

10V Drive Nch MOSFET

RCX120N20

● Structure

Silicon N-channel MOSFET

●Features

- 1) Low on-resistance.
- 2) Low input capacitance.
- 3) High ESD.

● Application

Switching

● Packaging specifications

Type	Package	Bulk
	Code	-
	Basic ordering unit (pieces)	500
RCX120N20		○

● **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^{*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}	6.0	A
Avalanche energy		E_{AS}^{*2}	11.6	mJ
Power dissipation		P_D^{*4}	40	W
Channel temperature		T_{ch}	150	$^{\circ}\text{C}$
Range of storage temperature		T_{stg}	-55 to $+150$	$^{\circ}\text{C}$

*1 $P_{w} \leq 10 \mu s$, Duty cycle $\leq 1\%$

*2 L = 500μH, V_{DD} = 50V, R_G = 25Ω, T_{ch} = 25°C

*3 Limited only by maximum channel temperature allowed.

*4 $T_C=25^{\circ}\text{C}$

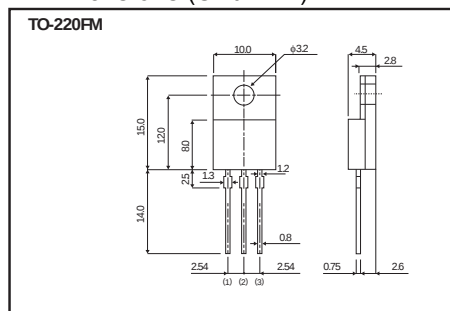
- Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to Case	$R_{th}(ch-c)^*$	3.125	°C / W

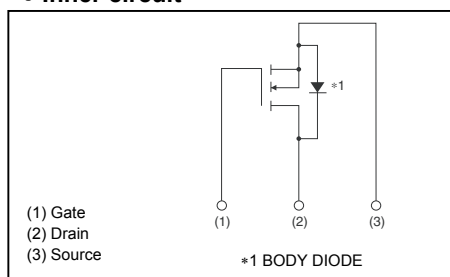
* $T_C=25^{\circ}\text{C}$

* Limited only by maximum channel temperature allowed.

● **Dimensions** (Unit : mm)



- Inner circuit



● 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	$V_{(BR)DSS}$	200	-	-	V	$I_D = 1mA$, $V_{GS} = 0V$
Zero gate voltage drain current	I_{DSS}	-	-	10	μA	$V_{DS} = 200V$, $V_{GS} = 0V$
Gate threshold voltage	$V_{GS(th)}$	3.25	-	5.25	V	$V_{DS} = 10V$, $I_D = 1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	-	250	325	m Ω	$I_D = 6.0A$, $V_{GS} = 10V$
Forward transfer admittance	$ Y_{fs} $ *	2.75	5.5	-	S	$V_{DS} = 10V$, $I_D = 6.0A$
Input capacitance	C_{iss}	-	740	-	pF	$V_{DS} = 25V$
Output capacitance	C_{oss}	-	57	-	pF	$V_{GS} = 0V$
Reverse transfer capacitance	C_{rss}	-	26	-	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$ *	-	20	-	ns	$V_{DD} \approx 100V$, $I_D = 6.0A$
Rise time	t_r *	-	33	-	ns	$V_{GS} = 10V$
Turn-off delay time	$t_{d(off)}$ *	-	27	-	ns	$R_L = 16.67\Omega$
Fall time	t_f *	-	11	-	ns	$R_G = 10\Omega$
Total gate charge	Q_g *	-	15	-	nC	$V_{DD} \approx 100V$, $I_D = 12A$
Gate-source charge	Q_{gs} *	-	6	-	nC	$V_{GS} = 10V$
Gate-drain charge	Q_{gd} *	-	6	-	nC	

*Pulsed

● Body diode characteristics (Source-Drain)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V_{SD} *	-	-	1.5	V	$I_S = 12A$, $V_{GS} = 0V$

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (I)

