

1.2V Drive Nch + Nch MOSFET

EM6K33

● Structure

Silicon N-channel MOSFET

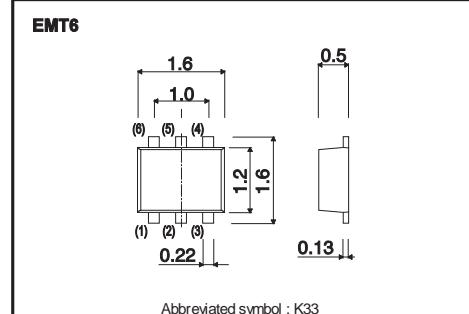
● Features

- 1) High speed switching.
- 2) Small package(EMD6).
- 3) Ultra low voltage drive(1.2V drive).

● Application

Switching

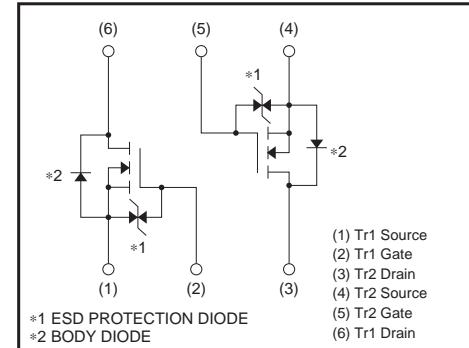
●Dimensions (Unit : mm)



●Packaging specifications

Type	Package	Taping
	Code	T2R
	Basic ordering unit (pieces)	8000
EM6K33		○

● Inner circuit



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

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	50	V
Gate-source voltage		V_{GSS}	± 8	V
Drain current	Continuous	I_D	± 200	mA
	Pulsed	I_{DP}	± 800	mA
Source current (Body Diode)	Continuous	I_s	125	mA
	Pulsed	I_{sp}	800	mA
Power dissipation		P_D	150	mW / TOTAL
			120	mW / ELEMENT
Channel temperature		T_{ch}	150	°C
Range of storage temperature		T_{stg}	-55 to +150	°C

*1 $P_{w} \leq 10 \mu\text{s}$, Duty cycle $\leq 1\%$

*2 Each terminal mounted on a recommended land.

● Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	Rth (ch-a)*	833	°C / W /TOTAL
		1042	°C / W /ELEMENT

* Each terminal mounted on a recommended land.

●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	$V_{GS}=\pm 8V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	50	-	-	V	$I_D=1mA, V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=50V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(\text{th})}$	0.3	-	1.0	V	$V_{DS}=10V, I_D=1mA$
Static drain-source on-state resistance	$R_{DS(\text{on})}^*$	-	1.6	2.2	Ω	$I_D=200mA, V_{GS}=4.5V$
		-	1.7	2.4		$I_D=200mA, V_{GS}=2.5V$
		-	1.9	2.7		$I_D=100mA, V_{GS}=1.8V$
		-	2.0	4.0		$I_D=40mA, V_{GS}=1.5V$
		-	2.4	7.2		$I_D=20mA, V_{GS}=1.2V$
Forward transfer admittance	$ Y_{fs} ^*$	0.4	-	-	S	$I_D=200mA, V_{DS}=10V$
Input capacitance	C_{iss}	-	25	-	pF	$V_{DS}=10V$
Output capacitance	C_{oss}	-	6	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	-	3	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	-	4	-	ns	$I_D=100mA, V_{DD}=30V$
Rise time	t_r^*	-	6	-	ns	$V_{GS}=4.5V$
Turn-off delay time	$t_{d(off)}^*$	-	15	-	ns	$R_L=300\Omega$
Fall time	t_f^*	-	55	-	ns	$R_G=10\Omega$

