



## 79DXX

## LINEAR INTEGRATED CIRCUIT

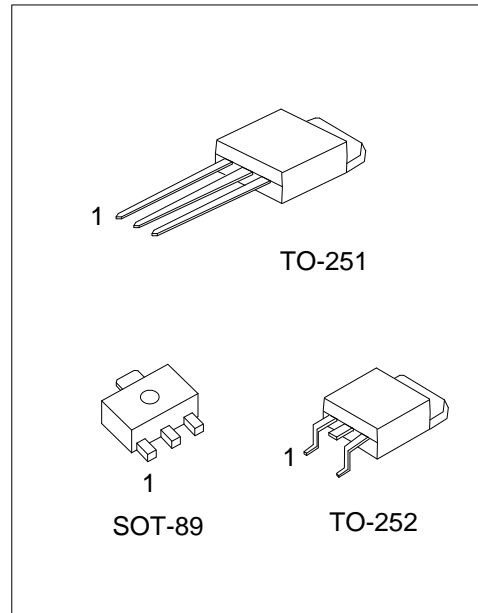
### 3 TERMINAL 0.5A NEGATIVE VOLTAGE REGULATOR

#### 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



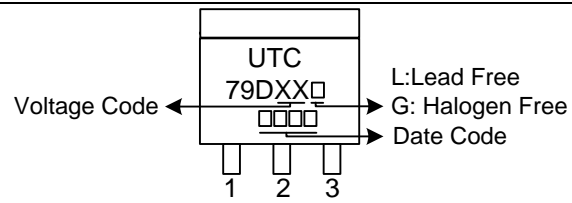
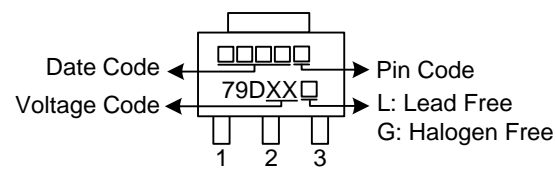
#### ORDERING INFORMATION

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-AB3-T	79DXXG-AB3-T	TO-251	G	I	O	Tube
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

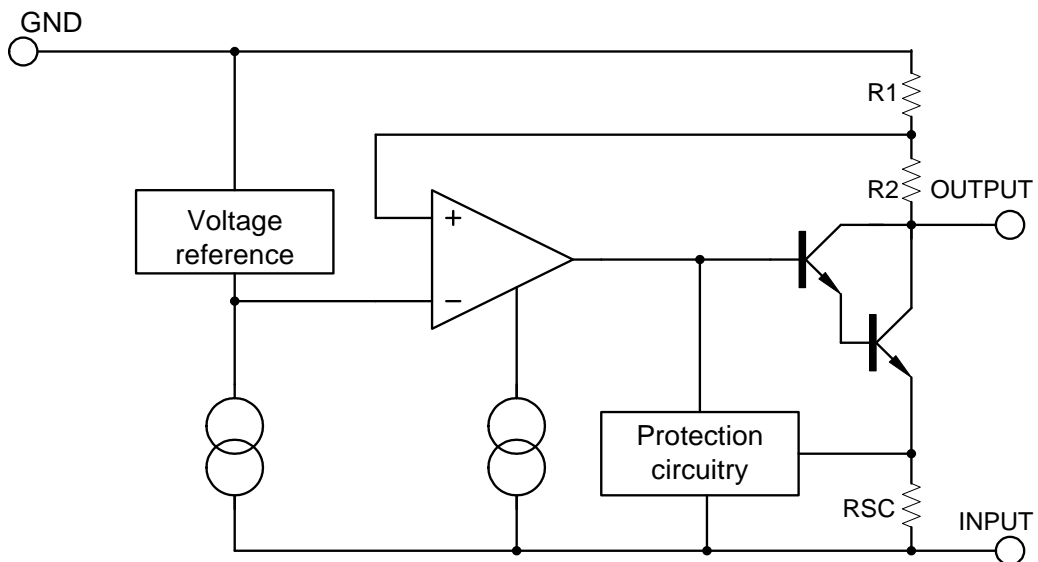
Notes: 1. xx: output voltage, refer to Marking Information  
 2. Pin Code: I: Input G: GND O: Output

<p>79DXXG-AB3-R</p>	<p>(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</p>
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### MARKING INFORMATION

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

### BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>OUT</sub> = -5 ~ -18V	V <sub>IN</sub>	-35	V
	V <sub>OUT</sub> = -20 ~ -24V		-40	V
Operating Temperature		T <sub>OPR</sub>	-40 ~ +125	°C
Storage Temperature		T <sub>STG</sub>	-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 <sub>JA</sub>	180	°C/W
	TO-251/TO-252		112	°C/W
Thermal Resistance Junction-Cases	SOT-89	θ <sub>JC</sub>	50	°C/W
	TO-251/TO-252		12.5	°C/W

