



78TXXA

LINEAR INTEGRATED CIRCUIT

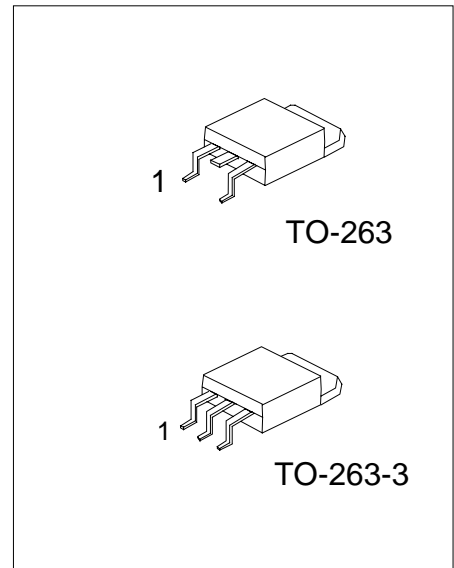
3-TERMINAL 1A POSITIVE VOLTAGE REGULATOR

DESCRIPTION

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

FEATURES

- *Peak output current up to 1 A
- *Fixed output voltage of 3.3V, 4.7V, 5V, 6V, 7V, 8V, 9V, 10V, 12V, 15V, 18V and 24V available
- *Thermal overload shutdown protection
- *Short circuit current limiting
- *Output transistor SOA protection



*Pb-free plating product number: 78TXXAL

ORDERING INFORMATION

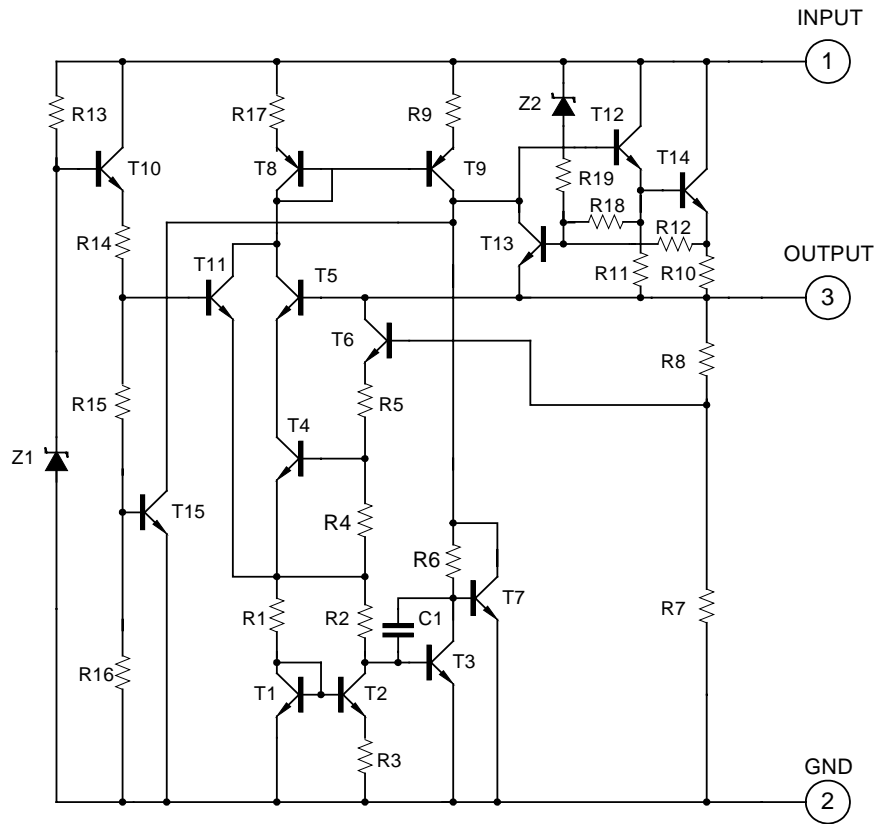
Order Number		Pin Assignment			Package	Packing
Normal	Lead Free Plating	1	2	3		
78TxxA-TQ2-D-R	78TxxAL-TQ2-D-R	I	G	O	TO-263	Tape Reel
78TxxA-TQ3-D-R	78TxxAL-TQ3-D-R	I	G	O	TO-263-3	Tape Reel

