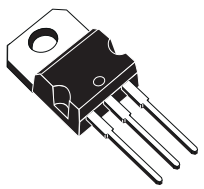
LM117/LM217/LM317

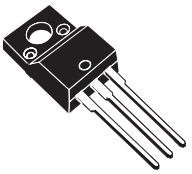
1.2 V to 37 V adjustable voltage regulators

Features

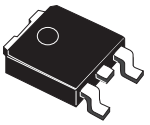
- Output voltage range: 1.2 to 37 V
- Output current in excess of 1.5 A
- 0.1% Line and load regulation
- Floating operation for high voltages
- Complete series of protections: current limiting, thermal shutdown and SOA control



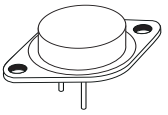
TO-220



TO-220FP



D^2PAK



TO-3

Description

The LM117/LM217/LM317 are monolithic integrated circuit in TO-220, TO-220FP, TO-3 and D^2PAK packages intended for use as positive adjustable voltage regulators.

They are designed to supply more than 1.5 A 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	**D^2PAK (tape and reel)**	**TO-220FP**	**TO-3**
			LM117K
LM217T	LM217D2T-TR		LM217K
LM317T	LM317D2T-TR	LM317P	LM317K

2 Maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter		Value	Unit
$V_I - V_O$	Input-reference differential voltage		40	V
I_O	Output current		Internally limited	
T_{OP}	Operating junction temperature for:	LM117	-55 to 150	°C
		LM217	-25 to 150	
		LM317	0 to 125	
P_D	Power dissipation		Internally limited	
T_{STG}	Storage temperature		-65 to 150	°C

Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Table 3. Thermal data

Symbol	Parameter	D^2PAK	TO-220	TO-220FP	TO-3	Unit
R_{thJC}	Thermal resistance junction-case	3	3	5	4	°C/W
R_{thJA}	Thermal resistance junction-ambient	62.5	50	60	35	°C/W

4 Electrical characteristics

Table 4. Electrical characteristics for LM117/LM217 (V_I - V_O = 5 V, I_O = 500 mA, I_{MAX} = 1.5 A and P_{MAX} = 20 W, T_J = -55 to 150°C for LM117, T_J = -25 to 150 °C for LM217, 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°C		0.01	0.02	%/V
					0.02	0.05	
ΔV_O	Load regulation	$V_O \leq 5$ V I_O = 10 mA to I_{MAX}	T_J = 25°C		5	15	mV
					20	50	
		$V_O \geq 5$ V, I_O = 10 mA to I_{MAX}	T_J = 25°C		0.1	0.3	%
					0.3	1	
I_{ADJ}	Adjustment pin current				50	100	µA
ΔI_{ADJ}	Adjustment pin current	V_I - V_O = 2.5 to 40V I_O = 10 mA to I_{MAX}			0.2	5	µA
V_{REF}	Reference voltage (between pin 3 and pin 1)	V_I - V_O = 2.5 to 40V I_O= 10 mA to I_{MAX} $P_D \leq P_{MAX}$		1.2	1.25	1.3	V
$\Delta V_O/V_O$	Output voltage temperature stability				1		%
$I_{O(min)}$	Minimum load current	V_I - V_O = 40 V			3.5	5	mA
$I_{O(max)}$	Maximum load current	V_I - $V_O \leq$15 V, $P_D < P_{MAX}$		1.5	2.2		A
		V_I - V_O = 40 V, $P_D < P_{MAX}$, T_J = 25°C			0.4		
eN	Output noise voltage (percentage of V_O)	B = 10Hz to 100kHz, T_J = 25°C			0.003		%
SVR	Supply voltage rejection (1)	T_J = 25°C, f = 120Hz	C_{ADJ}=0		65		dB
			C_{ADJ}=10µF	66	80		

