



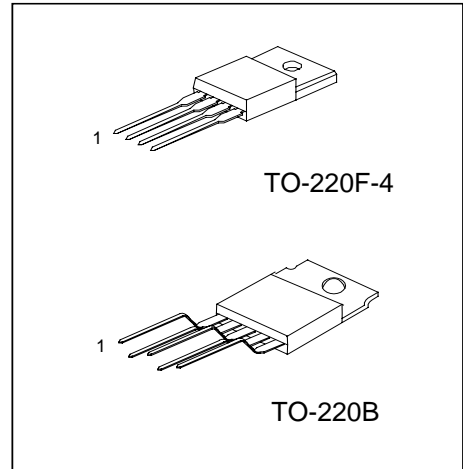
## RXXLD30

Linear Integrated Circuit

### 3A OUTPUT TYPE LOW POWER-LOSS VOLTAGE REGULATOR

#### FEATURES

- \*Low power-loss(Dropout voltage: 0.5V(max) at Io=3.0A)
- \*3.0A output type
- \*Output voltage precision:  $\pm 3.0\%$
- \*Built-in ON/OFF control function and over-current protection circuit.
- \*Thermal shutdown protection.



\*Pb-free plating product number:RXXLD30L

#### PIN DESCRIPTION

PIN NO.		PIN NAME
TO-220F-4	TO-220B	
	1	NC
1	2	INPUT
2	3	OUTPUT
3	4	GND
4	5	ON/OFF

#### ORDERING INFORMATION

Order Number		Package	Packing
Normal	Lead Free Plating		
RxxLD30-TF4-T	RxxLD30L-TF4-T	TO-220F-4	Tube
RxxLD30-TB5-T	RxxLD30L-TB5-T	TO-220B	Tube

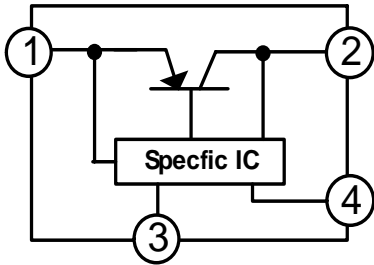
Note: xx: Output Voltage, refer to Marking Information.

#### MARKING INFORMATION

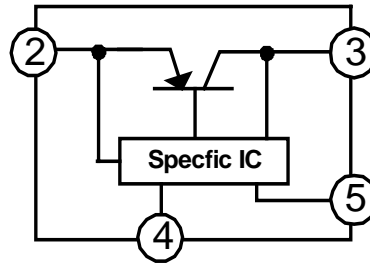
PACKAGE	VOLTAGE CODE	MARKING
TO-220F-4 TO-220B	33 :3.3V 05 :5.0V 09 :9.0V 12 :12 V	<p>UTC RXXLD30L □□□□ Space :Pb/Sn L: Pb-free DATE CODE</p>

■ BLOCK DIAGRAM

TO-220F-4



TO-220B



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■ ABSOLUTE MAXIMUM RATINGS (Ta=25 )

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	20	V
ON/OFF Control Terminal Voltage	V <sub>C</sub>	20	V
Output Current	I <sub>OUT</sub>	3.0	A
Power Dissipation	No Heat Sink	1.4	W
	With Heat Sink	15	W
Junction Temperature	T <sub>J</sub>	125	°C
Operating Temperature	T <sub>OPR</sub>	-20 ~ +85	°C
Storage Temperature	T <sub>STG</sub>	-40 ~ +150	°C

Note: The device is guaranteed to meet performance specification within 0 ~70 operating temperature range and assured by design from -20 ~85 , characteristic and correlation with static process control.

