4V Drive Nch MOSFET

RSD200N10

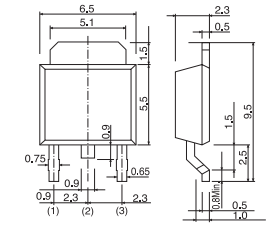
●Structure
Silicon N-channel MOSFET

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

●Applications
Switching

●Dimensions (Unit : mm)

CPT3

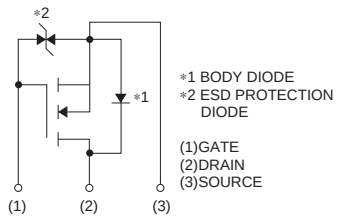


(1)Base(Gate)
(2)Collector(Drain)
(3)Emitter(Source)

●Packaging specifications

	Package	Taping
	Code	TL
Type	Basic ordering unit (pieces)	2500
RSD200N10		○

●Inner circuit



*1 BODY DIODE
*2 ESD PROTECTION DIODE

(1)GATE
(2)DRAIN
(3)SOURCE

●Absolute maximum ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	100	V
Gate-source voltage		V_{GSS}	±20	V
Drain current	Continuous	I_D *3	±20	A
	Pulsed	I_{DP} *1	±80	A
Source current (Body Diode)	Continuous	I_S	20	A
	Pulsed	I_{SP} *1	80	A
Avalanche Current		I_{AS} *2	20	A
Avalanche Energy		E_{AS} *2	85	mJ
Total power dissipation (Tc=25°C)		P_D	20	W
Channel temperature		Tch	150	°C
Range of storage temperature		Tstg	−55 to +150	°C

*1 Pw≤10μs, Duty cycle≤1%
*2 L≒265μH, V_{DD}=50V, R_G=25Ω, Starting, Tch=25°C
*3 Limited only by maximum tempterature allowed

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to case	Rth(ch-c)	6.25	°C/W

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	–	–	±10	μA	V_{GS}=±20V, V_{DS}=0V
Drain-source breakdown voltage	$V_{(BR)DSS}$	100	–	–	V	I_D=1mA, V_{GS}=0V
Zero gate voltage drain current	I_{DSS}	–	–	10	μA	V_{DS}=100V, V_{GS}=0V
Gate threshold voltage	$V_{GS(th)}$	1.0	–	2.5	V	V_{DS}=10V, I_D=1mA
Static drain-source on-state resistance	$R_{DS(on)}$ *	–	41	52	mΩ	I_D=10A, V_{GS}=10V
		–	44	58	mΩ	I_D=10A, V_{GS}=4.5V
		–	45	59	mΩ	I_D=10A, V_{GS}=4.0V
Forward transfer admittance	$\|Y_{fs}\|$ *	14	–	–	S	I_D=10A, V_{DS}=10V
Input capacitance	C_{iss}	–	2200	–	pF	V_{DS}=25V
Output capacitance	C_{oss}	–	180	–	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	–	110	–	pF	f=1MHz
Turn-on delay time	$t_{d(on)}$ *	–	18	–	ns	I_D=10A, V_{DD}≒50V
Rise time	t_r *	–	61	–	ns	V_{GS}=10V
Turn-off delay time	$t_{d(off)}$ *	–	128	–	ns	R_L=5Ω
Fall time	t_f *	–	193	–	ns	R_G=10Ω
Total gate charge	Q_g *	–	48.5	–	nC	V_{DD}≒50V I_D=20A V_{GS}=10V R_L=2.5Ω / R_G=10Ω
Gate-source charge	Q_{gs} *	–	5.5	–	nC	
Gate-drain charge	Q_{gd} *	–	13	–	nC	

