

# 2.5V Drive Pch MOSFET

## RTL020P02

### ●Structure

Silicon P-channel  
MOSFET

### ●Features

- 1) Low on-resistance. (180mΩ at 2.5V)
- 2) High power package.
- 3) High speed switching.
- 4) Low voltage drive. (2.5V)

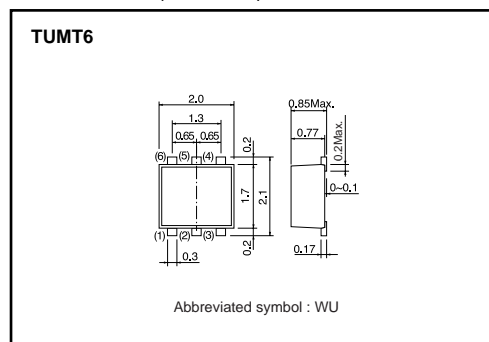
### ●Applications

DC-DC converter

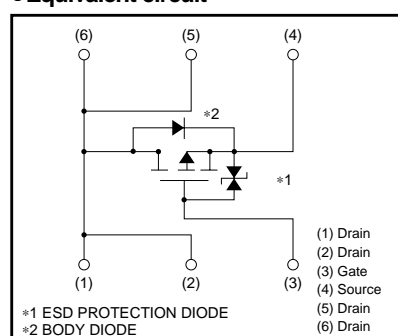
### ●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RTL020P02		○

### ●Dimensions (Unit : mm)



### ●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	A
	Pulsed	$I_{DP}$ *1	±8	A
Source current (Body diode)	Continuous	$I_S$	-0.8	A
	Pulsed	$I_{SP}$ *1	-8	A
Total power dissipation		$P_D$ *2	1	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	$I_{GSS}$	—	—	$\pm 10$	$\mu A$	$V_{GS} = \pm 12V$ , $V_{DS} = 0V$
Drain-source breakdown voltage	$V_{(BR) DSS}$	-20	—	—	V	$I_D = -1mA$ , $V_{GS} = 0V$
Zero gate voltage drain current	$I_{DSS}$	—	—	-1	$\mu A$	$V_{DS} = -20V$ , $V_{GS} = 0V$
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	$m\Omega$	$I_D = -2A$ , $V_{GS} = -4.5V$
		—	110	150	$m\Omega$	$I_D = -2A$ , $V_{GS} = -4V$
		—	180	250	$m\Omega$	$I_D = -1A$ , $V_{GS} = -2.5V$
Forward transfer admittance	$ Y_{fs} $	1.2	—	—	S	$V_{DS} = -10V$ , $I_D = -1A$
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	$I_D = -1A$
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	$R_L = 15\Omega$
Total gate charge	$Q_g$	—	4.9	—	nC	$V_{DD} = -15V$ $R_L = 7.5\Omega$
Gate-source charge	$Q_{gs}$	—	1.2	—	nC	$V_{GS} = -4.5V$ $R_G = 10\Omega$
Gate-drain charge	$Q_{gd}$	—	1.3	—	nC	$I_D = -2A$

