



LM317M

LINEAR INTEGRATED CIRCUIT

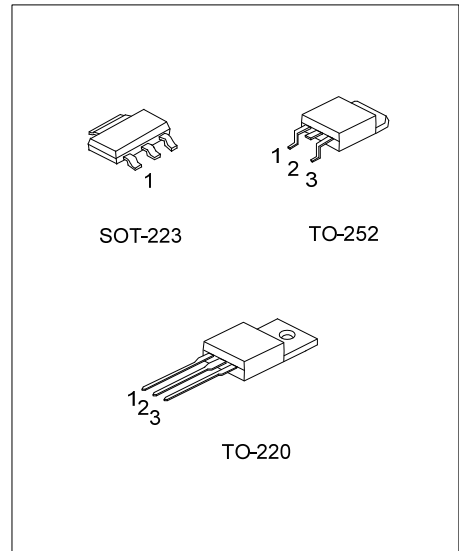
MEDIUM CURRENT 1.2V TO 37V ADJUSTABLE VOLTAGE REGULATOR

DESCRIPTION

The UTC **LM317M** is an adjustable 3-terminal positive voltage regulator, designed to supply 500mA of output current with voltage adjustable from 1.2V ~ 37V.

FEATURES

- *Output voltage adjustable from 1.2V ~ 37V
- *Output current in excess of 500mA
- *Internal thermal overload protection
- *Internal short circuit current limiting
- *Output transistor safe area compensation



Lead-free: LM317ML
Halogen-free: LM317MG

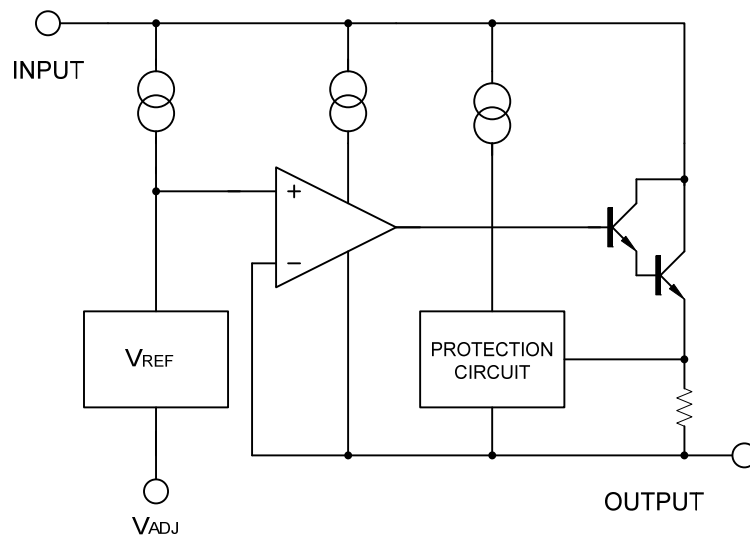
ORDERING INFORMATION

Ordering Number			Package	Pin Assignment			Packing
Normal	Lead Free	Halogen Free		1	2	3	
LM317M-AA3-R	LM317ML-AA3-R	LM317MG-AA3-R	SOT-223	ADJ	O	I	Tape Reel
LM317M-TA3-T	LM317ML-TA3-T	LM317MG-TA3-T	TO-220	ADJ	O	I	Tube
LM317M-TN3-R	LM317ML-TN3-R	LM317MG-TN3-R	TO-252	ADJ	O	I	Tape Reel
LM317M-TN3-T	LM317ML-TN3-T	LM317MG-TN3-T	TO-252	ADJ	O	I	Tube

Note: Pin Assignment: I:V_{IN} O:V_{OUT}

<p>LM317ML-AA3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) AA3: SOT-223, TA3: TO-220, TN3: TO-252</p> <p>(3) L: Halogen Free, K: Lead Free, Blank: Pb/Sn</p>
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■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Input-Output Voltage Differential	$V_{IN}-V_{OUT}$	40	V
Power Dissipation	P_D	Internally Limited	W
Junction Temperature	T_J	+125	°C
Operating Temperature	T_{OPR}	0 ~ +125	°C
Storage Temperature	T_{STG}	-40 ~ +150	°C

Note: 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-Ambient	SOT-223	245	°C/W
	TO-220	70	
	TO-252	92	
Junction-to-Case	SOT-223	15	°C/W
	TO-220	5	
	TO-252	5	