1. C_{ADJ} is connected between pin 1 and ground.

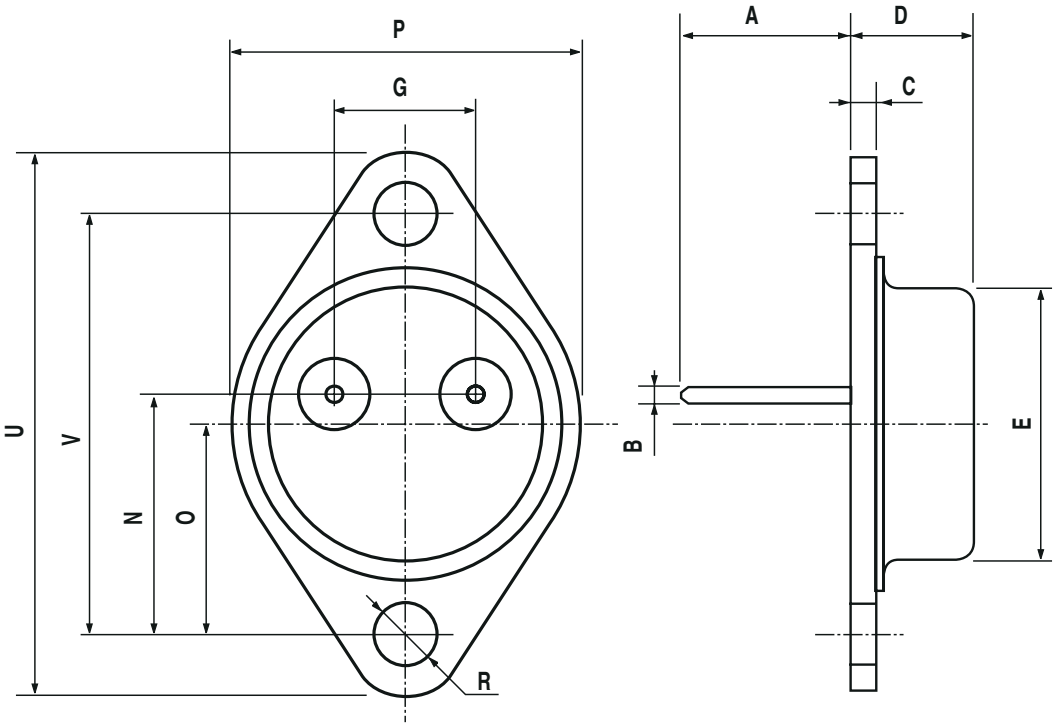
Table 5. Electrical characteristics for LM317 (V_I - V_O = 5 V, I_O = 500 mA, I_{MAX} = 1.5 A and P_{MAX} = 20 W, T_J = 0 to 125°C, unless otherwise specified)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
ΔV_O	Line regulation	V_I - V_O = 3 to 40 V	T_J = 25°C		0.01	0.04	%/V
					0.02	0.07	
ΔV_O	Load regulation	$V_O \leq$5 V I_O = 10 mA to I_{MAX}	T_J = 25°C		5	25	mV
					20	70	
		$V_O \geq$5 V, I_O = 10 mA to I_{MAX}	T_J = 25°C		0.1	0.5	%
					0.3	1.5	
I_{ADJ}	Adjustment pin current				50	100	µA
ΔI_{ADJ}	Adjustment pin current	V_I - V_O = 2.5 to 40V, I_O = 10 mA to 500mA			0.2	5	µA
V_{REF}	Reference voltage (between pin 3 and pin 1)	V_I - V_O = 2.5 to 40V I_O = 10 mA to 500mA $P_D \leq P_{MAX}$		1.2	1.25	1.3	V
$\Delta V_O/V_O$	Output voltage temperature stability				1		%
$I_{O(min)}$	Minimum load current	V_I - V_O = 40 V			3.5	10	mA
$I_{O(max)}$	Maximum load current	V_I - $V_O \leq$15 V, $P_D < P_{MAX}$		1.5	2.2		A
		V_I - V_O = 40 V, $P_D < P_{MAX}$, T_J = 25°C			0.4		
eN	Output noise voltage (percentage of V_O)	B = 10Hz to 100kHz, T_J = 25°C			0.003		%
SVR	Supply voltage rejection (1)	T_J = 25°C, f = 120Hz	C_{ADJ}=0		65		dB
			C_{ADJ}=10µF	66	80		

1. C_{ADJ} is connected between pin 1 and ground.

TO-3 mechanical data

Dim.	mm.			inch.		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		11.85			0.466	
B	0.96	1.05	1.10	0.037	0.041	0.043
C			1.70			0.066
D			8.7			0.342
E			20.0			0.787
G		10.9			0.429	
N		16.9			0.665	
P			26.2			1.031
R	3.88		4.09	0.152		0.161
U			39.5			1.555
V		30.10			1.185	



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