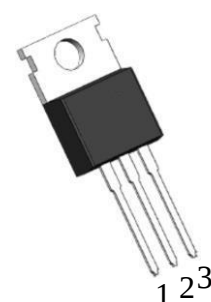


Three Terminal Voltage Regulators 三端稳压管 RCP78XX

产品特性 Features

输出电压 Output Voltage	稳压管 Regulators
5V	RCP7805
8V	RCP7808
9V	RCP7809
12V	RCP7812
15V	RCP7815
24V	RCP7824
最大输出电流 Max Output Current	1.5A
过载保护 Internal thermal overload prection	
短路电流限制 Internal short-current limiting	
输出端最大安全工作区域 Output transistor safe-area compensation	
输出电压精度在 4%以内 Output voltage offered in 4% tolerance	

封装形式 Package



1:Input 2:GND 3:Output

功能图 Functional diagram

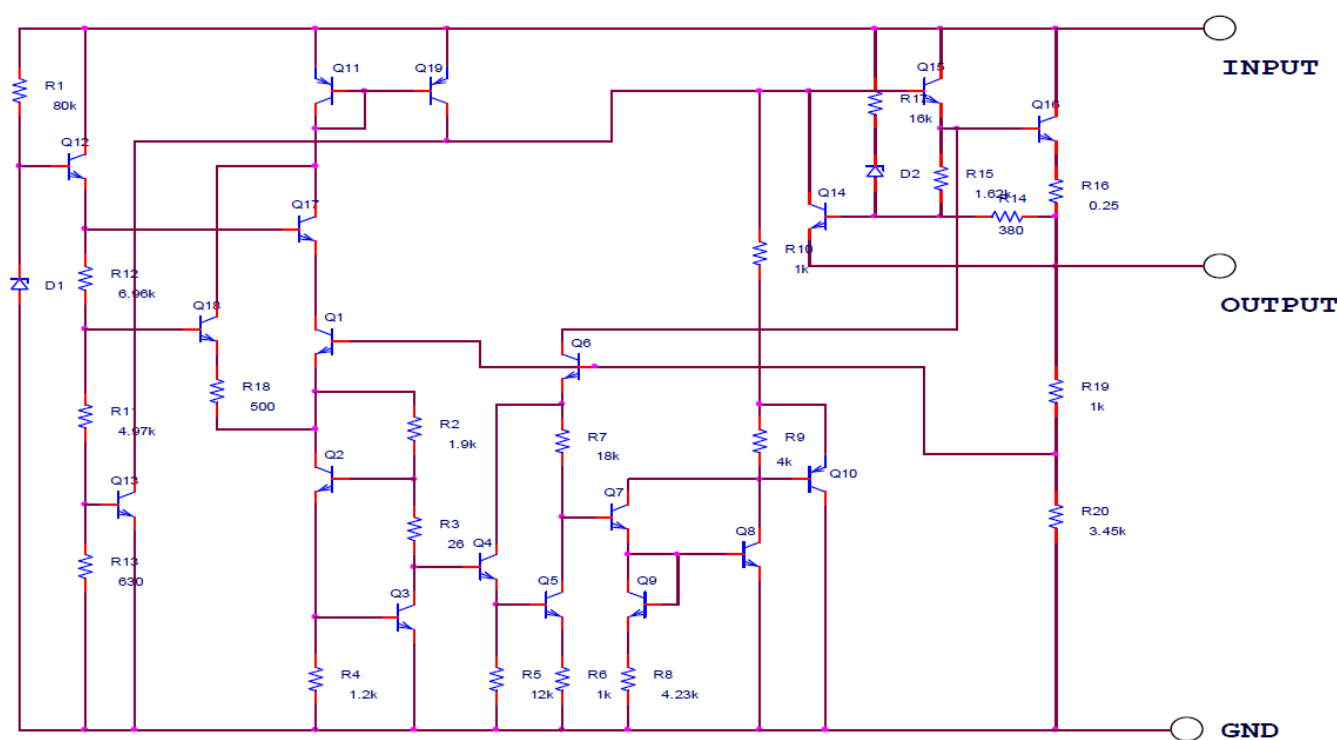


Fig.1

绝对最大额定值 Absolute Maximum Rating ($T_a = 25^{\circ}\text{C}$ unless otherwise noted)

Parameter 项目	Symbol 符号	Limit 极限值		Unit
输入电压 Input Voltage	V_{in}	for $V_o=5\text{V}$ to $V_o=18\text{V}$	35	V
		for $V_o=24\text{V}$	40	
功率损耗 Power Dissipation	P_D	Internal Limited		W
结温 Junction Temperature	T_j	+125		$^{\circ}\text{C}$
存储温度 Storage Temperature Range	T_{STG}	-65~+150		$^{\circ}\text{C}$
结-壳的热阻 Thermal Resistance -Junction to Case	$R_{\theta JC}$	5		$^{\circ}\text{C/W}$
结-环境的热阻 Thermal Resistance -Junction to Ambient	$R_{\theta JA}$	50		$^{\circ}\text{C/W}$

