

RTF020P02

Silicon P-channel MOSFET

- 1) Low on-resistance. (120mΩ at 2.5V)
- 2) High power package.
- 3) High speed switching.
- 4) Low voltage drive. (2.5V)

DC-DC converter

Type	Package	Taping
	Code	TL
	Basic ordering unit (pieces)	3000
RTF020P02		

Technical drawing of a TUMT3 component. The drawing includes a top view and a side view. The top view shows a rectangular component with a central circular feature. Dimensions include a total width of 2.0, a central hole diameter of 0.3, a distance of 0.2 from the hole to the right edge, and a distance of 0.2 from the hole to the bottom edge. The bottom edge has a total width of 1.3, with segments of 0.05, 0.05, and 0.2. The side view shows a height of 0.85Max. and a width of 0.17. A dimension of 0.77 is shown for the central feature, and a dimension of 0.20 is shown for the distance from the hole to the right edge. A dimension of 0-0.1 is shown for the distance from the hole to the bottom edge.

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

Abbreviated symbol : WM

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

*1 ESD PROTECTION DIODE
*2 BODY DIODE

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DSS}	-20	V
Gate-source voltage		V_{GSS}	± 12	V
Drain current	Continuous	I_D	± 2.0	A
	Pulsed	I_{DP}^{*1}	± 8	A
Source current (Body diode)	Continuous	I_S^{*1}	-0.6	A
	Pulsed	I_{SP}	-8	A
Total power dissipation		P_D^{*2}	0.8	W
Channel temperature		T_{ch}	150	$^{\circ}\text{C}$
Range of Storage temperature		T_{stg}	-55 to +150	$^{\circ}\text{C}$

- Thermal resistance

Parameter	Symbol	Limits	Unit
Channel to ambient	Rth(ch-a) *	156	°C / W

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●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Gate-source leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 12V$, $V_{DS} = 0V$
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	$R_{DS(on)}$ *	—	60	85	m Ω	$I_D = -2A$, $V_{GS} = -4.5V$
		—	65	90	m Ω	$I_D = -2A$, $V_{GS} = -4V$
		—	120	165	m Ω	$I_D = -1A$, $V_{GS} = -2.5V$
Forward transfer admittance	$ Y_{fs} $ *	2.0	—	—	S	$V_{DS} = -10V$, $I_D = -1A$
Input capacitance	C_{iss}	—	640	—	pF	$V_{DS} = -10V$
Output capacitance	C_{oss}	—	110	—	pF	$V_{GS} = 0V$
Reverse transfer capacitance	C_{rss}	—	85	—	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$ *	—	12	—	ns	$I_D = -1A$
Rise time	t_r *	—	15	—	ns	$V_{DD} = -15V$
Turn-off delay time	$t_{d(off)}$ *	—	40	—	ns	$V_{GS} = -4.5V$
Fall time	t_f *	—	12	—	ns	$R_L = 15\Omega$ $R_G = 10\Omega$
Total gate charge	Q_g *	—	7.0	—	nC	$V_{DD} = -15V$ $R_L = 7.5\Omega$
Gate-source charge	Q_{gs} *	—	1.6	—	nC	$V_{GS} = -4.5V$ $R_G = 10\Omega$
Gate-drain charge	Q_{gd} *	—	2.0	—	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	$I_S = -0.6A$, $V_{GS} = 0V$

