

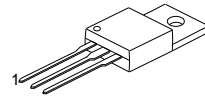
# UTC79XX

# LINEAR INTEGRATED CIRCUIT

## 3 TERMINAL 1.5A NEGATIVE VOLTAGE REGULATOR

### DESCRIPTION

The UTC79XX series of three-terminal negative regulators are available in TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut-down and safe operating area protection, making it essentially indestructible.



TO-220

### FEATURES

- \* Output current in excess of 1.5A
- \* -3,-5,-6,-8,-9,-10,-12,-15V output voltages available
- \* Internal Thermal overload protection
- \* Short circuit protection
- \* Output transistor SOA protection

1:GND; 2:Input; 3:Output

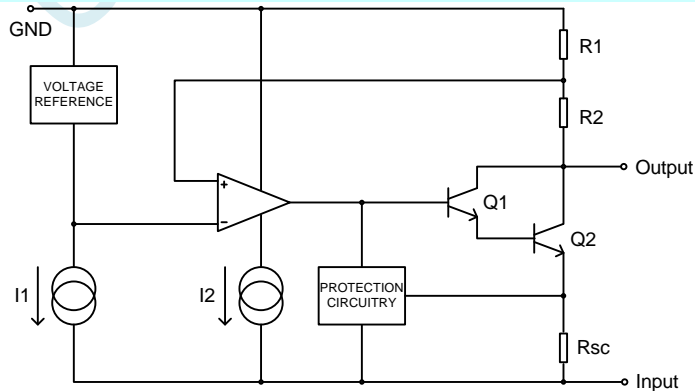
### ORDERING INFORMATION

Ordering Number	Package	Print Number	Free	Packing
UTC79XX-TA3-R-T	TO-220	UTC79XX	RoHS	Tube

### UTC79XX - TA3 - R - T

Packing Type: T:Tube, R:Tape Reel, K: Bulk,  
B: Tape Box  
Green Package: R:RoHS  
Package: TA3:TO-220  
Number

### BLOCK DIAGRAM



2022.04.06 V1.6

**ABSOLUTE MAXIMUM RATINGS** (Ta=25°C)

Characteristic	Symbol	Value	Unit
Input voltage	Vi	-35	V
Thermal resistance junction-air	RθJA	50	°C/W
Thermal resistance junction-cases	RθJC	5	°C/W
Operating Temperature	Topr	-20~+125	°C
Storage Temperature	Tstg	-65~+150	°C

**UTC7903 ELECTRICAL CHARACTERISTICS**

(Refer to test circuits, -20&lt;Tj&lt;125°C, Io=500mA, Vi=-8V, Ci=2.2μF, Co=1μF, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-2.88	-3.0	-3.12	V
		5mA<Io<1A, Po<15W Vi=-6V to -20V	-2.85	-3.0	-3.15	
Line regulation(Note)	ΔVo	Tj=25°C, Vi=-5V to -25V	-	35	60	mV
		Tj=25°C, Vi=-6V to -15V	-	8	30	
Load regulation(Note)	ΔVo	Tj=25°C, Io=5mA to 1.5A	-	10	60	mV
		Tj=25°C, Io=250mA to 750mA	-	3	30	
Quiescent current	IQ	Tj=25°C	-	3	6	mA
Quiescent current change	ΔIQ	Io=5mA to 1A	-	0.05	0.5	mA
		Vi=-5V to -20V	-	0.1	0.8	
Temperature coefficient of VD	ΔVo/ΔT	Io=5mA	-	0.5	-	mV/°C
Output noise voltage	VN	f=10Hz to 100kHz, Ta=25°C	-	40	-	μV
Ripple rejection	RR	f=120Hz, ΔVi=10V	54	60	-	dB
Dropout voltage	VD	Io=1A, Tj=25°C	-	1.5	-	V
Short circuit current	Isc	Vi=-25V, Tj=25°C	-	10	-	mA

Note: Load and line regulation are specified at constant junction temperature. Changes in VO due to heating effects must be taken into account separately. Pulse testing with low duty is used.

