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4V Drive Nch MOSFET

RP1L055SN

● Structure

Silicon N-channel MOSFET

● Features

- 1) Low on-resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small Surface Mount Package (MPT6).

● Application

Switching

● Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	1000
RP1L055SN		○

● Absolute maximum ratings (T_a = 25°C)

Parameter	Symbol	Limits	Unit
Drain-source voltage	V _{DSS}	60	V
Gate-source voltage	V _{GSS}	±20	V
Drain current	Continuous	I _D	±5.5 A
	Pulsed	I _{DP} *1	±22 A
Source current (Body Diode)	Continuous	I _S	1.6 A
	Pulsed	I _{SP} *1	22 A
Power dissipation	P _D *2	2.0	W
Channel temperature	T _{ch}	150	°C
Range of storage temperature	T _{stg}	-55 to +150	°C

*1 P_w ≤ 10μs, Duty cycle ≤ 1%

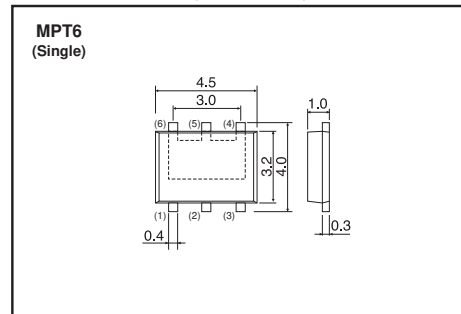
*2 Mounted on a ceramic board.

● Thermal resistance

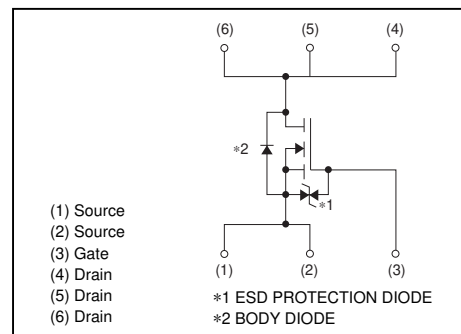
Parameter	Symbol	Limits	Unit
Channel to Ambient	R _{th(ch-a)} *	62.5	°C / W

*Mounted on a ceramic board.

● Dimensions (Unit : mm)



● Inner circuit



●Electrical characteristics (T_a = 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}	60	-	-	V	I _D =1mA, V _{GS} =0V
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} =60V, V _{GS} =0V
Gate threshold voltage	V _{GS(th)}	1.0	-	3.0	V	V _{DS} =10V, I _D =1mA
Static drain-source on-state resistance	R _{DS(on)} *	-	35	49	mΩ	I _D =5.5A, V _{GS} =10V
		-	40	56		I _D =5.5A, V _{GS} =4.5V
		-	45	63		I _D =5.5A, V _{GS} =4.0V
Forward transfer admittance	Y _{fs} *	5.0	-	-	S	I _D =5.5A, V _{DS} =10V
Input capacitance	C _{iss}	-	730	-	pF	V _{DS} =10V
Output capacitance	C _{oss}	-	180	-	pF	V _{GS} =0V
Reverse transfer capacitance	C _{rss}	-	70	-	pF	f=1MHz
Turn-on delay time	t _{d(on)} *	-	12	-	ns	I _D =2.75A, V _{DD} ≒30V
Rise time	t _r *	-	14	-	ns	V _{GS} =10V
Turn-off delay time	t _{d(off)} *	-	40	-	ns	R _L =10.9Ω
Fall time	t _f *	-	10	-	ns	R _G =10Ω
Total gate charge	Q _g *	-	14	-	nC	I _D =5.5A, V _{DD} ≒30V
Gate-source charge	Q _{gs} *	-	2.5	-	nC	V _{GS} =10V
Gate-drain charge	Q _{gd} *	-	3.0	-	nC	

*Pulsed

●Body diode characteristics (Source-Drain) (T_a = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward Voltage	V _{SD} *	-	-	1.2	V	I _S =5.5A, V _{GS} =0V

*Pulsed

●Electrical characteristic curves (Ta=25°C)

Fig.1 Typical Output Characteristics (I)

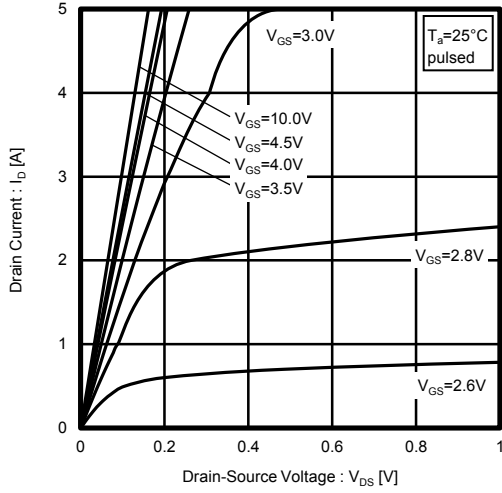


Fig.2 Typical Output Characteristics (II)

