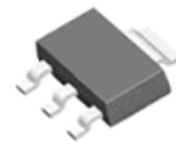


Adjustable Positive Voltage Regulator

General Description

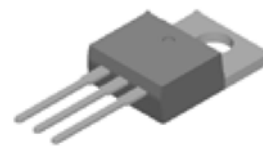
- The LM317 is an adjustable 3-terminal positive voltage regulator, designed to supply 1A of output current with voltage adjustable from 1.3V ~ 37V.
- The LM317 is available in SOT-223, D-PACK, TO-220 and D2-PACK packages.



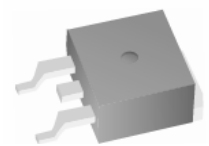
SOT-223



D-PACK
(TO-252)



TO-220



D2-PACK
(TO-263)

Features

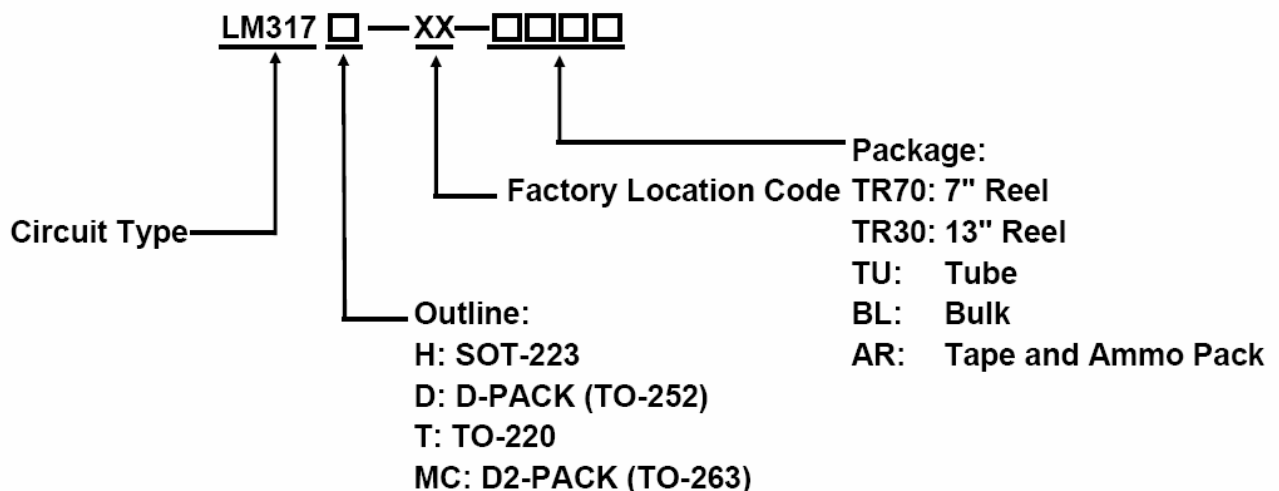
- Output Voltage adjustable from 1.3V ~ 37V
- Output current in excess of 1A
- Internal short circuit protection
- Internal over temperature protection
- Output transistors safe area compensation
- RoHS Compliance

Applications

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD Player
- Network Interface Card/Switch
- Telecom Equipment
- Printer and other Peripheral Equipment