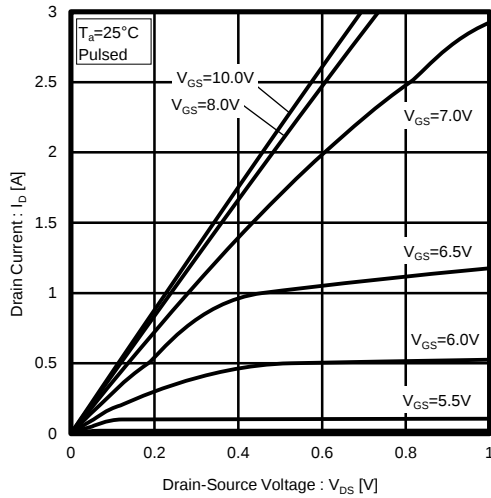


Fig.2 Typical Output Characteristics (II)

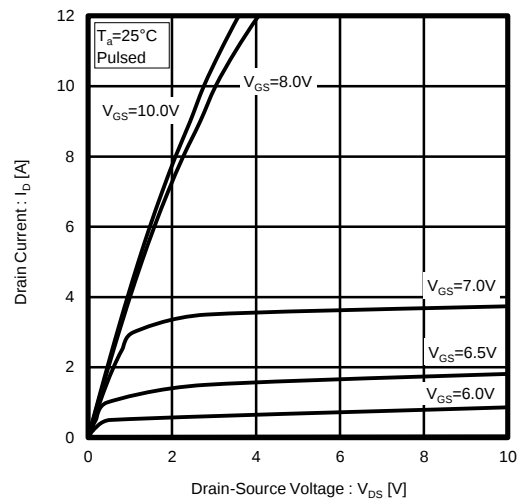


Fig.3 Typical Transfer Characteristics

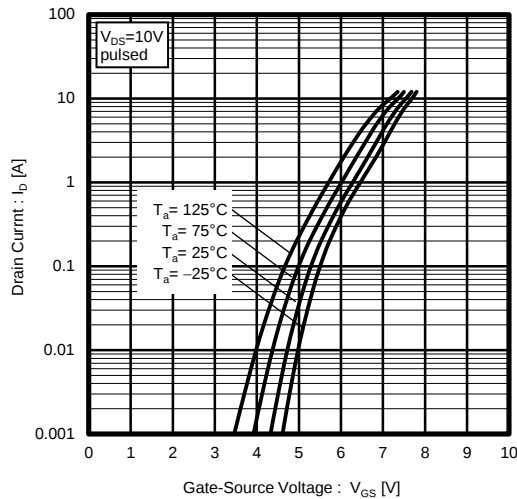


Fig.4 Gate Threshold Voltage vs. Channel Temperature

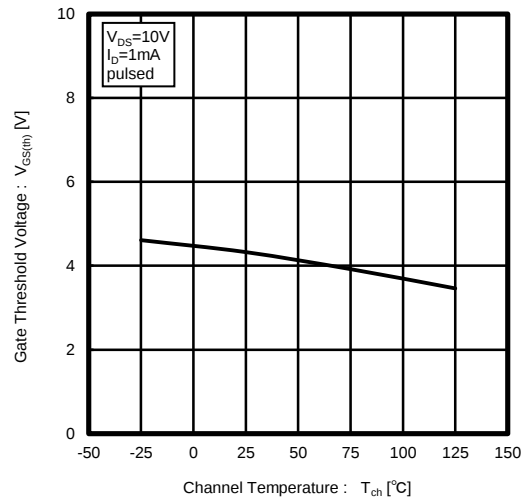


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

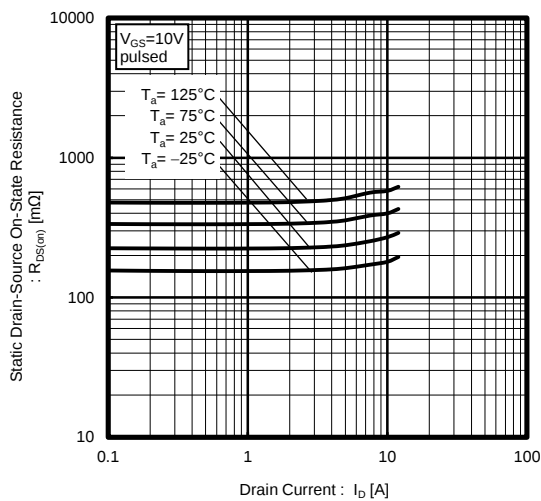


Fig.6 Static Drain-Source On-State Resistance vs. Channel Temperature

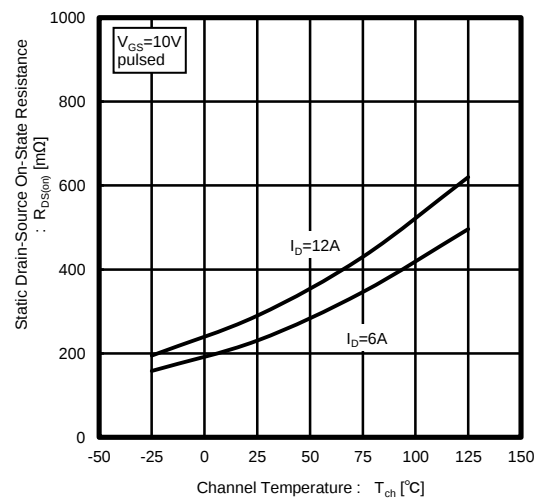


