

# 2.5V Drive Nch+Pch MOSFET

## US6M2

### ●Structure

Silicon N-channel MOSFET /  
Silicon P-channel MOSFET

### ●Features

- 1) Nch MOSFET and Pch MOSFET 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.

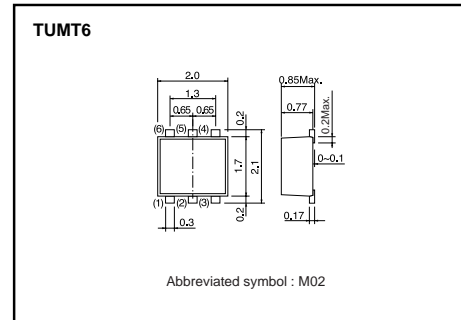
### ●Applications

Switching

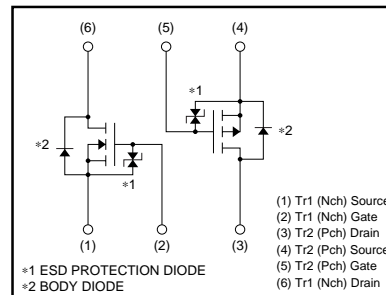
### ●Packaging specifications

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

### ●Dimensions (Unit : mm)



### ●Inner circuit



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

Parameter	Symbol	Limits		Unit
		Tr1 : Nchannel	Tr2 : Pchannel	
Drain-source voltage	$V_{DSS}$	30	-20	V
Gate-source voltage	$V_{GSS}$	12	-12	V
Drain current	Continuous	$I_D$	$\pm 1.5$	A
	Pulsed	$I_{DP}^{*1}$	$\pm 6$	A
Source current (Body diode)	Continuous	$I_S$	-0.4	A
	Pulsed	$I_{SP}^{*1}$	-4	A
Total power dissipation	$P_D^{*2}$	1.0		W / TOTAL
		0.7		W / ELEMENT
Channel temperature	$T_{ch}$	150		°C
Storage temperature	$T_{stg}$	-55 to +150		°C

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

\*2 Mounted on a ceramic board.

### ●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th(ch-a)}^*$	125	°C/W / TOTAL
		179	°C/W / ELEMENT

\* Mounted on a ceramic board

## Transistors

## 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 I <sub>D</sub> = 0.75A
Rise time	t <sub>r</sub> *	–	9	–	ns	V <sub>GS</sub> = 4.5V
Turn-off delay time	t <sub>d(off)*</sub>	–	15	–	ns	R <sub>L</sub> = 20Ω
Fall time	t <sub>f</sub> *	–	6	–	ns	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

## Transistors

## 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 I <sub>D</sub> = -0.5A
Rise time	t <sub>r</sub> *	-	8	-	ns	V <sub>GS</sub> = -4.5V
Turn-off delay time	t <sub>d(off)</sub> *	-	25	-	ns	R <sub>L</sub> = 30Ω
Fall time	t <sub>f</sub> *	-	10	-	ns	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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