■ ELECTRICAL CHARACTERISTICS (Refer to the test circuits, unless otherwise specified, Ta=25°C)

**For R33LD30(3.3V)**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> =5V, I <sub>OUT</sub> =2A	3.201	3.3	3.399	V
Line Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =4 ~ 10V, I <sub>OUT</sub> =5mA		0.1	2.5	%
Load Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =5V, I <sub>OUT</sub> =5mA ~ 3.0A		0.1	2.0	%
Temperature Coefficient of Output Voltage	TcVo	T <sub>J</sub> =0 ~ 125°C, I <sub>OUT</sub> =5mA		± 0.02		%/°C
Ripple Rejection	RR	Refer to Fig.2	45	55		dB
Dropout Voltage	V <sub>D</sub>	(Note1), I <sub>OUT</sub> =3A			0.5	V
Voltage for Control(Note2)	ON	V <sub>C(ON)</sub> V <sub>IN</sub> =5V	2.0			V
	OFF	V <sub>C(OFF)</sub> V <sub>IN</sub> =5V			0.8	V
Current for Control	ON	I <sub>C(ON)</sub> V <sub>C</sub> =2.7V, V <sub>IN</sub> =5V			20	μA
	OFF	I <sub>C(OFF)</sub> V <sub>C</sub> =0.4V, V <sub>IN</sub> =5V			-0.4	mA
Quiescent Current	I <sub>D</sub>	I <sub>OUT</sub> =0A, V <sub>IN</sub> =5V			10	mA

**For R05LD30(5V)**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	V <sub>IN</sub> =7V, I <sub>OUT</sub> =2A	4.85	5.0	5.15	V
Line Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =6 ~ 12V, I <sub>OUT</sub> =5mA		0.5	2.5	%
Load Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =7V, I <sub>OUT</sub> =5mA ~ 3.0A		0.1	2.0	%
Temperature Coefficient of Output Voltage	TcVo	T <sub>J</sub> =0 ~ 125°C, I <sub>OUT</sub> =5mA		± 0.02		%/°C
Ripple Rejection	RR	Refer to Fig.2	45	55		dB
Dropout Voltage	V <sub>D</sub>	(Note1), I <sub>OUT</sub> =3A			0.5	V
Voltage for Control(Note2)	ON	V <sub>C(ON)</sub> V <sub>IN</sub> =7V	2.0			V
	OFF	V <sub>C(OFF)</sub> V <sub>IN</sub> =7V			0.8	V
Current for Control	ON	I <sub>C(ON)</sub> V <sub>C</sub> =2.7V, V <sub>IN</sub> =7V			20	μA
	OFF	I <sub>C(OFF)</sub> V <sub>C</sub> =0.4V, V <sub>IN</sub> =7V			-0.4	mA
Quiescent Current	I <sub>D</sub>	I <sub>OUT</sub> =0A, V <sub>IN</sub> =7V			10	mA

## For R09LD30(9V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=11V, I_{OUT}=2A$	8.73	9.0	9.27	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=10 \sim 16V, I_{OUT}=5mA$		0.5	2.5	%
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=11V, I_{OUT}=5mA \sim 3.0A$		0.1	2.0	%
Temperature Coefficient of Output Voltage	$TcVo$	$T_J=0 \sim 125^{\circ}C, I_{OUT}=5mA$		$\pm 0.02$		%/ $^{\circ}C$
Ripple Rejection	RR	Refer to Fig.2	45	55		dB
Dropout Voltage	$V_D$	(Note1), $I_{OUT}=3A$			0.5	V
Voltage for Control(Note2)	ON	$V_{C(ON)}$	$V_{IN}=11V$	2.0		V
	OFF	$V_{C(OFF)}$	$V_{IN}=11V$		0.8	V
Current for Control	ON	$I_{C(ON)}$	$V_C=2.7V, V_{IN}=11V$		20	$\mu A$
	OFF	$I_{C(OFF)}$	$V_C=0.4V, V_{IN}=11V$		-0.4	mA
Quiescent Current	$I_D$	$I_{OUT}=0A, V_{IN}=11V$			10	mA