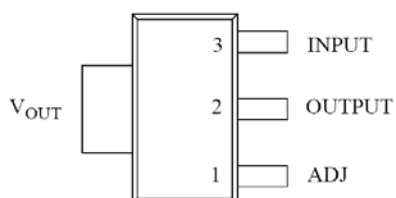
Ordering Information



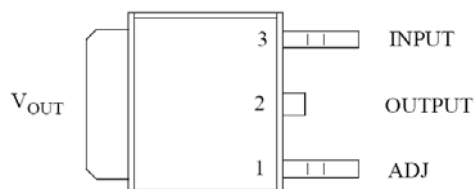
Adjustable Positive Voltage Regulator

LM317

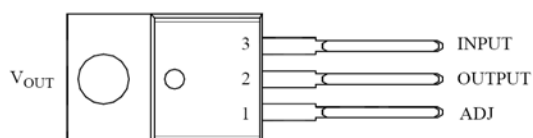
Pin Configuration



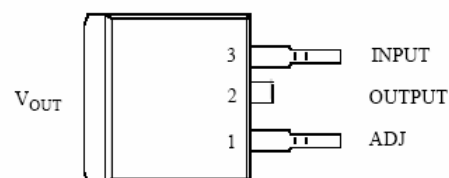
**Outline: H
SOT-223**



**Outline: D
D-PACK (TO-252)**

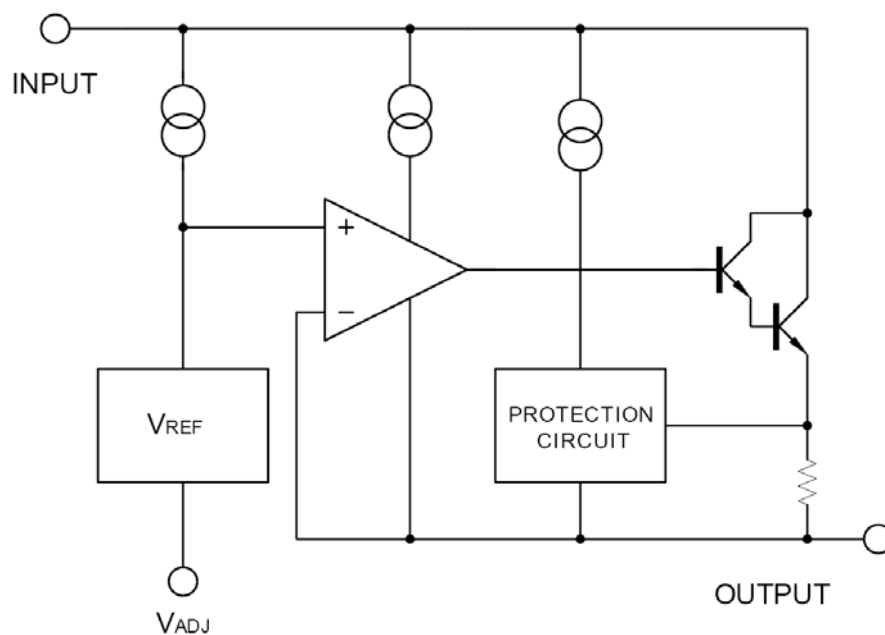


**Outline: T
TO-220**



**Outline: MC
D2-PACK (TO-263)**

Block Diagram



Adjustable Positive Voltage Regulator

LM317

Absolute Maximum Ratings (Ta=25° C, unless otherwise specified)

Symbol	Description	Ratings	Unit	
V _{IN-V_{OUT}}	Input - Output Voltage Differential	40	V	
I _O	Max. Output Current	1.0	A	
T _J	Operating Junction Temperature	125	° C	
T _{OPR}	Operating Temperature Range	-40 ~ 85	° C	
T _{STG}	Storage Temperature Range	-40 ~ 150	° C	
P _D	Power Dissipation	Internal limited	mW	
R _{thJC}	Thermal Resistance Junction-Case	T: TO-220	5	° C/W
		MC: D2-PACK (TO-263)	5	
		D: D-PACK (TO-252)	12	
		H: SOT-223	23	
R _{thJA}	Thermal Resistance Junction-Ambient	T: TO-220	54	° C/W
		MC: D2-PACK (TO-263)	64	
		D: D-PACK (TO-252)	112	
		H: SOT-223	165	

Note: Absolute maximum ratings are stress ratings only and functional device operation is not implied. The device could be damaged beyond Absolute maximum ratings.

Electrical Characteristics

(V_{IN-V_{OUT}}=5V, I_{OUT}=10mA, T_A=25°C, unless otherwise specified)

Symbol	Description	LM317			Unit	Conditions
		Min.	Typ.	Max.		
ΔV _{OUT} /V _{OUT}	Line Regulation	-	0.01	0.04	%/V	3V ≤ V _{IN-V_{OUT}} ≤ 40V
ΔV _{OUT}	Load Regulation	-	5	25	mV	10mA ≤ I _{OUT} ≤ 1A, V _{OUT} ≤ 5V
		-	0.1	0.5	mV	10mA ≤ I _{OUT} ≤ 1A, V _{OUT} ≥ 5V
I _{ADJ}	Adjustable Pin Current	-	50	100	μA	-
ΔI _{ADJ}	Adjustable Pin Current Change	-	0.2	5	μA	3V ≤ V _{IN-V_{OUT}} ≤ 40V, 10mA ≤ I _{OUT} ≤ 1A, P _D ≤ 20W
V _{REF}	Reference Input Voltage	1.20	1.25	1.30	V	3V ≤ V _{IN-V_{OUT}} ≤ 40V, 10mA ≤ I _{OUT} ≤ 1A, P _D ≤ 20W
-	Temperature Stability	-	0.7	-	%/V _{OUT}	T _{MIN} ≤ T _J ≤ T _{MAX}