Fig.7 Forward Transfer Admittance vs. Drain Current

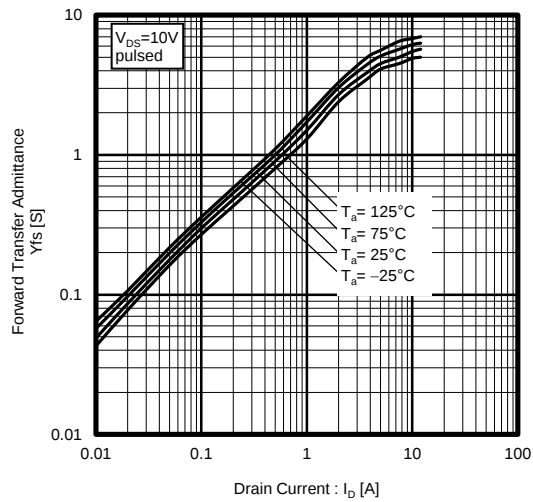


Fig.8 Source Current vs. Source-Drain Voltage

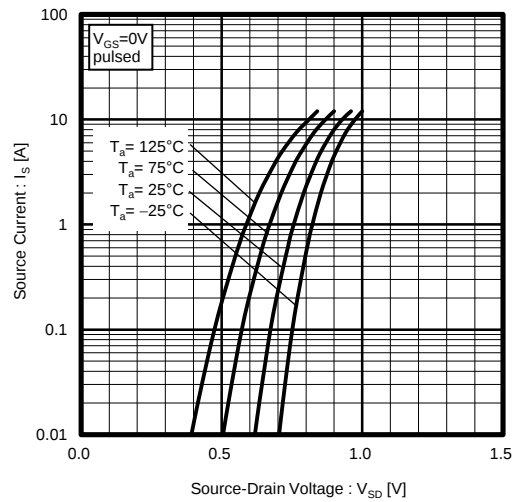


Fig.9 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

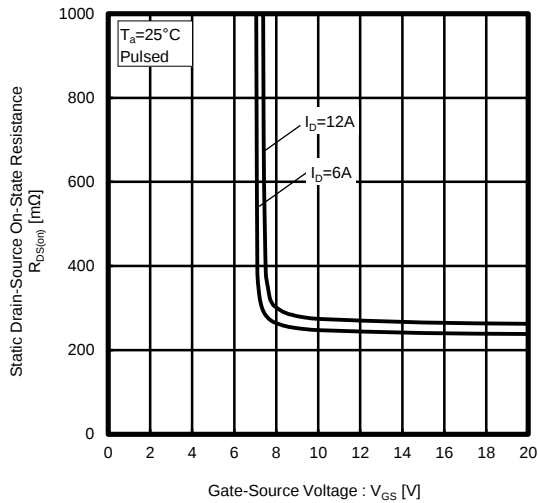


Fig.10 Switching Characteristics

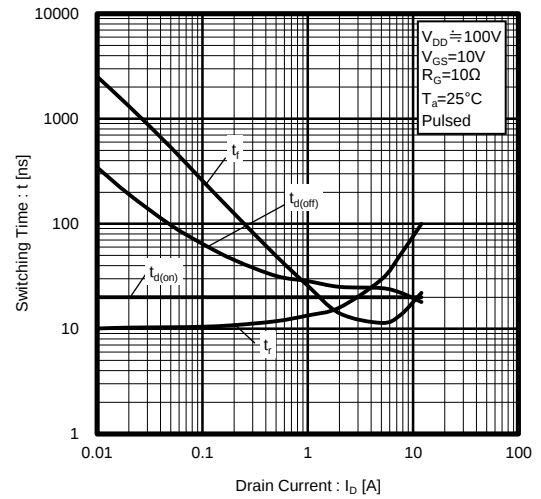


Fig.11 Dynamic Input Characteristics

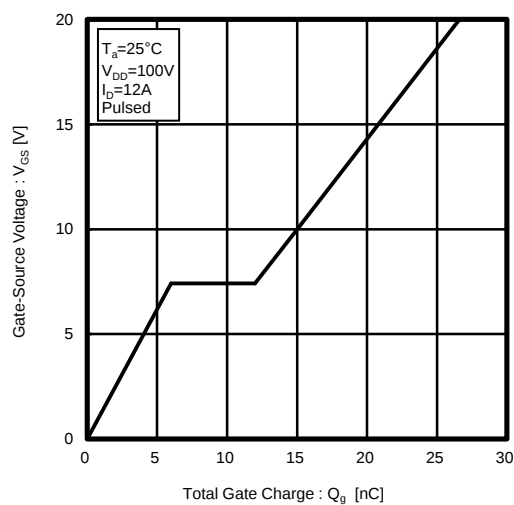
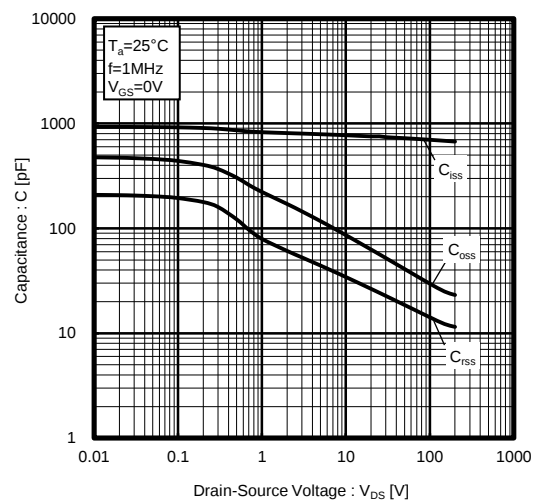


Fig.12 Typical Capacitance vs. Drain-Source Voltage



