

LM78XX

LINEAR INTEGRATED CIRCUIT

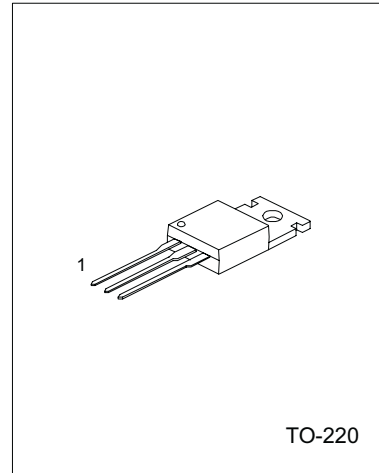
3-TERMINAL 1A POSITIVE VOLTAGE REGULATOR

DESCRIPTION

The Contek 78XX family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 1 A.

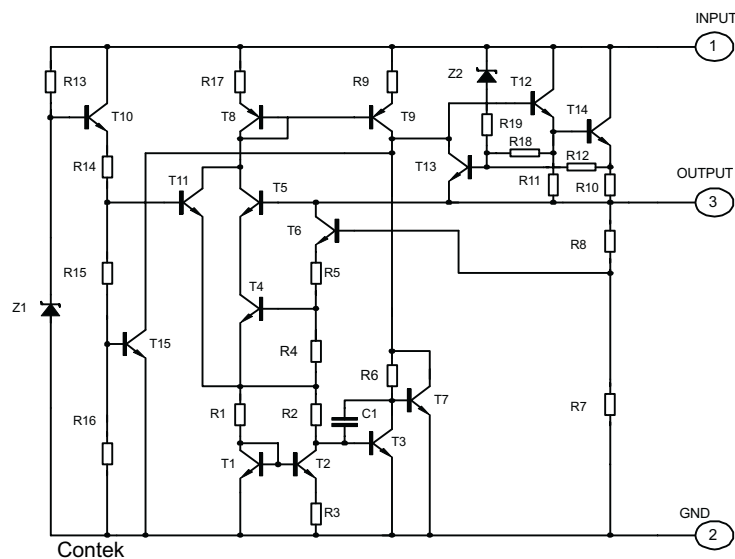
FEATURES

- *Output current up to 1.5 A
- *Fixed output voltage of 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V and 24V available
- *Thermal overload shutdown protection
- *Short circuit current limiting
- *Output transistor SOA protection



1:Input 2:GND 3:Output

TEST CIRCUIT



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ABSOLUTE MAXIMUM RATINGS

(Operating temperature range applies unless otherwise specified)

PARAMETER	SYMBOL	RATING	UNIT
Input voltage(for Vo=5~18V) (for Vo=24V)	V _I	35	V
		40	V
Output Current	I _o	1	A
Power Dissipation	PD	Internally Limited	W
Operating Junction Temperature Range	TOPR	-20 +150	°C
Storage Temperature Range	TSTG	-55 +150	°C

Contek LM7805 ELECTRICAL CHARACTERISTICS

(V_I=10V, I_o=0.5A, T_j= 0 °C - 125 °C, C₁=0.33μF, C_o=0.1μF, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V _o	T _j =25 °C, I _o =5mA - 1.0A	4.8	5.0	5.2	V
		V _I =7.5V to 20V, I _o =5mA - 1.0A, PD<15W	4.75		5.25	V
Load Regulation	ΔV _o	T _j =25 °C, I _o =5mA - 1.5A			50	mV
		T _j =25 °C, I _o =0.25A - 0.75A			25	mV
Line regulation	ΔV _o	V _I =7V to 25V, T _j =25 °C			50	mV
		V _I =7.5V to 20V, T _j =25 °C, I _o =1A			50	mV
Quiescent Current	I _q	T _j =25 °C, I _o <1A			8.0	mA
Quiescent Current Change	ΔI _q	V _I =7.5V to 20V			1.0	mA
	ΔI _q	I _o =5mA - 1.0A			0.5	mA
Output Noise Voltage	V _N	10Hz<f<=100kHz		40		μV
Temperature coefficient of V _o	ΔV _o /ΔT	I _o =5mA		-0.6		mV/ °C
Ripple Rejection	RR	V _I =8V - 18V, f=120Hz, T _j =25 °C	62	80		dB
Peak Output Current	I _{PK}	T _j =25 °C		1.8		A
Short-Circuit Current	I _{SC}	V _I =35V, T _j =25 °C		250		mA
Dropout Voltage	V _d	T _j =25 °C		2.0		V