\*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

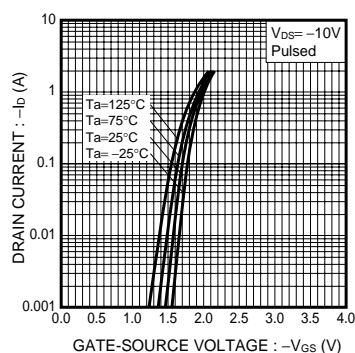


Fig.1 Typical Transfer Characteristics

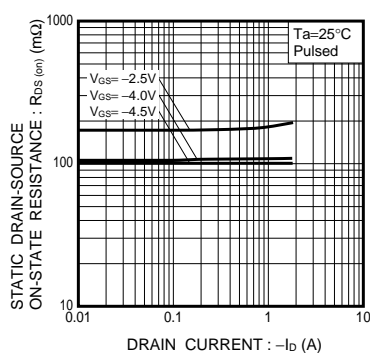


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

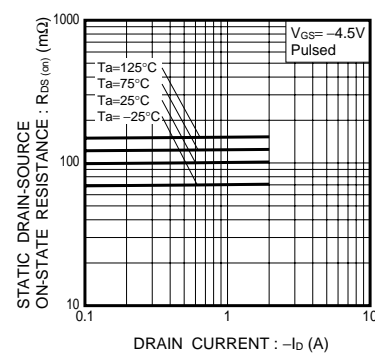


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

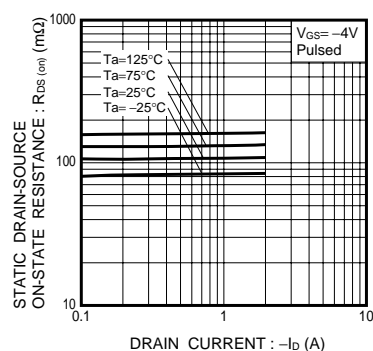


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

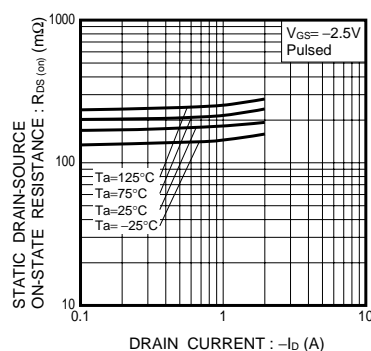


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

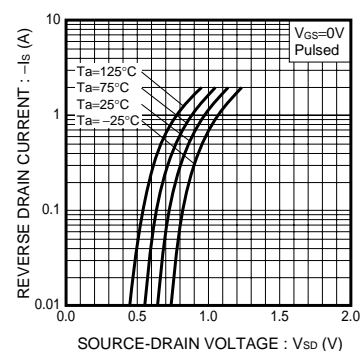


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

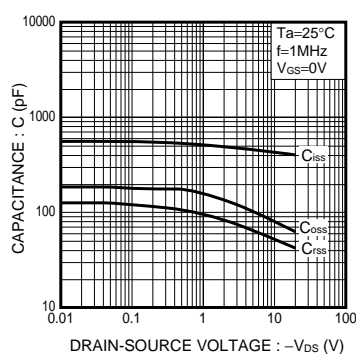


Fig.7 Typical Capacitance vs. Drain-Source Voltage

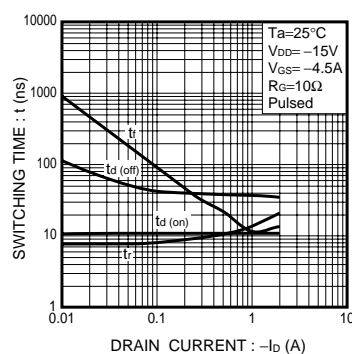


Fig.8 Switching Characteristics

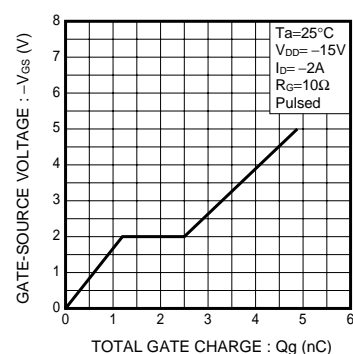


Fig.9 Dynamic Input Characteristics

## Transistors

### ●Measurement circuits

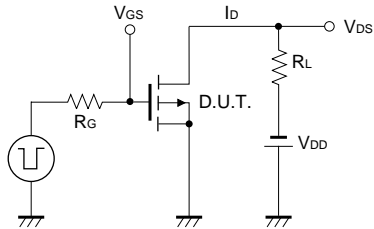


Fig.10 Switching Time Measurement Circuit

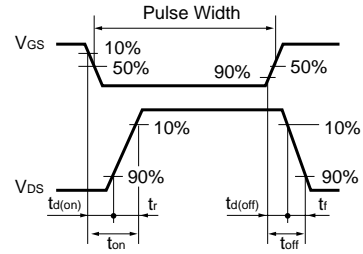


Fig.11 Switching Waveforms

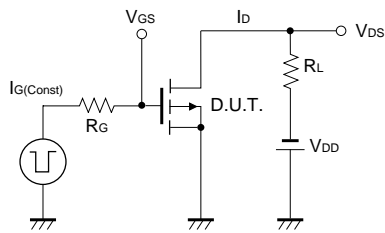


Fig.12 Gate Charge Measurement Circuit

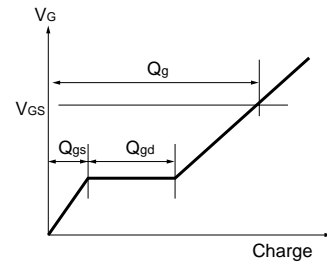


Fig.13 Gate Charge Waveforms

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