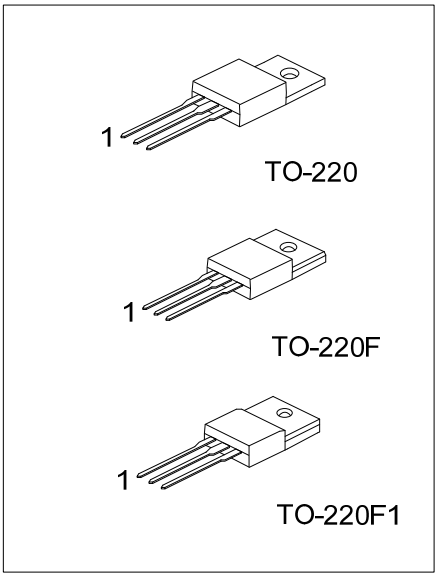
3 TERMINAL 1A NEGATIVE VOLTAGE REGULATOR



■ DESCRIPTION

The UTC **LM79XXS** series of three-terminal negative regulators is available several fixed output voltage, making them useful in a wide range of application. Each type employs internal current limiting, thermal shut-down, making it essentially indestructible.

■ FEATURES

* Output current up to 1A
* -5V, -6V, -7V, -8V, -9V,-12V, -15V, -18V, -24V output voltage available
* Thermal overload protection

■ NORDERING INFORMATIO

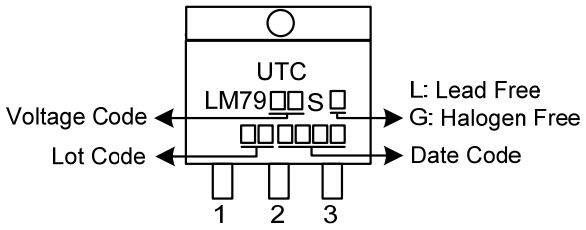
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
LM79XXSL-TA3-T	LM79XXSG-TA3-T	TO-220	G	I	O	Tube
LM79XXSL-TF1-T	LM79XXSG-TF1-T	TO-220F1	G	I	O	Tube
LM79XXSL-TF3-T	LM79XXSG-TF3-T	TO-220F	G	I	O	Tape Reel

Note: Pin Assignment: G: GND I: Input O: Output

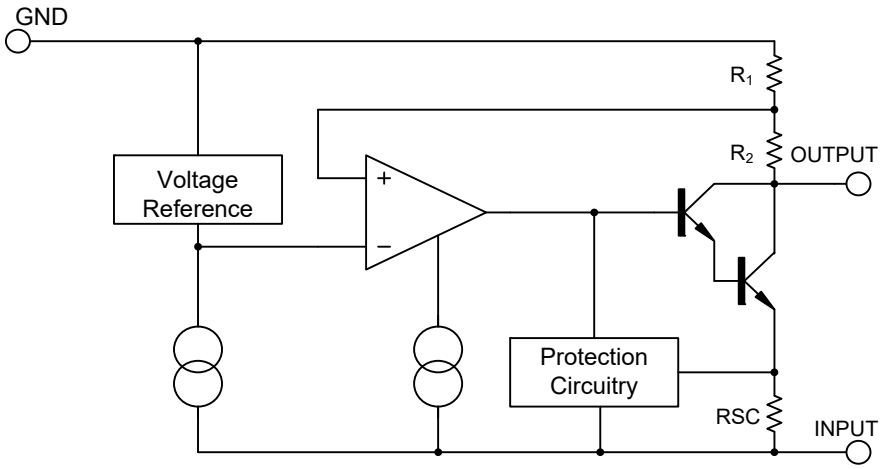
79DXXASG-TA3-T

(1)Packing Type	(1) T: Tube
(2)Package Type	(2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free
(4)Output Voltage Code	(4) XX: refer to Marking Information

■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-220 TO-220F TO-220F1	05:-5V 06:-6V 07:-7V 08:-8V 09:-9V 10: -10V 12:-12V 15:-15V 18:-18V 24:-24V	

