



## LM317M

## LINEAR INTEGRATED CIRCUIT

### 3-TERMINAL 0.5A POSITIVE ADJUSTABLE REGULATOR

#### DESCRIPTION

The UTC LM317M is a 3-terminal adjustable positive voltage regulator capable of supplying in excess of 500mA over an output voltage range of 1.2V ~ 37V. This voltage regulator is exceptionally easy to use and requires only two external resistors to set the output voltage.

#### FEATURES

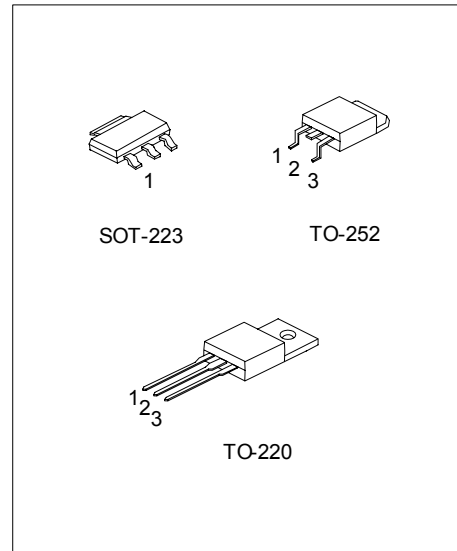
- \*Output Current in Excess of 0.5A
- \*Output Adjustable Between 1.2V and 37V
- \*Internal Thermal Overload Protection
- \*Internal Short Circuit Current Limiting
- \*Output Transistor Safe Area Compensation
- \*Floating Operation for High Voltage Applications

#### ORDERING INFORMATION

Order Number		Package	Pin Assignment			Packing
Normal	Lead Free Plating		1	2	3	
LM317M-AA3-0-R	LM317ML-AA3-0-R	SOT-223	A	O	I	Tape Reel
LM317M-TA3-0-T	LM317ML-TA3-0-T	TO-220	A	O	I	Tube
LM317M-TN3-0-R	LM317ML-TN3-0-R	TO-252	A	O	I	Tape Reel
LM317M-TN3-0-T	LM317ML-TN3-0-T	TO-252	A	O	I	Tube

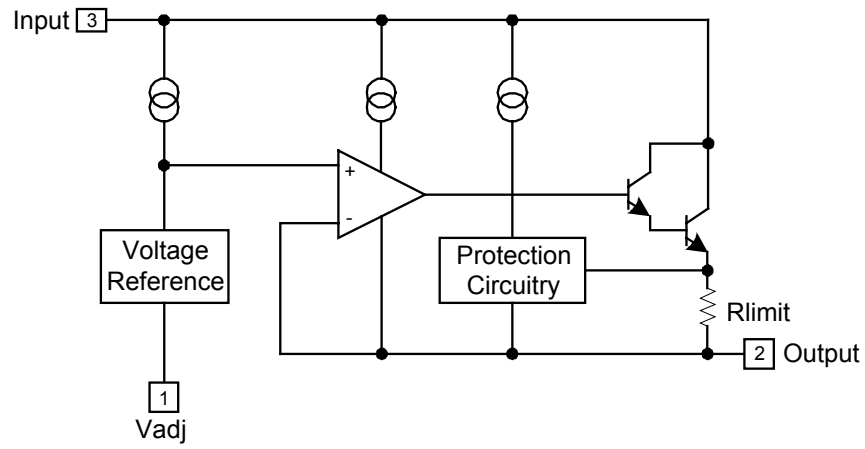
Note: Pin assignment: I:V<sub>IN</sub> O:V<sub>OUT</sub> A:ADJ

<p>LM317ML-AA3-0-R</p> <p>(1)Packing Type (2)Pin Assignment (3)Package Type (4)Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube (2) refer to Pin Assignment (3) AA3: SOT-223, TA3: TO-220, TN3: TO-252 (4) L: Lead Free Plating, Blank: Pb/Sn</p>
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\*Pb-free plating product number: LM317ML

## ■ 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	$T_{OPR}$	-20 ~ +85	°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°C~+70°C operating temperature range and assured by design from -20°C~+85°C.

