

DC-DC Converter (−30V, −3.5A)

RSQ035P03

●Features

- 1) Low On-resistance.(65mΩ at 4.5V)
- 2) High Power Package.
- 3) High speed switching.
- 4) Low voltage drive.(4.5V)

●Applications

DC-DC converter

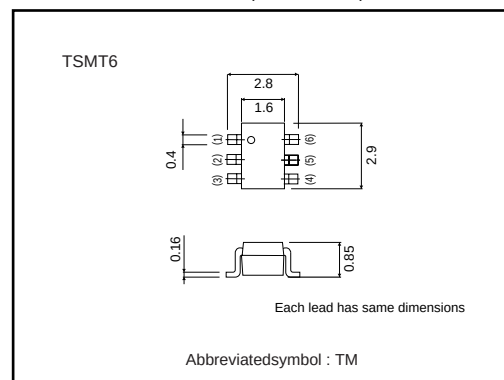
●Structure

Silicon P-channel
MOSFET

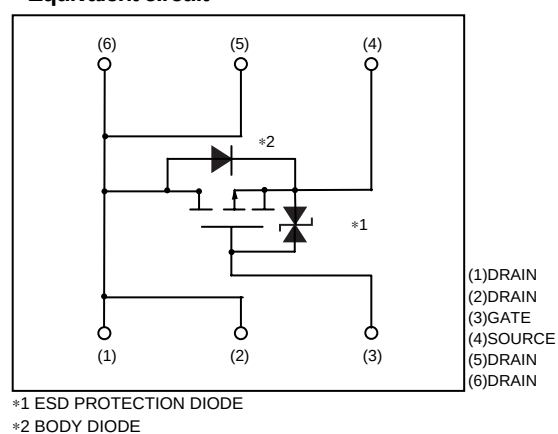
●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
RSQ035P03		○

●External dimensions (Units : mm)



●Equivalent circuit



Transistor

●Absolute maximum ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-source voltage		V_{DS}	-30	V
Gate-source voltage		V_{GS}	±20	V
Drain current	Continuous	I_D	±3.5	A
	Pulsed	I_{DP}	±14	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 Strage temperature		T_{stg}	-55~+150	°C

*1 $P_w \leq 10\mu s$, Duty cycle $\leq 1\%$

*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	$V_{GS} = \pm 20V$, $V_{DS} = 0V$
Drain-source breakdown voltage	$V_{(BR)DSS}$	-30	-	-	V	$I_D = -1mA$, $V_{GS} = 0V$
Zero gate voltage drain current	I_{DSS}	-	-	-1	μA	$V_{DS} = -30V$, $V_{GS} = 0V$
Gate threshold voltage	$V_{GS(th)}$	-1.0	-	-2.5	V	$V_{DS} = -10V$, $I_D = -1mA$
Static drain-source on-state resistance	$R_{DS(on)}$ *	-	45	65	mΩ	$I_D = -3.5A$, $V_{GS} = -10V$
		-	65	90	mΩ	$I_D = -3.5A$, $V_{GS} = -4.5V$
		-	70	95	mΩ	$I_D = -1.75A$, $V_{GS} = -4.0V$
Foward transfer admittance	$ Y_{fs} $ *	2.0	-	-	S	$V_{DS} = -10V$, $I_D = -1.75mA$
Input capacitance	C_{iss}	-	780	-	pF	$V_{DS} = -10V$, $V_{GS} = 0V$ $f = 1MHz$
Output capacitance	C_{oss}	-	180	-	pF	
Reverse transfer capacitance	C_{rss}	-	130	-	pF	
Turn-on delay time	$t_{d(on)}$ *	-	15	-	ns	$I_D = -1.75A$ $V_{DD} \approx -15V$ $V_{GS} = -10V$ $R_L = 8.6\Omega$ $R_{GS} = 10\Omega$
Rise time	t_r *	-	35	-	ns	
Turn-off delay time	$t_{d(off)}$ *	-	45	-	ns	
Fall time	t_f *	-	25	-	ns	
Total gate charge	Q_g	-	9.2	-	nC	$V_{DD} \approx -15V$ $V_{GS} = -5V$ $I_D = -3.5mA$
Gate-source charge	Q_{gs}	-	2.2	-	nC	
Gate-drain charge	Q_{gd}	-	3.4	-	nC	

*PULSED

Body diode characteristics (source-drain characteristics)

Forward voltage	V_{SD}	-	-	-1.2	V	$I_S = -1A$, $V_{GS} = 0V$
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Transistor

