

# 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.

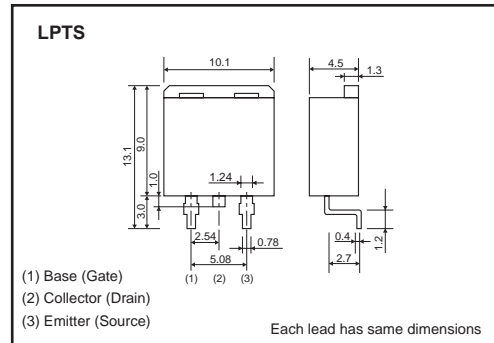
### ●Applications

Switching

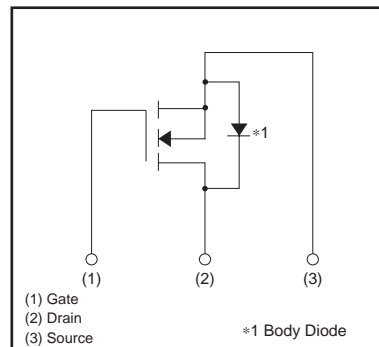
### ●Packaging specifications

	Package	Taping
	Code	TL
Type	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	$V_{GS}$	$\pm 30$	V	
Drain current	Continuous	$I_D$ *3	$\pm 16$	A
	Pulsed	$I_{DP}$ *1	$\pm 64$	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  $L = 500\mu H$ ,  $V_{DD} = 50V$ ,  $R_G = 25\Omega$ , Starting, Tch=25°C  
 \*3 Limited only by maximum temperature allowed

### ●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to case	Rth(ch-c)	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	$I_D=16A$ $V_{GS}=10V$
Gate-drain charge	$Q_{gd}^*$	–	21	–	nC	$R_L=15.6\Omega / R_G=10\Omega$

\* 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

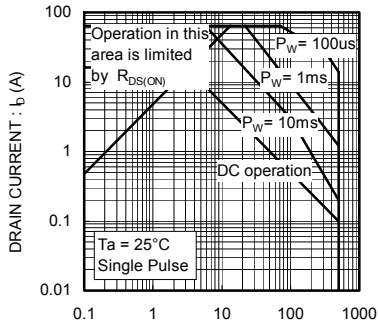


Fig.1 Maximum Safe Operating Area

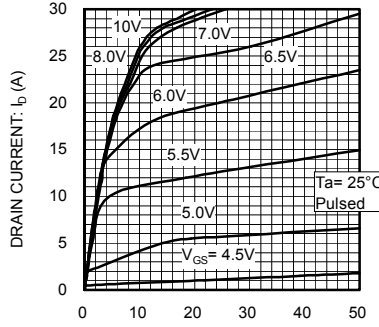


Fig.2 Typical Output Characteristics (I)

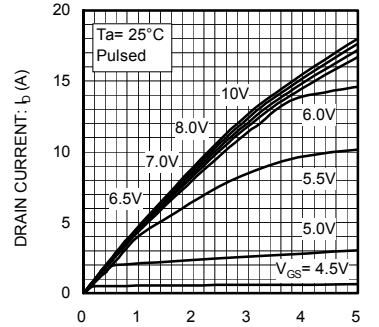


Fig.3 Typical Output Characteristics (II)

