78DXXL

LINEAR INTEGRATED CIRCUIT

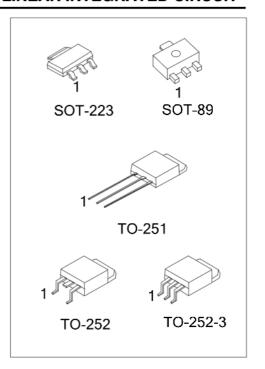
3-TERMINALS 0.5A POSITIVE VOLTAGE REGULATOR

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

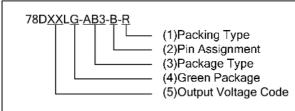


ORDERING INFORMATION

Ordering Number		Package	Pin	Assignn	Dooking	
Lead Free	Halogen Free	Fackage	1	2	3	Packing
78DXXLL-AA3-R	78DXXLG-AA3-R	SOT-223	- 1	G	0	Tape Reel
78DXXLL-AB3-B-R	78DXXLG-AB3-B-R	SOT-89	0	G	I	Tape Reel
78DXXLL-TM3-T	78DXXLG-TM3-T	TO-251	I	G	0	Tube
78DXXLL-TN3-R	78DXXLG-TN3-R	TO-252	I	G	0	Tape Reel
78DXXLL-TNA-R	78DXXLG-TNA-R	TO-252-3	Ī	G	0	Tape Reel

Note: 1. XX: Output Voltage, refer to Marking Information

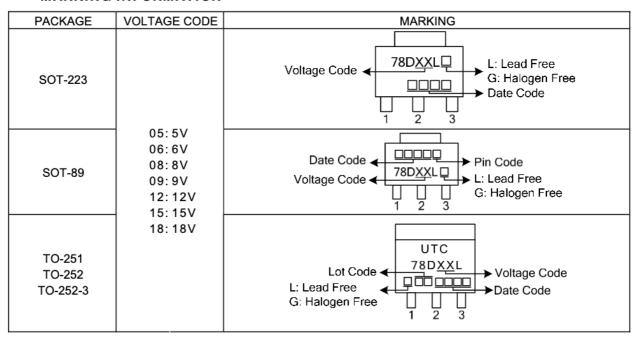
2. Pin Code: I: Input G: GND O: Output



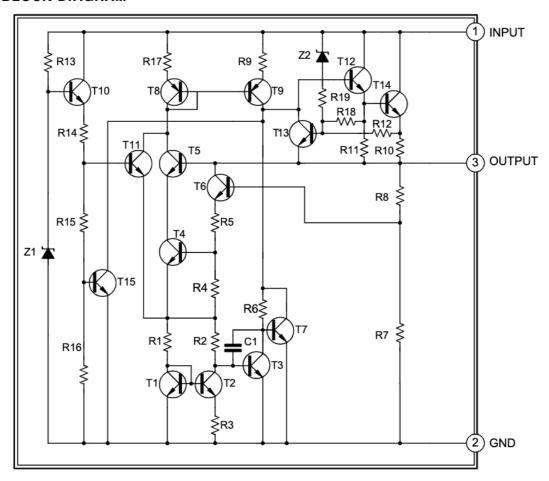
- (1) R: Tape Reel, T: Tube
- (2) refer to Pin Assignment
- (3) AA3: SOT-223, AB3: SOT-89, TM3: TO-251, TN3: TO-252, TNA: TO-252-3
- (4) G: Halogen Free and Lead Free, L: Lead Free
- (5) XX: refer to Marking Information

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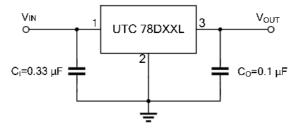
■ MARKING INFORMATION



■ 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)

PARAMETE	ARAMETER SYMBOL RATINGS		UNIT	
Input Voltage		V _{IN}	35	V
Output Current		l _{out}	0.5	Α
	SOT-223		8.3	
Power Dissipation (T _C =25°C)	SOT-89	P _D	2.3	w
· · · · / F	TO-251/TO-252		10	
Junction Temperature		TJ	-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 SOT-89 TO-251/T0	SOT-223		15	
	SOT-89	θ_{JC}	55	°C/W
	TO-251/TO-252		12.5	

