

DC-DC Converter (−20V, −3.0A)

RTQ030P02

●Features

- 1) Low On-resistance.(110mΩ at 2.5V)
- 2) High Power Package.
- 3) High speed switching.
- 4) Low voltage drive.(2.5V)

●Applications

DC-DC converter

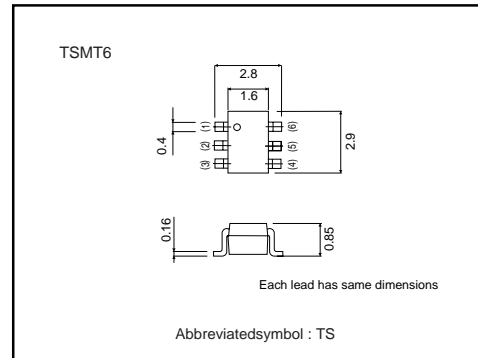
●Structure

Silicon P-channel
MOSFET

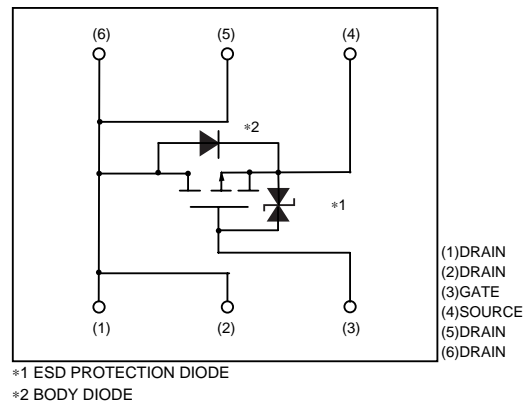
●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RTQ030P02		○

●External dimensions (Units : mm)



●Equivalent circuit



Transistor

●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	±3	A
	Pulsed	I _{DP}	±12	A * ¹
Source current (Body diode)	Continuous	I _S	-1	A
	Pulsed	I _{SP}	-4	A * ¹
Total power dissipation		P _D	1.25	W* ²
Channel temperature		T _{ch}	150	°C
Range of Storage temperature		T _{stg}	-55~+150	°C

*¹ P_W≤10μs, 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	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)} [*]	—	60	80	mΩ	I _D =−3A, V _{GS} =−4.5V
		—	65	90	mΩ	I _D =−3A, V _{GS} =−4V
		—	110	150	mΩ	I _D =−1.5A, V _{GS} =−2.5V
Foward transfer admittance	Y _{fs} [*]	2.0	—	—	S	V _{DS} =−10V, I _D =−1.5A
Input capacitance	C _{iss}	—	800	—	pF	V _{DS} =−10V, V _{GS} =0V f=1MHz
Output capacitance	C _{oss}	—	150	—	pF	
Reverse transfer capacitance	C _{rss}	—	100	—	pF	
Turn-on delay time	t _{d(on)} [*]	—	15	—	ns	I _D =−1.5A V _{DD} ≐−15V V _{GS} =−4.5V R _L =10Ω R _{GS} =10Ω
Rise time	t _r [*]	—	27	—	ns	
Turn-off delay time	t _{d(off)} [*]	—	50	—	ns	
Fall time	t _f [*]	—	20	—	ns	
Total gate charge	Q _g	—	9.0	—	nC	V _{DD} ≐−15V V _{GS} =−4.5V I _D =−3A
Gate-source charge	Q _{gs}	—	1.6	—	nC	
Gate-drain charge	Q _{gd}	—	4.6	—	nC	
*PULSED						
Body diode characteristics (source-drain characteristics)						
Forward voltage	V _{SD}	—	—	−1.2	V	I _S =−1A, V _{GS} =0V