Transistors

●Electrical characteristic curves

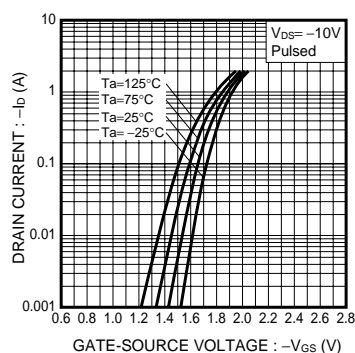


Fig.1 Typical Transfer Characteristics

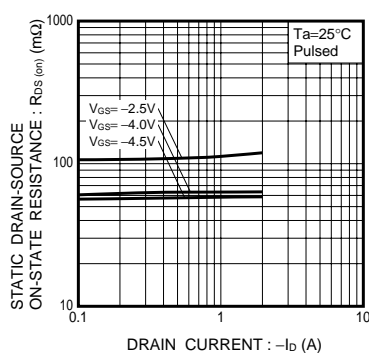


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

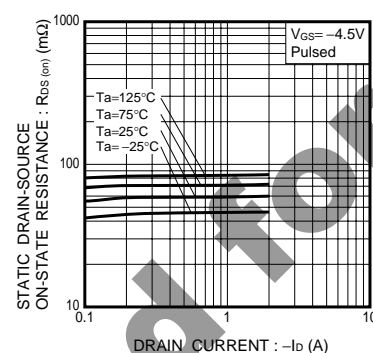


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

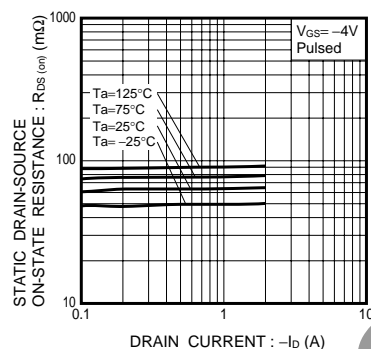


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

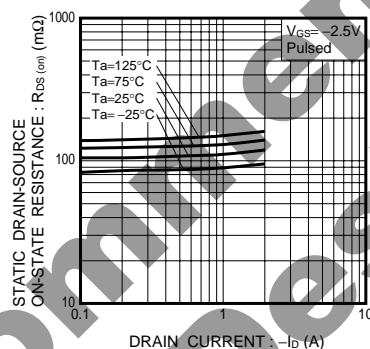


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

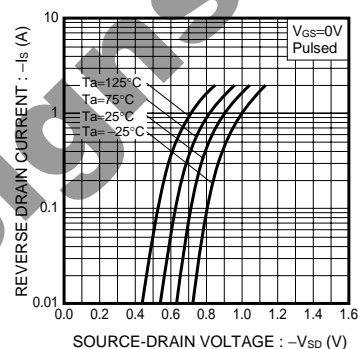


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

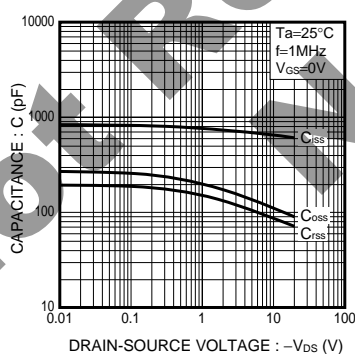


Fig.7 Typical Capacitance vs. Drain-Source Voltage

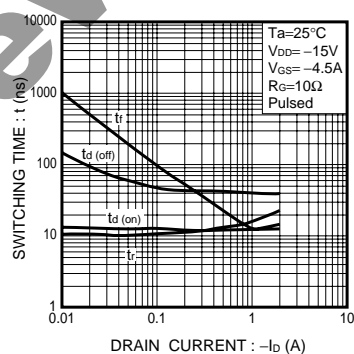


Fig.8 Switching Characteristics

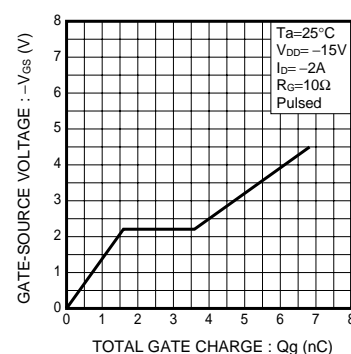


Fig.9 Dynamic Input Characteristics

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● Measurement circuits

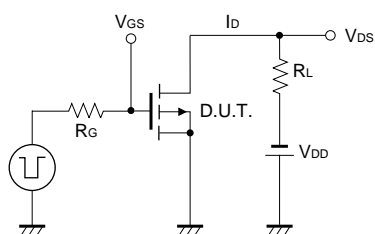


Fig.10 Switching Time Measurement Circuit

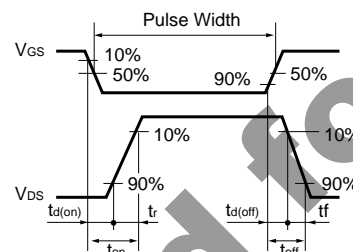


Fig.11 Switching Waveforms

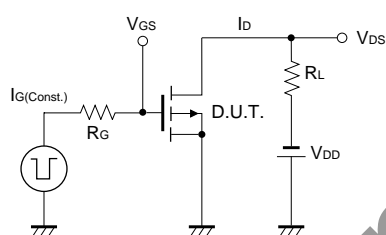


Fig.12 Gate Charge Measurement Circuit

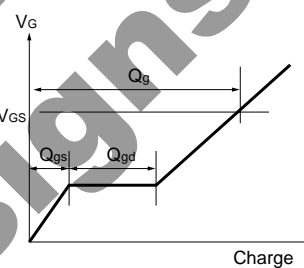


Fig.13 Gate Charge Waveforms

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