

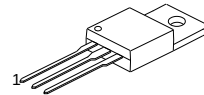
UTC79XX

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.



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

TO-220

1:GND; 2:Input; 3:Output

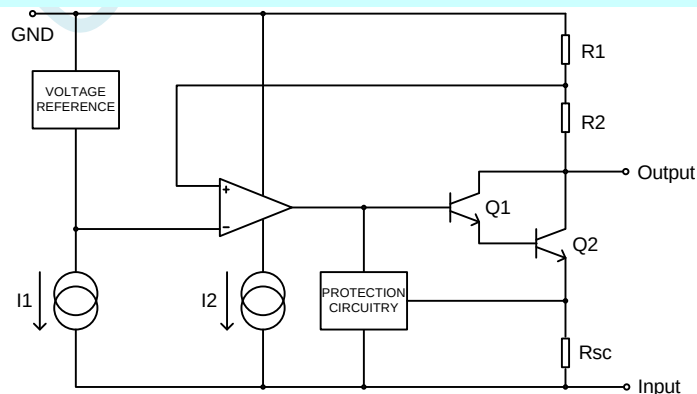
ORDERING INFORMATION

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	V_i	-35	V
Thermal resistance junction-air	$R_{\theta JA}$	50	°C/W
Thermal resistance junction-cases	$R_{\theta JC}$	5	°C/W
Operating Temperature	T_{opr}	-20~+125	°C
Storage Temperature	T_{stg}	-65~+150	°C

UTC7903 ELECTRICAL CHARACTERISTICS

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

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	V_o	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)	ΔV_o	Tj=25°C, Vi=-5V to -25V	-	35	60	mV
		Tj=25°C, Vi=-6V to -15V	-	8	30	
Load regulation(Note)	ΔV_o	Tj=25°C, Io=5mA to 1.5A	-	10	60	mV
		Tj=25°C, Io=250mA to 750mA	-	3	30	
Quiescent current	I_Q	Tj=25°C	-	3	6	mA
Quiescent current change	ΔI_Q	Io=5mA to 1A	-	0.05	0.5	mA
		Vi=-5V to -20V	-	0.1	0.8	
Temperature coefficient of VD	$\Delta V_o/\Delta T$	Io=5mA	-	0.5	-	mV/°C
Output noise voltage	V_N	f=10Hz to 100kHz, Ta=25°C	-	40	-	μV
Ripple rejection	RR	f=120Hz, $\Delta V_i=10V$	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 V_o due to heating effects must be taken into account separately. Pulse testing with low duty is used.

UTC7905 ELECTRICAL CHARACTERISTICS(Refer to test circuits, $-20^{\circ}\text{C} < T_j < 125^{\circ}\text{C}$, $I_o = 500\text{mA}$, $V_i = -10\text{V}$, $C_i = 2.2\mu\text{F}$, $C_o = 1\mu\text{F}$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	V_o	$T_j = 25^{\circ}\text{C}$	-4.8	-5.0	-5.2	V
		$5\text{mA} < I_o < 1\text{A}$, $P_o < 15\text{W}$ $V_i = -7\text{V}$ to -20V	-4.75	-5.0	-5.25	
Line regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $V_i = -7\text{V}$ to -25V	-	35	100	mV
		$T_j = 25^{\circ}\text{C}$, $V_i = -8\text{V}$ to -12V	-	8	50	
Load regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $I_o = 5\text{mA}$ to 1.5A	-	10	100	mV
		$T_j = 25^{\circ}\text{C}$, $I_o = 250\text{mA}$ to 750mA	-	3	50	
Quiescent current	I_Q	$T_j = 25^{\circ}\text{C}$	-	3	6	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 1A	-	0.05	0.5	mA
		$V_i = -8\text{V}$ to -25V	-	0.1	0.8	
Temperature coefficient of VD	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$	-	0.5	-	mV/ $^{\circ}\text{C}$
Output noise voltage	V_N	$f = 10\text{Hz}$ to 100kHz , $T_a = 25^{\circ}\text{C}$	-	40	-	μV
Ripple rejection	RR	$f = 120\text{Hz}$, $\Delta V_i = 10\text{V}$	54	60	-	dB
Dropout voltage	VD	$I_o = 1\text{A}$, $T_j = 25^{\circ}\text{C}$	-	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.

