AEC-Q101 Qualified

2.5V Drive Pch MOSFET

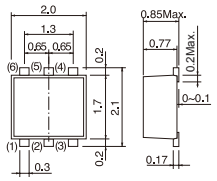
RTL020P02FRA

●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)

●Dimensions (Unit : mm)

TUMT6



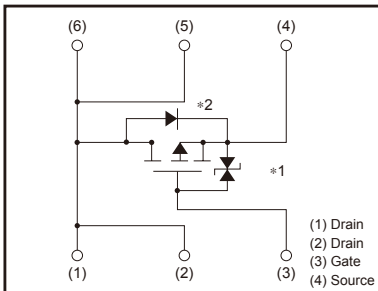
Abbreviated symbol : WU

●Applications
DC-DC converter

●Packaging specifications

Type	Package	Taping
	Code	TR
	Quantity (pcs)	3000
RTL020P02FRA		○

●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	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		Tch	150	°C
Range of Storage temperature		Tstg	−55 to +150	°C

*1 Pw≤10μs, Duty cycle≤1%
*2 Mounted on a ceramic board

●Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	Rth(ch-a) *	125	°C / W

* Mounted on a ceramic board.

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●**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= –2A, V_{GS}= –4.5V
		–	110	150	mΩ	I_D= –2A, V_{GS}= –4V
		–	180	250	mΩ	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 V_{DD}≒ –15V V_{GS}= –4.5V R_L=15Ω R_G=10Ω
Rise time	t_r *	–	13	–	ns	
Turn-off delay time	$t_{d\ (off)}$ *	–	38	–	ns	
Fall time	t_f *	–	12	–	ns	
Total gate charge	Q_g *	–	4.9	–	nC	V_{DD}≒ –15V R_L=7.5Ω
Gate-source charge	Q_{gs} *	–	1.2	–	nC	V_{GS}= –4.5V R_G=10Ω
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

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●**Electrical characteristic curves**

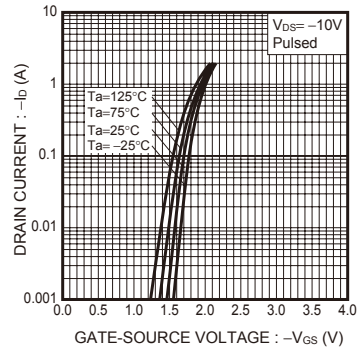


Fig.1 Typical Transfer Characteristics

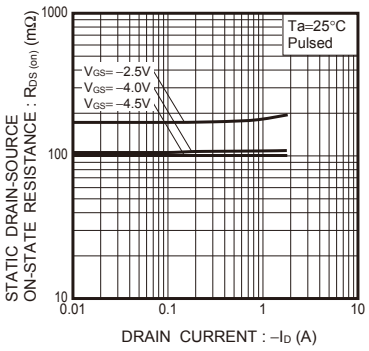


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

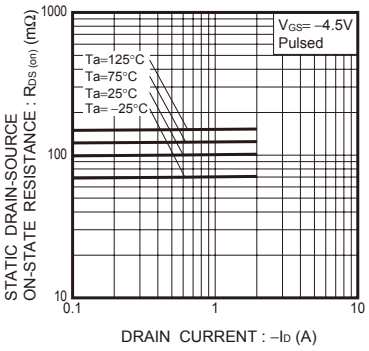


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

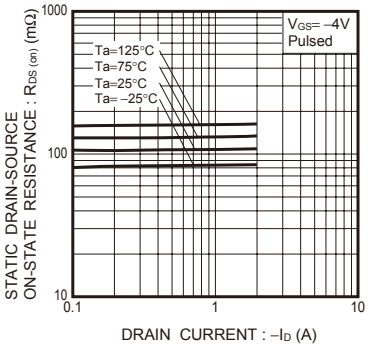


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

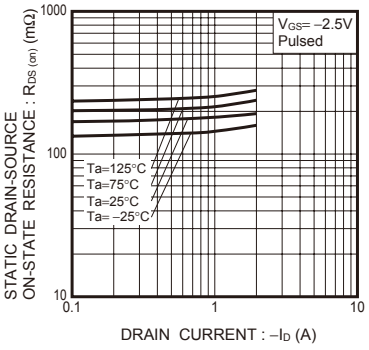


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

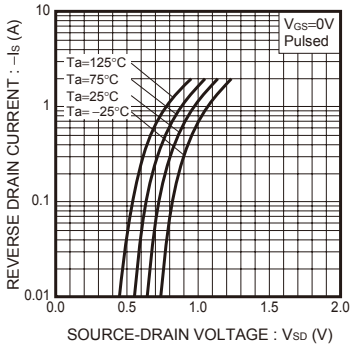


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

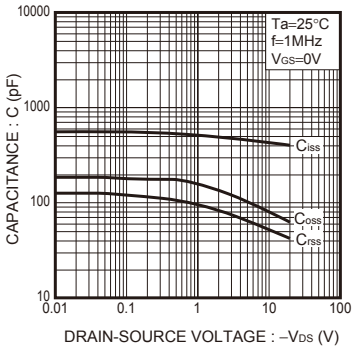


Fig.7 Typical Capacitance vs. Drain-Source Voltage

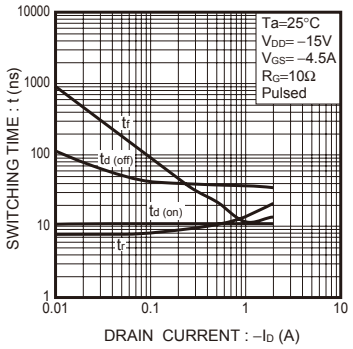


Fig.8 Switching Characteristics

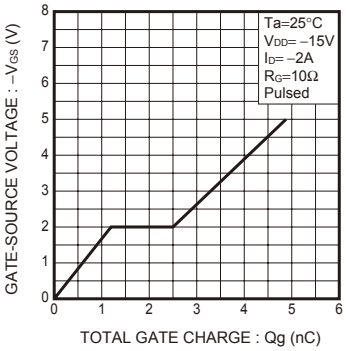


Fig.9 Dynamic Input Characteristics

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●**Measurement circuits**

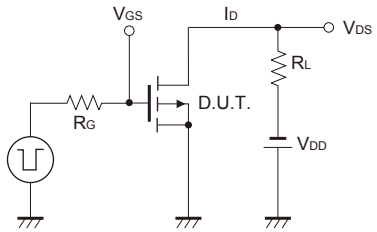


Fig.10 Switching Time Measurement Circuit

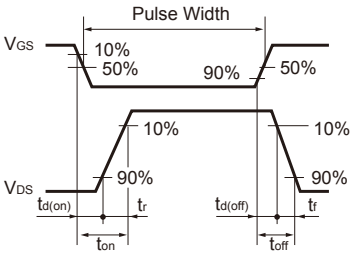


Fig.11 Switching Waveforms

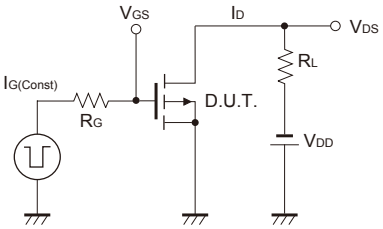


Fig.12 Gate Charge Measurement Circuit

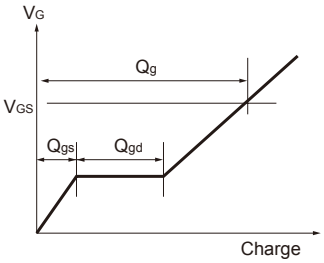


Fig.13 Gate Charge Waveforms

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