PQ1R30 Series

Low Output Current, Compact Surface Mount Type Low Power-Loss Voltage Regulators

Features

- Compact surface mount package (3.4 x 2.2 x 1.2mm)
- Low power-loss
  (Dropout voltage: TYP.0.16V/MAX. 0.26V at Io=60mA)
- High ripple rejection (TYP.55dB)
- Low current operation type
  (Dissipation current at no load: TYP. 170μA)
- Built-in ON/OFF control function
  (Dissipation current at OFF-state: MAX. 0.1μA)
- Overcurrent, overheat protection functions

Applications

- Cellular phones
- Cordless phones
- Personal information tools (PDA)
- Cameras/Camcoders
- PCMCIA cards for notebook PCs

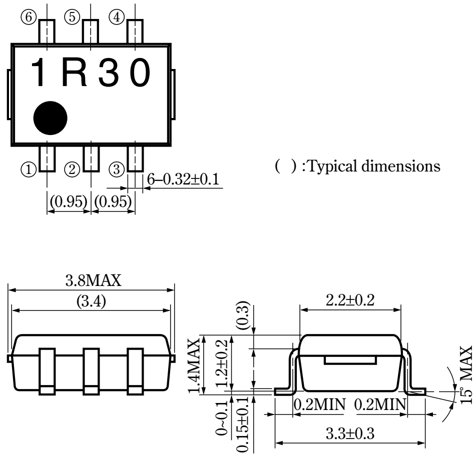
Model Line-ups

Output Voltage	Model No.	Output Voltage	Model No.
2.2V	PQ1R22	3.4V	PQ1R34
2.5V	PQ1R25	3.6V	PQ1R36
2.7V	PQ1R27	3.8V	PQ1R38
2.8V	PQ1R28	4.0V	PQ1R40
2.9V	PQ1R29	4.7V	PQ1R47
3.0V	PQ1R30	4.9V	PQ1R49
3.1V	PQ1R31	5.0V	PQ1R50
3.3V	PQ1R33	5.2V	PQ1R52

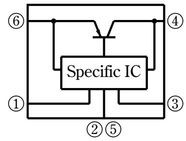
* It is available for every 0.1V (1.8V to 5.5V)

Outline Dimensions

(Unit : mm)



Internal connection diagram



① ON/OFF control terminal (V_c)
②⑤ GND
③ Noise reduction (N_r)
④ DC output (V_o)
⑥ DC input (V_{IN})

Absolute Maximum Ratings

(T_a=25°C)

Parameter	Symbol	Rating	Unit
*1 Input voltage	V_{IN}	16	V
*1 ON/OFF control terminal voltage	Vc	16	V
Output current	Io	240	mA
*2 Power dissipation	P_D	400	mW
*3 Junction temperature	Tj	150	˚C
Operating temperature	T_{opr}	–30 to +80	˚C
Storage temperature	T_{stg}	–55 to +150	˚C
Soldering temperature	T_{sol}	260 (For 10s)	˚C

*1 All are open except GND and applicable terminals.
*2 At mounted on PCB
*3 Overheat protection may operate at 125<=Tj<=150˚C.

• Please refer to the chapter " Handling Precautions ".

Electrical Characteristics

(Unless otherwise specified, ※4 Io=30mA, Vc=1.8V, Ta=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Output voltage	V_O	—	Refer to the following table.			V
Output current	I_O	※5	180	240	—	mA
Recommended output current	—	—	—	—	150	mA
Load regulation	$R_{eg}L$	I_O=5mA to 60mA	—	10	50	mV
		I_O=5mA to 100mA	—	20	100	
		I_O=5mA to 150mA	—	40	160	
Line regulation	$R_{eg}I$	V_i=V_O(TYP)+1V to V_O(TYP)+6V	—	3.0	20	mV
Temperature coefficient of output voltage	T_CV_O	I_O=10mA, T_j=–25 to +75°C	—	0.05	—	mV/°C
Ripple rejection	RR	—	—	55	—	dB
Output noise voltage	Vno(rms)	10Hz<f<100kHz, C_n=0.1µF, I_O=30mA	Refer to the following table.			µV
Dropout voltage	V_{i-O}(1)	I_O=60mA, ※6	—	0.16	0.26	V
	V_{i-O}(2)	I_O=150mA, ※6	—	0.29	0.4	
※7 ON-state voltage for control	V_C(ON)	—	1.8	—	—	V
ON-state current for control	I_C(ON)	V_C=1.8V	—	12	30	µA
OFF-state voltage for control	V_C(OFF)	—	—	—	0.6	V
Quiescent current	I_q	I_O=0mA	—	170	350	µA
Output OFF-state dissipation current	I_{qs}	V_{IN}=8V, V_C=0.4V	—	—	0.1	µA
Response time (Rise time)	T_r	I_O=30mA, V_C=0→1.8V	—	0.3	—	ms
Noise control terminal voltage	—	—	—	1.25	—	V

