

10V Drive Nch MOSFET

R5011ANJ

●Structure

Silicon N-channel MOSFET

●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Gate-source voltage (V_{GS}) guaranteed to be $\pm 30V$.
- 4) Drive circuits can be simple.
- 5) Parallel use is easy.

●Applications

Switching

●Packaging specifications

Type	Package	Taping	
	Code	LPTS	TL
		LPTL	TLL
	Basic ordering unit (pieces)	1000	

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

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DS}	500	V
Gate-source voltage		V_{GS}	± 30	V
Drain current	Continuous	I_D *3	± 11	A
	Pulsed	I_{DP} *1	± 44	A
Source current (Body Diode)	Continuous	I_S *3	11	A
	Pulsed	I_{SP} *1	44	A
Avalanche current		I_{AS} *2	5.5	A
Avalanche energy		E_{AS} *2	8.1	mJ
Total power dissipation ($T_c=25^{\circ}C$)		P_D	75	W
Channel temperature		T_{ch}	150	$^{\circ}C$
Range of storage temperature		T_{stg}	-55 to +150	$^{\circ}C$

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

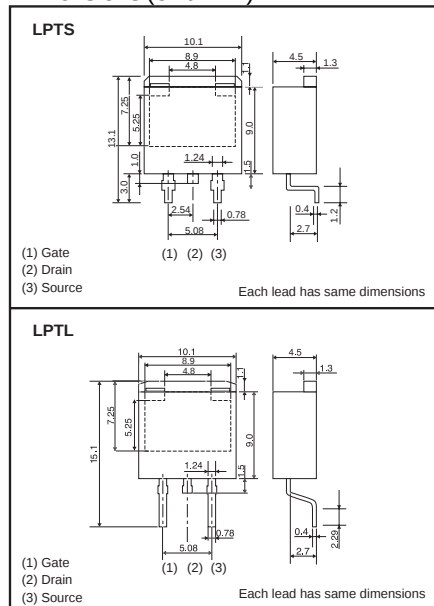
 *2 $L = 500\mu H$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting, $T_{ch} = 25^{\circ}C$

*3 Limited only by maximum temperature allowed

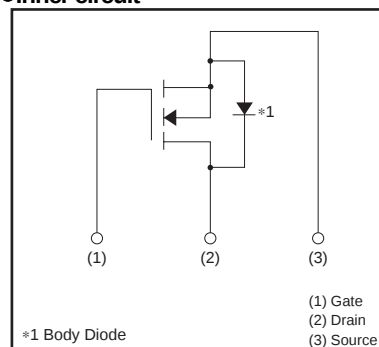
●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to case	$R_{th(ch-c)}$	1.67	$^{\circ}C/W$

●Dimensions (Unit : mm)



●Inner circuit



●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}	500	—	—	V	I _D =1mA, V _{GS} =0V
Zero gate voltage drain current	I _{DSS}	—	—	100	μA	V _{DS} =500V, V _{GS} =0V
Gate threshold voltage	V _{GS(th)}	2.5	—	4.5	V	V _{DS} =10V, I _D =1mA
Static drain-source on-state resistance	R _{DS(on)} *	—	0.38	0.5	Ω	I _D =5.5A, V _{GS} =10V
Forward transfer admittance	Y _{fs} *	3.5	—	—	S	V _{DS} =10V, I _D =5.5A
Input capacitance	C _{iss}	—	1000	—	pF	V _{DS} =25V
Output capacitance	C _{oss}	—	400	—	pF	V _{GS} =0V
Reverse transfer capacitance	C _{rss}	—	35	—	pF	f=1MHz
Turn-on delay time	t _{d(on)} *	—	26	—	ns	V _{DD} ≒250V, I _D =5.5A
Rise time	t _r *	—	28	—	ns	V _{GS} =10V
Turn-off delay time	t _{d(off)} *	—	75	—	ns	R _L =45.5Ω
Fall time	t _f *	—	30	—	ns	R _G =10Ω
Total gate charge	Q _g *	—	30	—	nC	V _{DD} ≒250V
Gate-source charge	Q _{gs} *	—	7	—	nC	I _D =11A
Gate-drain charge	Q _{gd} *	—	12	—	nC	V _{GS} =10V R _L =22.7Ω / R _G =10Ω

* Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V _{SD} *	—	—	1.5	V	I _S = 11A, V _{GS} =0V

* Pulsed

●Electrical characteristic curves

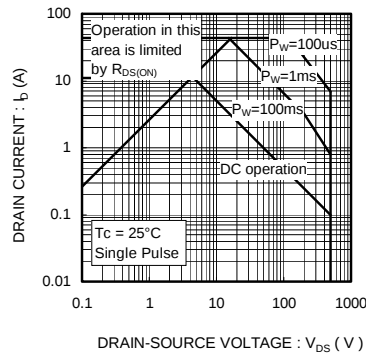


Fig.1 Maximum Safe Operating Area

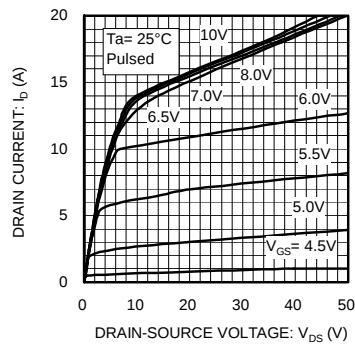


Fig.2 Typical Output Characteristics(I)