Three Terminal Voltage Regulators 三端稳压管 RCP78XX

RCP7805 电参数特性 Electrical Characteristics

($V_{in}=10V$, $I_{out}=500mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$, $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$; unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
输出电压 Output voltage	V_{out}	$T_j=25^{\circ}C$ $7.5V \leq V_{in} \leq 20V$, $5mA \leq I_{out} \leq 1A$, $PD \leq 15W$	4.80 4.75	5 5	5.20 5.25	V
线性调节 Line Regulation	REG _{line}	$T_j=25^{\circ}C$ $7.5V \leq V_{in} \leq 25V$ $8V \leq V_{in} \leq 12V$	-- --	5 2	50 25	mV
负载调节 Load Regulation	REG _{load}	$T_j=25^{\circ}C$ $5mA \leq I_{out} \leq 1.5A$ $250mA \leq I_{out} \leq 750mA$	-- --	25 10	50 25	mV
静态电流 Quiescent Current	I_q	$I_{out}=0$, $T_j=25^{\circ}C$	--	4.0	8	mA
静态电流变化 Quiescent Current Change	ΔI_q	$8.0V \leq V_{in} \leq 25V$ $5mA \leq I_{out} \leq 1A$	-- --	-- --	0.8 0.5	mA
输出电压纹波 Output Noise Voltage	V_n	$10Hz \leq f \leq 100KHz$, $T_j=25^{\circ}C$	--	42	--	μV
浪涌衰减 Ripple Rejection Ratio	RR	$f=120Hz$, $8V \leq V_{in} \leq 18V$	62	73	--	dB
衰减电压 Voltage Drop	V_{drop}	$I_{out}=1A$, $T_j=25^{\circ}C$	--	2	--	V
短路电流 Output Short Circuit Current	I_{os}	$T_j=25^{\circ}C$	--	200	--	mA
峰值电流 Peak Output Current	$I_{o\ peak}$	$T_j=25^{\circ}C$	--	2.2	--	A
输出电压特性 Temperature Coefficient of Output Voltage	$\Delta V_{out}/\Delta T_j$	$I_{out}=5mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$	--	-0.2	--	mV/ $^{\circ}C$
输出端电阻 Output resistance	R_o	$f=1KHz$	--	15	--	m Ω

RCP7808 电参数特性 Electrical Characteristics

($V_{in}=14V$, $I_{out}=500mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$, $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$; unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
输出电压 Output voltage	V_{out}	$T_j=25^{\circ}C$ $11V \leq V_{in} \leq 23V$, $5mA \leq I_{out} \leq 1A$, $PD \leq 15W$	7.7 7.6	8.0 8.0	8.3 8.4	V
线性调节 Line Regulation	REG _{line}	$T_j=25^{\circ}C$ $10.5V \leq V_{in} \leq 25V$ $11V \leq V_{in} \leq 17V$	-- --	8.0 3.0	80 40	mV
负载调节 Load Regulation	REG _{load}	$T_j=25^{\circ}C$ $5mA \leq I_{out} \leq 1.5A$ $250mA \leq I_{out} \leq 750mA$	-- --	30 10	80 40	mV
静态电流 Quiescent Current	I_q	$I_{out}=0$, $T_j=25^{\circ}C$	--	5.0	8	mA
静态电流变化 Quiescent Current Change	ΔI_q	$11V \leq V_{in} \leq 25V$ $5mA \leq I_{out} \leq 1A$	-- --	-- --	0.8 0.5	mA
输出电压纹波 Output Noise Voltage	V_n	$10Hz \leq f \leq 100KHz$, $T_j=25^{\circ}C$	--	52	--	μV
浪涌衰减 Ripple Rejection Ratio	RR	$f=120Hz$, $11.5V \leq V_{in} \leq 21.5V$	56	73	--	dB
衰减电压 Voltage Drop	V_{drop}	$I_{out}=1A$, $T_j=25^{\circ}C$	--	2	--	V
短路电流 Output Short Circuit Current	I_{os}	$T_j=25^{\circ}C$	--	200	--	mA
峰值电流 Peak Output Current	$I_{o\ peak}$	$T_j=25^{\circ}C$	--	2.2	--	A
输出电压特性 Temperature Coefficient of Output Voltage	$\Delta V_{out}/\Delta T_j$	$I_{out}=5mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$	--	-0.2	--	mV/ $^{\circ}C$
输出端电阻 Output resistance	R_o	$f=1KHz$	--	17	--	m Ω

Three Terminal Voltage Regulators 三端稳压管 RCP78XX

RCP7809 电参数特性 Electrical Characteristics

($V_{in}=15V$, $I_{out}=500mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$, $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$; unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
输出电压 Output voltage	V_{out}	$T_j=25^{\circ}C$ $11.5V \leq V_{in} \leq 24V$, $5mA \leq I_{out} \leq 1A$, $PD \leq 15W$	8.65 8.6	9.0 9.0	9.35 9.4	V
线性调节 Line Regulation	REGline	$T_j=25^{\circ}C$ $11.5V \leq V_{in} \leq 25V$ $12V \leq V_{in} \leq 17V$	-- --	8.0 3.0	90 45	mV
负载调节 Load Regulation	REGload	$T_j=25^{\circ}C$ $5mA \leq I_{out} \leq 1.5A$ $250mA \leq I_{out} \leq 750mA$	-- --	30 10	90 45	mV
静态电流 Quiescent Current	I_q	$I_{out}=0$, $T_j=25^{\circ}C$	--	4.0	8	mA
静态电流变化 Quiescent Current Change	ΔI_q	$12V \leq V_{in} \leq 26V$ $5mA \leq I_{out} \leq 1A$	-- --	-- --	0.8 0.5	mA
输出电压纹波 Output Noise Voltage	V_n	$10Hz \leq f \leq 100KHz$, $T_j=25^{\circ}C$	--	58	--	μV
浪涌衰减 Ripple Rejection Ratio	RR	$f=120Hz$, $11.5V \leq V_{in} \leq 21.5V$	56	73	--	dB
衰减电压 Voltage Drop	V_{drop}	$I_{out}=1A$, $T_j=25^{\circ}C$	--	2	--	V
短路电流 Output Short Circuit Current	I_{os}	$T_j=25^{\circ}C$	--	200	--	mA
峰值电流 Peak Output Current	$I_{o\ peak}$	$T_j=25^{\circ}C$	--	2.2	--	A
输出电压特性 Temperature Coefficient of Output Voltage	$\Delta V_{out}/\Delta T_j$	$I_{out}=5mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$	--	-0.2	--	$mV/^{\circ}C$
输出端电阻 Output resistance	R_o	$f=1KHz$	--	15	--	$m\Omega$

