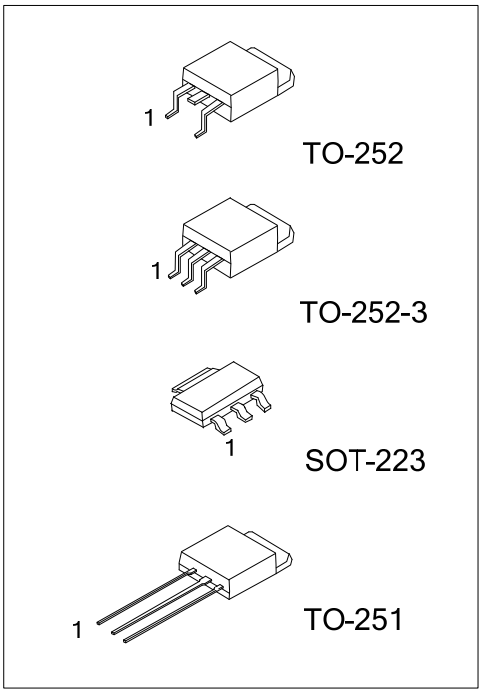
78DXXL

LINEAR INTEGRATED CIRCUIT

3-TERMINALS 0.5A POSITIVE VOLTAGE REGULATOR



■ DESCRIPTION

The UTC **78DXXL** family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 0.5 A.

■ FEATURE

* Output Current Up To 0.5 A
* Fixed Output Voltage Of 5V, 6V, 8V, 9V, 12V, 15V and 18V Available
* Thermal Overload Shutdown Protection
* Short Circuit Current Limiting
* Output Transistor SOA Protection

■ ORDERING INFORMATION

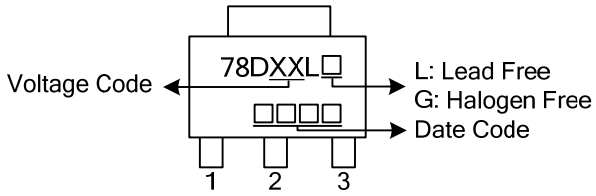
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
78DXXLL-AA3-R	78DXXLG-AA3-R	SOT-223	I	G	O	Tape Reel
78DXXLL-TM3-T	78DXXLG-TM3-T	TO-251	I	G	O	Tube
78DXXLL-TN3-R	78DXXLG-TN3-R	TO-252	I	G	O	Tape Reel
78DXXLL-TN3-T	78DXXLG-TN3-T	TO-252	I	G	O	Tube
78DXXLL-TNA-R	78DXXLG-TNA-R	TO-252-3	I	G	O	Tape Reel
78DXXLL-TNA-T	78DXXLG-TNA-T	TO-252-3	I	G	O	Tube

Note: 1. XX: Output Voltage, refer to Marking Information
2. Pin Code: I: Input G: GND O: Output

78DXXLL-AA3-R
(1)Packing Type
(2)Package Type
(3)Lead Free
(4)Output Voltage Code

(1) R: Tape Reel, T: Tube
(2) AA3: SOT-223, TM3: TO-251, TN3: TO-252, TNA: TO-252-3
(3) G: Halogen Free, L: Lead Free
(4) XX: refer to Marking Information

