



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

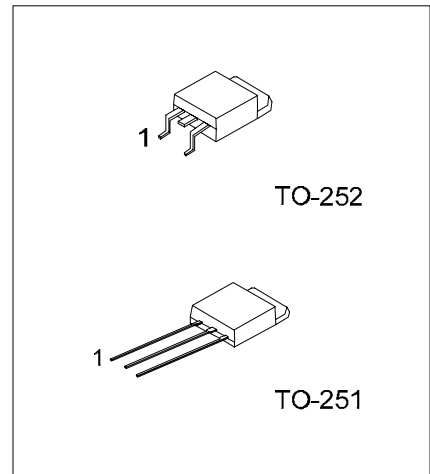
- * Output current up to 0.5A
- * -5V; -6V; -8V; -12V; -15V; -18V; -24V output voltage available
- * Thermal overload protection
- * Short circuit protection

ORDERING INFORMATION

Ordering Number		Pin Assignment			Package	Packing
Normal	Lead Free Plating	1	2	3		
79Dxx-TM3-T	79DxxL-TM3-T	G	I	O	TO-251	Tube
79Dxx-TN3-R	79DxxL-TN3-R	G	I	O	TO-252	Tape Reel
79Dxx-TN3-T	79DxxL-TN3-T	G	I	O	TO-252	Tube

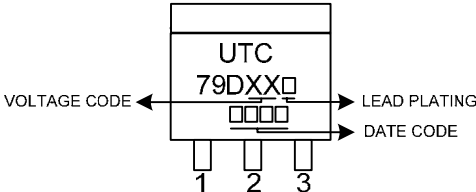
Note: 1. xx: output voltage, refer to Marking Information
 2. Pin Code: I: Input G: GND O: Output

<p>79DxxL-TM3-T</p>	<p>(1)Packing Type (2)Package Type (3)Lead Plating (4)Output Voltage Code</p>	<p>(1) R: Tape Reel, T: Tube (2) TM3: TO-251, TN3: TO-252 (3) L: Lead Free Plating, Blank: Pb/Sn (4) xx: refer to Marking Information</p>
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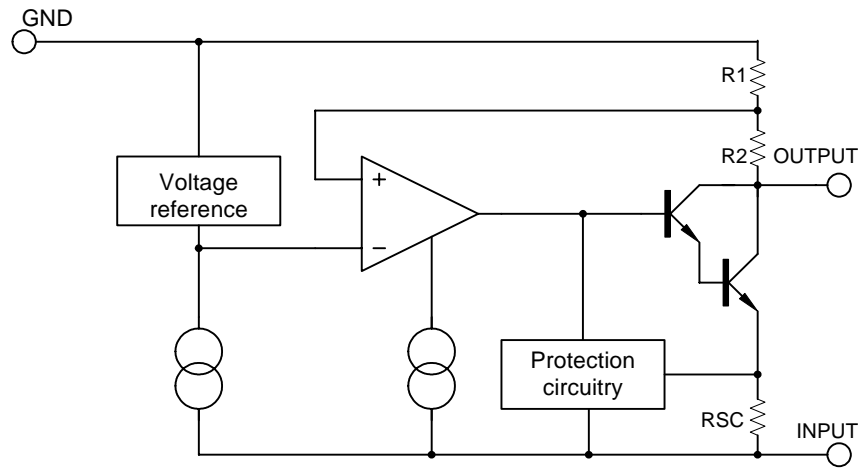


*Pb-free plating product number: 79DXXL

■ MARKING INFORMATION

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

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT	
Input Voltage	V _{IN}	V _{OUT} = -5 ~ -18V	-35	V
		V _{OUT} = -20 ~ -24V	-40	V
Operating Temperature	T _{OPR}	0 ~ +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	θ _{JA}	65	°C /W
Thermal Resistance Junction-Cases	θ _{JC}	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, P _{OUT} <15W 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				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}	ΔV _{OUT} /ΔT	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} =1.0A, T _J =25°C		2		V

