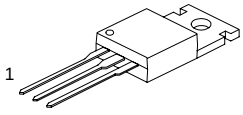
UTC79XX LINEAR INTEGRATED CIRCUIT

3 TERMINAL 1.5A NEGATIVE VOLTAGE REGULATORS



TO-220

1:GND; 2:INPUT; 3:OUTPUT

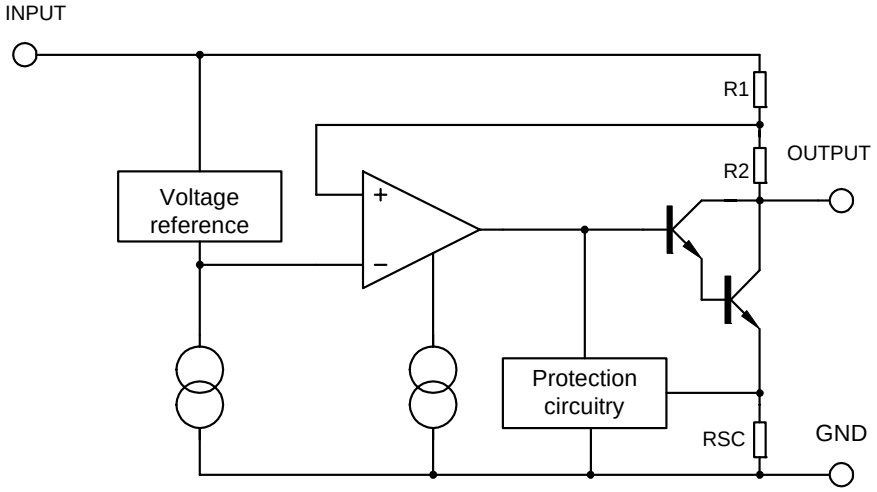
DESCRIPTION

The UTC79XX series of three-terminal negative regulators is available in TO-220 package and with several fixed output voltage, making them useful in a wide range of application. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided ,they can deliver over 1.5A output current, Although designed as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltage and currents.

FEATURES

*Output current up to 1.5A
*-5V;-6V;-8V;9V;10V;-12V;-15V;-18V;-24V output voltage available
*Thermal overload protection
*Short circuit protection
*Output transistor SOA protection

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS(Ta=25°C)

Characteristic		Symbol	Value	Unit
Input voltage	for Vo=5V to 18V	Vi	-35	V
	for Vo=24V	Vi	-40	V
Thermal resistance junction-air		$R_{\theta JA}$	65	°C/W
Thermal resistance junction-cases		$R_{\theta JC}$	5	°C/W
Operating Temperature		Topr	0~ +125	°C
Storage Temperature		Tstg	-65 ~ +150	℃

UTC7905 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=-10V,Ci=2.2μF, Co=1μF, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-4.8	-5.0	-5.2	V
		5.0mA<Io<1.0A,Po<15W Vi=-7V to -20V	-4.75	-5.00	-5.25	V
Line regulation	ΔVo*	Tj=25°C,Vi=-7V to -25V		10	100	mV
		Tj=25°C,Vi=-8V to -12V		5	50	mV
Load regulation	ΔVo*	Tj=25°C,Io=5.0mA to 1.5A		10	100	mV
		Tj=25°C,Io=250mA to 750mA		3	50	mV
Quiescent current	I_Q	Tj=25°C		5	8	mA
Quiescent current change	ΔI_Q	Io=5mA to 1.0A			0.5	mA
		Vi=-8V to -25V			0.8	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-0.4		mV/°C
Output noise voltage	V_N	f=10Hz to 100kHz,Ta=25°C		100		μV
Ripple rejection	RR	f=120Hz, Vi=-8V to -18V	54	60		dB
Dropout voltage	V_D	Io=1.0A,Tj=25°C, ΔVo=100mV		1.4		V
Short circuit current	Isc	Vi=-35V,Ta=25°C		10		mA
peak current	Ipk	Tj=25°C		2.2		A

* load and line regulation are specified at constant junction temperature.Changes in Vo due to heating effects must be taken inti account separately.Pulse testing with low duty cycle is used.

