Small switching (–20V, –1A)

US6J2

●Features

1) Two 2SK3018 transistors in a single TUMT package.
2) Mounting cost and area can be cut in half.
3) Low on-resistance.
4) Low voltage drive (2.5V) makes this device ideal for portable equipment.
5) Easily designed drive circuits.

●Applications

Interfacing, switching (–20V, –1A)

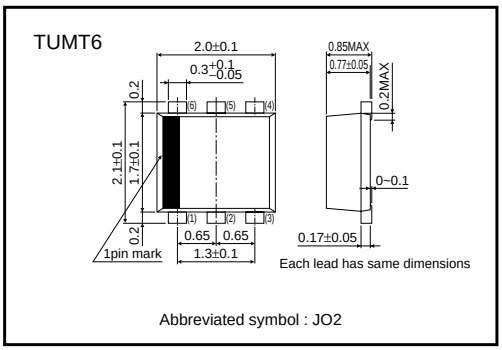
●Structure

Silicon P-channel
MOS FET

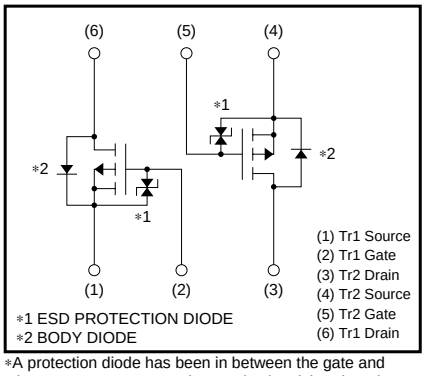
●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
US6J2		○

●External dimensions (Unit : mm)



●Equivalent circuit



∗A protection diode has been in between the gate and the source to protect against static electricity when the product is in use. Use the protection circuit when rated voltages are exceeded.

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

Parameter		Symbol	Limits	Unit	
Drain-source voltage		V_{DSS}	−20	V	
Gate-source voltage		V_{GSS}	−12	V	
Drain current	Continuous	I_D	±1	A	
	Pulsed	I_{DP}	±4	A	*1
Reverse drain current	Continuous	I_{DR}	−0.4	A	*1
	Pulsed	I_{DRP}	−1.6	A	
Total power dissipation (T_C=25°C)		P_D	1.0	W	*2
Channel temperature		Tch	150	°C	
Range of Storage temperature		Tstg	−55 to +150	°C	

*1 Pw≤10µs, Duty cycle≤50%
*2 With each pin mounted on the recommended lands.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	–	–	±10	µA	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}	–	–	−1.0	µA	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	mΩ	I_D= −1A, V_{GS}= −4.5V
		–	310	430	mΩ	I_D= −1A, V_{GS}= −4V
		–	570	800	mΩ	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	I_D= −0.5A V_{DD}≒ −15V V_{GS}= −4.5V R_L=30Ω R_{GS}=10Ω
Rise time	t_r	–	8	–	ns	
Turn-off delay time	$t_{d\ (off)}$	–	5	–	ns	
Fall time	t_f	–	10	–	ns	
Total gate charge	Q_g	–	2.1	–	nc	V_{DD}≒ −15V R_L=15Ω
Gate-source charge	Q_{gs}	–	0.5	–	nc	V_{GS}= −4.5V R_G=10Ω
Gate-drain charge	Q_{gd}	–	0.5	–	nc	I_D= −1A

