

2.5V Drive Pch MOS FET

RTR020P02

●Structure

Silicon P-channel MOS FET

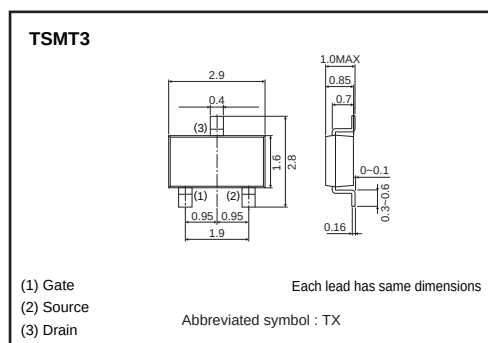
●Features

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

●Application

Power switching, DC / DC converter.

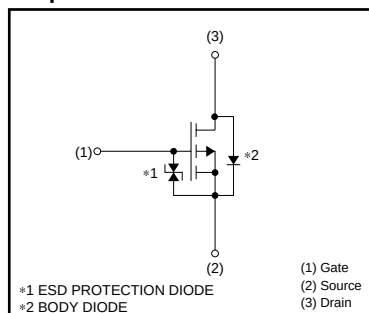
●External dimensions (Unit : mm)



●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
	Pulsed	I_{DP} *1	±8.0
Source current (Body diode)	Continuous	I_S	-0.8
	Pulsed	I_{SP} *1	-3.2
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	$V_{GS}=±12V$, $V_{DS}=0V$
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	mΩ	$I_D = -2.0A$, $V_{GS} = -4.5V$
		—	110	150	mΩ	$I_D = -2.0A$, $V_{GS} = -4.0V$
		—	180	250	mΩ	$I_D = -1.0A$, $V_{GS} = -2.5V$
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	$R_L=15Ω$ $R_G=10Ω$
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

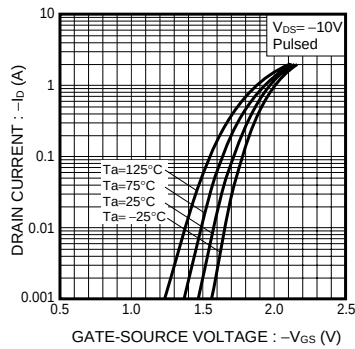


Fig.1 Typical Transfer Characteristics

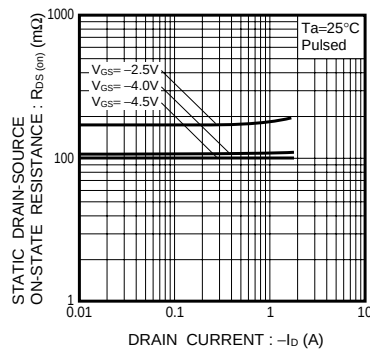


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

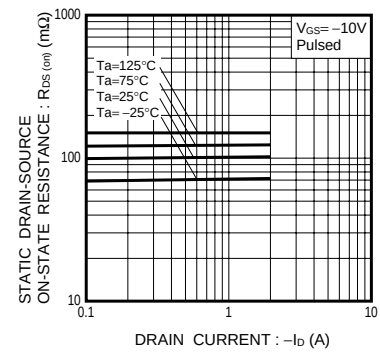


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

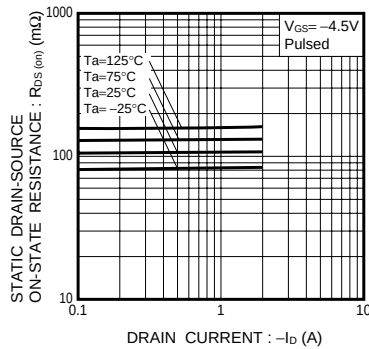


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

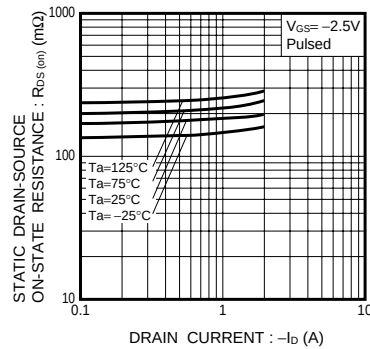


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

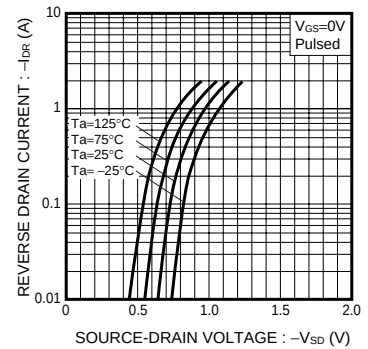


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

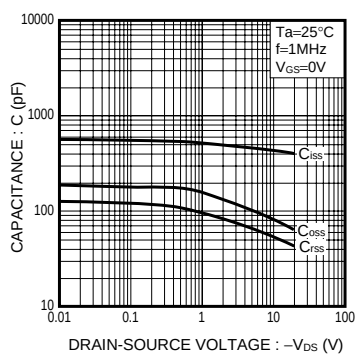


Fig.7 Typical Capacitance vs. Drain-Source Voltage

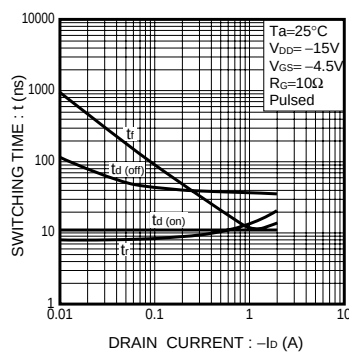


Fig.8 Switching Characteristics

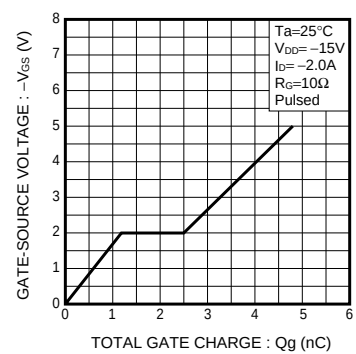


Fig.9 Dynamic Input Characteristics

Transistors

●Measurement circuits

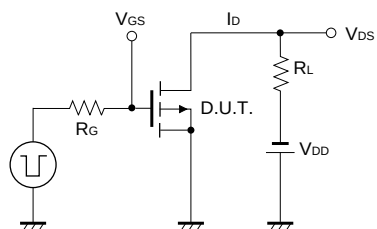


Fig.10 Switching Time Test Circuit

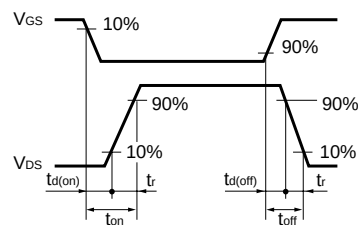


Fig.11 Switching Time Waveforms

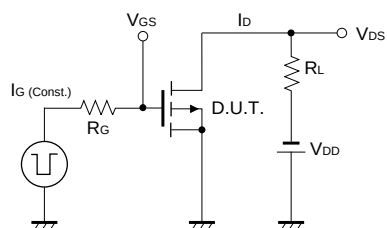


Fig.12 Gate Charge Test Circuit

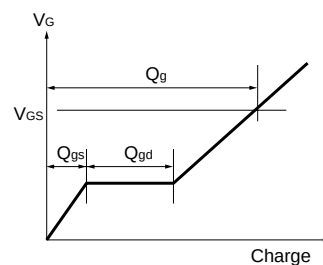


Fig.13 Gate Charge Waveform

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