UTC7906 ELECTRICAL CHARACTERISTICS(Refer to test circuits, $-20^{\circ}\text{C} < T_j < 125^{\circ}\text{C}$, $I_o = 500\text{mA}$, $V_i = -11\text{V}$, $C_i = 2.2\mu\text{F}$, $C_o = 1\mu\text{F}$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	V_o	$T_j = 25^{\circ}\text{C}$	-5.75	-6	-6.25	V
		$5\text{mA} < I_o < 1\text{A}$, $P_o < 15\text{W}$ $V_i = -9\text{V}$ to -21V	-5.7	-6	-6.3	
Line regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $V_i = -8\text{V}$ to -25V	-	10	120	mV
		$T_j = 25^{\circ}\text{C}$, $V_i = -9\text{V}$ to -13V	-	5	60	
Load regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $I_o = 5\text{mA}$ to 1.5A	-	10	120	mV
		$T_j = 25^{\circ}\text{C}$, $I_o = 250\text{mA}$ to 750mA	-	3	60	
Quiescent current	I_Q	$T_j = 25^{\circ}\text{C}$	-	3	6	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 1A	-	0.05	0.5	mA
		$V_i = -8\text{V}$ to -25V	-	0.1	1	
Temperature coefficient of VD	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$	-	0.6	-	mV/ $^{\circ}\text{C}$
Output noise voltage	V_N	$f = 10\text{Hz}$ to 100kHz , $T_a = 25^{\circ}\text{C}$	-	130	-	μV
Ripple rejection	RR	$f = 120\text{Hz}$, $\Delta V_i = 10\text{V}$	54	60	-	dB
Dropout voltage	VD	$I_o = 1\text{A}$, $T_j = 25^{\circ}\text{C}$	-	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.

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 -23V	-7.6	-8	-8.4	
Line regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $V_i = -10.5\text{V}$ to -25V	-	10	160	mV
		$T_j = 25^{\circ}\text{C}$, $V_i = -11\text{V}$ to -17V	-	5	80	
Load regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $I_o = 5\text{mA}$ to 1.5A	-	12	160	mV
		$T_j = 25^{\circ}\text{C}$, $I_o = 250\text{mA}$ to 750mA	-	4	80	
Quiescent current	I_Q	$T_j = 25^{\circ}\text{C}$	-	3	6	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 1A	-	0.05	0.5	mA
		$V_i = -10.5\text{V}$ to -25V	-	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 100kHz , $T_a = 25^{\circ}\text{C}$	-	175	-	μV
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 -25V	-8.6	-9.0	-9.4	
Line regulation(Note1)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $V_i = -11.5\text{V}$ to -26V	-	10	180	mV
		$T_j = 25^{\circ}\text{C}$, $V_i = -12\text{V}$ to -25V	-	5	90	
Load regulation(Note1)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $I_o = 5\text{mA}$ to 1.5A	-	12	180	mV
		$T_j = 25^{\circ}\text{C}$, $I_o = 250\text{mA}$ to 750mA	-	4	90	
Quiescent current	I_Q	$T_j = 25^{\circ}\text{C}$	-	3	6	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 1A	-	0.05	0.5	mA
		$V_i = -11.5\text{V}$ to -26V	-	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 100kHz , $T_a = 25^{\circ}\text{C}$	-	175	-	μV
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, $-20^{\circ}\text{C} < T_j < 125^{\circ}\text{C}$, $I_o = 500\text{mA}$, $V_i = -17\text{V}$, $C_i = 2.2\mu\text{F}$, $C_o = 1\mu\text{F}$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	V_o	$T_j = 25^{\circ}\text{C}$	-9.6	-10	-10.4	V
		$5\text{mA} < I_o < 1\text{A}$, $P_o < 15\text{W}$ $V_i = -14\text{V}$ to -25V	-9.5	-10	-10.5	
Line regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $V_i = -12.5\text{V}$ to -28V	-	12	200	mV
		$T_j = 25^{\circ}\text{C}$, $V_i = -14\text{V}$ to -25V	-	6	100	
Load regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $I_o = 5\text{mA}$ to 1.5A	-	12	200	mV
		$T_j = 25^{\circ}\text{C}$, $I_o = 250\text{mA}$ to 750mA	-	4	100	
Quiescent current	I_Q	$T_j = 25^{\circ}\text{C}$	-	3	6	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 1A	-	0.05	0.5	mA
		$V_i = -12.5\text{V}$ to -28V	-	0.1	1	
Temperature coefficient of V_D	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$	-	1.0	-	mV/ $^{\circ}\text{C}$
Output noise voltage	V_N	$f = 10\text{Hz}$ to 100kHz , $T_a = 25^{\circ}\text{C}$	-	280	-	μV
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.