### ■ ELECTRICAL CHARACTERISTICS

( $V_{IN}-V_{OUT}=5V$ ,  $I_{OUT}=0.1A$ ,  $0^{\circ}C \leq T_J \leq +125^{\circ}C$ ,  $P_{D(MAX)}=7.5W$ , unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Line Regulation	$\Delta V_{OUT}$	$T_a=+25^{\circ}C$ , $3V \leq V_{IN}-V_{OUT} \leq 40V$		0.01	0.04	%/V
		$3V \leq V_{IN}-V_{OUT} \leq 40V$		0.02	0.07	
Load Regulation	$\Delta V_{OUT}$	$T_a=+25^{\circ}C$ , $10mA \leq V_{IN}-V_{OUT} \leq 0.5A$ $V_{OUT} \leq 5V$ $V_{OUT} \geq 5V$		5 0.1	25 0.5	mV %/V <sub>o</sub>
		$10mA \leq I_{OUT} \leq 0.5A$ $V_{OUT} \leq 5V$ $V_{OUT} \geq 5V$		20 0.3	70 1.5	mV %/V <sub>o</sub>
Adjustment Pin Current	$I_{ADJ}$			50	100	μA
Adjustment Pin Current Change	$\Delta I_{ADJ}$	$3V \leq V_{IN}-V_{OUT} \leq 40V$ $10mA \leq I_{OUT} \leq 0.5A$ , $P_D < P_{D(MAX)}$		0.2	5	μA
Reference Voltage	$V_{REF}$	$3V \leq V_{IN}-V_{OUT} \leq 40V$ $10mA \leq I_{OUT} \leq 0.5A$ , $P_D < P_{D(MAX)}$	1.20	1.25	1.30	V
Temperature Stability	$ST_T$			0.7		%/V <sub>o</sub>
Minimum Load Current to Maintain Regulation	$I_{L(MIN)}$	$V_{IN}-V_{OUT}=40V$		3.5	10	mA
Maximum Output Current	$I_{O(MAX)}$	$V_{IN}-V_{OUT} \leq 15V$ , $P_D < P_{D(MAX)}$	0.5	0.9		
		$V_{IN}-V_{OUT}=40V$ $P_D < P_{D(MAX)}$ , $T_a=+25^{\circ}C$	0.15	0.25		A
RMS Noise, % of $V_{OUT}$	eN	$T_a=+25^{\circ}C$ , $10Hz < f < 10KHz$		0.003		%/V <sub>o</sub>
Ripple Rejection	RR	$V_{OUT}=10V$ , $f=120Hz$ Without $C_{ADJ}$ $C_{ADJ}=10\mu F$	66	65 80		V/μs
Long-Term Stability	ST	$T_J=+125^{\circ}C$ , 1000Hours		0.3	1	%/1000Hrs

## ■ TYPICAL APPLICATION

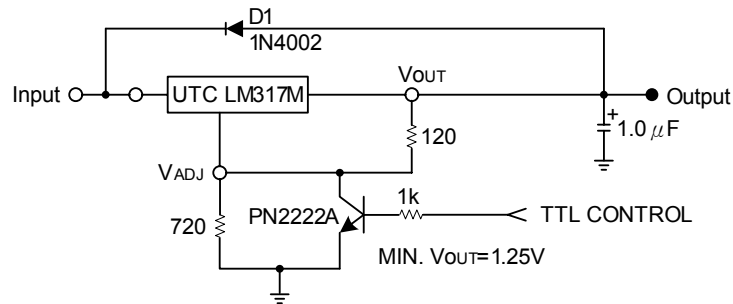


Figure 1. 1.5V Electronic Shutdown Regulator  
D1 protects the device during an input short circuit

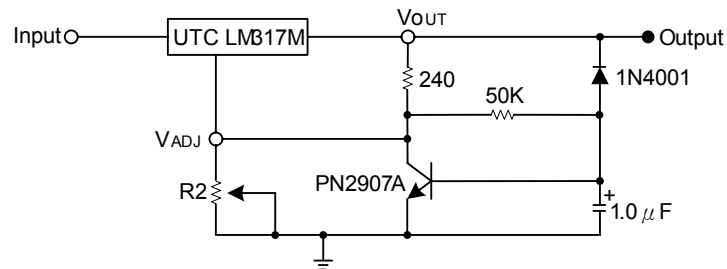
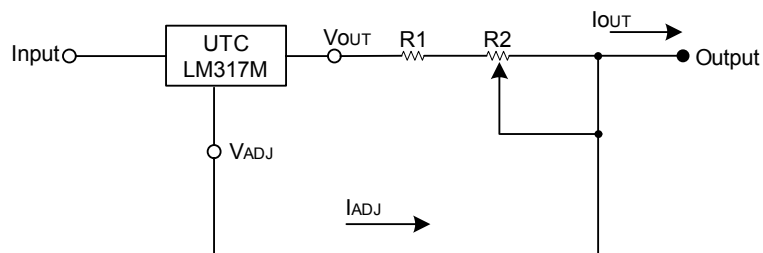


