DC-DC Converter (–20V, –1.0A)

RTF010P02

●Features

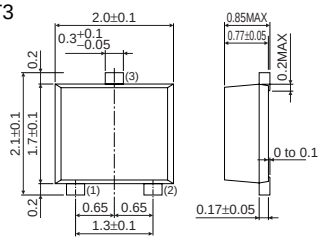
1) Low on-resistance. (80mΩ at 2.5V)
2) High power package.
3) High speed switching.
4) Low voltage drive. (2.5V)

●Applications

DC-DC converter

●External dimensions (Unit : mm)

TUMT3



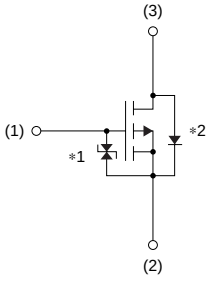
Each lead has same dimensions

Abbreviated symbol : WQ

●Structure

Silicon P-channel
MOS FET

●Equivalent circuit



∗1 ESD PROTECTION DIODE
∗2 BODY DIODE

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

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RTF010P02		○

●**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	±1	A
	Pulsed	I_{DP} *1	±4	A
Source current (Body diode)	Continuous	I_S *1	−0.4	A
	Pulsed	I_{SP}	−4	A
Total power dissipation		P_D *2	0.8	W
Channel temperature		Tch	150	°C
Range of Storage temperature		Tstg	−55 to +150	°C

∗1 Pw≤10∝s, Duty cycle≤1%
∗2 Mounted on a ceramic board

●**Electrical characteristics** (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	−	−	±10	∝A	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	∝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	$R_{DS\ (on)}$ *	−	280	390	mΩ	I_D= −1A, V_{GS}= −4.5V
		−	310	430	mΩ	I_D= −1A, V_{GS}= −4V
		−	570	800	mΩ	I_D= −0.5A, V_{GS}= −2.5V
Forward transfer admittance	$\|Y_{fs}\|$ *	0.7	−	−	S	V_{DS}= −10V, I_D= −0.5A
Input capacitance	C_{iss}	−	150	−	pF	V_{DS}= −10V
Output capacitance	C_{oss}	−	20	−	pF	V_{GS}=0V
Reverse transfer capacitance	C_{rss}	−	20	−	pF	f=1MHz
Turn-on delay time	$t_{d\ (on)}$ *	−	9	−	ns	I_D= −0.5A V_{DD}≒ −15V V_{GS}= −4.5V R_L=30Ω R_{GS}=10Ω
Rise time	t_r *	−	8	−	ns	
Turn-off delay time	$t_{d\ (off)}$ *	−	25	−	ns	
Fall time	t_f *	−	10	−	ns	
Total gate charge	Q_g	−	2.1	−	nC	V_{DD}≒ −15V R_L≒15Ω
Gate-source charge	Q_{gs}	−	0.5	−	nC	V_{GS}= −4.5V R_{GS}=10Ω
Gate-drain charge	Q_{gd}	−	0.5	−	nC	I_D= −1A

∗Pulsed

Body diode characteristics (source-drain characteristics)

