

10V Drive Nch MOSFET

R6008FNJ

● Structure

Silicon N-channel MOSFET

● Features

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

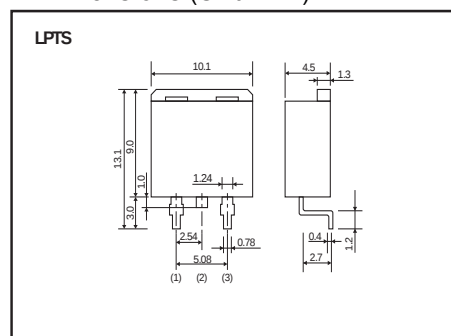
● Application

Switching

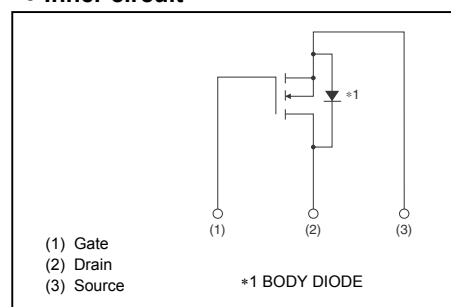
● Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	1000
R6008FNJ		○

● Dimensions (Unit : mm)



● Inner circuit



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

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	600	V
Gate-source voltage		V_{GSS}	± 30	V
Drain current	Continuous	I_D *3	± 8	A
	Pulsed	I_{DP} *1	± 32	A
Source current (Body Diode)	Continuous	I_S *3	8	A
	Pulsed	I_{SP} *1	32	A
Avalanche Current		I_{AS} *2	4	A
Avalanche Energy		E_{AS} *2	4.3	mJ
Power dissipation ($T_c=25^\circ C$)		P_D	50	W
Channel temperature		T_{ch}	150	$^\circ C$
Range of storage temperature		T_{stg}	-55 to +150	$^\circ C$

*1 $P_w \leq 10W$, 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	$R_{th(ch-c)}$	2.5	$^\circ C / W$

● 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	$V_{(BR)DSS}$	600	-	-	V	$I_D=1mA, V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	-	-	100	μA	$V_{DS}=600V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	2.0	-	4.0	V	$V_{DS}=10V, I_D=1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	-	0.73	0.95	Ω	$I_D=4A, V_{GS}=10V$
Forward transfer admittance	$ Y_{fs} $ *	2.5	5.0	-	S	$I_D=4A, V_{DS}=10V$
Input capacitance	C_{iss}	-	580	-	pF	$V_{DS}=25V$
Output capacitance	C_{oss}	-	450	-	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	-	25	-	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	20	-	ns	$I_D=4A, V_{DD}\approx 300V$
Rise time	t_r *	-	25	-	ns	$V_{GS}=10V$
Turn-off delay time	$t_{d(off)}$ *	-	60	-	ns	$R_L=75\Omega$
Fall time	t_f *	-	30	-	ns	$R_G=10\Omega$
Total gate charge	Q_g *	-	20	-	nC	$I_D=8A,$
Gate-source charge	Q_{gs} *	-	5	-	nC	$V_{DD}\approx 300V$
Gate-drain charge	Q_{gd} *	-	10	-	nC	$V_{GS}=10V$

*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD} *	-	-	1.5	V	$I_s=8A, V_{GS}=0V$
Reverse Recovery Time	t_{rr} *	-	67	-	ns	$I_s=8A, di/dt=100A/\mu s$

*Pulsed

●Electrical characteristic curves

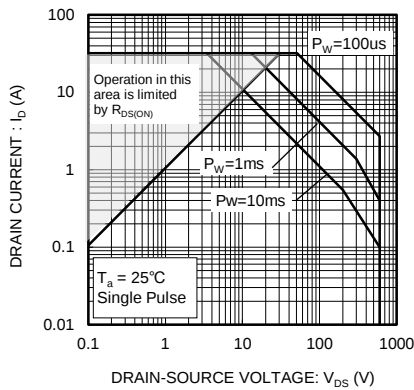


Fig.1 Maximum Safe Operating Area

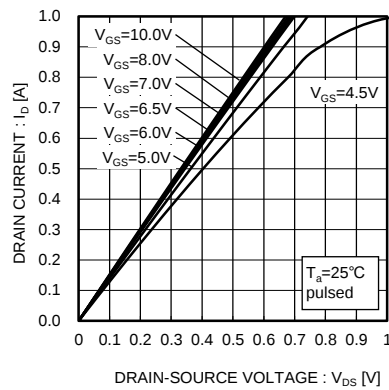


Fig.2 Typical Output Characteristics (I)

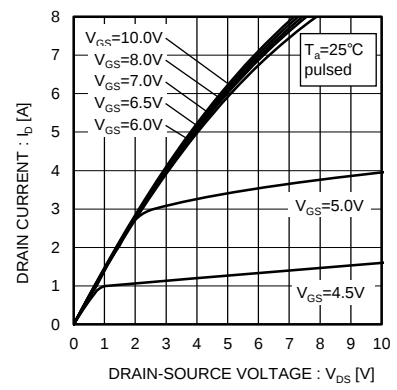


Fig.3 Typical Output Characteristics (II)

