub> = 1mA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>	–	–	1	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS (th)</sub>	0.3	–	1.0	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Static drain-source on-state resistance	R <sub>DS (on)</sub> *	–	130	180	mΩ	I <sub>D</sub> = 1.5A, V <sub>GS</sub> = 4.5V
		–	170	240	mΩ	I <sub>D</sub> = 1.5A, V <sub>GS</sub> = 2.5V
		–	220	310	mΩ	I <sub>D</sub> = 0.8A, V <sub>GS</sub> = 1.8V
Forward transfer admittance	Y <sub>fs</sub>  *	1.6	–	–	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1.5A
Input capacitance	C <sub>iss</sub>	–	110	–	pF	V <sub>DS</sub> = 10V
Output capacitance	C <sub>oss</sub>	–	18	–	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	–	15	–	pF	f=1MHz
Turn-on delay time	t <sub>d (on)</sub> *	–	5	–	ns	I <sub>D</sub> = 1.0A
Rise time	t <sub>r</sub> *	–	5	–	ns	V <sub>DD</sub> ≐ 10V V <sub>GS</sub> = 4.5V
Turn-off delay time	t <sub>d (off)</sub> *	–	20	–	ns	R <sub>L</sub> = 10Ω
Fall time	t <sub>f</sub> *	–	3	–	ns	R <sub>GS</sub> =10Ω
Total gate charge	Q <sub>g</sub> *	–	1.8	2.5	nC	V <sub>DD</sub> ≐ 10V
Gate-source charge	Q <sub>gs</sub> *	–	0.3	–	nC	V <sub>GS</sub> = 4.5V
Gate-drain charge	Q <sub>gd</sub> *	–	0.3	–	nC	I <sub>D</sub> = 1.5A

\*Pulsed

## ●Body diode characteristics (Source-drain) (Ta=25°C)

&lt;It is the same characteristics for the Tr1 and Tr2&gt;

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>SD</sub>	–	–	1.2	V	I <sub>S</sub> = 0.6A, V <sub>GS</sub> =0V

Transistors

●Electrical characteristics curves

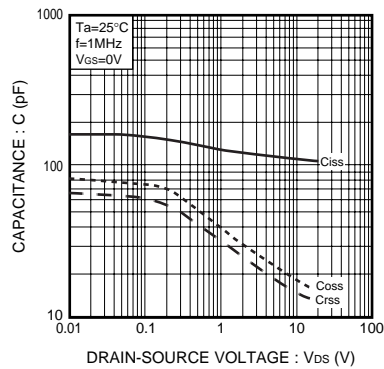


Fig.1 Typical Capacitance vs. Drain-Source Voltage

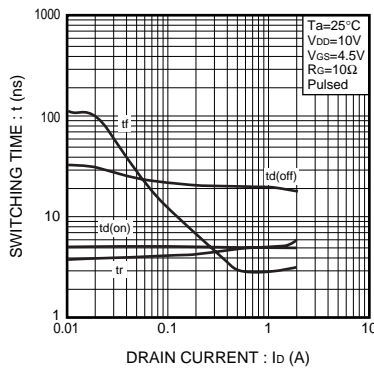


Fig.2 Switching Characteristics

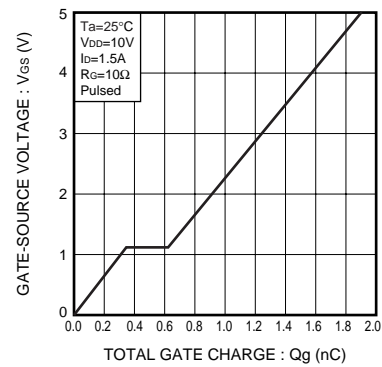


Fig.3 Dynamic Input Characteristics

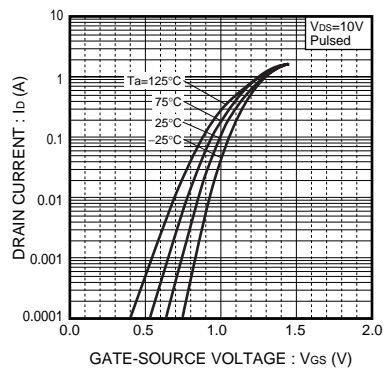


Fig.4 Typical Transfer Characteristics

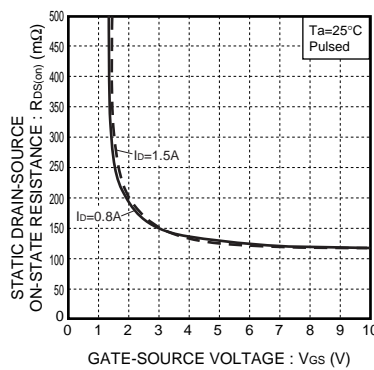


Fig.5 Static Drain-Source On-State Resistance vs. Gate-source Voltage

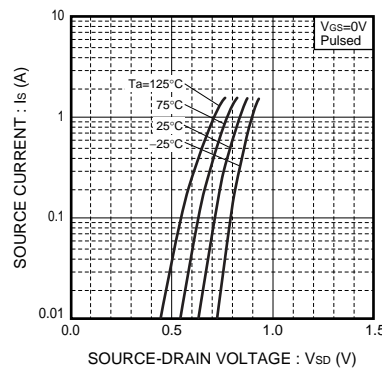


Fig.6 Source Current vs. Source-Drain Voltage

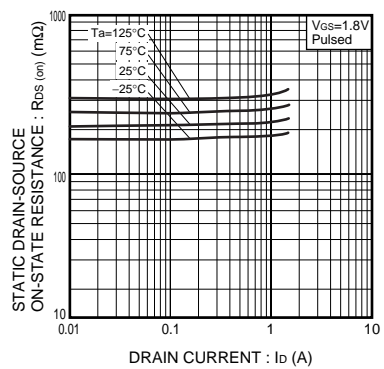


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current ( I )

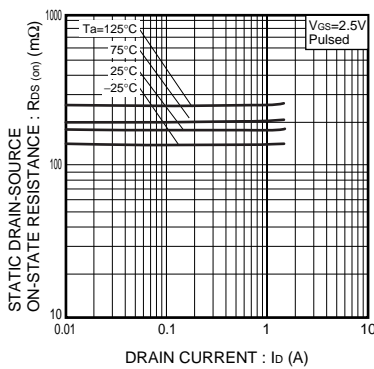


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current ( II )

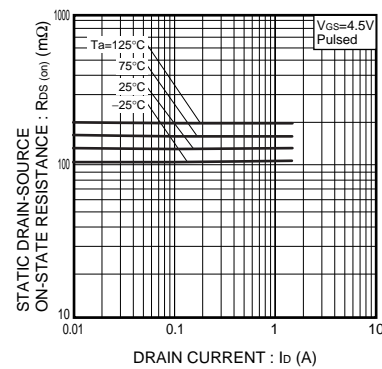


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current ( III )

●Notice

This product might cause chip aging and breakdown under the large electrified environment. Please consider to design ESD protection circuit.

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