

78DXX LINEAR INTEGRATED CIRCUIT

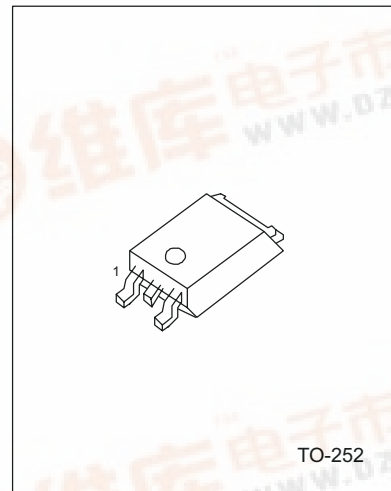
3-TERMINAL 0.5A POSITIVE VOLTAGE REGULATOR

DESCRIPTION

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

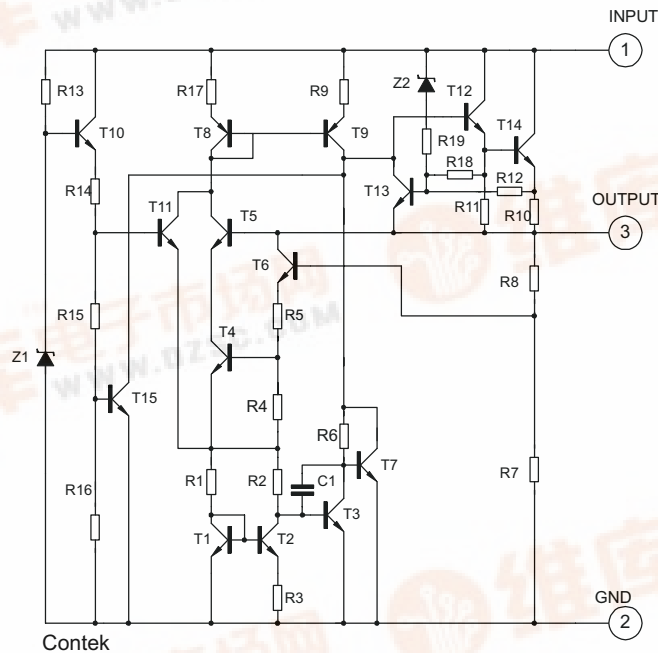
FEATURE

- *Output current up to 0.5 A
- *Fixed output voltage of 5V, 6V, 8V, 9V, 12V, 15V, 18V and 24V available
- *Thermal overload shutdown protection
- *Short circuit current limiting
- *Output transistor SOA protection



1:Input 2:GND 3:Output

EQUIVALENT CIRCUIT



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ABSOLUTE MAXIMUM RATINGS

(Operating temperature range applies unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Input voltage(for $V_o=5\sim 18V$) (for $V_o=20\sim 24V$)	V_i	35	V
		40	V
Output Current	I_o	0.5	A
Power Dissipation	PD	Internally Limited	W
Operating Junction Temperature Range	T_J	+150	C
Storage Temperature Range	T_{STG}	-65 to+150	C

Contek78D05 ELECTRICAL CHARACTERISTICS

($V_i=10V$, $I_o=0.5A$, $T_j=0\text{ C} - 125\text{ C}$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$	4.8	5.0	5.2	V
		$V_i=7.5V$ to 20V, $I_o=5mA - 0.5A$, PD<7W	4.75		5.25	V
Load Regulation	ΔV_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$			50	mV
		$T_j=25\text{ C}$, $I_o=5mA - 200\text{ mA}$			25	mV
Line regulation	ΔV_o	$V_i=7V$ to 25V, $T_j=25\text{ C}$			50	mV
		$V_i=7.5V$ to 20V, $T_j=25\text{ C}$, $I_o=0.5A$			50	mV
Quiescent Current	I_q	$T_j=25\text{ C}$, $I_o=0.5A$			8.0	mA
Quiescent Current Change	ΔI_q	$V_i=7.5V$ to 20V			1.0	mA
	ΔI_q	$I_o=5mA - 0.5A$			0.5	mA
Output Noise Voltage	V_N	10Hz<=f<=100kHz		40		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_o=5mA$		-0.6		mV/ C
Ripple Rejection	RR	$V_i=8V - 18V$, f=120Hz, $T_j=25\text{ C}$	62	80		dB
Peak Output Current	I_{PK}	$T_j=25\text{ C}$		1.2		A
Short-Circuit Current	I_{sc}	$V_i=35V$, $T_j=25\text{ C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ C}$		2.0		V

