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# Switching (60V, 200mA)

## SM6K2

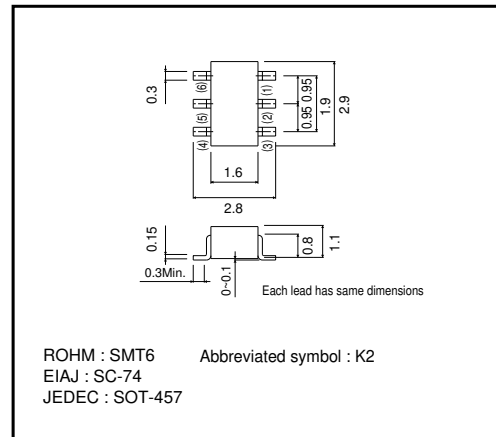
### ●Features

- 1) Two RHU002N06 chips in a SMT package.
- 2) Mounting possible with SMT3 automatic mounting machines.
- 3) Transistor elements are independent, eliminating interference.
- 4) Mounting cost and area can be cut in half.

### ●Structure

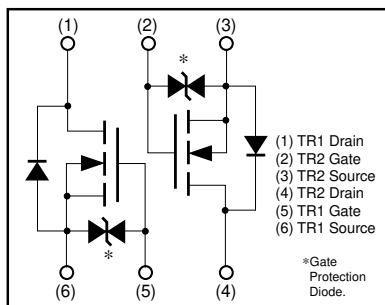
Silicon N-channel  
MOSFET transistor

### ●External dimensions (Units : mm)



The following characteristics apply to both Tr1 and Tr2.

### ●Equivalent circuit



\* 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 fixed voltages are exceeded.

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

Parameter	Symbol	Limits	Unit
Drain-source voltage	$V_{DSS}$	60	V
Gate-source voltage	$V_{GSS}$	$\pm 20$	V
Drain current	Continuous	$I_D$	200 mA
	Pulsed	$I_{DP}^{*1}$	800 mA
Drain reverse current	Continuous	$I_{DR}$	200 mA
	Pulsed	$I_{DRP}^{*1}$	800 mA
Total power dissipation	$P_D^{*2}$	200	mW
Channel temperature	$T_{ch}$	150	°C
Storage temperature	$T_{stg}$	-55~+150	°C

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

\*2 When using 1×0.75×0.062 inch glass epoxy board.

Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate leakage current	I <sub>GSS</sub>	-	-	±10	μA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	60	-	-	V	I <sub>D</sub> =10μA, V <sub>GS</sub> =0V
Drain cutoff current	I <sub>BSS</sub>	-	-	1	μA	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	1	-	2.5	V	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA
Drain-source on-state resistance	R <sub>DS(on)*1</sub>	-	1.7	2.4	Ω	I <sub>D</sub> =200mA, V <sub>GS</sub> =10V
		-	2.8	4.0		I <sub>D</sub> =200mA, V <sub>GS</sub> =4V
Forward transfer admittance	Y <sub>fs</sub>  *1	100	-	-	mS	V <sub>DS</sub> =10V, I <sub>D</sub> =200mA
Input capacitance	C <sub>iss</sub>	-	15	-	pF	V <sub>DS</sub> =25V V <sub>GS</sub> =0V f=1MHz
Output capacitance	C <sub>oss</sub>	-	8	-	pF	
Reverse transfer capacitance	C <sub>rss</sub>	-	4	-	pF	
Turn-on delay time	t <sub>d(on)*2</sub>	-	6	-	ns	I <sub>D</sub> =100mA, V <sub>DD</sub> =30V V <sub>GS</sub> =10V R <sub>L</sub> =300Ω R <sub>GS</sub> =10Ω
Rise time	t <sub>r</sub> *2	-	5	-	ns	
Turn-off delay time	t <sub>d(off)*2</sub>	-	12	-	ns	
Fall time	t <sub>f</sub> *2	-	95	-	ns	
Total gate charge	Q <sub>g</sub> *2	-	2.2	4.4	nC	V <sub>DD</sub> =30V
Gate-source charge	Q <sub>gs</sub> *2	-	0.6	-	nC	V <sub>GS</sub> =10V
Gate-drain charge	Q <sub>gd</sub> *2	-	0.3	-	nC	I <sub>D</sub> =200mA