Contek LM7806 ELECTRICAL CHARACTERISTICS

(V_I=11V, I_o=0.5A, T_j= 0 °C - 125 °C, C₁=0.33μF, C_o=0.1μF, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V _o	T _j =25 °C, I _o =5mA - 1.0A	5.75	6.0	6.26.2	V
		V _I =8.5V to 21V, I _o =5mA - 1.0A, PD<15W	5.7		6.3	V
Load Regulation	ΔV _o	T _j =25 °C, I _o =5mA - 1.5A			60	mV
		T _j =25 °C, I _o =0.25A - 0.75A			30	mV
Line regulation	ΔV _o	V _I =8V to 25V, T _j =25 °C			60	mV
		V _I =8.5V to 21V, T _j =25 °C, I _o =1A			60	mV
Quiescent Current	I _q	T _j =25 °C, I _o <1A			8.0	mA
Quiescent Current Change	ΔI _q	V _I =8.5V to 21V			1.0	mA
	ΔI _q	I _o =5mA - 1.0A			0.5	mA
Output Noise Voltage	V _N	10Hz<f<=100kHz		45		μV
Temperature coefficient of V _o	ΔV _o /ΔT	I _o =5mA		-0.7		mV/ °C
Ripple Rejection	RR	V _I =9V - 19V, f=120Hz, T _j =25 °C	59	75		dB
Peak Output Current	I _{PK}	T _j =25 °C		1.8		A



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PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Short-Circuit Current	I _{sc}	V _I =35V, T _j =25 °C		250		mA
Dropout Voltage	V _d	T _j =25 °C		2.0		V

Contek LM7808 ELECTRICAL CHARACTERISTICS

(V_I=14V, I_o=0.5A, T_j= 0 °C - 125 °C, C₁=0.33μF, C_o=0.1μF, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V _o	T _j =25 °C, I _o =5mA - 1.0A	7.7	8.0	8.3	V
		V _I =10.5V to 23V, I _o =5mA - 1.0A, P _D <15W	7.6		8.4	V
Load Regulation	ΔV _o	T _j =25 °C, I _o =5mA - 1.5A			80	mV
		T _j =25 °C, I _o =0.25A - 0.75A			40	mV
Line regulation	ΔV _o	V _I =10.5V to 25V, T _j =25 °C			80	mV
		V _I =10.5V to 23V, T _j =25 °C, I _o =1A			80	mV
Quiescent Current	I _q	T _j =25 °C, I _o <1A			8.0	mA
Quiescent Current Change	ΔI _q	V _I =10.5V to 23V			1.0	mA
	ΔI _q	I _o =5mA - 1.0A			0.5	mA
Output Noise Voltage	V _N	10Hz<f<=100kHz		58		μV
Temperature coefficient of V _o	ΔV _o /ΔT	I _o =5mA		-0.9		mV/ °C
Ripple Rejection	RR	V _I =11.5V to 21.5V, f=120Hz, T _j =25 °C	56	72		dB
Peak Output Current	I _{PK}	T _j =25 °C		1.8		A
Short-Circuit Current	I _{sc}	V _I =35V, T _j =25 °C		250		mA
Dropout Voltage	V _d	T _j =25 °C		2.0		V

