

# Small switching (30V, 0.1A)

## 2SK3541

### ●Applications

Interfacing, switching (30V, 100mA)

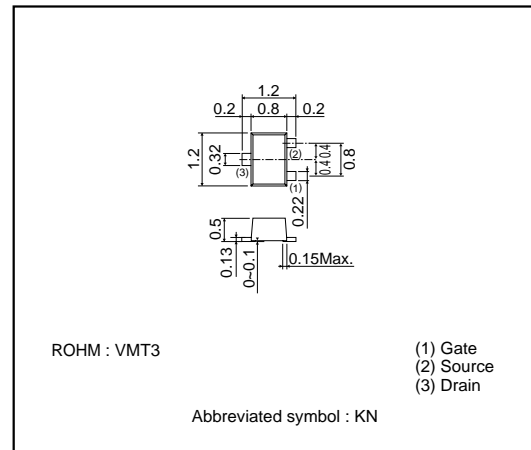
### ●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Low voltage drive (2.5V) makes this device ideal for portable equipment.
- 4) Easily designed drive circuits.
- 5) Easy to parallel.

### ●Structure

Silicon N-channel  
MOSFET

### ●External dimensions (Units : mm)



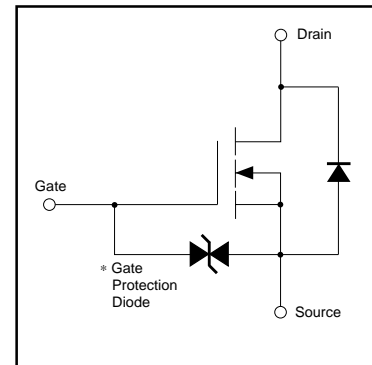
### ●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-source voltage	$V_{DS}$	30	V
Gate-source voltage	$V_{GS}$	$\pm 20$	V
Drain current	Continuous	$I_D$	100 mA
	Pulsed	$I_{DP}^{*1}$	400 mA
Reverse drain current	Continuous	$I_{DR}$	100 mA
	Pulsed	$I_{DRP}^{*1}$	400 mA
Total power dissipation (Tc=25°C)	$P_D^{*2}$	150	mW
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55~+150	°C

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

\*2 With each pin mounted on the recommended lands.

### ●Equivalent circuit



\*A protection diode is included between the gate and the source terminals to protect the diode against static electricity when the product is in use. Use a protection circuit when the fixed voltages are exceeded.

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●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I <sub>GSS</sub>	-	-	±1	μA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	30	-	-	V	I <sub>D</sub> =10μA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>	-	-	1.0	μA	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	0.8	-	1.5	V	V <sub>DS</sub> =3V, I <sub>D</sub> =100μA
Static drain-source on-state resistance	R <sub>DS(on)</sub>	-	5	8	Ω	I <sub>D</sub> =10mA, V <sub>GS</sub> =4V
	R <sub>DS(on)</sub>	-	7	13	Ω	I <sub>D</sub> =1mA, V <sub>GS</sub> =2.5V
Forward transfer admittance	Y <sub>fs</sub>	20	-	-	ms	I <sub>D</sub> =10mA, V <sub>DS</sub> =3V
Input capacitance	C <sub>iss</sub>	-	13	-	pF	V <sub>DS</sub> =5V
Output capacitance	C <sub>oss</sub>	-	9	-	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	-	4	-	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub>	-	15	-	ns	I <sub>D</sub> =10mA, V <sub>DD</sub> ≐ 5V
Rise time	t <sub>r</sub>	-	35	-	ns	V <sub>GS</sub> =5V
Turn-off delay time	t <sub>d(off)</sub>	-	80	-	ns	R <sub>L</sub> =500Ω
Fall time	t <sub>f</sub>	-	80	-	ns	R <sub>GS</sub> =10Ω

●Packaging specifications

Type	Package	Taping
	Code	T2R
	Basic ordering unit (pieces)	8000
2SK3541		○

●Electrical characteristic curves

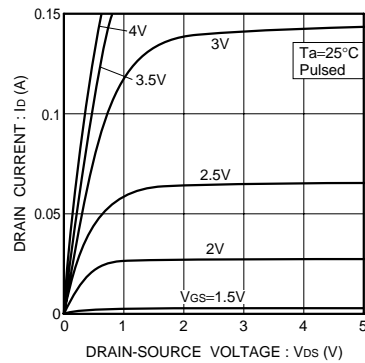


Fig.1 Typical output characteristics

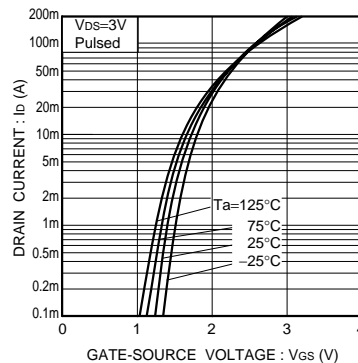


Fig.2 Typical transfer characteristics

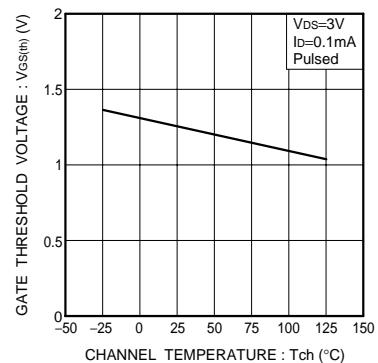


Fig.3 Gate threshold voltage vs. channel temperature

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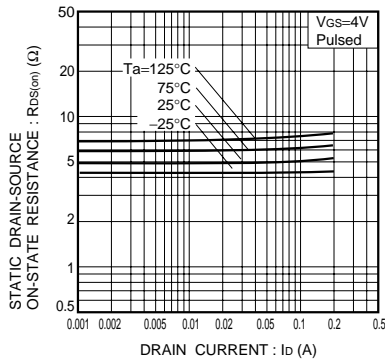


