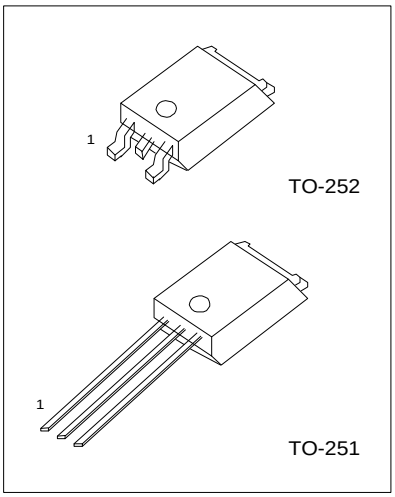
UTC 78DXX LINEAR INTEGRATED CIRCUIT

3-TERMINAL 0.5A POSITIVE VOLTAGE REGULATOR



1:Input 2:GND 3:Output

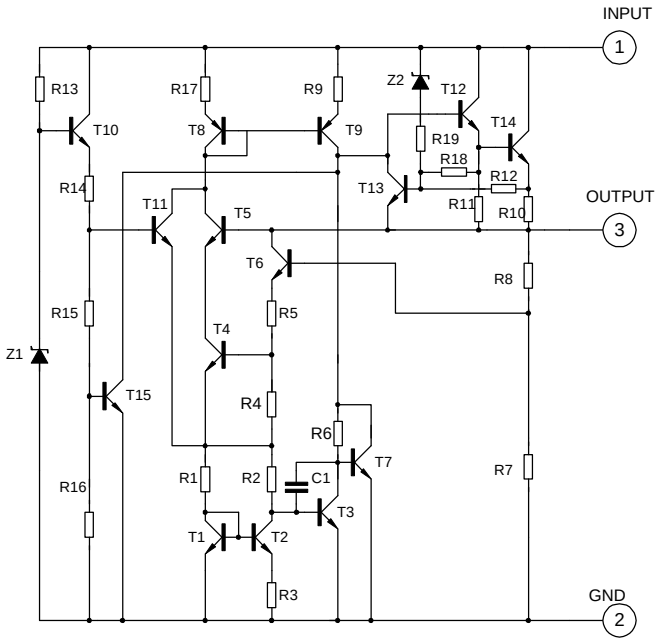
DESCRIPTION

The UTC 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

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS

(Operating temperature range applies unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Input voltage(for Vo=5~18V) (for Vo=20~24V)	V_I	35 40	V 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

UTC78D05 ELECTRICAL CHARACTERISTICS

(VI=10V, 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, 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	ΔVo	Tj=25°C,I_O=5mA - 0.5A			50	mV
		Tj=25°C,I_O=5mA - 200 mA			25	mV
Line regulation	ΔVo	V_I =7V to 25V,Tj=25°C			50	mV
		V_I =7.5V to 20V,Tj=25°C,Io=0.5A			50	mV
Quiescent Current	Iq	Tj=25°C, I_O=0.5A			8.0	mA
Quiescent Current Change	ΔIq	V_I =7.5V to 20V			1.0	mA
	ΔIq	I_O=5mA - 0.5A			0.5	mA
Output Noise Voltage	V_N	10Hz<=f<=100kHz		40		uV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		-0.6		mV/°C
Ripple Rejection	RR	V_I =8V -18V,f=120Hz,Tj=25°C	62	80		dB
Peak Output Current	I_{PK}	Tj=25°C		1.2		A
Short-Circuit Current	I_{SC}	VI=35V, Tj=25°C		250		mA
Dropout Voltage	Vd	Tj=25°C		2.0		V