RCP7812 电参数特性 Electrical Characteristics

($V_{in}=19V$, $I_{out}=500mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$, $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$; unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
输出电压 Output voltage	V_{out}	$T_j=25^{\circ}C$ $14.5V \leq V_{in} \leq 27V$, $5mA \leq I_{out} \leq 1A$, $PD \leq 15W$	11.5 11.4	12.0 12.0	12.5 12.6	V
线性调节 Line Regulation	REGline	$T_j=25^{\circ}C$ $14.5V \leq V_{in} \leq 30V$ $16V \leq V_{in} \leq 22V$	-- --	10 3	120 60	mV
负载调节 Load Regulation	REGload	$T_j=25^{\circ}C$ $5mA \leq I_{out} \leq 1.5A$ $250mA \leq I_{out} \leq 750mA$	-- --	30 10	120 60	mV
静态电流 Quiescent Current	I_q	$I_{out}=0$, $T_j=25^{\circ}C$	--	4.0	8	mA
静态电流变化 Quiescent Current Change	ΔI_q	$15V \leq V_{in} \leq 30V$ $5mA \leq I_{out} \leq 1A$	-- --	-- --	0.8 0.5	mA
输出电压纹波 Output Noise Voltage	V_n	$10Hz \leq f \leq 100KHz$, $T_j=25^{\circ}C$	--	76	--	μV
浪涌衰减 Ripple Rejection Ratio	RR	$f=120Hz$, $15V \leq V_{in} \leq 25V$	55	71	--	dB
衰减电压 Voltage Drop	V_{drop}	$I_{out}=1A$, $T_j=25^{\circ}C$	--	2	--	V
短路电流 Output Short Circuit Current	I_{os}	$T_j=25^{\circ}C$	--	200	--	mA
峰值电流 Peak Output Current	$I_{o\ peak}$	$T_j=25^{\circ}C$	--	2.2	--	A
输出电压特性 Temperature Coefficient of Output Voltage	$\Delta V_{out}/\Delta T_j$	$I_{out}=5mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$	--	-0.2	--	$mV/^{\circ}C$
输出端电阻 Output resistance	R_o	$f=1KHz$	--	18	--	$m\Omega$

Three Terminal Voltage Regulators 三端稳压管 RCP78XX

RCP7815 电参数特性 Electrical Characteristics

($V_{in}=23V$, $I_{out}=500mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$, $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$; unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
输出电压 Output voltage	V_{out}	$T_j=25^{\circ}C$ $17.5V \leq V_{in} \leq 30V$, $5mA \leq I_{out} \leq 1A$, $PD \leq 15W$	14.4 14.25	15.0 15.0	15.6 15.75	V
线性调节 Line Regulation	REGline	$T_j=25^{\circ}C$ $17.5V \leq V_{in} \leq 30V$ $20V \leq V_{in} \leq 26V$	-- --	12 5	150 75	mV
负载调节 Load Regulation	REGload	$T_j=25^{\circ}C$ $5mA \leq I_{out} \leq 1.5A$ $250mA \leq I_{out} \leq 750mA$	-- --	35 10	150 75	mV
静态电流 Quiescent Current	I_q	$I_{out}=0$, $T_j=25^{\circ}C$	--	4.0	8	mA
静态电流变化 Quiescent Current Change	ΔI_q	$18V \leq V_{in} \leq 30.5V$ $5mA \leq I_{out} \leq 1A$	-- --	-- --	0.8 0.5	mA
输出电压纹波 Output Noise Voltage	V_n	$10Hz \leq f \leq 100KHz$, $T_j=25^{\circ}C$	--	90	--	μV
浪涌衰减 Ripple Rejection Ratio	RR	$f=120Hz$, $18.5V \leq V_{in} \leq 28.5V$	54	70	--	dB
衰减电压 Voltage Drop	V_{drop}	$I_{out}=1A$, $T_j=25^{\circ}C$	--	2	--	V
短路电流 Output Short Circuit Current	I_{os}	$T_j=25^{\circ}C$	--	200	--	mA
峰值电流 Peak Output Current	$I_{o peak}$	$T_j=25^{\circ}C$	--	2.2	--	A
输出电压特性 Temperature Coefficient of Output Voltage	$\Delta V_{out} / \Delta T_j$	$I_{out}=5mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$	--	-0.2	--	$mV/^{\circ}C$
输出端电阻 Output resistance	R_o	$f=1KHz$	--	19	--	$m\Omega$