Note: xx: output voltage, refer to Marking Information

MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-263 TO-263-3	33 :3.3V	<p>The diagram shows a top-down view of the 78TXXA package. It is labeled 'UTC' and '78TXXA'. Below the package, three pins are labeled 1, 2, and 3. To the right of the package, there are two arrows pointing to the marking area: one labeled 'VOLTAGE CODE' and one labeled 'DATE CODE'.</p>
	47 :4.7V	
	05 :5.0V	
	06 :6.0V	
	07 :7.0V	
	08 :8.0V	
	09 :9.0V	
	10 :10V	
	12 :12V	
	15 :15V	
	18 :18V	
	24 :24V	

■ TEST CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

PARAMETER	SYMBOL	RATING	UNIT	
Input Voltage	$V_{OUT}=3.3\sim 18V$	V_{IN}	35	V
	$V_{OUT}=24V$	V_{IN}	40	V
Output Current	I_{OUT}	1	A	
Power Dissipation	P_D	Internally Limited	W	
Junction Temperature	T_J	+125	°C	
Operating Junction Temperature	T_{OPR}	0~ +70	°C	
Storage Temperature	T_{STG}	-40~ +150	°C	

Note 1. 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.

2. The device is guaranteed to meet performance specification within 0 ~+70 operating temperature range and assured by design from -20 ~+85 .

■ ELECTRICAL CHARACTERISTICS

FOR 78T33A ($V_{IN}=5.8V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C\sim 125^{\circ}C$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA\sim 1.0A$	3.168	3.30	3.432	V
		$V_{IN}=5.8V\sim 18.3V$, $I_{OUT}=5mA\sim 1.0A$, $P_D=15W$	3.135		3.465	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA\sim 1.0A$			33	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A\sim 0.75A$			17	mV
Line regulation	ΔV_{OUT}	$V_{IN}=5.8V\sim 18.3V$, $T_J=25^{\circ}C$			33	mV
		$V_{IN}=5.8V\sim 18.3V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			33	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT}=1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=5.8V\sim 18.3V$			1.0	mA
		$I_{OUT}=5mA\sim 1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		55		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-0.4		mV/°C
Ripple Rejection	RR	$V_{IN}=6.3V\sim 16.3V$, $f=120Hz$, $T_J=25^{\circ}C$		57		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

FOR 78T47A ($V_{IN}=9.7V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C\sim 125^{\circ}C$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA\sim 1.0A$	4.512	4.70	4.888	V
		$V_{IN}=7.2V\sim 19.7V$, $I_{OUT}=5mA\sim 1.0A$, $P_D=15W$	4.465		4.935	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA\sim 1.0A$			47	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A\sim 0.75A$			24	mV
Line regulation	ΔV_{OUT}	$V_{IN}=7.2V\sim 19.7V$, $T_J=25^{\circ}C$			47	mV
		$V_{IN}=7.2V\sim 19.7V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			47	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT}=1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=7.2V\sim 19.7V$			1.0	mA
		$I_{OUT}=5mA\sim 1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		40		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-0.6		mV/°C
Ripple Rejection	RR	$V_{IN}=7.7V\sim 17.7V$, $f=120Hz$, $T_J=25^{\circ}C$	62	80		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

■ ELECTRICAL CHARACTERISTICS(Cont.)