Transistor

●Electrical characteristic curves

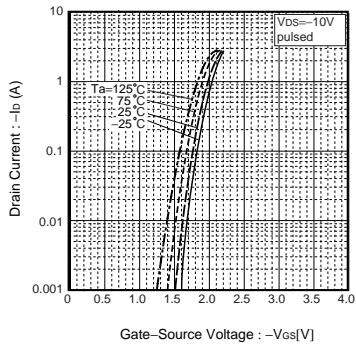


Fig.1 Typical Transfer Characteristics

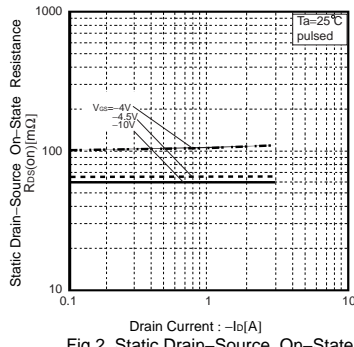


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

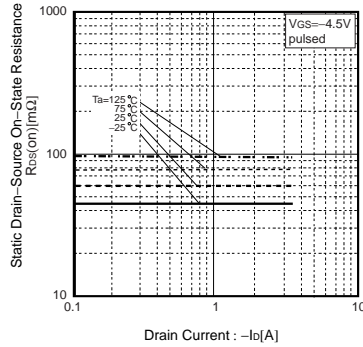


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

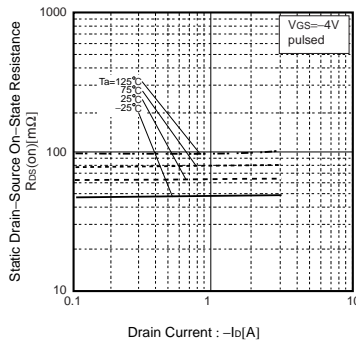


Fig.4 Static Drain-Source On-State Resistance vs. Drain-Current

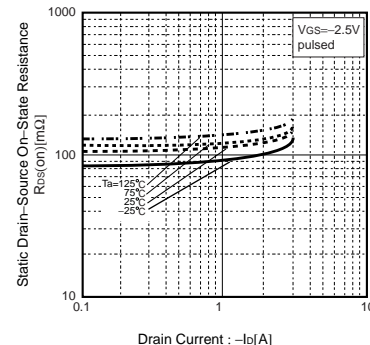


Fig.5 Static Drain-Source On-State Resistance vs. Drain-Current

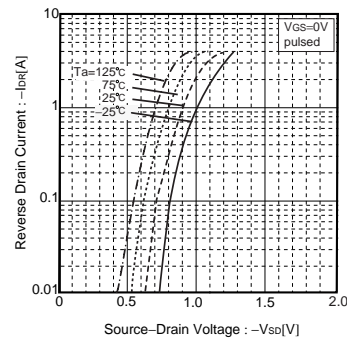


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

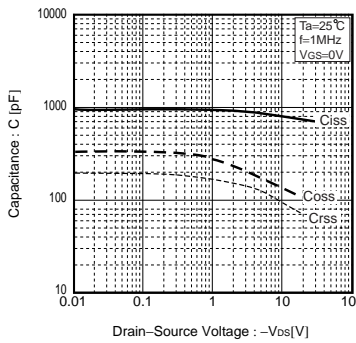


Fig.7 Typical Capacitance vs. Drain-Source Voltage

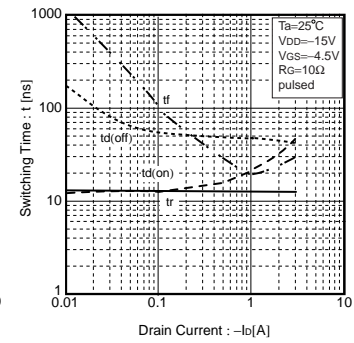


Fig.8 Switching Characteristics

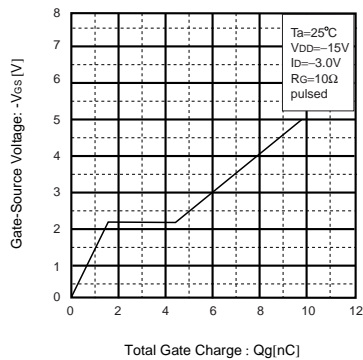


Fig.9 Dynamic Input Characteristics

Transistor

●Measurement circuits

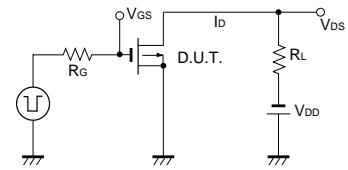


Fig.10 Switching Time Measurement Circuit

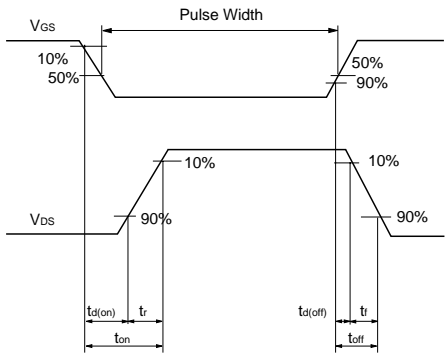


Fig.11 Switching Waveforms

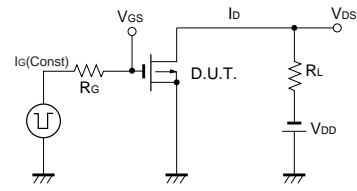


Fig.12 Gate Charge Measurement Circuit

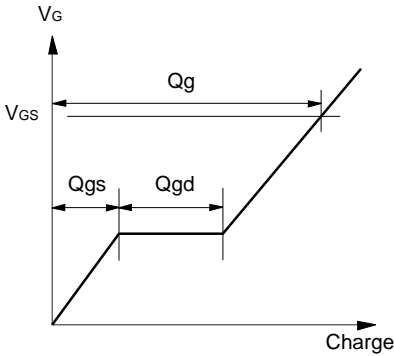


Fig.13 Gate Charge Waveforms

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