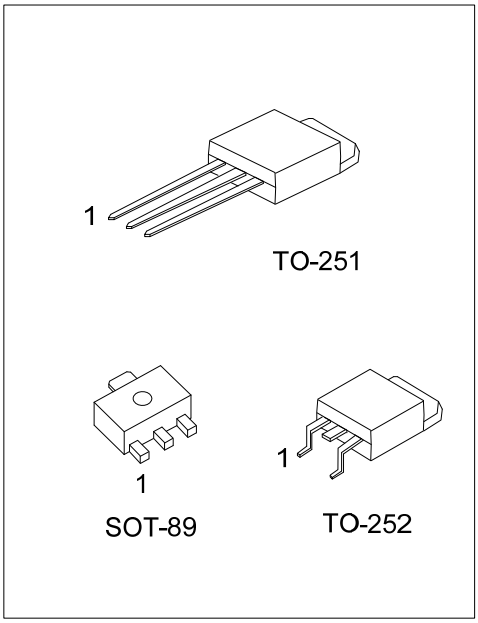
79DXX

LINEAR INTEGRATED CIRCUIT

3 TERMINAL 0.5A NEGATIVE VOLTAGE REGULATOR



■ DESCRIPTION

The UTC **79DXX** 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	
79DXXL-AB3-R	79DXXG-AB3-R	SOT-89	O	G	I	Tape Reel
79DXXL-TM3-T	79DXXG-TM3-T	TO-251	G	I	O	Tube
79DXXL-TN3-T	79DXXG-TN3-T	TO-252	G	I	O	Tube
79DXXL-TN3-R	79DXXG-TN3-R	TO-252	G	I	O	Tape Reel

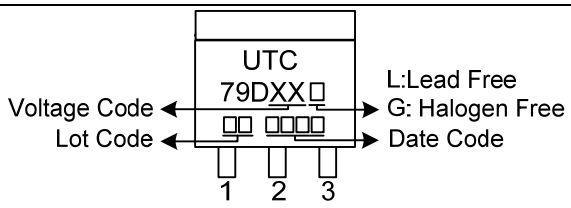
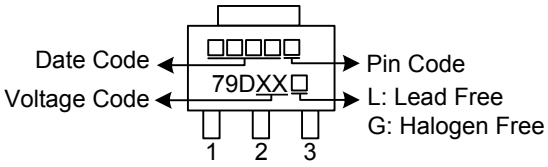
Notes: 1. xx: output voltage, refer to Marking Information
2. Pin Code: I: Input G: GND O: Output

79DXXG-AB3-R

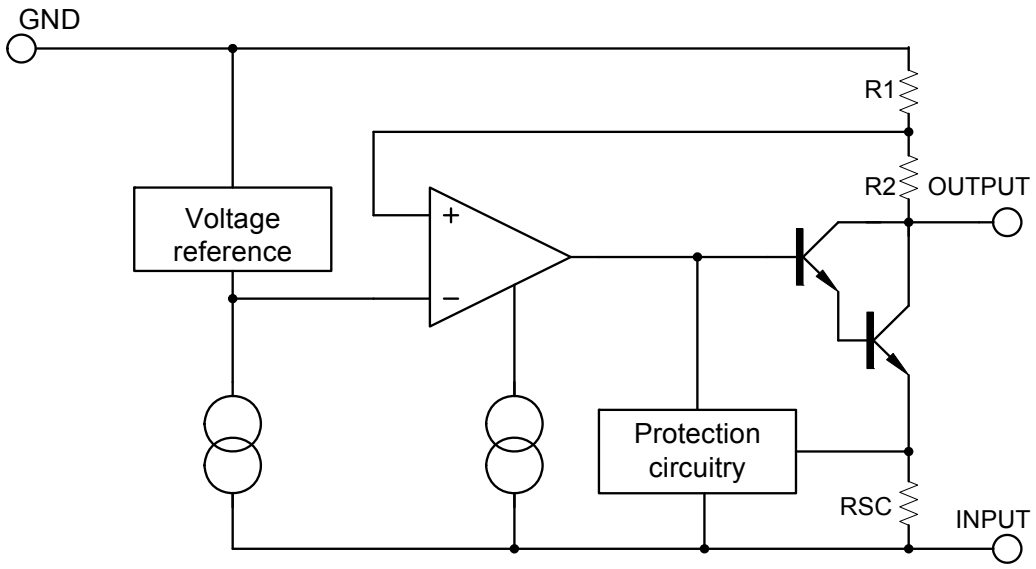
(1)Packing Type
(2)Package Type
(3)Green Package
(4)Output Voltage Code

