

10V Drive Nch MOS FET

2SK3050

●Structure

Silicon N-channel MOSFET

●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) Drive circuits can be simple.
- 6) Parallel use is easy.

●Applications

Switching

●Packaging specifications

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

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

Parameter	Symbol	Limits	Unit	
Drain-source voltage	V_{DS}	600	V	
Gate-source voltage	V_{GS}	± 30	V	
Drain current	Continuous	I_D	2	A
	Pulsed	I_{DP} *1	6	A
Reverse drain current	Continuous	I_{DR}	2	A
	Pulsed	I_{DRP} *1	6	A
Source current (Body Diode)	Continuous	I_S	2	A
	Pulsed	I_{SP} *1	6	A
Avalanche Current	I_{AS} *2	2	A	
Avalanche Energy	E_{AS} *2	21	mJ	
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	$^\circ C$	

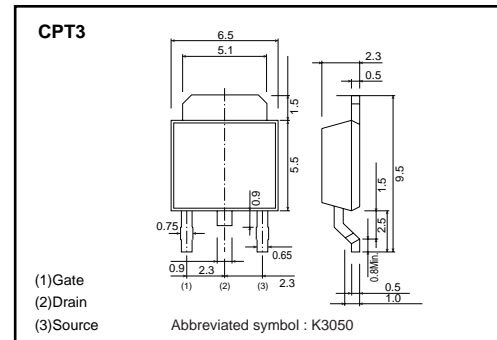
*1 $P_w \leq 10 \mu s$, Duty cycle $\leq 1\%$

*2 $L = 10 mH$, $V_{DD} = 50V$, $R_G = 25\Omega$, 1 Pulse, $T_{ch} = 25^\circ C$

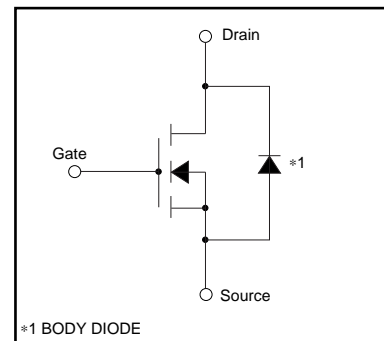
●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to case	$R_{th(ch-c)}$	6.25	$^\circ C/W$

●External dimensions (Unit : mm)



●Inner circuit



Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I _{GSS}	–	–	±100	nA	V _{GS} =±30V, V _{DS} =0V
Drain-source breakdown voltage	V _{(BR)DSS}	600	–	–	V	I _D =1mA, V _{GS} =0V
Zero gate voltage drain current	I _{DSS}	–	–	100	μA	V _{DS} =600V, V _{GS} =0V
Gate threshold voltage	V _{GS(th)}	2.0	–	4.0	V	V _{DS} =10V, I _D =1mA
Static drain-source on-state resistance	R _{DS(on)} *	–	4.4	5.5	Ω	I _D =1A, V _{GS} =10V
Forward transfer admittance	Y _{fs} *	0.5	1.0	–	S	I _D =1A, V _{DS} =10V
Input capacitance	C _{iss}	–	280	–	pF	V _{DS} =10V
Output capacitance	C _{oss}	–	48	–	pF	V _{GS} =0V
Reverse transfer capacitance	C _{rss}	–	16	–	pF	f=1MHz
Turn-on delay time	t _{d(on)} *	–	12	–	ns	I _D =1A, V _{DD} ≒300V
Rise time	t _r *	–	17	–	ns	V _{GS} =10V
Turn-off delay time	t _{d(off)} *	–	29	–	ns	R _L =300Ω
Fall time	t _f *	–	105	–	ns	R _G =10Ω
Total gate charge	Q _g *	–	12.8	25.6	nC	V _{DD} =300V
Gate-source charge	Q _{gs} *	–	3.3	–	nC	V _{GS} =10V
Gate-drain charge	Q _{gd} *	–	5.5	–	nC	I _D =2A