### ■ ELECTRICAL CHARACTERISTICS (0<T<sub>J</sub><125°C, unless otherwise specified)

For 79D05 (V<sub>IN</sub>=-10V, I<sub>OUT</sub>=500mA, C<sub>I</sub>=33uF, C<sub>O</sub>=1uF)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	T <sub>J</sub> =25°C	-4.80	-5.0	-5.20	V
		5.0mA<I <sub>OUT</sub> <0.5A V <sub>IN</sub> =-7V ~ -20V	-4.75		-5.25	V
Line Regulation	ΔV <sub>OUT</sub>	T <sub>J</sub> =25°C, V <sub>IN</sub> =-7V ~ -25V		10	100	mV
		T <sub>J</sub> =25°C, V <sub>IN</sub> =-8V ~ -12V		5	60	mV
Load Regulation	ΔV <sub>OUT</sub>	T <sub>J</sub> =25°C, I <sub>OUT</sub> =5.0mA ~ 0.5A		10	100	mV
		T <sub>J</sub> =25°C, I <sub>OUT</sub> =5.0mA ~ 200mA		3	50	mV
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> =25°C		4.3	8	mA
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>OUT</sub> =5mA ~ 0.5A		0.05	0.5	mA
		V <sub>IN</sub> =-7V ~ -25V		0.1	1.3	mA
Temperature Coefficient of V <sub>OUT</sub>	ΔV <sub>OUT</sub> /ΔT	I <sub>OUT</sub> =5mA		-0.4		mV/°C
Output Noise Voltage	V <sub>N</sub>	f=10Hz ~ 100kHz, T <sub>a</sub> =25°C		100		μV
Ripple Rejection	RR	f=120Hz, V <sub>IN</sub> =-8V ~ -18V	54	60		dB
Dropout Voltage	V <sub>D</sub>	I <sub>OUT</sub> =0.5A, T <sub>J</sub> =25°C		2		V

For 79D06 (V<sub>IN</sub>=-11V, I<sub>OUT</sub>=500mA, C<sub>I</sub>=2.2uF, C<sub>O</sub>=1uF)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	T <sub>J</sub> =25°C	-5.76	-6.0	-6.24	V
		5.0mA<I <sub>OUT</sub> <0.5A, V <sub>IN</sub> =-8V ~ -21V	-5.70		-6.30	V
Line Regulation	ΔV <sub>OUT</sub>	T <sub>J</sub> =25°C, V <sub>IN</sub> =-8V ~ -25V		10	120	mV
		T <sub>J</sub> =25°C, V <sub>IN</sub> =-9V ~ -13V		5	60	mV
Load Regulation	ΔV <sub>OUT</sub>	T <sub>J</sub> =25°C, I <sub>OUT</sub> =5.0mA ~ 0.5A		10	120	mV
		T <sub>J</sub> =25°C, I <sub>OUT</sub> =5.0mA ~ 200mA		3	60	mV
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> =25°C		4.3	8	mA
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>OUT</sub> =5mA ~ 0.5A			0.5	mA
		V <sub>IN</sub> =-8V ~ -25V			1.3	mA
Temperature Coefficient of V <sub>OUT</sub>	ΔV <sub>OUT</sub> /ΔT	I <sub>OUT</sub> =5mA		-0.5		mV/°C
Output Noise Voltage	e <sub>N</sub>	F=10Hz ~ 100kHz, T <sub>a</sub> =25°C		130		μV
Ripple Rejection	RR	F=120Hz, V <sub>IN</sub> =-9V ~ -19V	54	60		dB
Dropout Voltage	V <sub>D</sub>	I <sub>OUT</sub> =0.5A, T <sub>J</sub> =25°C		2		V

### ■ ELECTRICAL CHARACTERISTICS (Cont.)

**For 79D08** ( $V_{IN}=-14V$ ,  $I_{OUT}=500mA$ ,  $C_I=2.2\mu F$ ,  $C_O=1\mu F$ )

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	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $V_{IN}=-10.5V \sim -25V$		10	100	mV
		$T_J=25^\circ C$ , $V_{IN}=-11.5V \sim -17V$		5	80	mV
Load Regulation	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $I_{OUT}=5.0mA \sim 0.5A$		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	$\Delta I_Q$	$I_{OUT}=5mA \sim 0.5A$		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		$\mu V$
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 79D09** ( $V_{IN}=-15V$ ,  $I_{OUT}=500mA$ ,  $C_I=2.2\mu F$ ,  $C_O=1\mu F$ )

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	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $V_{IN}=-11.5V \sim -25V$		10	180	mV
		$T_J=25^\circ C$ , $V_{IN}=-12.5V \sim -18V$		5	90	mV
Load Regulation	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $I_{OUT}=5.0mA \sim 0.5A$		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	$\Delta I_Q$	$I_{OUT}=5mA \sim 0.5A$		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		$\mu V$
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 79D12** ( $V_{IN}=-18V$ ,  $I_{OUT}=500mA$ ,  $C_I=2.2\mu F$ ,  $C_O=1\mu F$ )