Forward voltage	VSD	−	−	−1.2	V	I_S= −0.4A, V_{GS}=0V

●Electrical characteristic curves

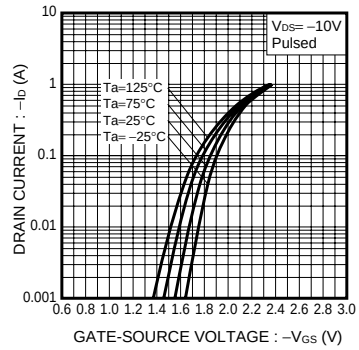


Fig.1 Typical Transfer Characteristics

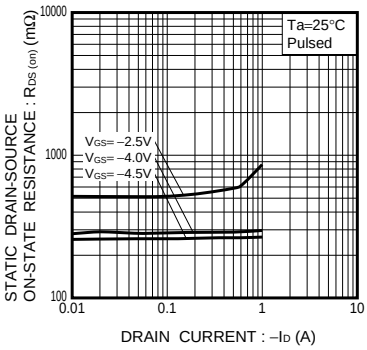


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

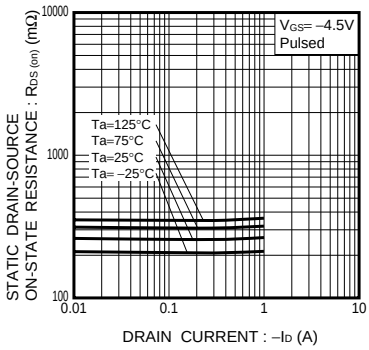


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

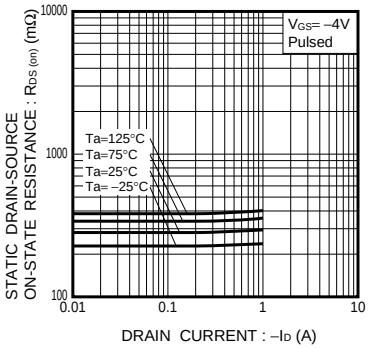


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

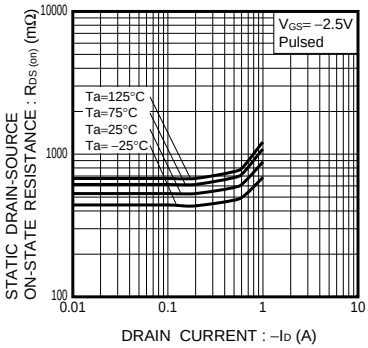


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

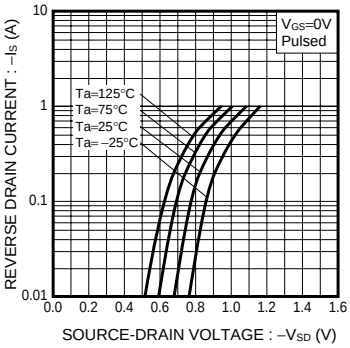


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

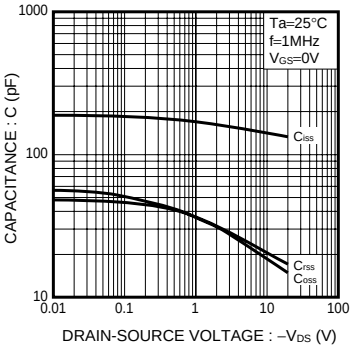


Fig.7 Typical Capacitance vs. Drain-Source Voltage

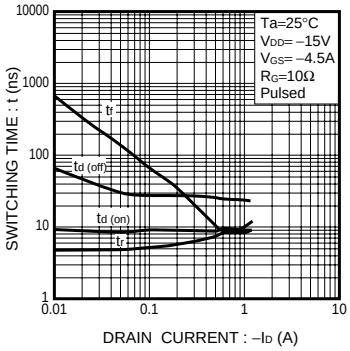


Fig.8 Switching Characteristics

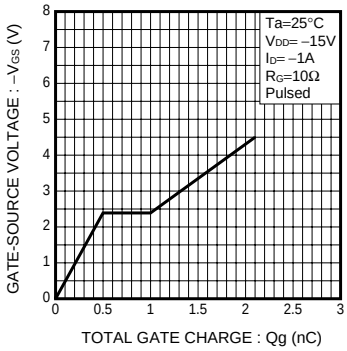


Fig.9 Dynamic Input Characteristics

●**Measurement circuits**

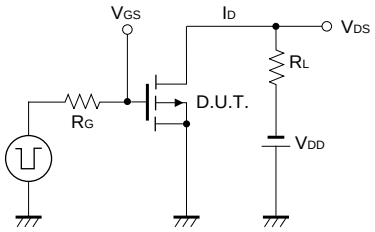


Fig.10 Switching Time Measurement Circuit

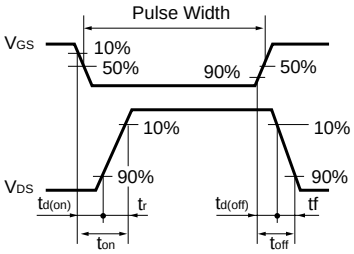


Fig.11 Switching Waveforms

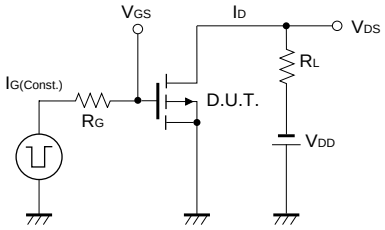


Fig.12 Gate Charge Measurement Circuit

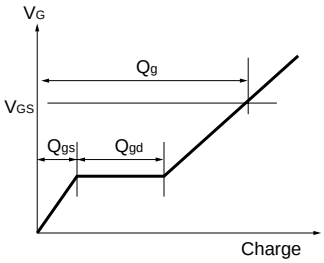


Fig.13 Gate Charge Waveforms

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