

4V Drive Nch MOSFET

RSD050N10

●Structure

Silicon N-channel MOSFET

●Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Drive circuits can be simple.
- 3) Parallel use is easy.

●Applications

Switching

●Packaging specifications

Type	Package	CPT3
	Code	TL
	Basic ordering unit (pieces)	2500

●Absolute maximum ratings ($T_a=25^{\circ}\text{C}$)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	100	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	Continuous	I_{D}	± 5.0	A
	Pulsed	I_{DP} *1	± 20	A
Source current (Body Diode)	Continuous	I_{S}	5.0	A
	Pulsed	I_{SP} *1	20	A
Power dissipation		P_{D} *2	15	W
Channel temperature		T_{ch}	150	$^{\circ}\text{C}$
Range of storage temperature		T_{stg}	-55 to +150	$^{\circ}\text{C}$

 *1 $P_w \leq 10\mu\text{s}$, Duty cycle $\leq 1\%$

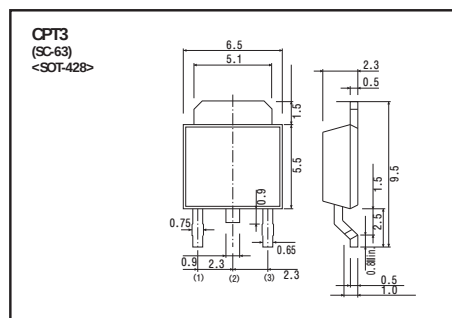
 *2 $T_c=25^{\circ}\text{C}$

●Thermal resistance

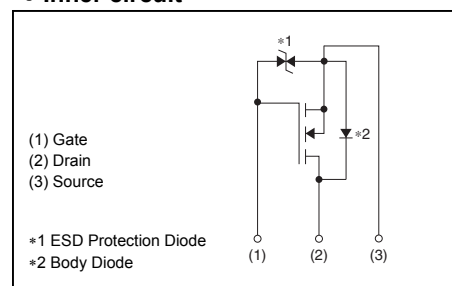
Parameter	Symbol	Limits	Unit
Channel to Case	$R_{\text{th (ch-c)}}$ *	8.33	$^{\circ}\text{C} / \text{W}$

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

●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}	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)} [*]	-	135	190	mΩ	I _D =5.0A, V _{GS} =10V
		-	142	200		I _D =5.0A, V _{GS} =4.5V
		-	145	205		I _D =5.0A, V _{GS} =4.0V
Forward transfer admittance	Y _{fs} [*]	2.5	-	-	S	I _D =5.0A, V _{DS} =10V
Input capacitance	C _{iss}	-	530	-	pF	V _{DS} =25V
Output capacitance	C _{oss}	-	50	-	pF	V _{GS} =0V
Reverse transfer capacitance	C _{rss}	-	30	-	pF	f=1MHz
Turn-on delay time	t _{d(on)} [*]	-	10	-	ns	I _D =2.5A, V _{DD} = 50V
Rise time	t _r [*]	-	15	-	ns	V _{GS} =10V
Turn-off delay time	t _{d(off)} [*]	-	45	-	ns	R _L =20Ω
Fall time	t _f [*]	-	15	-	ns	R _G =10Ω
Total gate charge	Q _g [*]	-	14	-	nC	V _{DD} = 50V
Gate-source charge	Q _{gs} [*]	-	1.7	-	nC	I _D =5.0A,
Gate-drain charge	Q _{gd} [*]	-	3.0	-	nC	V _{GS} =10V

*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 =5.0A, V _{GS} =0V

*Pulsed

●Electrical characteristic curves ($T_a=25^\circ\text{C}$)

Fig.1 Typical Output Characteristics (I)

