AEC-Q101 Qualified

2.5V Drive Pch MOS FET

RTQ025P02FRA

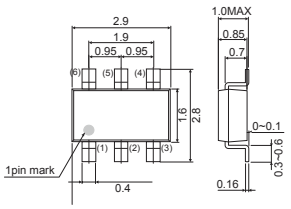
●Structure
Silicon P-channel MOSFET

●Features
1) Low On-resistance.(140mΩ 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)

TSMT6



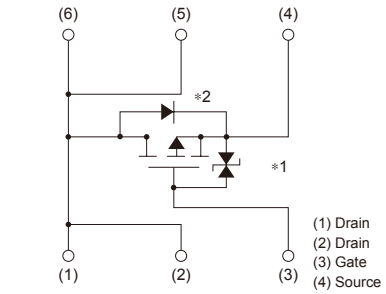
Each lead has same dimensions

Abbreviated symbol : TQ

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RTQ025P02FRA		○

●Equivalent circuit



∗1 ESD PROTECTION DIODE
∗2 BODY DIODE

●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	−1	A
	Pulsed	I_{SP} ∗1	−4	A
Total power dissipation		P_D ∗2	1.25	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) ∗	100	°C / W

∗ Mounted on a ceramic board.

●**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	$R_{DS(on)}$*	–	72	100	mΩ	I_D=–2.5A, V_{GS}=–4.5V
		–	80	110	mΩ	I_D=–2.5A, V_{GS}=–4V
		–	140	190	mΩ	I_D=–1.2A, V_{GS}=–2.5V
Foward transfer admittance	$\|Y_{fs}\|$*	2.0	–	–	S	V_{DS}=–10V, I_D=–1.2A
Input capacitance	C_{iss}	–	580	–	pF	V_{DS}=–10V,V_{GS}=0V f=1MHz
Output capacitance	C_{oss}	–	110	–	pF	
Reverse transfer capacitance	C_{rss}	–	80	–	pF	
Turn-on delay time	$t_{d(on)}$*	–	12	–	ns	I_D=–1.2A V_{DD}≒–15V V_{GS}=–4.5V R_L=12.5Ω R_G=10Ω
Rise time	t_r*	–	20	–	ns	
Turn-off delay time	$t_{d(off)}$*	–	40	–	ns	
Fall time	t_f*	–	17	–	ns	
Total gate charge	Qg	–	6.4	–	nC	V_{DD}≒–15V V_{GS}=–4.5V I_D=–2.5A
Gate-source charge	Qgs	–	1.4	–	nC	
Gate-drain charge	Qgd	–	1.9	–	nC	

