

Switching (−20V, −2.5A)

RTR025P02

●Features

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

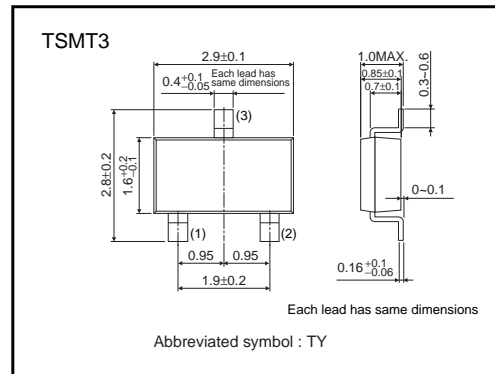
●Application

Power switching, DC / DC converter.

●Structure

Silicon P-channel
MOS FET

●External dimensions (Unit : mm)



●Packaging specifications

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	3000
RTR025P02		○

●Absolute maximum ratings (Ta=25°C)

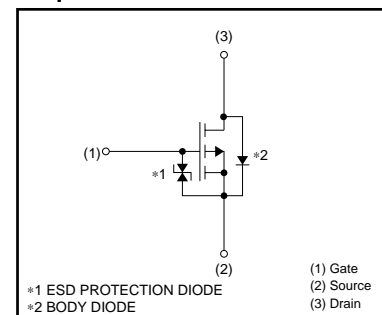
Parameter	Symbol	Limits	Unit	
Drain-source voltage	V_{DSS}	−20	V	
Gate-source voltage	V_{GSS}	±12	V	
Drain current	Continuous	I_D	±2.5	A
	Pulsed	I_{DP} *1	±10	A
Source current (Body diode)	Continuous	I_S	−0.8	A
	Pulsed	I_{SP} *1	−3.2	A
Total power dissipation	P_D *2	1.0	W	
Channel temperature	T_{ch}	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 (Ta=25°C)

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

●Equivalent circuit



*1 ESD PROTECTION DIODE
*2 BODY DIODE

(1) Gate
(2) Source
(3) Drain

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	$R_{DS(on)}$ *	–	70	95	m Ω	$I_D = -2.5A, V_{GS} = -4.5V$
		–	75	105	m Ω	$I_D = -2.5A, V_{GS} = -4.0V$
		–	115	160	m Ω	$I_D = -1.25A, V_{GS} = -2.5V$
Forward transfer admittance	$ Y_{fs} $ *	2.3	–	–	S	$V_{DS} = -10V, I_D = -1.2A$
Input capacitance	C_{iss}	–	630	–	pF	$V_{DS} = -10V$
Output capacitance	C_{oss}	–	110	–	pF	$V_{GS}=0V$
Reverse transfer capacitance	C_{rss}	–	75	–	pF	$f=1MHz$
Turn-on delay time	$t_{d(on)}$ *	–	12	–	ns	$I_D = -1.25A$
Rise time	t_r *	–	18	–	ns	$V_{DD} = -15V$
Turn-off delay time	$t_{d(off)}$ *	–	50	–	ns	$V_{GS} = -4.5V$
Fall time	t_f *	–	20	–	ns	$R_L=12\Omega$ $R_{GS}=10\Omega$
Total gate charge	Q_g	–	7	–	nC	$V_{DD} = -15V$
Gate-source charge	Q_{gs}	–	1.5	–	nC	$V_{GS} = -4.5V$
Gate-drain charge	Q_{gd}	–	2.0	–	nC	$I_D = -2.5A$

*Pulsed

Body diode characteristics (source-drain characteristics)

Forward voltage	V_{SD}	–	–	–1.2	V	$I_S = -0.8A, V_{GS}=0V$
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Transistors

