

# Small switching (30V, 0.1A)

## EM6K1

### ●Features

- 1) Two 2SK3019 transistors in a single EMT package.
- 2) The MOSFET elements are independent, eliminating interference.
- 3) Mounting cost and area can be cut in half.
- 4) Low on-resistance.
- 5) Low voltage drive (2.5V) makes this device ideal for portable equipment.

### ●Applications

Interfacing, switching (30V, 100mA)

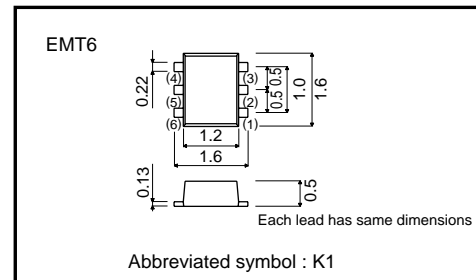
### ●Structure

Silicon N-channel  
MOSFET

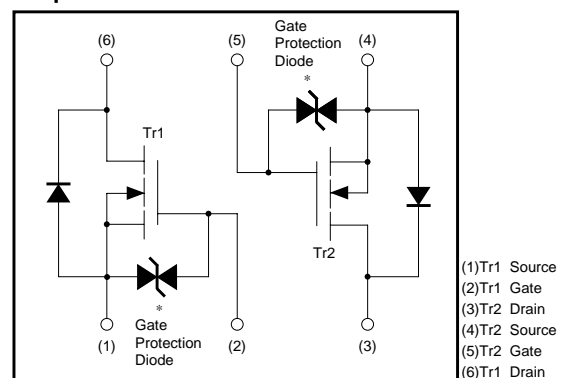
### ●Packaging specifications

Type	Package	Taping
	Code	T2R
	Basic ordering unit (pieces)	8000
EM6K1		○

### ●External dimensions (Units : mm)



### ●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 rated voltages are exceeded.

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

Parameter	Symbol	Limits	Unit
Drain-source voltage	$V_{DS}$	30	V
Gate-source voltage	$V_{GS}$	$\pm 20$	V
Drain current	Continuous	$I_D$	100 mA
	Pulsed	$I_{DP}^{*1}$	400 mA
Reverse drain current	Continuous	$I_{DR}$	100 mA
	Pulsed	$I_{DRP}^{*1}$	400 mA
Total power dissipation (Tc=25°C)	$P_D^{*2}$	150	mW/TOTAL 120mW/1ELEMENT
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55~+150	°C

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

\*2 With each pin mounted on the recommended lands.

Transistor

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I <sub>GSS</sub>	-	-	±1	μA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	30	-	-	V	I <sub>D</sub> =10μA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>	-	-	1.0	μA	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	0.8	-	1.5	V	V <sub>DS</sub> =3V, I <sub>D</sub> =100μA
Static drain-source on-state resistance	R <sub>DS(on)</sub>	-	5	8	Ω	I <sub>D</sub> =10mA, V <sub>GS</sub> =4V
	R <sub>DS(on)</sub>	-	7	13	Ω	I <sub>D</sub> =1mA, V <sub>GS</sub> =2.5V
Forward transfer admittance	Y <sub>fs</sub>	20	-	-	mS	V <sub>DS</sub> =3V, I <sub>D</sub> =10mA
Input capacitance	C <sub>iss</sub>	-	13	-	pF	V <sub>DS</sub> =5V
Output capacitance	C <sub>oss</sub>	-	9	-	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	-	4	-	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub>	-	15	-	ns	I <sub>D</sub> =10mA, V <sub>DD</sub> =5V
Rise time	t <sub>r</sub>	-	35	-	ns	V <sub>GS</sub> =5V
Turn-off delay time	t <sub>d(off)</sub>	-	80	-	ns	R <sub>L</sub> =500Ω
Fall time	t <sub>f</sub>	-	80	-	ns	R <sub>GS</sub> =10Ω

●Electrical characteristic curves

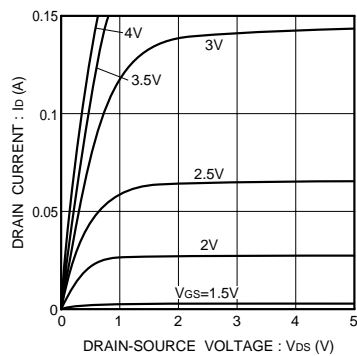


Fig.1 Typical Output Characteristics

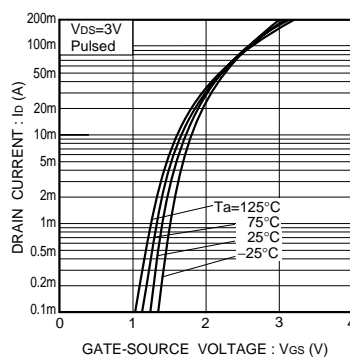


Fig.2 Typical Transfer Characteristics

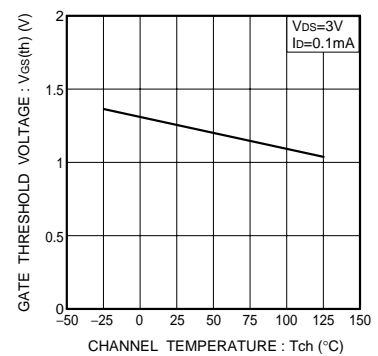


Fig.3 Gate Threshold Voltage vs. Channel Temperature

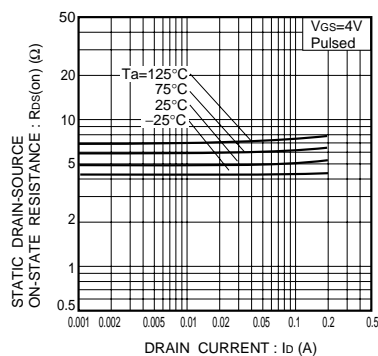


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current (I)