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATING	UNIT
Input Voltage	V_{IN}	-35	V
Output Current	I_{OUT}	1	A
Power Dissipation	P_D	1.5	W
Operating Temperature	T_{OPR}	-40 ~ +125	°C
Storage Temperature	T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	65	°C/W
Junction to Case	θ_{JC}	5	°C/W

■ ELECTRICAL CHARACTERISTICS

(I_{OUT}=0.5A, T_J=0°C~125°C, C_I=2.2uF, C_O=1uF, unless otherwise specified)

For UTC LM7905S (V_{IN}=-10V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-4.80	-5.0	-5.20	V
		V_{IN}=-7V~-20V, I_{OUT}=5mA~1A		-4.75		-5.25	V
Dropout Voltage	V_D	I_{OUT}=1A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN}=-7V~-25V	T_J=25°C		10	100	mV
		V_{IN}=-8V~-12V	T_J=25°C		5	60	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		10	100	mV
		I_{OUT}=250mA~750mA	T_J=25°C		3	50	mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN}=-7V~-25V			0.1	1.3	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-0.4		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

For UTC LM7906S (V_{IN}=-11V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-5.76	-6.00	-6.24	V
		V_{IN}=-8V~-21V, I_{OUT}=5mA~1A		-5.70		-6.30	V
Dropout Voltage	V_D	I_{OUT}=1.0A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN}=-8V~-25V	T_J=25°C		10	120	mV
		V_{IN}=-9V~-13V	T_J=25°C		5	60	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		10	120	mV
		I_{OUT}=250mA~750mA	T_J=25°C		3	60	mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN}=-8V~-25V			0.1	1.3	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-0.5		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

■ ELECTRICAL CHARACTERISTICS (Cont.)

For UTC LM7907S (V_{IN}=-13V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-6.72	-7.0	-7.28	V
		V_{IN}=-10.5V~-23V, I_{OUT}=5mA~1A		-6.65		-7.35	V
Dropout Voltage	V_D	I_{OUT}=1A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN}=-10.5V~-25V	T_J=25°C		10	140	mV
		V_{IN}=-11.5V~-17V	T_J=25°C		5	70	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		12		mV
		I_{OUT}=250mA~750mA	T_J=25°C		4		mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN}=-11.5V~-25V			0.1	1.3	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-0.6		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

For UTC LM7908S (V_{IN}=-14V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-7.68	-8.0	-8.32	V
		V_{IN}=-10.5V~-23V, I_{OUT}=5mA~1A		-7.60		-8.40	V
Dropout Voltage	V_D	I_{OUT}=1A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN}=-10.5V~-25V	T_J=25°C		10	160	mV
		V_{IN}=-11.5V~-17V	T_J=25°C		5	80	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		12	160	mV
		I_{OUT}=250mA~750mA	T_J=25°C		4	80	mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN}=-11.5V~-25V			0.1	1.0	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-0.6		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

For UTC LM7909S (V_{IN}=-15V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-8.64	-9.0	-9.36	V
		V_{IN}=-11.5V~-23V, I_{OUT}=5mA~1A		-8.55		-9.45	V
Dropout Voltage	V_D	I_{OUT}=1A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN}=-11.5V~-26V	T_J=25°C		10	180	mV
		V_{IN}=-12V~-18V	T_J=25°C		5	90	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		12	180	mV
		I_{OUT}=250mA~750mA	T_J=25°C		4	90	mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN}=-11.5V~-26V			0.1	1.0	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-0.6		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

■ ELECTRICAL CHARACTERISTICS (Cont.)