RCP7824 电参数特性 Electrical Characteristics

($V_{in}=33V$, $I_{out}=500mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$, $C_{in}=0.33\mu F$, $C_{out}=0.1\mu F$; unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
输出电压 Output voltage	V_{out}	$T_j=25^{\circ}C$ $27V \leq V_{in} \leq 38V$, $5mA \leq I_{out} \leq 1A$, $PD \leq 15W$	23 22.8	24 24	25 25.2	V
线性调节 Line Regulation	REGline	$T_j=25^{\circ}C$ $27V \leq V_{in} \leq 38V$ $30V \leq V_{in} \leq 36V$	-- --	15 6	240 120	mV
负载调节 Load Regulation	REGload	$T_j=25^{\circ}C$ $5mA \leq I_{out} \leq 1.5A$ $250mA \leq I_{out} \leq 750mA$	-- --	35 10	240 120	mV
静态电流 Quiescent Current	I_q	$I_{out}=0$, $T_j=25^{\circ}C$	--	4.0	8	mA
静态电流变化 Quiescent Current Change	ΔI_q	$27V \leq V_{in} \leq 38V$ $5mA \leq I_{out} \leq 1A$	-- --	-- --	1.0 0.5	mA
输出电压纹波 Output Noise Voltage	V_n	$10Hz \leq f \leq 100KHz$, $T_j=25^{\circ}C$	--	160	--	μV
浪涌衰减 Ripple Rejection Ratio	RR	$f=120Hz$, $28V \leq V_{in} \leq 38V$	50	67	--	dB
衰减电压 Voltage Drop	V_{drop}	$I_{out}=1A$, $T_j=25^{\circ}C$	--	2	--	V
短路电流 Output Short Circuit Current	I_{os}	$T_j=25^{\circ}C$	--	200	--	mA
峰值电流 Peak Output Current	$I_{o peak}$	$T_j=25^{\circ}C$	--	2.2	--	A
输出电压特性 Temperature Coefficient of Output Voltage	$\Delta V_{out} / \Delta T_j$	$I_{out}=5mA$, $0^{\circ}C \leq T_j \leq 125^{\circ}C$	--	-0.2	--	$mV/^{\circ}C$
输出端电阻 Output resistance	R_o	$f=1KHz$	--	28	--	$m\Omega$

