

UTC 79DXX LINEAR INTEGRATED CIRCUIT

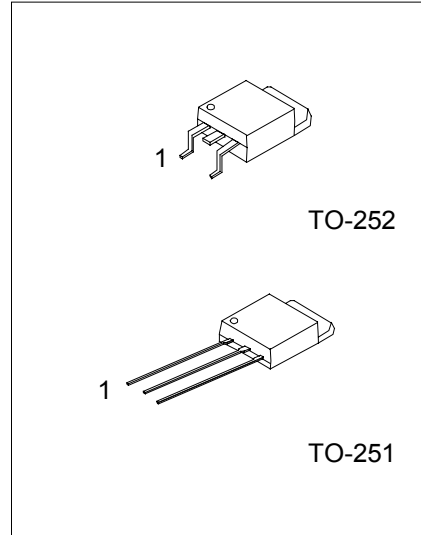
3 TERMINAL 0.5A NEGATIVE VOLTAGE REGULATOR

DESCRIPTION

The UTC 79DXX series of three-terminal negative regulators are available in TO-252 and TO-251 packages and 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.

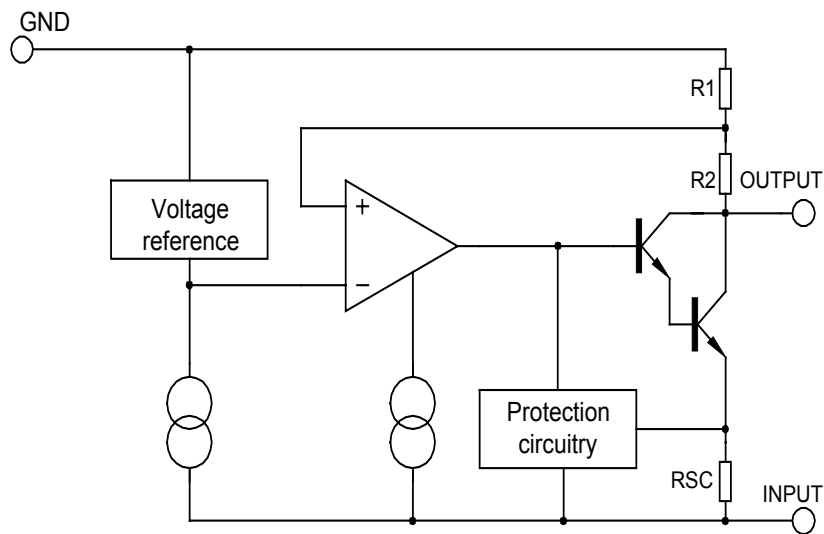
FEATURES

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



1: GND 2: Input 3: Output

BLOCK DIAGRAM



UTC 79DXX LINEAR INTEGRATED CIRCUIT

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	VALUE	UNIT
Input voltage (for Vo=-5 ~ -18V) (for Vo=-20 ~ -24V)	Vi	-35 -40	V
Thermal resistance junction-air	R θ JA	65	°C /W
Thermal resistance junction-cases	R θ JC	5	°C /W
Operating Temperature	Topr	0 ~ +125	°C
Storage Temperature	Tstg	-65 ~ +150	°C

UTC 79D05 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, 0<Tj<125°C, Io=500mA, Vi=-10V, Ci=33uF, Co=1uF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	Vo	Tj=25°C	-4.80	-5.0	-5.20	V
		5.0mA<Io<0.5A, Po<15W Vi=-7V to -20V	-4.75		-5.25	V
Line regulation	ΔVo	Tj=25°C, Vi=-7V to -25V		10	100	mV
		Tj=25°C, Vi=-8V to -12V				mV
Load regulation	ΔVo	Tj=25°C, Io=5.0mA to 0.5A		10	100	mV
		Tj=25°C, Io=5.0mA to 200mA		3	50	mV
Quiescent current	Iq	Tj=25°C		4.3	8	mA
Quiescent current change	ΔIq	Io=5mA to 0.5A		0.05	0.5	mA
		Vi=-7V to -25V		0.1	1.3	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-0.4		mV/°C
Output noise voltage	VN	f=10Hz to 100kHz, Ta=25°C		100		μV
Ripple rejection	RR	f=120Hz, Vi=-8V to -18V	54	60		dB
Dropout voltage	Vd	Io=1.0A, Tj=25°C		2		V