●Electrical characteristic curves

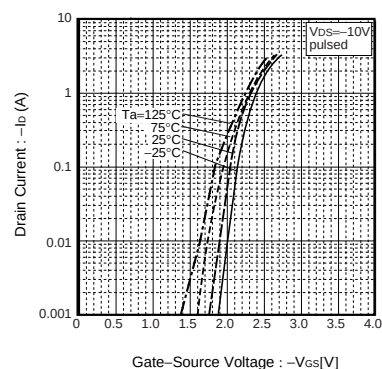


Fig.1 Typical Transfer Characteristics

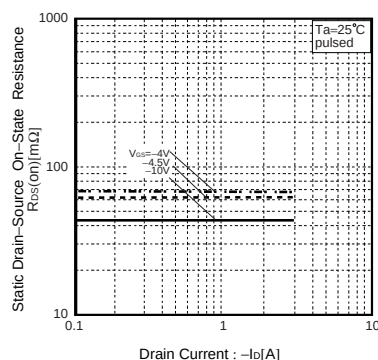


Fig.2 Static Drain-Source On-State Resistance vs. Drain Current

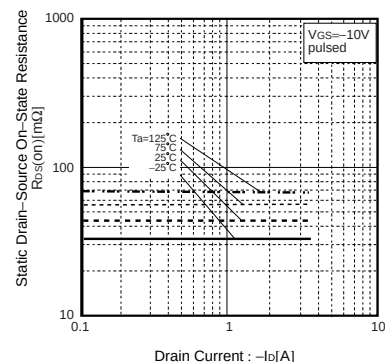


Fig.3 Static Drain-Source On-State Resistance vs. Drain Current

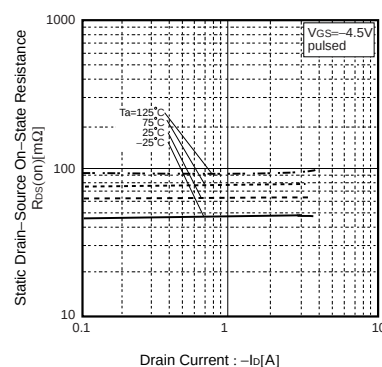


Fig.4 Static Drain-Source On-State Resistance vs. Drain Current

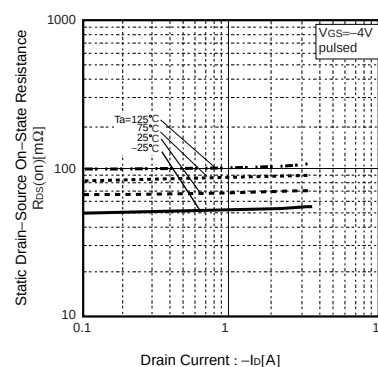


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

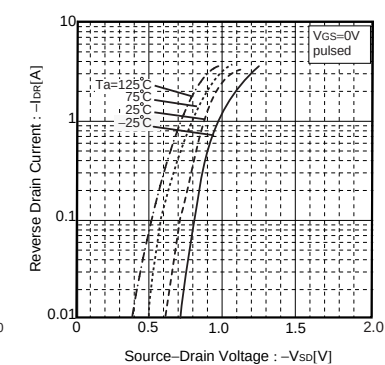


Fig.6 Reverse Drain Current vs. Source-Drain Voltage

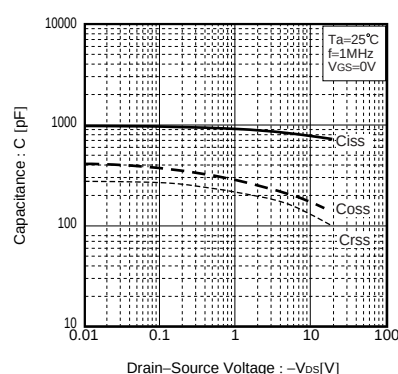


Fig.7 Typical Capacitance vs. Drain-Source Voltage

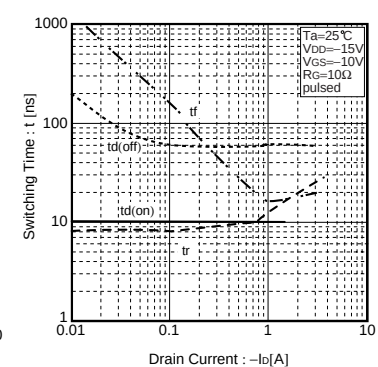


Fig.8 Switching Characteristics

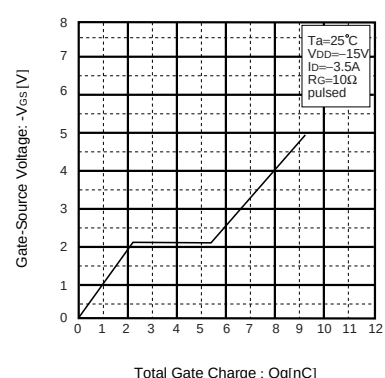


Fig.9 Dynamic Input Characteristics

Transistor

● Measurement circuits

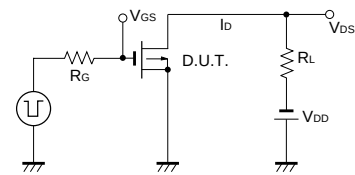


Fig.10 Switching Time Measurement Circuit

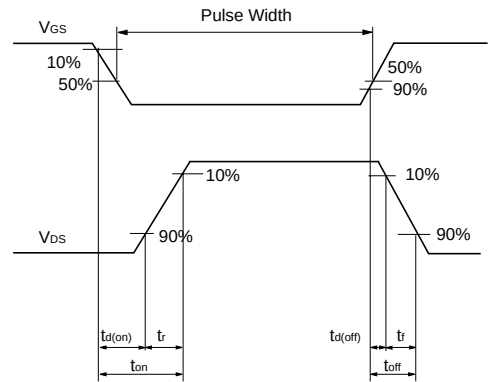


Fig.11 Switching Waveforms

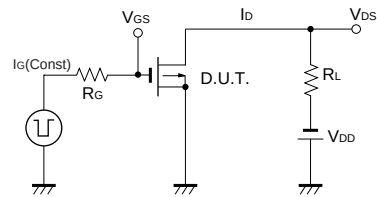


Fig.12 Gate Charge Measurement Circuit

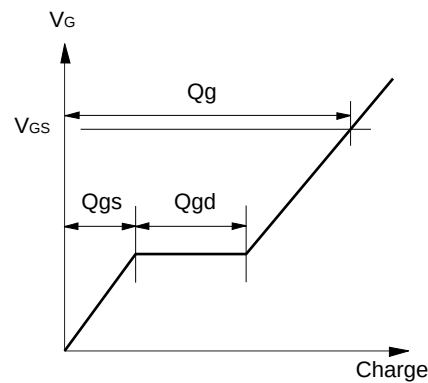


Fig.13 Gate Charge Waveforms

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