Contek LM7809 ELECTRICAL CHARACTERISTICS

(V_I=15V, I_o=0.5A, T_j= 0 °C - 125 °C, C₁=0.33μF, C_o=0.1μF, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V _o	T _j =25 °C, I _o =5mA - 1.0A	8.65	9.00	9.35	V
		V _I =11.5V to 24V, I _o =5mA - 1.0A, P _D <15W	8.6		9.4	V
Load Regulation	ΔV _o	T _j =25 °C, I _o =5mA - 1.5A			90	mV
		T _j =25 °C, I _o =0.25A - 0.75A			45	mV
Line regulation	ΔV _o	V _I =11.5V to 25 V, T _j =25 °C, P _D <15W			90	mV
		V _I =11.5V to 24V, T _j =25 °C, I _o <=1A			90	mV
Quiescent Current	I _q	T _j =25 °C, I _o <1A			8.0	mA
Quiescent Current Change	ΔI _q	V _I =11.5V to 24V			1.0	mA
	ΔI _q	I _o =5mA - 1.0A			0.5	mA
Output Noise Voltage	V _N	10Hz<f<=100kHz		58		μV
Temperature coefficient of V _o	ΔV _o /ΔT	I _o =5mA		-1.1		mV/ °C
Ripple Rejection	RR	V _I =12.5V to 22.5V, f=120Hz, T _j =25 °C	56	72		dB
Peak Output Current	I _{PK}	T _j =25 °C		1.8		A
Short-Circuit Current	I _{sc}	V _I =35V, T _j =25 °C		250		mA
Dropout Voltage	V _d	T _j =25 °C		2.0		V



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Contek LM7810 ELECTRICAL CHARACTERISTICS

($V_I=16V$, $I_o=0.5A$, $T_j=0\text{ }^{\circ}\text{C} - 125\text{ }^{\circ}\text{C}$, $C_1=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5\text{mA} - 1.0\text{A}$	9.6	10.0	10.4	V
		$V_I=12.5\text{V to }25\text{V}$, $I_o=5\text{mA} - 1.0\text{A}$, $P_D \leq 15\text{W}$	9.5		10.5	V
Load Regulation	ΔV_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5\text{mA} - 1.5\text{A}$			100	mV
		$T_j=25\text{ }^{\circ}\text{C}$, $I_o=0.25\text{A} - 0.75\text{A}$			50	mV
Line regulation	ΔV_o	$V_I=13\text{V to }25\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$			100	mV
		$V_I=13\text{V to }25\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$, $I_o \leq 1\text{A}$			100	mV
Quiescent Current	I_q	$T_j=25\text{ }^{\circ}\text{C}$, $I_o \leq 1\text{A}$			8.0	mA
Quiescent Current Change	ΔI_q	$V_I=12.6\text{V to }25\text{V}$			1.0	mA
	ΔI_q	$I_o=5\text{mA} - 1.0\text{A}$			0.5	mA
Output Noise Voltage	V_N	$10\text{Hz} \leq f \leq 100\text{kHz}$		58		μV
Temperature coefficient of V_o	$\Delta V_o / \Delta T$	$I_o=5\text{mA}$		-1.1		mV/ $^{\circ}\text{C}$
Ripple Rejection	RR	$V_I=13\text{V} - 23\text{V}$, $f=120\text{Hz}$, $T_j=25\text{ }^{\circ}\text{C}$	56	72		dB
Peak Output Current	I_{PK}	$T_j=25\text{ }^{\circ}\text{C}$		1.8		A
Short-Circuit Current	I_{SC}	$V_I=35\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ }^{\circ}\text{C}$		2.0		V