## For R12LD30(12V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=14V, I_{OUT}=2A$	11.64	12.0	12.36	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=13 \sim 19V, I_{OUT}=5mA$		0.5	2.5	%
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=14V, I_{OUT}=5mA \sim 3.0A$		0.1	2.0	%
Temperature Coefficient of Output Voltage	$TcVo$	$T_J=0 \sim 125^{\circ}C, I_{OUT}=5mA$		$\pm 0.02$		%/ $^{\circ}C$
Ripple Rejection	RR	Refer to Fig.2	45	55		dB
Dropout Voltage	$V_D$	(Note1), $I_{OUT}=3A$			0.5	V
Voltage for Control(Note2)	ON	$V_{C(ON)}$	$V_{IN}=14V$	2.0		V
	OFF	$V_{C(OFF)}$	$V_{IN}=14V$		0.8	V
Current for Control	ON	$I_{C(ON)}$	$V_C=2.7V, V_{IN}=14V$		20	$\mu A$
	OFF	$I_{C(OFF)}$	$V_C=0.4V, V_{IN}=14V$		-0.4	mA
Quiescent Current	$I_D$	$I_{OUT}=0A, V_{IN}=14V$			10	mA

Note: 1.Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

2.In case of opening control terminal(pin 5 of TO-220B, pin 4 of TO-220F-4), output voltage turns on.

### TEST CIRCUIT

Note : ( ) : TO-220F-4, ( ) : TO-220B

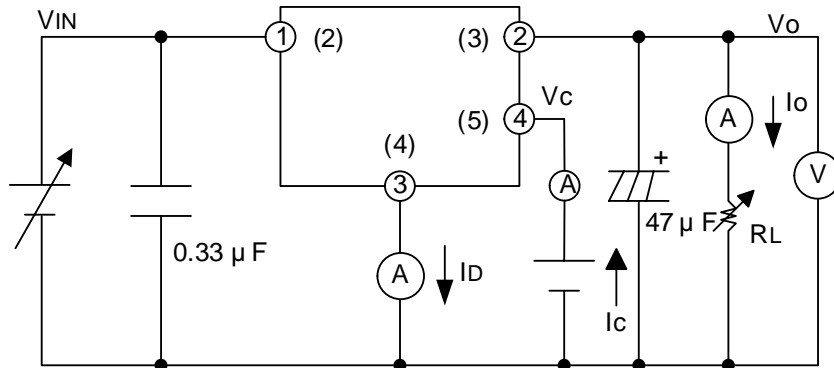
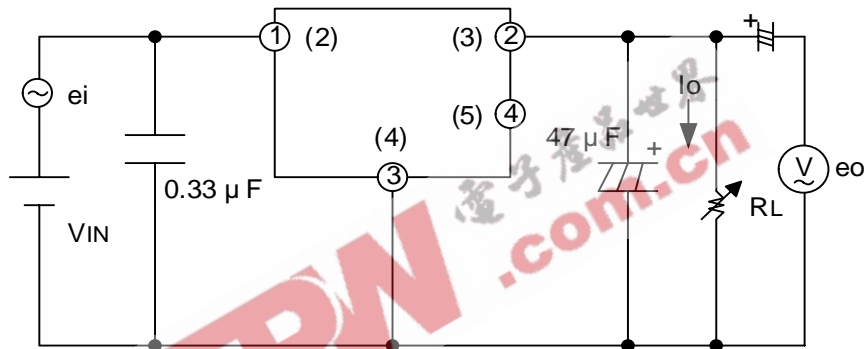


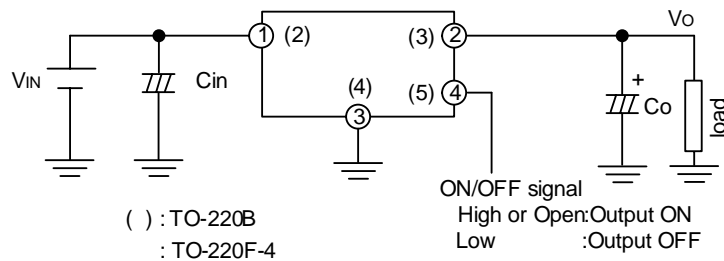
Fig.1



$V_{IN}=5V(R33LD30)$        $f=120Hz$   
 $7V(R05LD30)$        $e_i=0.5V_{rms}$   
 $11V(R09LD30)$        $I_o=0.5A$   
 $14V(R12LD30)$        $RR=20\log(e_i/e_o)$

