10V Drive Nch MOSFET

RDD050N20

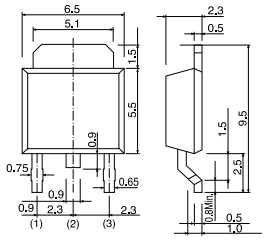
●Structure
Silicon N-channel
MOSFET

●Features
1) Low on-resistance.
2) Low input capacitance.
3) Exellent resistance to damage from static electricity.

●Application
Switching

●Dimensions (Unit : mm)

CPT3

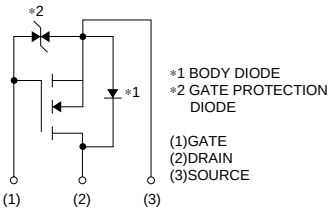


(1)Base(Gate)
(2)Collector(Drain)
(3)Emitter(Source)

●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	2500
RDD050N20		○

●Equivalent Circuit



*1 BODY DIODE
*2 GATE PROTECTION DIODE

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

*A protection diode is included between the gate and the source terminals to protect the diode against static electricity when the product is in use. Use the protection circuit when the fixed voltages are exceeded.

●Absolute maximum ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DSS}	200	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	Continuous	I_D	±5	A
	Pulsed	I_{DP} *1	±20	A
Source Current (Body Diode)	Continuous	I_S	5	A
	Pulsed	I_{SP} *1	20	A
Avalanche Current		I_{AS} *2	5	A
Avalanche Energy		E_{AS} *2	75	mJ
Total Power Dissipation (T_C=25°C)		P_D	20	W
Channel Temperature		T_{ch}	150	°C
Storage Temperature		T_{stg}	–55 to +150	°C

*1 Pw ≤ 10μs, Duty cycle ≤ 1%
*2 L≒ 4.5mH, V_{DD}=50V, R_G=25Ω, 1Pulse, Tch=25°C

●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}=±30V, V_{DS}=0V
Drain-Source Breakdown Voltage	$V_{(BR)\ DSS}$	200	—	—	V	I_D=1mA, V_{GS}=0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	25	μA	V_{DS}=200V, 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	$R_{DS\ (on)}$ *	—	0.55	0.72	Ω	I_D=2.5A, V_{GS}=10V
Forward Transfer Admittance	$\|Y_{fs}\|$ *	1.1	1.8	—	S	V_{DS}=10V, I_D=2.5A
Input Capacitance	C_{iss}	—	292	—	pF	V_{DS}=10V
Output Capacitance	C_{oss}	—	92	—	pF	V_{GS}=0V
Reverse Transfer Capacitance	C_{rss}	—	28	—	pF	f=1MHz
Turn-On Delay Time	$t_{d\ (on)}$ *	—	10	—	ns	I_D=2.5A, V_{DD}≒100V
Rise Time	t_r *	—	22	—	ns	V_{GS}=10V
Turn-Off Delay Time	$t_{d\ (off)}$ *	—	23	—	ns	R_L=40Ω
Fall Time	t_f *	—	28	—	ns	R_G=10Ω
Total Gate Charge	Q_g *	—	9.3	—	nC	V_{DD}=100V
Gate-Source Charge	Q_{gs} *	—	2.8	—	nC	V_{GS}=10V
Gate-Drain Charge	Q_{gd} *	—	3.7	—	nC	I_D=5A

* 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= 5.0A, V_{GS}=0V
Reverse recovery time	t_{rr}	–	117	–	ns	I_{DR}= 5.0A, V_{GS}=0V
Reverse recovery charge	Q_{rr}	–	0.37	–	μC	di/dt= 100A / μs

