

# 10V Drive Nch MOSFET

## R6006ANX

### ●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.

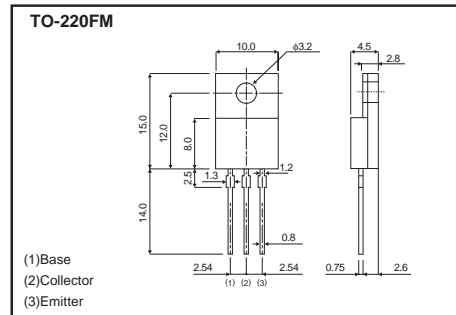
### ●Applications

Switching

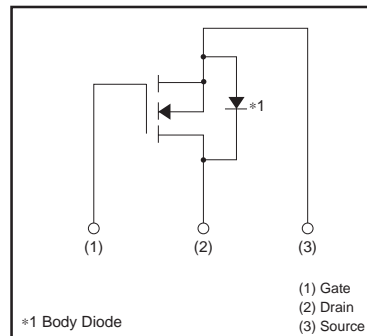
### ●Packaging specifications

Type	Package	Bulk
	Code	-
	Basic ordering unit (pieces)	500
R6006ANX		○

### ●Dimensions (Unit : mm)



### ●Inner circuit



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

Parameter	Symbol	Limits	Unit	
Drain-source voltage	$V_{DS}$	600	V	
Gate-source voltage	$V_{GS}$	$\pm 30$	V	
Drain current	Continuous	$I_D$ *3	$\pm 6$	A
	Pulsed	$I_{DP}$ *1	$\pm 24$	A
Source current (Body Diode)	Continuous	$I_S$ *3	6	A
	Pulsed	$I_{SP}$ *1	24	A
Avalanche current	$I_{AS}$ *2	3	A	
Avalanche energy	$E_{AS}$ *2	2.4	mJ	
Total power dissipation ( $T_c=25^\circ C$ )	$P_D$	40	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	$R_{th(ch-c)}$	3.125	$^\circ C/W$

## ●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I <sub>gss</sub>	–	–	±100	nA	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	600	–	–	V	I <sub>D</sub> =1mA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>	–	–	100	μA	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	2.5	–	4.5	V	V <sub>DS</sub> =10V, I <sub>D</sub> =1mA
Static drain-source on-state resistance	R <sub>DS(on)</sub> *	–	0.9	1.2	Ω	I <sub>D</sub> =3A, V <sub>GS</sub> =10V
Forward transfer admittance	Y <sub>fs</sub>  *	1.7	–	–	S	V <sub>DS</sub> =10V, I <sub>D</sub> =3A
Input capacitance	C <sub>iss</sub>	–	520	–	pF	V <sub>DS</sub> =25V
Output capacitance	C <sub>oss</sub>	–	380	–	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	–	25	–	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub> *	–	22	–	ns	V <sub>DD</sub> ≒300V, I <sub>D</sub> =3A
Rise time	t <sub>r</sub> *	–	18	–	ns	V <sub>GS</sub> =10V
Turn-off delay time	t <sub>d(off)</sub> *	–	50	–	ns	R <sub>L</sub> =100Ω
Fall time	t <sub>f</sub> *	–	35	–	ns	R <sub>G</sub> =10Ω
Total gate charge	Q <sub>g</sub> *	–	15	–	nC	V <sub>DD</sub> ≒300V
Gate-source charge	Q <sub>gs</sub> *	–	4	–	nC	I <sub>D</sub> =6A
Gate-drain charge	Q <sub>gd</sub> *	–	6	–	nC	V <sub>GS</sub> =10V R <sub>L</sub> =50Ω / R <sub>G</sub> =10Ω

\* Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>SD</sub> *	–	–	1.5	V	I <sub>S</sub> = 6A, V <sub>GS</sub> =0V

