

# 2.5V Drive Pch MOS FET

## RTR020P02

### ●Structure

Silicon P-channel MOS FET

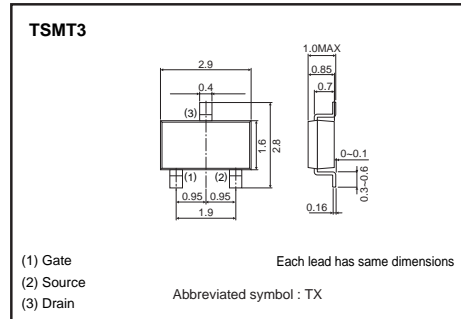
### ●Features

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

### ●Application

Power switching, DC / DC converter.

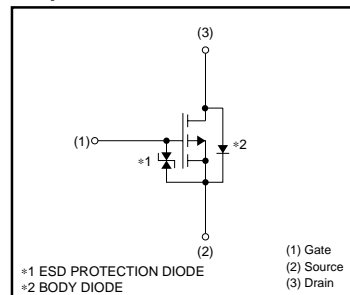
### ●External dimensions (Unit : mm)



### ●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	$V_{DS}$	-20	V	
Gate-source voltage	$V_{GS}$	±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 <sub>GSS</sub>	-	-	±10	μA	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V
Drain-source breakdown voltage	V <sub>(BR) DSS</sub>	-20	-	-	V	I <sub>D</sub> = -1mA, V <sub>GS</sub> =0V
Zero gate voltage drain current	I <sub>DSS</sub>	-	-	-1	μA	V <sub>DS</sub> = -20V, V <sub>GS</sub> =0V
Gate threshold voltage	V <sub>GS(th)</sub>	-0.7	-	-2.0	V	V <sub>DS</sub> = -10V, I <sub>D</sub> = -1mA
Static drain-source on-state resistance	R <sub>DS(on)</sub> *	-	100	135	mΩ	I <sub>D</sub> = -2.0A, V <sub>GS</sub> = -4.5V
		-	110	150	mΩ	I <sub>D</sub> = -2.0A, V <sub>GS</sub> = -4.0V
		-	180	250	mΩ	I <sub>D</sub> = -1.0A, V <sub>GS</sub> = -2.5V
Forward transfer admittance	Y <sub>fs</sub>  *	1.2	-	-	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -1.0A
Input capacitance	C <sub>iss</sub>	-	430	-	pF	V <sub>DS</sub> = -10V
Output capacitance	C <sub>oss</sub>	-	80	-	pF	V <sub>GS</sub> =0V
Reverse transfer capacitance	C <sub>rss</sub>	-	55	-	pF	f=1MHz
Turn-on delay time	t <sub>d(on)</sub> *	-	11	-	ns	I <sub>D</sub> = -1.0A
Rise time	t <sub>r</sub> *	-	13	-	ns	V <sub>DD</sub> ≐ -15V
Turn-off delay time	t <sub>d(off)</sub> *	-	38	-	ns	V <sub>GS</sub> = -4.5V
Fall time	t <sub>f</sub> *	-	12	-	ns	R <sub>L</sub> =15Ω
Total gate charge	Q <sub>g</sub>	-	4.9	-	nC	V <sub>DD</sub> ≐ -15V
Gate-source charge	Q <sub>gs</sub>	-	1.2	-	nC	V <sub>GS</sub> = -4.5V
Gate-drain charge	Q <sub>gd</sub>	-	1.3	-	nC	I <sub>D</sub> = -2.0A

\*Pulsed

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Forward voltage	V <sub>SD</sub>	-	-	-1.2	V	I <sub>S</sub> = -0.8A, V <sub>GS</sub> =0V