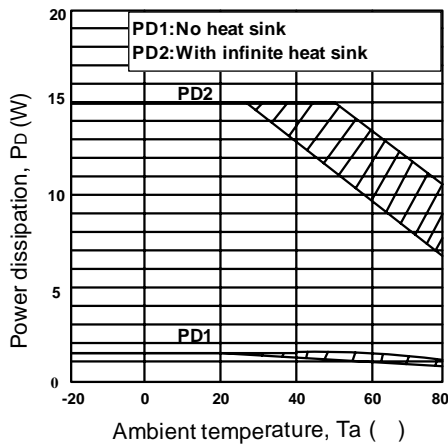
Fig.2 For Ripple Rejection

### TYPICAL APPLICATION



## TYPICAL CHARACTERISTICS

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) (R33LD30)

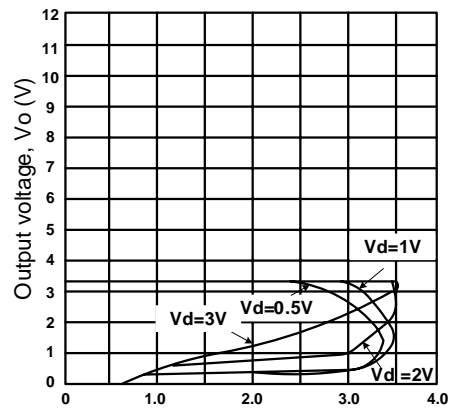


Fig.5 Overcurrent Protection Characteristics (Typical Value)(R05LD30)

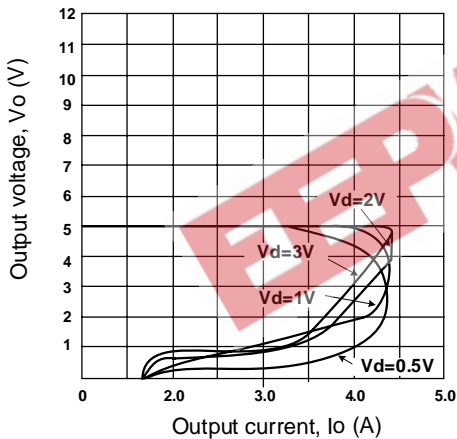


Fig.6 Overcurrent Protection Characteristics (Typical Value)(R09LD30)

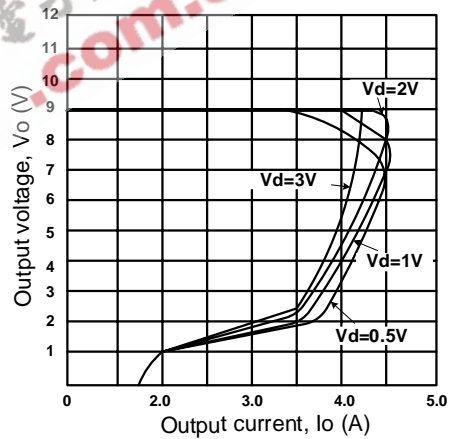


Fig.7 Overcurrent Protection Characteristics (Typical Value)(R12LD30)