* 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= 20A, V_{GS}=0V

* Pulsed

●**Electrical characteristic curves**

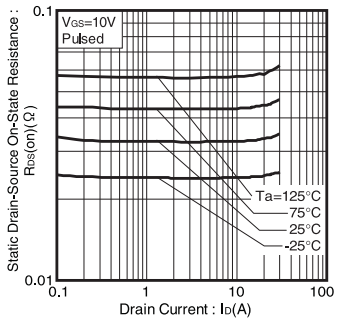


Fig.1 Static Drain-Source On-State Resistance vs. Drain Current

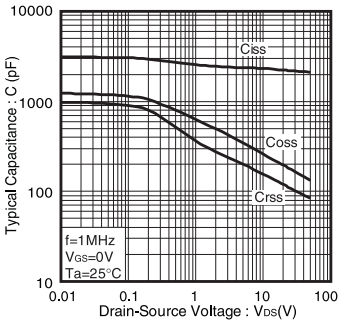


Fig.2 Typical Capacitance vs. Drain-Source Voltage

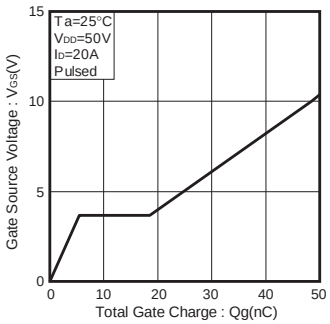


Fig.3 Dynamic Input Characteristics

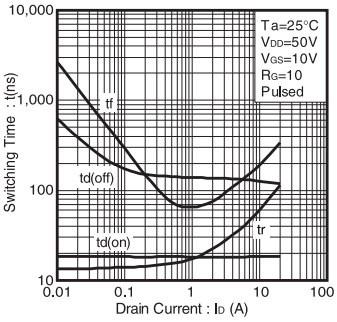


Fig.4 Switching Characteristics

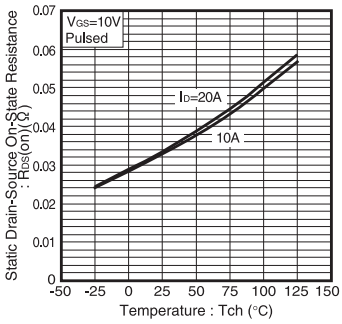


Fig.5 Static Drain-Source On-State Resistance vs. Channel Temperature

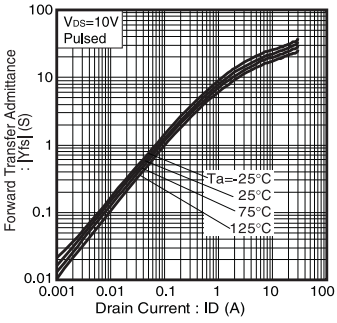


Fig.6 Forward Transfer Admittance vs.Pulsed

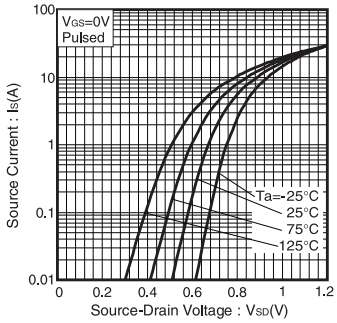


Fig.7 Source Current vs. Source-Drain Voltage

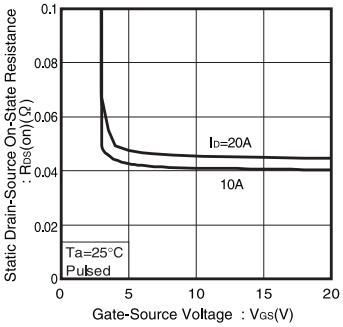


Fig.8 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

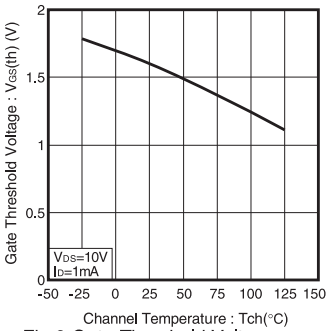