■ ELECTRICAL CHARACTERISTICS

($V_{IN}-V_{OUT}=5V$, $I_{OUT}=0.1A$, $T_a=25^{\circ}C$, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Line Regulation	$\Delta V_{OUT}/V_{OUT}$	$3V \cong V_{IN}-V_{OUT} \cong 40V$		0.01	0.04	%/V	
Load Regulation	ΔV_{OUT}	$10mA \cong I_{OUT} \cong 0.5A$		$V_{OUT} \leq 5V$	5	25	mV
				$V_{OUT} \geq 5V$	0.1	0.5	%
Adjustable Pin Current	I_{ADJ}			50	100	μA	
Adjustable Pin Current Change	ΔI_{ADJ}	$3V \cong V_{IN}-V_{OUT} \cong 40V$, $10mA \cong I_{OUT} \cong 0.5A$, $P_D < 7.5W$		0.2	5	μA	
Reference Voltage	V_{REF}	$3V \cong V_{IN}-V_{OUT} \cong 40V$, $10mA \cong I_{OUT} \cong 0.5A$, $P_D < 7.5W$	1.20	1.25	1.30	V	
Temperature Stability		$T_{MIN} \cong T_J \cong T_{MAX}$		0.7		%/V _{OUT}	
Minimum Load Current for Regulation	$I_{L(MIN)}$	$V_{IN}-V_{OUT}=40V$		3.5	10	mA	
Maximum Output Current	$I_{O(MAX)}$	$V_{IN}-V_{OUT}=40V$, $P_D \leq 7.5W$	0.1	0.2		A	
RMS Noise vs. % of V_{OUT}	eN	$10Hz \leq f \leq 10KHz$		0.003		%/V _{OUT}	
Ripple Rejection	RR	$V_{OUT}=10V, f=120Hz$	$C_{ADJ}=0$		65	dB	
			$C_{ADJ}=10\mu F$	66	80		

Note: C_{ADJ} is connected between Adjust pin and Ground.

APPLICATION CIRCUITS

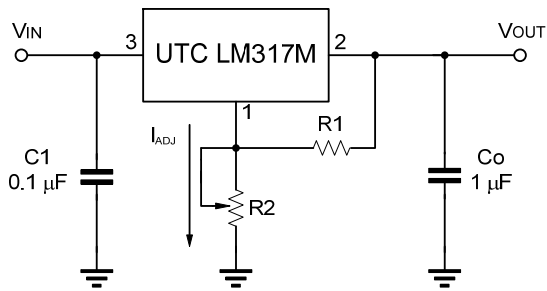


Fig.1 Programmable voltage regulator

$$V_{OUT} = 1.25V \cdot (1 + R2/R1) + I_{ADJ} \cdot R2$$

C1 is required when regulator is located an appreciated distance from power supply. Co is needed to improve transient response.

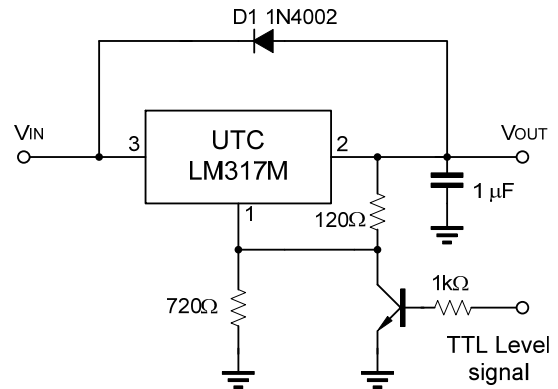


Fig.2 Regulator with On-off control

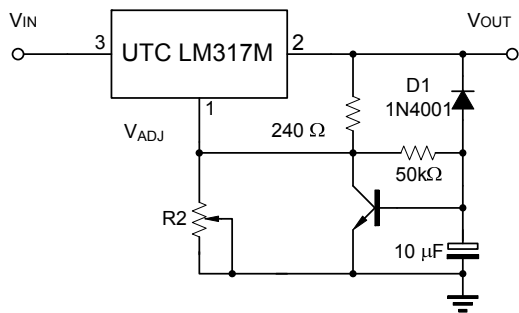
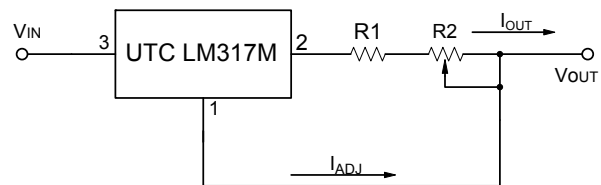


