

Medium current 1.2 to 37 V adjustable voltage regulator

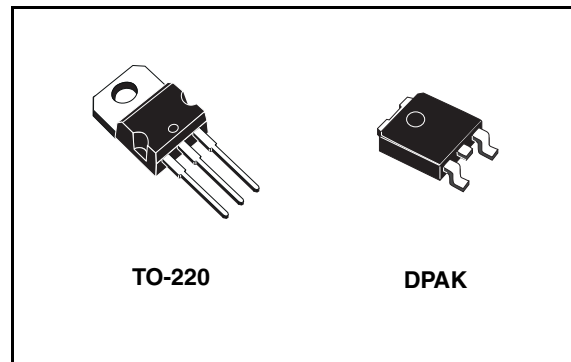
Features

- Output voltage range: 1.2 to 37 V
- Output current in excess of 500 mA
- Line regulation typ. 0.01 %
- Load regulation typ. 0.1 %
- Thermal overload protection
- Short circuit protection
- Output transition safe area compensation
- Floating operation for high voltage applications

Description

The LM217M/LM317M are monolithic integrated circuits in TO-220 and DPAK packages intended for use as positive adjustable voltage regulators. They are designed to supply until 500 mA of load current with an output voltage adjustable over a 1.2 to 37 V range.

The nominal output voltage is selected by means of only a resistive divider, making the device



exceptionally easy to use and eliminating the stocking of many fixed regulators.

Table 1. Device summary

Order codes	
TO-220	DPAK (tape and reel)
	LM217MDT-TR
LM317MT	LM317MDT-TR

3 Maximum ratings

Table 2. Absolute maximum ratings

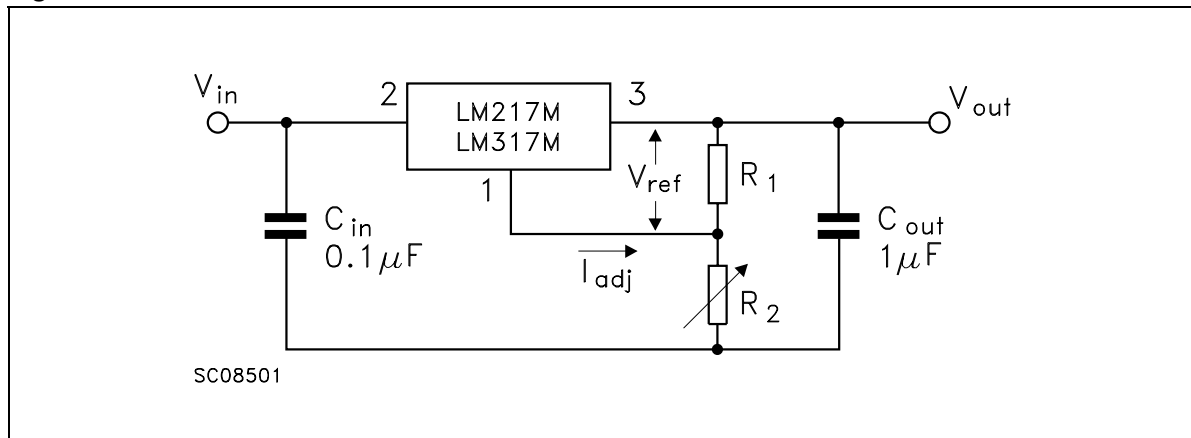
Symbol	Parameter	Value	Unit
V_I-V_O	Input-output differential voltage	40	V
P_D	Power dissipation	Internally limited	mW
T_{OP}	Operating junction temperature range ⁽¹⁾	for LM217M	-40 to 125
		for LM317M	0 to 125
T_{STG}	Storage temperature range	-55 to 150	°C

1. Re-Boot is not guaranteed for $T_J \geq 85^\circ\text{C}$.

Table 3. Thermal data

Symbol	Parameter	TO-220	DPAK	Unit
R_{thJC}	Thermal resistance junction-case	3	8	°C/W
R_{thJA}	Thermal resistance junction-ambient	50	100	°C/W

