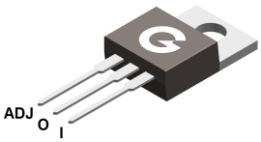
Adjustable Voltage Regulators

LM317 LM317D LM317R

Features

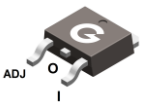
- Output voltage adjustable from 1.3V ~ 37V
- Output current in excess of
  LM317: 1.5A; LM317D: 1A; LM317R: 0.8A
- Internal short circuit protection
- Internal over temperature protection
- Output transistor safe area compensation
- RoHS compliant with Halogen-free

HF



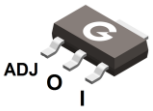
LM317

TO-220AB



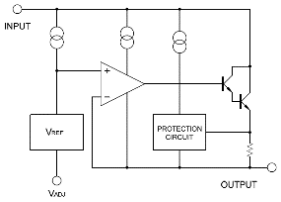
LM317D

TO-252



LM317R

SOT-223



Mechanical Data

- Case: TO-220AB, TO-252, SOT-223
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
LM317	TO-220AB	50 pcs / Tube	LM317
LM317D	TO-252	80 pcs / Tube or 2500 pcs / Tape & Reel	LM317
LM317R	SOT-223	4000 pcs / Tape & Reel	LM317

Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Input - Output Differential Voltage	V_{IN}- V_{OUT}	40	V

Thermal Characteristics

Parameter		Symbol	Value	Unit
Power Dissipation (T_A = 25°C)	TO-220AB	P_D	1.54	W
	TO-252		0.89	W
	SOT-223		0.61	W
Thermal Resistance Junction-to-Air	TO-220AB	$R_{\theta JA}$	65	°C/W
	TO-252		112	°C/W
	SOT-223		165	°C/W
Thermal Resistance Junction-to-Case	TO-220AB	$R_{\theta JC}$	5	°C/W
	TO-252		12	°C/W
	SOT-223		23	°C/W
Operating Virtual Junction Temperature		T_J	150	°C
Operating Temperature Range		T_{OPR}	-40 ~ +125	°C
Storage Temperature Range		T_{STG}	-65 ~ +150	°C

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Line Regulation	$\Delta V_{OUT}/ V_{OUT}$	3V ≤ V_{IN}-V_{OUT} ≤ 40V	-	-	0.04	%/V
Load Regulation	ΔV_{OUT}	10mA ≤ I_{OUT} ≤ 1A, V_{OUT} ≤ 5V	-	-	25	mV
		10mA ≤ I_{OUT} ≤ 1A, V_{OUT} ≥5V	-	-	0.5	%
Adjustable Pin Current	I_{ADJ}		-	-	100	μA
Adjustable Pin Current Change	ΔI_{ADJ}	3V ≤ V_{IN}-V_{OUT} ≤ 40V 10mA ≤ I_{OUT} ≤ 1A, P_D ≤ 20W	-	-	5	μA
Reference Voltage	V_{REF}	3V ≤ V_{IN}-V_{OUT} ≤ 40V 10mA ≤ I_{OUT} ≤ 1A, P_D ≤ 20W	1.20	1.25	1.30	V
Temperature Stability		T_{MIN} ≤ T_J ≤ T_{MAX}	-	0.7	-	%/VOUT
Minimum Load Current for Regulation	$I_{L(MIN)}$	V_{IN}-V_{OUT} = 40V	-	-	10	mA
Maximum Output Current	$I_{O(MAX)}$	V_{IN}-V_{OUT} = 40V, P_D ≤ 20W	0.2	-	-	A

Ratings and Characteristics Curves (@ T_A = 25°C unless otherwise specified)