Contek78D06 ELECTRICAL CHARACTERISTICS

($V_i=11V$, $I_o=0.5A$, $T_j=0\text{ C} - 125\text{ C}$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$	5.75	6.0	6.26.2	V
		$V_i=8.5V$ to 21V, $I_o=5mA - 0.5A$, PD<7W	5.7		6.3	V
Load Regulation	ΔV_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$			60	mV
		$T_j=25\text{ C}$, $I_o=5mA - 200mA$			30	mV
Line regulation	ΔV_o	$V_i=8V$ to 25V, $T_j=25\text{ C}$			60	mV
		$V_i=8.5V$ to 21V, $T_j=25\text{ C}$, $I_o=0.5A$			60	mV
Quiescent Current	I_q	$T_j=25\text{ C}$, $I_o=0.5A$			8.0	mA
Quiescent Current Change	ΔI_q	$V_i=8.5V$ to 21V			1.0	mA
	ΔI_q	$I_o=5mA - 0.5A$			0.5	mA
Output Noise Voltage	V_N	10Hz<=f<=100kHz		45		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_o=5mA$		-0.7		mV/ C
Ripple Rejection	RR	$V_i=9V - 19V$, f=120Hz, $T_j=25\text{ C}$	59	75		dB



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PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Peak Output Current	IPK	Tj=25 C		1.2		A
Short-Circuit Current	Isc	VI=35V, Tj=25 C		250		mA
Dropout Voltage	Vd	Tj=25 C		2.0		V

Contek78D08 ELECTRICAL CHARACTERISTICS

(VI=14V, Io=0.5A, Tj= 0 C - 125 C, C1=0.33uF, Co=0.1uF, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	Vo	Tj=25 C, Io=5mA - 0.5A	7.7	8.0	8.3	V
		VI=10.5V to 23V, Io=5mA 0.5A, PD<7W	7.6		8.4	V
Load Regulation	ΔV_o	Tj=25 C, Io=5mA - 0.5A			80	mV
		Tj=25 C, Io=5mA - 200mA			40	mV
Line regulation	ΔV_o	VI=10.5V to 25V, Tj=25 C			80	mV
		VI=10.5V to 3V, Tj=25 C, Io=0.5A			80	mV
Quiescent Current	Iq	Tj=25 C, Io=0.5A			8.0	mA
Quiescent Current Change	ΔI_q	VI=10.5V to 23V			1.0	mA
	ΔI_q	Io=5mA - 0.5A			0.5	mA
Output Noise Voltage	VN	10Hz<=f<=100kHz		58		μ V
Temperature coefficient of Vo	$\Delta V_o/\Delta T$	Io=5mA		-0.9		mV/ C
Ripple Rejection	RR	VI=11.5V to 21.5V, f=120Hz, Tj=25 C	56	72		dB
Peak Output Current	IPK	Tj=25 C		1.2		A
Short-Circuit Current	Isc	VI=35V, Tj=25 C		250		mA
Dropout Voltage	Vd	Tj=25 C		2.0		V

Contek78D09 ELECTRICAL CHARACTERISTICS

(VI=15V, Io=0.5A, Tj= 0 C - 125 C, C1=0.33uF, Co=0.1uF, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	Vo	Tj=25 C, Io=5mA - 0.5A	8.65	9.00	9.35	V
		VI=11.5V to 24V, Io=5mA - 0.5A, PD<7W	8.6		9.4	V
Load Regulation	ΔV_o	Tj=25 C, Io=5mA - 0.5A			90	mV
		Tj=25 C, Io=5mA - 200mA			45	mV
Line regulation	ΔV_o	VI=11.5V to 25 V, Tj=25 C			90	mV
		VI=11.5V to 24V, Tj=25 C, Io=0.5A			90	mV
Quiescent Current	Iq	Tj=25 C, Io=0.5A			8.0	mA
Quiescent Current Change	ΔI_q	VI=11.5V to 24V			1.0	mA
	ΔI_q	Io=5mA 0.5A			0.5	mA
Output Noise Voltage	VN	10Hz<=f<=100kHz		58		μ V
Temperature coefficient of Vo	$\Delta V_o/\Delta T$	Io=5mA		-1.1		mV/ C
Ripple Rejection	RR	VI=12.5V to 22.5V, f=120Hz, Tj=25 C	56	72		dB
Peak Output Current	IPK	Tj=25 C		1.2		A
Short-Circuit Current	Isc	VI=35V, Tj=25 C		250		mA
Dropout Voltage	Vd	Tj=25 C		2.0		V



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Contek78D12 ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$	11.5	12.0	12.5	V
		$V_I=14.5V$ to $27V$, $I_o=5mA - 0.5A, PD<7W$	11.4		12.6	V
Load Regulation	ΔV_o	$T_j=25\text{ C}, I_o=5mA - 0.5A$			120	mV
		$T_j=25\text{ C}, I_o=5mA - 200mA$			60	mV
Line regulation	ΔV_o	$V_I=14.5V$ to $30V, T_j=25\text{ C}$			120	mV
		$V_I=14.6V$ to $27V, T_j=25\text{ C}$, $I_o=0.5A$			120	mV
Quiescent Current	I_q	$T_j=25\text{ C}$, $I_o=0.5A$			8.0	mA
Quiescent Current Change	ΔI_q	$V_I=14.5V$ to $30V$			1.0	mA
	ΔI_q	$I_o=5mA - 0.5A$			0.5	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100kHz$		75		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_o=5mA$		-1.5		mV/ C
Ripple Rejection	RR	$V_I=15V - 25V, f=120Hz, T_j=25\text{ C}$	55	72		dB
Peak Output Current	I_{PK}	$T_j=25\text{ C}$		1.2		A
Short-Circuit Current	I_{sc}	$V_I=35V, T_j=25\text{ C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ C}$		2.0		V