FOR 79D06 (V_{IN}=-11V, 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	-5.76	-6.0	-6.24	V
		5.0mA<I _{OUT} <0.5A, P _{OUT} <15W 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}	ΔV _{OUT} /ΔT	I _{OUT} =5mA		-0.5		mV/°C
Output Noise Voltage	e _N	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 ($V_{IN}=-14V$, $I_{OUT}=500mA$, $C_I=2.2\mu F$, $C_O=1\mu F$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^\circ C$	-7.68	-8.0	-8.32	V
		$5.0mA < I_{OUT} < 0.5A$, $P_{OUT} < 15W$ $V_{IN} = -10.5V \sim -23V$	-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 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
		$5.0mA < I_{OUT} < 0.5A$, $P_{OUT} < 15W$ $V_{IN} = -11.5V \sim -24V$	-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 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
		$5.0mA < I_{OUT} < 0.5A$, $P_{OUT} < 15W$ $V_{IN} = -14.5V \sim -27V$	-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 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
		$5.0mA < I_{OUT} < 0.5A$, $P_{OUT} < 15W$ $V_i = -17.5V \sim -30V$	-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 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
		$5.0mA < I_{OUT} < 0.5A$, $P_{OUT} < 15W$ $V_{IN}=-21V \sim -33V$	-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 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
		$5.0mA < I_{OUT} < 0.5A$, $P_{OUT} < 15W$ $V_{IN}=-27V \sim -38V$	-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	$f=120Hz$, $V_{IN}=-28V$ to $-38V$	54	60		dB
Dropout Voltage	V_D	$I_{OUT}=0.5A$, $T_J=25^\circ C$		2		V

APPLICATION CIRCUITS

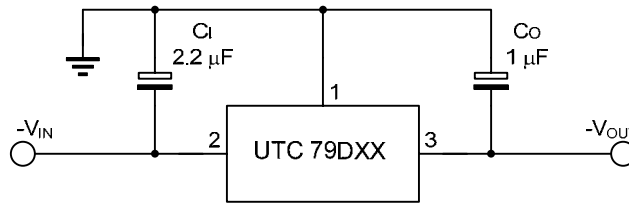


Fig.1 Fixed output regulator

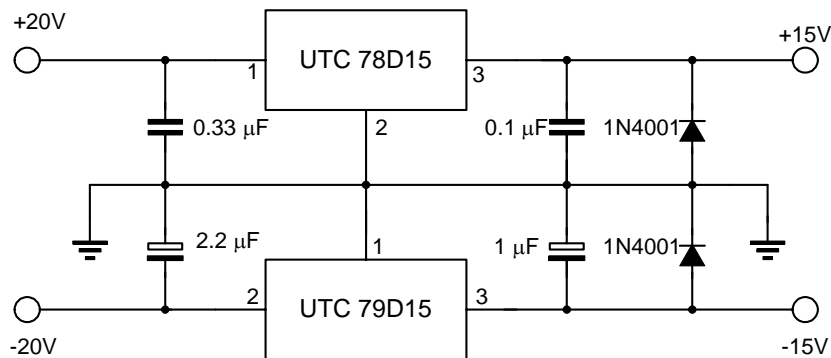


Fig.2 Split power supply ($\pm 15V$, 0.5A)

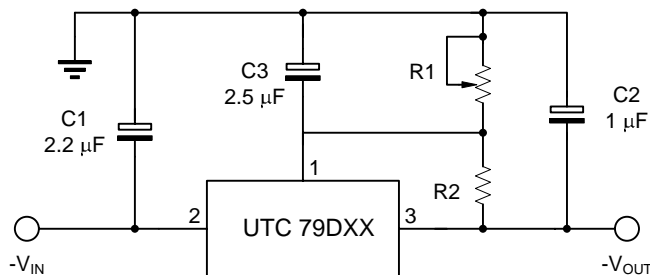


Fig.3 Circuit for increasing output voltage

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