

10V Drive Nch MOSFET

R5016ANJ

● 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.

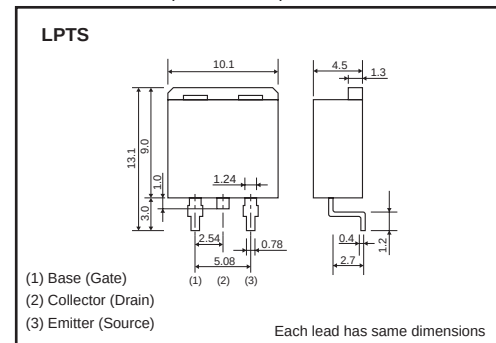
●Applications

Switching

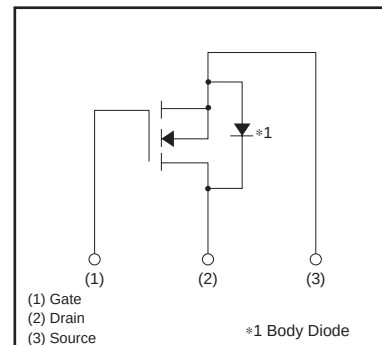
●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	1000
R5016ANJ		○

●Dimensions (Unit : mm)



- Inner circuit



●Absolute maximum ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	500	V
Gate-source voltage		V_{GSS}	±30	V
Drain current	Continuous	I_D *3	±16	A
	Pulsed	I_{DP} *1	±64	A
Source current (Body Diode)	Continuous	I_S *3	16	A
	Pulsed	I_{SP} *1	64	A
Avalanche Current		I_{AS} *2	8	A
Avalanche Energy		E_{AS} *2	18	mJ
Total power dissipation (Tc=25°C)		P_D	100	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 $L \doteq 500\mu\text{H}$, $V_{\text{DD}}=50\text{V}$, $R_{\text{G}}=25\Omega$, Starting, $T_{\text{ch}}=25^{\circ}\text{C}$

*3 Limited only by maximum temperature allowed

- Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to case	Rth(ch-c)	1.25	°C/W

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	–	–	±100	nA	$V_{GS}=\pm 30V$, $V_{DS}=0V$
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	$R_{DS(on)}^*$	–	0.21	0.27	Ω	$I_D=8A$, $V_{GS}=10V$
Forward transfer admittance	$ Y_{fs} ^*$	6.0	–	–	S	$I_D=8A$, $V_{DS}=10V$
Input capacitance	C_{iss}	–	1800	–	pF	$V_{DS}=25V$
Output capacitance	C_{oss}	–	750	–	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	–	55	–	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}^*$	–	40	–	ns	$I_D=8A$, $V_{DD} \approx 250V$
Rise time	t_r^*	–	50	–	ns	$V_{GS}=10V$
Turn-off delay time	$t_{d(off)}^*$	–	150	–	ns	$R_L=31.3\Omega$
Fall time	t_f^*	–	55	–	ns	$R_G=10\Omega$
Total gate charge	Q_g^*	–	50	–	nC	$V_{DD} \approx 250V$
Gate-source charge	Q_{gs}^*	–	9.5	–	nC	$I_D=16A$
Gate-drain charge	Q_{gd}^*	–	21	–	nC	$V_{GS}=10V$ $R_L=15.6\Omega$ / $R_G=10\Omega$

* Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD}^*	–	–	1.5	V	$I_S=16A$, $V_{GS}=0V$

* Pulsed

●Electrical characteristics curves

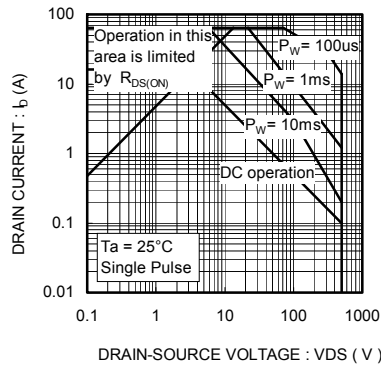


Fig.1 Maximum Safe Operating Area

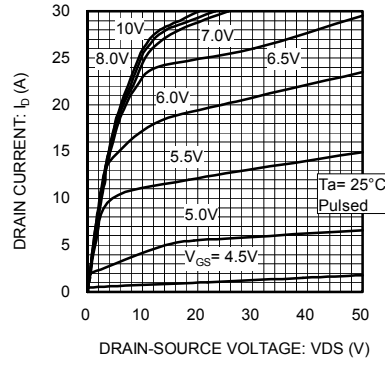


Fig.2 Typical Output Characteristics(I)