**UTC7905 ELECTRICAL CHARACTERISTICS**

(Refer to test circuits,  $-20 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -10\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-4.8	-5.0	-5.2	V
		5mA < Io < 1A, Po < 15W Vi = -7V to -20V	-4.75	-5.0	-5.25	
Line regulation(Note)	ΔVo	Tj=25°C, Vi = -7V to -25V	-	35	100	mV
		Tj=25°C, Vi = -8V to -12V	-	8	50	
Load regulation(Note)	ΔVo	Tj=25°C, Io = 5mA to 1.5A	-	10	100	mV
		Tj=25°C, Io = 250mA to 750mA	-	3	50	
Quiescent current	IQ	Tj=25°C	-	3	6	mA
Quiescent current change	ΔIQ	Io = 5mA to 1A	-	0.05	0.5	mA
		Vi = -8V to -25V	-	0.1	0.8	
Temperature coefficient of VD	ΔVo/ΔT	Io = 5mA	-	0.5	-	mV/°C
Output noise voltage	VN	f = 10Hz to 100kHz, Ta = 25°C	-	40	-	μV
Ripple rejection	RR	f = 120Hz, ΔVi = 10V	54	60	-	dB
Dropout voltage	VD	Io = 1A, Tj = 25°C	-	2	-	V
Short circuit current	Isc	Vi = -35V, Tj = 25°C	-	10	-	mA

Note: Load and line regulation are specified at constant junction temperature. Changes in VO due to heating effects must be taken into account separately. Pulse testing with low duty is used.

**UTC7906 ELECTRICAL CHARACTERISTICS**

(Refer to test circuits,  $-20 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -11\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-5.75	-6	-6.25	V
		5mA < Io < 1A, Po < 15W Vi = -9V to -21V	-5.7	-6	-6.3	
Line regulation(Note)	ΔVo	Tj=25°C, Vi = -8V to -25V	-	10	120	mV
		Tj=25°C, Vi = -9V to -13V	-	5	60	
Load regulation(Note)	ΔVo	Tj=25°C, Io = 5mA to 1.5A	-	10	120	mV
		Tj=25°C, Io = 250mA to 750mA	-	3	60	
Quiescent current	IQ	Tj=25°C	-	3	6	mA
Quiescent current change	ΔIQ	Io = 5mA to 1A	-	0.05	0.5	mA
		Vi = -8V to -25V	-	0.1	1	
Temperature coefficient of VD	ΔVo/ΔT	Io = 5mA	-	0.6	-	mV/°C
Output noise voltage	VN	f = 10Hz to 100kHz, Ta = 25°C	-	130	-	μV
Ripple rejection	RR	f = 120Hz, ΔVi = 10V	54	60	-	dB
Dropout voltage	VD	Io = 1A, Tj = 25°C	-	2	-	V
Short circuit current	Isc	Vi = -35V, Tj = 25°C	-	10	-	mA

Note: Load and line regulation are specified at constant junction temperature. Changes in VO due to heating effects must be taken into account separately. Pulse testing with low duty is used.

**UTC7908 ELECTRICAL CHARACTERISTICS**

(Refer to test circuits,  $-20 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -14\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-7.7	-8	-8.3	V
		$5\text{mA} < I_o < 1\text{A}$ , $P_o < 15\text{W}$ $V_i = -11.5\text{V}$ to $-23\text{V}$	-7.6	-8	-8.4	
Line regulation(Note)	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -10.5\text{V}$ to $-25\text{V}$	-	10	160	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -11\text{V}$ to $-17\text{V}$	-	5	80	
Load regulation(Note)	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5\text{mA}$ to $1.5\text{A}$	-	12	160	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$	-	4	80	
Quiescent current	$I_Q$	$T_j = 25^\circ\text{C}$	-	3	6	mA
Quiescent current change	$\Delta I_Q$	$I_o = 5\text{mA}$ to $1\text{A}$	-	0.05	0.5	mA
		$V_i = -10.5\text{V}$ to $-25\text{V}$	-	0.1	1	
Temperature coefficient of $V_D$	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$	-	0.8	-	mV/ $^\circ\text{C}$
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$	-	175	-	$\mu\text{V}$
Ripple rejection	RR	$f = 120\text{Hz}$ , $\Delta V_i = 10\text{V}$	54	60	-	dB
Dropout voltage	$V_D$	$I_o = 1\text{A}$ , $T_j = 25^\circ\text{C}$	-	2	-	V
Short circuit current	Isc	$V_i = -35\text{V}$ , $T_j = 25^\circ\text{C}$	-	10	-	mA