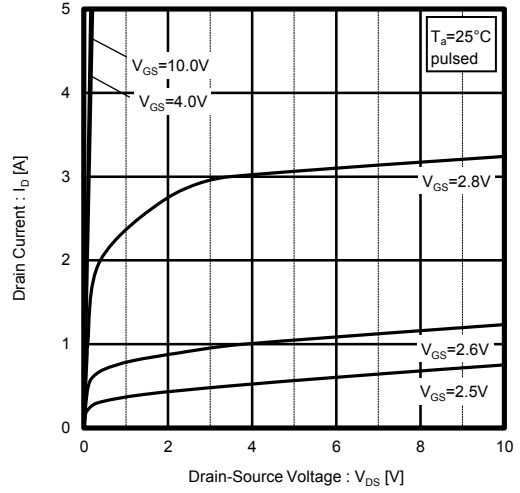


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

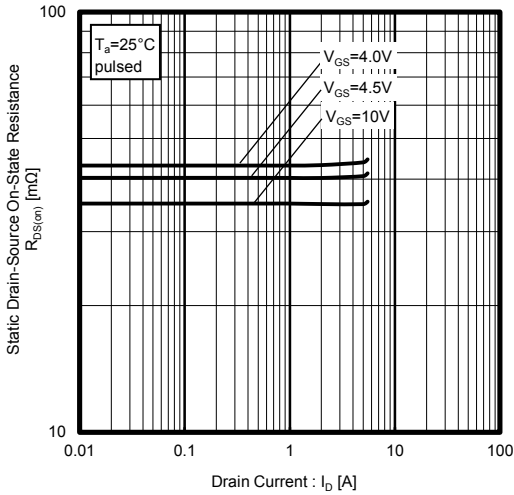


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

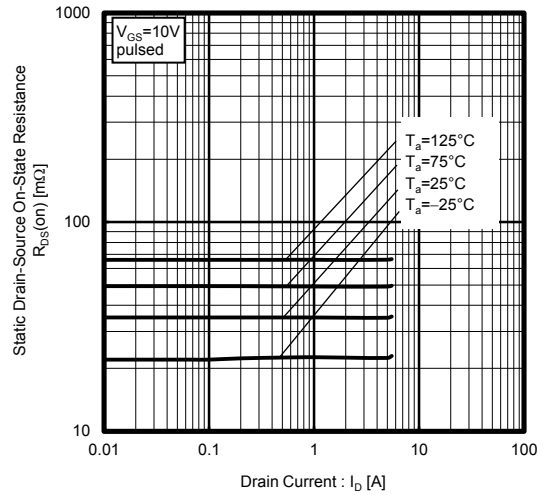


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

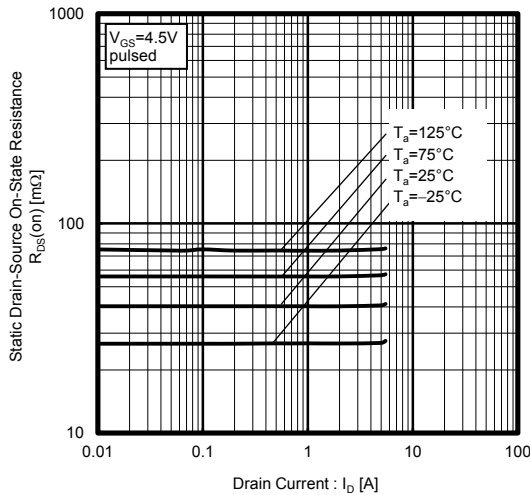


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

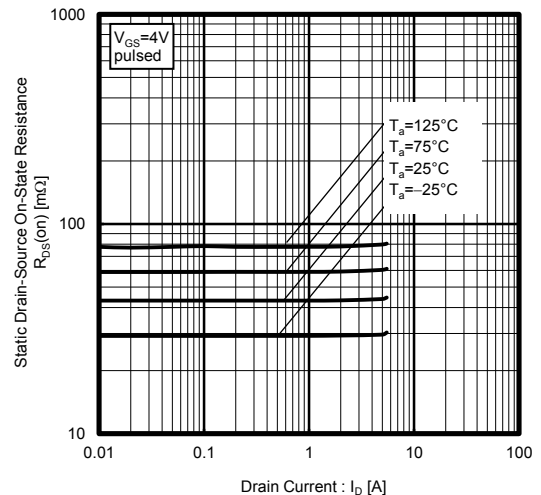


Fig.7 Forward Transfer Admittance vs. Drain Current

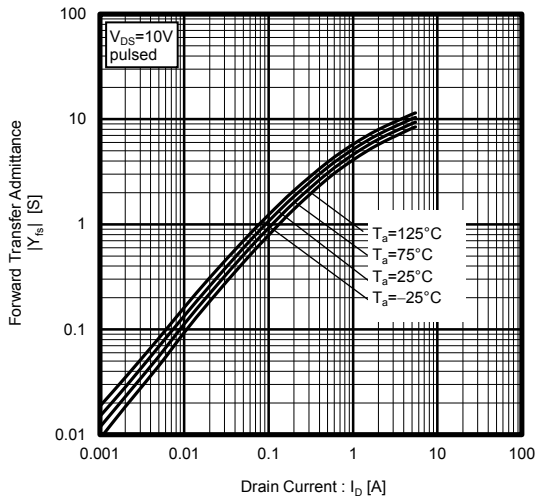


