



LM79XXS

Preliminary

LINEAR INTEGRATED CIRCUIT

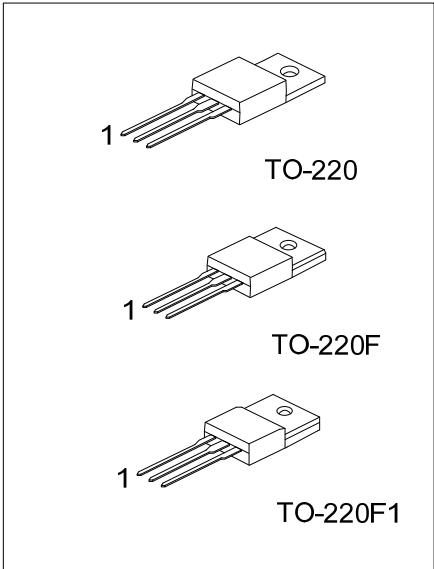
3 TERMINAL 1A NEGATIVE VOLTAGE REGULATOR

■ 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



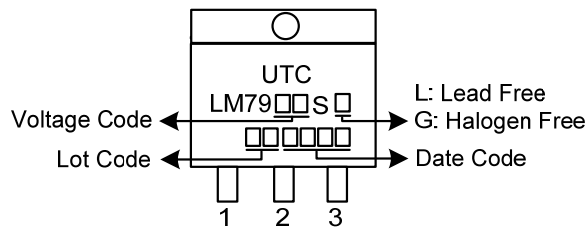
■ NORDERING INFORMATIO

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

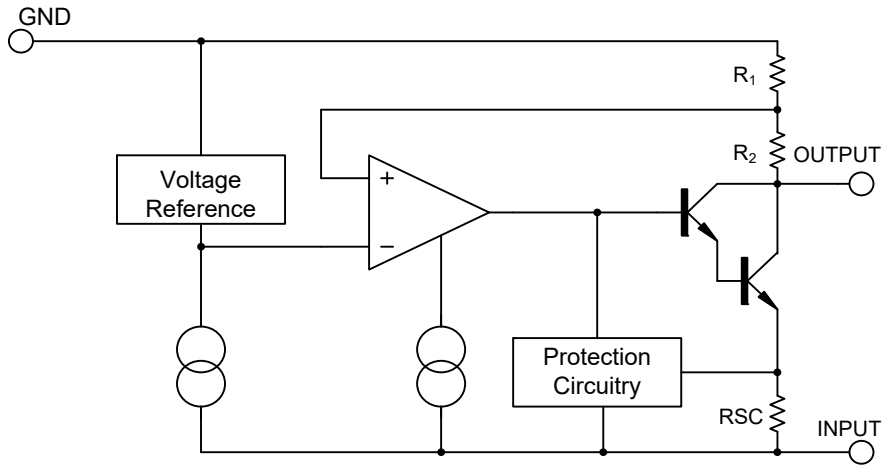
Note: Pin Assignment: G: GND I: Input O: Output

<p>79DXXASG-TA3-T</p>	<p>(1)Packing Type (2)Package Type (3)Green Package (4)Output Voltage Code</p>	<p>(1) T: Tube (2) TA3: TO-220, TF1: TO-220F1, TF3: TO-220F (3) G: Halogen Free and Lead Free, L: Lead Free (4) XX: refer to Marking Information</p>
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MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-220 TO-220F TO-220F1	05:-5V	 <p>UTC LM79□□S□ Voltage Code ← □ □ □ □ □ □ □ □ → Date Code Lot Code ← □ □ □ □ □ □ □ □ → 1 2 3</p> <p>L: Lead Free G: Halogen Free</p>
	06:-6V	
	07:-7V	
	08:-8V	
	09:-9V	
	10: -10V	
	12:-12V	
	15:-15V	
18:-18V		
24:-24V		

BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$, 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	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

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	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	5	$^{\circ}\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS

($I_{OUT}=0.5\text{A}$, $T_J=0^{\circ}\text{C}\sim 125^{\circ}\text{C}$, $C_I=2.2\mu\text{F}$, $C_O=1\mu\text{F}$, unless otherwise specified)

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

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

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

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

■ ELECTRICAL CHARACTERISTICS (Cont.)

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

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

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

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

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

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

■ ELECTRICAL CHARACTERISTICS (Cont.)

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

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

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

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

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

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

■ ELECTRICAL CHARACTERISTICS (Cont.)

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

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

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

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

Note: 1. Thermal resistance test board.

■ APPLICATION CIRCUITS

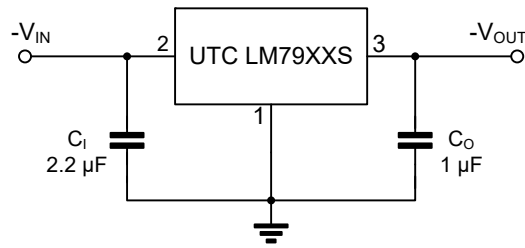


Fig.1 Fixed output regulator

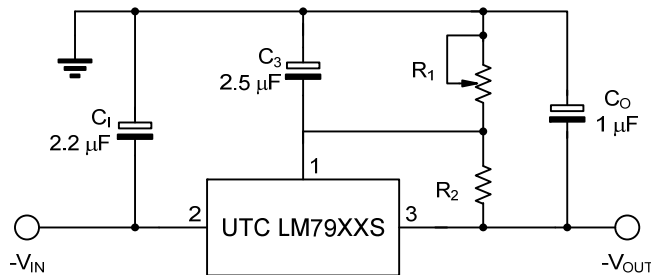


Fig.2 Circuit for increasing output voltage

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