■ MARKING INFORMATION

<table>
<tr><th>PACKAGE</th><th>VOLTAGE CODE</th><th>MARKING</th></tr>
<tr><td>SOT-223</td><td rowspan="2">05: 5V
06: 6V
08: 8V
09: 9V
12: 12V
15: 15V
18: 18V</td><td> 
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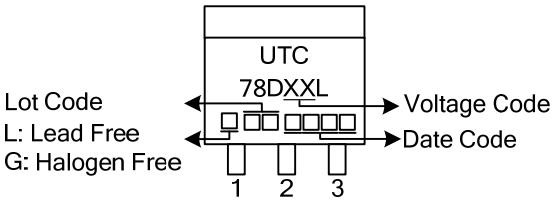
<tr><td>TO-251
TO-252
TO-252-3</td><td> 
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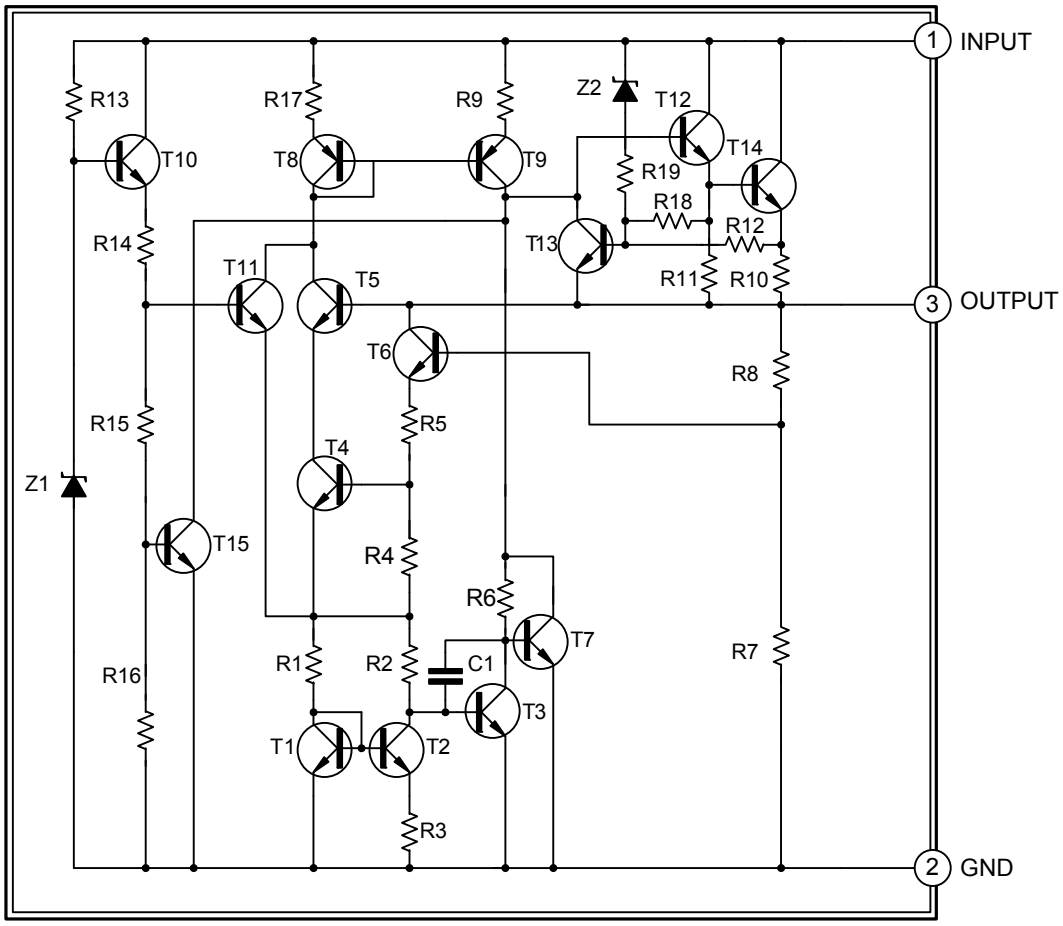
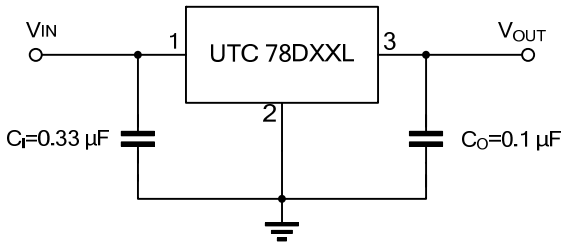
■ BLOCK DIAGRAM



■ TYPICAL APPLICATION CIRCUIT



Note: Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators.