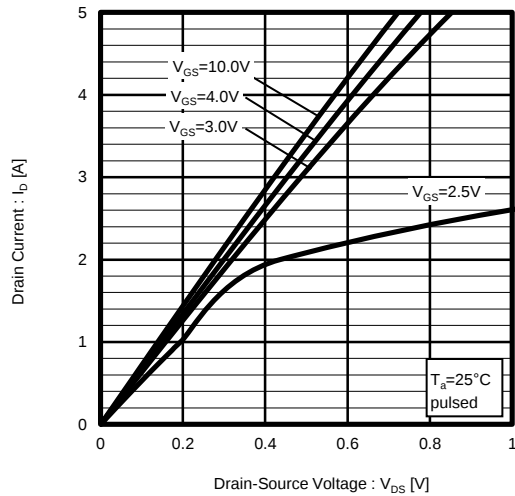


Fig.2 Typical Output Characteristics (II)

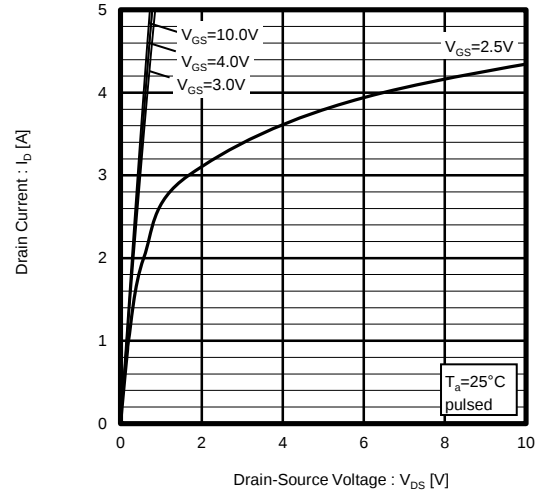


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

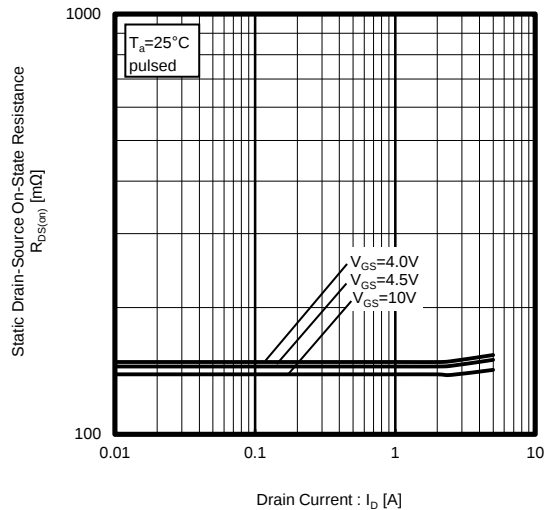


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

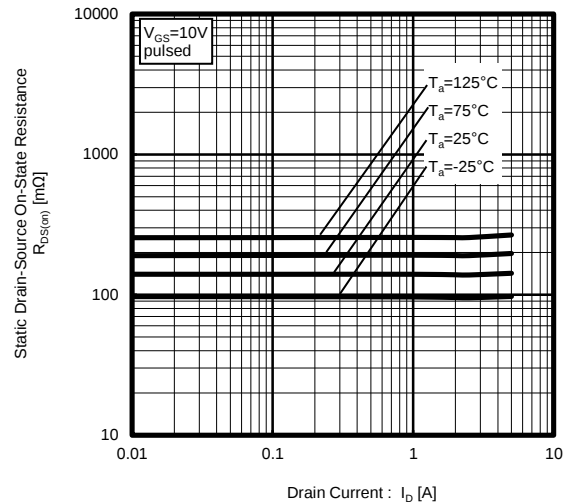


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

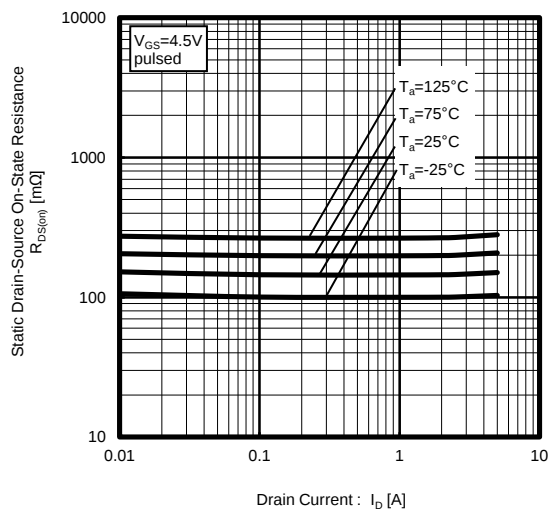