(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

■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-251 TO-252	05 : -5V 06 : -6V 08 : -8V 09 : -9V 12 : -12V 15 : -15V 18 : -18V 24 : -24V	
SOT-89		

■ BLOCK DIAGRAM



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

PARAMETER		SYMBOL	RATINGS	UNIT
Input Voltage	V_{OUT}= -5 ~ -18V	V_{IN}	-35	V
	V_{OUT}= -20 ~ -24V		-40	V
Power Dissipation	SOT-89	P_D	0.55	W
	TO-251/TO-252		0.89	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	RATINGS	UNIT
Thermal Resistance Junction-Air	SOT-89	θ_{JA}	180	°C/W
	TO-251/TO-252		112	°C/W
Thermal Resistance Junction-Cases	SOT-89	θ_{JC}	50	°C/W
	TO-251/TO-252		12.5	°C/W

■ ELECTRICAL CHARACTERISTICS (0<T_J<125°C, unless otherwise specified)

For 79D05 (V_{IN}=-10V, I_{OUT}=500mA, C_I=33uF, C_O=1uF)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	T_J=25°C	-4.80	-5.0	-5.20	V
		5.0mA<I_{OUT}<0.5A, V_{IN}=-7V ~ -20V	-4.75		-5.25	V
Line Regulation	ΔV_{OUT}	T_J=25°C, V_{IN}=-7V ~ -25V		10	100	mV
		T_J=25°C, V_{IN}=-8V ~ -12V		5	60	mV
Load Regulation	ΔV_{OUT}	T_J=25°C, I_{OUT}=5.0mA ~ 0.5A		10	100	mV
		T_J=25°C, I_{OUT}=5.0mA ~ 200mA		3	50	mV
Quiescent Current	I_Q	T_J=25°C		4.3	8	mA
Quiescent Current Change	ΔI_Q	I_{OUT}=5mA ~ 0.5A		0.05	0.5	mA
		V_{IN}=-7V ~ -25V		0.1	1.3	mA
Temperature Coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		-0.4		mV/°C
Output Noise Voltage	V_N	f=10Hz ~ 100kHz, Ta=25°C		100		μV
Ripple Rejection	RR	f=120Hz, V_{IN}=-8V ~ -18V	54	60		dB
Dropout Voltage	V_D	I_{OUT}=0.5A, T_J=25°C		2		V

For 79D06 (V_{IN}=-11V, I_{OUT}=500mA, C_I=2.2uF, Co=1uF)

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

■ ELECTRICAL CHARACTERISTICS (Cont.)

For 79D08 (V_{IN}=-14V, I_{OUT}=500mA, C_I=2.2uF,C_O=1uF)

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

For 79D09 (V_{IN}=-15V, I_{OUT}=500mA, C_I=2.2uF,Co=1uF)

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

For 79D12 (V_{IN}=-18V, I_{OUT}=500mA, C_I=2.2uF,Co=1uF)

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

■ ELECTRICAL CHARACTERISTICS (Cont.)