Three Terminal Voltage Regulators 三端稳压管 RCP78XX

测试电路 Test Circuits

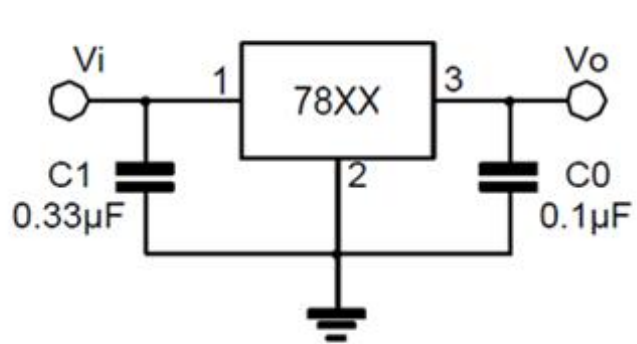


FIG.2 DC PARAMETERS

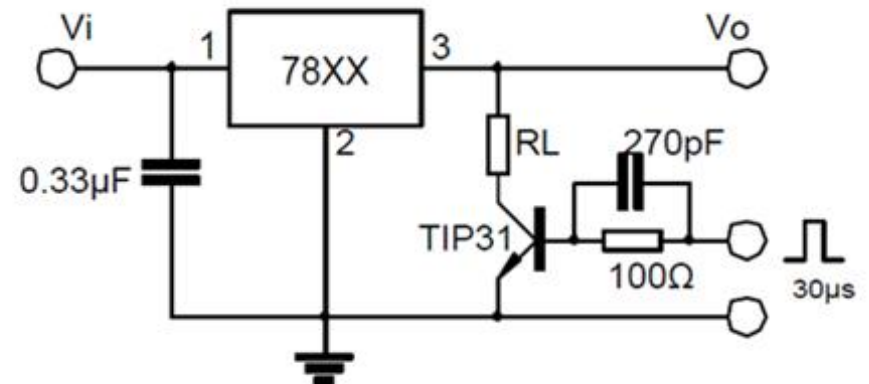


FIG.3 LOAD REGULATION

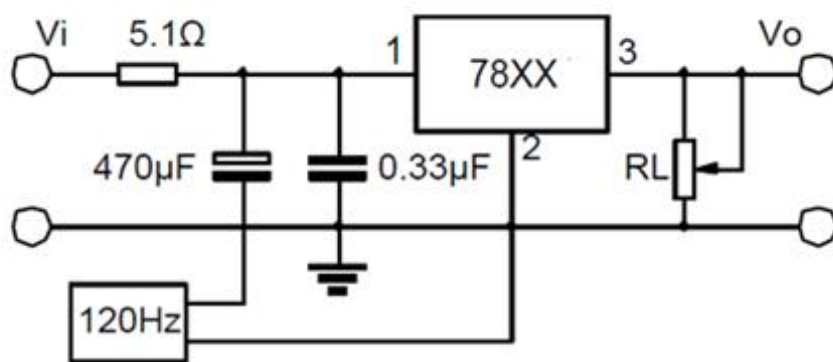


FIG.4 RIPPLE REJECTION

Three Terminal Voltage Regulators 三端稳压管 RCP78XX

典型应用电路 Typical application circuit

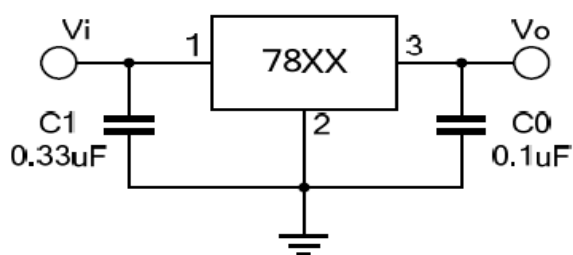


Fig.5 Fixed output regulator

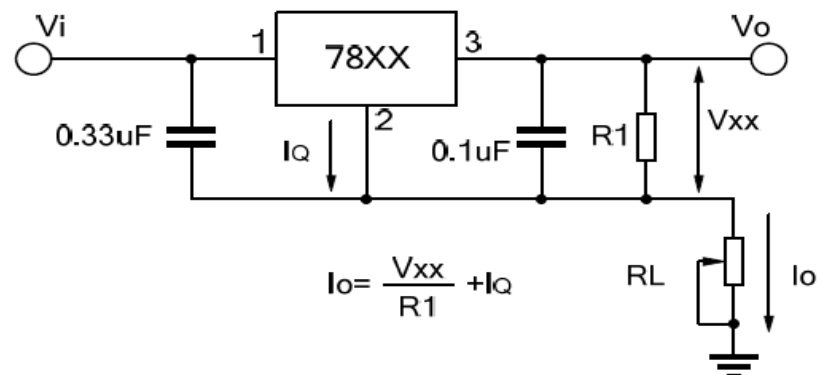


Fig.6 Constant current regulator

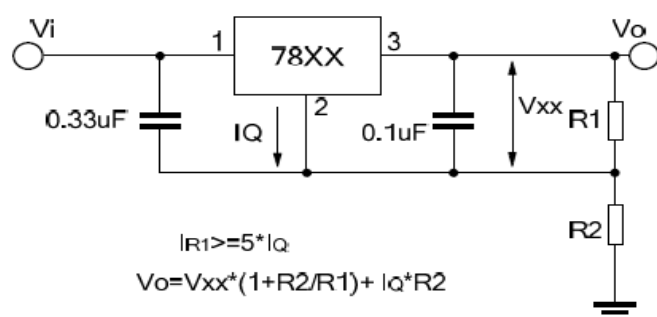


Fig.7 Circuit for increasing Regulator output voltage

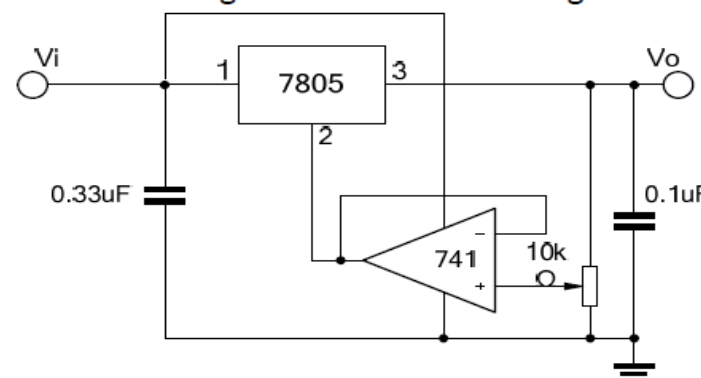
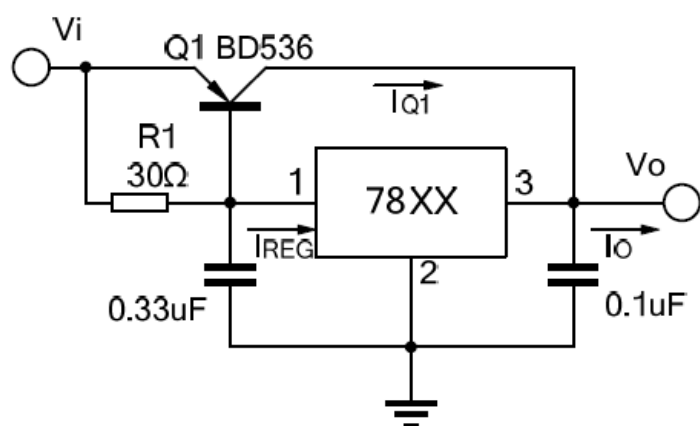