UTC78D06 ELECTRICAL CHARACTERISTICS

(VI=11V, 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, 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	ΔVo	Tj=25°C,I_O=5mA - 0.5A			60	mV
		Tj=25°C,I_O=5mA - 200mA			30	mV
Line regulation	ΔVo	V_I =8V to 25V,Tj=25°C			60	mV
		V_I =8.5V to 21V,Tj=25°C,Io=0.5A			60	mV
Quiescent Current	Iq	Tj=25°C, I_O=0.5A			8.0	mA
Quiescent Current Change	ΔIq	V_I =8.5V to 21V			1.0	mA
	ΔIq	I_O=5mA – 0.5A			0.5	mA
Output Noise Voltage	V_N	10Hz<=f<=100kHz		45		uV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		-0.7		mV/°C
Ripple Rejection	RR	V_I =9V - 19V,f=120Hz,Tj=25°C	59	75		dB

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Peak Output Current	I_{PK}	Tj=25°C		1.2		A
Short-Circuit Current	I_{SC}	VI=35V, Tj=25°C		250		mA
Dropout Voltage	Vd	Tj=25°C		2.0		V

UTC78D08 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, I_O=5mA - 0.5A	7.7	8.0	8.3	V
		V_I =10.5V to 23V, I_O=5mA – 0.5A, PD<7W	7.6		8.4	V
Load Regulation	ΔVo	Tj=25°C,I_O=5mA - 0.5A			80	mV
		Tj=25°C,I_O=5mA - 200mA			40	mV
Line regulation	ΔVo	V_I =10.5V to 25V,Tj=25°C			80	mV
		V_I =10.5V to 3V,Tj=25°C,Io=0.5A			80	mV
Quiescent Current	Iq	Tj=25°C, I_O=0.5A			8.0	mA
Quiescent Current Change	ΔIq	V_I =10.5V to 23V			1.0	mA
	ΔIq	I_O=5mA - 0.5A			0.5	mA
Output Noise Voltage	V_N	10Hz<=f<=100kHz		58		uV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		-0.9		mV/°C
Ripple Rejection	RR	V_I =11.5V to 21.5V, f=120Hz,Tj=25°C	56	72		dB
Peak Output Current	I_{PK}	Tj=25°C		1.2		A
Short-Circuit Current	I_{SC}	VI=35V, Tj=25°C		250		mA
Dropout Voltage	Vd	Tj=25°C		2.0		V

UTC78D09 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, I_O=5mA - 0.5A	8.65	9.00	9.35	V
		V_I =11.5V to 24V, I_O=5mA - 0.5A,PD<7W	8.6		9.4	V
Load Regulation	ΔVo	Tj=25°C,I_O=5mA - 0.5A			90	mV
		Tj=25°C,I_O=5mA - 200mA			45	mV
Line regulation	ΔVo	V_I =11.5V to 25 V,Tj=25°C			90	mV
		V_I =11.5V to 24V,Tj=25°C, Io=0.5A			90	mV
Quiescent Current	Iq	Tj=25°C, I_O=0.5A			8.0	mA
Quiescent Current Change	ΔIq	V_I =11.5V to 24V			1.0	mA
	ΔIq	I_O=5mA – 0.5A			0.5	mA
Output Noise Voltage	V_N	10Hz<=f<=100kHz		58		uV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		-1.1		mV/°C
Ripple Rejection	RR	V_I =12.5V to 22.5V, f=120Hz,Tj=25°C	56	72		dB
Peak Output Current	I_{PK}	Tj=25°C		1.2		A
Short-Circuit Current	I_{SC}	VI=35V, Tj=25°C		250		mA
Dropout Voltage	Vd	Tj=25°C		2.0		V

UTC78D12 ELECTRICAL CHARACTERISTICS

(VI=19V, 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	11.5	12.0	12.5	V
		VI =14.5V to 27V, IO=5mA – 0.5A,PD<7W	11.4		12.6	V
Load Regulation	ΔVo	Tj=25°C,IO=5mA - 0.5A			120	mV
		Tj=25°C,IO=5mA - 200mA			60	mV
Line regulation	ΔVo	VI =14.5V to 30V,Tj=25°C			120	mV
		VI =14.6V to 27V,Tj=25°C, Io=0.5A			120	mV
Quiescent Current	Iq	Tj=25°C, IO=0.5A			8.0	mA
Quiescent Current Change	ΔIq	VI =14.5V to 30V			1.0	mA
	ΔIq	IO=5mA – 0.5A			0.5	mA
Output Noise Voltage	VN	10Hz<=f<=100kHz		75		uV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		-1.5		mV/°C
Ripple Rejection	RR	VI =15V - 25V,f=120Hz,Tj=25°C	55	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