Fig. 4 Static drain-source on-state resistance vs. drain current (I)

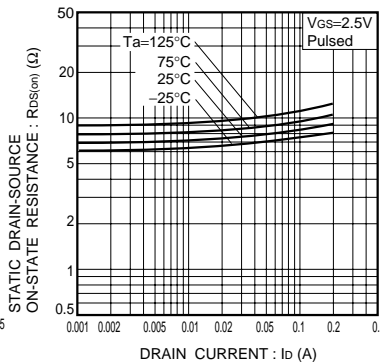


Fig. 5 Static drain-source on-state resistance vs. drain current (II)

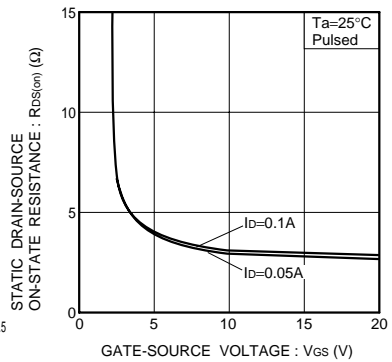


Fig. 6 Static drain-source on-state resistance vs. gate-source voltage

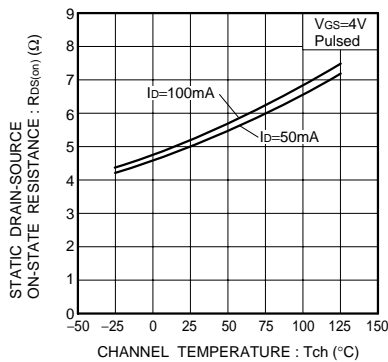


Fig. 7 Static drain-source on-state resistance vs. channel temperature

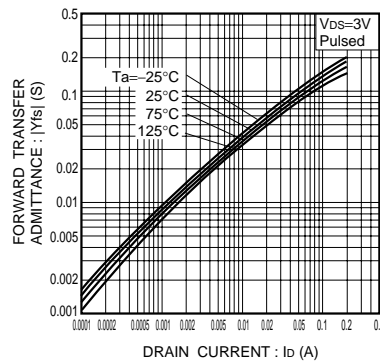


Fig. 8 Forward transfer admittance vs. drain current

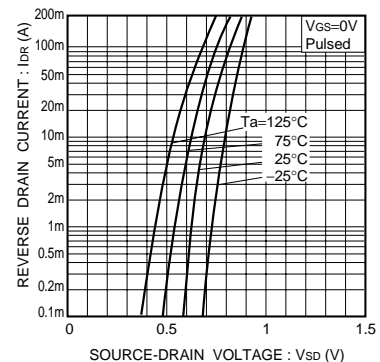


Fig. 9 Reverse drain current vs. source-drain voltage (I)

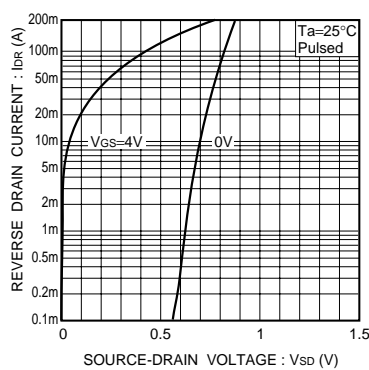


Fig. 10 Reverse drain current vs. source-drain voltage (II)

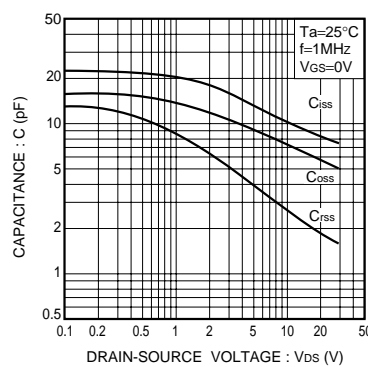


Fig. 11 Typical capacitance vs. drain-source voltage

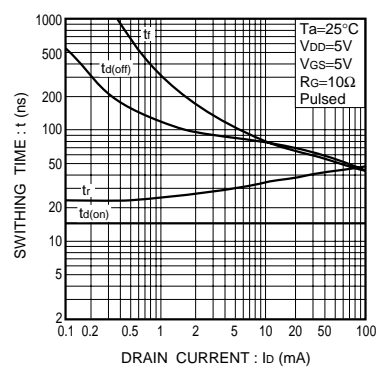


Fig. 12 Switching characteristics (See Figures 13 and 14 for the measurement circuit and resultant waveforms)

## Transistor

### ● Switching characteristics measurement circuit

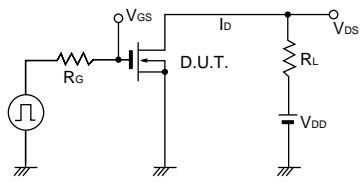


Fig.13 Switching time measurement circuit

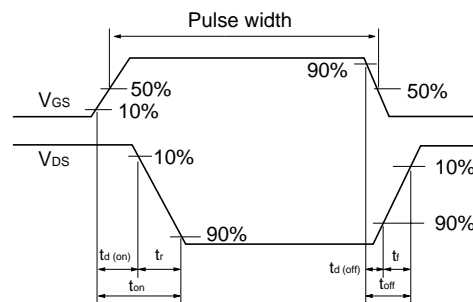


Fig.14 Switching time waveforms

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