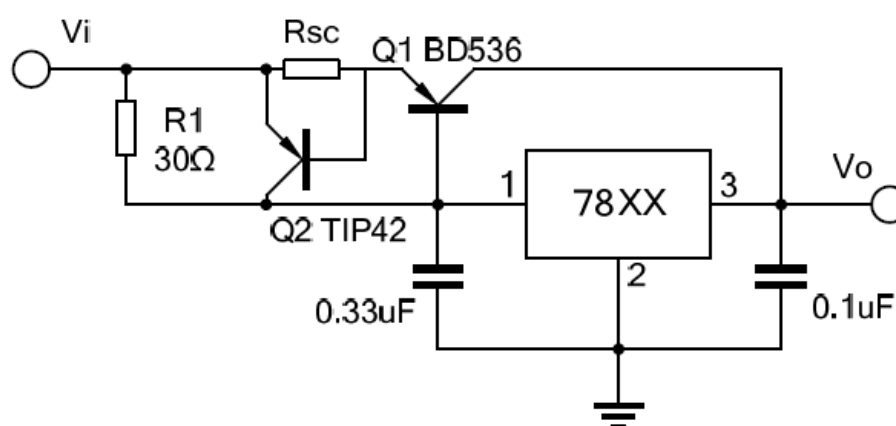
Fig.8 Adjustable output



$$I_o = I_{REG} * (I_{REG} - V_{BEQ1} / R1)$$

$$R1 = V_{BEQ1} / (I_{REG} - I_{Q1} * Q1)$$

Fig.9.1 High current with voltage regulator



$$R_{sc} = V_{BEQ2} / I_{sc}$$

Fig.9.2 High output current short circuit protection

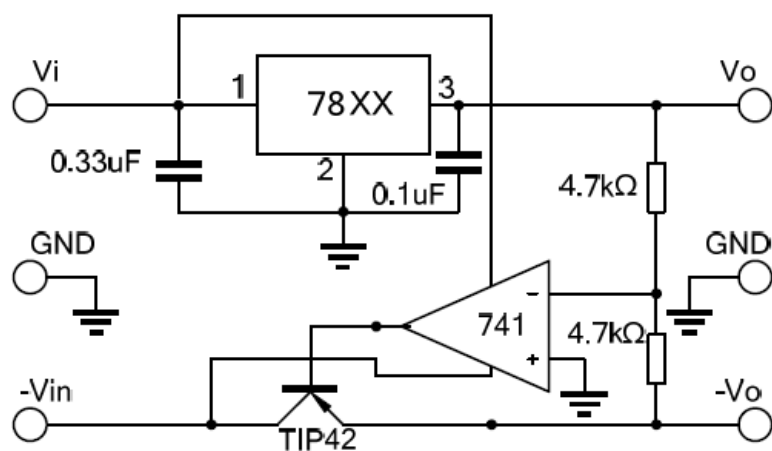


Fig.10 Tracking voltage regulator

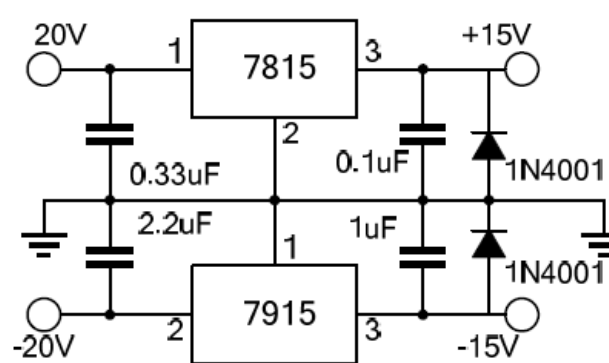


Fig.11 Split power supply (±15V, 1A)

