ROHM SEMICONDUCTOR

Data Sheet

10V Drive Nch MOSFET

R6012ANJ

●Structure
Silicon N-channel MOSFET

●Features
1) Low on-resistance.
2) Fast switching speed.
3) Gate-source voltage (V_{GSS}) guaranteed to be ±30V.
4) Drive circuits can be simple.
5) Parallel use is easy.

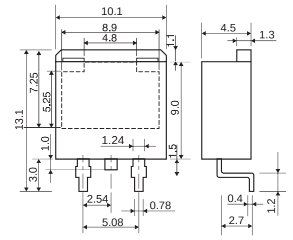
●Applications
Switching

●Packaging specifications

Type	Package	Taping	
	Code	LPTS	TL
		LPTL	TLL
	Basic ordering unit (pieces)	1000	

●Dimensions (Unit : mm)

LPTS

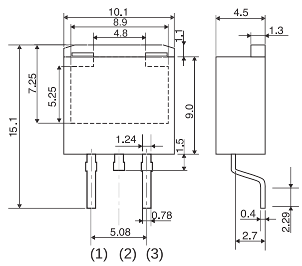


(1) Gate
(2) Drain
(3) Source

(1) (2) (3)

Each lead has same dimensions

LPTL



(1) Gate
(2) Drain
(3) Source

(1) (2) (3)

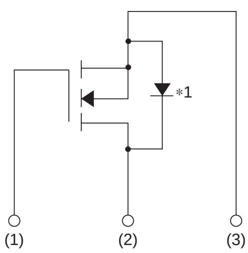
Each lead has same dimensions

●Absolute maximum ratings (Ta=25°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	±12	A
	Pulsed	I_{DP} *1	±48	A
Source current (Body Diode)	Continuous	I_S *3	12	A
	Pulsed	I_{SP} *1	48	A
Avalanche Current		I_{AS} *2	6	A
Avalanche Energy		E_{AS} *2	9.6	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 Pw≤10µs, Duty cycle≤1%
*2 L≒500µH, V_{DD}=50V, R_G=25Ω, Starting, Tch=25°C
*3 Limited only by maximum temperature allowed

●Inner circuit



(1) Gate
(2) Drain
(3) Source

*1 Body Diode

●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}=±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	$V_{GS(th)}$	2.5	–	4.5	V	V_{DS}=10V, I_D=1mA
Static drain-source on-state resistance	$R_{DS(on)}$ *	–	0.32	0.42	Ω	I_D=6A, V_{GS}=10V
Forward transfer admittance	$\|Y_{fs}\|$ *	3.5	–	–	S	I_D=6A, V_{DS}=10V
Input capacitance	C_{iss}	–	1300	–	pF	V_{DS}=25V
Output capacitance	C_{oss}	–	890	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	45	–	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$ *	–	30	–	ns	I_D=6A, V_{DD}≒300V
Rise time	t_r *	–	30	–	ns	V_{GS}=10V
Turn-off delay time	$t_{d(off)}$ *	–	90	–	ns	R_L=50Ω
Fall time	t_f *	–	35	–	ns	R_G=10Ω
Total gate charge	Q_g *	–	35	–	nC	V_{DD}≒300V
Gate-source charge	Q_{gs} *	–	7	–	nC	I_D=12A V_{GS}=10V
Gate-drain charge	Q_{gd} *	–	15	–	nC	R_L=25Ω / 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=12A, V_{GS}=0V

* Pulsed

●Electrical characteristics curves

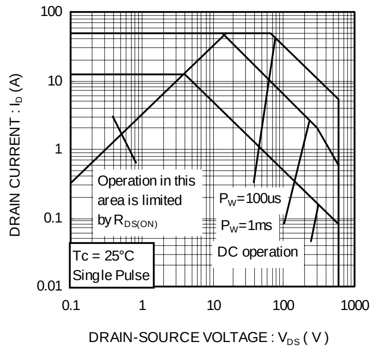


Fig.1 Maximum Safe Operating Aera

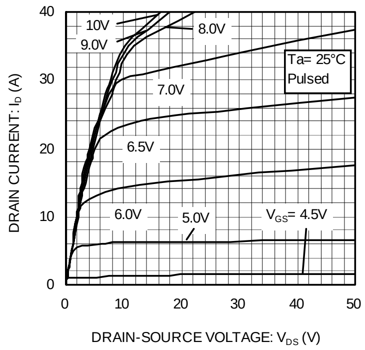


Fig.2: Typical Output Characteristics(Ⅰ)