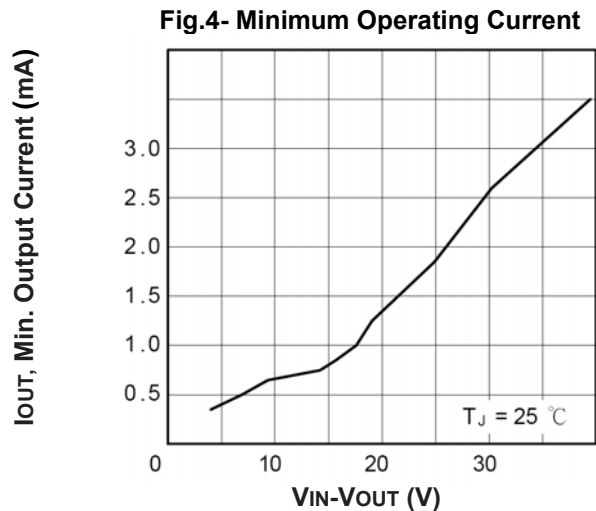
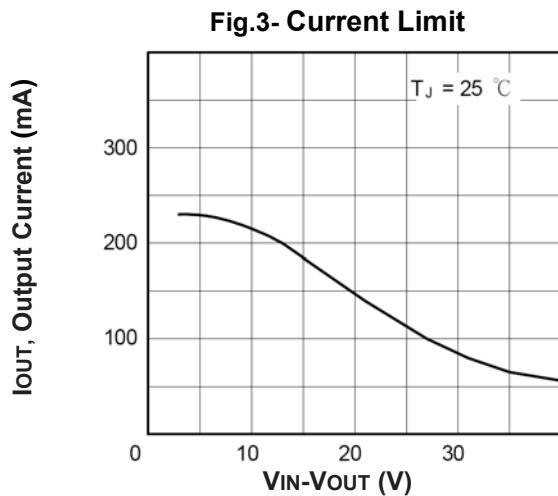
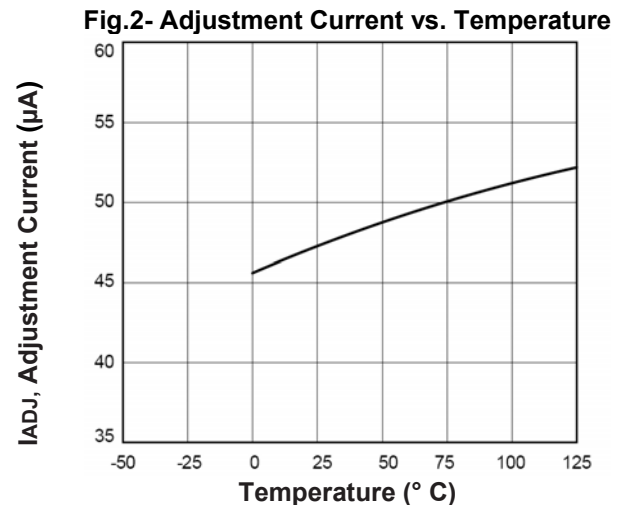
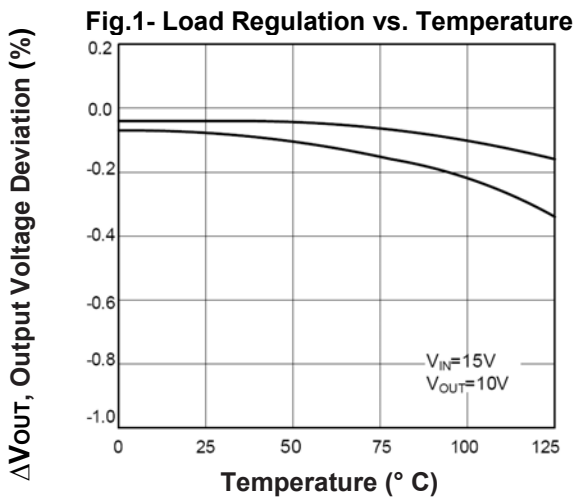
Adjustable Positive Voltage Regulator