Contek LM7812 ELECTRICAL CHARACTERISTICS

($V_I=19V$, $I_o=0.5A$, $T_j=0\text{ }^{\circ}\text{C} - 125\text{ }^{\circ}\text{C}$, $C_1=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5\text{mA} - 1.0\text{A}$	11.5	12.0	12.5	V
		$V_I=14.5\text{V to }27\text{V}$, $I_o=5\text{mA} - 1.0\text{A}$, $P_D \leq 15\text{W}$	11.4		12.6	V
Load Regulation	ΔV_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5\text{mA} - 1.5\text{A}$			120	mV
		$T_j=25\text{ }^{\circ}\text{C}$, $I_o=0.25\text{A} - 0.75\text{A}$			60	mV
Line regulation	ΔV_o	$V_I=14.5\text{V to }30\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$			120	mV
		$V_I=14.6\text{V to }27\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$, $I_o=1\text{A}$			120	mV
Quiescent Current	I_q	$T_j=25\text{ }^{\circ}\text{C}$, $I_o \leq 1\text{A}$			8.0	mA
Quiescent Current Change	ΔI_q	$V_I=14.5\text{V to }30\text{V}$			1.0	mA
	ΔI_q	$I_o=5\text{mA} - 1.0\text{A}$			0.5	mA
Output Noise Voltage	V_N	$10\text{Hz} \leq f \leq 100\text{kHz}$		75		μV
Temperature coefficient of V_o	$\Delta V_o / \Delta T$	$I_o=5\text{mA}$		-1.5		mV/ $^{\circ}\text{C}$
Ripple Rejection	RR	$V_I=15\text{V} - 25\text{V}$, $f=120\text{Hz}$, $T_j=25\text{ }^{\circ}\text{C}$	55	72		dB
Peak Output Current	I_{PK}	$T_j=25\text{ }^{\circ}\text{C}$		1.8		A
Short-Circuit Current	I_{SC}	$V_I=35\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ }^{\circ}\text{C}$		2.0		V



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LM78XX

LINEAR INTEGRATED CIRCUIT

Contek LM7815 ELECTRICAL CHARACTERISTICS

($V_I=23V$, $I_o=0.5A$, $T_j=0\text{ }^{\circ}\text{C} - 125\text{ }^{\circ}\text{C}$, $C_1=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5\text{mA} - 1.0\text{A}$	14.4	15.0	15.6	V
		$V_I=17.5\text{V to }30\text{V}$, $I_o=5\text{mA} - 1.0\text{A}$, $P_D<15\text{W}$	14.25		15.75	V
Load Regulation	ΔV_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5\text{mA} - 1.5\text{A}$			150	mV
		$T_j=25\text{ }^{\circ}\text{C}$, $I_o=0.25\text{A} - 0.75\text{A}$			75	mV
Line regulation	ΔV_o	$V_I=18.5\text{V to }30\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$			150	mV
		$V_I=17.7\text{V to }30\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$, $I_o=1\text{A}$			150	mV
Quiescent Current	I_q	$T_j=25\text{ }^{\circ}\text{C}$, $I_o<1\text{A}$			8.0	mA
Quiescent Current Change	ΔI_q	$V_I=17.5\text{V to }30\text{V}$			1.0	mA
	ΔI_q	$I_o=5\text{mA} - 1.0\text{A}$			0.5	mA
Output Noise Voltage	V_N	$10\text{Hz} \leq f \leq 100\text{kHz}$		90		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_o=5\text{mA}$		-1.8		mV/ $^{\circ}\text{C}$
Ripple Rejection	RR	$V_I=18.5\text{V to }28.5\text{V}$ $f=120\text{Hz}$, $T_j=25\text{ }^{\circ}\text{C}$	54	70		dB
Peak Output Current	I_{PK}	$T_j=25\text{ }^{\circ}\text{C}$		1.8		A
Short-Circuit Current	I_{SC}	$V_I=35\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ }^{\circ}\text{C}$		2.0		V

