

DC-DC Converter (-20V, -3.5A)

RTQ035P02

●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

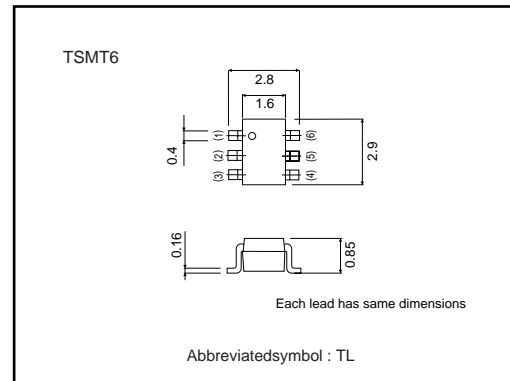
●Structure

Silicon P-channel
MOSFET

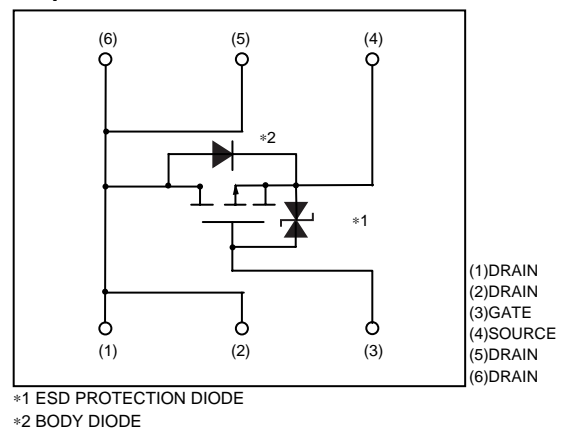
●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RTQ035P02		○

●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	±3.5 A
	Pulsed	I _{DP}	±17.5 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 Pw≤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)} * [†]	-	50	65	mΩ	I _D =-3.5A, V _{GS} =-4.5V
		-	55	70	mΩ	I _D =-3.5A, V _{GS} =-4V
		-	80	100	mΩ	I _D =-1.75A, V _{GS} =-2.5V
Forward transfer admittance	Y _{fs} * [†]	3.5	-	-	S	V _{DS} =-10V, I _D =-3.5A
Input capacitance	C _{iss}	-	1200	-	pF	V _{DS} =-10V, V _{GS} =0V f=1MHz
Output capacitance	C _{oss}	-	200	-	pF	
Reverse transfer capacitance	C _{rss}	-	130	-	pF	
Turn-on delay time	t _{d(on)} * [†]	-	16	-	ns	I _D =-2A V _{DD} =-15V V _{GS} =-4.5V R _L =7.5Ω R _{GS} =10Ω
Rise time	t _r * [†]	-	40	-	ns	
Turn-off delay time	t _{d(off)} * [†]	-	55	-	ns	
Fall time	t _f * [†]	-	30	-	ns	
Total gate charge	Q _g	-	10.5	-	nC	V _{DD} =-15V V _{GS} =-4.5V I _D =-3.5A
Gate-source charge	Q _{gs}	-	2.0	-	nC	
Gate-drain charge	Q _{gd}	-	3.5	-	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

