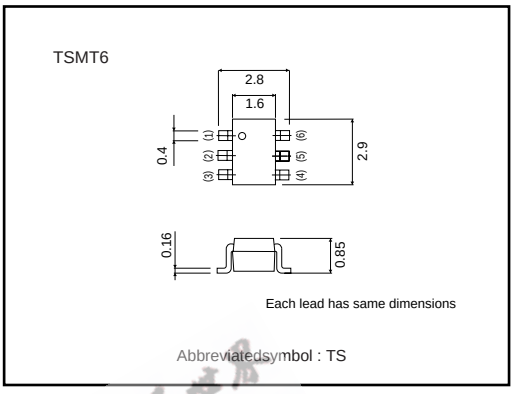
DC-DC Converter (−20V, −3.0A)

RTQ030P02

●Features

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

●External dimensions (Units : mm)



●Applications

DC-DC converter

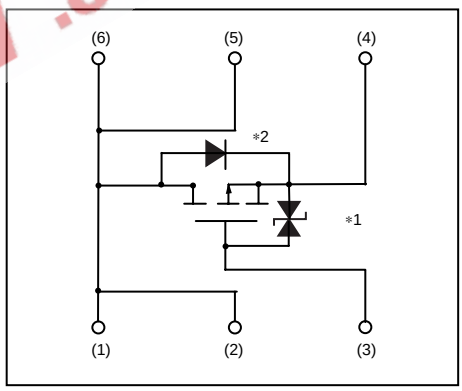
●Structure

Silicon P-channel
MOSFET

●Packaging specifications

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

●Equivalent circuit



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

∗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	±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		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	$R_{DS(on)}$*	–	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	Qg	–	9.0	–	nC	V_{DD}≒−15V V_{GS}=−4.5V I_D=−3A
Gate-source charge	Qgs	–	1.6	–	nC	
Gate-drain charge	Qgd	–	4.6	–	nC	

∗PULSED

Body diode characteristics (source-drain characteristics)