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

PARAMETER		SYMBOL	RATINGS	UNIT
Input Voltage		V_{IN}	35	V
Output Current		I_{OUT}	0.5	A
Power Dissipation (T_C=25°C)	SOT-223	P_D	8.5	W
	TO-251 / TO-252		10	
Junction Temperature		T_J	-20~ +150	°C
Storage Temperature		T_{STG}	-65 ~ +150	°C

Notes: 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
Junction to Case	SOT-223	θ_{JC}	15	°C/W
	TO-251 / TO-252		12.5	

■ ELECTRICAL CHARACTERISTICS

(T_J=25°C, C_I=0.33μF, C_O=0.1μF, P_D≤7W, unless otherwise specified)

For 78D05L (V_{IN}=10V, I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	I_{OUT}=5mA~0.5A	4.8	5	5.2	V
		V_{IN} =7.5~20V, I_{OUT}=5mA~0.5A	4.75		5.25	V
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~0.5A			100	mV
		I_{OUT}=5mA~200mA			50	mV
Line Regulation	ΔV_{OUT}	V_{IN} =7V~25V			100	mV
		V_{IN} =7.5~20V, I_{OUT}=0.5A			100	mV
Quiescent Current	I_Q	I_{OUT}=0.5A			8	mA
Quiescent Current Change	ΔI_Q	V_{UT} =7.5~20V			1	mA
		I_{OUT}=5mA~0.5A			0.5	mA
Output Noise Voltage	e_N	10Hz≤f≤100kHz		40		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		-0.6		mV/°C
Ripple Rejection	RR	V_{IN} =8~18V,f=120Hz	62	80		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	V_{IN}=V_{OUT}+19V		250		mA
Dropout Voltage	V_D			2		V

For 78D06L (V_{IN}=11V, I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	I_{OUT}=5mA~0.5A	5.76	6	6.24	V
		V_{IN}=8.5~21V,I_{OUT}=5mA~0.5A	5.7		6.3	V
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~0.5A			120	mV
		I_{OUT}=5mA~200mA			60	mV
Line Regulation	ΔV_{OUT}	V_{IN}=8~25V			120	mV
		V_{IN}=8.5~21V, I_{OUT}=0.5A			120	mV
Quiescent Current	I_Q	I_{OUT}=0.5A			8	mA
Quiescent Current Change	ΔI_Q	V_{IN} =8.5~21V			1	mA
		I_{OUT}=5mA~0.5A			0.5	mA
Output Noise Voltage	e_N	10Hz≤f≤100kHz		45		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		-0.7		mV/°C
Ripple Rejection	RR	V_{IN} =9~19V,f=120Hz	59	75		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	V_{IN}=V_{OUT}+19V		250		mA
Dropout Voltage	V_D			2		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

For 78D08L (V_{IN}=14V, I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	I_{OUT}=5mA~0.5A	7.68	8	8.32	V
		V_{IN}=10.5~23V, I_{OUT}=5mA~0.5A	7.6		8.4	V
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~0.5A			160	mV
		I_{OUT}=5mA~200mA			80	mV
Line Regulation	ΔV_{OUT}	V_{IN} =10.5~25V			160	mV
		V_{IN} =10.5~23V, I_{OUT}=0.5A			160	mV
Quiescent Current	I_Q	I_{OUT}=0.5A			8	mA
Quiescent Current Change	ΔI_Q	V_{IN} =10.5~23V			1	mA
		I_{OUT}=5mA~0.5A			0.5	mA
Output Noise Voltage	e_N	10Hz≤f≤100kHz		58		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		-0.9		mV/°C
Ripple Rejection	RR	V_{IN} =11.5~21.5V, f=120Hz	56	72		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	V_{IN}=V_{OUT}+19V		250		mA
Dropout Voltage	V_D			2		V