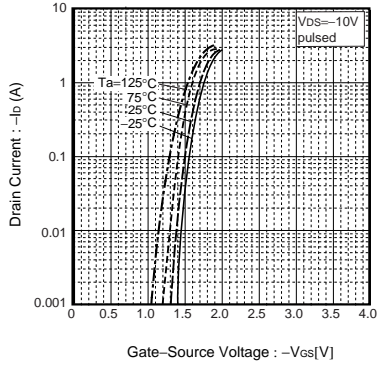


Fig.1 Typical Transfer Characteristics

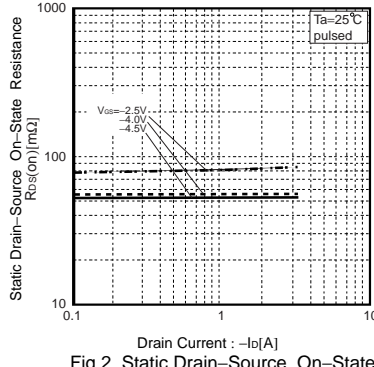


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

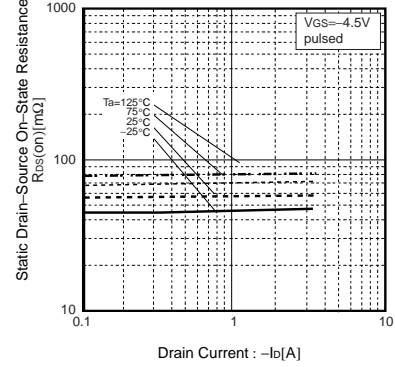


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

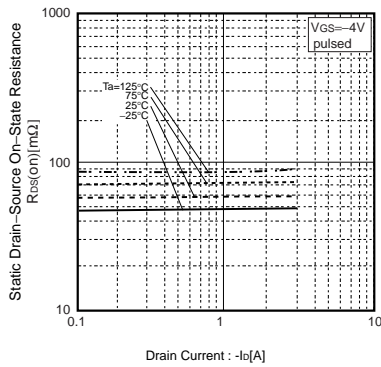


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

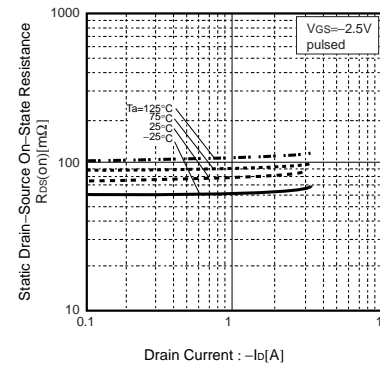


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

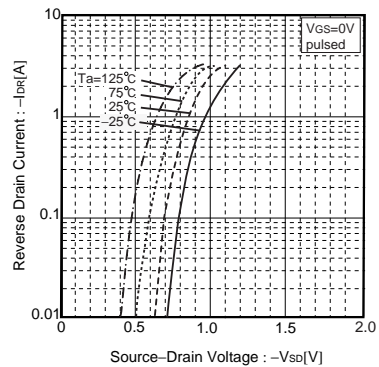


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

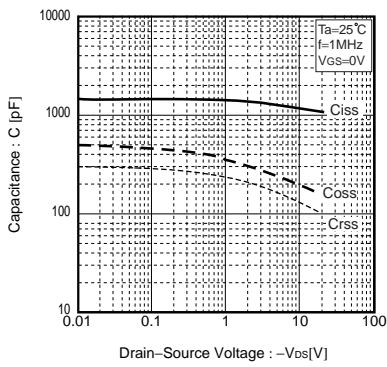


Fig.7 Typical Capacitance vs. Drain-Source Voltage

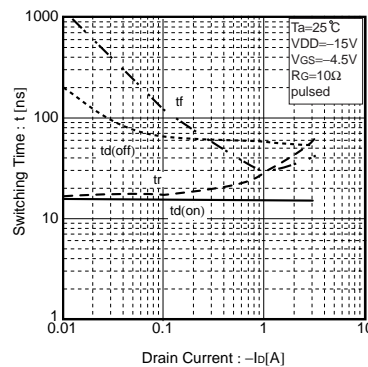


Fig.8 Switching Characteristics

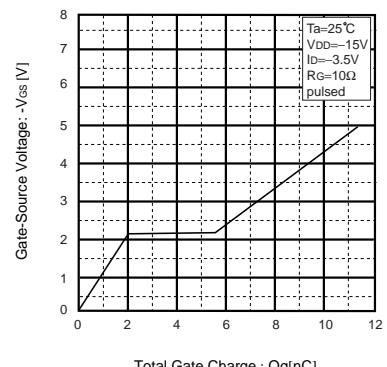


Fig.9 Dynamic Input Characteristics

Transistor

● Measurement circuits

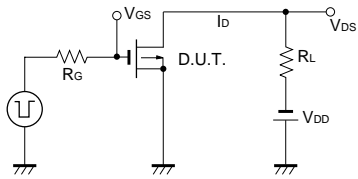


Fig.10 Switching Time Measurement Circuit

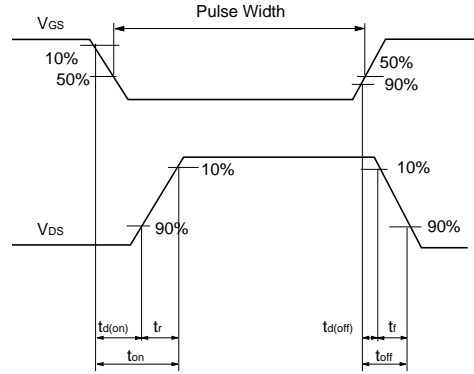


Fig.11 Switching Waveforms

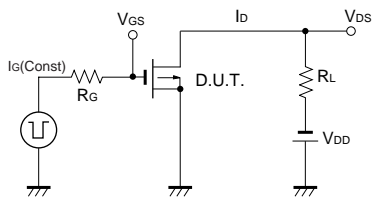


Fig.12 Gate Charge Measurement Circuit

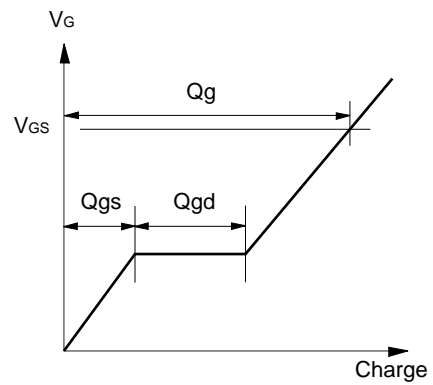


Fig.13 Gate Charge Waveforms