

10V Drive Nch MOSFET

R5007ANX

●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

	Package	Bulk
	Code	-
Type	Basic ordering unit (pieces)	500
R5007ANX		○

●Absolute maximum ratings (Ta=25°C)

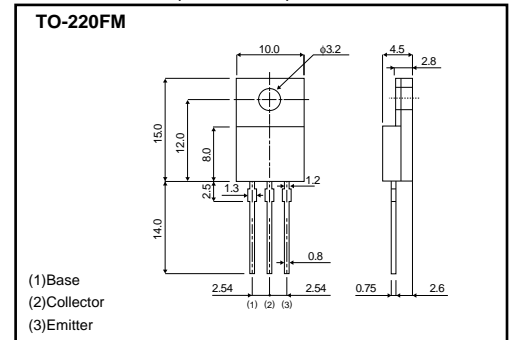
Parameter	Symbol	Limits	Unit	
Drain-source voltage	V_{DSS}	500	V	
Gate-source voltage	V_{GS}	± 30	V	
Drain current	Continuous	I_D *3	± 7	A
	Pulsed	I_{DP} *1	± 28	A
Source current (Body Diode)	Continuous	I_S *3	7	A
	Pulsed	I_{SP} *1	28	A
Avalanche Current	I_{AS} *2	3.5	A	
Avalanche Energy	E_{AS} *2	3.2	mJ	
Total power dissipation (Tc=25°C)	P_D	40	W	
Channel temperature	Tch	150	°C	
Range of storage temperature	Tstg	-55 to +150	°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, Tch=25°C
 *3 Limited only by maximum temperature allowed

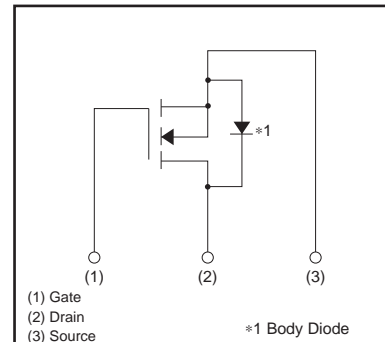
●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to case	Rth(ch-c)	3.13	°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)} *	–	0.8	1.05	Ω	I _D =3.5A, V _{GS} =10V
Forward transfer admittance	Y _{fs} *	2.5	–	–	S	I _D =3.5A, V _{DS} =10V
Input capacitance	C _{iss}	–	500	–	pF	V _{DS} =25V
Output capacitance	C _{oss}	–	300	–	pF	V _{GS} =0V
Reverse transfer capacitance	C _{rss}	–	23	–	pF	f=1MHz
Turn-on delay time	t _{d(on)} *	–	20	–	ns	I _D =3.5A, V _{DD} =250V
Rise time	t _r *	–	22	–	ns	V _{GS} =10V
Turn-off delay time	t _{d(off)} *	–	50	–	ns	R _L =71.4Ω
Fall time	t _f *	–	25	–	ns	R _G =10Ω
Total gate charge	Q _g *	–	13	–	nC	V _{DD} =250V I _D =7A
Gate-source charge	Q _{gs} *	–	3.5	–	nC	V _{GS} =10V
Gate-drain charge	Q _{gd} *	–	5.5	–	nC	R _L =35.7Ω / 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 =7A, V _{GS} =0V

* Pulsed

●Electrical characteristic curves

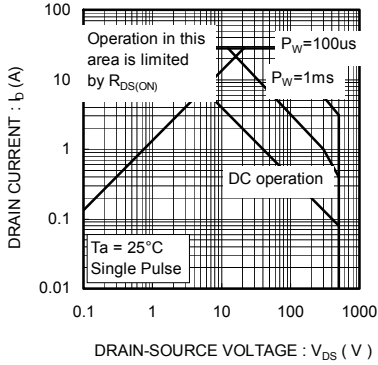


Fig.1 Maximum Safe Operating Area

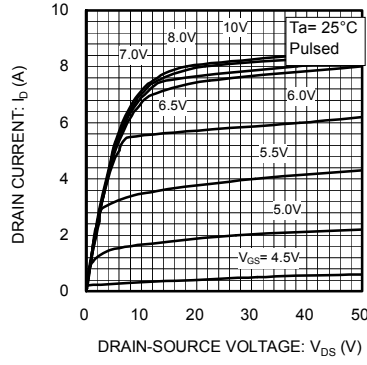


Fig.2: Typical Output Characteristics (I)