Fig.8 Typical Transfer Characteristics

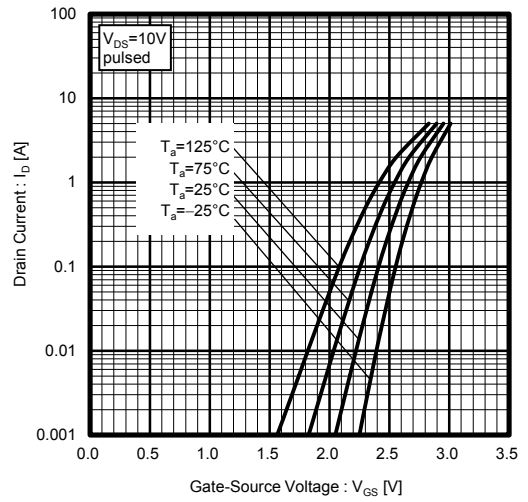


Fig.9 Source Current vs. Source-Drain Voltage

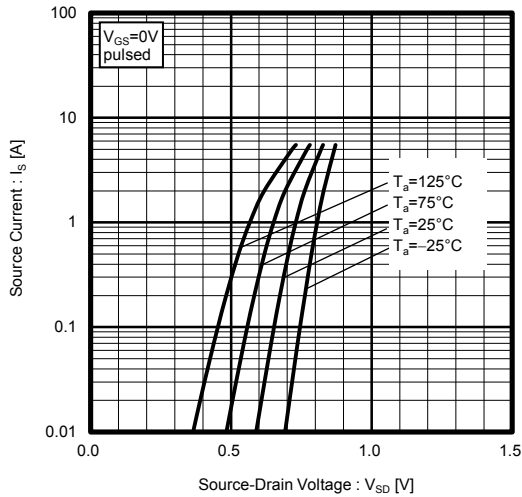


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

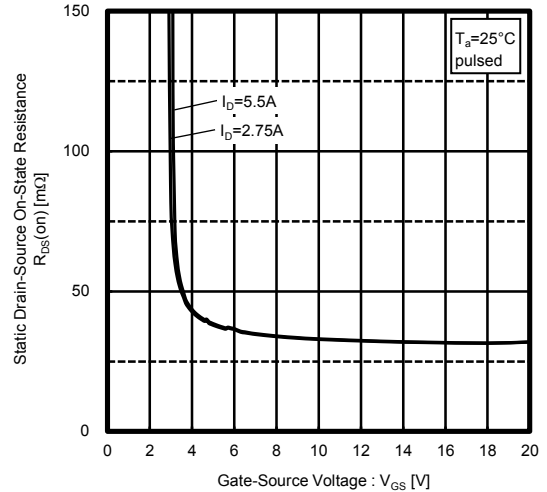


Fig.11 Switching Characteristics

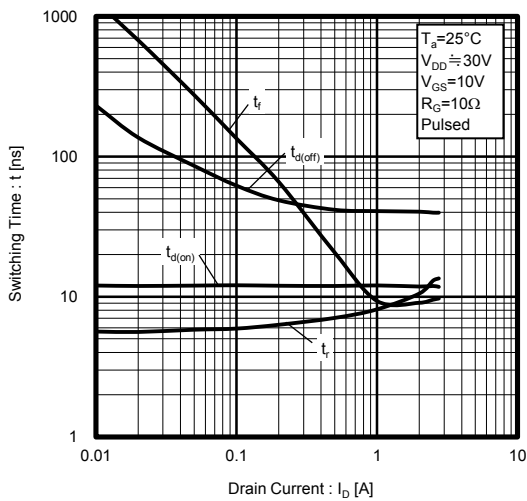


Fig.12 Dynamic Input Characteristics

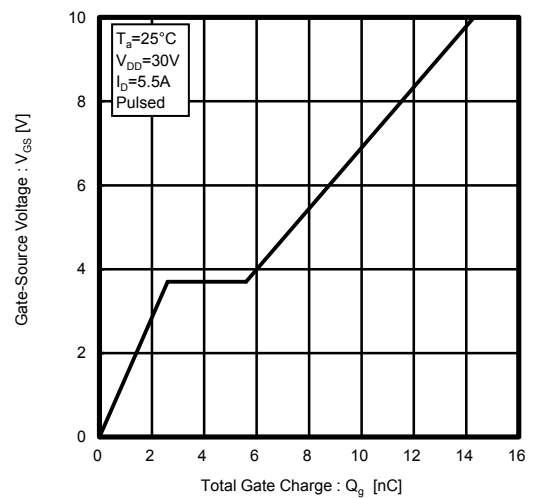


Fig.13 Typical Capacitance vs. Drain-Source Voltage

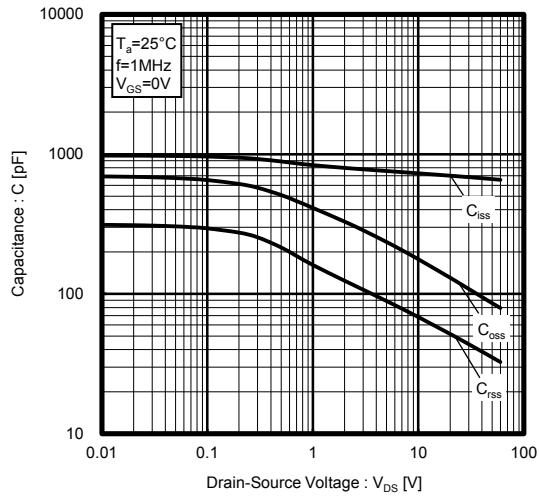


Fig.14 Maximum Safe Operating Area