For 79D15 (V_{IN}=-23V, I_{OUT}=500mA, C_I=2.2uF, Co=1uF)

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

For 79D18 (V_{IN}=-27V, I_{OUT}=500mA, C_I=2.2uF, Co=1uF)

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

For 79D24 (V_{IN}=-33V, I_{OUT}=500mA, C_I=2.2uF, Co=1uF)

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

■ APPLICATION CIRCUITS

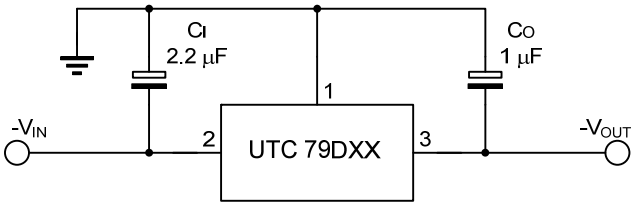


Fig.1 Fixed output regulator

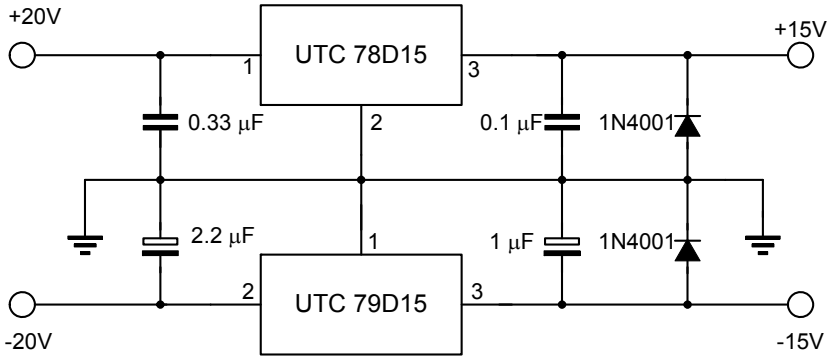


Fig.2 Split power supply（±15V, 0.5A)

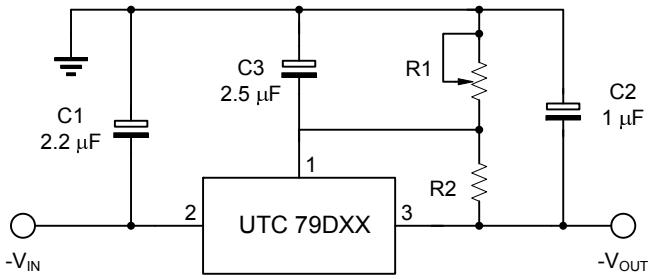
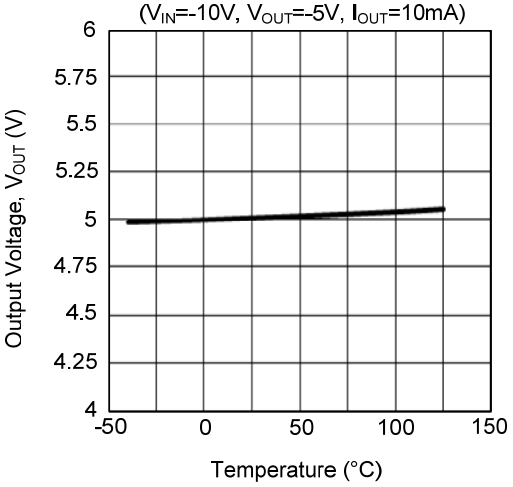


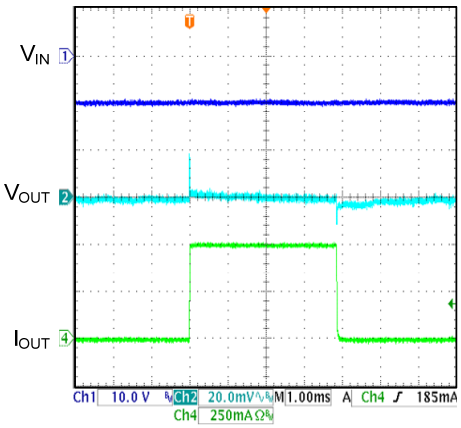
Fig.3 Circuit for increasing output voltage

■ TYPICAL CHARACTERISTICS

Output Voltage vs. Temperature
(V_{IN}=-10V, V_{OUT}=-5V, I_{OUT}=10mA)



Load Transient
(V_{IN}=-10V, V_{OUT}=-5V, I_{OUT}=5~500mA)



Power Dissipation vs. Ambient Temperature