Fig.6 Static Drain-Source On-State Resistance vs. Drain Current

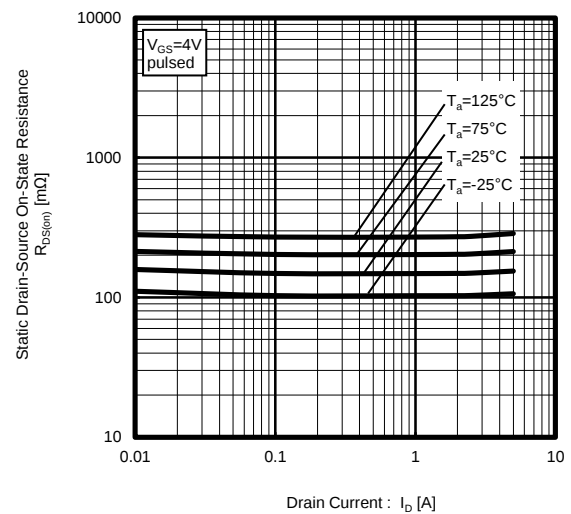


Fig.7 Forward Transfer Admittance vs. Drain Current

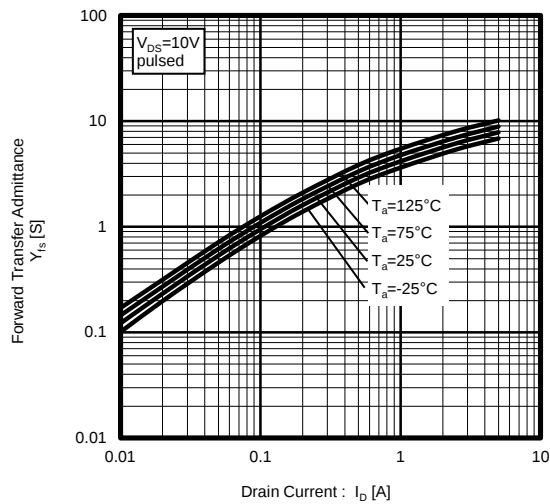


Fig.8 Typical Transfer Characteristics

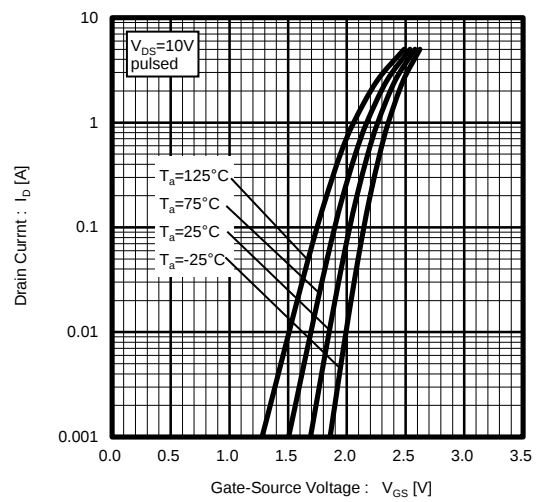


Fig.9 Source Current vs. Source-Drain Voltage

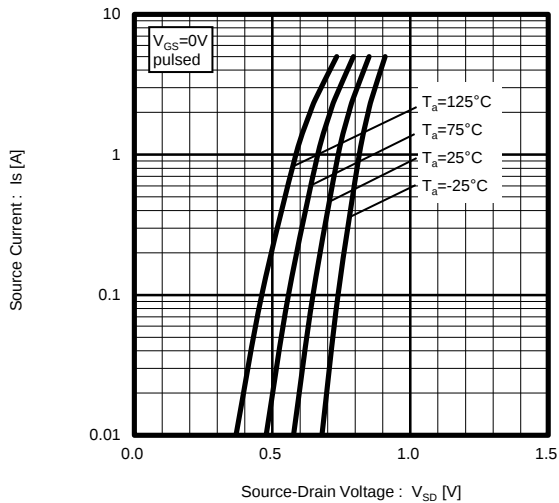


Fig.10 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