Contek LM7818 ELECTRICAL CHARACTERISTICS

($V_I=27\text{V}$, $I_o=0.5A$, $T_j=0\text{ }^{\circ}\text{C} - 125\text{ }^{\circ}\text{C}$, $C_1=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5\text{mA} - 1.0\text{A}$	17.3	18.0	18.7	V
		$V_I=21\text{V to }33\text{V}$, $I_o=5\text{mA} - 1.0\text{A}$	17.1		18.9	V
Load Regulation	ΔV_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5\text{mA} - 1.5\text{A}$			180	mV
		$T_j=25\text{ }^{\circ}\text{C}$, $I_o=0.25\text{A} - 0.75\text{A}$			90	mV
Line regulation	ΔV_o	$V_I=21\text{V to }33\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$			180	mV
		$V_I=21\text{V to }33\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$, $I_o<1\text{A}$, $P_D<15\text{W}$			180	mV
Quiescent Current	I_q	$T_j=25\text{ }^{\circ}\text{C}$, $I_o<1\text{A}$			8.0	mA
Quiescent Current Change	ΔI_q	$V_I=21.5\text{V to }33\text{V}$			1.0	mA
	ΔI_q	$I_o=5\text{mA} - 1.0\text{A}$			0.5	mA
Output Noise Voltage	V_N	$10\text{Hz} \leq f \leq 100\text{kHz}$		110		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_o=5\text{mA}$		-2.2		mV/ $^{\circ}\text{C}$
Ripple Rejection	RR	$V_I=22\text{V} - 32\text{V}$, $f=120\text{Hz}$, $T_j=25\text{ }^{\circ}\text{C}$	53	69		dB
Peak Output Current	I_{PK}	$T_j=25\text{ }^{\circ}\text{C}$		1.8		A
Short-Circuit Current	I_{SC}	$V_I=35\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ }^{\circ}\text{C}$		2.0		V



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LM78XX LINEAR INTEGRATED CIRCUIT

Contek LM7824 ELECTRICAL CHARACTERISTICS

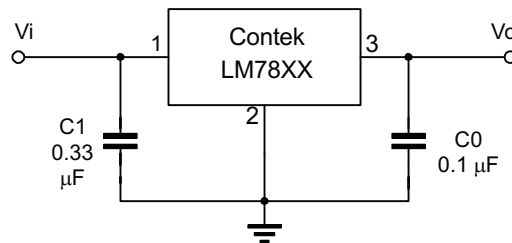
($V_I=33V$, $I_o=0.5A$, $T_j=0\text{ }^{\circ}\text{C} - 12\text{ }^{\circ}\text{C}$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5mA - 1.0A$	23.0	24.0	25.0	V
		$V_I=27V$ to $38V$, $I_o=5mA - 1.0A$	22.8		25.2	V
Load Regulation	ΔV_o	$T_j=25\text{ }^{\circ}\text{C}$, $I_o=5mA - 1.5A$			240	mV
		$T_j=25\text{ }^{\circ}\text{C}$, $I_o=0.25A - 0.75A$			120	mV
Line regulation	ΔV_o	$V_I=27V$ to $38V$, $T_j=25\text{ }^{\circ}\text{C}$			240	mV
		$V_I=27V$ to $38V$, $T_j=25\text{ }^{\circ}\text{C}$, $I_o=1A$			240	mV
Quiescent Current	I_q	$T_j=25\text{ }^{\circ}\text{C}$, $I_o<1A$			8.0	mA
Quiescent Current Change	ΔI_q	$V_I=28V$ to $38V$			1.0	mA
	ΔI_q	$I_o=5mA - 1.0A$			0.5	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100kHz$		170		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_o=5mA$		-2.8		mV/ $^{\circ}\text{C}$
Ripple Rejection	RR	$V_I=28V - 38V$, $f=120Hz$, $T_j=25\text{ }^{\circ}\text{C}$	50	66		dB
Peak Output Current	I_{PK}	$T_j=25\text{ }^{\circ}\text{C}$		1.8		A
Short-Circuit Current	I_{SC}	$V_I=35V$, $T_j=25\text{ }^{\circ}\text{C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ }^{\circ}\text{C}$		2.0		V

Note 1: The Maximum steady state usable output current are dependent on input voltage, heat sinking, lead length of the package and copper pattern of PCB. The data above represents pulse test conditions with junction temperatures specified at the initiation of test.

Note 2: Power dissipation $< 0.5W$

APPLICATION CIRCUIT



Note 1: To specify an output voltage, substitute voltage value for "XX".

Note 2: Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators.



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