



79DXXS

Preliminary

LINEAR INTEGRATED CIRCUIT

3 TERMINAL 0.5A NEGATIVE VOLTAGE REGULATOR

DESCRIPTION

The UTC **79DXXS** series of three-terminal negative regulators are available 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.

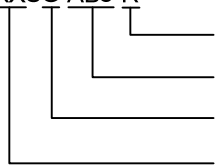
FEATURES

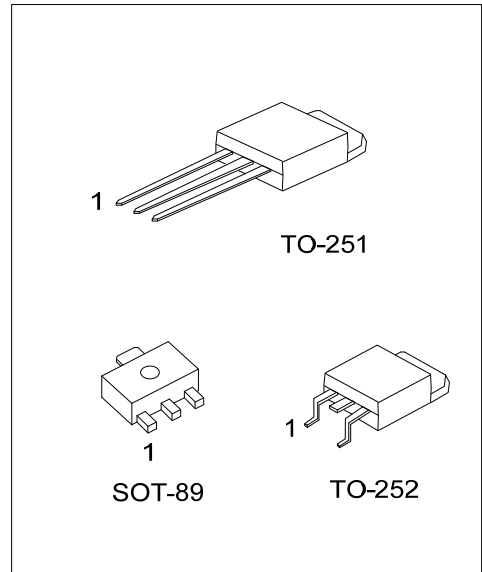
- * Output current up to 0.5A
- * -5V, -6V, -8V, -9V, -12V, -15V, -18V, -24V output voltage available
- * Thermal overload protection
- * Short circuit protection

ORDERING INFORMATION

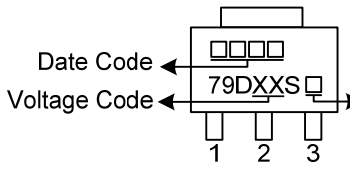
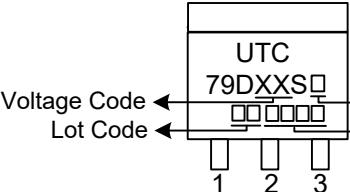
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
79DXXSL-AB3-R	79DXXSG-AB3-R	SOT-89	O	G	I	Tape Reel
79DXXSL-TM3-T	79DXXSG-TM3-T	TO-251	G	I	O	Tube
79DXXSL-TN3-R	79DXXSG-TN3-R	TO-252	G	I	O	Tape Reel

Notes: 1. xx: output voltage, refer to Marking Information.
2. Pin Code: O: Output I: Input G: GND

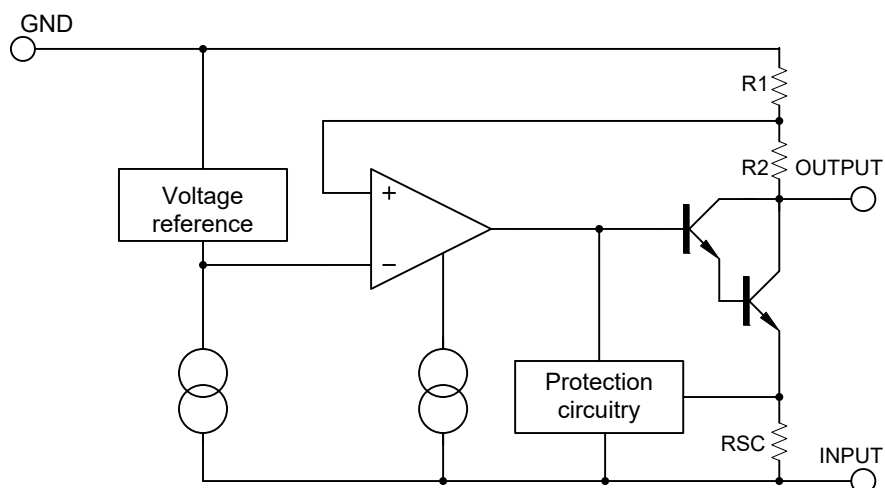
79DXXSG-AB3-R 	(1) R: Tape Reel, T: Tube (2) AB3: SOT-89, TM3: TO-251, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free (4) xx: refer to Marking Information
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MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	05: -5V 06: -6V 08: -8V 09: -9V	 Date Code Voltage Code 79DXXS L: Lead Free G: Halogen Free
TO-251 TO-252	12: -12V 15: -15V 18: -18V 24: -24V	 UTC Voltage Code Lot Code 79DXXS L: Lead Free G: Halogen Free Date Code

BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Input Voltage	$V_{OUT} = -5 \sim -18\text{V}$	V_{IN}	-35	V
	$V_{OUT} = -20 \sim -24\text{V}$		-40	V
Operating Temperature		T_{OPR}	$-40 \sim +125$	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	$-65 \sim +150$	$^{\circ}\text{C}$

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	RATINGS	UNIT
Thermal Resistance Junction-Air	SOT-89	θ_{JA}	180	$^{\circ}\text{C/W}$
	TO-251/TO-252		112	$^{\circ}\text{C/W}$
Thermal Resistance Junction-Cases	SOT-89	θ_{JC}	50	$^{\circ}\text{C/W}$
	TO-251/TO-252		12.5	$^{\circ}\text{C/W}$

■ ELECTRICAL CHARACTERISTICS

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

For 79D05S ($V_{IN}=-10\text{V}$)

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
		$5.0\text{mA} < I_{OUT} < 0.5\text{A}$ $V_{IN}=-7\text{V} \sim -20\text{V}$	-4.75		-5.25	V
Line Regulation	ΔV_{OUT}	$T_J=25^{\circ}\text{C}$, $V_{IN}=-7\text{V} \sim -25\text{V}$		10	100	mV
		$T_J=25^{\circ}\text{C}$, $V_{IN}=-8\text{V} \sim -12\text{V}$		5	60	mV
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}\text{C}$, $I_{OUT}=5.0\text{mA} \sim 0.5\text{A}$		10	100	mV
		$T_J=25^{\circ}\text{C}$, $I_{OUT}=5.0\text{mA} \sim 200\text{mA}$		3	50	mV
Quiescent Current	I_Q	$T_J=25^{\circ}\text{C}$		4.3	8	mA
Quiescent Current Change	ΔI_Q	$I_{OUT}=5\text{mA} \sim 0.5\text{A}$		0.05	0.5	mA
		$V_{IN}=-7\text{V} \sim -25\text{V}$		0.1	1.3	mA
Temperature Coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5\text{mA}$		-0.4		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f=10\text{Hz} \sim 100\text{kHz}$, $T_A=25^{\circ}\text{C}$		100		μV
Ripple Rejection	RR	$f=120\text{Hz}$, $V_{IN}=-8\text{V} \sim -18\text{V}$	54	60		dB
Dropout Voltage	V_D	$I_{OUT}=0.5\text{A}$, $T_J=25^{\circ}\text{C}$		2		V

For 79D06S ($V_{IN}=-11\text{V}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}\text{C}$	-5.76	-6.0	-6.24	V
		$5.0\text{mA} < I_{OUT} < 0.5\text{A}$, $V_{IN}=-8\text{V} \sim -21\text{V}$	-5.70		-6.30	V
Line Regulation	ΔV_{OUT}	$T_J=25^{\circ}\text{C}$, $V_{IN}=-8\text{V} \sim -25\text{V}$		10	120	mV
		$T_J=25^{\circ}\text{C}$, $V_{IN}=-9\text{V} \sim -13\text{V}$		5	60	mV
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}\text{C}$, $I_{OUT}=5.0\text{mA} \sim 0.5\text{A}$		10	120	mV
		$T_J=25^{\circ}\text{C}$, $I_{OUT}=5.0\text{mA} \sim 200\text{mA}$		3	60	mV
Quiescent Current	I_Q	$T_J=25^{\circ}\text{C}$		4.3	8	mA
Quiescent Current Change	ΔI_Q	$I_{OUT}=5\text{mA} \sim 0.5\text{A}$			0.5	mA
		$V_{IN}=-8\text{V} \sim -25\text{V}$			1.3	mA
Temperature Coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5\text{mA}$		-0.5		mV/ $^{\circ}\text{C}$
Output Noise Voltage	eN	$F=10\text{Hz} \sim 100\text{kHz}$, $T_A=25^{\circ}\text{C}$		130		μV
Ripple Rejection	RR	$F=120\text{Hz}$, $V_{IN}=-9\text{V} \sim -19\text{V}$	54	60		dB
Dropout Voltage	V_D	$I_{OUT}=0.5\text{A}$, $T_J=25^{\circ}\text{C}$		2		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

