

# Small switching (600V, 2A)

## 2SK3050

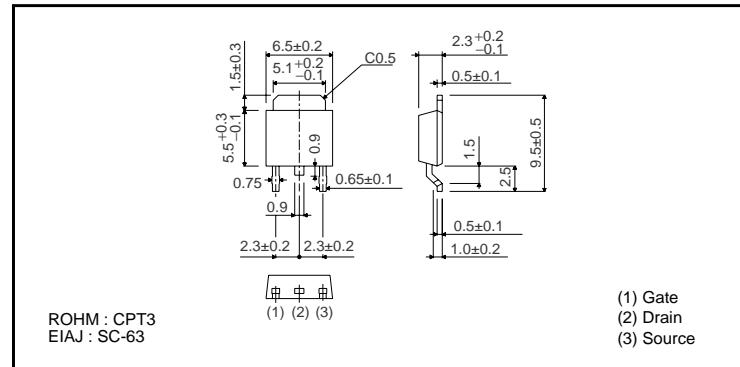
### ●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Wide SOA (safe operating area).
- 4) Gate-source voltage ( $V_{GS}$ ) guaranteed to be  $\pm 30V$ .
- 5) Easily designed drive circuits.
- 6) Easy to use in parallel.

### ●Structure

Silicon N-channel  
MOSFET

### ●External dimensions (Unit : mm)



### ●Absolute maximum ratings ( $T_a=25^\circ C$ )

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DS}$	600	V	
Gate-source voltage	$V_{GS}$	$\pm 30$	V	
Drain current	Continuous	$I_D$	2	A
	Pulsed	$I_{DP}^*$	6	A
Reverse drain current	Continuous	$I_{DR}$	2	A
	Pulsed	$I_{DRP}^*$	6	A
Total power dissipation ( $T_c=25^\circ C$ )	$P_D$	20	W	
Channel temperature	$T_{ch}$	150	$^\circ C$	
Storage temperature	$T_{stg}$	-55 to +150	$^\circ C$	

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

### ●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	2500
2SK3050		○

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●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-source leakage	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	600	-	-	V	I <sub>D</sub> =1mA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>	-	-	100	μA	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	2.0	-	4.0	V	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA
Static drain-source on-state resistance	R <sub>DS(on)</sub>	-	4.4	5.5	Ω	I <sub>D</sub> =1A, V <sub>GS</sub> =10V
Forward transfer admittance	Y <sub>fs</sub>	0.5	1.0	-	S	I <sub>D</sub> =1A, V <sub>DS</sub> =10V
Input capacitance	C <sub>iss</sub>	-	280	-	pF	V <sub>DS</sub> =10V
Output capacitance	C <sub>oss</sub>	-	48	-	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	-	16	-	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub>	-	12	-	ns	I <sub>D</sub> =1A, V <sub>DD</sub> =300V
Rise time	t <sub>r</sub>	-	17	-	ns	V <sub>GS</sub> =10V
Turn-off delay time	t <sub>d(off)</sub>	-	29	-	ns	R <sub>L</sub> =300Ω
Fall time	t <sub>f</sub>	-	105	-	ns	R <sub>G</sub> =10Ω
Reverse recovery time	t <sub>rr</sub>	-	460	-	ns	I <sub>DR</sub> =2A, V <sub>GS</sub> =0V
Reverse recovery charge	Q <sub>rr</sub>	-	2.0	-	μC	di/dt=100A/μs