■ ELECTRICAL CHARACTERISTICS

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

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
		I _{OUT} =5mA~0.5A	4.8	5	5.2	V
Output Voltage	V _{OUT}	V _{IN} =7.5~20V, I _{OUT} =5mA~0.5A	4.75		5.25	V
Load Degulation	۸۱/	I _{OUT} =5mA~0.5A			100	mV
Load Regulation	ΔV _{OUT}	I _{OUT} =5mA~200mA			50	mV
Line Deculation	۸۱/	V _{IN} =7V~25V			100	mV
Line Regulation	ΔV _{OUT}	V _{IN} =7.5~20V, I _{OUT} =0.5A			100	mV
Quiescent Current	Ιq	I _{OUT} =0.5A			8	mA
Outcome Comment Change	Δlq	V _{UT} =7.5~20V			1	mA
Quiescent Current Change		I _{OUT} =5mA~0.5A			0.5	mA
Output Noise Voltage	e _N	10Hz≤f≤100kHz		40		μV
Temperature coefficient of V _{OUT}	ΔV _{OUT} /ΔΤ	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		Α
Short-Circuit Current	I _{sc}	V _{IN} =V _{OUT} +19V		250		mA
Dropout Voltage	V _D			2		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

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

1 01 10000E (VIN-11V, 1001-0.0A)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Outrot Valtage	.,	I _{OUT} =5mA~0.5A	5.76	6	6.24	V
Output Voltage	V _{OUT}	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
Load Regulation	ΔVOUT	I _{OUT} =5mA~200mA			60	mV
Line Deculation	۸۱/	V _{IN} =8~25V			120	mV
Line Regulation	ΔV _{OUT}	V _{IN} =8.5~21V, I _{OUT} =0.5A			120	mV
Quiescent Current	Ιq	I _{OUT} =0.5A			8	mA
Quigagent Current Change	Δlq	V _{IN} =8.5~21V			1	mA
Quiescent Current Change		I _{OUT} =5mA~0.5A			0.5	mA
Output Noise Voltage	e _N	10Hz≤f≤100kHz		45		μV
Temperature coefficient of V _{OUT}	ΔV _{OUT} /ΔΤ	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		Α
Short-Circuit Current	I _{sc}	V _{IN} =V _{OUT} +19V		250		mA
Dropout Voltage	V _D			2		V

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

FUI 10000L (VIN-14V, 100T-0.3A)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
0.44.)/-14	.,	I _{OUT} =5mA~0.5A	7.68	8	8.32	V
Output Voltage	V _{OUT}	V _{IN} =10.5~23V, I _{OUT} =5mA~0.5A	7.6		8.4	V
Load Domitor	A\/	I _{OUT} =5mA~0.5A			160	mV
Load Regulation	ΔV _{OUT}	I _{OUT} =5mA~200mA			80	mV
Line Begulation	A\/	V _{IN} =10.5~25V			160	mV
Line Regulation	ΔV _{OUT}	V _{IN} =10.5~23V, I _{OUT} =0.5A			160	mV
Quiescent Current	Ιq	I _{OUT} =0.5A			8	mA
Outcomet Comment Change	ΔlQ	V _{IN} =10.5~23V			1	mA
Quiescent Current Change		I _{OUT} =5mA~0.5A			0.5	mA
Output Noise Voltage	e _N	10Hz≤f≤100kHz		58		μV
Temperature coefficient of V _{OUT}	ΔV _{OUT} /ΔΤ	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		Α
Short-Circuit Current	Isc	V _{IN} =V _{OUT} +19V		250		mA
Dropout Voltage	V _D			2		V

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

101 70D03E (VIN-10V, 1001-0.0A)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	.,	I _{OUT} =5mA~0.5A	8.64	9	9.36	V
Output Voltage	V _{OUT}	V _{IN} =11.5~24V,I _{OUT} =5mA~0.5A	8.55		9.45	V
Load Pagulation	۸۱/	I _{OUT} =5mA~0.5A			180	mV
Load Regulation	ΔV_{OUT}	I _{OUT} =5mA~200mA			90	mV
Line Regulation	ΔV_{OUT}	V _{IN} =11.5~25V			180	mV
Line Regulation	ΔVOUT	V _{IN} =11.5~24V, I _{OUT} =0.5A			180	mV
Quiescent Current	ΙQ	I _{OUT} =0.5A			8	mA
Quiescent Current Change	ΔlQ	V _{IN} =11.5~24V			1	mA
Quiescent Current Change		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		Α
Short-Circuit Current	I _{SC}	V _{IN} =V _{OUT} +19V		250		mA
Dropout Voltage	V_D			2		V

■ ELECTRICAL CHARACTERISTICS (Cont.)