For 79D08S ($V_{IN}=-14V$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	-7.68	-8.0	-8.32	V
		$5.0mA < I_{OUT} < 0.5A$ $V_{IN}=-10.5V \sim -23V$	-7.60		-8.40	V
Line Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, V_{IN}=-10.5V \sim -25V$		10	100	mV
		$T_J=25^{\circ}C, V_{IN}=-11.5V \sim -17V$		5	80	mV
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 0.5A$		12	160	mV
		$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 200mA$		4	80	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$		4.3	8	mA
Quiescent Current change	ΔI_Q	$I_{OUT}=5mA \sim 0.5A$		0.05	0.5	mA
		$V_{IN}=-11.5V \sim -25V$		0.1	1.0	mA
Temperature Coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.6		mV/ $^{\circ}C$
Output Noise Voltage	eN	$f=10Hz \sim 100kHz, T_A=25^{\circ}C$		175		μV
Ripple Rejection	RR	$f=120Hz, V_{IN}=-11.5V \sim -21.5V$	54	60		dB
Dropout Voltage	V_D	$I_{OUT}=0.5A, T_J=25^{\circ}C$		2		V

For 79D09S ($V_{IN}=-15V$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	-8.64	-9.0	-9.36	V
		$5.0mA < I_{OUT} < 0.5A$ $V_{IN}=-11.5V \sim -24V$	-8.55		-9.45	V
Line regulation	ΔV_{OUT}	$T_J=25^{\circ}C, V_{IN}=-11.5V \sim -25V$		10	180	mV
		$T_J=25^{\circ}C, V_{IN}=-12.5V \sim -18V$		5	90	mV
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 0.5A$		12	180	mV
		$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 200mA$		4	90	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$		4.3	8	mA
Quiescent Current Change	ΔI_Q	$I_{OUT}=5mA \sim 0.5A$		0.05	0.5	mA
		$V_{IN}=-11.5V \sim -26V$		0.1	1.0	mA
Temperature Coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.6		mV/ $^{\circ}C$
Output Noise Voltage	eN	$f=10Hz \sim 100kHz, T_A=25^{\circ}C$		175		μV
Ripple Rejection	RR	$f=120Hz, V_{IN}=-12.5V \sim -22.5V$	54	60		dB
Dropout Voltage	V_D	$I_{OUT}=0.5A, T_J=25^{\circ}C$		2		V

For 79D12S ($V_{IN}=-18V$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	-11.52	-12.0	-12.48	V
		$5.0mA < I_{OUT} < 0.5A$ $V_{IN}=-14.5V \sim -27V$	-11.40		-12.60	V
Line Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, V_{IN}=-14.5V \sim -30V$		12	240	mV
		$T_J=25^{\circ}C, V_{IN}=-16V \sim -22V$		6	120	mV
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 0.5A$		12	240	mV
		$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 200mA$		4	120	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$		4.3	8	mA
Quiescent Current Change	ΔI_Q	$I_{OUT}=5mA \sim 0.5A$		0.05	0.5	mA
		$V_{IN}=-14.5V \sim -30V$		0.1	1.0	mA
Temperature Coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.8		mV/ $^{\circ}C$
Output Noise Voltage	eN	$f=10Hz \sim 100kHz, T_A=25^{\circ}C$		200		μV
Ripple Rejection	RR	$f=120Hz, V_{IN}=-15V \sim -25V$	54	60		dB
Dropout Voltage	V_D	$I_{OUT}=0.5A, T_J=25^{\circ}C$		2		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

For 79D15S ($V_{IN}=-23V$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	-14.40	-15.0	-15.60	V
		$5.0mA < I_{OUT} < 0.5A$ $V_i=-17.5V \sim -30V$	-14.25		-15.75	V
Line Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, V_{IN}=-17.5V \sim -30V$		12	300	mV
		$T_J=25^{\circ}C, V_{IN}=-20V \sim -26V$		6	150	mV
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 0.5A$		12	300	mV
		$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 200mA$		4	150	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$		4.3	8	mA
Quiescent Current Change	ΔI_Q	$I_{OUT}=5mA \sim 0.5A$		0.05	0.5	mA
		$V_{IN}=-17.5V \sim -30.5V$		0.1	1.0	MA
Temperature Coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.9		mV/ $^{\circ}C$
Output Noise Voltage	eN	$f=10Hz \sim 100kHz, T_A=25^{\circ}C$		250		μV
Ripple Rejection	RR	$f=120Hz, V_{IN}=-18.5V \sim -28.5V$	54	60		dB
Dropout Voltage	V_D	$I_{OUT}=0.5A, T_J=25^{\circ}C$		2		V