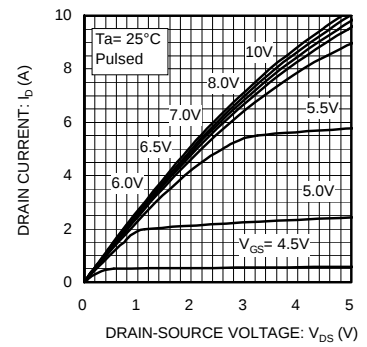


Fig.3 Typical Output Characteristics(II)

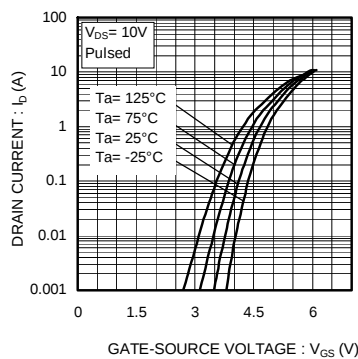


Fig.4 Typical Transfer Characteristics

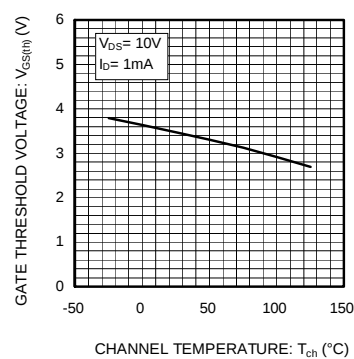


Fig.5 Gate Threshold Voltage vs. Channel Temperature

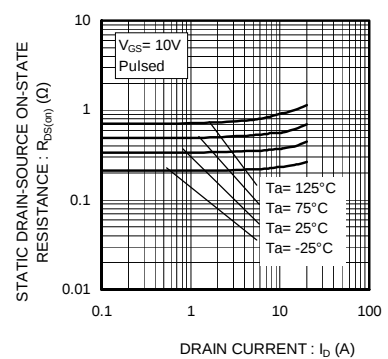


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

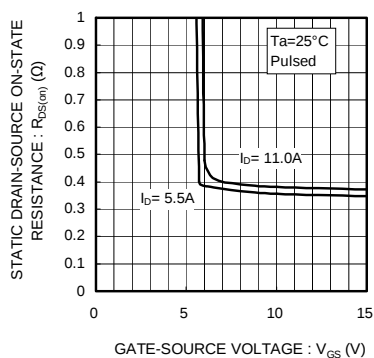


Fig.7 Static Drain-Source On-State Resistance vs. Gate Source Voltage

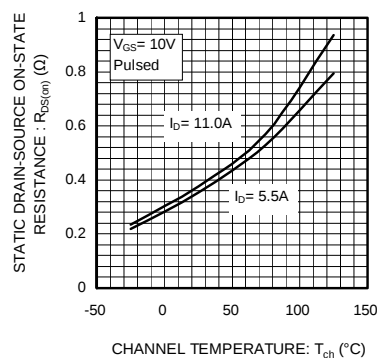


Fig.8 Static Drain-Source On-State Resistance vs. Channel Temperature

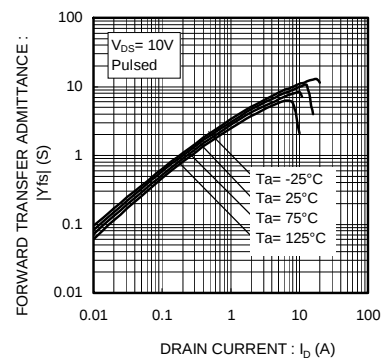


Fig.9 Forward Transfer Admittance vs. Drain Current

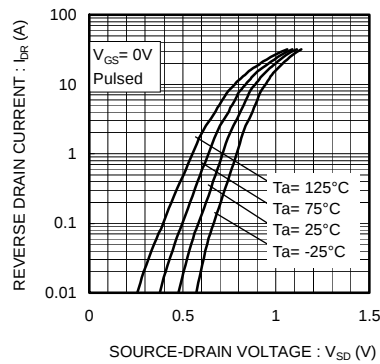


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

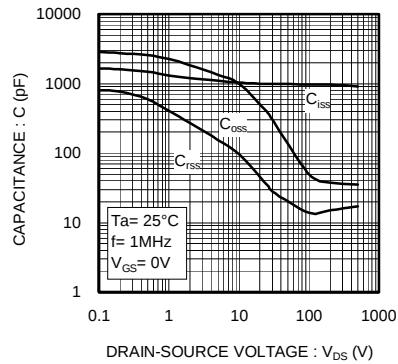


Fig.11 Typical Capacitance vs. Drain-Source Voltage

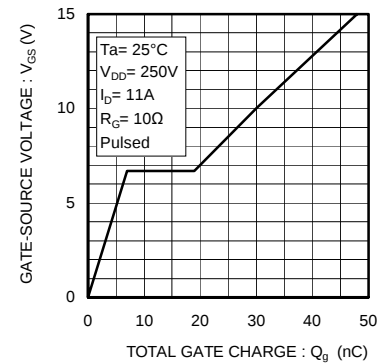


