

10V Drive Nch MOSFET

RDD050N20

●Structure

Silicon N-channel
MOSFET

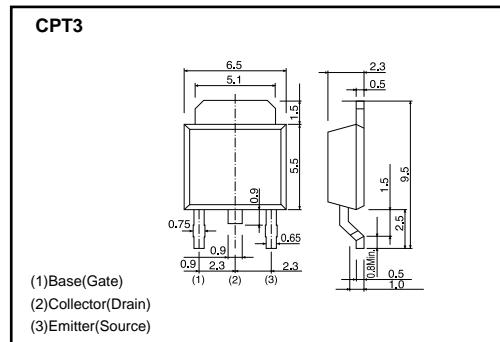
●Features

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

●Application

Switching

●Dimensions (Unit : mm)



●Packaging specifications

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

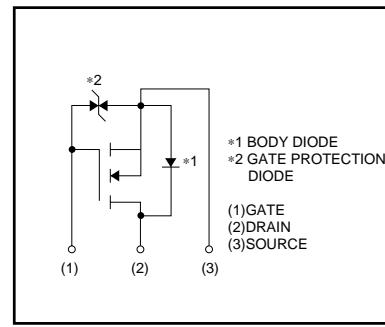
●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit	
Drain-Source Voltage	V _{DSS}	200	V	
Gate-Source Voltage	V _{GS}	±30	V	
Drain Current	Continuous	I _D	±5	A
	Pulsed	I _{DP}	±20	A
Source Current (Body Diode)	Continuous	I _S	5	A
	Pulsed	I _{SP}	20	A
Avalanche Current	I _{AS}	5	A	
Avalanche Energy	E _{AS}	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 P_w ≤ 10μs, Duty cycle ≤ 1%

*2 L = 4.5mH, V_{DD}=50V, R_G=25Ω, 1Pulse, T_{ch}=25°C

●Equivalent Circuit



*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.

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to case	R _{th(ch-c)}	6.25	°C/W

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●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS}=\pm 30V, V_{DS}=0V$
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	$R_L=40\Omega$
Fall Time	t_f *	—	28	—	ns	$R_G=10\Omega$
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