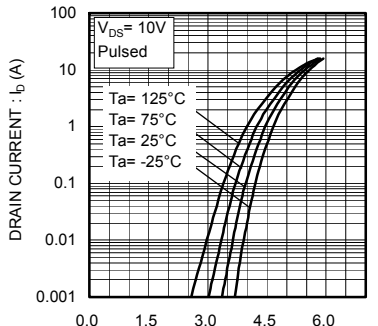


Fig.4 Typical Transfer Characteristics

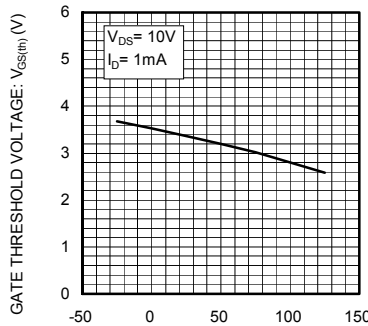


Fig.5 Gate Threshold Voltage vs. Channel Temperature

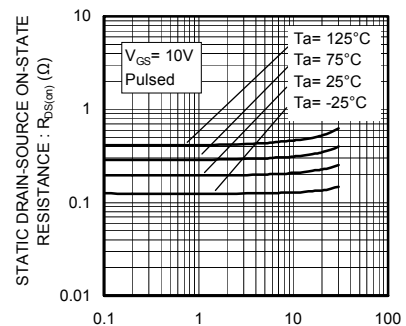


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

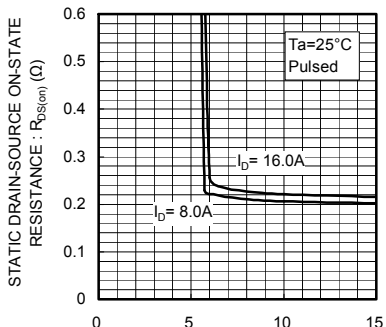


Fig.7 Static Drain-Source On-State Resistance vs. Gate Source Voltage

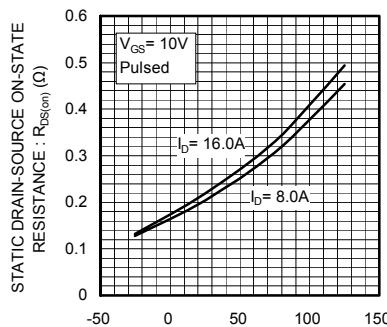


Fig.8 Static Drain-Source On-State Resistance vs. Channel Temperature

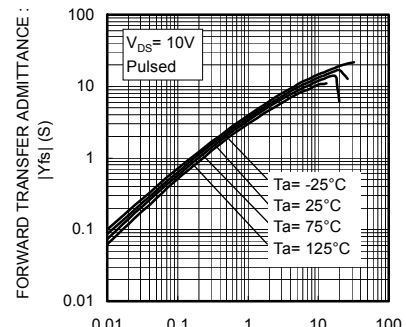


Fig.9 Forward Transfer Admittance vs. Drain Current

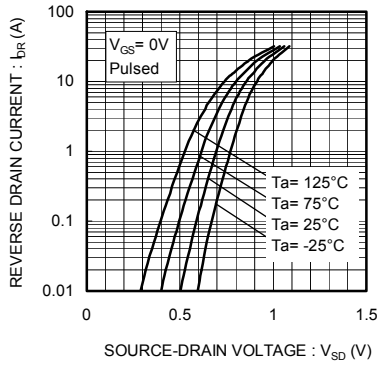


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

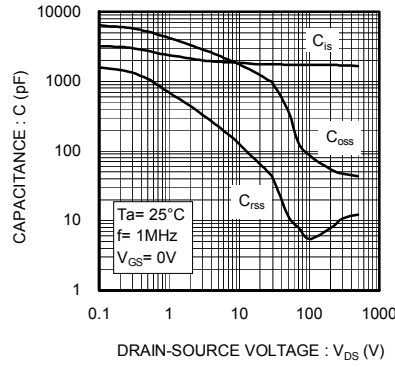


Fig.11 Typical Capacitance vs. Drain-Source Voltage

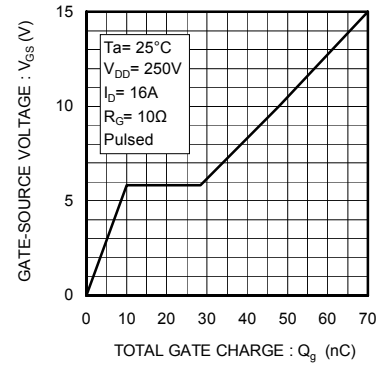