Figure 3. Test circuit



4 Electrical characteristics

Table 4. Electrical characteristics of LM217M (refer to the test circuits, $T_J = -40$ to 125 °C, $V_I - V_O = 5$ V, $I_O = 100$ mA, $P_D \leq 7.5$ W, unless otherwise specified)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
ΔV_O	Line regulation	$V_I - V_O = 3$ to 40 V	$T_J = 25^\circ\text{C}$		0.01	0.02	%V
					0.02	0.05	
ΔV_O	Load regulation	$V_O \leq 5$ V $I_O = 10$ to 500 mA	$T_J = 25^\circ\text{C}$		5	15	mV
					20	50	
		$V_O \geq 5$ V $I_O = 10$ to 500 mA	$T_J = 25^\circ\text{C}$		0.1	0.3	%V _O
					0.3	1	
I_{ADJ}	Adjustment pin current			50	100	μA	
ΔI_{ADJ}	Adjustment pin current	$V_I - V_O = 3$ to 40 V, $I_O = 10$ to 500 mA			0.2	5	μA
V_{REF}	Reference voltage	$V_I - V_O = 3$ to 40 V, $I_O = 10$ to 500 mA		1.2	1.25	1.3	V
$\Delta V_O/V_O$	Output voltage temperature stability				0.7		%
$I_{O(\min)}$	Minimum load current	$V_I - V_O = 40$ V			3.5	5	mA
$I_{O(\max)}$	Maximum output current	$V_I - V_O \leq 15$ V		500	1000		mA
		$V_I - V_O = 40$ V, $P_d < P_{D\text{MAX}}$, $T_J = 25^\circ\text{C}$			200		
eN	Output noise voltage (percentage of V_O)	B = 10 Hz to 100 kHz, $T_J = 25^\circ\text{C}$			0.003		%
SVR	Supply voltage rejection ⁽¹⁾	$T_J = 25^\circ\text{C}$ $f = 120$ Hz	$C_{ADJ} = 0$		65		dB
			$C_{ADJ} = 10$ μF	66	80		

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

Table 5. Electrical characteristics of LM317M (refer to the test circuits, $T_J = 0$ to 125 °C, $V_I - V_O = 5$ V, $I_O = 100$ mA, $P_D \leq 7.5$ W, unless otherwise specified)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
ΔV_O	Line regulation	$V_I - V_O = 3$ to 40 V	$T_J = 25^\circ\text{C}$		0.01	0.04	%V
					0.02	0.07	
ΔV_O	Load regulation	$V_O \leq 5$ V $I_O = 10$ to 500 mA	$T_J = 25^\circ\text{C}$		5	25	mV
					20	70	
		$V_O \geq 5$ V $I_O = 10$ to 500 mA	$T_J = 25^\circ\text{C}$		0.1	0.5	%V _O
					0.3	1.5	
I_{ADJ}	Adjustment pin current			50	100	μA	
ΔI_{ADJ}	Adjustment pin current	$V_I - V_O = 3$ to 40 V, $I_O = 10$ to 500 mA			0.2	5	μA
V_{REF}	Reference voltage	$V_I - V_O = 3$ to 40 V, $I_O = 10$ to 500 mA		1.2	1.25	1.3	V
$\Delta V_O/V_O$	Output voltage temperature stability				0.7		%
$I_{O(\min)}$	Minimum load current	$V_I - V_O = 40$ V			3.5	10	mA
$I_{O(\max)}$	Maximum output current	$V_I - V_O \leq 15$ V		500	1000		mA
		$V_I - V_O = 40$ V, $P_d < P_{D\text{MAX}}$, $T_J = 25^\circ\text{C}$			200		
eN	Output noise voltage (percentage of V_O)	B = 10 Hz to 100 kHz, $T_J = 25^\circ\text{C}$			0.003		%
SVR	Supply voltage rejection ⁽¹⁾	$T_J = 25^\circ\text{C}$ $f = 120$ Hz	$C_{ADJ} = 0$		65		dB
			$C_{ADJ} = 10$ μF	66	80		

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

TO-220 mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151