*Pulsed

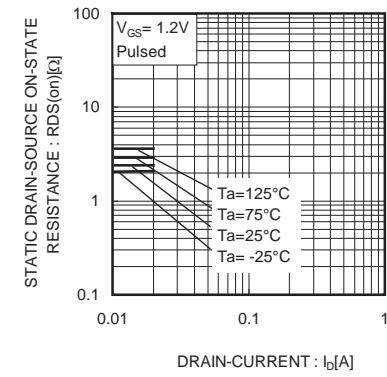
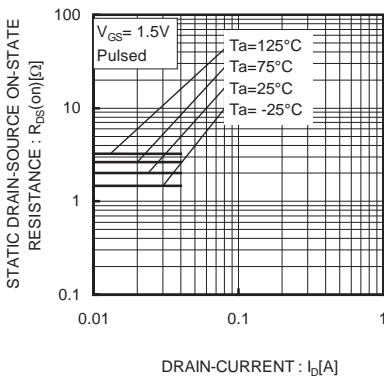
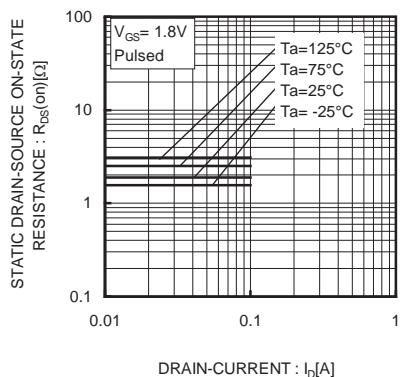
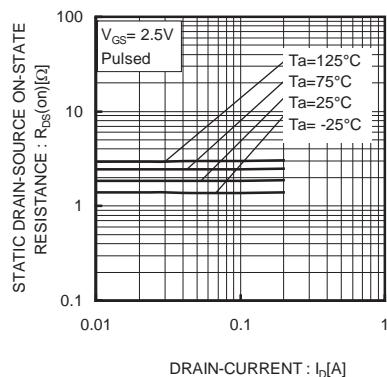
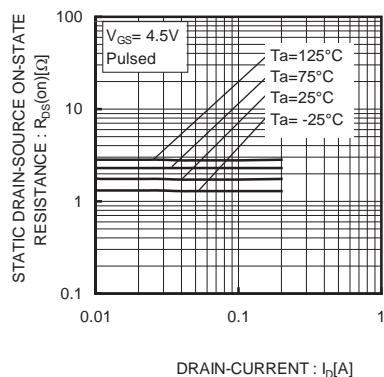
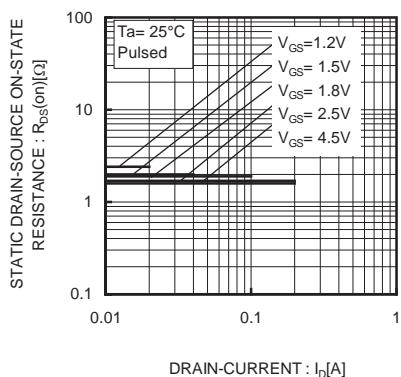
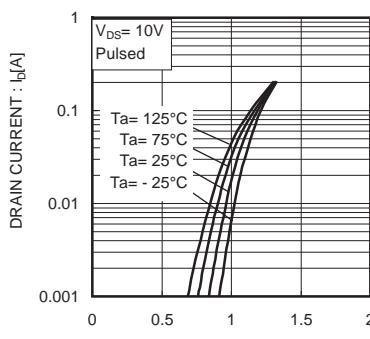
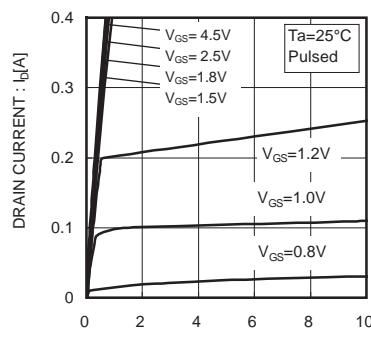
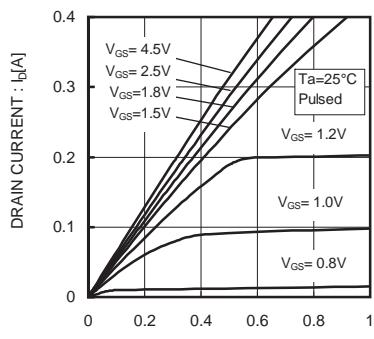
●Body diode characteristics (Source-Drain) (Ta = 25°C)