For 78D09L (V_{IN}=15V, I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	I_{OUT}=5mA~0.5A	8.64	9	9.36	V
		V_{IN} =11.5~24V,I_{OUT}=5mA~0.5A	8.55		9.45	V
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~0.5A			180	mV
		I_{OUT}=5mA~200mA			90	mV
Line Regulation	ΔV_{OUT}	V_{IN} =11.5~25V			180	mV
		V_{IN} =11.5~24V, I_{OUT}=0.5A			180	mV
Quiescent Current	I_Q	I_{OUT}=0.5A			8	mA
Quiescent Current Change	ΔI_Q	V_{IN}=11.5~24V			1	mA
		I_{OUT}=5mA~0.5A			0.5	mA
Output Noise Voltage	e_N	10Hz≤f≤100kHz		58		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		-1.1		mV/°C
Ripple Rejection	RR	V_{IN}=12.5~22.5V,f=120Hz	56	72		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	V_{IN}=V_{OUT}+19V		250		mA
Dropout Voltage	V_D			2		V

For 78D12L (V_{IN}=19V, I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	I_{OUT}=5mA~0.5A	11.52	12	12.48	V
		V_{IN} =14.5~27V,I_{OUT}=5mA~0.5A	11.4		12.6	V
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~0.5A			240	mV
		I_{OUT}=5mA~200mA			120	mV
Line Regulation	ΔV_{OUT}	V_{IN}=14.5~30V			240	mV
		V_{IN}=14.6~27V, I_{OUT}=0.5A			240	mV
Quiescent Current	I_Q	I_{OUT}=0.5A			8	mA
Quiescent Current Change	ΔI_Q	V_{IN} =14.5~30V			1	mA
		I_{OUT}=5mA~0.5A			0.5	mA
Output Noise Voltage	e_N	10Hz≤f≤100kHz		75		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		-1.5		mV/°C
Ripple Rejection	RR	V_{IN} =15~25V, f=120Hz	55	72		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	V_{IN}=V_{OUT}+19V		250		mA
Dropout Voltage	V_D			2		V

■ ELECTRICAL CHARACTERISTICS(Cont.)

For 78D15L (V_{IN}=23V, I_{OUT}=0.5A, C_I=0.33μF, C_O=0.1μF,)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	I_{OUT}=5mA~0.5A	14.4	15	15.6	V
		V_{IN} =17.5~30V, I_{OUT}=5mA~0.5A	14.25		15.75	V
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~0.5A			300	mV
		I_{OUT}=5mA~200mA			150	mV
Line Regulation	ΔV_{OUT}	V_{IN}=18.5~30V			300	mV
		V_{IN}=17.5~30V, I_{OUT}=0.5A			300	mV
Quiescent Current	I_Q	I_{OUT}=0.5A			8	mA
Quiescent Current Change	ΔI_Q	V_{IN}=17.5~30V			1	mA
		I_{OUT}=5mA~0.5A			0.5	mA
Output Noise Voltage	e_N	10Hz≤f≤100kHz		90		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		-1.8		mV/°C
Ripple Rejection	RR	V_{IN}=18.5~28.5V, f=120Hz	54	70		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	V_{IN}=V_{OUT}+19V		250		mA
Dropout Voltage	V_D			2		V

For 78D18L (V_{IN}=27V, I_{OUT}=0.5A)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	I_{OUT}=5mA~0.5A	17.28	18	18.72	V
		V_{IN}=21~33V,I_{OUT}=5mA~0.5A	17.1		18.9	V
Load Regulation	ΔV_{OUT}	I_{OUT}=5mA~0.5A			360	mV
		I_{OUT}=5mA~200mA			180	mV
Line Regulation	ΔV_{OUT}	V_{IN}=21~33V			360	mV
		V_{IN}=21~33V, I_{OUT} =0.5A			360	mV
Quiescent Current	I_Q	I_{OUT}=0.5A			8	mA
Quiescent Current Change	ΔI_Q	V_{IN}=21.5~33V			1	mA
		I_{OUT}=5mA~0.5A			0.5	mA
Output Noise Voltage	e_N	10Hz≤f≤100kHz		110		μV
Temperature coefficient of V_{OUT}	$\Delta V_{OUT}/\Delta T$	I_{OUT}=5mA		-2.2		mV/°C
Ripple Rejection	RR	V_{IN} =22~32V,f=120Hz	53	69		dB
Peak Output Current	I_{PEAK}			1.2		A
Short-Circuit Current	I_{SC}	V_{IN}= 35V		250		mA
Dropout Voltage	V_D			2		V