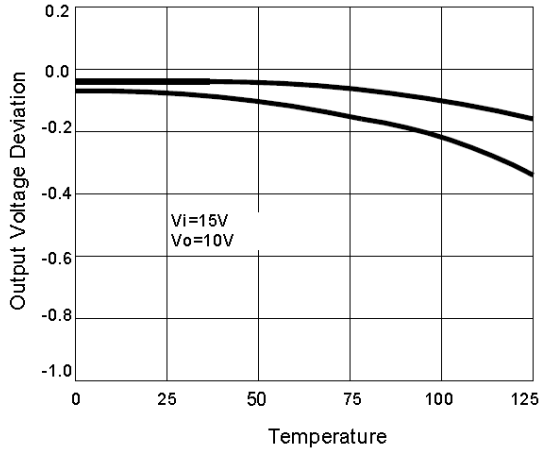


Fig 1 Load Regulation vs Temperature

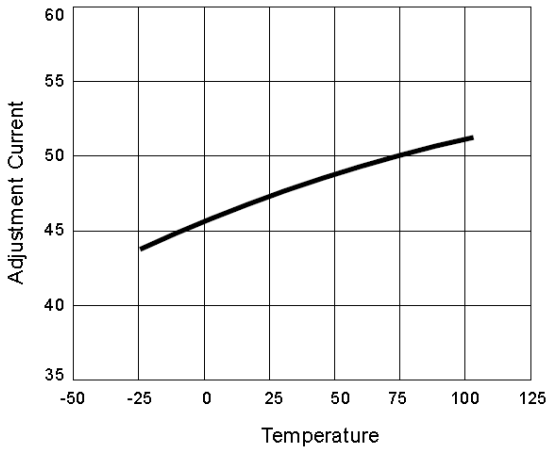


Fig 2 Adjustment Current vs Temperature

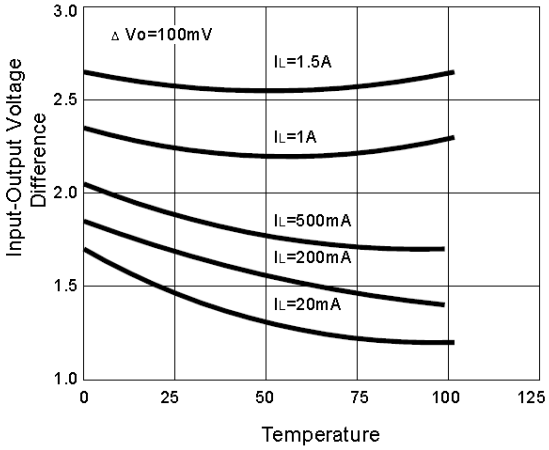


Fig 3 Dropout Voltage vs Input-Output Voltage Difference

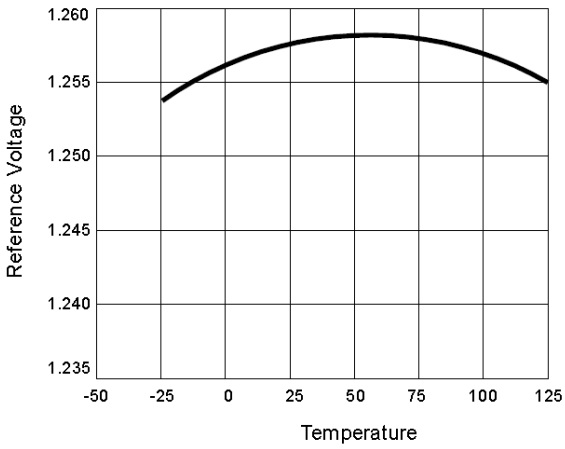
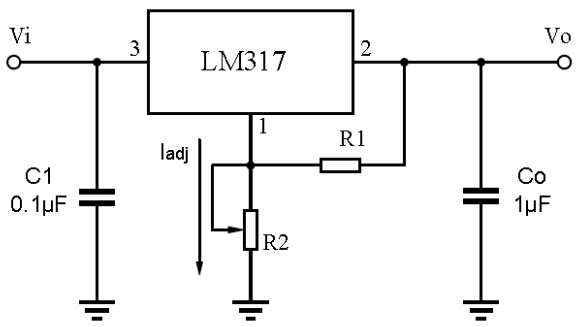