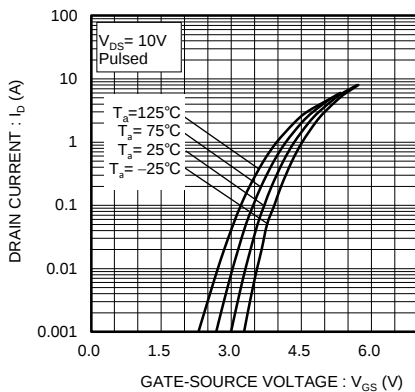


Fig.4 Typical Transfer Characteristics

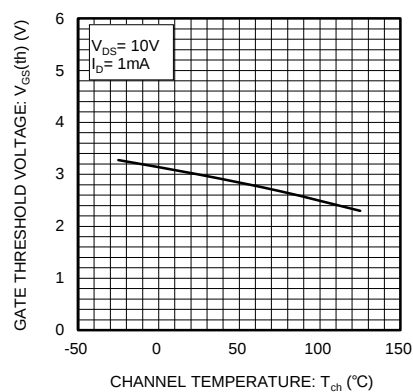


Fig.5 Gate Threshold Voltage vs. Channel Temperature

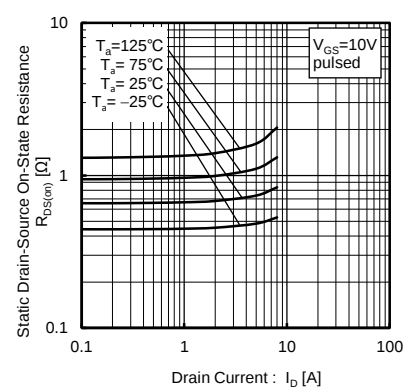


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

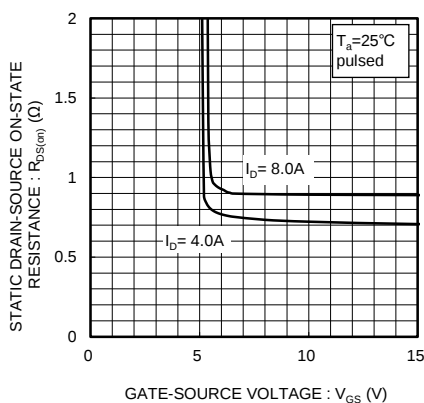


Fig.7 Static Drain-Source On-State Resistance vs. Gate Source Voltage

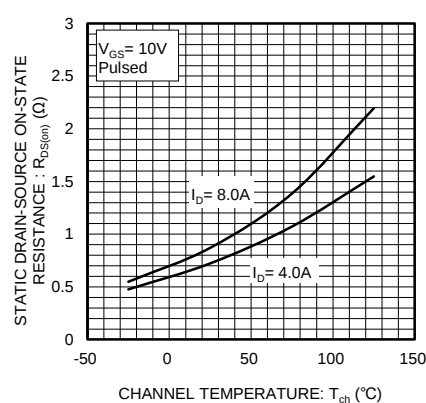


Fig.8 Static Drain-Source On-State Resistance vs. Channel Temperature

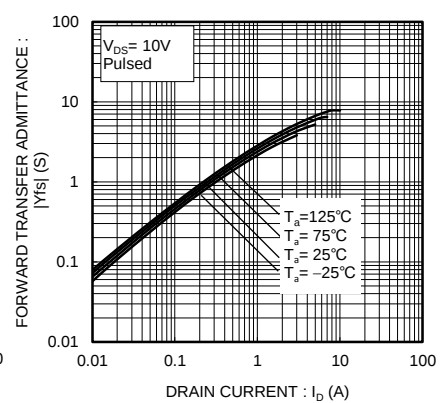


Fig.9 Forward Transfer Admittance vs. Drain Current

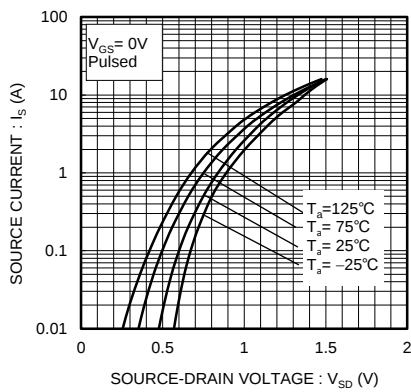


Fig.10 Source Current vs. Source-Drain Voltage

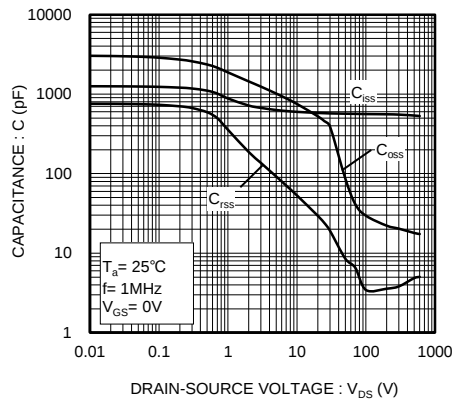


Fig.11 Typical Capacitance vs. Drain-Source Voltage

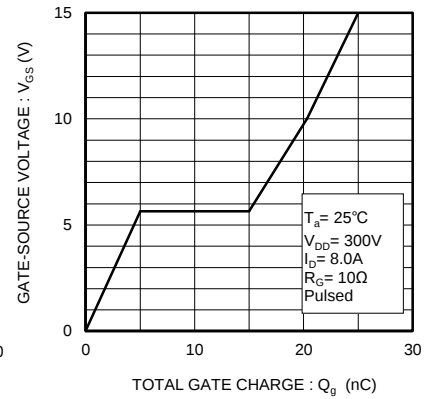