FOR 78T05A ($V_{IN}=10V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA - 1.0A$	4.80	5.0	5.20	V
		$V_{IN}=7.5V\sim 20V$, $I_{OUT}=5mA-1.0A$, $P_D 15W$	4.75		5.25	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			50	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			25	mV
Line regulation	ΔV_{OUT}	$V_{IN}=7V\sim 25V$, $T_J=25^{\circ}C$			50	mV
		$V_{IN}=7.5V\sim 20V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			50	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=7.5V\sim 20V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		40		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-0.6		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=8V-18V$, $f=120Hz$, $T_J=25^{\circ}C$	62	80		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

FOR 78T06A ($V_{IN}=11V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$	5.76	6.0	6.24	V
		$V_{IN}=8.5V\sim 21V$, $I_{OUT}=5mA-1.0A$, $P_D 15W$	5.70		6.30	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			60	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			30	mV
Line regulation	ΔV_{OUT}	$V_{IN}=8V\sim 25V$, $T_J=25^{\circ}C$			60	mV
		$V_{IN}=8.5V\sim 21V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			60	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=8.5V\sim 21V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		45		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-0.7		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=9V-19V$, $f=120Hz$, $T_J=25^{\circ}C$	59	75		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

FOR 78T07A ($V_{IN}=13V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$	6.72	7.0	7.28	V
		$V_{IN}=9.5V\sim 22V$, $I_{OUT}=5mA-1.0A$, $P_D 15W$	6.65		7.35	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			70	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			35	mV
Line regulation	ΔV_{OUT}	$V_{IN}=9V\sim 25V$, $T_J=25^{\circ}C$			70	mV
		$V_{IN}=9.5V\sim 22V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			70	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=9.5V\sim 22V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		50		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-0.8		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=10V-20V$, $f=120Hz$, $T_J=25^{\circ}C$	59	75		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.7		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

■ ELECTRICAL CHARACTERISTICS(Cont.)

FOR 78T08A ($V_{IN}=14V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C1=0.33\mu F$, $C0=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$	7.68	8.0	8.32	V
		$V_{IN}=10.5V\sim 23V$, $I_{OUT}=5mA-1.0A$, $P_D \leq 15W$	7.60		8.40	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			80	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			40	mV
Line regulation	ΔV_{OUT}	$V_{IN}=10.5V\sim 25V$, $T_J=25^{\circ}C$			80	mV
		$V_{IN}=10.5V\sim 23V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			80	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} \leq 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=10.5V\sim 23V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		58		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-0.9		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=11.5V\sim 21.5V$, $f=120Hz$, $T_J=25^{\circ}C$	56	72		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

FOR 78T09A ($V_{IN}=15V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C1=0.33\mu F$, $C0=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA - 1.0A$	8.64	9.0	9.36	V
		$V_{IN}=11.5V\sim 24V$, $I_{OUT}=5mA-1.0A$, $P_D \leq 15W$	8.55		9.45	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			90	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			45	mV
Line regulation	ΔV_{OUT}	$V_{IN}=11.5V\sim 25V$, $T_J=25^{\circ}C$			90	mV
		$V_{IN}=11.5V\sim 24V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			90	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} \leq 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=11.5V\sim 24V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		58		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-1.1		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=12.5V\sim 22.5V$, $f=120Hz$, $T_J=25^{\circ}C$	56	72		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

FOR 78T10A ($V_{IN}=16V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C1=0.33\mu F$, $C0=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$	9.60	10.0	10.40	V
		$V_{IN}=12.5V\sim 25V$, $I_{OUT}=5mA-1.0A$, $P_D \leq 15W$	9.50		10.50	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			100	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			50	mV
Line regulation	ΔV_{OUT}	$V_{IN}=13V\sim 25V$, $T_J=25^{\circ}C$			100	mV
		$V_{IN}=13V\sim 25V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			100	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} \leq 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=12.6V\sim 25V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		58		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-1.1		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=13V\sim 23V$, $f=120Hz$, $T_J=25^{\circ}C$	56	72		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

■ ELECTRICAL CHARACTERISTICS(Cont.)