LM317

Symbol	Description	LM317			Unit	Conditions	
		Min.	Typ.	Max.			
$I_{L(MIN)}$	Minimum Load Current for Regulation	-	3.5	10	mA	$V_{IN}-V_{OUT}=40V$	
$I_{O(MAX)}$	Maximum Output Current	0.3	0.4	-	A	$V_{IN}-V_{OUT}=40V, P_D \leq 20W$	
eN	RMS Noise vs. % of V_{OUT}	-	0.003	-	%/ V_{OUT}	$10Hz \leq f \leq 10KHz$	
RR	Ripple Rejection	$C_{ADJ}=0$	-	65	-	dB	$V_{OUT}=10V, f=120Hz$
		$C_{ADJ}=10\mu F$	66	80	-		

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

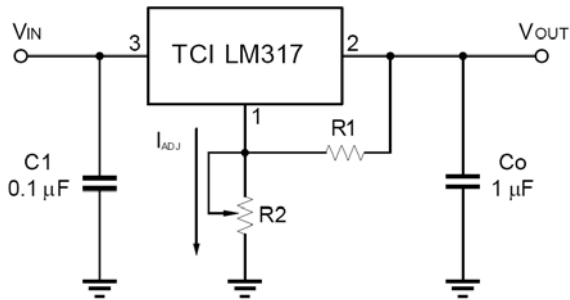
Typical Characteristics Curves



Adjustable Positive Voltage Regulator

LM317

Typical Application



$V_{OUT} = 1.25V * (1 + R2/R1) + I_{ADJ} * R2$
 C 1 is required when regulator is an appreciated distance from pow supply . Co is needed to improve transient response .

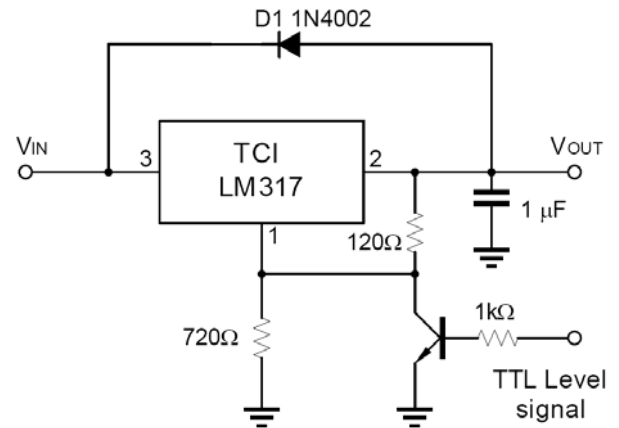


Fig.5-Programmable Voltage Regulator

Fig.6- Regulator with On-off Control

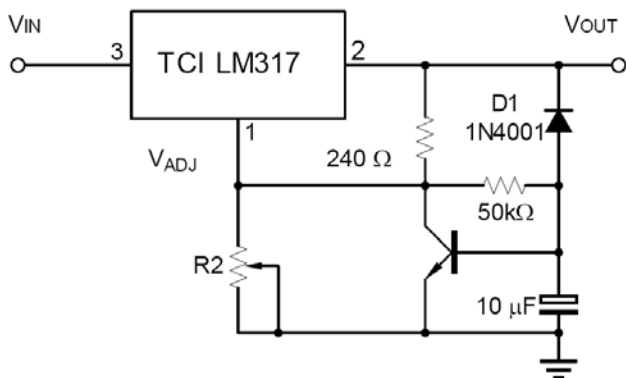
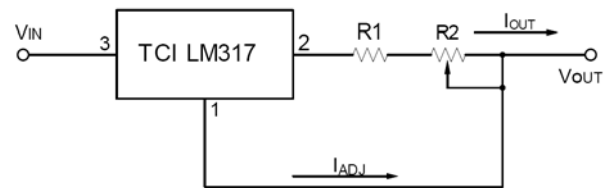