* Pulsed

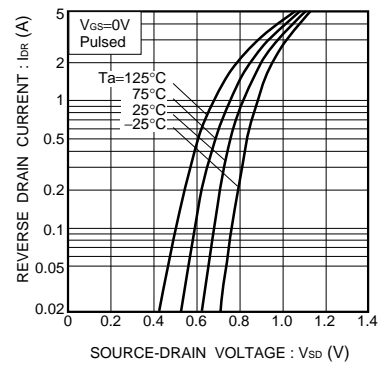
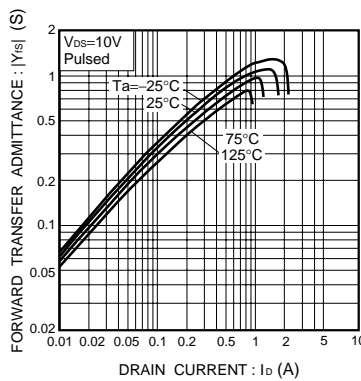
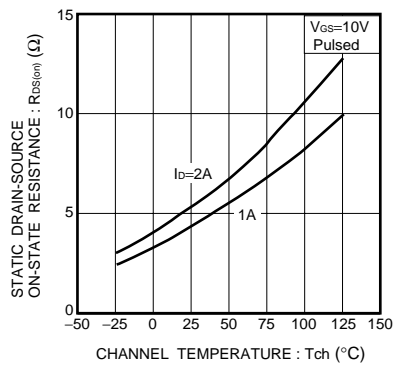
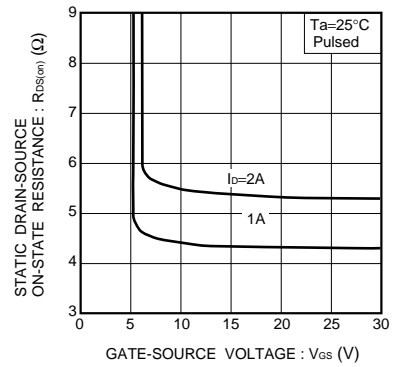
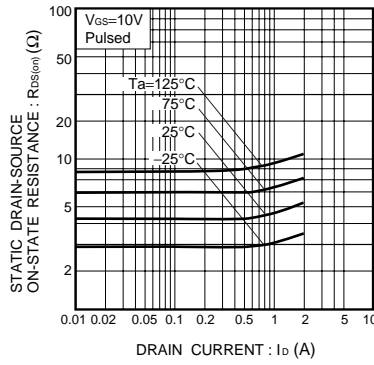
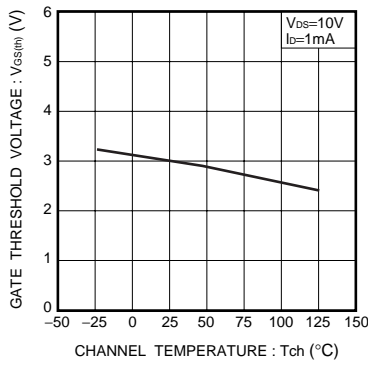
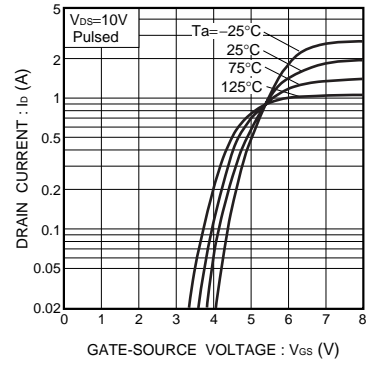
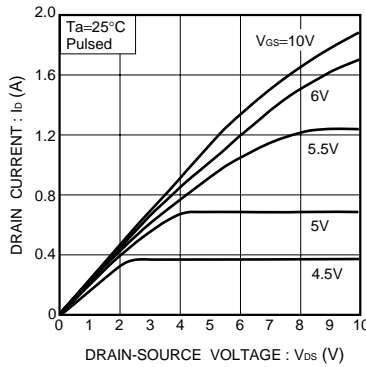
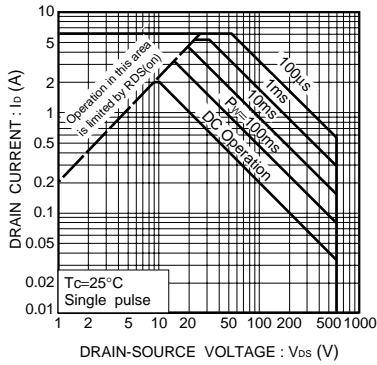
●Body diode characteristics (Source-drain) (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V _{SD}	–	–	2.0	V	I _S = 2A, V _{GS} =0V
Reverse recovery time	t _{rr} *	–	460	–	ns	I _{DR} =2A, V _{GS} =0V
Reverse recovery charge	Q _{rr} *	–	2.0	–	μC	di/dt= 100A / μs