FOR 78T12A ($V_{IN}=19V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C1=0.33\mu F$, $C0=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$	11.52	12.0	12.48	V
		$V_{IN}=14.5V\sim 27V$, $I_{OUT}=5mA-1.0A$, $P_D 15W$	11.40		12.60	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			120	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			60	mV
Line regulation	ΔV_{OUT}	$V_{IN}=14.5V\sim 30V$, $T_J=25^{\circ}C$			120	mV
		$V_{IN}=14.6V\sim 27V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			120	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=14.5V\sim 30V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		75		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-1.5		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=15V-25V$, $f=120Hz$, $T_J=25^{\circ}C$	55	72		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

FOR 78T15A ($V_{IN}=23V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C1=0.33\mu F$, $C0=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$	14.40	15.0	15.60	V
		$V_{IN}=17.5V\sim 30V$, $I_{OUT}=5mA-1.0A$, $P_D 15W$	14.25		15.75	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			150	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			75	mV
Line regulation	ΔV_{OUT}	$V_{IN}=18.5V\sim 30V$, $T_J=25^{\circ}C$			150	mV
		$V_{IN}=17.7V\sim 30V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			150	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=17.5V\sim 30V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		90		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-1.8		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=18.5V\sim 28.5V$, $f=120Hz$, $T_J=25^{\circ}C$	54	70		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

FOR 78T18A ($V_{IN}=27V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C1=0.33\mu F$, $C0=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$	17.28	18.0	18.72	V
		$V_{IN}=21V\sim 33V$, $I_{OUT}=5mA-1.0A$, $P_D 15W$	17.10		18.90	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			180	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			90	mV
Line regulation	ΔV_{OUT}	$V_{IN}=21V\sim 33V$, $T_J=25^{\circ}C$			180	mV
		$V_{IN}=21V\sim 33V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			180	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=21.5V\sim 33V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		110		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-2.2		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=22V-32V$, $f=120Hz$, $T_J=25^{\circ}C$	53	69		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		2.0		V

■ ELECTRICAL CHARACTERISTICS(Cont.)

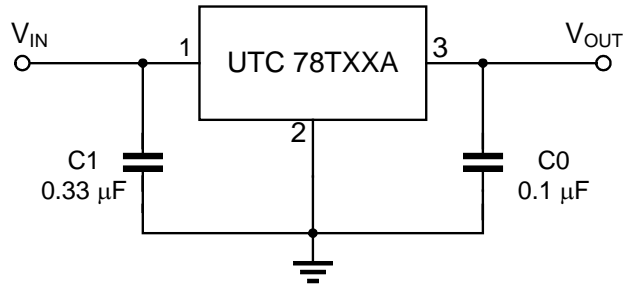
FOR 78T24A ($V_{IN}=33V$, $I_{OUT}=0.5A$, $T_J=0^{\circ}C - 125^{\circ}C$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$	23.04	24.0	24.96	V
		$V_{IN}=27V\sim 38V$, $I_{OUT}=5mA-1.0A$, $P_D \leq 15W$	22.80		25.20	V
Load Regulation	ΔV_{OUT}	$T_J=25^{\circ}C$, $I_{OUT}=5mA-1.0A$			240	mV
		$T_J=25^{\circ}C$, $I_{OUT}=0.25A-0.75A$			120	mV
Line regulation	ΔV_{OUT}	$V_{IN}=27V\sim 38V$, $T_J=25^{\circ}C$			240	mV
		$V_{IN}=27V\sim 38V$, $T_J=25^{\circ}C$, $I_{OUT}=1.0A$			240	mV
Quiescent Current	I_Q	$T_J=25^{\circ}C$, $I_{OUT} = 1.0A$			8.0	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=28V\sim 38V$			1.0	mA
		$I_{OUT}=5mA-1.0A$			0.5	mA
Output Noise Voltage	eN	10Hz f 100kHz		170		μV
Temperature coefficient of V_o	$\Delta V_o/\Delta T$	$I_{OUT}=5mA$		-2.8		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=28V-38V$, $f=120Hz$, $T_J=25^{\circ}C$	50	66		dB
Peak Output Current	I_{PEAK}	$T_J=25^{\circ}C$		1.8		A
Short-Circuit Current	I_{SC}	$V_{IN}=35V$, $T_J=25^{\circ}C$		250		mA
Dropout Voltage	V_D	$T_J=25^{\circ}C$		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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