Fig.7- Soft Start Application



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

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

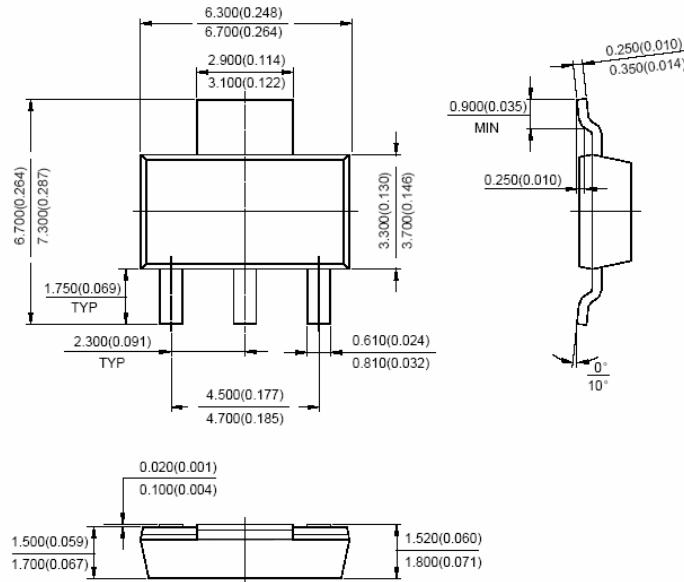
5mA < I_{OUT} < 100mA

Fig.8- Constant Current Application

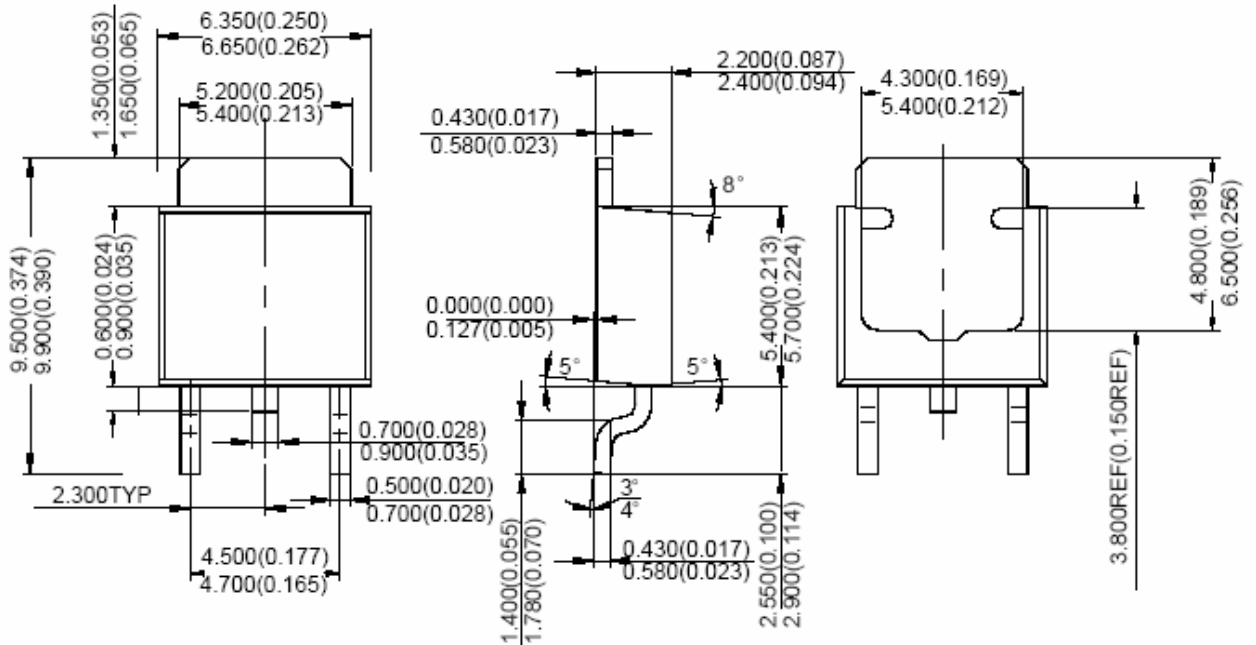
Adjustable Positive Voltage Regulator

LM317

Dimensions in inches (mm)