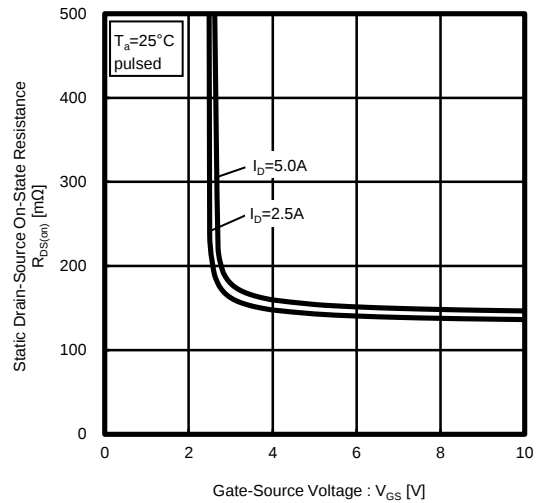


Fig.11 Switching Characteristics

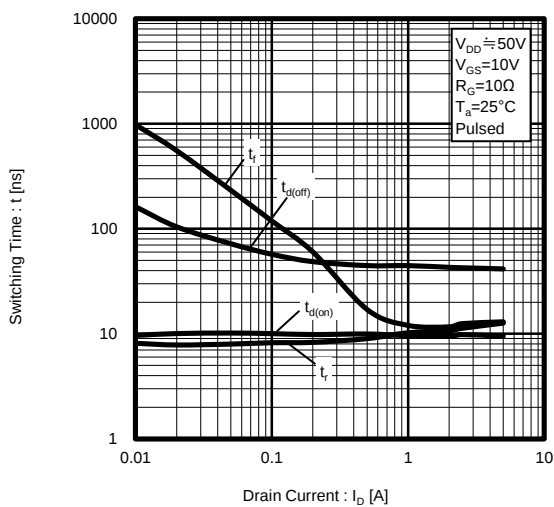


Fig.12 Dynamic Input Characteristics

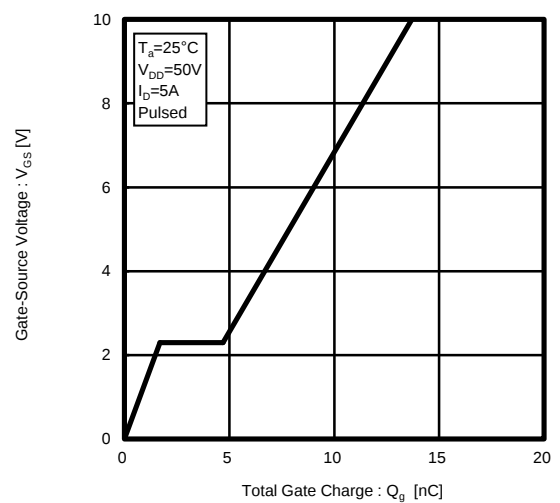


Fig.13 Typical Capacitance vs. Drain-Source Voltage

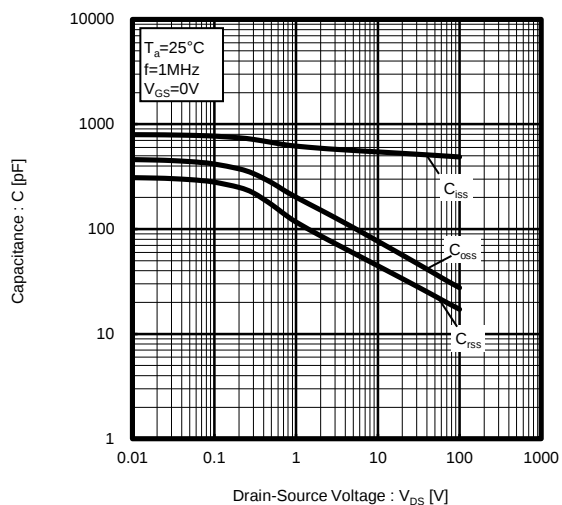


Fig.14 Maximum Safe Operating Area

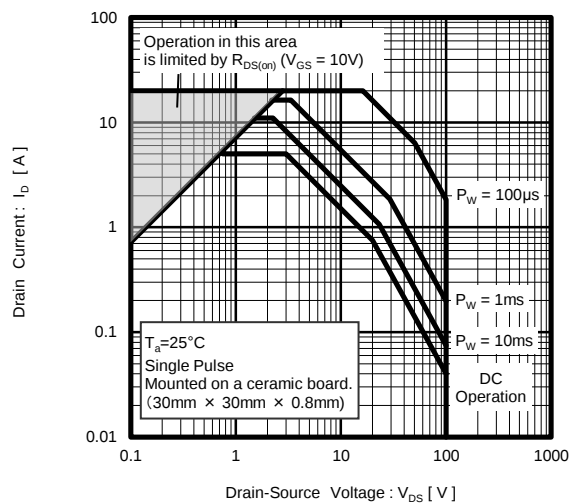
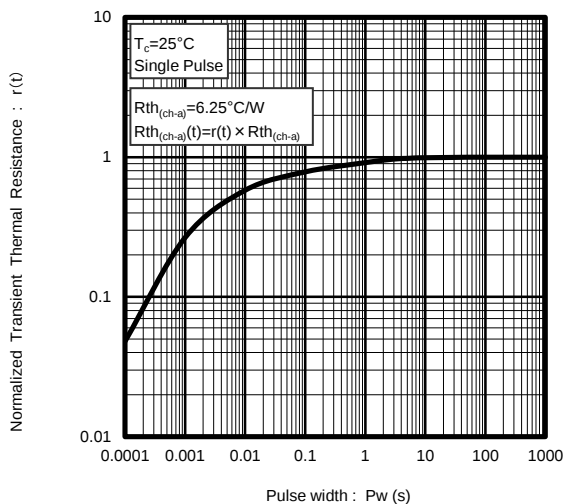