For UTC LM7910S (V_{IN}=-16V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-9.6	-10	-10.4	V
		V_{IN}=-12.5V~-25V, I_{OUT}=5mA~1A		-9.5		-10.5	V
Dropout Voltage	V_D	I_{OUT}=1A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN} =-12.5V~-28V	T_J=25°C		11	200	mV
		V_{IN} =-14V~-20V	T_J=25°C		5	100	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		12	200	mV
		I_{OUT}=250mA~750mA	T_J=25°C		4	100	mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN}=-12.5V~-28V			0.1	1.0	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-0.7		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

For UTC LM7912S (V_{IN}=-18V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-11.52	-12.0	-12.48	V
		V_{IN}=-14.5V~-27V, I_{OUT}=5mA~1A		-11.40		-12.60	V
Dropout Voltage	V_D	I_{OUT}=1A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN} =-14.5V~-30V	T_J=25°C		12	240	mV
		V_{IN} =-16V~-22V	T_J=25°C		6	120	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		12	240	mV
		I_{OUT}=250mA~750mA	T_J=25°C		4	120	mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN}=-14.5V~-30V			0.1	1.0	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-0.8		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

For UTC LM7915S (V_{IN}=-23V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-14.40	-15.0	-15.60	V
		V_{IN}=-17.5V~-30V, I_{OUT}=5mA~1A		-14.25		-15.75	V
Dropout Voltage	V_D	I_{OUT}=1A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN}=-17.5V~-30V	T_J=25°C		12	300	mV
		V_{IN}=-20V~-26V	T_J=25°C		6	150	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		12	300	mV
		I_{OUT}=250mA~750mA	T_J=25°C		4	150	mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN}=-17.5V~-30.5V			0.1	1.0	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-0.9		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

■ ELECTRICAL CHARACTERISTICS (Cont.)

For UTC LM7918S (V_{IN}=-27V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-17.28	-18.0	-18.72	V
		V_{IN}=-21V~-33V, I_{OUT}=5mA~1A		-17.10		-18.90	V
Dropout Voltage	V_D	I_{OUT}=1A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN} =-21V~-33V	T_J=25°C		15	360	mV
		V_{IN} =-24V~-30V	T_J=25°C		8	180	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		15	360	mV
		I_{OUT}=250mA~750mA	T_J=25°C		5.0	180	mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN}=-21V~-32V			0.1	1.0	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-1		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

For UTC LM7924S (V_{IN}=-33V)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		T_J=25°C	-23.04	-24	-24.96	V
		V_{IN}=-27V~-38V, I_{OUT}=5mA~1A		-22.80		-25.20	V
Dropout Voltage	V_D	I_{OUT}=1.0A	T_J=25°C		2		V
Line Regulation	ΔV_{OUT}	V_{IN}=-27V~-38V	T_J=25°C		15	480	mV
		V_{IN}=-30V~-36V	T_J=25°C		8	240	mV
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~1A	T_J=25°C		15	480	mV
		I_{OUT}=250mA~750mA	T_J=25°C		5.0	240	mV
Quiescent Current	I_Q		T_J=25°C		3	6	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA~1A			0.05	0.5	mA
		V_{IN} =-27V~-38V			0.1	1.0	mA
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA			-1		mV/°C
Peak Current	I_{PEAK}		T_J=25°C		2.2		A

Note: 1. Thermal resistance test board.

■ APPLICATION CIRCUITS

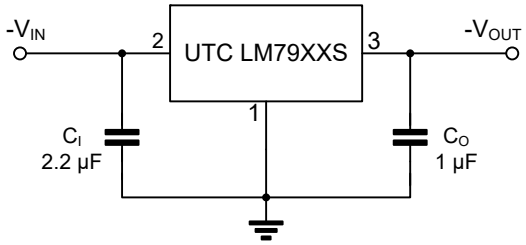


Fig.1 Fixed output regulator

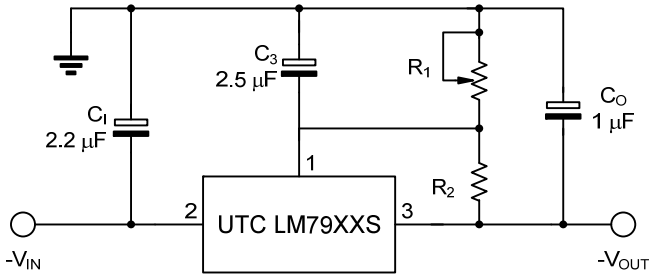


Fig.2 Circuit for increasing output voltage