\*1 P<sub>WS</sub>≤300μs, Duty cycles1%  
\*2 Pulsed

●Packaging specifications

Type	Package	Taping
		Code
	Basic ordering unit (pieces)	3000
SM6K2		○

●Electrical characteristic curves

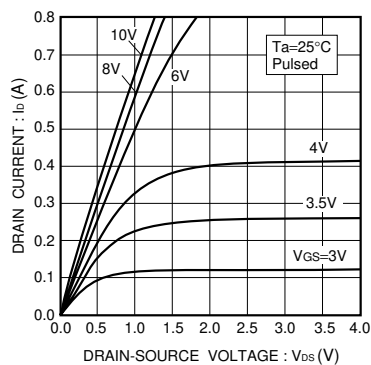


Fig.1 Typical output characteristics

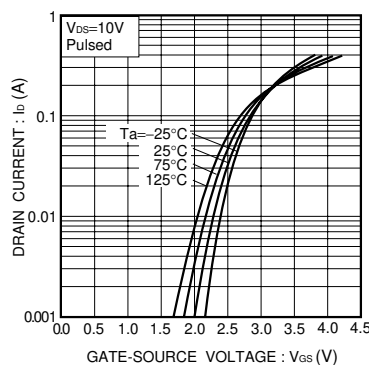


Fig.2 Typical transfer characteristics

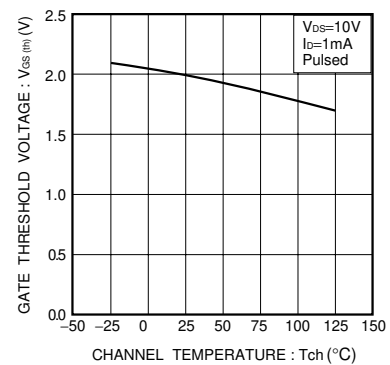


Fig.3 Gate threshold voltage vs. channel temperature

Transistors

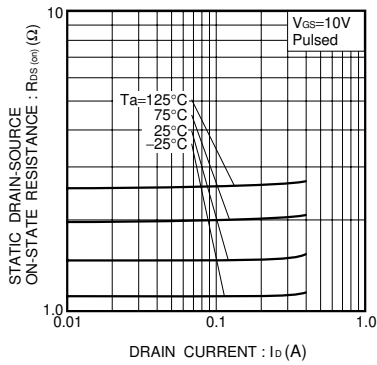


Fig.4 Static drain-source on-state resistance vs. drain current ( I )

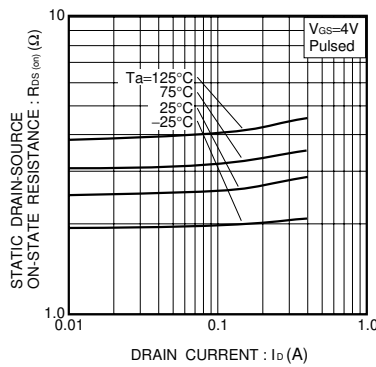


Fig.5 Static drain-source on-state resistance vs. drain current ( II )