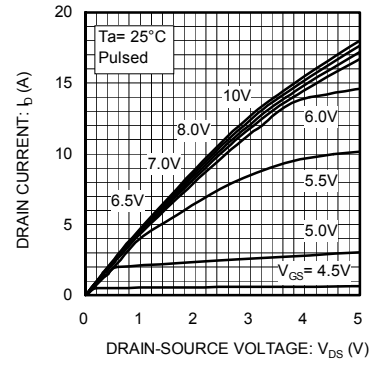


Fig.3 Typical Output Characteristics(II)

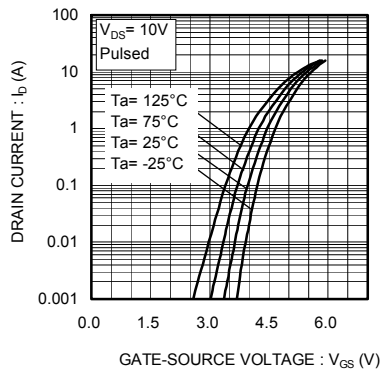


Fig.4 Typical Transfer Characteristics

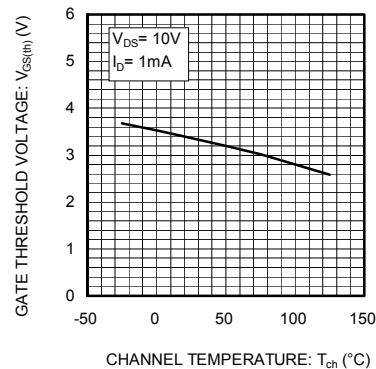


Fig.5 Gate Threshold Voltage vs. Channel Temperature

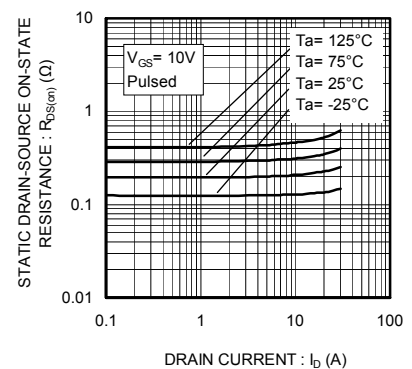


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

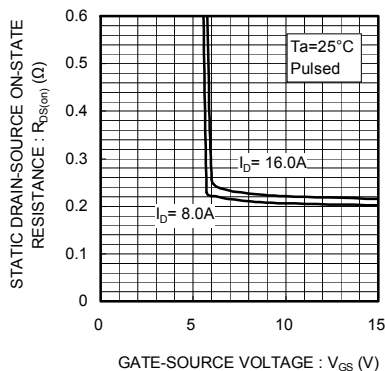


Fig.7 Static Drain-Source On-State Resistance vs. Gate Source Voltage

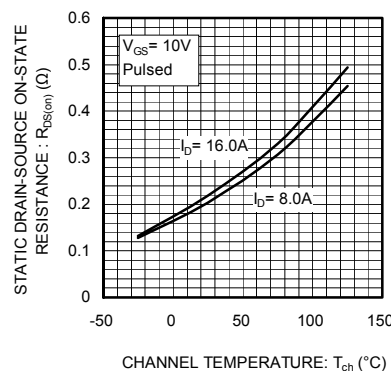


Fig.8 Static Drain-Source On-State Resistance vs. Channel Temperature