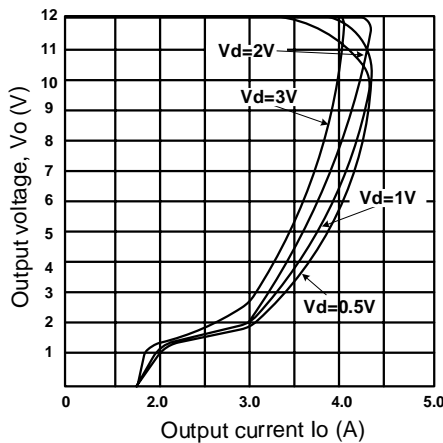
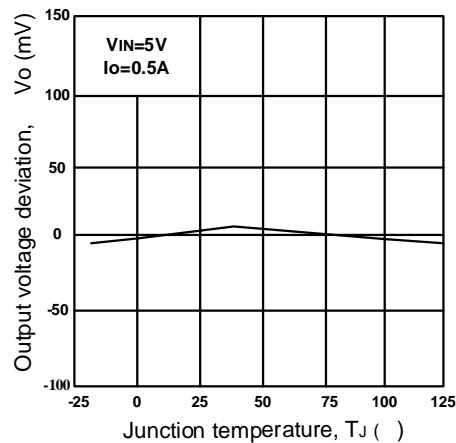


Fig.8 Output Voltage Deviation vs .Junction Temperature (R03LD30)



### ■ TYPICAL CHARACTERISTICS(cont.)

Fig.9 Output Voltage Deviation vs .Junction Temperature (R05LD30)

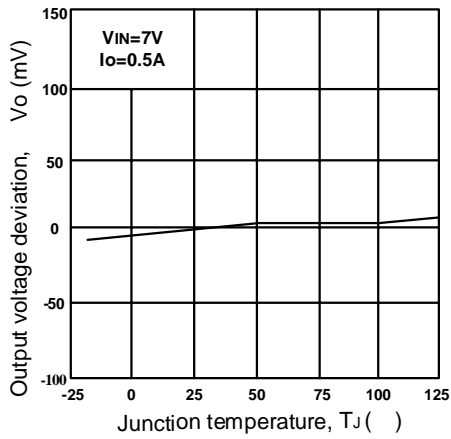


Fig.10 Output Voltage Deviation vs .Junction Temperature (R09LD30)

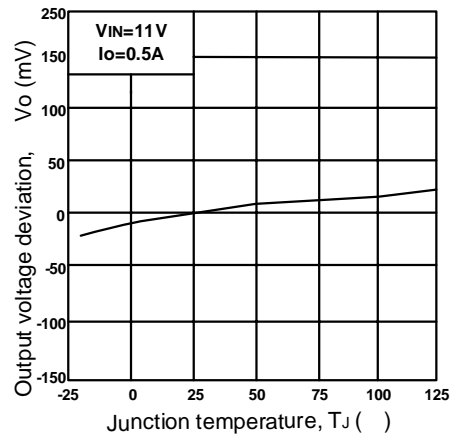


Fig.11 Output Voltage Deviation vs .Junction Temperature (R12LD30)

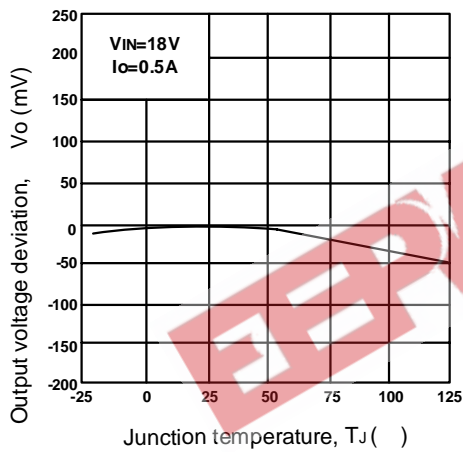


Fig.12 Output Voltage vs .Input Voltage (R33LD30)