Fig.12 Dynamic Input Characteristics

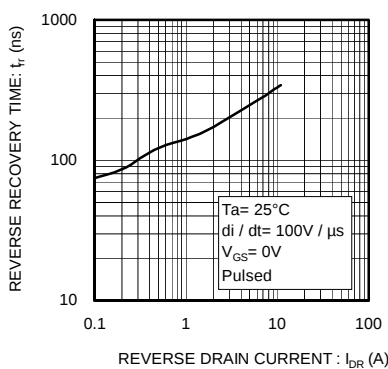


Fig.13 Reverse Recovery Time vs. Reverse Drain Current

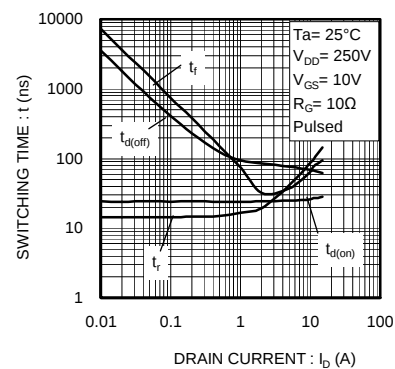


Fig.14 Switching Characteristics

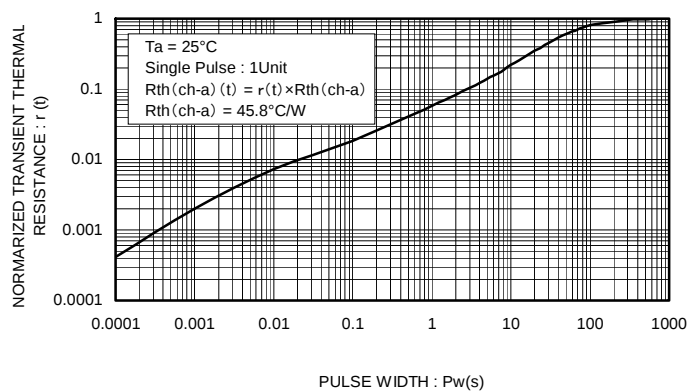


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width

●Switching characteristics measurement circuit

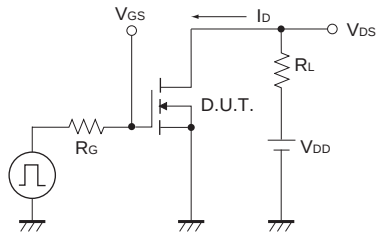


Fig.1-1 Switching time measurement circuit

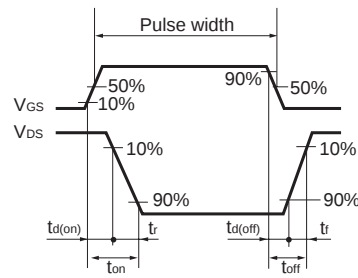


Fig.1-2 Switching waveforms

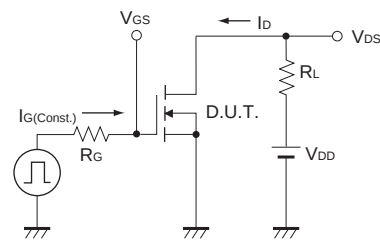


Fig.2-1 Gate charge measurement circuit

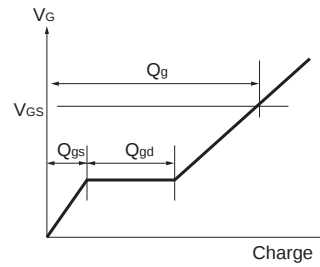


Fig.2-2 Gate charge waveform

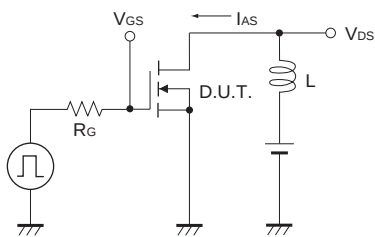


Fig.3-1 Avalanche Measurement circuit

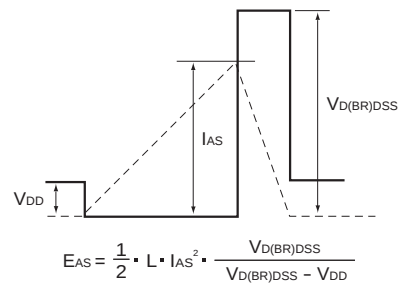


Fig.3-2 Avalanche waveform

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