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

SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
	I _{OUT} =5mA~0.5A	11.52	12	12.48	V
VOUT	V _{IN} =14.5~27V,I _{OUT} =5mA~0.5A	11.4		12.6	V
۸۱/	I _{OUT} =5mA~0.5A			240	mV
ΔVOUT	I _{OUT} =5mA~200mA			120	mV
۸۱/	V _{IN} =14.5~30V			240	mV
ΔVOUT	V _{IN} =14.6~27V, I _{OUT} =0.5A			240	mV
Ιq	I _{OUT} =0.5A			8	mA
ΔlQ	V _{IN} =14.5~30V			1	mA
	I _{OUT} =5mA~0.5A			0.5	mA
e _N	10Hz≤f≤100kHz		75		μV
ΔV _{OUT} /ΔΤ	I _{OUT} =5mA		-1.5		mV/°C
RR	V _{IN} =15~25V, f=120Hz	55	72		dB
I _{PEAK}			1.2		Α
Isc	V _{IN} =V _{OUT} +19V		250		mA
V_D			2		V
	V_{OUT} ΔV_{OUT} L_{Q} ΔI_{Q} e_{N} $\Delta V_{\text{OUT}}/\Delta T$ RR L_{PEAK} L_{SC}	$V_{OUT} = \frac{I_{OUT} = 5mA \sim 0.5A}{V_{IN} = 14.5 \sim 27V, I_{OUT} = 5mA \sim 0.5A}$ $\Delta V_{OUT} = \frac{I_{OUT} = 5mA \sim 0.5A}{I_{OUT} = 5mA \sim 200mA}$ $\Delta V_{OUT} = \frac{V_{IN} = 14.5 \sim 30V}{V_{IN} = 14.6 \sim 27V, I_{OUT} = 0.5A}$ $I_{Q} = \frac{I_{OUT} = 0.5A}{I_{OUT} = 5mA \sim 0.5A}$ $e_{N} = \frac{V_{IN} = 14.5 \sim 30V}{I_{OUT} = 5mA \sim 0.5A}$ $e_{N} = \frac{10Hz \leq f \leq 100kHz}{I_{OUT} = 5mA}$ $RR = \frac{V_{IN} = 15 \sim 25V, f = 120Hz}{I_{PEAK}}$ $I_{SC} = \frac{V_{IN} = V_{OUT} + 19V}{I_{OUT} = 5mA}$	$\begin{array}{c} V_{OUT} & I_{OUT} \!\!=\! 5mA \!\!\sim\!\! 0.5A & 11.52 \\ \hline V_{IN} \!\!=\! 14.5 \!\!\sim\!\! 27V, I_{OUT} \!\!=\! 5mA \!\!\sim\!\! 0.5A & 11.4 \\ \hline \Delta V_{OUT} & I_{OUT} \!\!=\! 5mA \!\!\sim\!\! 0.5A & \\ \hline I_{OUT} \!\!=\! 5mA \!\!\sim\!\! 2.00mA & \\ \hline \Delta V_{OUT} & V_{IN} \!\!=\! 14.5 \!\!\sim\!\! 30V & \\ \hline V_{IN} \!\!=\! 14.6 \!\!\sim\!\! 27V, I_{OUT} \!\!=\! 0.5A & \\ \hline I_{Q} & I_{OUT} \!\!=\! 0.5A & \\ \hline \Delta I_{Q} & V_{IN} \!\!=\! 14.5 \!\!\sim\!\! 30V & \\ \hline I_{OUT} \!\!=\! 5mA \!\!\!\sim\!\! 0.5A & \\ \hline e_{N} & 10Hz \!\!\leq\! f \!\!\leq\! 100kHz & \\ \hline \Delta V_{OUT} \!\!/\! \Delta T & I_{OUT} \!\!=\! 5mA & \\ \hline RR & V_{IN} \!\!=\! 15 \!\!\sim\!\! 25V, f \!\!=\! 120Hz & 55 \\ \hline I_{PEAK} & I_{SC} & V_{IN} \!\!=\! V_{OUT} \!\!+\! 19V & \\ \hline \end{array}$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