UTC7906 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=-11V,Ci=2.2μF, Co=1μF, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-5.75	-6.00	-6.25	V
		5.0mA<Io<1.0A,Po<15W Vi=-8V to -21V	-5.7	-6.0	-6.3	V
Line regulation	ΔVo*	Tj=25°C,Vi=-8V to -25V		10	120	mV
		Tj=25°C,Vi=-9V to -13V		5	60	mV
Load regulation	ΔVo*	Tj=25°C,Io=5.0mA to 1.5A		10	120	mV
		Tj=25°C,Io=250mA to 750mA		3	60	mV
Quiescent current	I_Q	Tj=25°C		5	8	mA
Quiescent current change	ΔI_Q	Io=5mA to 1.0A			0.5	mA
		Vi=-9V to -25V			0.8	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-0.6		mV/°C
Output noise voltage	V_N	f=10Hz to 100kHz,Ta=25°C		144		μV
Ripple rejection	RR	f=120Hz, Vi=-9V to -19V	54	60		dB
Dropout voltage	V_D	Io=1.0A,Tj=25°C, ΔVo=100mV		1.4		V
Short circuit current	Isc	Vi=-35V,Ta=25°C		10		mA
peak current	Ipk	Tj=25°C		2.2		A

* load and line regulation are specified at constant junction temperature.Changes in Vo due to heating effects must be taken inti account separately.Pulse testing with low duty cycle is used.

UTC7908 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=-14V,Ci=2.2μF, Co=1μF, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-7.7	-8.0	-8.3	V
		5.0mA<Io<1.0A,Po<15W Vi=-10.5V to -23V	-7.6	-8.0	-8.4	V
Line regulation	ΔVo*	Tj=25°C,Vi=-10.5V to -25V		12	160	mV
		Tj=25°C,Vi=-11.5V to -17V		5	80	mV
Load regulation	ΔVo*	Tj=25°C,Io=5.0mA to 1.5A		12	160	mV
		Tj=25°C,Io=250mA to 750mA		4	80	mV
Quiescent current	I_Q	Tj=25°C		5	8	mA
Quiescent current change	ΔI_Q	Io=5mA to 1.0A			0.5	mA
		Vi=-11V to -25V			0.8	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-0.6		mV/°C
Output noise voltage	V_N	f=10Hz to 100kHz,Ta=25°C		175		μV
Ripple rejection	RR	f=120Hz, Vi=-11.5V to -21.5V	54	60		dB
Dropout voltage	V_D	Io=1.0A,Tj=25°C, ΔVo=100mV		1.4		V
Short circuit current	Isc	Vi=-35V,Ta=25°C		10		mA
peak current	Ipk	Tj=25°C		2.2		A

* load and line regulation are specified at constant junction temperature.Changes in Vo due to heating effects must be taken inti account separately.Pulse testing with low duty cycle is used.

UTC7909 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=-15V,Ci=2.2μF, Co=1μF, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-8.6	-9.0	-9.4	V
		5.0mA<Io<1.0A,Po<15W Vi=-11.5V to -24V	-8.55	-9.0	-9.45	V
Line regulation	ΔVo*	Tj=25°C,Vi=-11.5V to -26V		12	200	mV
		Tj=25°C,Vi=-12.5V to -18V		5	100	mV
Load regulation	ΔVo*	Tj=25°C,Io=5.0mA to 1.5A		12	200	mV
		Tj=25°C,Io=250mA to 750mA		4	100	mV
Quiescent current	I_Q	Tj=25°C		5	8	mA
Quiescent current change	ΔI_Q	Io=5mA to 1.0A			0.5	mA
		Vi=-12V to -26V			0.8	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-0.7		mV/°C
Output noise voltage	V_N	f=10Hz to 100kHz,Ta=25°C		185		μV
Ripple rejection	RR	f=120Hz, Vi=-12V to -22V	54	60		dB
Dropout voltage	V_D	Io=1.0A,Tj=25°C, ΔVo=100mV		1.4		V
Short circuit current	Isc	Vi=-35V,Ta=25°C		10		mA
peak current	Ipk	Tj=25°C		2.2		A

* load and line regulation are specified at constant junction temperature.Changes in Vo due to heating effects must be taken inti account separately.Pulse testing with low duty cycle is used.

