

2.5V Drive Nch + Nch MOSFET

EM6K31

● Structure

Silicon N-channel MOSFET

● Features

- 1) High speed switing.
- 2) Small package(EMT6).
- 3) Low voltage drive(2.5V drive).

● Application

Switching

● Packaging specifications

Type	Package	Taping
	Code	T2R
	Basic ordering unit (pieces)	8000
EM6K31		○

● Absolute maximum ratings (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	60	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	Continuous	I_D	± 250	mA
	Pulsed	I_{DP}^{*1}	± 1	A
Source current (Body Diode)	Continuous	I_S	125	mA
	Pulsed	I_{SP}^{*1}	1	A
Power dissipation		P_D^{*2}	150	mW / TOTAL
			120	mW / 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 $\leq 1\%$

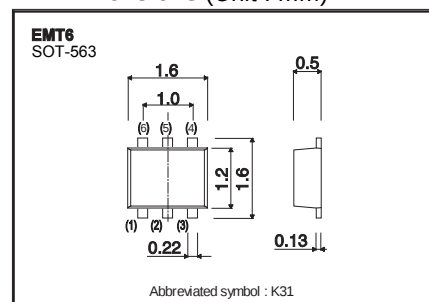
*2 Each terminal mounted on a recommended land.

● Thermal resistance

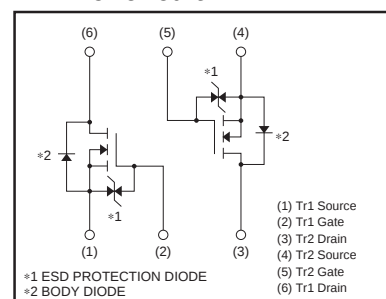
Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th}(ch-a)^*$	833	°C / W / TOTAL
		1042	°C / W / ELEMENT

* Each terminal mounted on a recommended land.

● Dimensions (Unit : mm)



● Inner circuit



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

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	-	-	± 10	μA	$V_{GS}=\pm 20V$, $V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	60	-	-	V	$I_D=1mA$, $V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=60V$, $V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	1.0	-	2.3	V	$V_{DS}=10V$, $I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	-	1.7	2.4	Ω	$I_D=250mA$, $V_{GS}=10V$
		-	2.1	3.0		$I_D=250mA$, $V_{GS}=4.5V$
		-	2.3	3.2		$I_D=250mA$, $V_{GS}=4.0V$
		-	3.0	12.0		$I_D=10mA$, $V_{GS}=2.5V$
Forward transfer admittance	$ Y_{fs} $ *	0.25	-	-	S	$I_D=250mA$, $V_{DS}=10V$
Input capacitance	C_{iss}	-	15	-	pF	$V_{DS}=25V$
Output capacitance	C_{oss}	-	4.5	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	-	2.0	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	3.5	-	ns	$I_D=100mA$, $V_{DD}\approx 30V$
Rise time	t_r *	-	5	-	ns	$V_{GS}=10V$
Turn-off delay time	$t_{d(off)}$ *	-	18	-	ns	$R_L\approx 300\Omega$
Fall time	t_f *	-	28	-	ns	$R_G=10\Omega$

*Pulsed

● **Body diode characteristics** (Source-Drain) (Ta = 25°C)

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD} *	-	-	1.2	V	$I_S=250mA$, $V_{GS}=0V$

*Pulsed

●Electrical characteristic curves

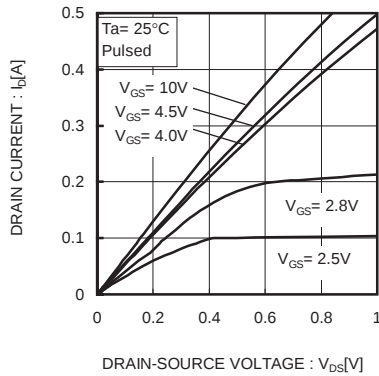


Fig.1 Typical Output Characteristics(I)

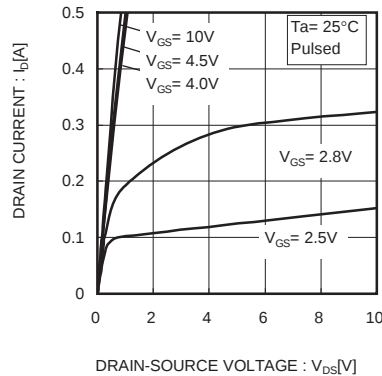


Fig.2 Typical Output Characteristics(II)

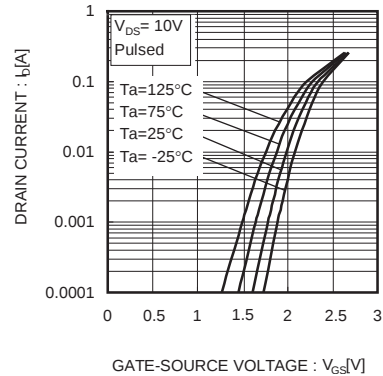


Fig.3 Typical Transfer Characteristics

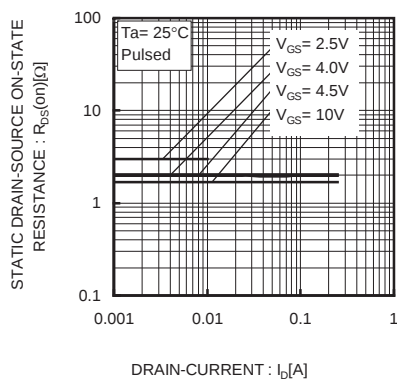


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current(I)