●Electrical characteristic curves

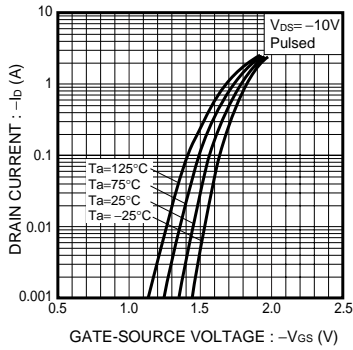


Fig.1 Typical Transfer Characteristics

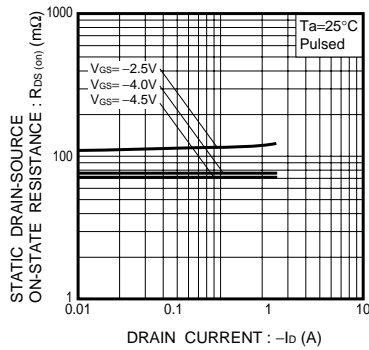


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

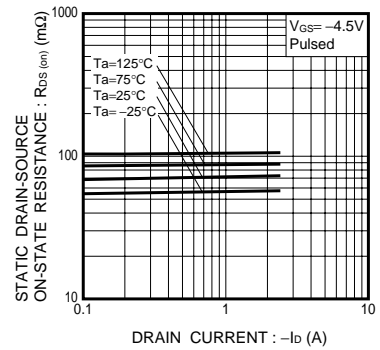


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

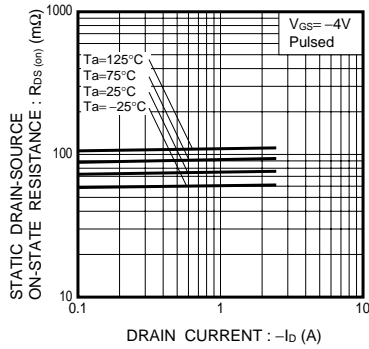


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

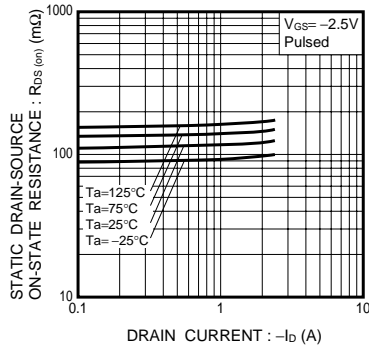


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

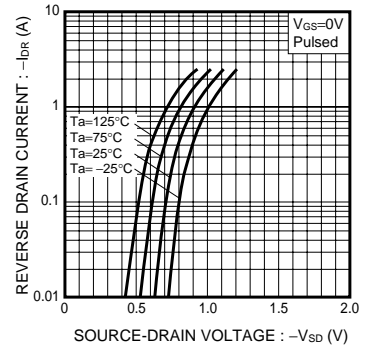


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

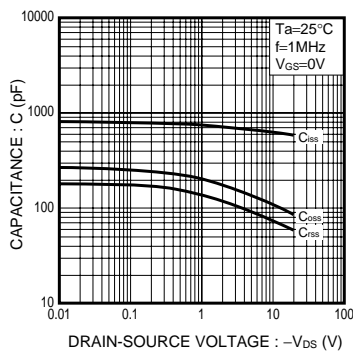


Fig.7 Typical Capacitance vs. Drain-Source Voltage

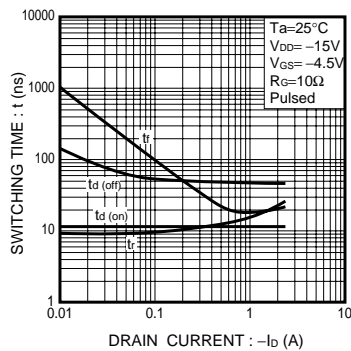


Fig.8 Switching Characteristics

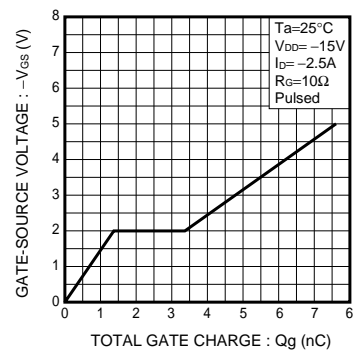


Fig.9 Dynamic Input Characteristics

Transistors

●Measurement circuits

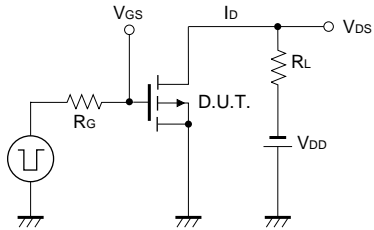


Fig.10 Switching Time Test Circuit

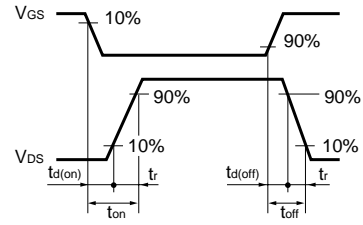


Fig.11 Switching Time Waveforms

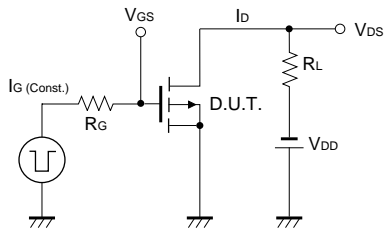


Fig.12 Gate Charge Test Circuit

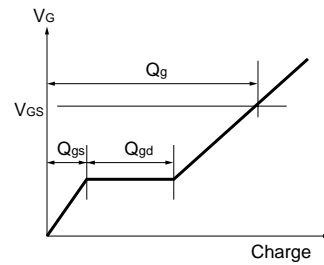


Fig.13 Gate Charge Waveform

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