UTC 79D06 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, 0<Tj<125°C, Io=500mA, Vi=-11V, Ci=2.2uF, Co=1uF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	Vo	Tj=25°C	-5.76	-6.0	-6.24	V
		5.0mA<Io<0.5A, Po<15W Vi=-8V to -21V	-5.70		-6.30	V
Line regulation	ΔVo	Tj=25°C, Vi=-8V to -25V		10	120	mV
		Tj=25°C, Vi=-9V to -13V		5	60	mV
Load regulation	ΔVo	Tj=25°C, Io=5.0mA to 0.5A		10	120	mV
		Tj=25°C, Io=5.0mA to 200mA		3	60	mV
Quiescent current	Iq	Tj=25°C		4.3	8	mA
Quiescent current change	ΔIq	Io=5mA to 0.5A			0.5	mA
		Vi=-8V to -25V			1.3	mA
Output voltage drift	ΔVo/ΔT	Io=5mA		-0.5		mV/°C
Output noise voltage	VN	f=10Hz to 100kHz, Ta=25°C		130		μV
Ripple rejection	RR	f=120Hz, Vi=-9V to -19V	54	60		dB
Dropout voltage	Vd	Io=0.5A, Tj=25°C		2		V

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UTC 79D08 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, $0 < T_j < 125^\circ\text{C}$, $I_o = 500\text{mA}$, $V_i = -14\text{V}$, $C_i = 2.2\mu\text{F}$, $C_o = 1\mu\text{F}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	V_o	$T_j = 25^\circ\text{C}$	-7.68	-8.0	-8.32	V
		$5.0\text{mA} < I_o < 0.5\text{A}$, $P_o < 15\text{W}$ $V_i = -10.5\text{V}$ to -23V	-7.60		-8.40	V
Line regulation	ΔV_o	$T_j = 25^\circ\text{C}$, $V_i = -10.5\text{V}$ to -25V		10	100	mV
		$T_j = 25^\circ\text{C}$, $V_i = -11.5\text{V}$ to -17V		5	80	mV
Load regulation	ΔV_o	$T_j = 25^\circ\text{C}$, $I_o = 5.0\text{mA}$ to 0.5A		12	160	mV
		$T_j = 25^\circ\text{C}$, $I_o = 5.0\text{mA}$ to 200mA		4	80	mV
Quiescent current	I_Q	$T_j = 25^\circ\text{C}$		4.3	8	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 0.5A		0.05	0.5	mA
		$V_i = -11.5\text{V}$ to -25V		0.1	1.0	mA
Output voltage drift	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$		-0.6		mV/ $^\circ\text{C}$
Output noise voltage	V_N	$f = 10\text{Hz}$ to 100kHz , $T_a = 25^\circ\text{C}$		175		μV
Ripple rejection	RR	$f = 120\text{Hz}$, $V_i = -11.5\text{V}$ to -21.5V	54	60		dB
Dropout voltage	V_d	$I_o = 0.5\text{A}$, $T_j = 25^\circ\text{C}$		2		V

UTC 79D09 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, $0 < T_j < 125^\circ\text{C}$, $I_o = 500\text{mA}$, $V_i = -15\text{V}$, $C_i = 2.2\mu\text{F}$, $C_o = 1\mu\text{F}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j = 25^\circ\text{C}$	-8.64	-9.0	-9.36	V
		$5.0\text{mA} < I_o < 0.5\text{A}$, $P_o < 15\text{W}$ $V_i = -11.5\text{V}$ to -24V	-8.55		-9.45	V
Line regulation	ΔV_o	$T_j = 25^\circ\text{C}$, $V_i = -11.5\text{V}$ to -25V		10	180	mV
		$T_j = 25^\circ\text{C}$, $V_i = -12.5\text{V}$ to -18V		5	90	mV
Load Regulation	ΔV_o	$T_j = 25^\circ\text{C}$, $I_o = 5.0\text{mA}$ - 0.5A		12	180	mV
		$T_j = 25^\circ\text{C}$, $I_o = 5.0\text{mA}$ - 200mA		4	90	mV
Quiescent Current	I_Q	$T_j = 25^\circ\text{C}$		4.3	8	mA
Quiescent Current Change	ΔI_Q	$I_o = 5\text{mA}$ to 0.5A		0.05	0.5	mA
		$V_i = -11.5\text{V}$ to -26V		0.1	1.0	mA
Temperature coefficient of V_o	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$		-0.6		mV/ $^\circ\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz}$ to 100kHz , $T_a = 25^\circ\text{C}$		175		μV
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_i = -12.5\text{V}$ to -22.5V	54	60		dB
Dropout Voltage	V_d	$I_o = 0.5\text{A}$, $T_j = 25^\circ\text{C}$		2		V

