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# 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.

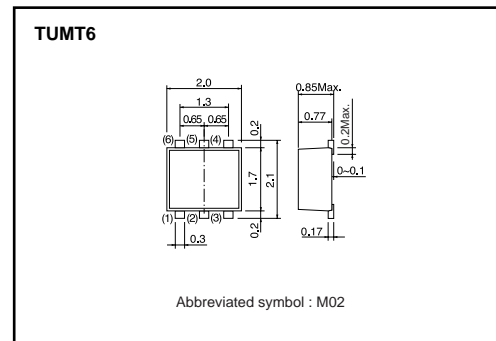
### ●Applications

Switching

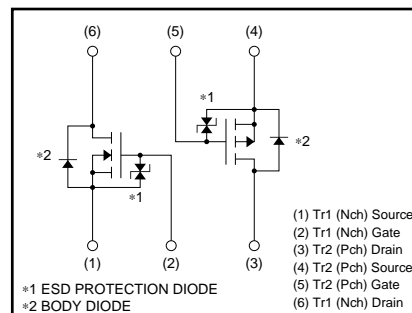
### ●Packaging specifications

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 <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	A
	Pulsed	I <sub>DP</sub> *1	±6	A
Source current (Body diode)	Continuous	I <sub>S</sub>	0.6	A
	Pulsed	I <sub>SP</sub> *1	6	A
Total power dissipation	P <sub>D</sub> *2	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

\*1 Pw≤10μs, Duty cycle≤1%

\*2 Mounted on a ceramic board.

### ●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	R <sub>th(ch-a)</sub> *	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
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
Total gate charge	Q <sub>g</sub> *	–	1.6	2.2	nC	R <sub>G</sub> =10Ω
Gate-source charge	Q <sub>gs</sub> *	–	0.5	–	nC	V <sub>DD</sub> ≐ 15V, V <sub>GS</sub> = 4.5V
Gate-drain charge	Q <sub>gd</sub> *	–	0.3	–	nC	I <sub>D</sub> = 1.5A
						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	$I_{GSS}$	–	–	10	$\mu A$	$V_{GS} = -12V, V_{DS} = 0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	-20	–	–	V	$I_D = -1mA, V_{GS} = 0V$
Zero gate voltage drain current	$I_{DSS}$	–	–	-1	$\mu A$	$V_{DS} = -20V, V_{GS} = 0V$
Gate threshold voltage	$V_{GS(th)}$	-0.7	–	-2.0	V	$V_{DS} = -10V, I_D = -1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	–	280	390	m $\Omega$	$I_D = -1A, V_{GS} = -4.5V$
		–	310	430	m $\Omega$	$I_D = -1A, V_{GS} = -4V$
		–	570	800	m $\Omega$	$I_D = -0.5A, V_{GS} = -2.5V$
Forward transfer admittance	$ Y_{fs} $ *	0.7	–	–	S	$V_{DS} = -10V, I_D = -0.5A$
Input capacitance	$C_{iss}$	–	150	–	pF	$V_{DS} = -10V$
Output capacitance	$C_{oss}$	–	20	–	pF	$V_{GS} = 0V$
Reverse transfer capacitance	$C_{rss}$	–	20	–	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$ *	–	9	–	ns	$V_{DD} = -15V$
Rise time	$t_r$ *	–	8	–	ns	$I_D = -0.5A$
Turn-off delay time	$t_{d(off)}$ *	–	25	–	ns	$V_{GS} = -4.5V$
Fall time	$t_f$ *	–	10	–	ns	$R_L = 30\Omega$
Total gate charge	$Q_g$ *	–	2.1	–	nC	$V_{DD} = -15V, V_{GS} = -4.5V$
Gate-source charge	$Q_{gs}$ *	–	0.5	–	nC	$I_D = -1A$
Gate-drain charge	$Q_{gd}$ *	–	0.5	–	nC	$R_L = 15\Omega, R_G = 10\Omega$

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	$V_{SD}$	–	–	-1.2	V	$I_S = -0.4A, V_{GS} = 0V$

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