* Pulsed

Transistors

●Electrical characteristic curves



Transistors

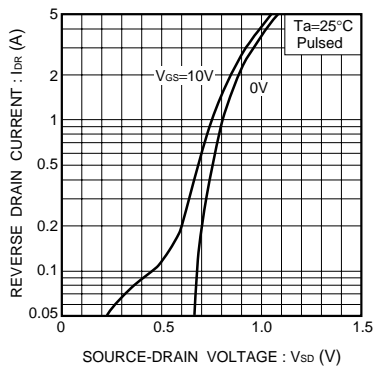


Fig.10 Reverse drain current vs. source-drain voltage (II)

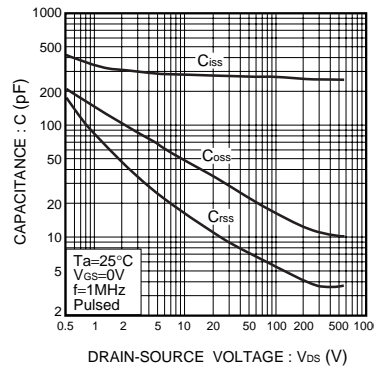


Fig.11 Typical capacitance vs. drain-source voltage

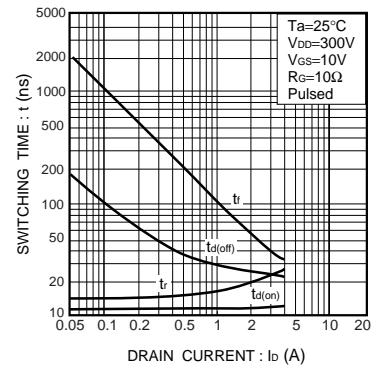


Fig.12 Switching characteristics

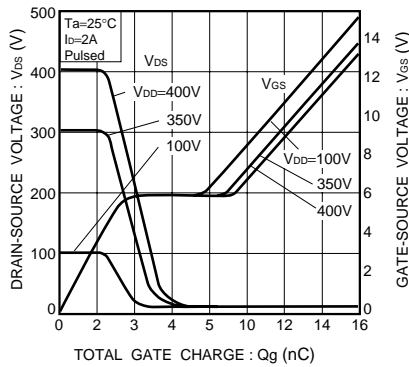


Fig.13 Dynamic input characteristics

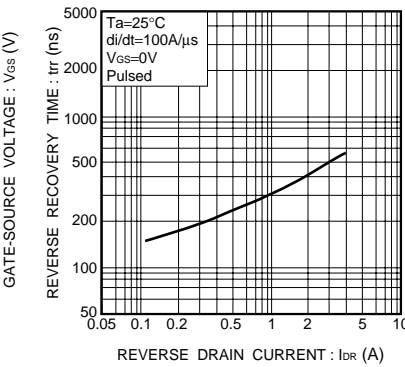


Fig.14 Reverse recovery time vs. reverse drain current

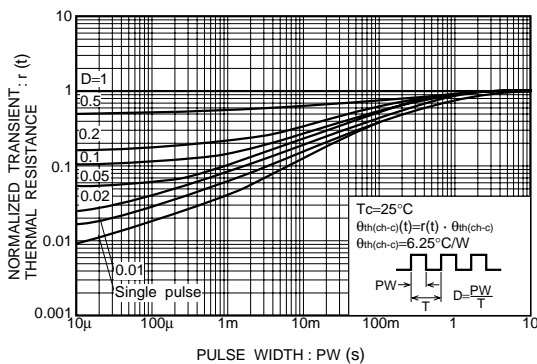


Fig.15 Normalized transient thermal resistance vs. pulse width

Transistors

● Switching characteristics measurement circuit

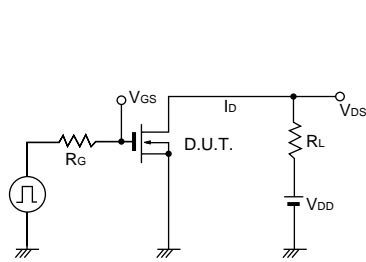


Fig.16 Switching time measurement circuit

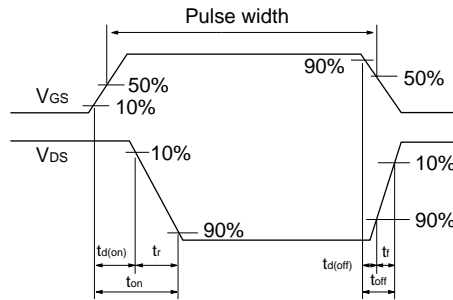


Fig.17 Switching time waveforms

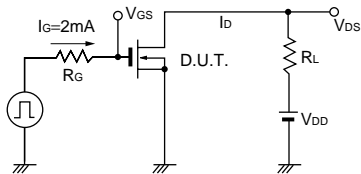


Fig.18 Gate charge measurement circuit

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