●Electrical characteristic curves

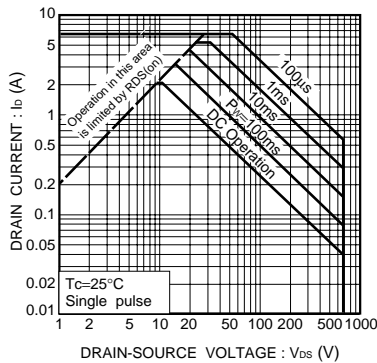


Fig.1 Maximum safe operating area

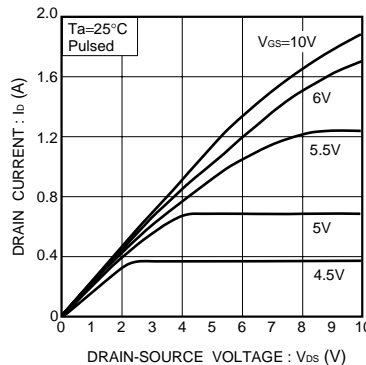


Fig.2 Typical output characteristics

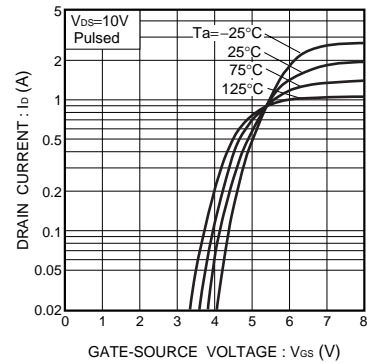


Fig.3 Typical transfer characteristics

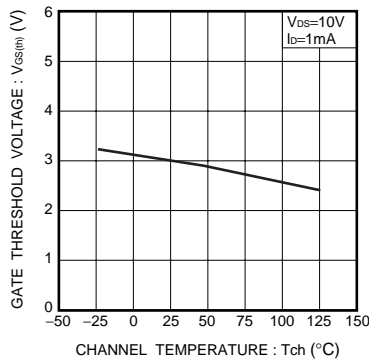


Fig.4 Gate threshold voltage vs. channel temperature

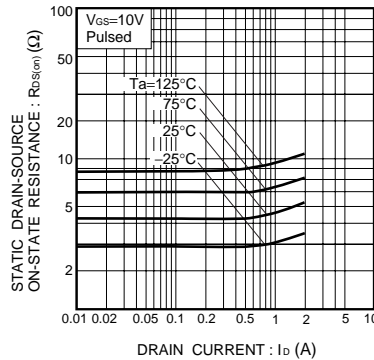


Fig.5 Static drain-source on-state resistance vs. drain current

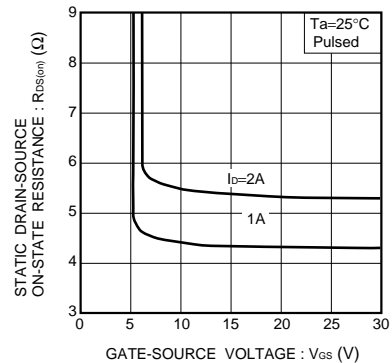


Fig.6 Static drain-source on-state resistance vs. gate-source voltage

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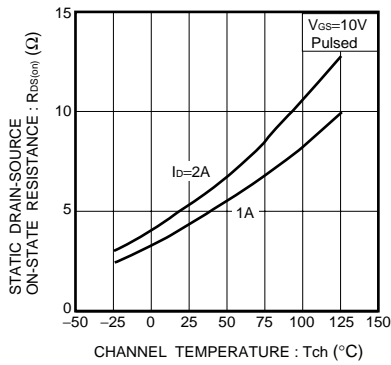


Fig.7 Static drain-source on-state resistance vs. channel temperature

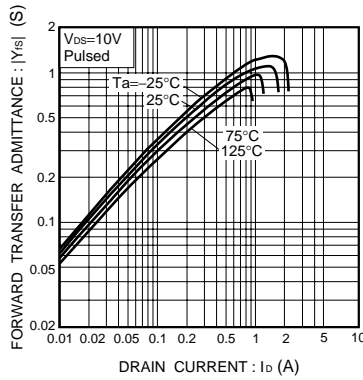


Fig.8 Forward transfer admittance vs. drain current

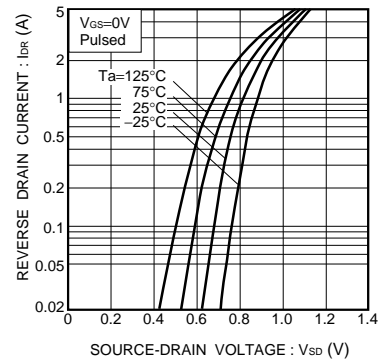


Fig.9 Reverse drain current vs. source-drain voltage ( I )

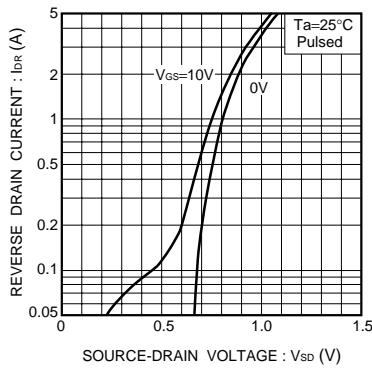


Fig.10 Reverse drain current vs. source-drain voltage ( II )