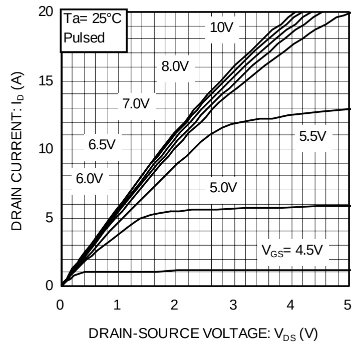


Fig.3: Typical Output Characteristics(Ⅱ)

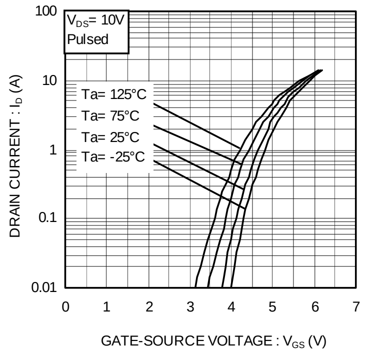


Fig.4 Typical Transfer Characteristics

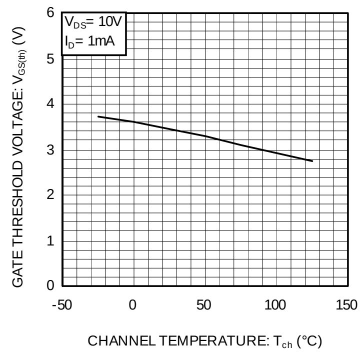


Fig.5 Gate Threshold Voltage vs. Channel Temperature

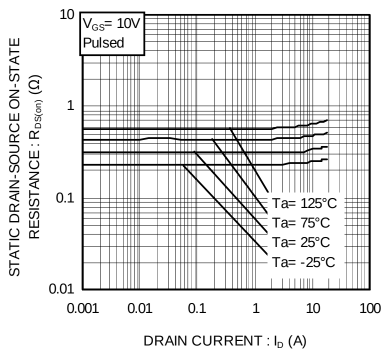


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

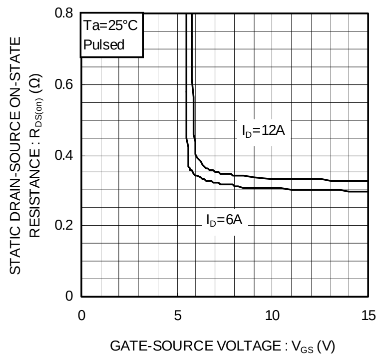


Fig.7 Static Drain-Source On-State Resistance vs. Gate Source Voltage

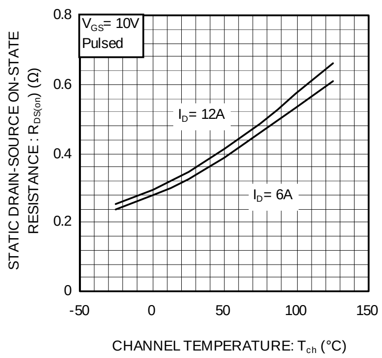


Fig.8 Static Drain-Source On-State Resistance vs. Channel Temperature

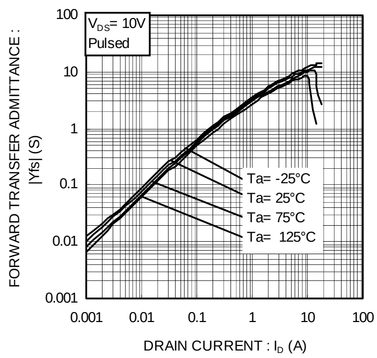