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD}^*	-	-	1.2	V	$I_s=200mA, V_{GS}=0V$

*Pulsed

●Electrical characteristic curves



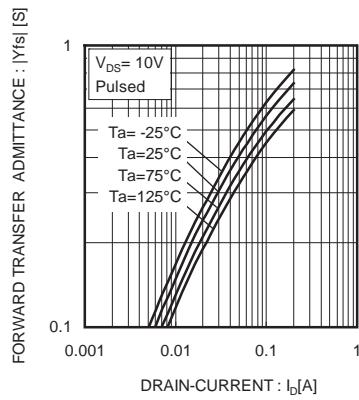


Fig.10 Forward Transfer Admittance vs. Drain Current

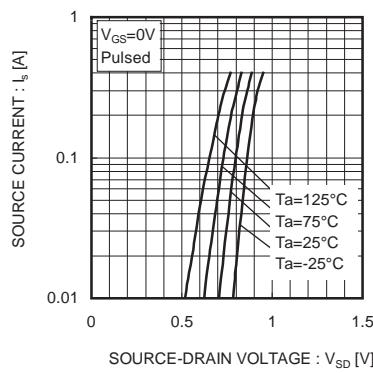


Fig.11 Reverse Drain Current vs. Source-Drain Voltage

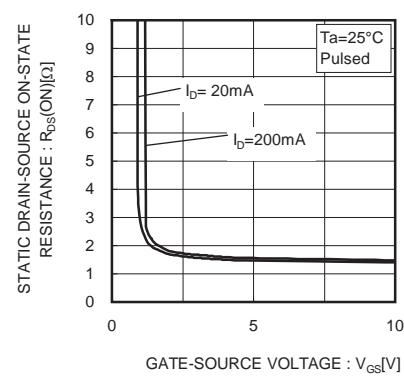


Fig.12 Static Drain-Source On-State Resistance vs. Gate Source Voltage

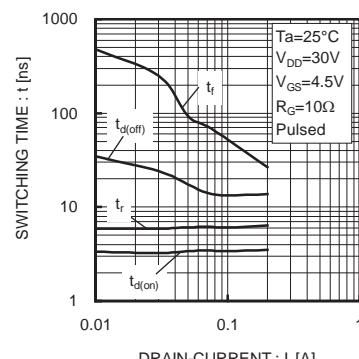


Fig.13 Switching Characteristics

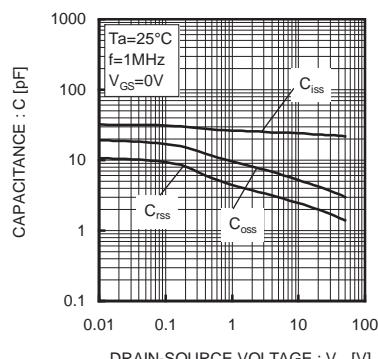


Fig.14 Typical Capacitance vs. Drain-Source Voltage

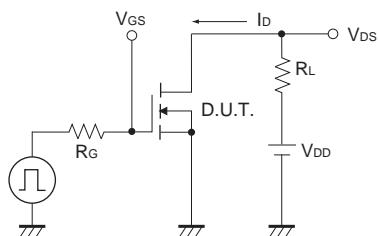
●Measurement circuits

Fig.1-1 Switching time measurement circuit

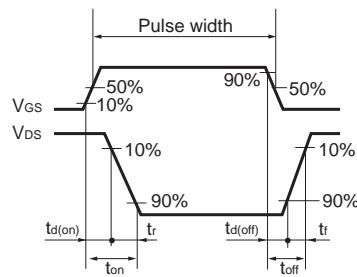


Fig.1-2 Switching waveforms

●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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