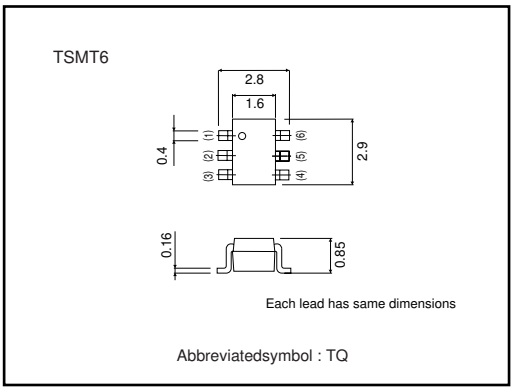
DC-DC Converter (−20V, −2.5A)

RTQ025P02

●Features

1) Low On-resistance.(140mΩ at 2.5V)
2) High Power Package.
3) High speed switching.
4) Low voltage drive.(2.5V)

●External dimensions (Units : mm)



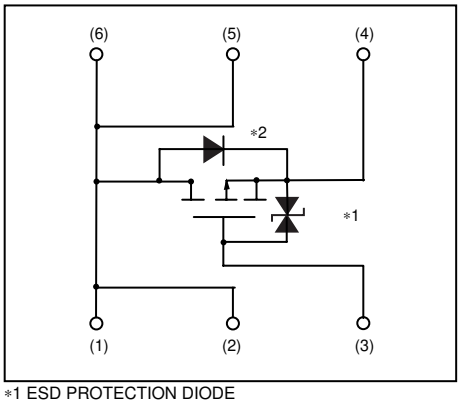
●Applications

DC-DC converter

●Structure

Silicon P-channel
MOSFET

●Equivalent circuit



(1)DRAIN
(2)DRAIN
(3)GATE
(4)SOURCE
(5)DRAIN
(6)DRAIN

∗1 ESD PROTECTION DIODE
∗2 BODY DIODE

●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RTQ025P02		○

●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}	±10	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		Tch	150	°C
Range of Storage temperature		Tstg	−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	$R_{DS(on)}$*	−	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_{GS}=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 characteristics)