\* Pulsed

●Electrical characteristic curves

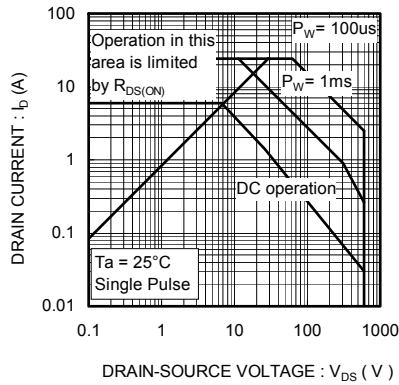


Fig.1 Maximum Safe Operating Area

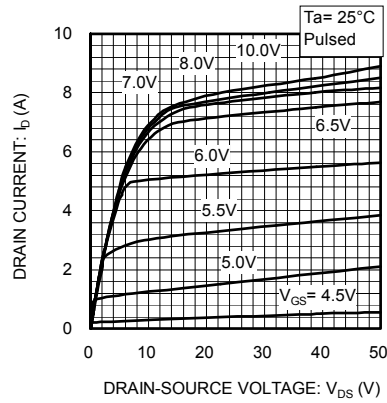


Fig.2 Typical Output Characteristics (I)

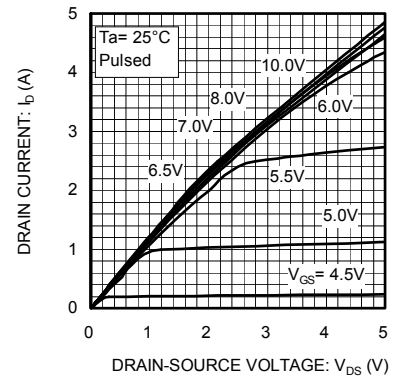


Fig.3 Typical Output Characteristics (II)