Note: Load and line regulation are specified at constant junction temperature. Changes in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.

**UTC7909 ELECTRICAL CHARACTERISTICS**

(Refer to test circuits,  $-20 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -15\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-8.7	-9.0	-9.3	V
		$5\text{mA} < I_o < 1\text{A}$ , $P_o < 15\text{W}$ $V_i = -12\text{V}$ to $-25\text{V}$	-8.6	-9.0	-9.4	
Line regulation(Note1)	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -11.5\text{V}$ to $-26\text{V}$	-	10	180	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -12\text{V}$ to $-25\text{V}$	-	5	90	
Load regulation(Note1)	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5\text{mA}$ to $1.5\text{A}$	-	12	180	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$	-	4	90	
Quiescent current	$I_Q$	$T_j = 25^\circ\text{C}$	-	3	6	mA
Quiescent current change	$\Delta I_Q$	$I_o = 5\text{mA}$ to $1\text{A}$	-	0.05	0.5	mA
		$V_i = -11.5\text{V}$ to $-26\text{V}$	-	0.1	1	
Temperature coefficient of $V_D$	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$	-	0.9	-	mV/ $^\circ\text{C}$
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$	-	175	-	$\mu\text{V}$
Ripple rejection	RR	$f = 120\text{Hz}$ , $\Delta V_i = 10\text{V}$	54	60	-	dB
Dropout voltage	$V_D$	$I_o = 1\text{A}$ , $T_j = 25^\circ\text{C}$	-	2	-	V
Short circuit current	Isc	$V_i = -35\text{V}$ , $T_j = 25^\circ\text{C}$	-	10	-	mA

Note: Load and line regulation are specified at constant junction temperature. Changes in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.

**UTC7910 ELECTRICAL CHARACTERISTICS**

(Refer to test circuits,  $-20 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -17\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-9.6	-10	-10.4	V
		5mA < Io < 1A, Po < 15W Vi = -14V to -25V	-9.5	-10	-10.5	
Line regulation(Note)	ΔVo	Tj=25°C, Vi = -12.5V to -28V	-	12	200	mV
		Tj=25°C, Vi = -14V to -25V	-	6	100	
Load regulation(Note)	ΔVo	Tj=25°C, Io = 5mA to 1.5A	-	12	200	mV
		Tj=25°C, Io = 250mA to 750mA	-	4	100	
Quiescent current	IQ	Tj=25°C	-	3	6	mA
Quiescent current change	ΔIQ	Io = 5mA to 1A	-	0.05	0.5	mA
		Vi = -12.5V to -28V	-	0.1	1	
Temperature coefficient of VD	ΔVo/ΔT	Io = 5mA	-	1.0	-	mV/°C
Output noise voltage	VN	f = 10Hz to 100kHz, Ta = 25°C	-	280	-	μV
Ripple rejection	RR	f = 120Hz, ΔVi = 10V	54	60	-	dB
Dropout voltage	VD	Io = 1A, Tj = 25°C	-	2	-	V
Short circuit current	Isc	Vi = -35V, Tj = 25°C	-	10	-	mA

Note: Load and line regulation are specified at constant junction temperature. Changes in VO due to heating effects must be taken into account separately. Pulse testing with low duty is used.