* Pulsed

●**Electrical characteristic curves**

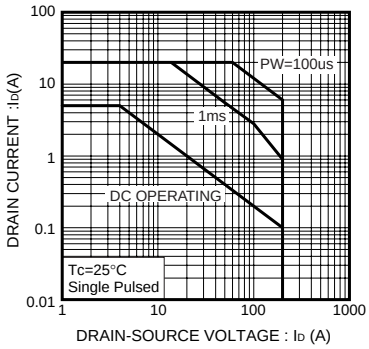


Fig.1 Maximum Safe Operating Area

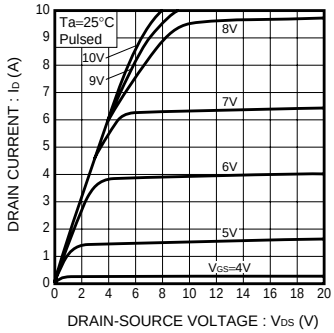


Fig.2 Typical Output Characteristics

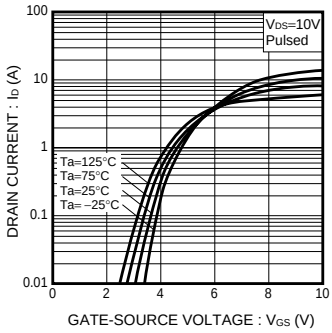


Fig.3 Typical Transfer Characteristics

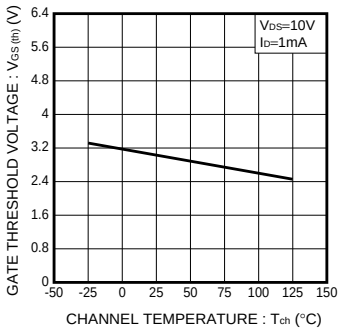


Fig.4 Gate Threshold Voltage vs. Channel Temperature

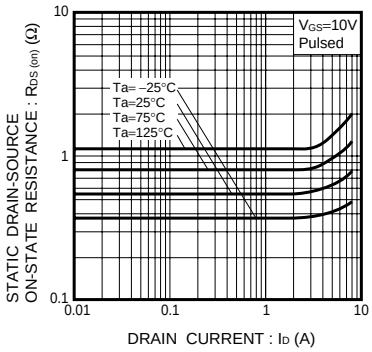


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

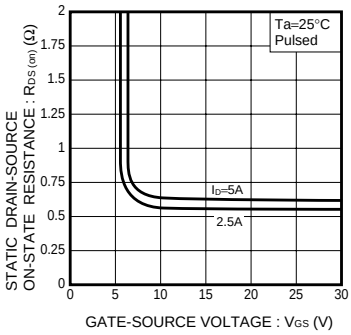


Fig.6 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

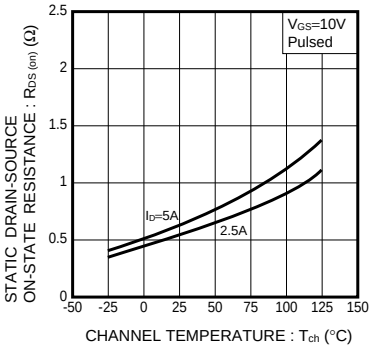


Fig.7 Static Drain-Source On-State Resistance vs. Channel Temperature

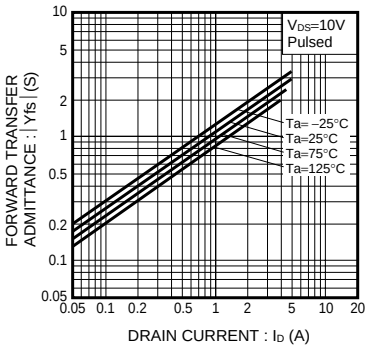


Fig.8 Forward Transfer Admittance vs. Drain Current

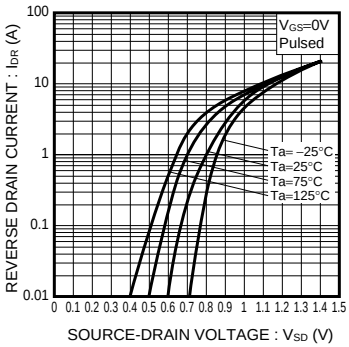


Fig.9 Reverse Drain Current vs. Source-Drain Voltage

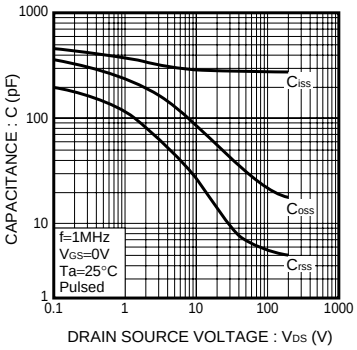


Fig.10 Typical Capacitance vs. Drain-Source Voltage