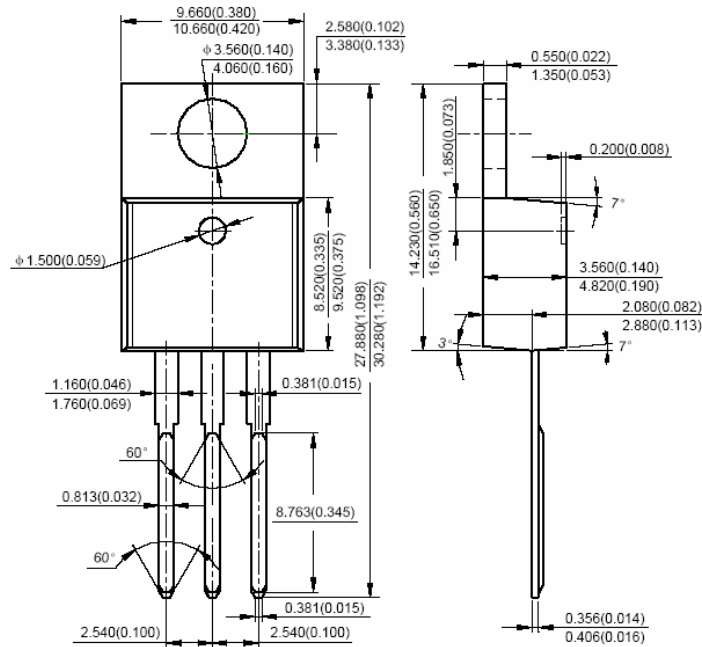
SOT-223



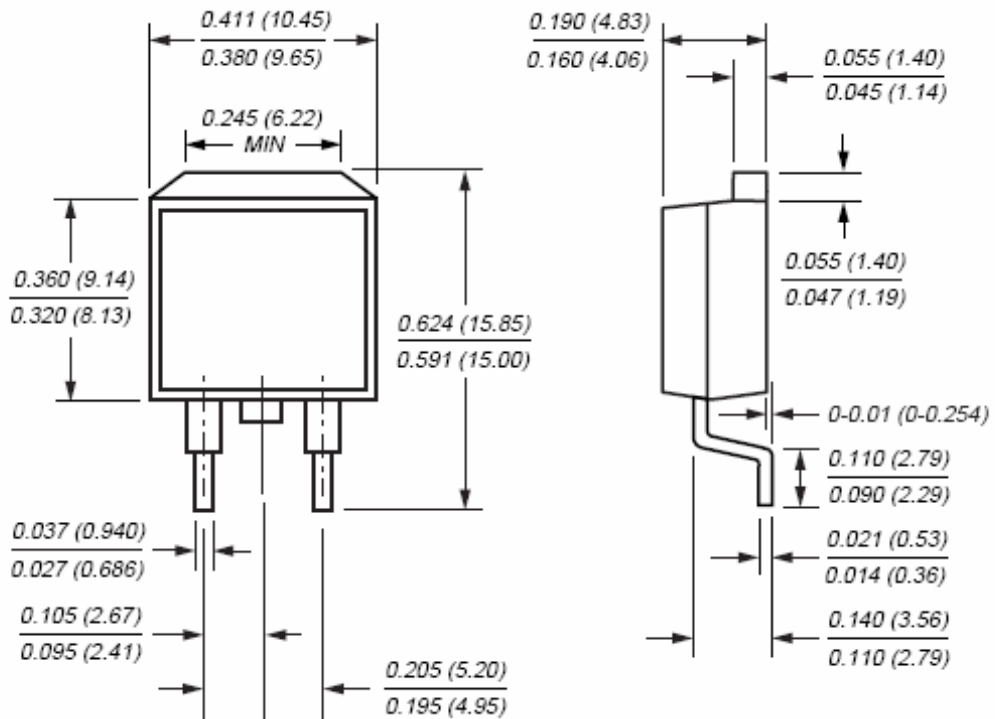
D-PACK
(TO-252)

Adjustable Positive Voltage Regulator

LM317



TO-220



D2-PACK
(TO-263)

Adjustable Positive Voltage Regulator

LM317

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