**UTC7912 ELECTRICAL CHARACTERISTICS**

(Refer to test circuits,  $-20 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -19\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	Vo	Tj=25°C	-11.5	-12	-12.5	V
		5mA < Io < 1A, Po < 15W Vi = -16V to -25V	-11.4	-12	-12.6	
Line regulation(Note1)	ΔVo	Tj=25°C, Vi = -14.5V to -30V	-	12	240	mV
		Tj=25°C, Vi = -16V to -25V	-	6	120	
Load regulation(Note1)	ΔVo	Tj=25°C, Io = 5mA to 1.5A	-	12	240	mV
		Tj=25°C, Io = 250mA to 750mA	-	4	120	
Quiescent current	IQ	Tj=25°C	-	3	6	mA
Quiescent current change	ΔIQ	Io = 5mA to 1A	-	0.05	0.5	mA
		Vi = -14.5V to -30V	-	0.1	1	
Temperature coefficient of VD	ΔVo/ΔT	Io = 5mA	-	1.2	-	mV/°C
Output noise voltage	VN	f = 10Hz to 100kHz, Ta = 25°C	-	200	-	μV
Ripple rejection	RR	f = 120Hz, ΔVi = 10V	54	60	-	dB
Dropout voltage	VD	Io = 1A, Tj = 25°C	-	2	-	V
Short circuit current	Isc	Vi = -35V, Tj = 25°C	-	10	-	mA

Note: Load and line regulation are specified at constant junction temperature. Changes in VO due to heating effects must be taken into account separately. Pulse testing with low duty is used.

**UTC7915 ELECTRICAL CHARACTERISTICS**

(Refer to test circuits,  $-20 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -23\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-14.4	-15	-15.6	V
		$5\text{mA} < I_o < 1\text{A}$ , $P_o < 15\text{W}$ $V_i = -20\text{V}$ to $-26\text{V}$	-14.25	-15	-15.75	
Line regulation(Note1)	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -17.5\text{V}$ to $-30\text{V}$	-	12	300	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -20\text{V}$ to $-26\text{V}$	-	6	150	
Load regulation(Note1)	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5\text{mA}$ to $1.5\text{A}$	-	12	300	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$	-	4	150	
Quiescent current	$I_q$	$T_j = 25^\circ\text{C}$	-	3	6	mA
Quiescent current change	$\Delta I_q$	$I_o = 5\text{mA}$ to $1\text{A}$	-	0.05	0.5	mA
		$V_i = -17.5\text{V}$ to $-30\text{V}$	-	0.1	1	
Temperature coefficient of $V_o$	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$	-	1.5	-	mV/ $^\circ\text{C}$
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$	-	250	-	$\mu\text{V}$
Ripple rejection	RR	$f = 120\text{Hz}$ , $\Delta V_i = 10\text{V}$	54	60	-	dB
Dropout voltage	$V_D$	$I_o = 1\text{A}$ , $T_j = 25^\circ\text{C}$	-	2	-	V
Short circuit current	$I_{sc}$	$V_i = -35\text{V}$ , $T_j = 25^\circ\text{C}$	-	10	-	mA

Note: Load and line regulation are specified at constant junction temperature. Changes in  $V_o$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.