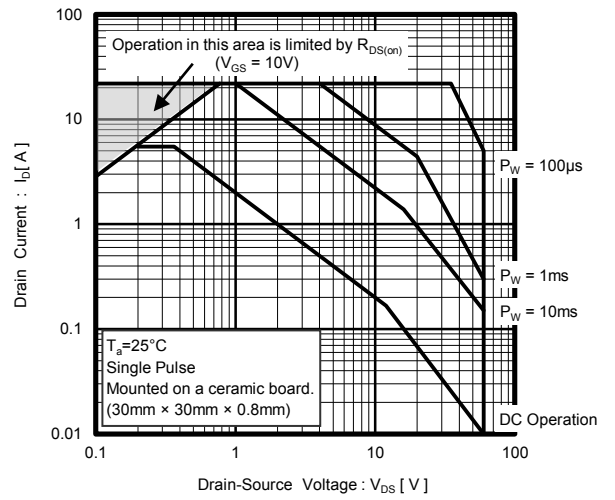
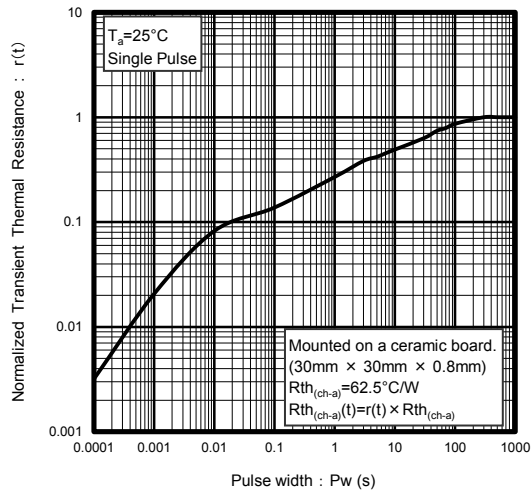


Fig.15 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

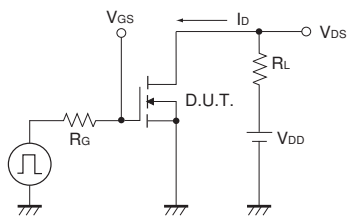


Fig.1-1 Switching Time Measurement Circuit

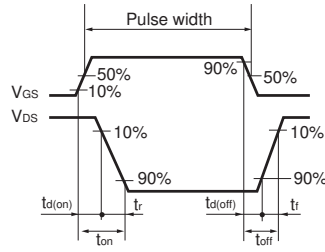


Fig.1-2 Switching Waveforms

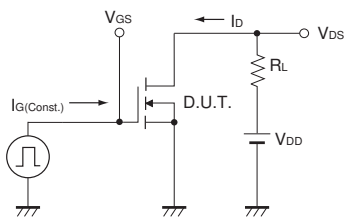


Fig.2-1 Gate Charge Measurement Circuit

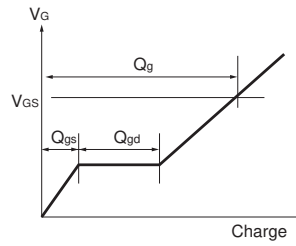


Fig.2-2 Gate Charge Waveform

Notes

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