

Transistors

# 2.5V Drive Nch+Pch MOS FET

## US6M2

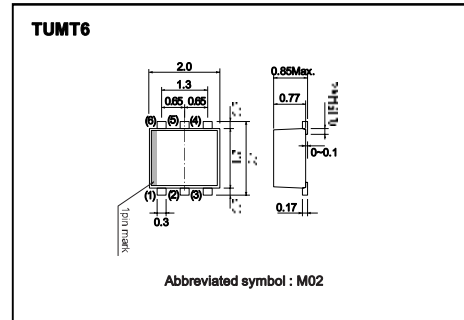
●Structure

Silicon N-channel MOS FET /  
Silicon P-channel MOS FET

●Features

- 1) Nch MOS FET and Pch MOS FET are put in TUMT6 package.
- 2) High-speed switching, low On-resistance.
- 3) Low voltage drive (2.5V drive).
- 4) Built-in G-S Protection Diode.

●External dimensions (Unit : mm)



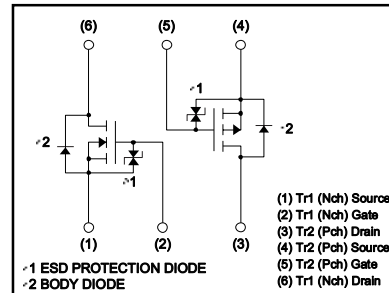
●Applications

Switching

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
US6M2		○

●Inner circuit



●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit	
		Tr1 : Nchannel	Tr2 : Pchannel		
Drain-source voltage	V <sub>DSS</sub>	30	-20	V	
Gate-source voltage	V <sub>GSS</sub>	12	-12	V	
Drain current	Continuous	I <sub>D</sub>	±1.5	±1	A
	Pulsed	I <sub>DP</sub> <sup>1</sup>	±6	±4	A
Source current (Body diode)	Continuous	I <sub>S</sub>	0.6	-0.4	A
	Pulsed	I <sub>SP</sub> <sup>1</sup>	6	-4	A
Total power dissipation	P <sub>D</sub> <sup>2</sup>	1.0		W / TOTAL	
		0.7		W / ELEMENT	
Channel temperature	T <sub>ch</sub>	150		°C	
Storage temperature	T <sub>stg</sub>	-55 to +150		°C	

<sup>1</sup> Pw:10µs, Duty cycle ≤1%  
<sup>2</sup> Mounted on a ceramic board.

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	R <sub>th(ch-a)</sub> <sup>*</sup>	125	°C/W / TOTAL
		179	°C/W / ELEMENT

<sup>\*</sup> Mounted on a ceramic board

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## N-ch

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I <sub>GSS</sub>	–	–	10	μA	V <sub>GS</sub> =12V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	30	–	–	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> = 30V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	0.5	–	1.5	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Static drain-source on-state resistance	R <sub>DS(on)</sub>	–	170	240	mΩ	I <sub>D</sub> = 1.5A, V <sub>GS</sub> = 4.5V
		–	180	250	mΩ	I <sub>D</sub> = 1.5A, V <sub>GS</sub> = 4V
		–	240	340	mΩ	I <sub>D</sub> = 1.5A, V <sub>GS</sub> = 2.5V
Forward transfer admittance	Y <sub>fs</sub>	1.5	–	–	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1.5A
Input capacitance	C <sub>iss</sub>	–	80	–	pF	V <sub>DS</sub> = 10V
Output capacitance	C <sub>oss</sub>	–	13	–	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	–	12	–	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub>	–	7	–	ns	V <sub>DD</sub> = 15V
Rise time	t <sub>r</sub>	–	9	–	ns	I <sub>D</sub> = 0.75A
Turn-off delay time	t <sub>d(off)</sub>	–	15	–	ns	V <sub>GS</sub> = 4.5V
Fall time	t <sub>f</sub>	–	6	–	ns	R <sub>L</sub> = 20Ω R <sub>G</sub> =10Ω
Total gate charge	Q <sub>g</sub>	–	1.6	2.2	nC	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 4.5V
Gate-source charge	Q <sub>gs</sub>	–	0.5	–	nC	I <sub>D</sub> = 1.5A
Gate-drain charge	Q <sub>gd</sub>	–	0.3	–	nC	R <sub>L</sub> = 10Ω, R <sub>G</sub> = 10Ω

\*Pulsed

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

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

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## P-ch

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I <sub>GSS</sub>	–	–	10	μA	V <sub>GS</sub> = –12V, 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>	–0.7	–	–2.0	V	V <sub>DS</sub> = –10V, I <sub>D</sub> = –1mA
Static drain-source on-state resistance	R <sub>DS(on)</sub>	–	280	390	mΩ	I <sub>D</sub> = –1A, V <sub>GS</sub> = –4.5V
		–	310	430	mΩ	I <sub>D</sub> = –1A, V <sub>GS</sub> = –4V
		–	570	800	mΩ	I <sub>D</sub> = –0.5A, V <sub>GS</sub> = –2.5V
Forward transfer admittance	Y <sub>fs</sub>	0.7	–	–	S	V <sub>DS</sub> = –10V, I <sub>D</sub> = –0.5A
Input capacitance	C <sub>iss</sub>	–	150	–	pF	V <sub>DS</sub> = –10V
Output capacitance	C <sub>oss</sub>	–	20	–	pF	V <sub>GS</sub> = 0V
Reverse transfer capacitance	C <sub>rss</sub>	–	20	–	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub>	–	9	–	ns	V <sub>DD</sub> = –15V
Rise time	t <sub>r</sub>	–	8	–	ns	I <sub>D</sub> = –0.5A
Turn-off delay time	t <sub>d(off)</sub>	–	25	–	ns	V <sub>GS</sub> = –4.5V
Fall time	t <sub>f</sub>	–	10	–	ns	R <sub>L</sub> = 30Ω R <sub>G</sub> = 10Ω
Total gate charge	Q <sub>g</sub>	–	2.1	–	nC	V <sub>DD</sub> = –15V, V <sub>GS</sub> = –4.5V
Gate-source charge	Q <sub>gs</sub>	–	0.5	–	nC	I <sub>D</sub> = –1A
Gate-drain charge	Q <sub>gd</sub>	–	0.5	–	nC	R <sub>L</sub> = 15Ω, R <sub>G</sub> = 10Ω

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>SD</sub>	–	–	–1.2	V	I <sub>S</sub> = –0.4A, V <sub>GS</sub> =0V

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