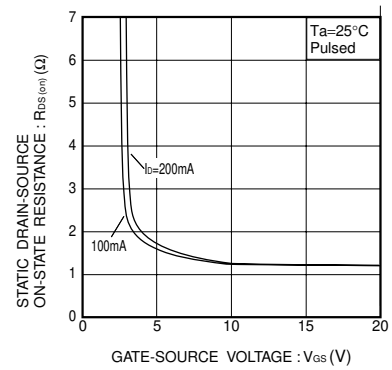


Fig.6 Static drain-source on-state resistance vs. gate-source voltage

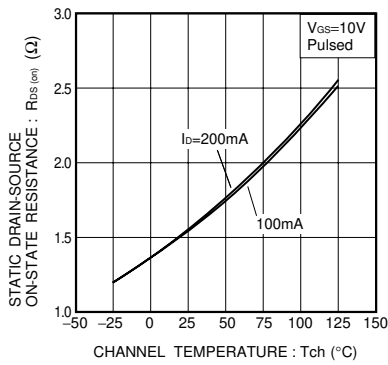


Fig.7 Static drain-source on-state resistance vs. channel temperature

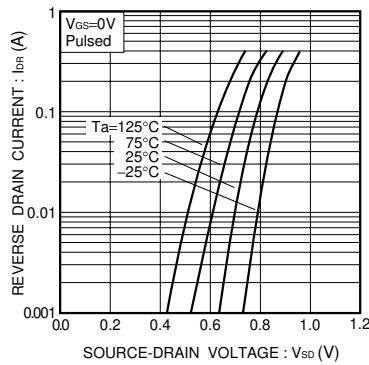


Fig.8 Reverse drain current vs. source-drain voltage ( I )

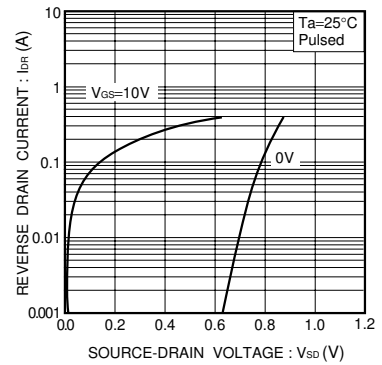


Fig.9 Reverse drain current vs. source-drain voltage ( II )

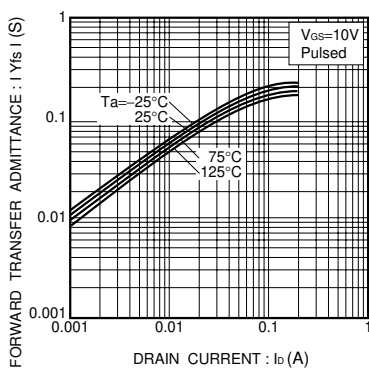


Fig.10 Forward transfer admittance vs. drain current

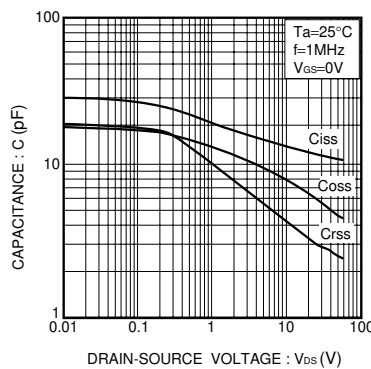


Fig.11 Typical capacitance vs. drain-source voltage

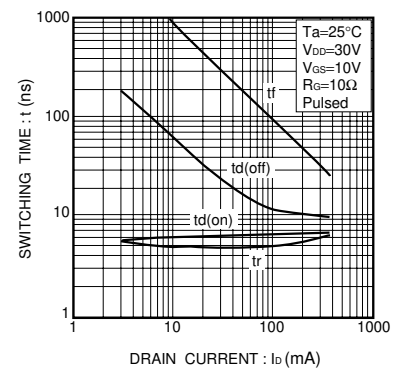


Fig.12 Switching characteristics

## Transistors

### ● Switching characteristics measurement circuit

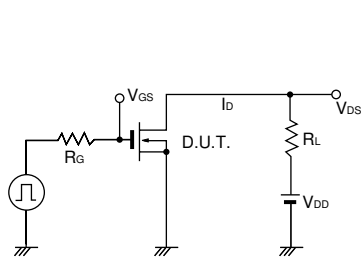


Fig.13 Switching time test circuit

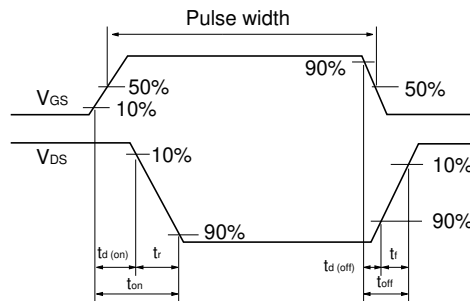


Fig.14 Switching time waveforms

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