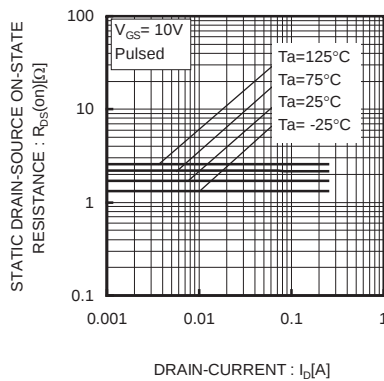


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current(II)

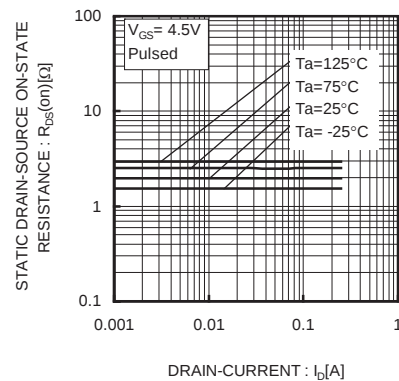


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current(III)

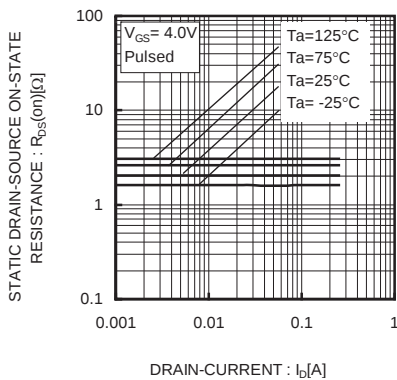


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current(IV)

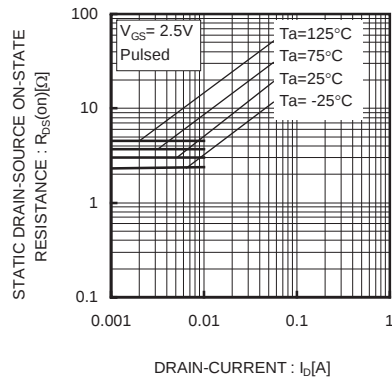


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current(V)

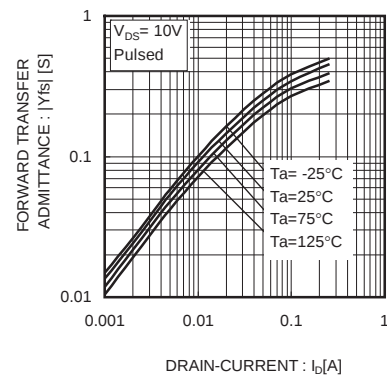


Fig.9 Forward Transfer Admittance vs. Drain Current

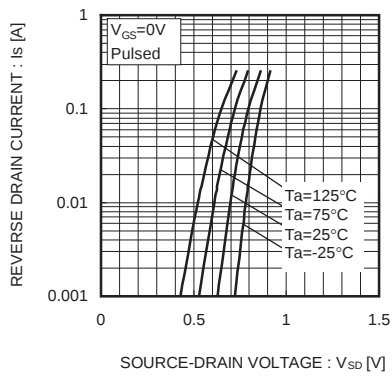


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

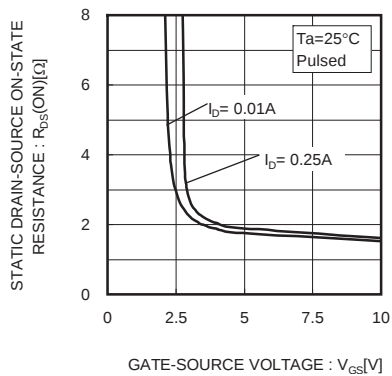


Fig.11 Static Drain-Source On-State Resistance vs. Gate Source Voltage

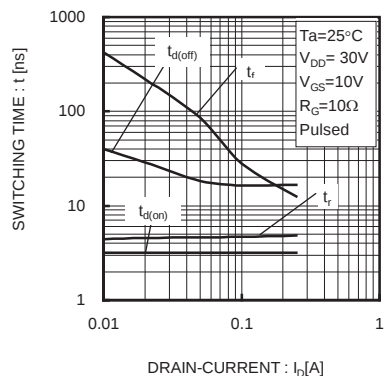


Fig.12 Switching Characteristics

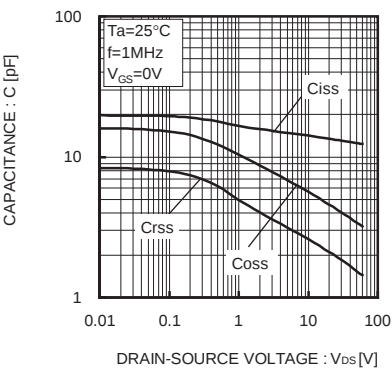


Fig.13 Typical Capacitance vs. Drain-Source Voltage

●Measurement circuits

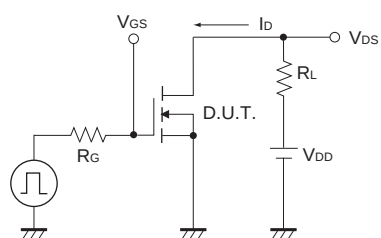


Fig.1-1 Switching time measurement circuit

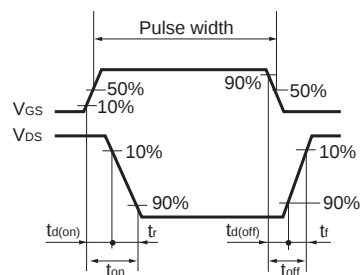


Fig.1-2 Switching waveforms

●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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