*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=–1A, V_{GS}=0V

●Electrical characteristic curves

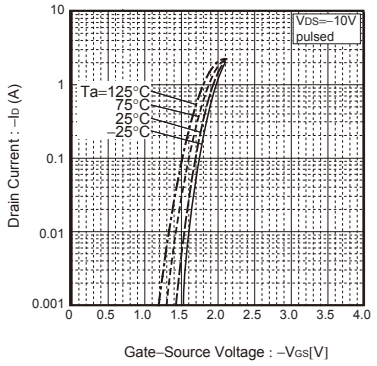


Fig.1 Typical Transfer Characteristics

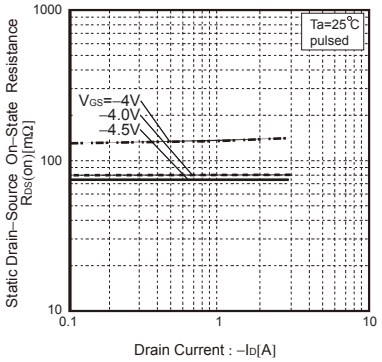


Fig.2 Static Drain−Source On−State Resistance vs.Drain Current

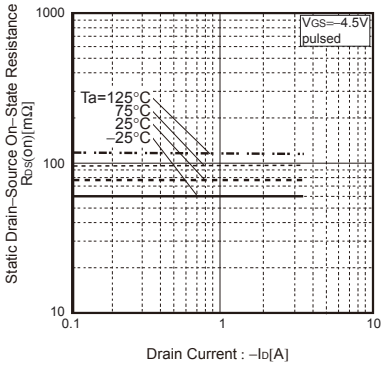


Fig.3 Static Drain−Source On−State Resistance vs.Drain Current

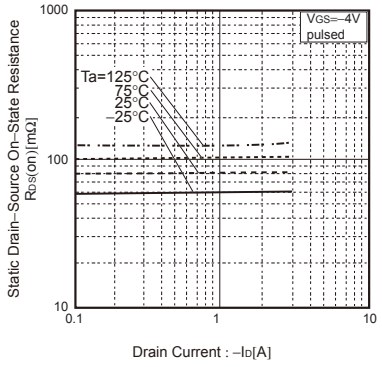


Fig.4 Static Drain−Source On−State Resistance vs.Drain−Current

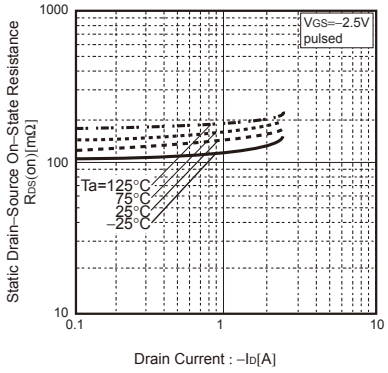


Fig.5 Static Drain−Source On−State Resistance vs.Drain−Current

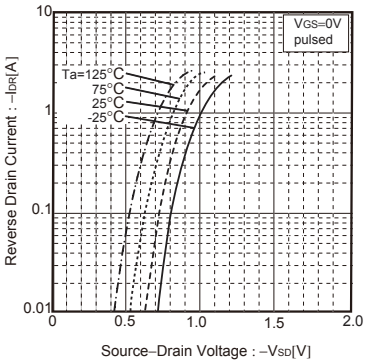


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

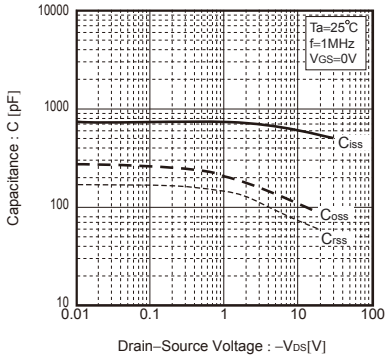


Fig.7 Typical Capactitance vs.Drain−Source Voltage

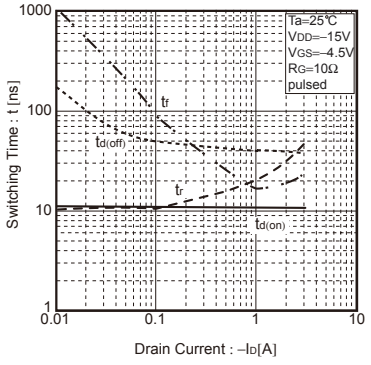


Fig.8 Switching Characteristics

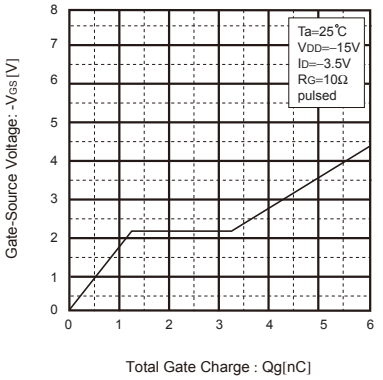


Fig.9 Dynamic Input Characteristics

●**Measurement circuits**

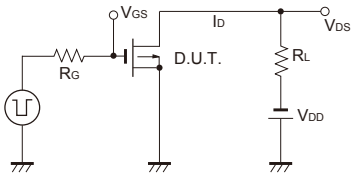


Fig.10 Switching Time Measurement Circuit

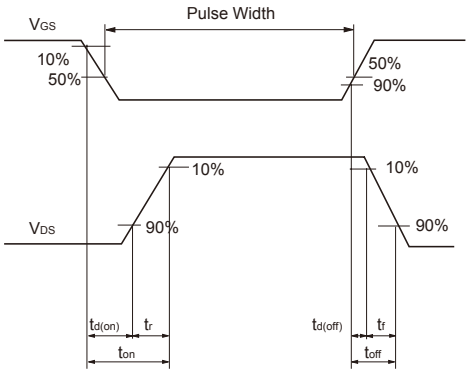


Fig.11 Switching Waveforms

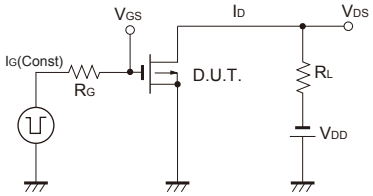


Fig.12 Gate Charge Measurement Circuit

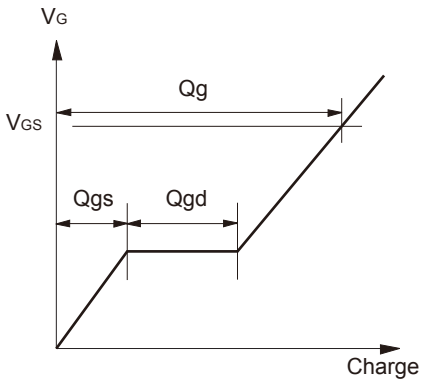


Fig.13 Gate Charge Waveforms

Notice

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1. If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment (Note 1), aircraft/spacecraft, nuclear power controllers, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the ROHM sales representative in advance. Unless otherwise agreed in writing by ROHM in advance, ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any ROHM's Products for Specific Applications.

(Note1) Medical Equipment Classification of the Specific Applications

JAPAN	USA	EU	CHINA
CLASSⅢ	CLASSⅢ	CLASSⅡb	CLASSⅢ
CLASSⅣ		CLASSⅢ	

2. ROHM designs and manufactures its Products subject to strict quality control system. However, semiconductor products can fail or malfunction at a certain rate. Please be sure to implement, at your own responsibilities, adequate safety measures including but not limited to fail-safe design against the physical injury, damage to any property, which a failure or malfunction of our Products may cause. The following are examples of safety measures:
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   [a] Use of our Products in any types of liquid, including water, oils, chemicals, and organic solvents
   [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
   [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl_2, H_2S, NH_3, SO_2, and NO_2
   [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