Fig.9 Forward Transfer Admittance vs. Drain Current

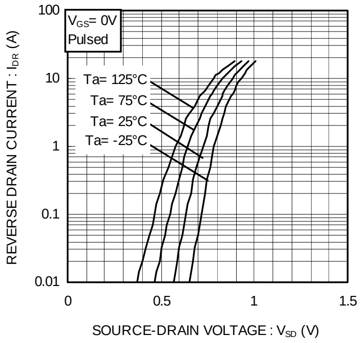


Fig.10 Reverse Drain Current vs. Sourse-Drain Voltage

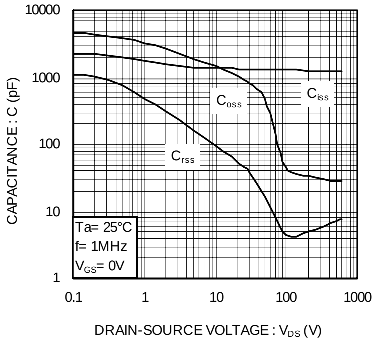


Fig.11 Typical Capacitance vs. Drain-Source Voltage

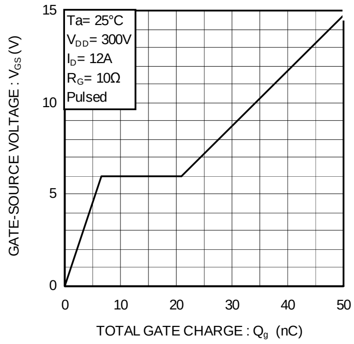


Fig.12 Dynamic Input Characteristics

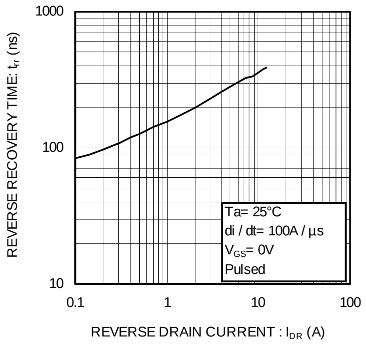


Fig.13 Reverse Recovery Time vs.Reverse Drain Current

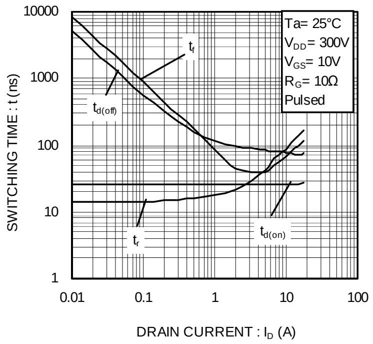


Fig.14 Switching Characteristics

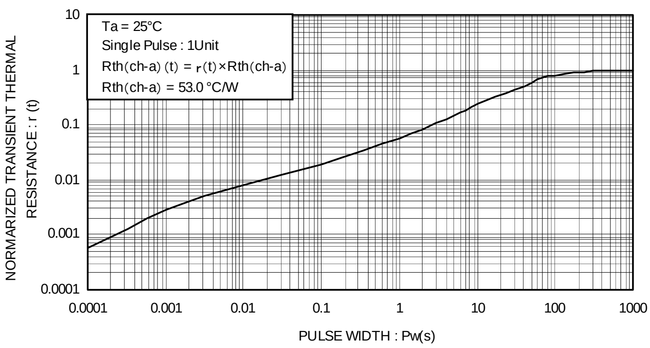


Fig.15 Normalized Transient Thermal Resistance vs. Pulse Width

●**Measurement circuits**