Figure 2. Slow Turn-On Regulator



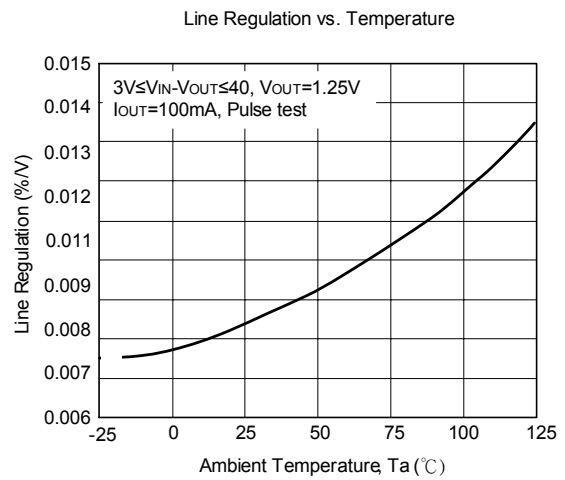
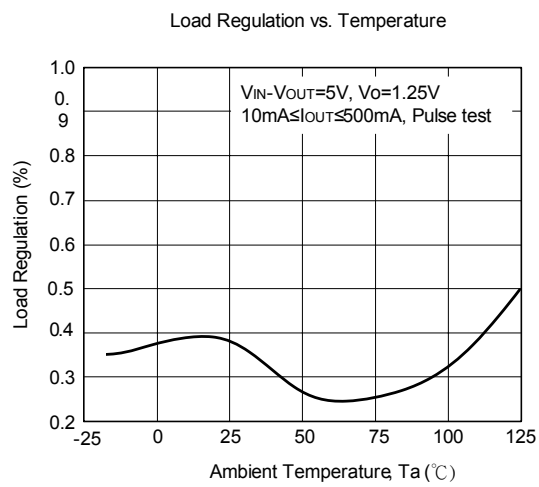
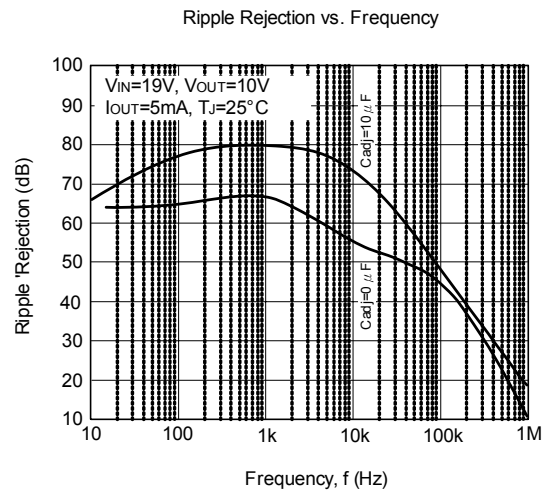
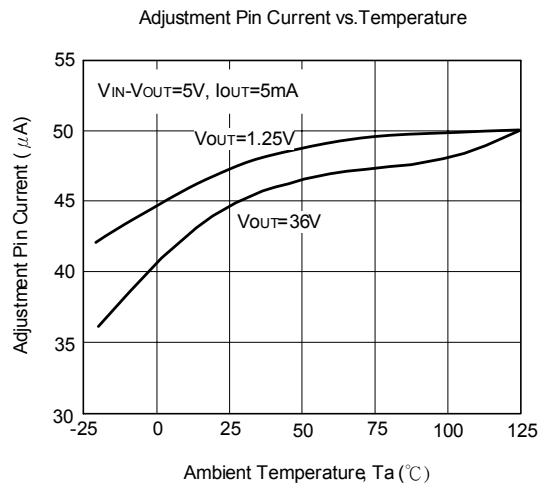
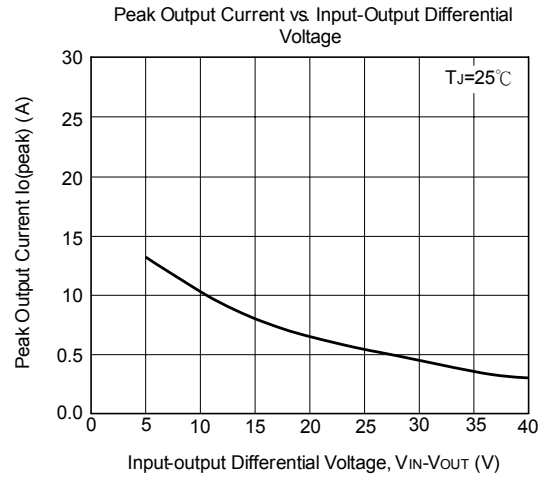
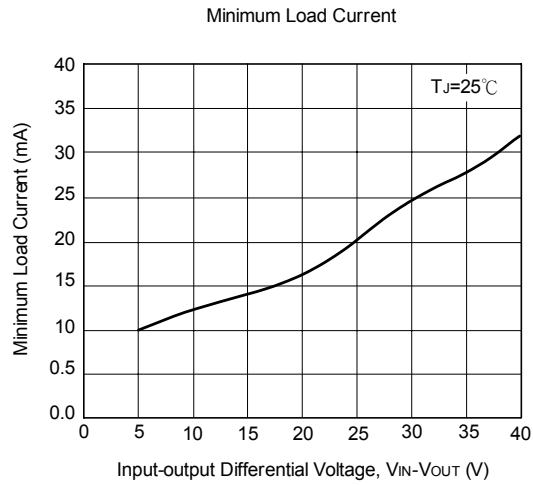
$$I_{O(MAX)} = \left( \frac{V_{REF}}{R_1} \right) + I_{ADJ} = \frac{1.25V}{R_1}$$