Transistors

● Electrical characteristic curves

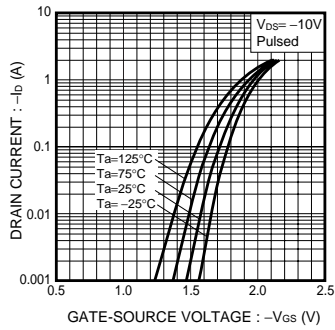


Fig.1 Typical Transfer Characteristics

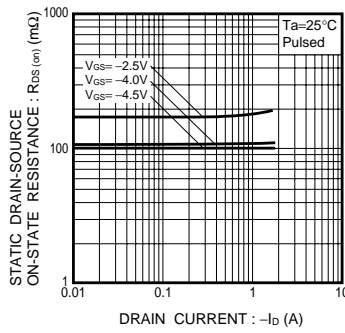


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

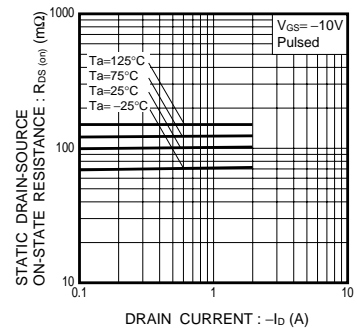


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

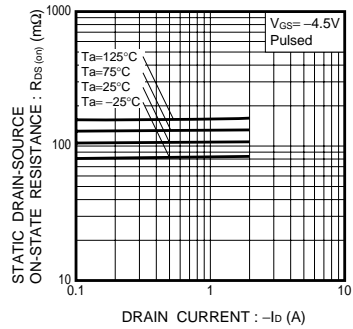


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

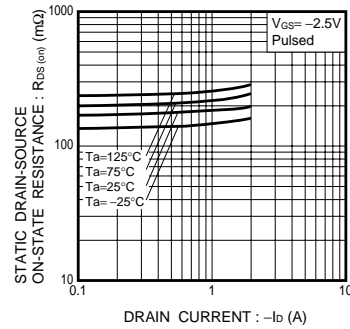


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

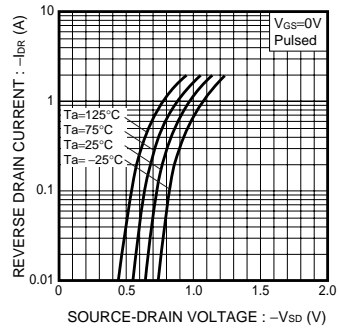


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

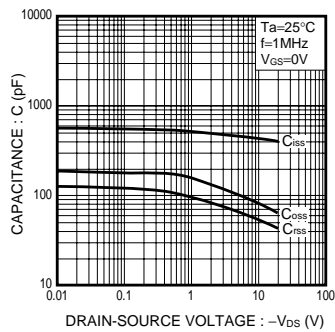


Fig.7 Typical Capacitance vs. Drain-Source Voltage

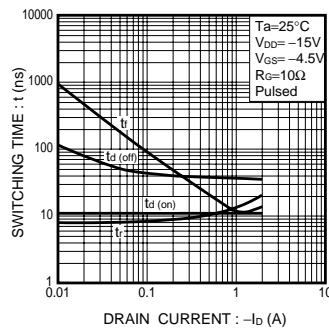


Fig.8 Switching Characteristics

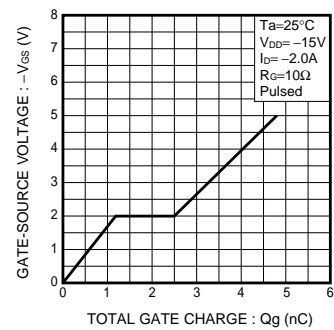


Fig.9 Dynamic Input Characteristics

Transistors

●Measurement circuits

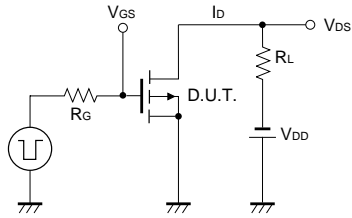


Fig.10 Switching Time Test Circuit

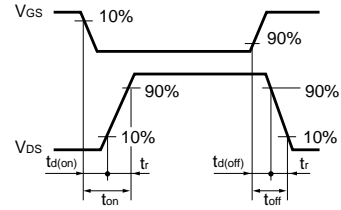


Fig.11 Switching Time Waveforms

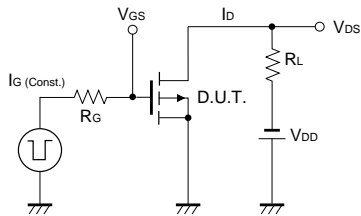


Fig.12 Gate Charge Test Circuit

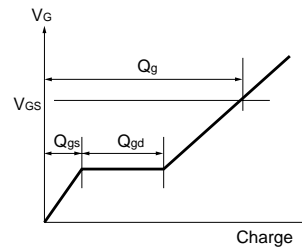


Fig.13 Gate Charge Waveform

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