   [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
   [f] Sealing or coating our Products with resin or other coating materials
   [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
   [h] Use of the Products in places subject to dew condensation

4. The Products are not subject to radiation-proof design.

5. Please verify and confirm characteristics of the final or mounted products in using the Products.

6. In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse. is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

7. De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.

8. Confirm that operation temperature is within the specified range described in the product specification.

9. ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

Precaution for Mounting / Circuit board design

1. When a highly active halogenous (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.

2. In principle, the reflow soldering method must be used on a surface-mount products, the flow soldering method must be used on a through hole mount products. If the flow soldering method is preferred on a surface-mount products, please consult with the ROHM representative in advance.

For details, please refer to ROHM Mounting specification

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1. If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.

2. You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. ROHM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

Precaution for Storage / Transportation

1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
   - [a] the Products are exposed to sea winds or corrosive gases, including Cl2, H2S, NH3, SO2, and NO2
   - [b] the temperature or humidity exceeds those recommended by ROHM
   - [c] the Products are exposed to direct sunshine or condensation
   - [d] the Products are exposed to high Electrostatic

2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.

3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.

4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

Precaution for Product Label

QR code printed on ROHM Products label is for ROHM's internal use only.

Precaution for Disposition

When disposing Products please dispose them properly using an authorized industry waste company.

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Since concerned goods might be fallen under listed items of export control prescribed by Foreign exchange and Foreign trade act, please consult with ROHM in case of export.

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RTQ025P02FRA - Web Page

Part Number	RTQ025P02FRA
Package	TSMT6
Unit Quantity	3000
Minimum Package Quantity	3000
Packing Type	Taping
Constitution Materials List	inquiry
RoHS	Yes