Fig.12 Dynamic Input Characteristics

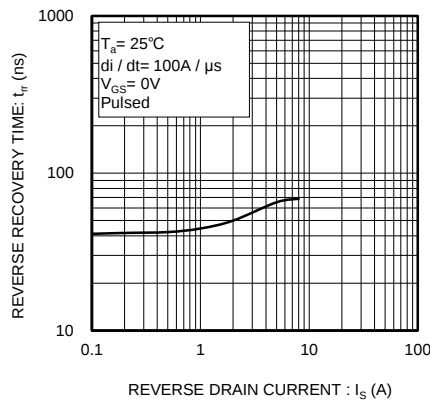


Fig.13 Reverse Recovery Time vs. Source Current

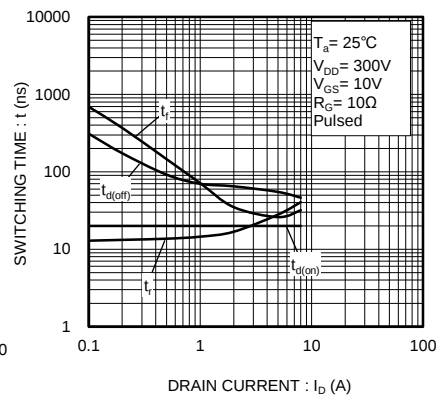


Fig.14 Switching Characteristics

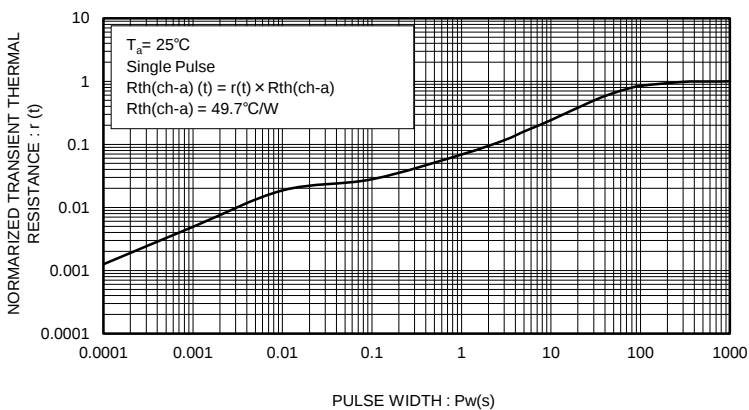


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width

● Measurement circuits

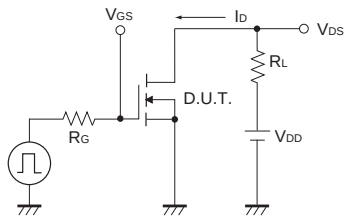


Fig.1-1 Switching Time Measurement Circuit

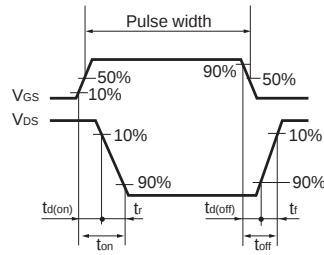


Fig.1-2 Switching Waveforms

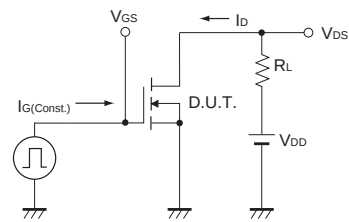


Fig.2-1 Gate Charge Measurement Circuit

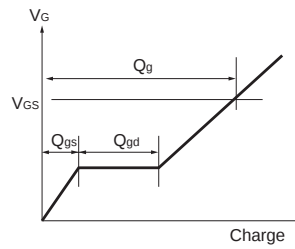


Fig.2-2 Gate Charge Waveform

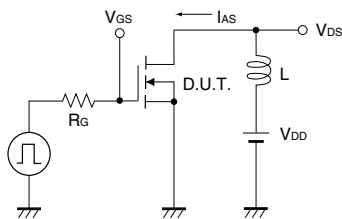


Fig.3-1 Avalanche Measurement Circuit

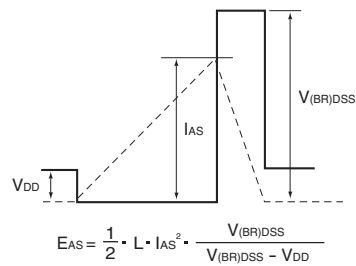


Fig.3-2 Avalanche Waveform

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