● Measurement circuits

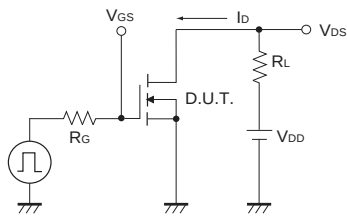


Fig.1-1 Switching Time Measurement Circuit

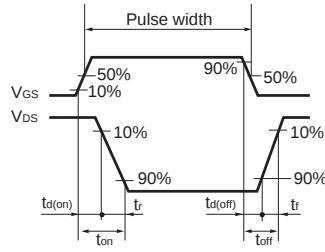


Fig.1-2 Switching Waveforms

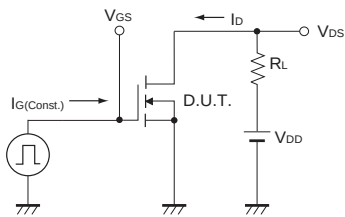


Fig.2-1 Gate Charge Measurement Circuit

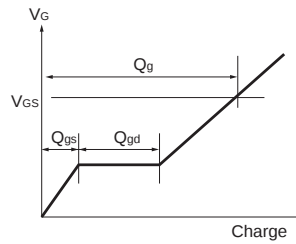


Fig.2-2 Gate Charge Waveform

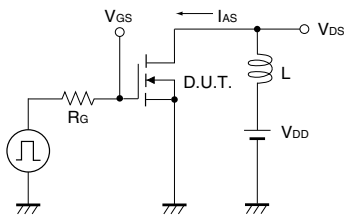


Fig.3-1 Avalanche Measurement Circuit

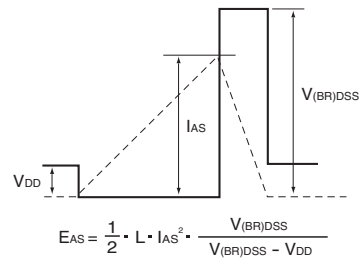


Fig.3-2 Avalanche Waveform

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