

2.5V Drive Pch MOS FET

RTR020P02

●Structure

Silicon P-channel MOS FET

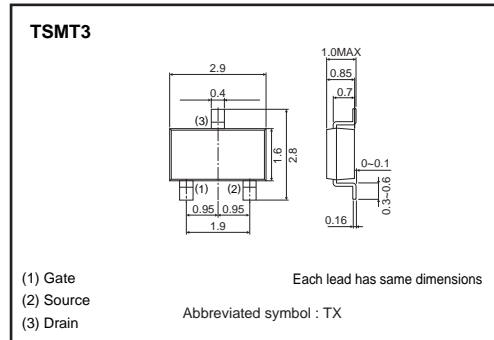
●Features

- 1) Low On-resistance.
- 2) Built-in G-S Protection Diode.
- 3) Small Surface Mount Package (TSMT3).

●Application

Power switching, DC / DC converter.

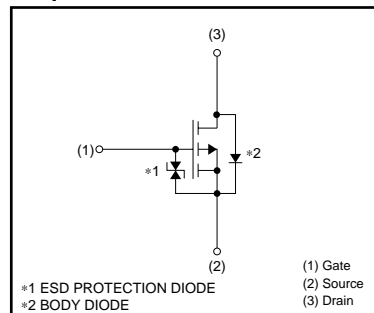
●External dimensions (Unit : mm)



●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	3000
RTR020P02		○

●Equivalent circuit



●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit	
Drain-source voltage	V_{DSS}	-20	V	
Gate-source voltage	V_{GSS}	± 12	V	
Drain current	Continuous	I_D	± 2.0	A
	Pulsed	I_{DP} *1	± 8.0	A
Source current (Body diode)	Continuous	I_S	-0.8	A
	Pulsed	I_{SP} *1	-3.2	A
Total power dissipation	P_D *2	1.0	W	
Channel temperature	T_{ch}	150	°C	
Range of Storage temperature	T_{stg}	-55 to +150	°C	

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

*2 Mounted on a ceramic board

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	$R_{th}(ch-a)$ *	125	°C / W

* Mounted on a ceramic board.

Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	–	–	± 10	μA	$V_{GS}=\pm 12V, V_{DS}=0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	–20	–	–	V	$I_D = -1mA, V_{GS}=0V$
Zero gate voltage drain current	I_{DSS}	–	–	–1	μA	$V_{DS} = -20V, V_{GS}=0V$
Gate threshold voltage	$V_{GS(th)}$	–0.7	–	–2.0	V	$V_{DS} = -10V, I_D = -1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	–	100	135	m Ω	$I_D = -2.0A, V_{GS} = -4.5V$
		–	110	150	m Ω	$I_D = -2.0A, V_{GS} = -4.0V$
		–	180	250	m Ω	$I_D = -1.0A, V_{GS} = -2.5V$
Forward transfer admittance	$ Y_{fs} $ *	1.2	–	–	S	$V_{DS} = -10V, I_D = -1.0A$
Input capacitance	C_{iss}	–	430	–	pF	$V_{DS} = -10V$
Output capacitance	C_{oss}	–	80	–	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	–	55	–	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	–	11	–	ns	$I_D = -1.0A$
Rise time	t_r *	–	13	–	ns	$V_{DD} = -15V$
Turn-off delay time	$t_{d(off)}$ *	–	38	–	ns	$V_{GS} = -4.5V$
Fall time	t_f *	–	12	–	ns	$R_L=15\Omega$ $R_G=10\Omega$
Total gate charge	Q_g	–	4.9	–	nC	$V_{DD} = -15V$
Gate-source charge	Q_{gs}	–	1.2	–	nC	$V_{GS} = -4.5V$
Gate-drain charge	Q_{gd}	–	1.3	–	nC	$I_D = -2.0A$

*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V_{SD}	–	–	–1.2	V	$I_S = -0.8A, V_{GS}=0V$