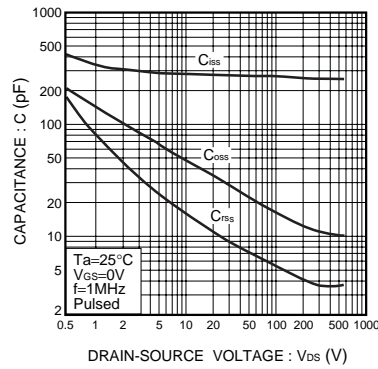


Fig.11 Typical capacitance vs. drain-source voltage

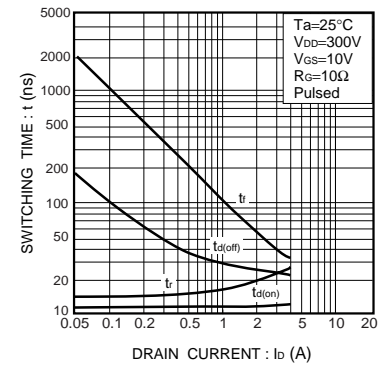


Fig.12 Switching characteristics

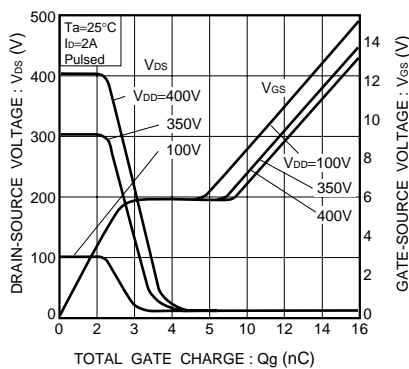


Fig.13 Dynamic input characteristics

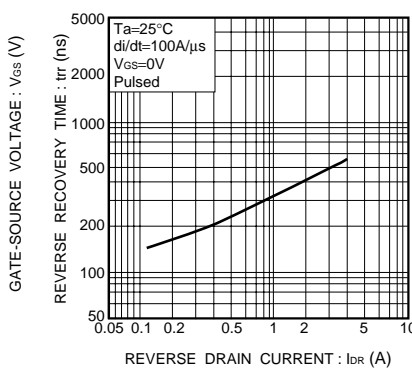


Fig.14 Reverse recovery time vs. reverse drain current

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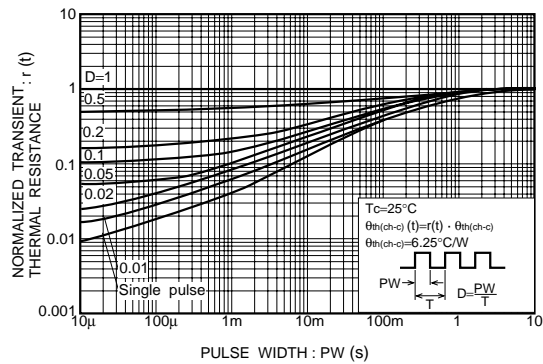


Fig.15 Normalized transient thermal resistance vs. pulse width

● Switching characteristics measurement circuit

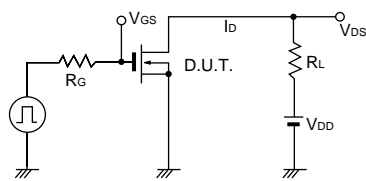


Fig.16 Switching time measurement circuit

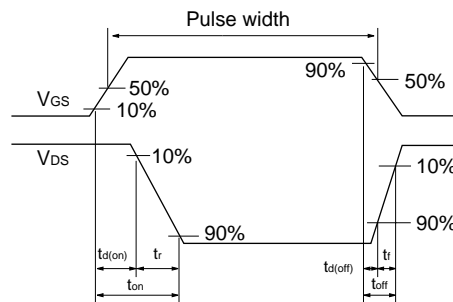


Fig.17 Switching time waveforms

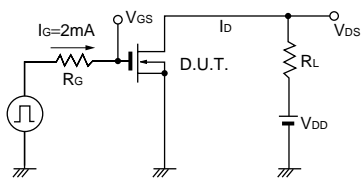


Fig.18 Gate charge measurement circuit

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