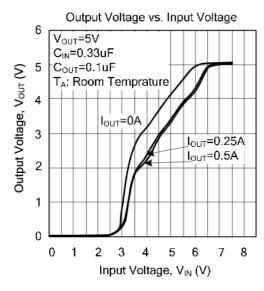
For 78D15L (V_{IN} =23V, I_{OUT} =0.5A, C_I =0.33 μ F, C_O =0.1 μ F,)

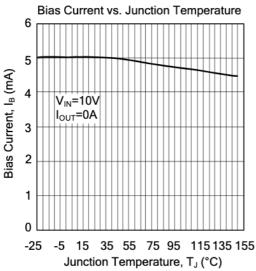
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Valtage	V _{OUT}	I _{OUT} =5mA~0.5A	14.4	15	15.6	V
Output Voltage	VOUT	V _{IN} =17.5~30V, I _{OUT} =5mA~0.5A	14.25		15.75	V
Load Degulation	۸۱/	I _{OUT} =5mA~0.5A			300	mV
Load Regulation	ΔV _{OUT}	I _{OUT} =5mA~200mA			150	mV
Line Book Inflore	۸۱/	V _{IN} =18.5~30V			300	mV
Line Regulation	ΔV _{OUT}	V _{IN} =17.5~30V, I _{OUT} =0.5A			300	mV
Quiescent Current	ΙQ	I _{OUT} =0.5A			8	mA
Quiaccant Current Change	Δlq	V _{IN} =17.5~30V			1	mA
Quiescent Current Change		I _{OUT} =5mA~0.5A			0.5	mA
Output Noise Voltage	e _N	10Hz≤f≤100kHz		90		μV
Temperature coefficient of V _{OUT}	ΔV _{OUT} /ΔΤ	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		Α
Short-Circuit Current	Isc	V _{IN} =V _{OUT} +19V		250		mA
Dropout Voltage	V _D			2		V

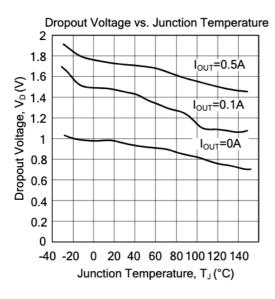
For 78D18L (V_{IN}=27V, I_{OUT}=0.5A)

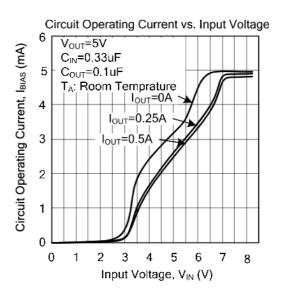
101 100 10L (VIN-21 V, 1001-0.5A)		·	,			
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Valtage	V	I _{OUT} =5mA~0.5A	17.28	18	18.72	V
Output Voltage	V _{OUT}	V _{IN} =21~33V,I _{OUT} =5mA~0.5A	17.1		18.9	V
Load Begulation	۸۱/	I _{OUT} =5mA~0.5A			360	mV
Load Regulation	ΔV _{OUT}	I _{OUT} =5mA~200mA			180	mV
Line Regulation	۸۱/	V _{IN} =21~33V			360	mV
Line Regulation	ΔV_{OUT}	V _{IN} =21~33V, I _{OUT} =0.5A			360	mV
Quiescent Current	Ιq	I _{OUT} =0.5A			8	mA
Outpoont Current Change	Δlq	V _{IN} =21.5~33V			1	mA
Quiescent Current Change		I _{OUT} =5mA~0.5A			0.5	mA
Output Noise Voltage	e _N	10Hz≤f≤100kHz		110		μV
Temperature coefficient of V _{OUT}	ΔV _{OUT} /ΔΤ	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		Α
Short-Circuit Current	I _{sc}	V _{IN} = 35V		250		mA
Dropout Voltage	V_D			2		V

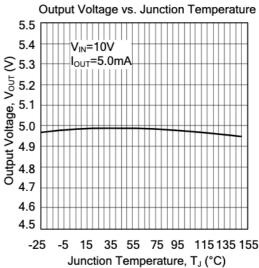
■ TYPICAL CHARACTERISTICS

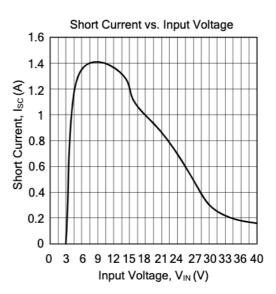












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