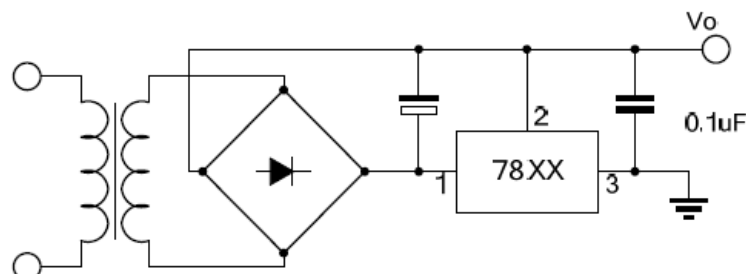


Fig.12 Negative output voltage circuit

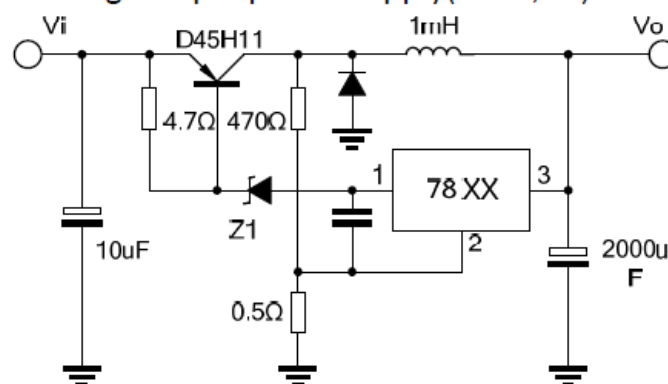


Fig.13 switching regulator

Three Terminal Voltage Regulators 三端稳压管 RCP78XX

典型特性曲线 Typical performance characteristics

Fig.14 Quiescent current

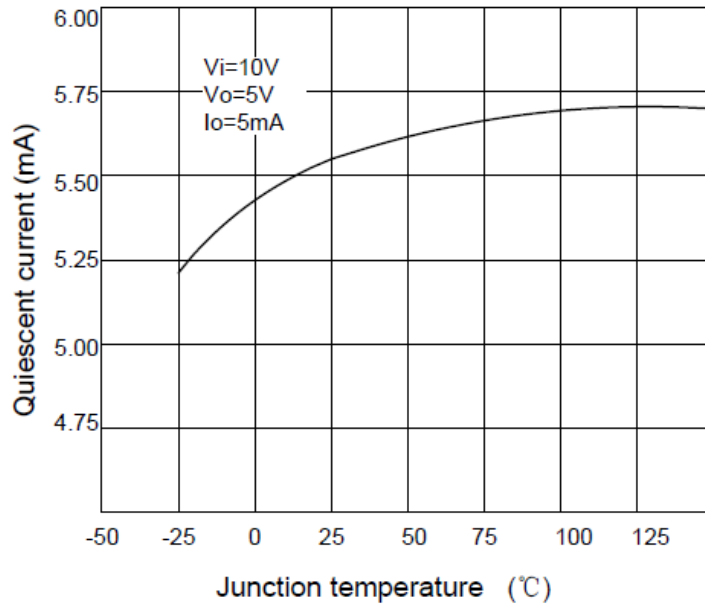


Fig.15 Output voltage

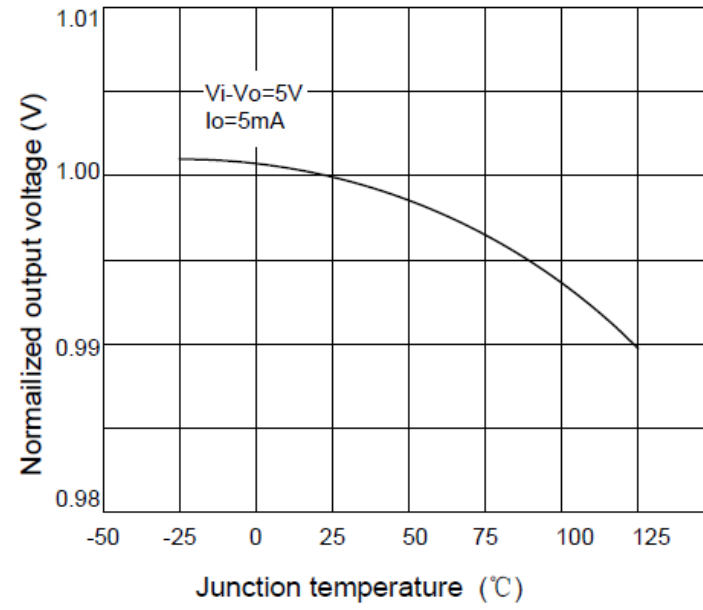


Fig.16 Peak output current

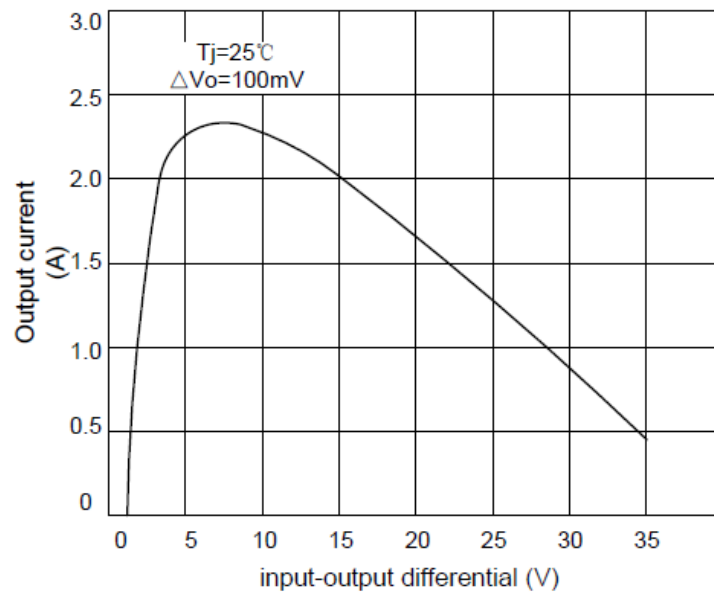
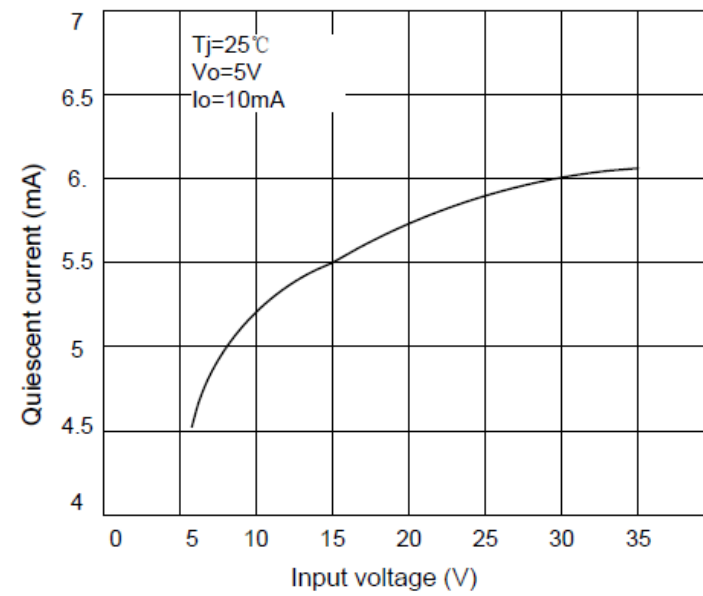
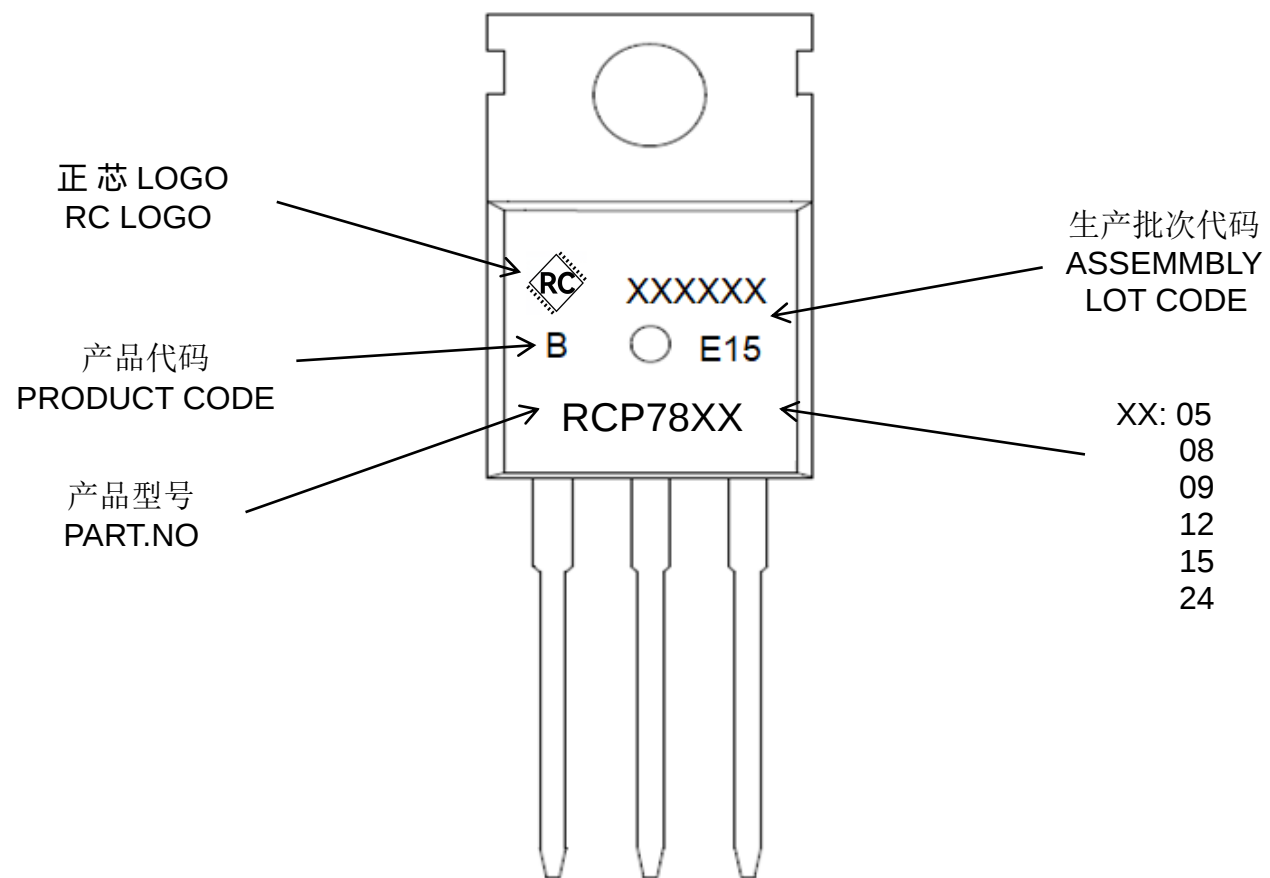