UTC7912 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=-18V,Ci=2.2μF, Co=1μF, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-11.5	-12.0	-12.5	V
		5.0mA<Io<1.0A,Po<15W Vi=-14.5V to -27V	-11.4	-12	-12.6	V
Line regulation	ΔVo*	Tj=25°C,Vi=-14.5V to -30V		12	240	mV
		Tj=25°C,Vi=-16V to -22V		6	120	mV
Load regulation	ΔVo*	Tj=25°C,Io=5.0mA to 1.5A		12	240	mV
		Tj=25°C,Io=250mA to 750mA		4	120	mV
Quiescent current	I_Q	Tj=25°C		5	8	mA
Quiescent current change	ΔI_Q	Io=5mA to 1.0A			0.5	mA
		Vi=-15V to -30V			0.8	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-0.8		mV/°C
Output noise voltage	V_N	f=10Hz to 100kHz,Ta=25°C		200		μV
Ripple rejection	RR	f=120Hz, Vi=-15V to -25V	54	60		dB
Dropout voltage	V_D	Io=1.0A,Tj=25°C, ΔVo=100mV		1.4		V
Short circuit current	Isc	Vi=-35V,Ta=25°C		10		mA
peak current	Ipk	Tj=25°C		2.2		A

* load and line regulation are specified at constant junction temperature.Changes in Vo due to heating effects must be taken inti account separately.Pulse testing with low duty cycle is used.

UTC7915 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=-23V,Ci=2.2μF, Co=1μF, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-14.4	-15.0	-15.6	V
		5.0mA<Io<1.0A,Po<15W Vi=-17.5V to -30V	-14.25	-15	-15.75	V
Line regulation	ΔVo*	Tj=25°C,Vi=-17.5V to -30V		12	300	mV
		Tj=25°C,Vi=-20V to -26V		6	150	mV
Load regulation	ΔVo*	Tj=25°C,Io=5.0mA to 1.5A		12	300	mV
		Tj=25°C,Io=250mA to 750mA		4	150	mV
Quiescent current	I_Q	Tj=25°C		5	8	mA
Quiescent current change	ΔI_Q	Io=5mA to 1.0A			0.5	mA
		Vi=-18V to -30V			0.8	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-0.9		mV/°C
Output noise voltage	V_N	f=10Hz to 100kHz,Ta=25°C		250		μV
Ripple rejection	RR	f=120Hz, Vi=-18.5V to -28.5V	54	60		dB
Dropout voltage	V_D	Io=1.0A,Tj=25°C, ΔVo=100mV		1.4		V
Short circuit current	Isc	Vi=-35V,Ta=25°C		10		mA
peak current	Ipk	Tj=25°C		2.2		A

* load and line regulation are specified at constant junction temperature.Changes in Vo due to heating effects must be taken inti account separately.Pulse testing with low duty cycle is used.

UTC7918 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=-27V,Ci=2.2μF, Co=1μF, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-17.3	-18.0	-18.7	V
		5.0mA<Io<1.0A,Po<15W Vi=-21V to -33V	-17.1	-18	-18.9	V
Line regulation	ΔVo*	Tj=25°C,Vi=-21V to -33V		15	360	mV
		Tj=25°C,Vi=-24V to -30V		8	180	mV
Load regulation	ΔVo*	Tj=25°C,Io=5.0mA to 1.5A		15	360	mV
		Tj=25°C,Io=250mA to 750mA		5	8	mV
Quiescent current	I_Q	Tj=25°C		5	8	mA
Quiescent current change	ΔI_Q	Io=5mA to 1.0A			0.5	mA
		Vi=-21V to -32V			0.8	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-1		mV/°C
Output noise voltage	V_N	f=10Hz to 100kHz,Ta=25°C		300		μV
Ripple rejection	RR	f=120Hz, Vi=-22V to -32V	54	60		dB
Dropout voltage	V_D	Io=1.0A,Tj=25°C, ΔVo=100mV		1.4		V
Short circuit current	Isc	Vi=-35V,Ta=25°C		10		mA
peak current	Ipk	Tj=25℃		2.2		A

* load and line regulation are specified at constant junction temperature.Changes in Vo due to heating effects must be taken inti account separately.Pulse testing with low duty cycle is used.