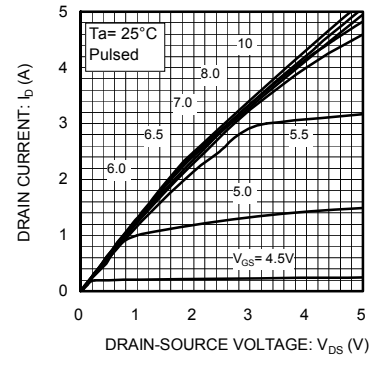


Fig.3: Typical Output Characteristics (II)

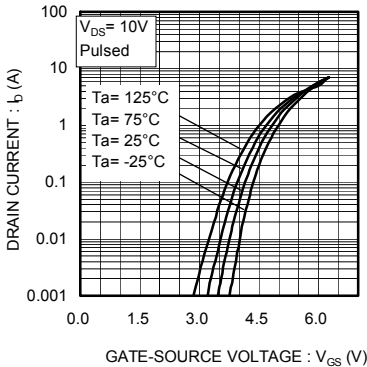


Fig.4 Typical Transfer Characteristics

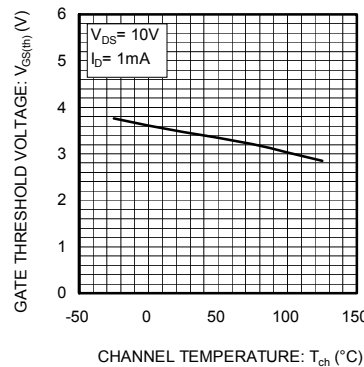


Fig.5 Gate Threshold Voltage vs. Channel

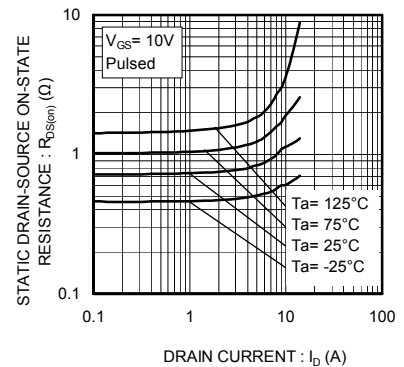


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

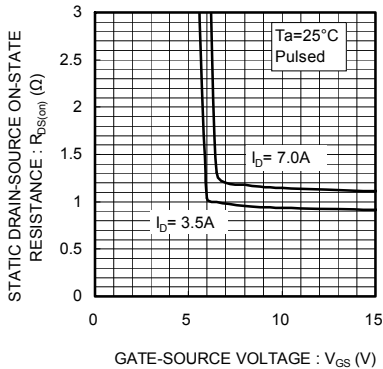


Fig.7 Static Drain-Source On-State Resistance vs. Gate Source

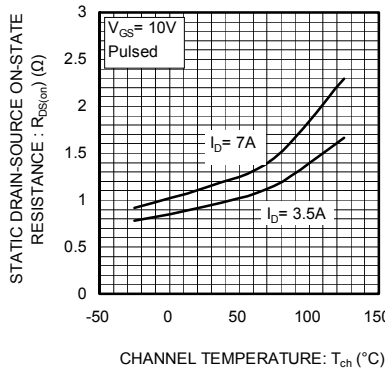


Fig.8 Static Drain-Source On-State Resistance vs. Channel

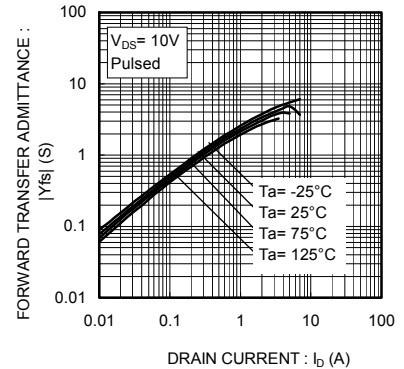