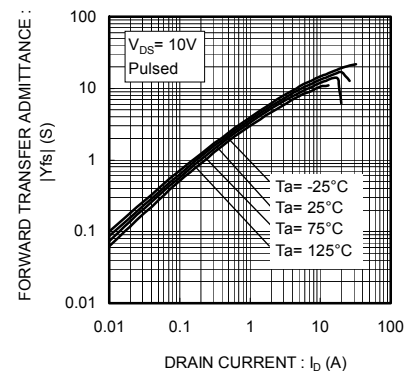


Fig.9 Forward Transfer Admittance vs. Drain Current

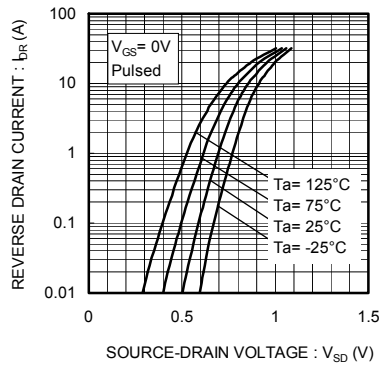


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

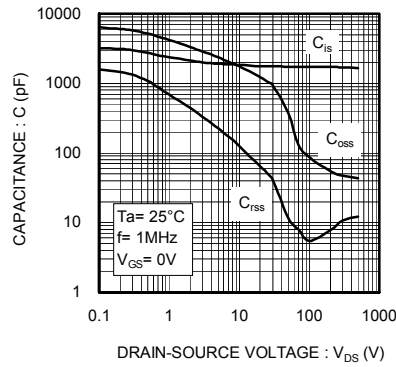


Fig.11 Typical Capacitance vs. Drain-Source Voltage

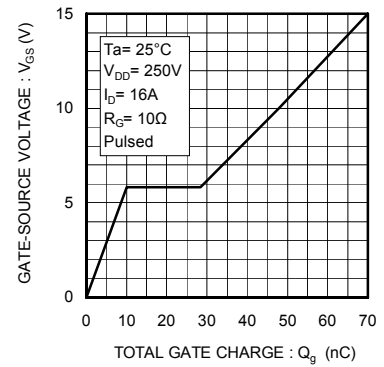


Fig.12 Dynamic Input Characteristics

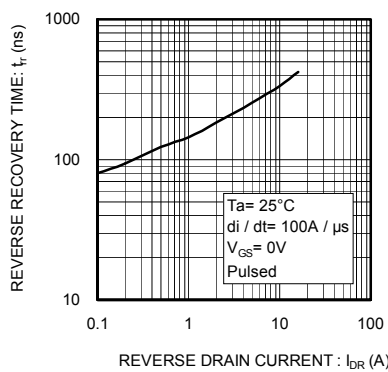


Fig.13 Reverse Recovery Time vs. Reverse Drain Current

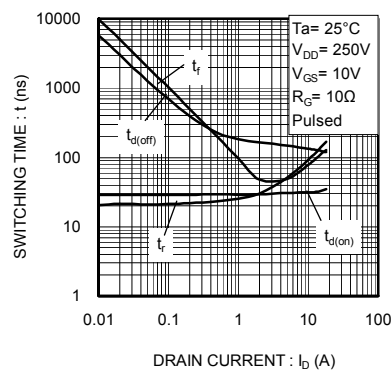


Fig.14 Switching Characteristics

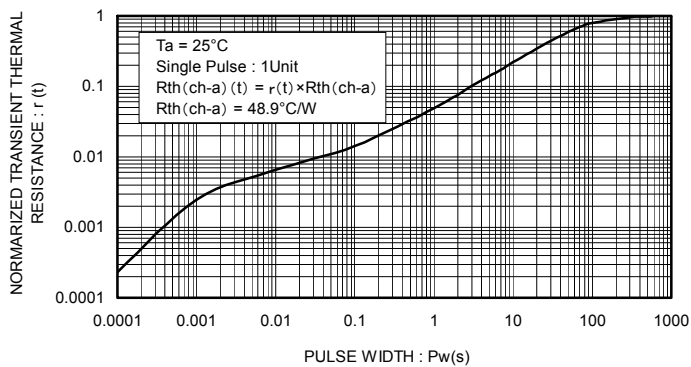