●**Electrical characteristic curves**

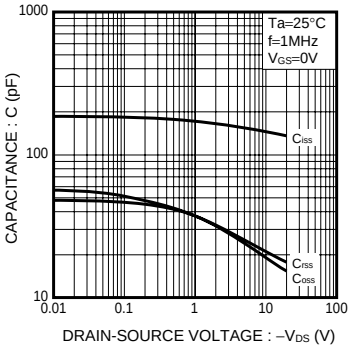


Fig.1 Typical Capacitance vs. Drain-Source Voltage

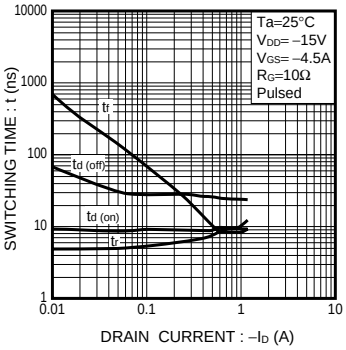


Fig.2 Switching Characteristics

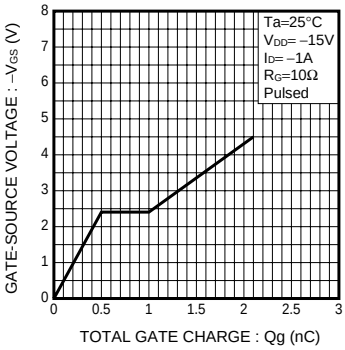


Fig.3 Dynamic Input Characteristics

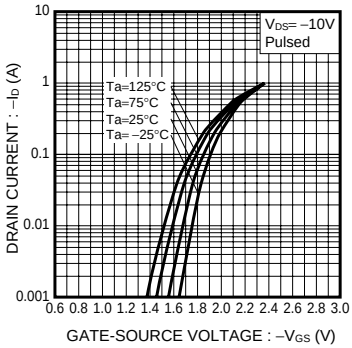


Fig.4 Typical Transfer Characteristics

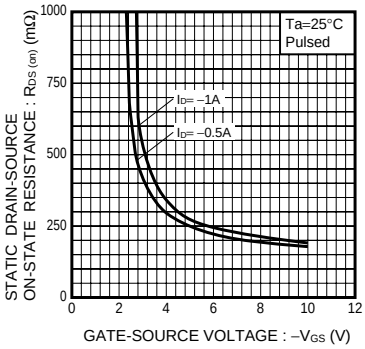


Fig.5 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

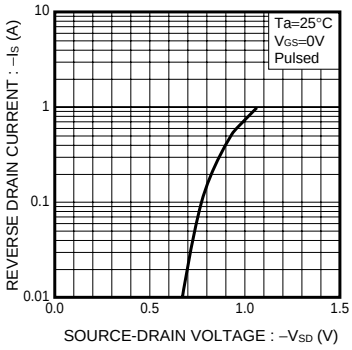


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

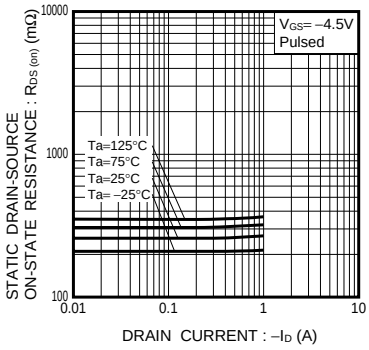


Fig.7 Static Drain-Source On-State Resistance vs. Drain Current (II)

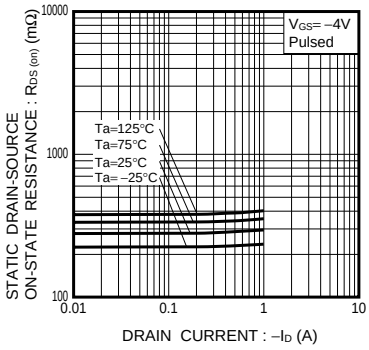


Fig.8 Static Drain-Source On-State Resistance vs. Drain Current (III)

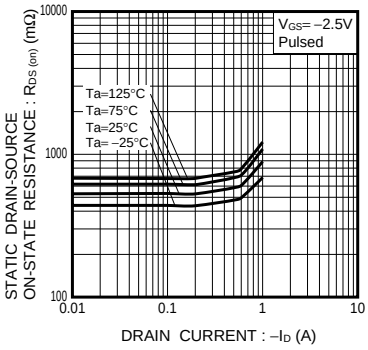


Fig.9 Static Drain-Source On-State Resistance vs. Drain Current (I)

●**Measurement circuits**

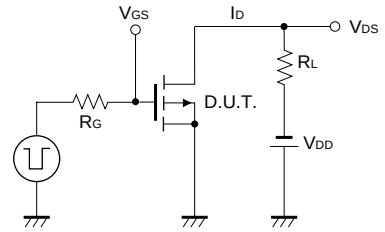


Fig.10 Switching Time Measurement Circuit

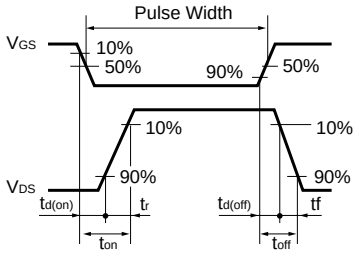


Fig.11 Switching Waveforms

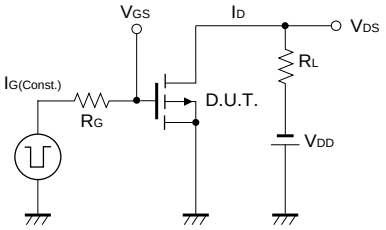


Fig.12 Gate Charge Measurement Circuit

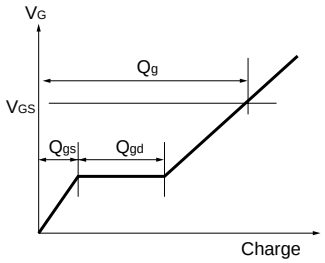


Fig.13 Gate Charge Waveform