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

●Electrical characteristic curves

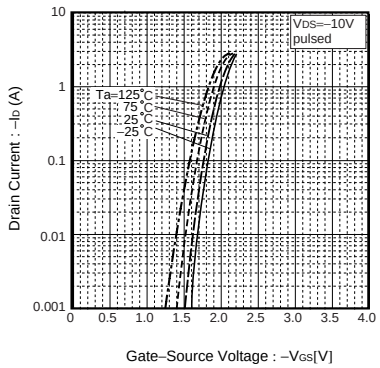


Fig.1 Typical Transfer Characteristics

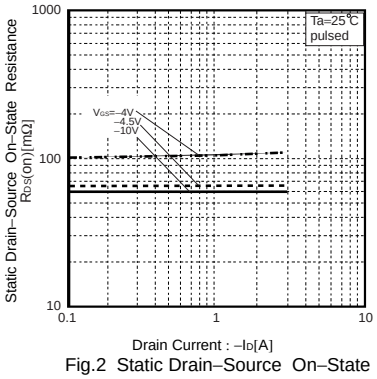


Fig.2 Static Drain–Source On–State Resistance vs.Drain Current

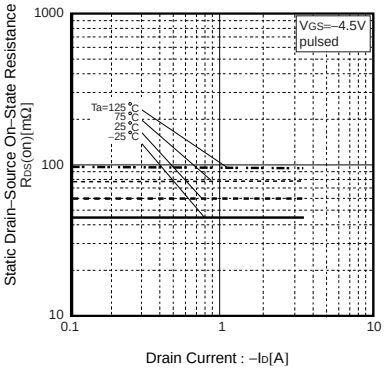


Fig.3 Static Drain–Source On–State Resistance vs.Drain Current

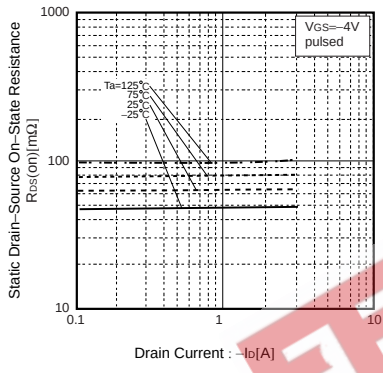


Fig.4 Static Drain–Source On–State Resistance vs.Drain–Current

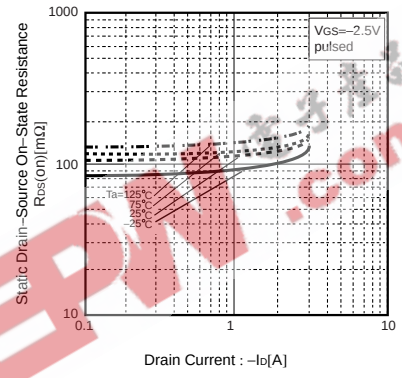


Fig.5 Static Drain–Source On–State Resistance vs.Drain–Current

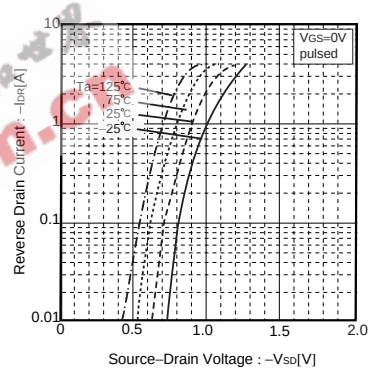


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

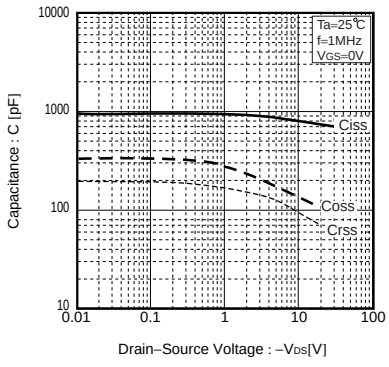


Fig.7 Typical Capactitance vs.Drain–Source Voltage

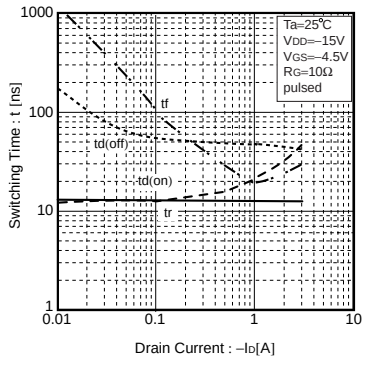


Fig.8 Switching Characteristics

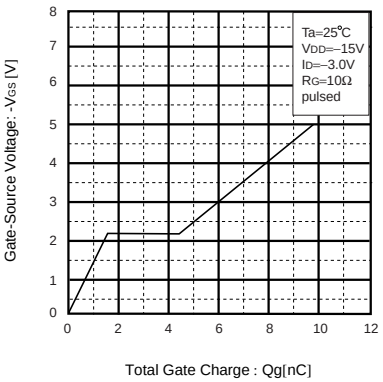


Fig.9 Dynamic Input Characteristics

●**Measurement circuits**

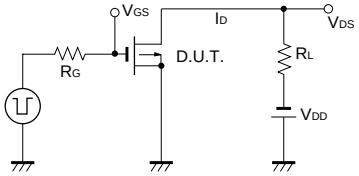


Fig.10 Switching Time Measurement Circuit

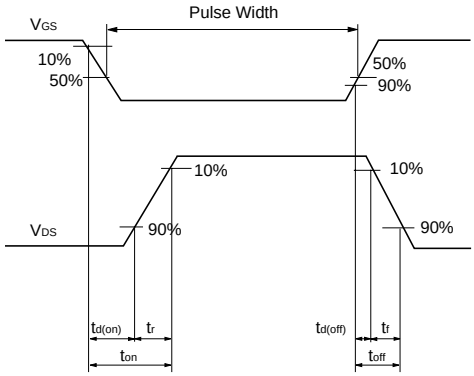


Fig.11 Switching Waveforms

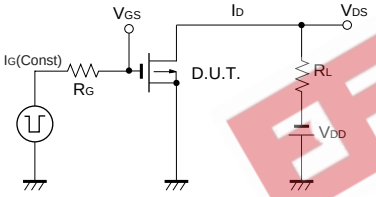


Fig.12 Gate Charge Measurement Circuit

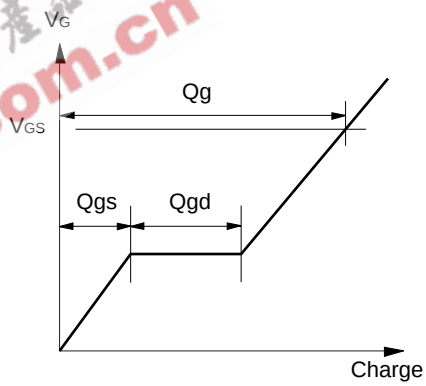


Fig.13 Gate Charge Waveforms

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