UTC 79D12 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, $0 < T_j < 125^\circ\text{C}$, $I_o = 500\text{mA}$, $V_i = -18\text{V}$, $C_i = 2.2\mu\text{F}$, $C_o = 1\mu\text{F}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	V_o	$T_j = 25^\circ\text{C}$	-11.52	-12.0	-12.48	V
		$5.0\text{mA} < I_o < 0.5\text{A}$, $P_o < 15\text{W}$ $V_i = -14.5\text{V}$ to -27V	-11.40		-12.60	V
Line regulation	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 -22V		6	120	mV
Load regulation	ΔV_o	$T_j = 25^\circ\text{C}$, $I_o = 5.0\text{mA}$ to 0.5A		12	240	mV
		$T_j = 25^\circ\text{C}$, $I_o = 5.0\text{mA}$ to 200mA		4	120	mV
Quiescent current	I_Q	$T_j = 25^\circ\text{C}$		4.3	8	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 0.5A		0.05	0.5	mA
		$V_i = -14.5\text{V}$ to -30V		0.1	1.0	mA
Output voltage drift	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$		-0.8		mV/ $^\circ\text{C}$

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Output noise voltage	V _N	f=10Hz to 100kHz, T _a =25°C		200		μV
Ripple rejection	RR	f=120Hz, V _i =-15V to -25V	54	60		dB
Dropout voltage	V _d	I _o =0.5A, T _j =25°C		2		V

UTC 79D15 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, 0<T_j<125°C, I_o=500mA, V_i=-23V, C_i=2.2μF, C_o=1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	V _o	T _j =25°C	-14.40	-15.0	-15.60	V
		5.0mA<I _o <0.5A, P _o <15W V _i =-17.5V to -30V	-14.25		-15.75	V
Line regulation	ΔV _o	T _j =25°C, V _i =-17.5V to -30V		12	300	mV
		T _j =25°C, V _i =-20V to -26V		6	150	mV
Load regulation	ΔV _o	T _j =25°C, I _o =5.0mA to 0.5A		12	300	mV
		T _j =25°C, I _o =5.0mA to 200mA		4	150	mV
Quiescent current	I _Q	T _j =25°C		4.3	8	mA
Quiescent current change	ΔI _Q	I _o =5mA to 0.5A		0.05	0.5	mA
		V _i =-17.5V to -30.5V		0.1	1.0	mA
Output voltage drift	ΔV _o /ΔT	I _o =5mA		-0.9		mV/°C
Output noise voltage	V _N	f=10Hz to 100kHz, T _a =25°C		250		μV
Ripple rejection	RR	f=120Hz, V _i =-18.5V to -28.5V	54	60		DB
Dropout voltage	V _d	I _o =0.5A, T _j =25°C		2		V

UTC 79D18 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, 0<T_j<125°C, I_o=500mA, V_i=-27V, C_i=2.2μF, C_o=1μF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	V _o	T _j =25°C	-17.28	-18.0	-18.72	V
		5.0mA<I _o <0.5A, P _o <15W V _i =-21V to -33V	-17.10		-18.90	V
Line regulation	ΔV _o	T _j =25°C, V _i =-21V to -33V		15	360	mV
		T _j =25°C, V _i =-24V to -30V		8	180	mV
Load regulation	ΔV _o	T _j =25°C, I _o =5.0mA to 0.5A		15	360	mV
		T _j =25°C, I _o =5.0mA to 200mA		5.0	180	mV
Quiescent current	I _Q	T _j =25°C		4.3	8	mA
Quiescent current change	ΔI _Q	I _o =5mA to 0.5A			0.5	mA
		V _i =-21V to -32V			1.0	mA
Output voltage drift	ΔV _o /ΔT	I _o =5mA		-1		mV/°C
Output noise voltage	V _N	f=10Hz to 100kHz, T _a =25°C		300		μV
Ripple rejection	RR	f=120Hz, V _i =-22V to -32V	54	60		dB
Dropout voltage	V _d	I _o =0.5A, T _j =25°C		2		V