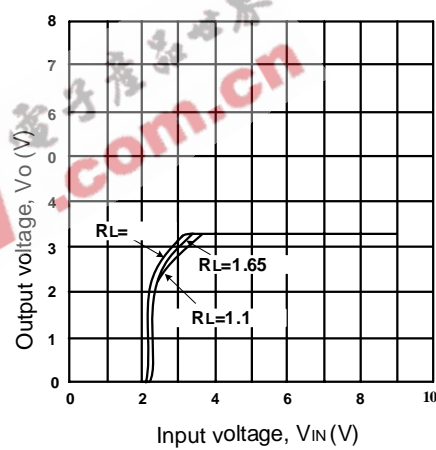


Fig.13 Output Voltage vs .Input Voltage (R05LD30)

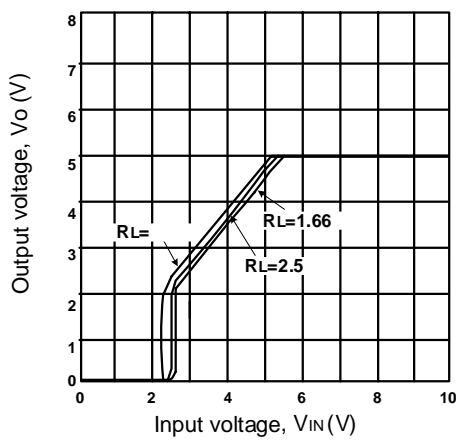
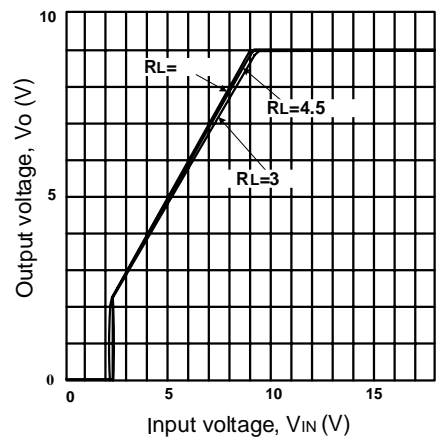


Fig.14 Output Voltage vs .Input Voltage (R09LD30)



### ■ TYPICAL CHARACTERISTICS(cont.)

Fig.15 Output Voltage vs .Input Voltage (R12LD30)

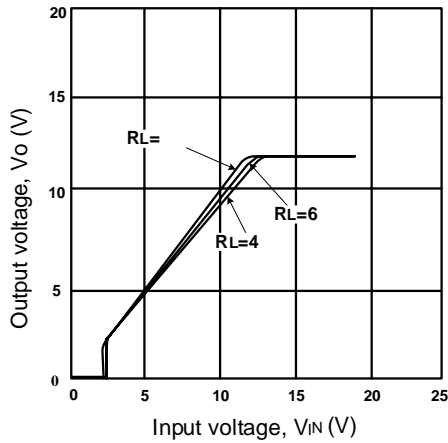


Fig.16 Circuit Operating Current vs .Input Voltage (R33LD30)

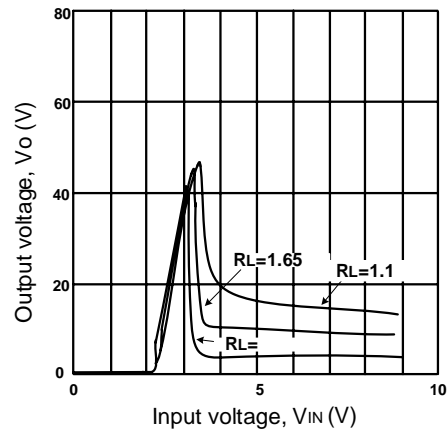


Fig.17 Circuit Operating Current vs .Input Voltage (R05LD30)

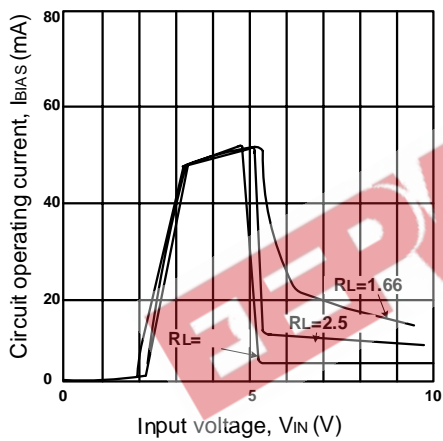


Fig.18 Circuit Operating Current vs .Input Voltage (R09LD30)