UTC7912 ELECTRICAL CHARACTERISTICS(Refer to test circuits, $-20^{\circ}\text{C} < T_j < 125^{\circ}\text{C}$, $I_o = 500\text{mA}$, $V_i = -19\text{V}$, $C_i = 2.2\mu\text{F}$, $C_o = 1\mu\text{F}$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Output voltage	V_o	$T_j = 25^{\circ}\text{C}$	-11.5	-12	-12.5	V
		$5\text{mA} < I_o < 1\text{A}$, $P_o < 15\text{W}$ $V_i = -16\text{V}$ to -25V	-11.4	-12	-12.6	
Line regulation(Note1)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $V_i = -14.5\text{V}$ to -30V	-	12	240	mV
		$T_j = 25^{\circ}\text{C}$, $V_i = -16\text{V}$ to -25V	-	6	120	
Load regulation(Note1)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $I_o = 5\text{mA}$ to 1.5A	-	12	240	mV
		$T_j = 25^{\circ}\text{C}$, $I_o = 250\text{mA}$ to 750mA	-	4	120	
Quiescent current	I_Q	$T_j = 25^{\circ}\text{C}$	-	3	6	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 1A	-	0.05	0.5	mA
		$V_i = -14.5\text{V}$ to -30V	-	0.1	1	
Temperature coefficient of V_D	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$	-	1.2	-	mV/ $^{\circ}\text{C}$
Output noise voltage	V_N	$f = 10\text{Hz}$ to 100kHz , $T_a = 25^{\circ}\text{C}$	-	200	-	μV
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.

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 -26V	-14.25	-15	-15.75	
Line regulation(Note1)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $V_i = -17.5\text{V}$ to -30V	-	12	300	mV
		$T_j = 25^{\circ}\text{C}$, $V_i = -20\text{V}$ to -26V	-	6	150	
Load regulation(Note1)	ΔV_o	$T_j = 25^{\circ}\text{C}$, $I_o = 5\text{mA}$ to 1.5A	-	12	300	mV
		$T_j = 25^{\circ}\text{C}$, $I_o = 250\text{mA}$ to 750mA	-	4	150	
Quiescent current	I_Q	$T_j = 25^{\circ}\text{C}$	-	3	6	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 1A	-	0.05	0.5	mA
		$V_i = -17.5\text{V}$ to -30V	-	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 100kHz , $T_a = 25^{\circ}\text{C}$	-	250	-	μV
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.