**APPLICATION CIRCUITS**

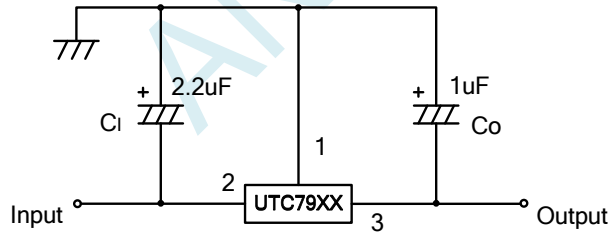


Fig.1 Negative fixed output regulator

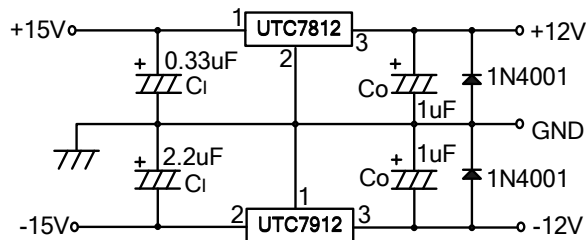
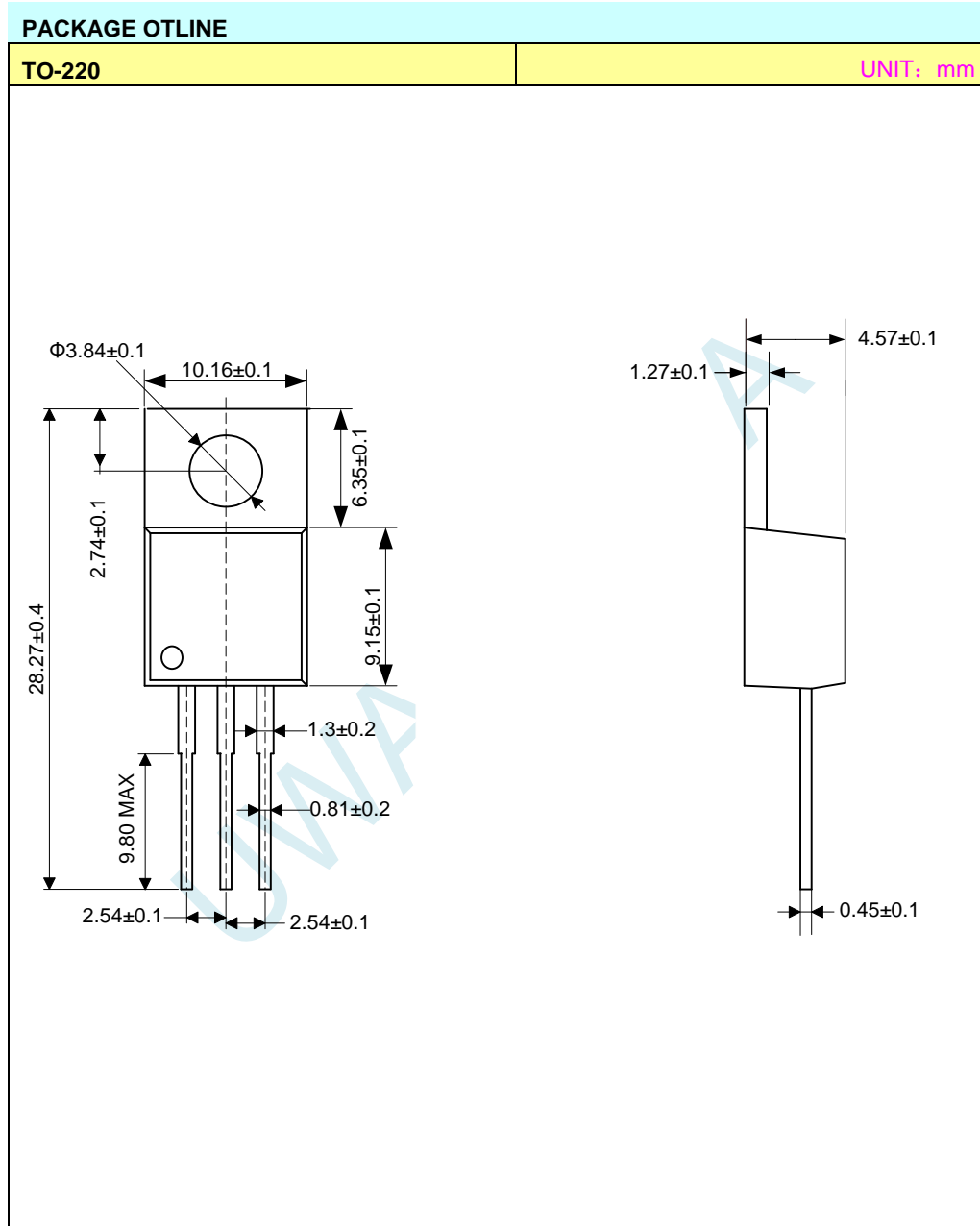


Fig.2 Split power supply ( $\pm 12\text{V}/1\text{A}$ )



**ELECTROSTATIC DISCHARGE CAUTION**



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage handling to prevent electrostatic damage to the device.

**NOTICE**