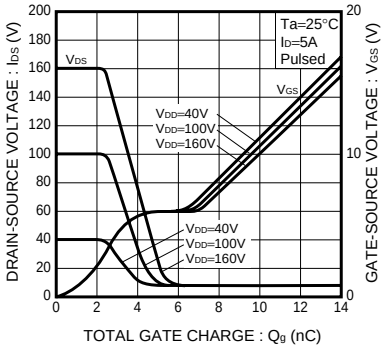


Fig.11 Dynamic Input Characteristics

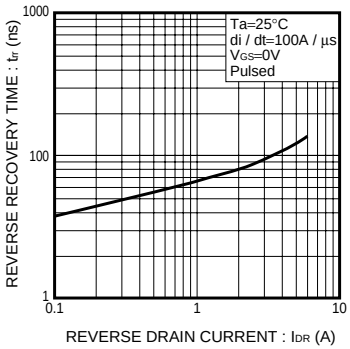


Fig.12 Reverse Recovery Time vs. Reverse Drain Current

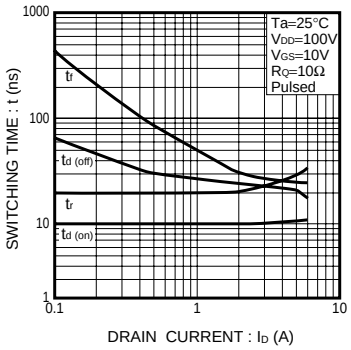


Fig.13 Switching Characteristcs

●**Switching characteristics measurement circuit**

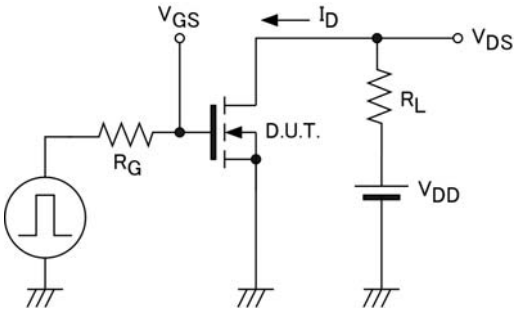


Fig.1-1 Switching time measurement circuit

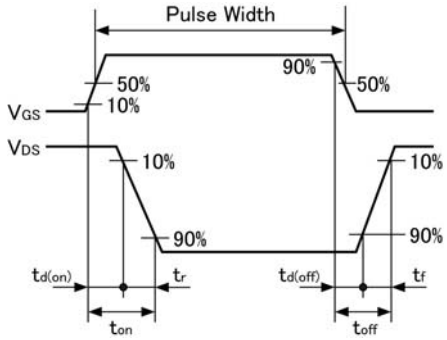


Fig.1-2 Switching waveforms

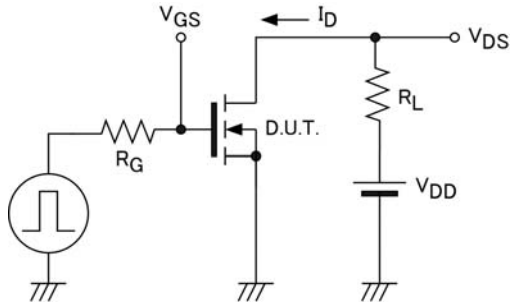


Fig.2-1 Gate charge measurement circuit

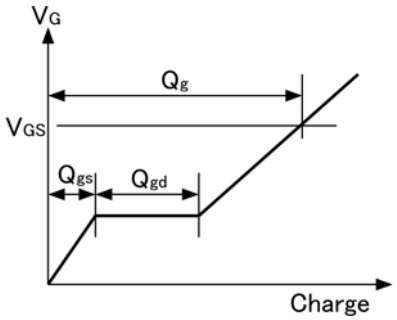


Fig.2-2 Gate charge waveform

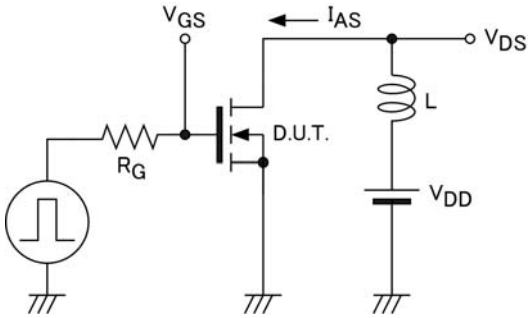


Fig.3-1 Avalanche measurement circuit

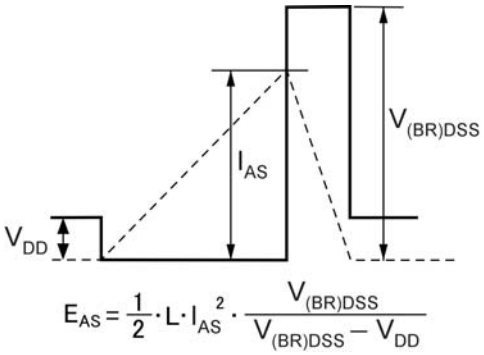


Fig.3-2 Avalanche waveform

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Contact us : webmaster@rohm.co.jp

ROHM CO., LTD. 21 Saiin Mizosaki-cho, Ukyo-ku, Kyoto 615-8585, Japan
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