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width

●Switching characteristics measurement circuit

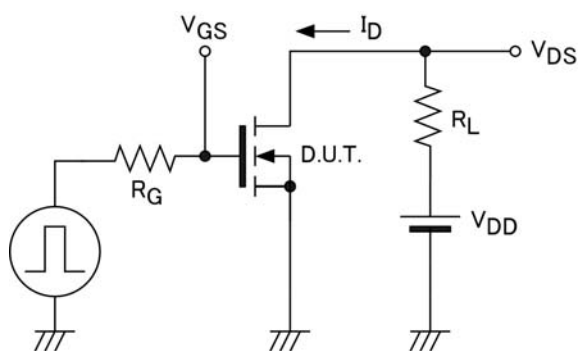


Fig.1 Switching time measurement circuit

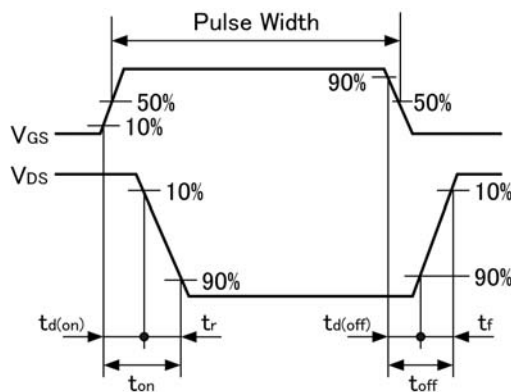


Fig.2 Switching waveforms

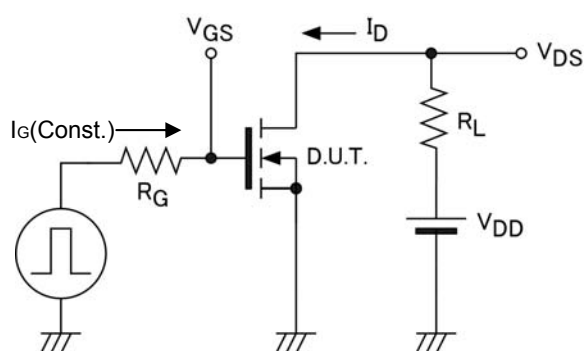


Fig.3 Gate charge measurement circuit

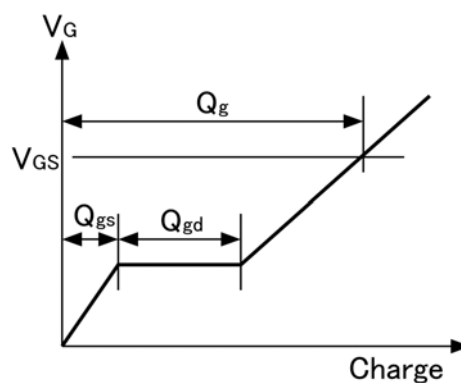


Fig.4 Gate charge waveform

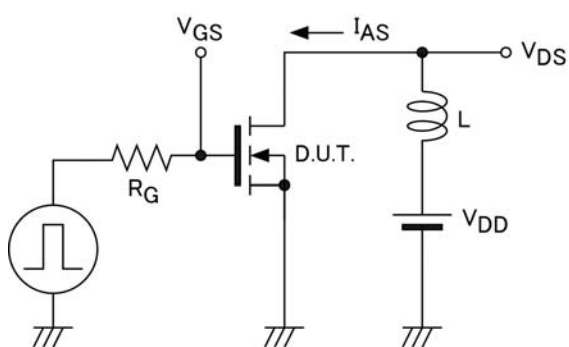


Fig.5 Avalanche measurement circuit

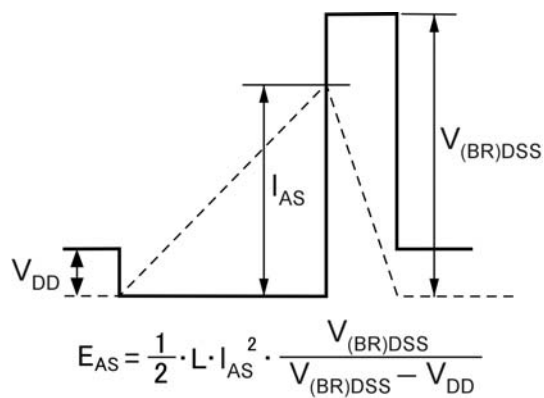


Fig.6 Avalanche waveform

Notes

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