UTC7924 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=-33V,Ci=2.2μF, Co=1μF, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-23	-24	-25	V
		5.0mA<Io<1.0A,Po<15W Vi=-27V to -38V	-22.8	-24	-25.2	V
Line regulation	ΔVo*	Tj=25°C,Vi=-27V to -38V		15	480	mV
		Tj=25°C,Vi=-30V to -36V		8	240	mV
Load regulation	ΔVo*	Tj=25°C,Io=5.0mA to 1.5A		15	480	mV
		Tj=25°C,Io=250mA to 750mA		5	240	mV
Quiescent current	I_Q	Tj=25°C		5	8	mA
Quiescent current change	ΔI_Q	Io=5mA to 1.0A			0.5	mA
		Vi=-27V to -38V			0.8	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-1		mV/°C
Output noise voltage	V_N	f=10Hz to 100kHz,Ta=25°C		400		μV
Ripple rejection	RR	f=120Hz, Vi=-28V to -38V	54	60		dB
Dropout voltage	V_D	Io=1.0A,Tj=25°C, ΔVo=100mV		1.4		V
Short circuit current	Isc	Vi=-35V,Ta=25°C		10		mA
peak current	Ipk	Tj=25°C		2.2		A

* load and line regulation are specified at constant junction temperature.Changes in Vo due to heating effects must be taken inti account separately.Pulse testing with low duty cycle is used.

APPLICATION CIRCUITS

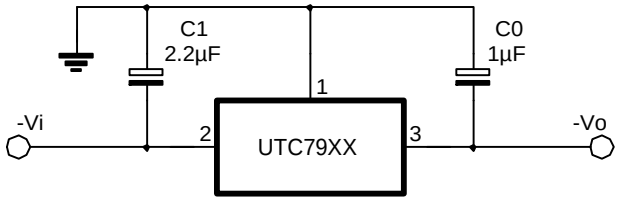


Fig.2 Fixed output regulator

NOTE:
1. To specify an output voltage ,substitute voltage value for"xx'.
2. Required for stability.For value given,capacitor must be solid tantalum.If aluminium electrolytics are used,at least ten times value should be selected.C1 is required if regulator is lacated an appreciable distance from power supply filter.
3. To improve transientr response.If large capacitors are used,a high current diode from input to output(1N4001 or similar)should be introduced to protect the device from momentary input short circuit.

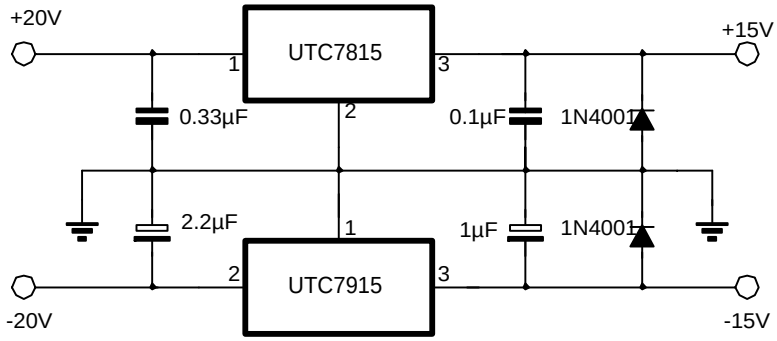


Fig.3 Split power supply(±15V,1A)

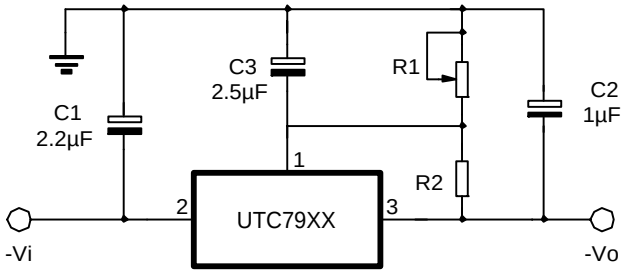


Fig.4 Circuit for increasing output voltage