※4 V_{IN}=Vo (TYP)+1.0V
※5 Output current shall be the value when output voltage lowers 0.3V from the voltage at Io=30mA.
※6 Dropout voltage when output voltage lowers 5% from the voltage at V_{IN}=Vo+1V.
※7 In case that the control terminal ① is non-connection, output voltage should be OFF-state.
※8 In case of **PQ1R13**, **PQ1R15**, **PQ1R18**, V_{IN} minimum=2.3V

Output Voltage Line-ups

(V_{IN}=Vo(TYP)+1.0V, Io=30mA, Vc=1.8V, Ta=25°C)

Model No.	Symbol	MIN.	TYP.	MAX.	Unit
PQ1R13	V_O	1.220	1.3	1.380	V
PQ1R15		1.420	1.5	1.580	
PQ1R18		1.720	1.8	1.800	
PQ1R22		2.120	2.2	2.280	
PQ1R25		2.420	2.5	2.580	
PQ1R27		2.620	2.7	2.780	
PQ1R28		2.720	2.8	2.880	
PQ1R29		2.820	2.9	2.980	
PQ1R30		2.920	3.0	3.080	
PQ1R31		3.020	3.1	3.180	
PQ1R32		3.120	3.2	3.280	
PQ1R33		3.215	3.3	3.385	
PQ1R34		3.315	3.4	3.485	
PQ1R35		3.410	3.5	3.590	
PQ1R36		3.510	3.6	3.690	
PQ1R37		3.605	3.7	3.795	
PQ1R38		3.705	3.8	3.895	
PQ1R40		3.900	4.0	4.100	
PQ1R42		4.095	4.2	4.305	
PQ1R47		4.580	4.7	4.820	
PQ1R49		4.775	4.9	5.025	
PQ1R50		4.875	5.0	5.125	
PQ1R52		5.070	5.2	5.330	

Output Noise Voltage Line-ups

(V_{IN}=Vo(TYP)+1.0V, Io=30mA, Vc=1.8V, Cn=0.1µF, 10Hz<f<100kHz, Ta=25°C)

Model No.	Symbol	MIN.	TYP.	MAX.	Unit
PQ1R13	Vno(rms)	—	15	—	µV
PQ1R15		—	30	—	
PQ1R18		—	15	—	
PQ1R22		—	20	—	
PQ1R25		—	25	—	
PQ1R27		—	25	—	
PQ1R28		—	25	—	
PQ1R29		—	25	—	
PQ1R30		—	30	—	
PQ1R31		—	30	—	
PQ1R32		—	30	—	
PQ1R33		—	30	—	
PQ1R34		—	30	—	
PQ1R35		—	40	—	
PQ1R36		—	35	—	
PQ1R37		—	30	—	
PQ1R38		—	35	—	
PQ1R40		—	40	—	
PQ1R42		—	30	—	
PQ1R47		—	45	—	
PQ1R49		—	45	—	
PQ1R50		—	50	—	
PQ1R52		—	50	—	