Fig.9 Gate Threshold Voltage vs. Channel Temperature

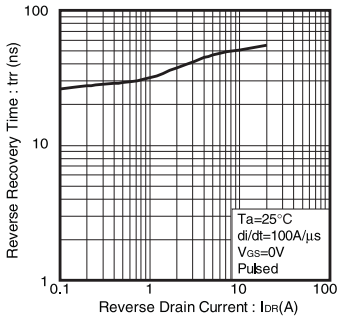


Fig.10 Reverse Recovery Time vs. Reverse Drain Current

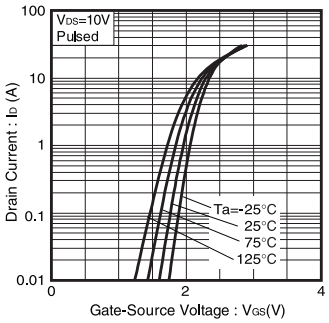


Fig.11 Typical Transfer Characteristics

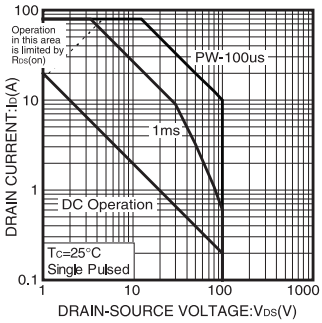


Fig.12 Maximum Safe Operating Area

●**Switching characteristics measurement circuit**

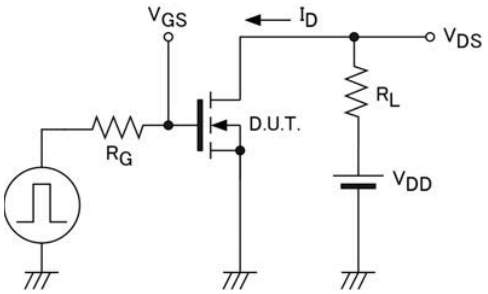


Fig.1-1 Switching time measurement circuit

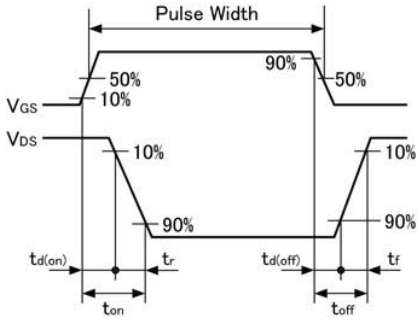


Fig.1-2 Switching waveforms

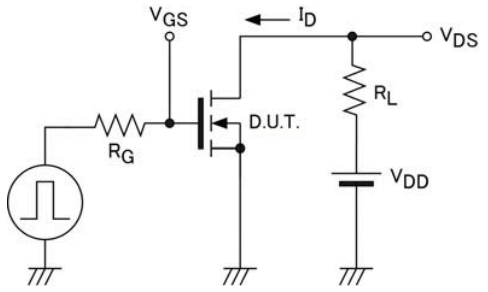


Fig.2-1 Gate charge measurement circuit

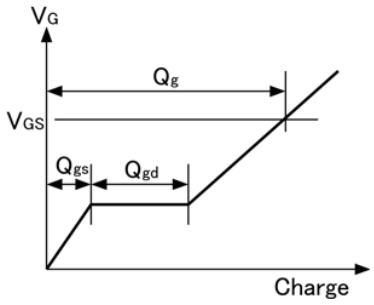


Fig.2-2 Gate charge waveform

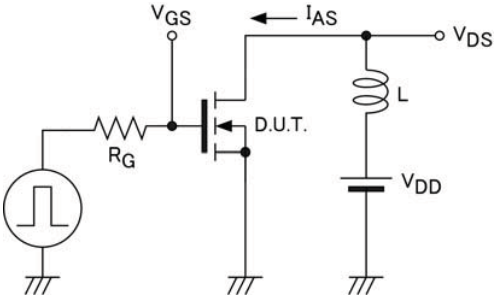


Fig.3-1 Avalanche measurement circuit

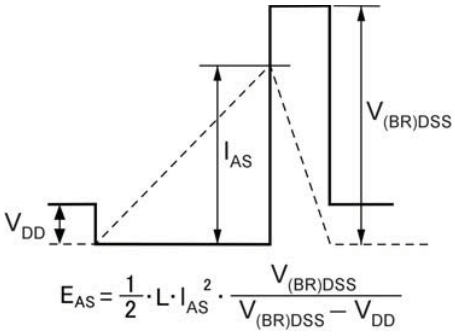


Fig.3-2 Avalanche waveform

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