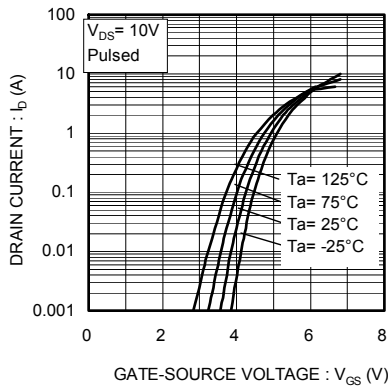


Fig.4 Typical Transfer Characteristics

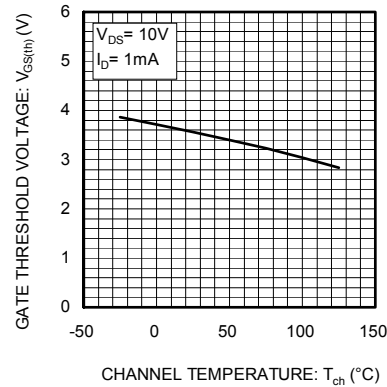


Fig.5 Gate Threshold Voltage vs. Channel Temperature

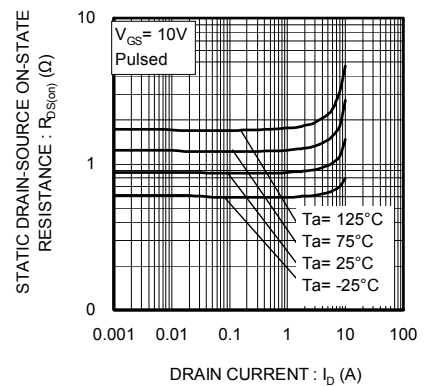


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

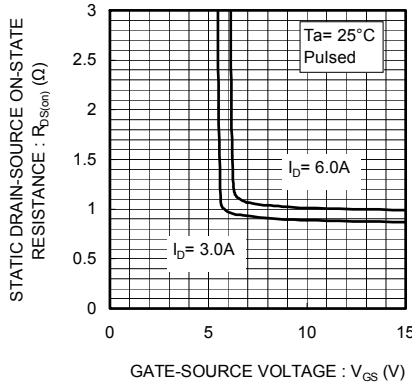


Fig.7 Static Drain-Source On-State Resistance vs. Gate Source

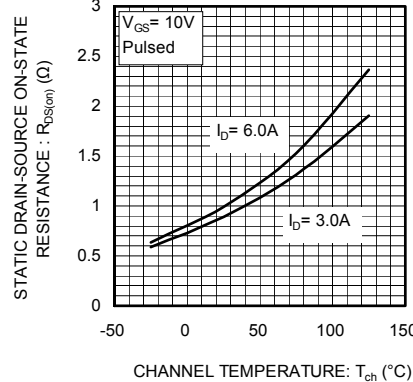


Fig.8 Static Drain-Source On-State Resistance vs. Channel

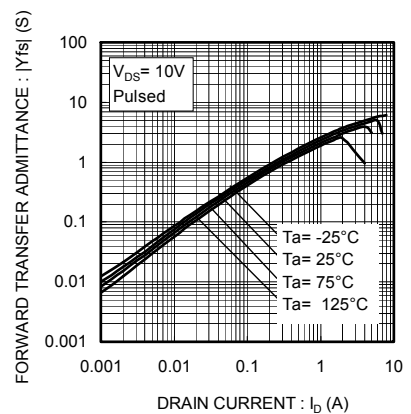


Fig.9 Forward Transfer Admittance vs. Drain Current

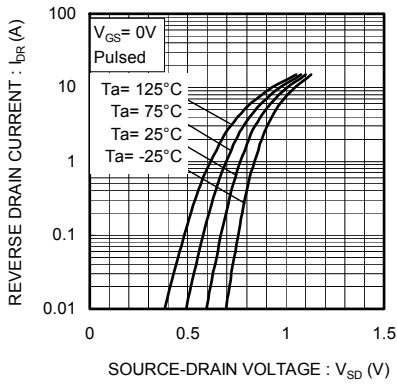


Fig.10 Reverse Drain Current vs. Source-Drain Voltage

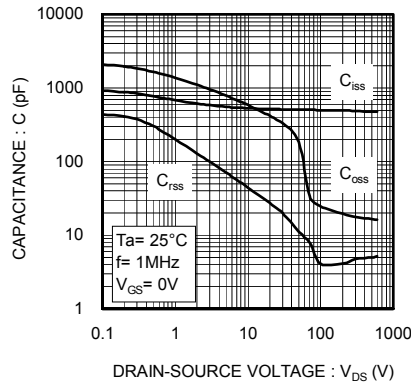


Fig.11 Typical Capacitance vs. Drain-Source Voltage

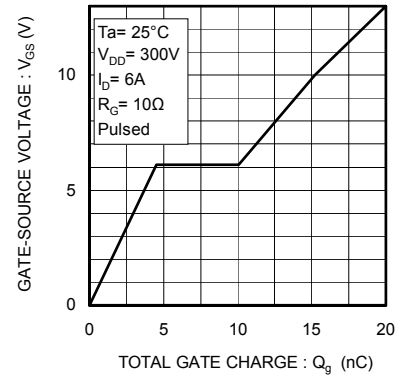


Fig.12 Dynamic Input Characteristics