Fig. 1 Test Circuit

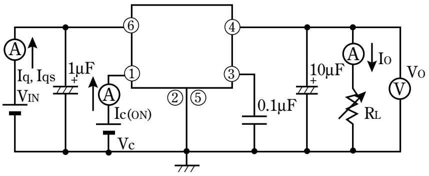
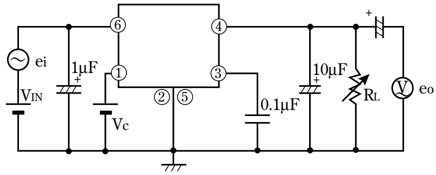
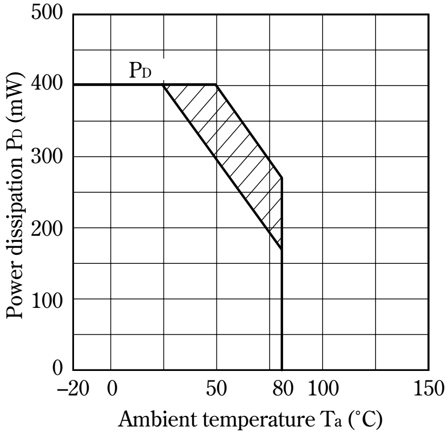


Fig. 2 Test Circuit of Ripple Rejection



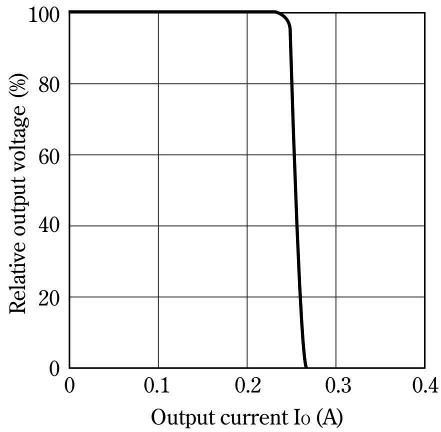
f=400Hz (sine wave)
ei(rms)=100mV
V_{IN}=Vo (TYP)+1.0V
I_O=10mA
RR=20 log (ei(rms)/eo(rms))

Fig. 3 Power Dissipation vs. Ambient Temperature



Note) Oblique line portion : Overheat protection may operate in this area.

Fig. 4 Overcurrent Protection Characteristics (Typical Value)



Note) Oblique line portion : Overheat protection may operate in this area.

Fig. 5 Output Voltage Deviation vs. Junction Temperature (PQ1R30) (Typical Value)

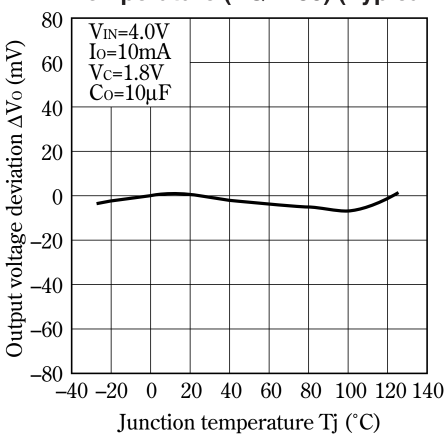


Fig. 6 Output Voltage vs. Input Voltage (PQ1R30) (Typical Value)

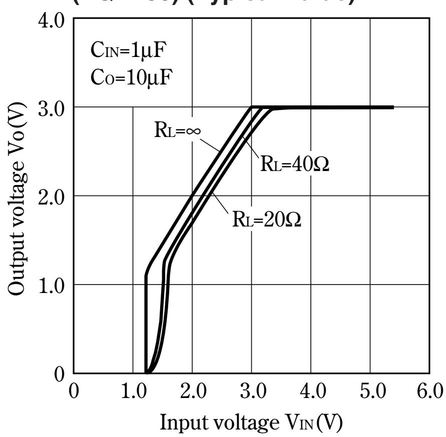


Fig. 7 Circuit Operating Current vs. Input Voltage (PQ1R30) (Typical Value)

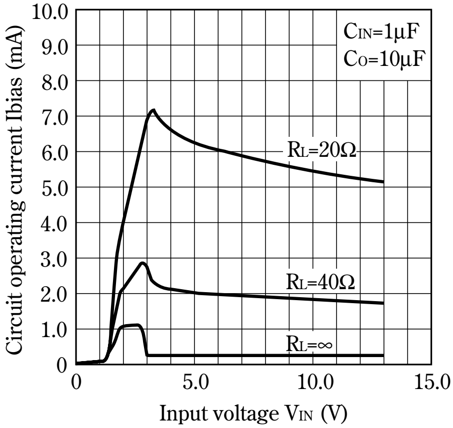


Fig. 8 Dropout Voltage vs. Junction Temperature (PQ1R30) (Typical Value)