Fig.9 Forward Transfer Admittance vs. Drain Current

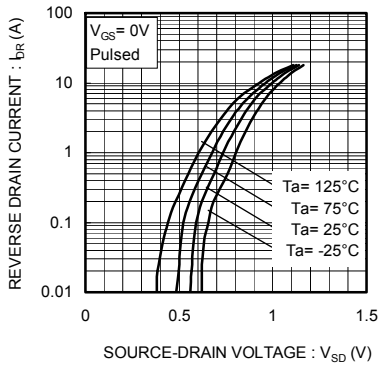


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

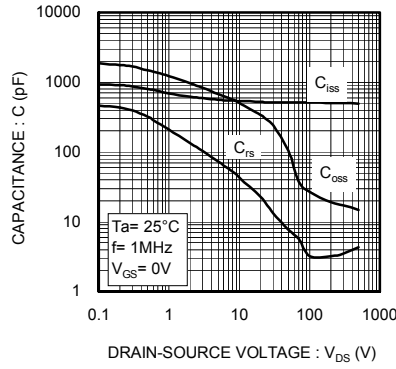


Fig.11 Typical Capacitance vs. Drain-Source Voltage

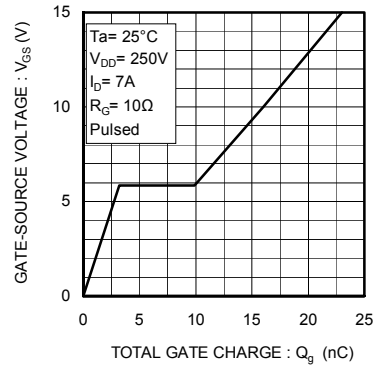


Fig.12 Dynamic Input Characteristics

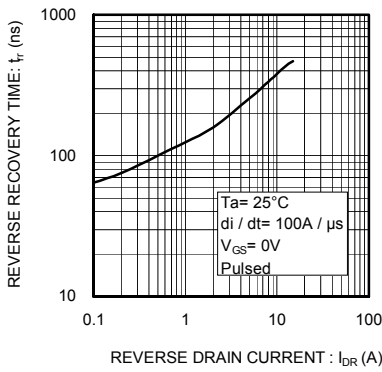


Fig.13 Reverse Recovery Time vs. Reverse Drain Current

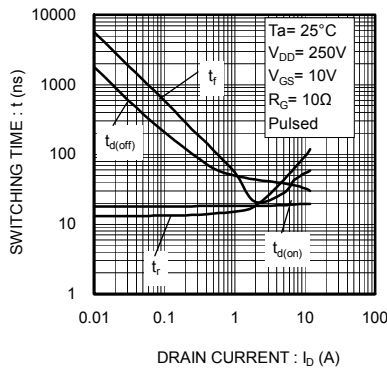


Fig.14 Switching Characteristics

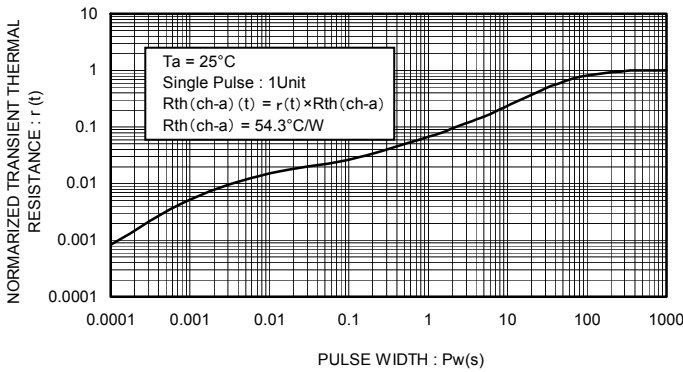


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width