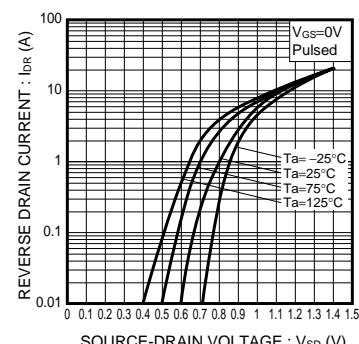
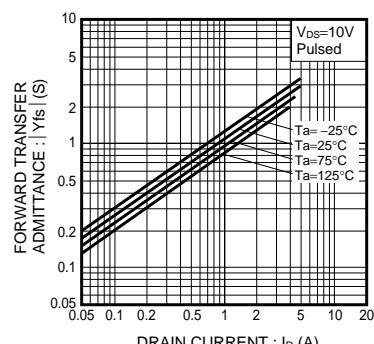
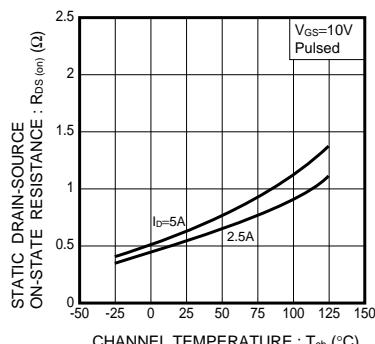
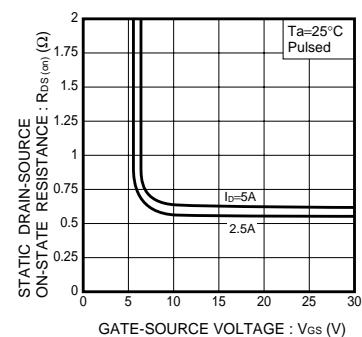
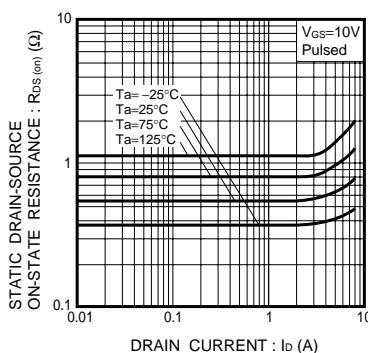
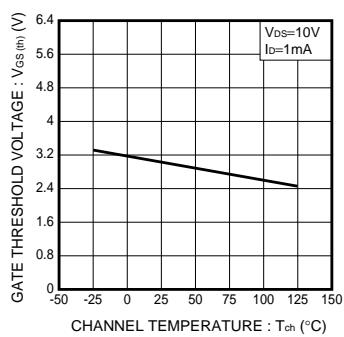
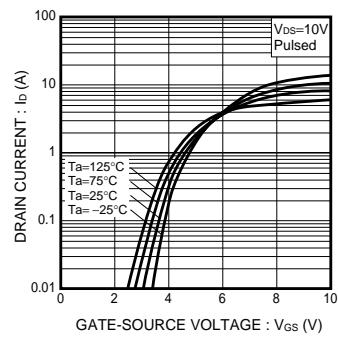
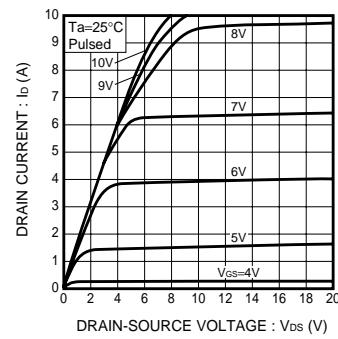
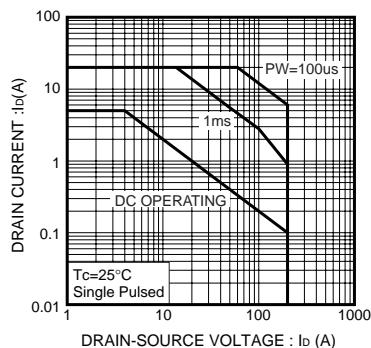
●Body diode characteristics (Source-drain) (Ta=25°C)

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	$di/dt=100A/\mu s$

* Pulsed

Transistors

● Electrical characteristic curves



Transistors

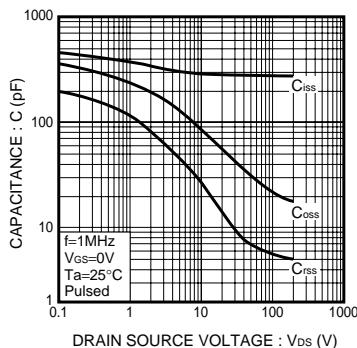
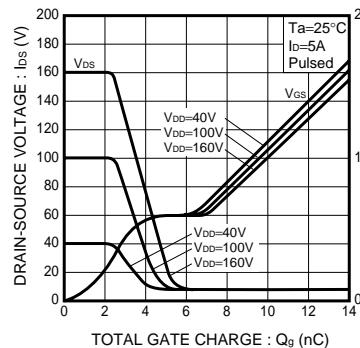
Fig.10 Typical Capacitance vs.
Drain-Source Voltage

Fig.11 Dynamic Input Characteristics

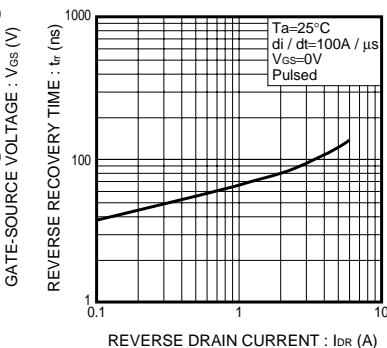
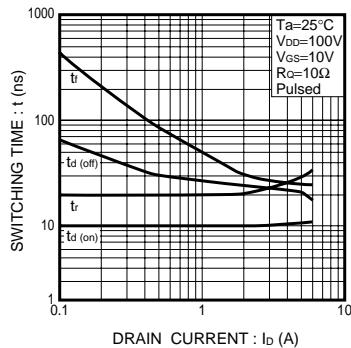
Fig.12 Reverse Recovery Time
vs. Reverse Drain Current