Contek78D15 ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$	14.4	15.0	15.6	V
		$V_I=17.5V$ to $30V$, $I_o=5mA - 0.5A, PD<7W$	14.25		15.75	V
Load Regulation	ΔV_o	$T_j=25\text{ C}, I_o=5mA - 0.5A$			150	mV
		$T_j=25\text{ C}, I_o=5mA - 200mA$			75	mV
Line regulation	ΔV_o	$V_I=18.5V$ to $30V, T_j=25\text{ C}$			150	mV
		$V_I=17.7V$ to $30V$, $T_j=25\text{ C}, I_o=0.5A$			150	mV
Quiescent Current	I_q	$T_j=25\text{ C}$, $I_o=0.5A$			8.0	mA
Quiescent Current Change	ΔI_q	$V_I=17.5V$ to $30V$			1.0	mA
	ΔI_q	$I_o=5mA - 0.5A$			0.5	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100kHz$		90		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_o=5mA$		-1.8		mV/ C
Ripple Rejection	RR	$V_I=18.5V$ to $28.5V$ $f=120Hz, T_j=25\text{ C}$	54	70		dB
Peak Output Current	I_{PK}	$T_j=25\text{ C}$		1.2		A
Short-Circuit Current	I_{sc}	$V_I=35V, T_j=25\text{ C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ C}$		2.0		V



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Contek78D18 ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$	17.3	18.0	18.7	V
		$V_I=21V$ to $33V$, $I_o=5mA - 0.5A, PD<7W$	17.1		18.9	V
Load Regulation	ΔV_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$			180	mV
		$T_j=25\text{ C}$, $I_o=5mA - 200mA$			90	mV
Line regulation	ΔV_o	$V_I=21V$ to $33V, T_j=25\text{ C}$			180	mV
		$V_I=21V$ to $33V$, $T_j=25\text{ C}$, $I_o=0.5A$			180	mV
Quiescent Current	I_q	$T_j=25\text{ C}$, $I_o=0.5A$			8.0	mA
Quiescent Current Change	ΔI_q	$V_I=21.5V$ to $33V$			1.0	mA
	ΔI_q	$I_o=5mA - 0.5A$			0.5	mA
Output Noise Voltage	V_N	$10Hz \leq f \leq 100kHz$		110		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_o=5mA$		-2.2		mV/ C
Ripple Rejection	RR	$V_I=22V - 32V, f=120Hz, T_j=25\text{ C}$	53	69		dB
Peak Output Current	I_{PK}	$T_j=25\text{ C}$		1.2		A
Short-Circuit Current	I_{sc}	$V_I=35V, T_j=25\text{ C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ C}$		2.0		V

Contek78D24 ELECTRICAL CHARACTERISTICS

($V_I=33V$, $I_o=0.5A$, $T_j=0\text{ C} - 125\text{ C}$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$	23.0	24.0	25.0	V
		$V_I=27V$ to $38V$, $I_o=5mA - 0.5A, PD<7W$	22.8		25.2	V
Load Regulation	ΔV_o	$T_j=25\text{ C}$, $I_o=5mA - 0.5A$			240	mV
		$T_j=25\text{ C}$, $I_o=5mA - 200mA$			120	mV
Line regulation	ΔV_o	$V_I=27V$ to $38V, T_j=25\text{ C}$			240	mV
		$V_I=27V$ to $38V, T_j=25\text{ C}, I_o=0.5A$			240	mV
Quiescent Current	I_q	$T_j=25\text{ C}$, $I_o=0.5A$			8.0	mA
Quiescent Current Change	ΔI_q	$V_I=28V$ to $38V$			1.0	mA
	ΔI_q	$I_o=5mA - 0.5A$			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/ C
Ripple Rejection	RR	$V_I=28V - 38V, f=120Hz, T_j=25\text{ C}$	50	66		dB
Peak Output Current	I_{PK}	$T_j=25\text{ C}$		1.2		A
Short-Circuit Current	I_{sc}	$V_I=35V, T_j=25\text{ C}$		250		mA
Dropout Voltage	V_d	$T_j=25\text{ C}$		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

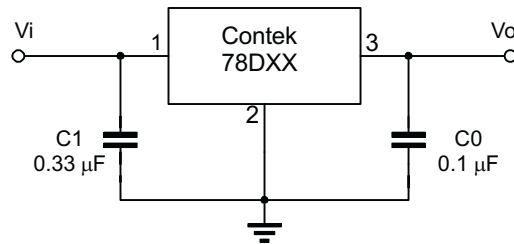


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78DXX LINEAR INTEGRATED CIRCUIT

TYPICAL APPLICATION CIRCUIT



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

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