For 79D18S ($V_{IN}=-27$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	-17.28	-18.0	-18.72	V
		$5.0mA < I_{OUT} < 0.5A$ $V_{IN}=-21V \sim -33V$	-17.10		-18.90	V
Line Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, V_{IN}=-21V \sim -33V$		15	360	mV
		$T_J=25^{\circ}C, V_{IN}=-24V \sim -30V$		8	180	mV
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 0.5A$		15	360	mV
		$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 200mA$		5.0	180	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$		4.3	8	mA
Quiescent Current Change	ΔI_Q	$I_{OUT}=5mA \sim 0.5A$			0.5	mA
		$V_{IN}=-21V \sim -32V$			1.0	mA
Temperature Coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-1		mV/ $^{\circ}C$
Output Noise Voltage	eN	$f=10Hz \sim 100kHz, T_A=25^{\circ}C$		300		μV
Ripple Rejection	RR	$f=120Hz, V_{IN}=-22V \sim -32V$	54	60		dB
Dropout Voltage	V_D	$I_{OUT}=0.5A, T_J=25^{\circ}C$		2		V

For 79D24S ($V_{IN}=-33V$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	-23.04	-24.0	-24.96	V
		$5.0mA < I_{OUT} < 0.5A$ $V_{IN}=-27V \sim -38V$	-22.80		-25.20	V
Line Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, V_{IN}=-27V \sim -38V$		15	480	mV
		$T_J=25^{\circ}C, V_{IN}=-30V \sim -36V$		8	240	mV
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 0.5A$		15	480	mV
		$T_J=25^{\circ}C, I_{OUT}=5.0mA \sim 200mA$		5.0	240	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$		4.3	8	mA
Quiescent Current Change	ΔI_Q	$I_{OUT}=5mA \sim 0.5A$			0.5	mA
		$V_{IN}=-27V \sim -38V$			1.0	mA
Temperature Coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-1		mV/ $^{\circ}C$
Output Noise Voltage	eN	$f=10Hz \sim 100kHz, T_A=25^{\circ}C$		400		μV
Ripple Rejection	RR	$f=120Hz, V_{IN}=-28V \sim -38V$	54	60		dB
Dropout Voltage	V_D	$I_{OUT}=0.5A, T_J=25^{\circ}C$		2		V

■ APPLICATION CIRCUITS (C_i and C_o please use electrolytic capacitor)

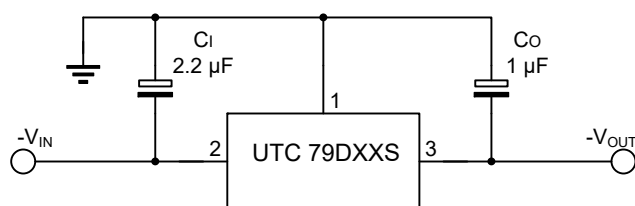


Fig.1 Fixed output regulator

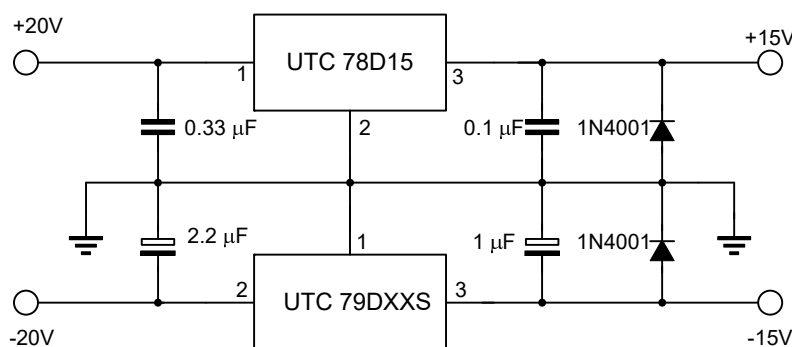


Fig.2 Split power supply ($\pm 15V$, 0.5A)

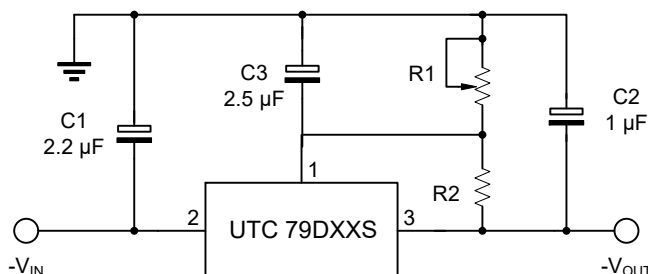


Fig.3 Circuit for increasing output voltage

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