Forward voltage	VSD	−	−	−1.2	V	I_S=−1A, V_{GS}=0V

●Electrical characteristic curves

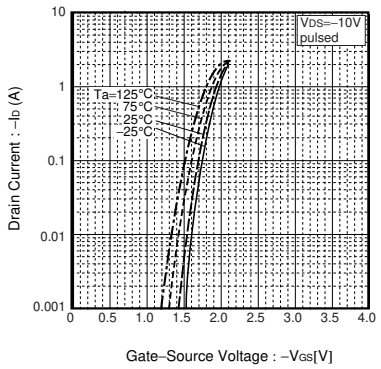


Fig.1 Typical Transfer Characteristics

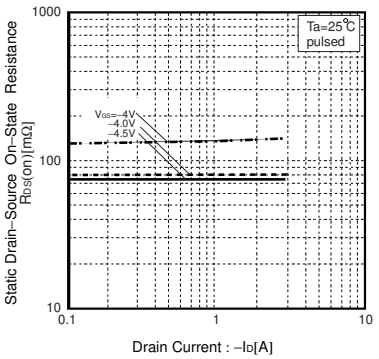


Fig.2 Static Drain−Source On−State Resistance vs.Drain Current

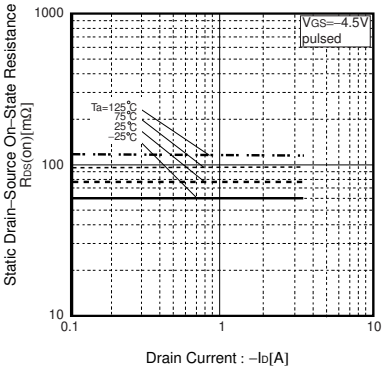


Fig.3 Static Drain−Source On−State Resistance vs.Drain Current

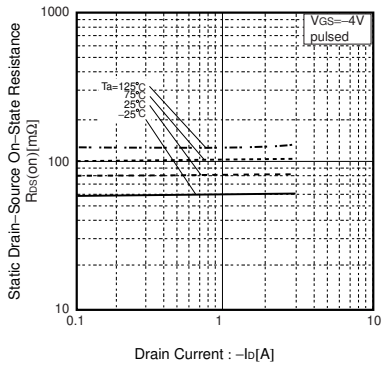


Fig.4 Static Drain−Source On−State Resistance vs.Drain−Current

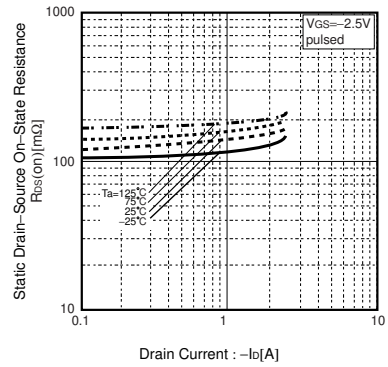


Fig.5 Static Drain−Source On−State Resistance vs.Drain−Current

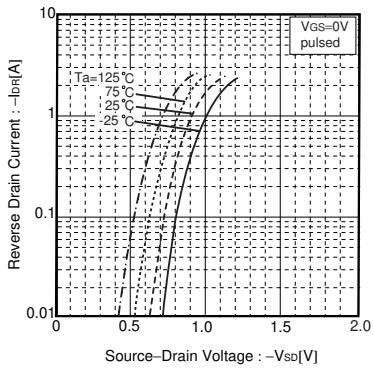


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

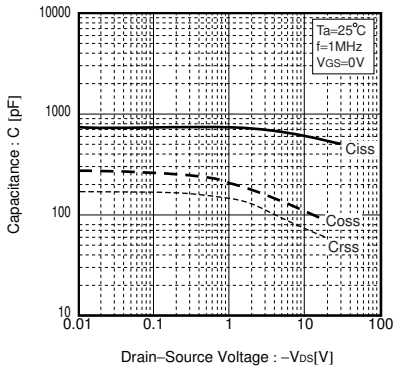


Fig.7 Typical Capactitance vs.Drain−Source Voltage

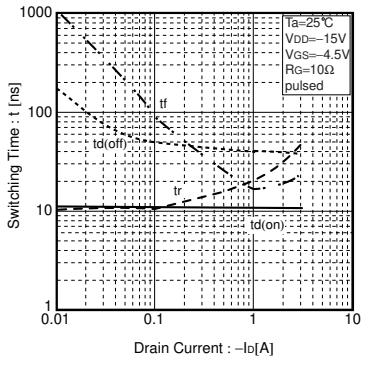


Fig.8 Switching Characteristics

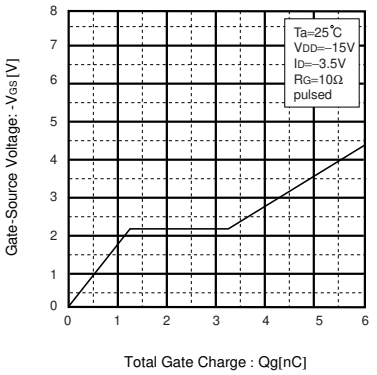


Fig.9 Dynamic Input Characteristics

●**Measurement circuits**

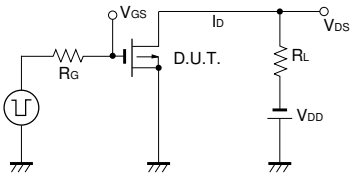


Fig.10 Switching Time Measurement Circuit

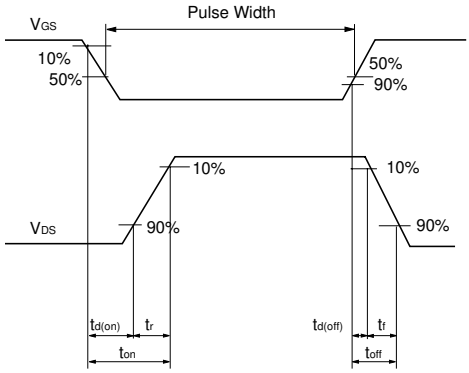


Fig.11 Switching Waveforms

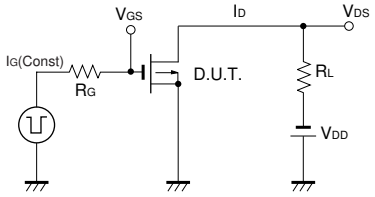


Fig.12 Gate Charge Measurement Circuit

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