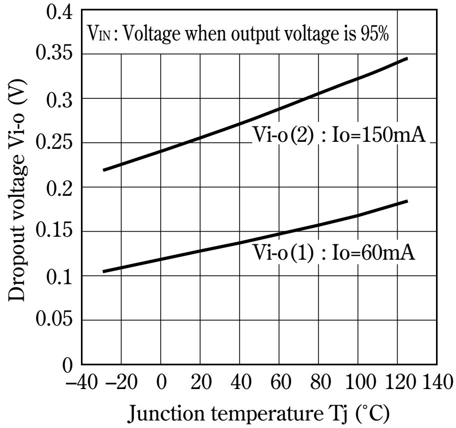


Fig. 9 Quiescent Current vs. Junction Temperature

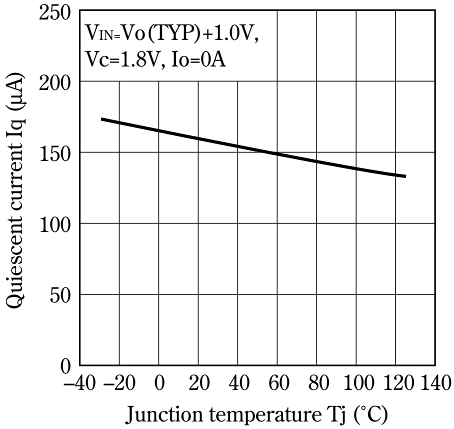


Fig.10 Ripple Rejection vs. Input Ripple Frequency

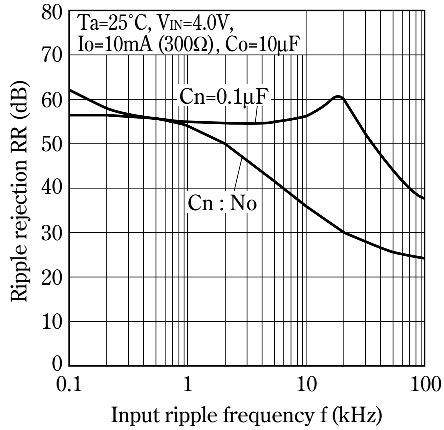


Fig.11 Dropout Voltage vs. Output Current

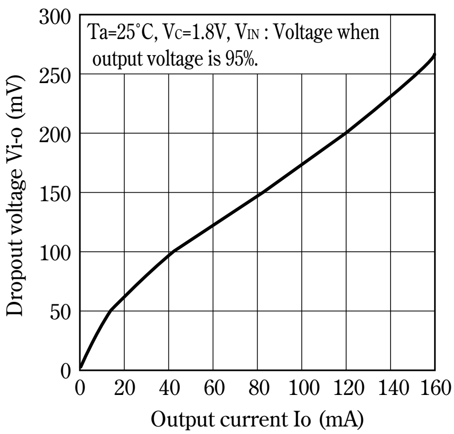
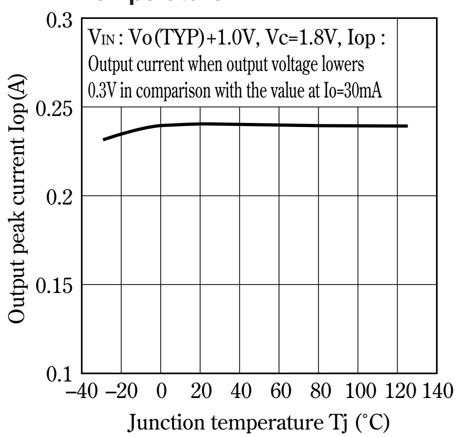
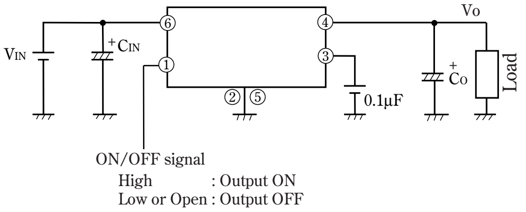


Fig.12 Output Peak Current vs. Junction Temperature



ON/OFF Operation



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  --- Office automation equipment
  --- Telecommunication equipment [terminal]
  --- Test and measurement equipment
  --- Industrial control
  --- Audio visual equipment
  --- Consumer electronics

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  --- Gas leakage sensor breakers
  --- Alarm equipment
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