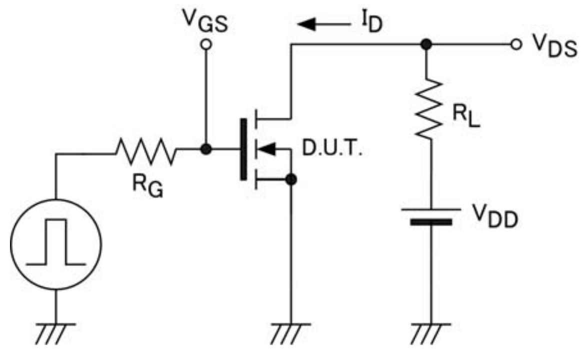


Fig.1 Switching time measurement circuit

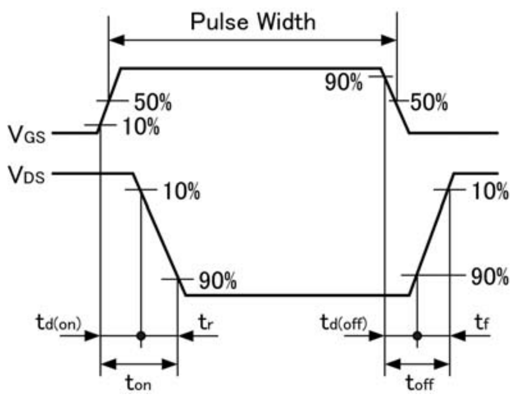


Fig.2 Switching waveforms

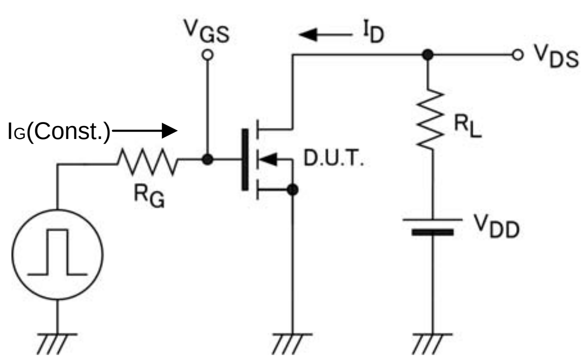


Fig.3 Gate charge measurement circuit

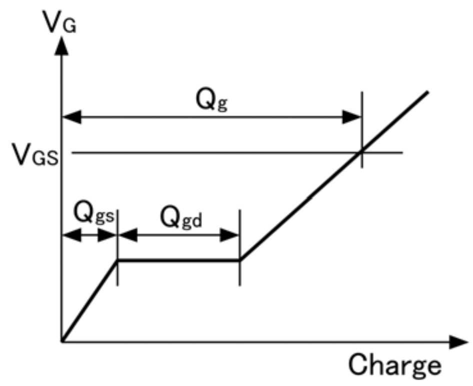


Fig.4 Gate charge waveform

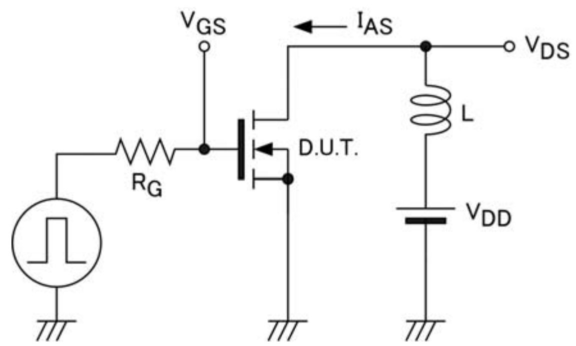
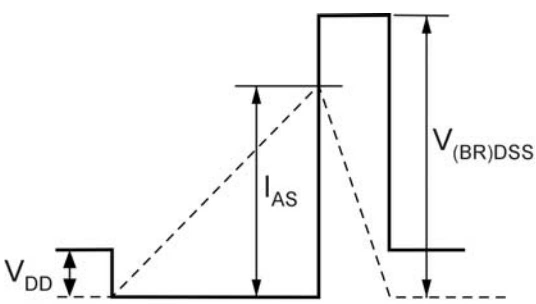


Fig.5 Avalanche measurement circuit



$$E_{AS} = \frac{1}{2} \cdot L \cdot I_{AS}{}^{2} \cdot \frac{V_{(BR)DSS}}{V_{(BR)DSS} - V_{DD}}$$

Fig.6 Avalanche waveform

Notes

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