UTC78D15 ELECTRICAL CHARACTERISTICS

(VI=23V, 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	14.4	15.0	15.6	V
		VI =17.5V to 30V, IO=5mA - 0.5A,PD<7W	14.25		15.75	V
Load Regulation	ΔVo	Tj=25°C,IO=5mA - 0.5A			150	mV
		Tj=25°C,IO=5mA - 200mA			75	mV
Line regulation	ΔVo	VI =18.5V to 30V,Tj=25°C			150	mV
		VI =17.7V to 30V, Tj=25°C, IO =0.5A			150	mV
Quiescent Current	Iq	Tj=25°C, IO=0.5A			8.0	mA
Quiescent Current Change	ΔIq	VI =17.5V to 30V			1.0	mA
	ΔIq	IO=5mA – 0.5A			0.5	mA
Output Noise Voltage	VN	10Hz<=f<=100kHz		90		uV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		-1.8		mV/°C
Ripple Rejection	RR	VI =18.5V to 28.5V f=120Hz,Tj=25°C	54	70		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

UTC78D18 ELECTRICAL CHARACTERISTICS

(VI=27V, 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	17.3	18.0	18.7	V
		VI =21V to 33V, IO=5mA - 0.5A,PD<7W	17.1		18.9	V
Load Regulation	ΔVo	Tj=25°C,IO=5mA - 0.5A			180	mV
		Tj=25°C,IO=5mA - 200mA			90	mV
Line regulation	ΔVo	VI =21V to 33V,Tj=25°C			180	mV
		VI =21V to 33V, Tj=25°C, IO =0.5A			180	mV
Quiescent Current	Iq	Tj=25°C, IO=0.5A			8.0	mA
Quiescent Current Change	ΔIq	VI =21.5V to 33V			1.0	mA
	ΔIq	IO=5mA - 0.5A			0.5	mA
Output Noise Voltage	VN	10Hz<=f<=100kHz		110		uV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		-2.2		mV/°C
Ripple Rejection	RR	VI =22V - 32V,f=120Hz,Tj=25°C	53	69		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

UTC78D24 ELECTRICAL CHARACTERISTICS

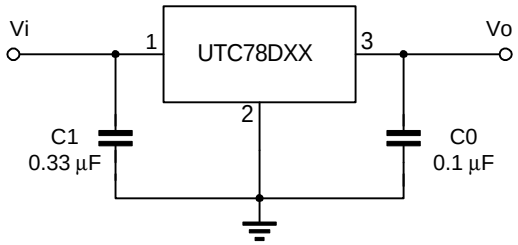
(VI=33V, Io=0.5A, Tj= 0°C - 125°C, C1=0.33uF, Co=0.1uF, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	Vo	Tj=25°C, IO=5mA - 0.5A	23.0	24.0	25.0	V
		VI =27V to 38V, IO=5mA - 0.5A, PD<7W	22.8		25.2	V
Load Regulation	ΔVo	Tj=25°C,IO=5mA - 0.5A			240	mV
		Tj=25°C,IO=5mA - 200mA			120	mV
Line regulation	ΔVo	VI =27V to 38V,Tj=25°C			240	mV
		VI =27V to 38V,Tj=25°C,Io=0.5A			240	mV
Quiescent Current	Iq	Tj=25°C, IO=0.5A			8.0	mA
Quiescent Current Change	ΔIq	VI =28V to 38V			1.0	mA
	ΔIq	IO=5mA - 0.5A			0.5	mA
Output Noise Voltage	VN	10Hz<=f<=100kHz		170		uV
Temperature coefficient of Vo	ΔVo/ΔT	Io=5mA		-2.8		mV/°C
Ripple Rejection	RR	VI =28V - 38V,f=120Hz,Tj=25°C	50	66		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

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

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.