●Switching characteristics measurement circuit

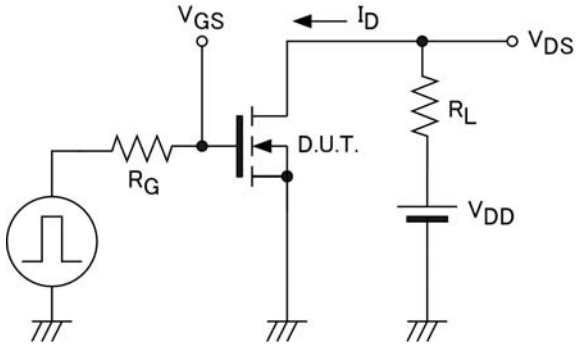


Fig.1 Switching time measurement circuit

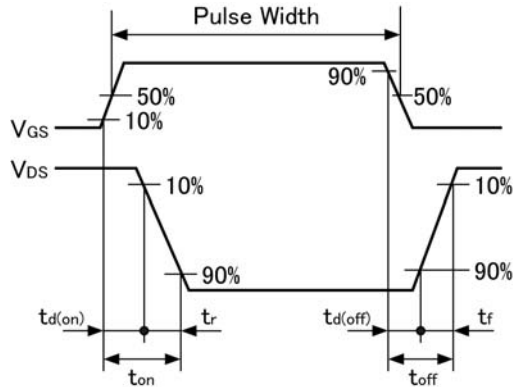


Fig.2 Switching waveforms

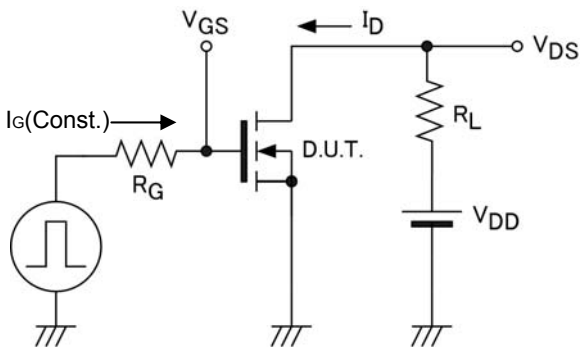


Fig.3 Gate charge measurement circuit

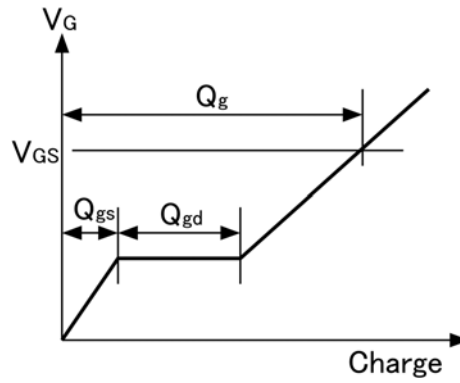


Fig.4 Gate charge waveform

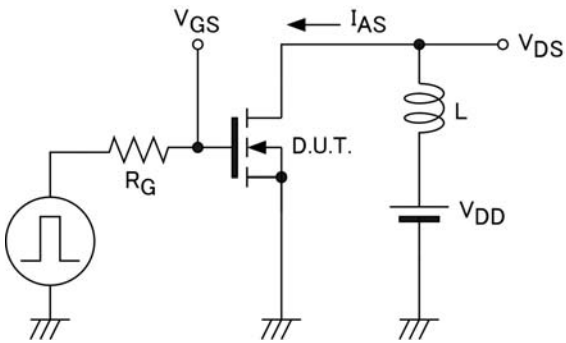


Fig.5 Avalanche measurement circuit

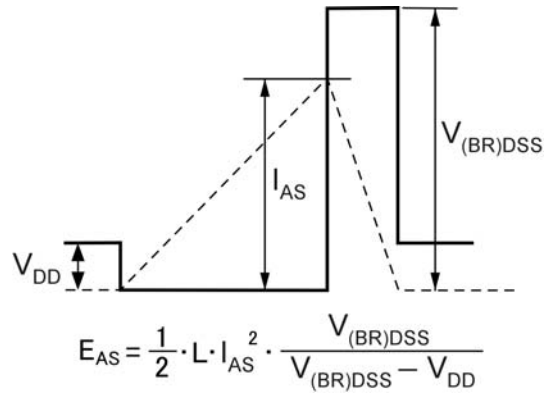


Fig.6 Avalanche waveform

Notes

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