Fig.13 Switching Characteristics

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●Switching characteristics measurement circuit

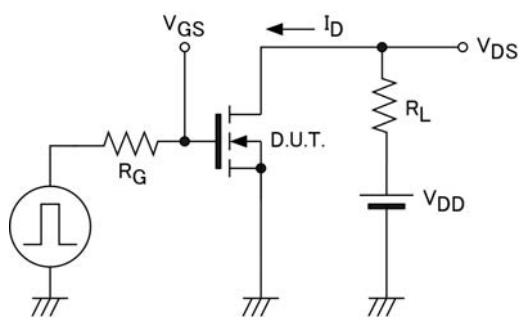


Fig.1-1 Switching time measurement circuit

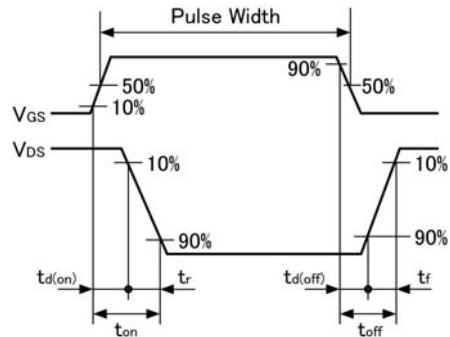


Fig.1-2 Switching waveforms

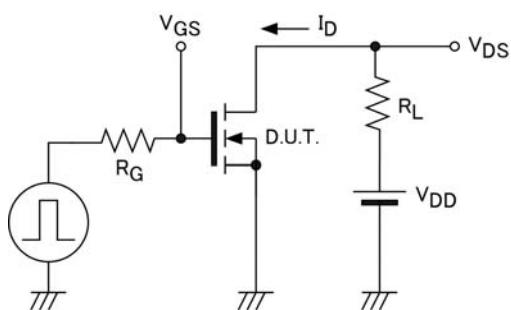


Fig.2-1 Gate charge measurement circuit

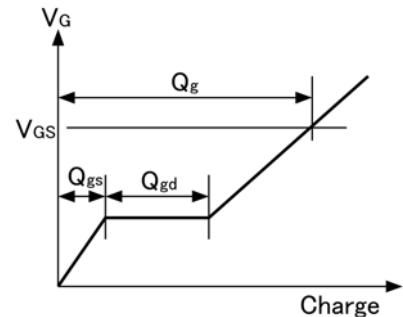


Fig.2-2 Gate charge waveform

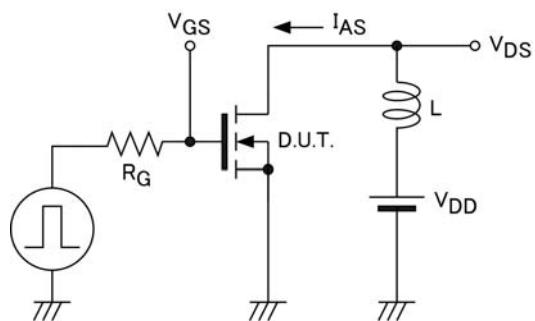


Fig.3-1 Avalanche measurement circuit

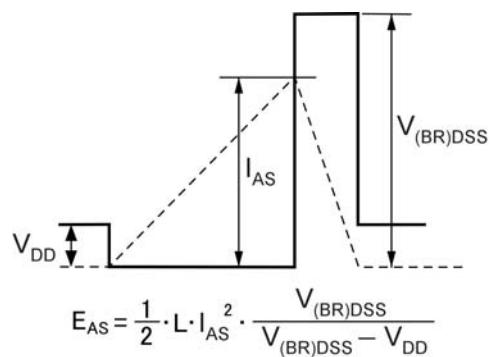


Fig.3-2 Avalanche waveform

Appendix

Notes

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