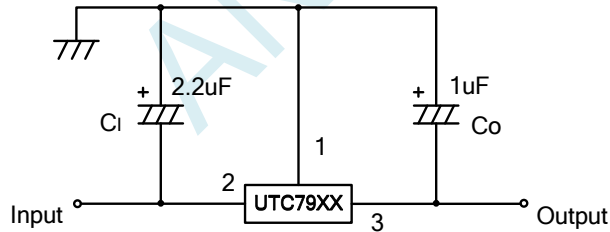
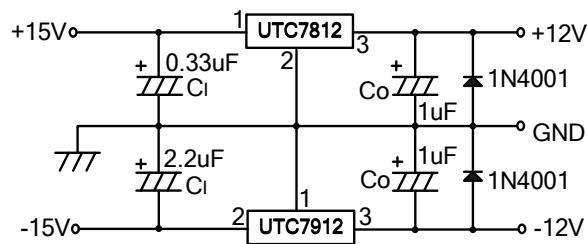
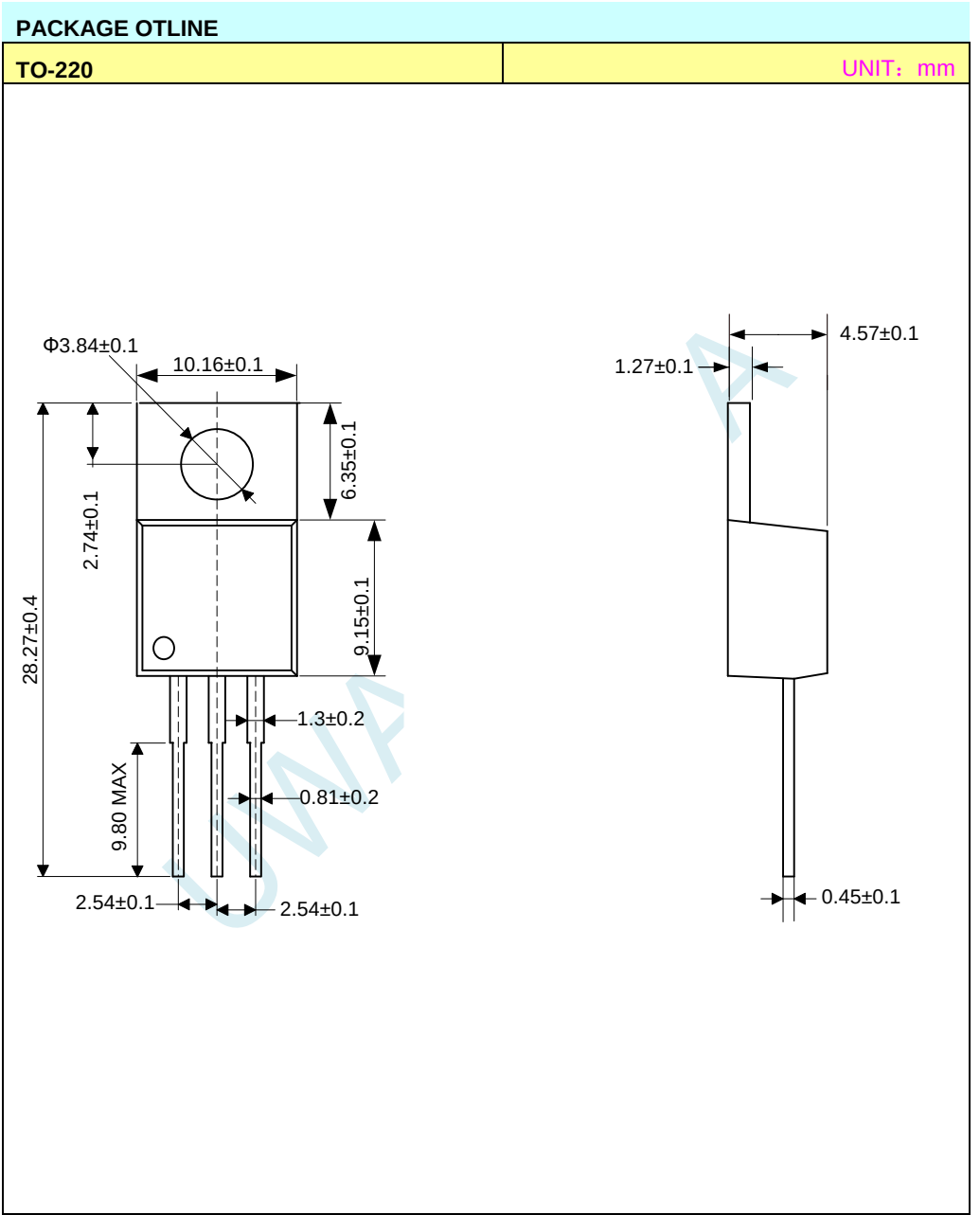
APPLICATION CIRCUITS

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