Fig.12 Dynamic Input Characteristics

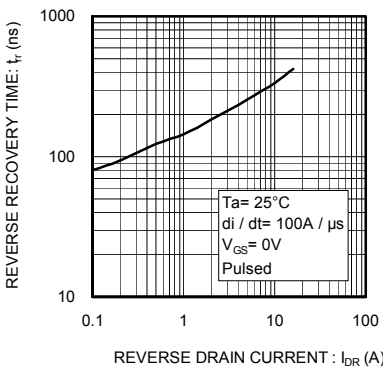


Fig.13 Reverse Recovery Time vs. Reverse Drain Current

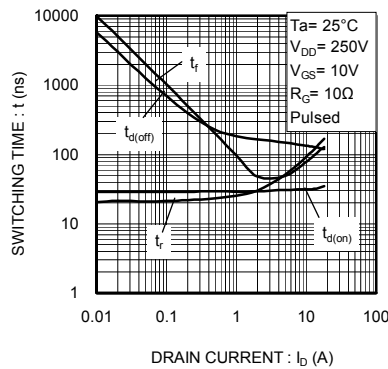


Fig.14 Switching Characteristics

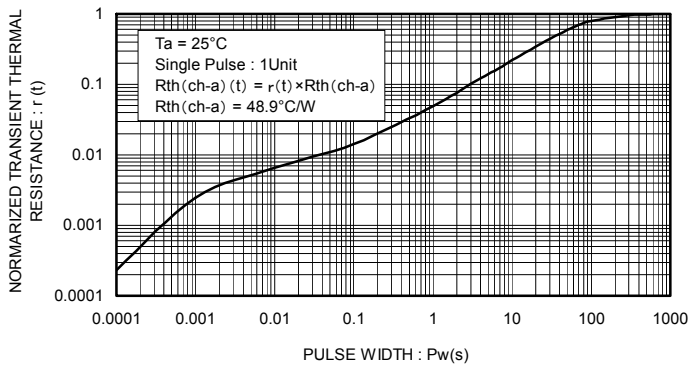


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width

●Switching characteristics measurement circuit

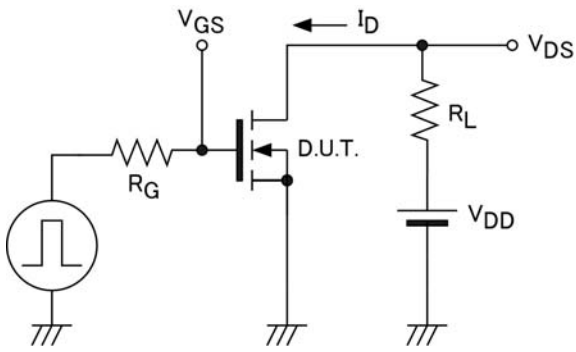


Fig.1 Switching time measurement circuit

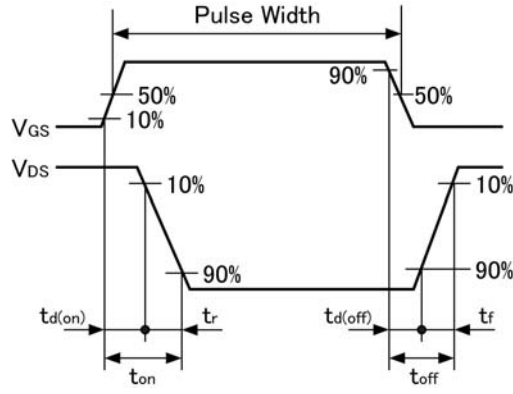


Fig.2 Switching waveforms

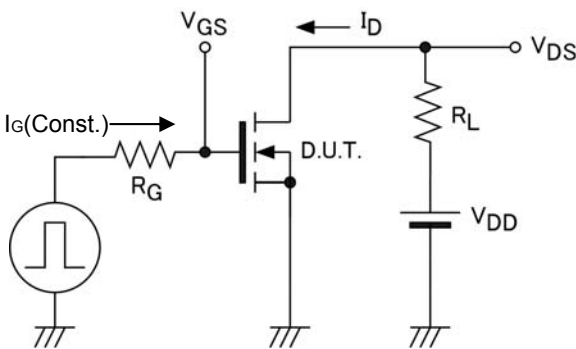


Fig.3 Gate charge measurement circuit

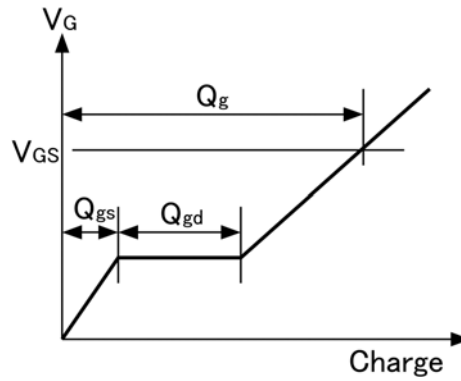


Fig.4 Gate charge waveform

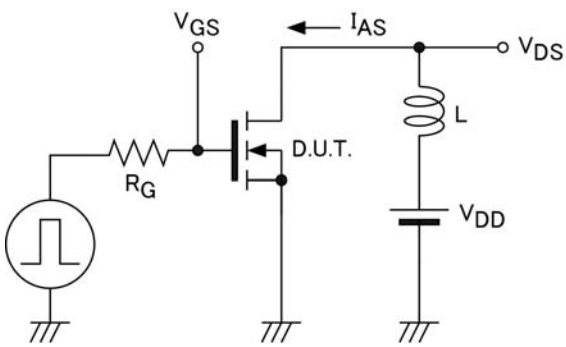


Fig.5 Avalanche measurement circuit

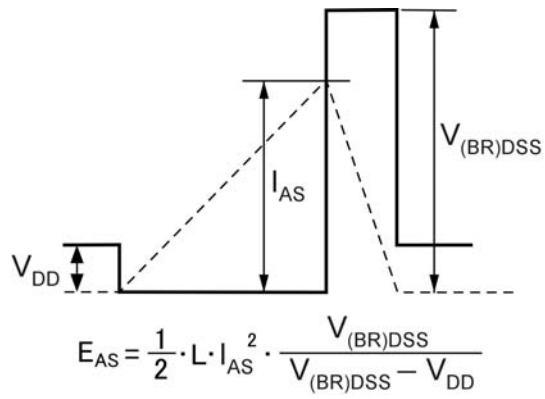


Fig.6 Avalanche waveform

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