$$I_{O(MIN)} = \left( \frac{V_{REF}}{R_1 + R_2} \right) + I_{ADJ} = \frac{1.25V}{R_1 + R_2}$$

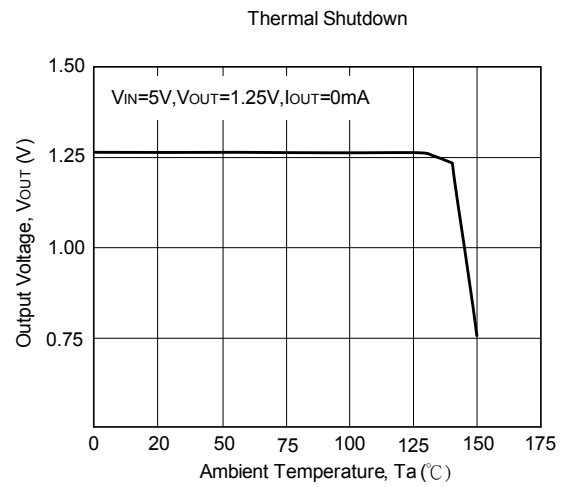
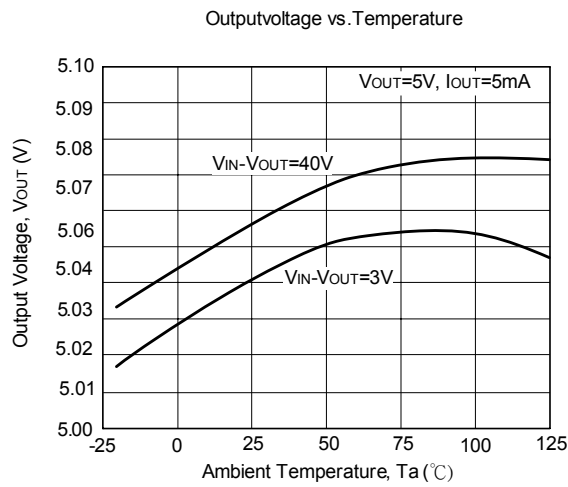
5mA < IOOUT < 500mA

Figure 3. Current Regulator

## TYPICAL CHARACTERISTICS



### ■ TYPICAL CHARACTERISTICS(Cont.)



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