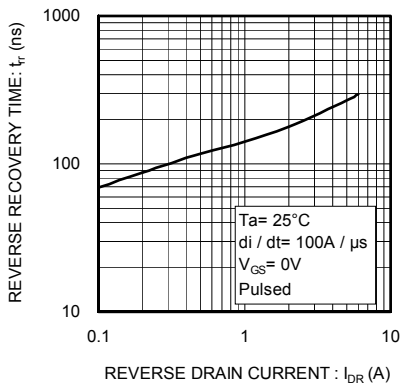


Fig.13 Reverse Recovery Time vs. Reverse Drain Current

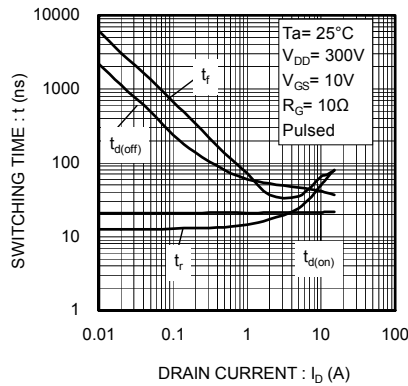


Fig.14 Switching Characteristics

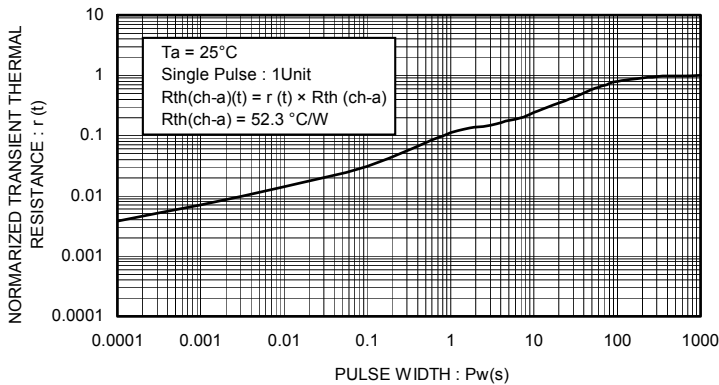


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width

●Switching characteristics measurement circuit

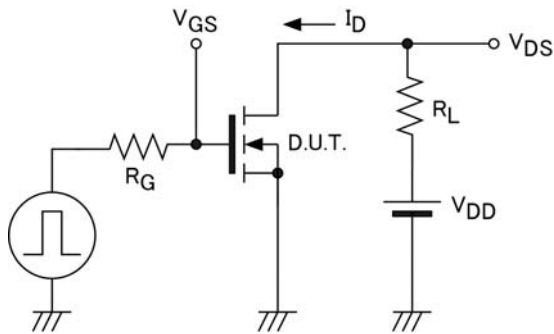


Fig.1-1 Switching time measurement circuit

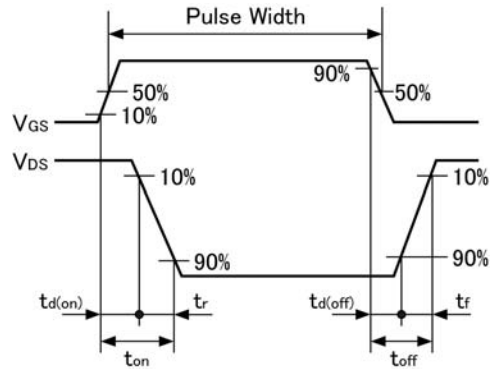


Fig.1-2 Switching waveforms

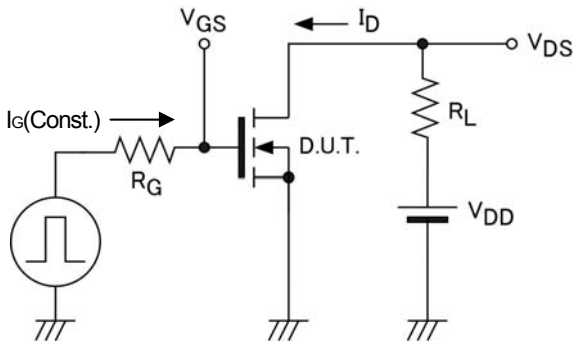


Fig.2-1 Gate charge measurement circuit

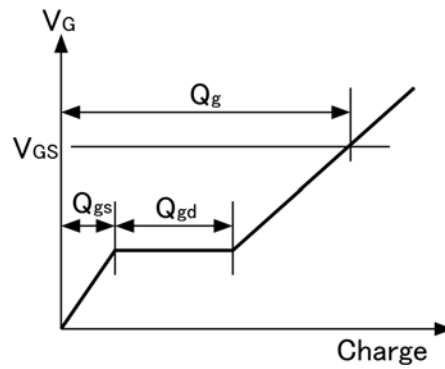


Fig.2-2 Gate charge waveform

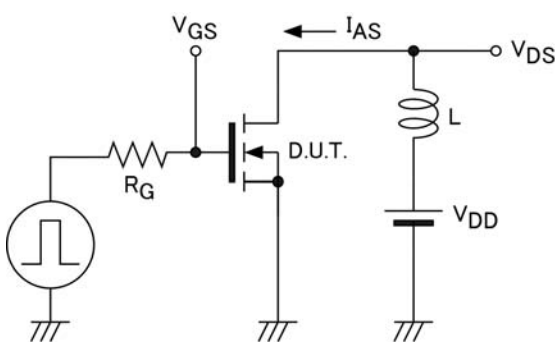


Fig.3-1 Avalanche measurement circuit

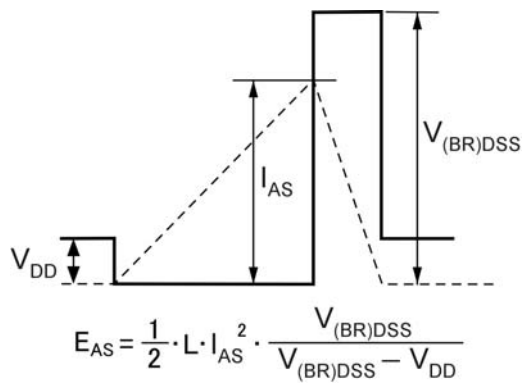


Fig.3-2 Avalanche waveform

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