Fig.3 Soft Start Application



$$I_{O(MAX)} = \left(\frac{V_{REF}}{R1} \right) + I_{ADJ} = \frac{1.25V}{R1}$$

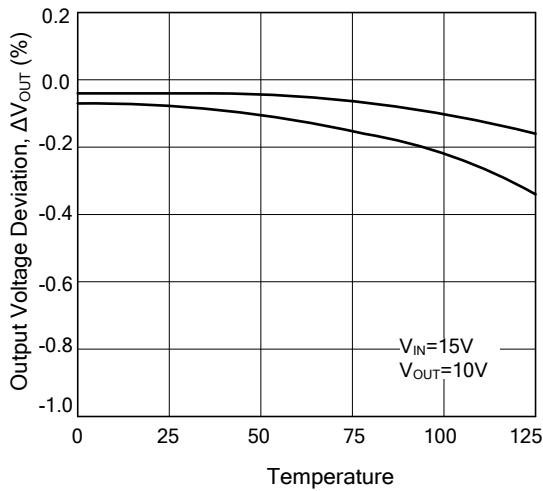
$$I_{O(MIN)} = \left(\frac{V_{REF}}{R1+R2} \right) + I_{ADJ} = \frac{1.25V}{R1+R2}$$

$$5mA < I_{OUT} < 100mA$$

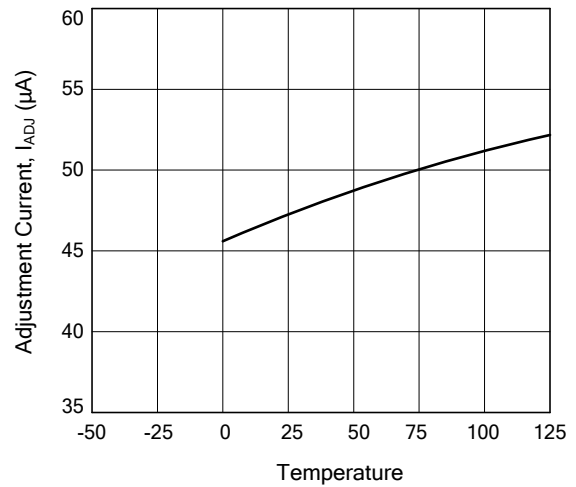
Fig.4 Constant Current Application

TYPICAL CHARACTERISTICS

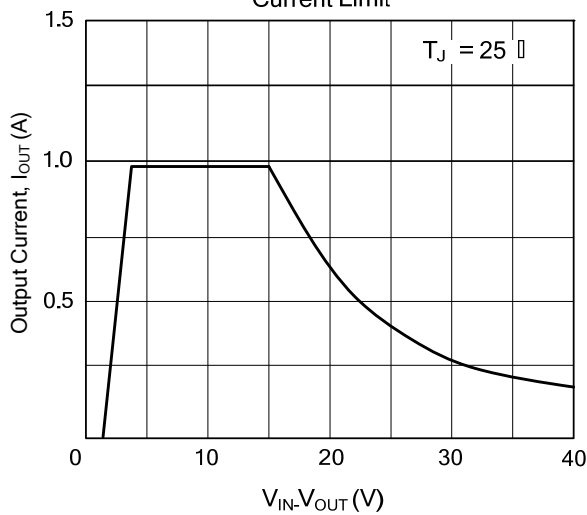
Load Regulation vs. temperature



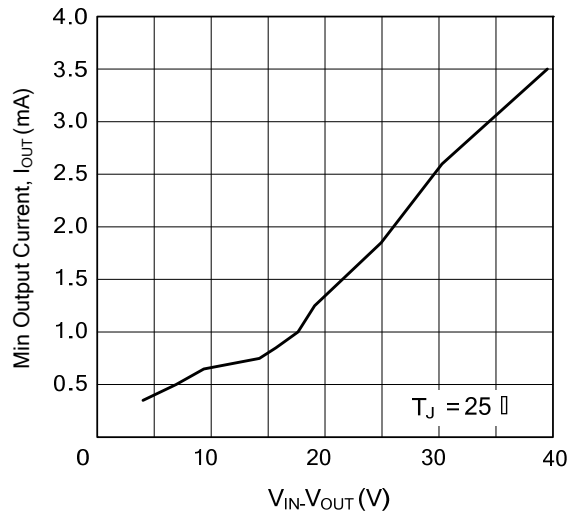
Adjustment Current vs. Temperature



Current Limit



Minimum Operating Current



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