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	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $V_{IN}=-14.5V \sim -30V$		12	240	mV
		$T_J=25^\circ C$ , $V_{IN}=-16V \sim -22V$		6	120	mV
Load Regulation	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $I_{OUT}=5.0mA \sim 0.5A$		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	$\Delta I_Q$	$I_{OUT}=5mA \sim 0.5A$		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		$\mu V$
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 79D15 ( $V_{IN}=-23V$ ,  $I_{OUT}=500mA$ ,  $C_I=2.2\mu F$ ,  $C_O=1\mu F$ )

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	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $V_{IN}=-17.5V \sim -30V$		12	300	mV
		$T_J=25^\circ C$ , $V_{IN}=-20V \sim -26V$		6	150	mV
Load Regulation	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $I_{OUT}=5.0mA \sim 0.5A$		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	$\Delta I_Q$	$I_{OUT}=5mA \sim 0.5A$		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		$\mu V$
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 79D18 ( $V_{IN}=-27V$ ,  $I_{OUT}=500mA$ ,  $C_I=2.2\mu F$ ,  $C_O=1\mu F$ )

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	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $V_{IN}=-21V \sim -33V$		15	360	mV
		$T_J=25^\circ C$ , $V_{IN}=-24V \sim -30V$		8	180	mV
Load Regulation	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $I_{OUT}=5.0mA \sim 0.5A$		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	$\Delta I_Q$	$I_{OUT}=5mA \sim 0.5A$			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		$\mu V$
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 79D24 ( $V_{IN}=-33V$ ,  $I_{OUT}=500mA$ ,  $C_I=2.2\mu F$ ,  $C_O=1\mu F$ )

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	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $V_{IN}=-27V \sim -38V$		15	480	mV
		$T_J=25^\circ C$ , $V_{IN}=-30V \sim -36V$		8	240	mV
Load Regulation	$\Delta V_{OUT}$	$T_J=25^\circ C$ , $I_{OUT}=5.0mA \sim 0.5A$		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	$\Delta I_Q$	$I_{OUT}=5mA \sim 0.5A$			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		$\mu V$
Ripple Rejection	RR	$f=120Hz$ , $V_{IN}=-28V$ to $-38V$	54	60		dB
Dropout Voltage	$V_D$	$I_{OUT}=0.5A$ , $T_J=25^\circ C$		2		V

## APPLICATION CIRCUITS

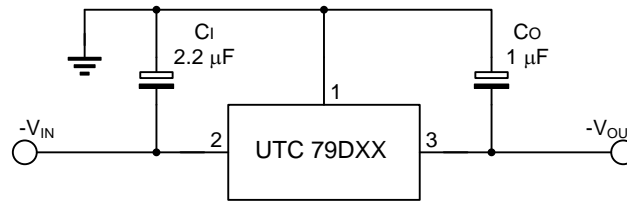


Fig.1 Fixed output regulator

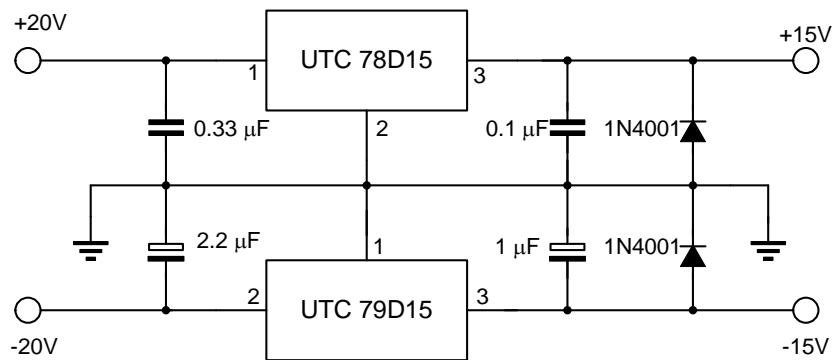


Fig.2 Split power supply ( $\pm 15V$ , 0.5A)

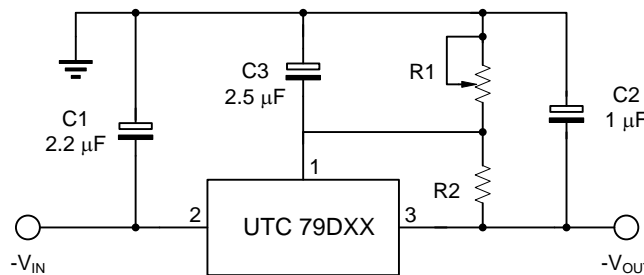


Fig.3 Circuit for increasing output voltage

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