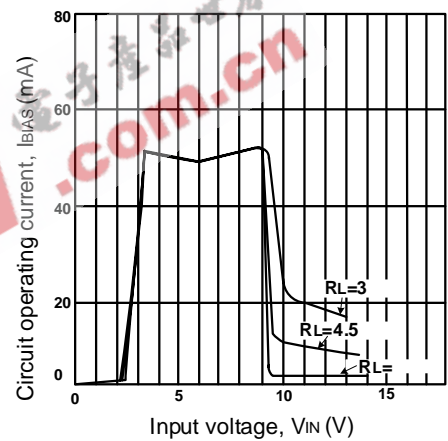


Fig.19 Circuit Operating Current vs .Input Voltage (R12LD30)

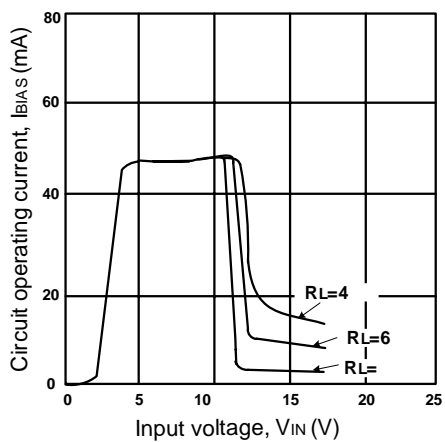
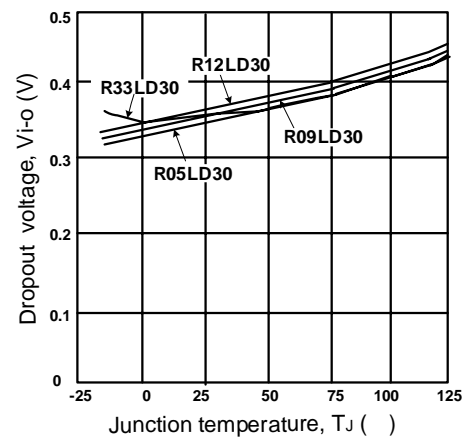


Fig.20 Dropout Voltage vs .Junction Temperature





■ TYPICAL CHARACTERISTICS(cont.)

Fig.21 Quiescent Current vs .Junction Temperature

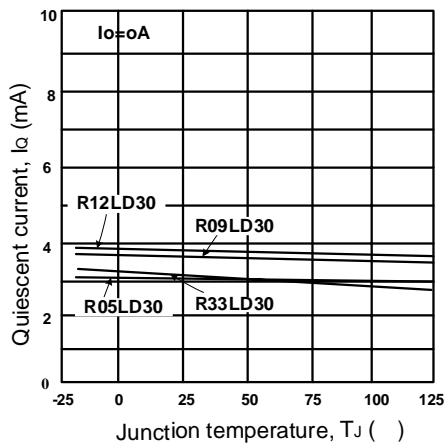
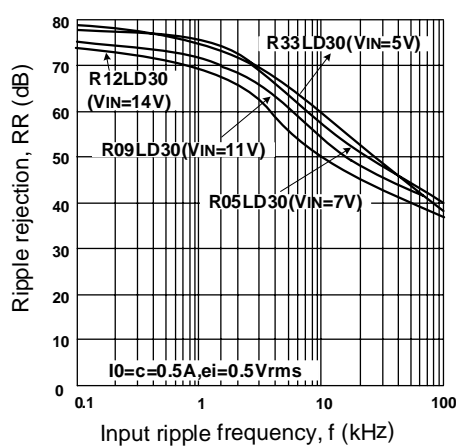


Fig.22 Ripple Rejection vs .Input Ripple Frequency



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