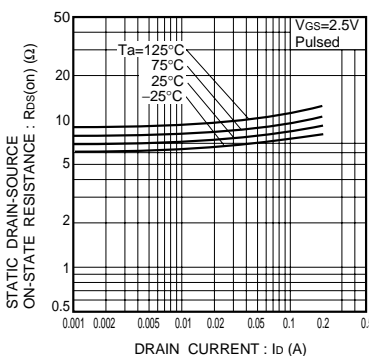


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current (II)

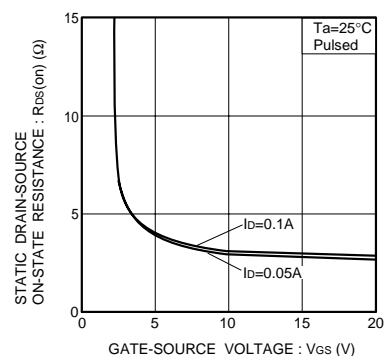


Fig.6 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

Transistor

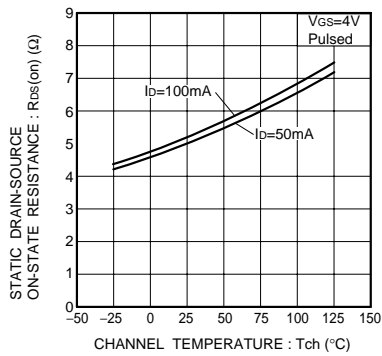


Fig.7 Static Drain-Source On-State Resistance vs. Channel Temperature

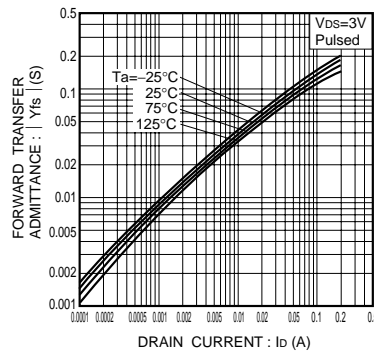


Fig.8 Forward Transfer Admittance vs. Drain Current

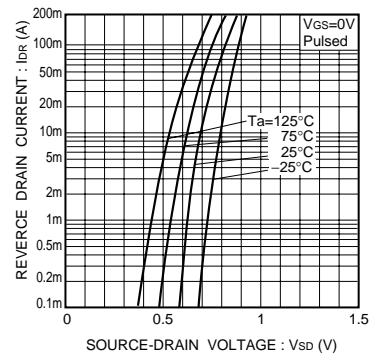


Fig.9 Reverse Drain Current vs. Source-Drain Voltage (I)

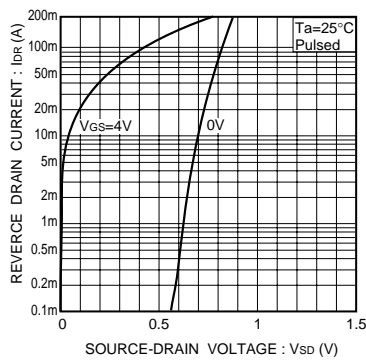


Fig.10 Reverse Drain Current vs. Source-Drain Voltage (II)

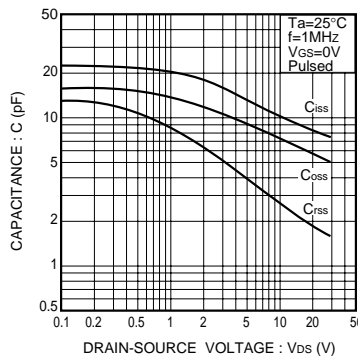


Fig.11 Typical Capacitance vs. Drain-Source Voltage

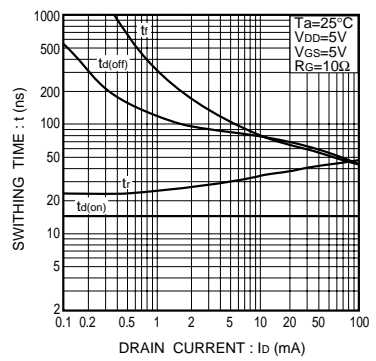


Fig.12 Switching Characteristics

●Switching characteristics measurement circuits

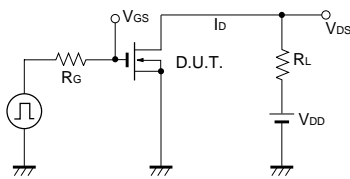


Fig.13 Switching Time Test Circuit

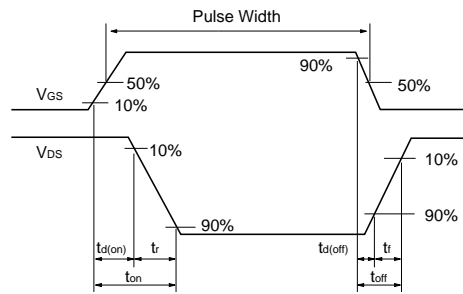


Fig.14 Switching Time Waveforms