Fig.17 Quiescent current



Three Terminal Voltage Regulators 三端稳压管 RCP78XX

印记 Marking:

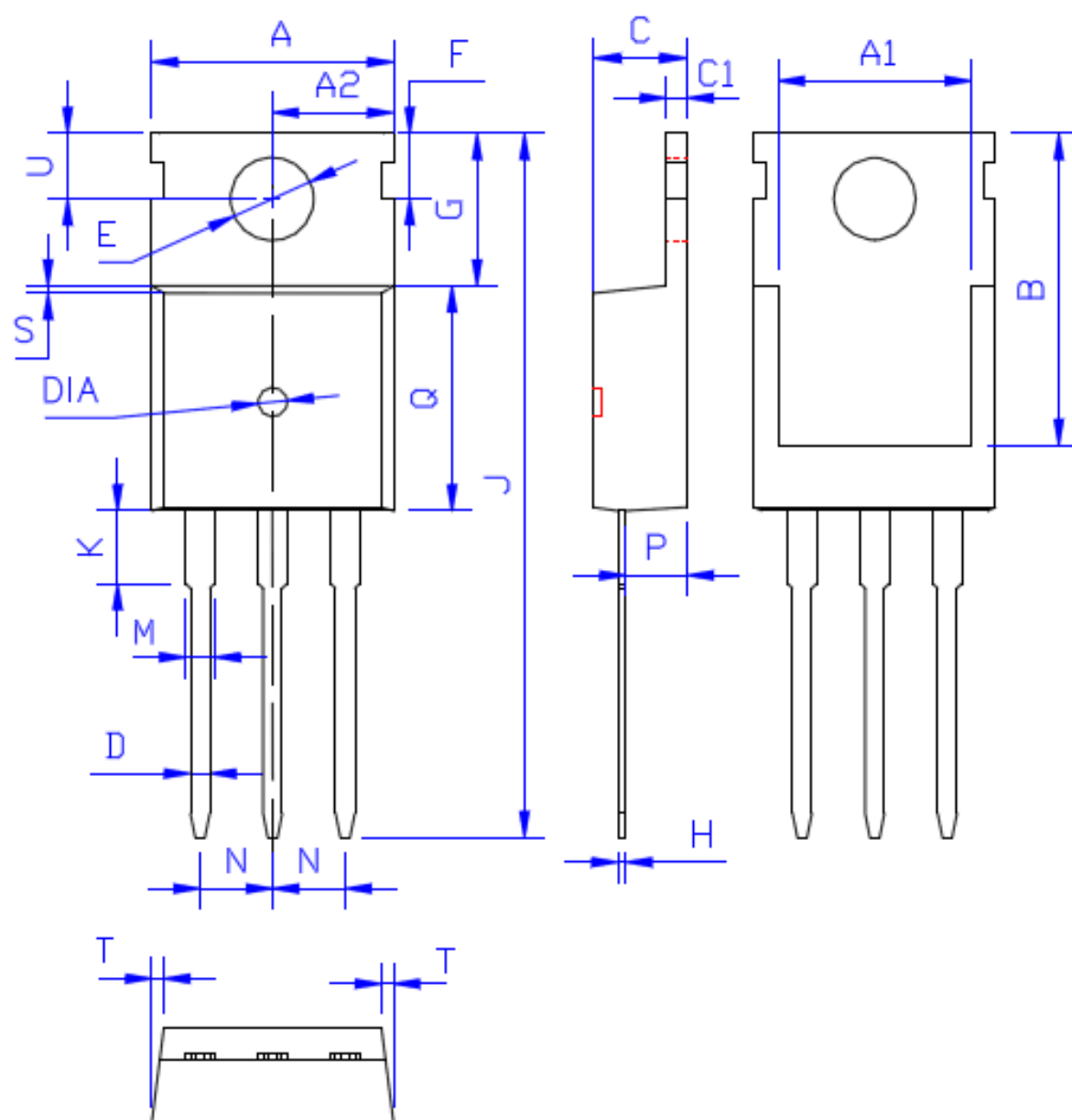


Three Terminal Voltage Regulators 三端稳压管 RCP78XX

外形尺寸:

Package Dimension:

TO-220



DIM	MILLIMETERS
A	10.00±0.30
A1	8.00±0.30
A2	5.00±0.30
B	13.20±0.40
C	4.50±0.20
C1	1.30±0.20
D	0.80±0.20
E	3.60±0.20
F	3.00±0.30
G	6.60±0.40
H	0.50±0.20
J	28.88±0.50
K	3.00±0.30
M	1.30±0.30
N	Typical 2.54
P	2.40±0.40
Q	9.20±0.40
S	0.25±0.15
T	0.25±0.15
U	2.80±0.30
DIA	宽 1.50±0.10 深 0.50 MAX

(Unit: mm)