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UTC 79D24 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, $0 < T_j < 125^\circ\text{C}$, $I_o = 500\text{mA}$, $V_i = -33\text{V}$, $C_i = 2.2\mu\text{F}$, $C_o = 1\mu\text{F}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	V_o	$T_j = 25^\circ\text{C}$	-23.04	-24.0	-24.96	V
		$5.0\text{mA} < I_o < 0.5\text{A}$, $P_o < 15\text{W}$ $V_i = -27\text{V}$ to -38V	-22.80		-25.20	V
Line regulation	ΔV_o	$T_j = 25^\circ\text{C}$, $V_i = -27\text{V}$ to -38V		15	480	mV
		$T_j = 25^\circ\text{C}$, $V_i = -30\text{V}$ to -36V		8	240	mV
Load regulation	ΔV_o	$T_j = 25^\circ\text{C}$, $I_o = 5.0\text{mA}$ to 0.5A		15	480	mV
		$T_j = 25^\circ\text{C}$, $I_o = 5.0\text{mA}$ to 200mA		5.0	240	mV
Quiescent current	I_Q	$T_j = 25^\circ\text{C}$		4.3	8	mA
Quiescent current change	ΔI_Q	$I_o = 5\text{mA}$ to 0.5A			0.5	mA
		$V_i = -27\text{V}$ to -38V			1.0	mA
Output voltage drift	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$		-1		mV/ $^\circ\text{C}$
Output noise voltage	V_N	$f = 10\text{Hz}$ to 100kHz , $T_a = 25^\circ\text{C}$		400		μV
Ripple rejection	RR	$f = 120\text{Hz}$, $V_i = -28\text{V}$ to -38V	54	60		dB
Dropout voltage	V_d	$I_o = 0.5\text{A}$, $T_j = 25^\circ\text{C}$		2		V

APPLICATION CIRCUITS

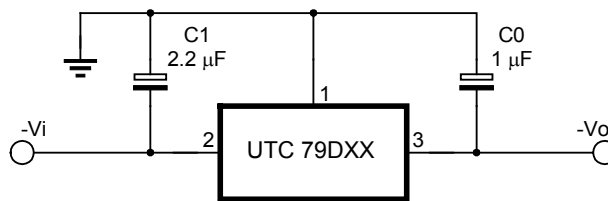


Fig.1 Fixed output regulator

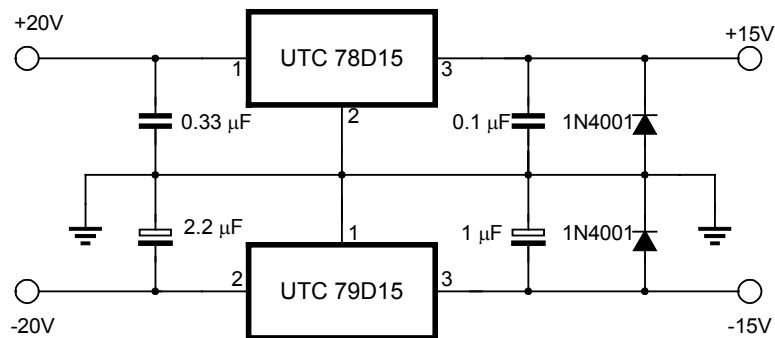


Fig.2 Split power supply (+-15V, 0.5A)

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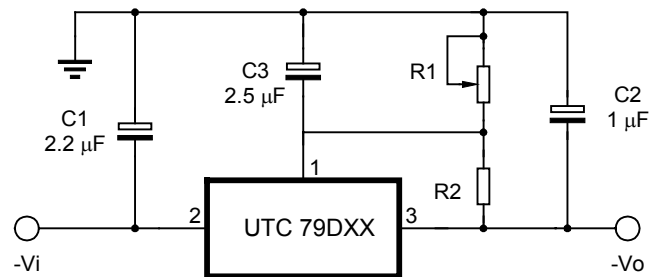


Fig.3 Circuit for increasing output voltage