Fig.15 Normalized Transient Thermal Resistance v.s. Pulse Width



● Measurement circuits

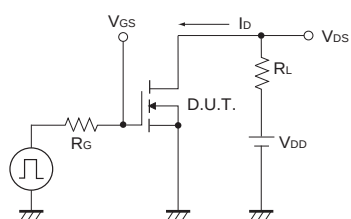


Fig.1-1 Switching time measurement circuit

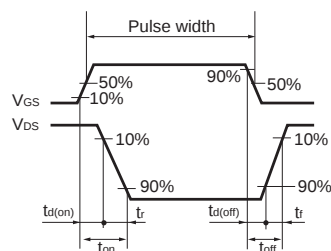


Fig.1-2 Switching waveforms

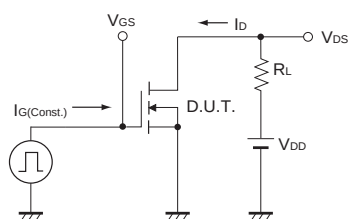


Fig.2-1 Gate charge measurement circuit

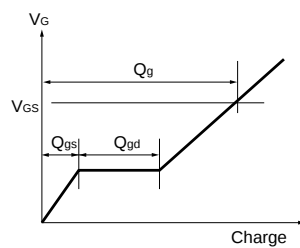


Fig.2-2 Gate Charge Waveform

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