Transistors

●Electrical characteristic curves

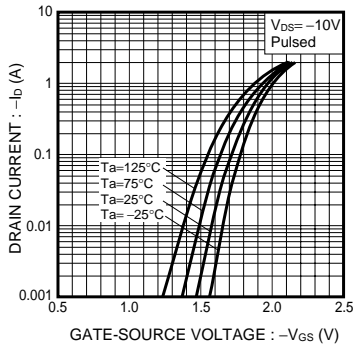


Fig.1 Typical Transfer Characteristics

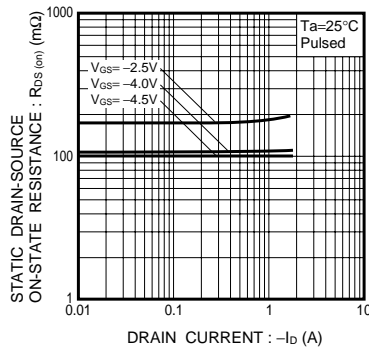


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

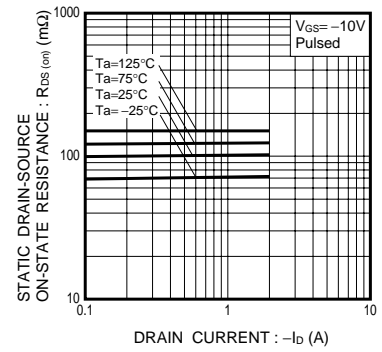


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

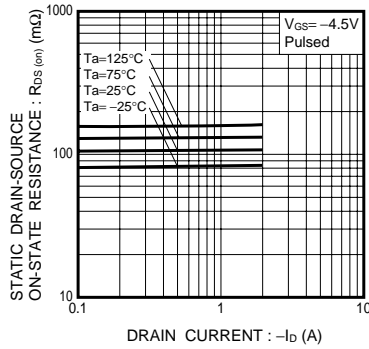


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

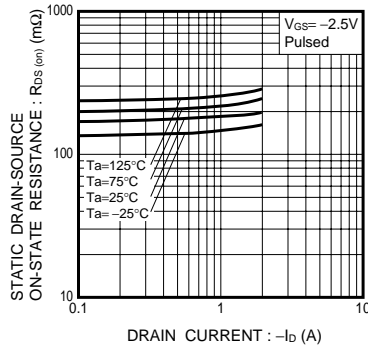


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

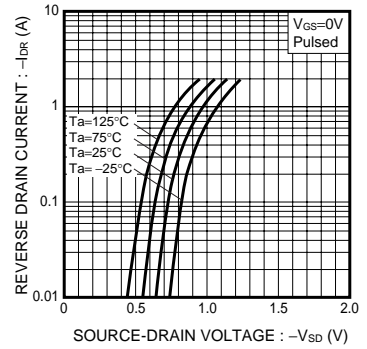


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

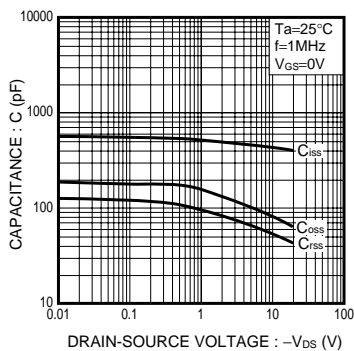


Fig.7 Typical Capacitance vs. Drain-Source Voltage

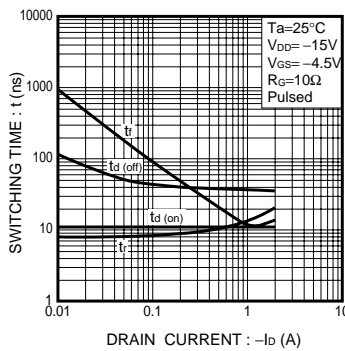


Fig.8 Switching Characteristics

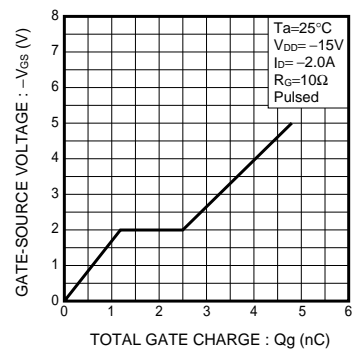


Fig.9 Dynamic Input Characteristics

Transistors

●Measurement circuits

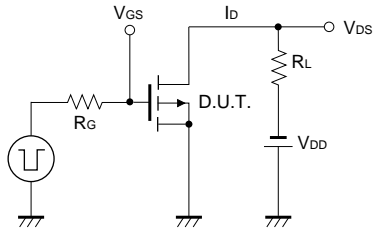


Fig.10 Switching Time Test Circuit

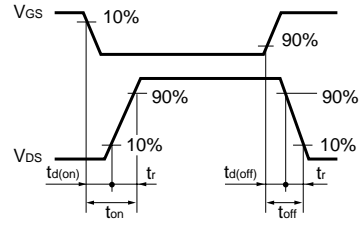


Fig.11 Switching Time Waveforms

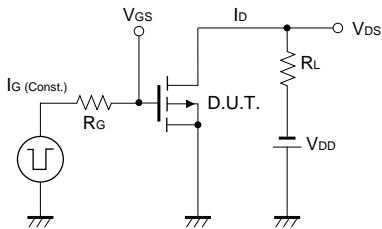


Fig.12 Gate Charge Test Circuit

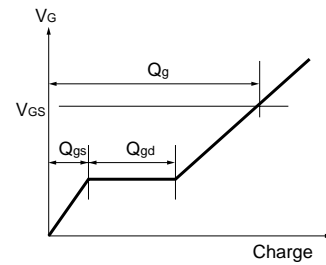


Fig.13 Gate Charge Waveform

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