Fig 4 Reference Voltage vs Temperature



Vo = 1.25V*(1+R2/R1)+Iadj*R2

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

Fig 5 Programmable voltage regulator

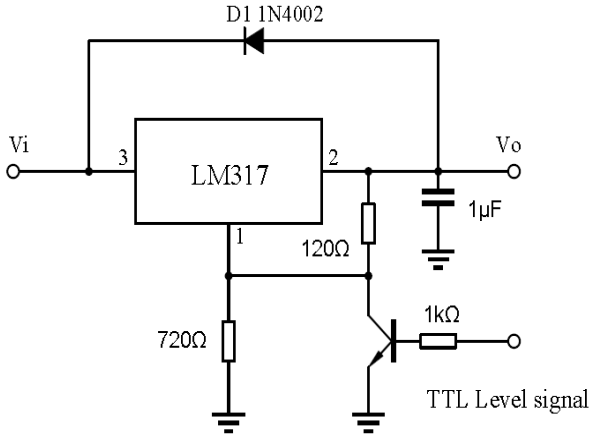


Fig 6 Regulator with On-off control

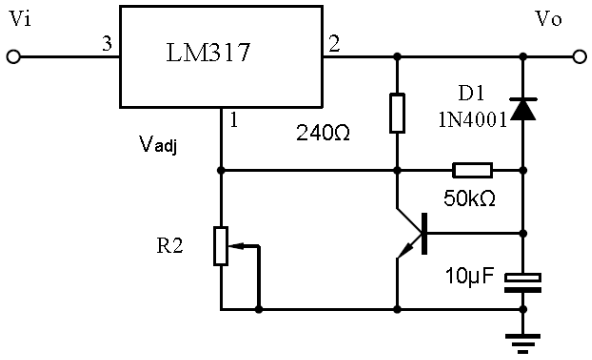


Fig 7 Soft start application

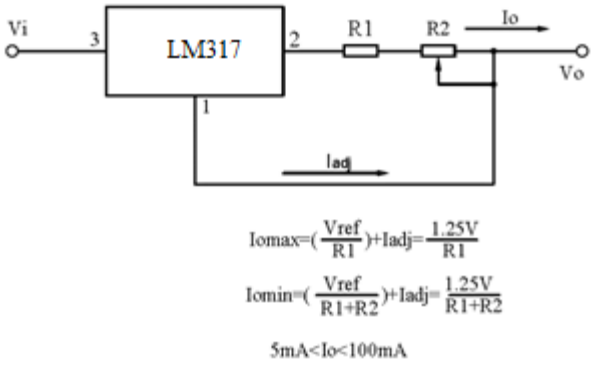
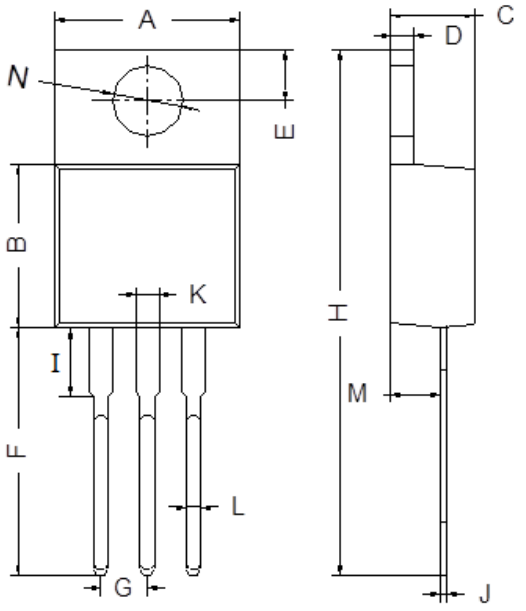
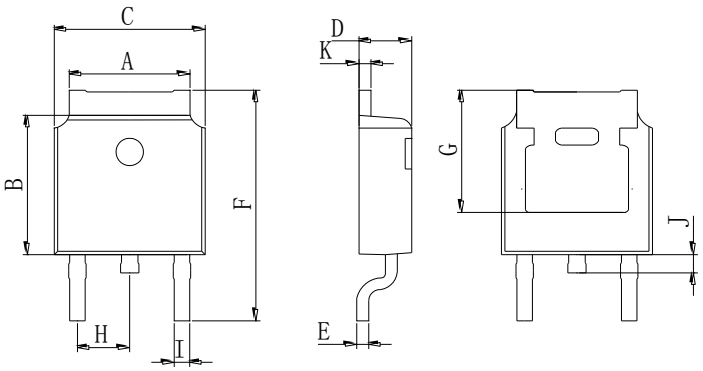


Fig 8 Constant current application

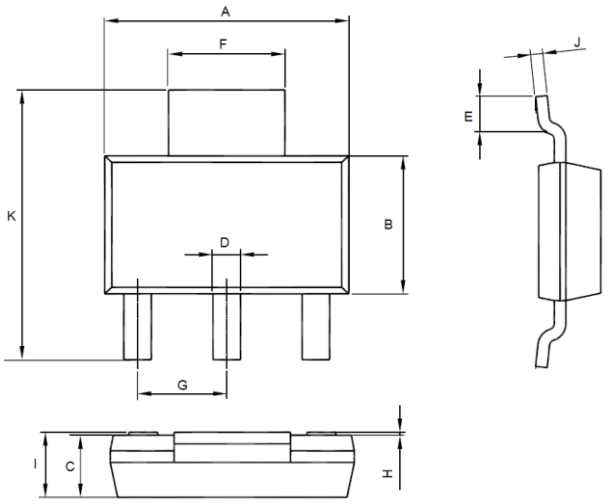
Package Outline Dimensions (Unit: mm)



TO-220AB		
Dimension	**Min.**	**Max.**
A	9.80	10.30
B	8.70	9.10
C	4.37	4.77
D	1.07	1.47
E	2.64	2.84
F	13.14	13.74
G	2.44	2.64
H	28.03	28.83
I	3.50	4.00
J	0.28	0.48
K	1.22	1.32
L	0.71	0.91
M	2.40	2.60
N	3.76	3.96



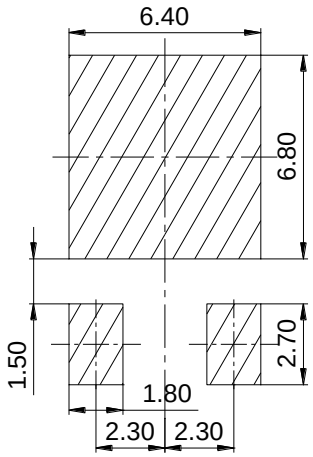
TO-252		
Dimension	**Min.**	**Max.**
A	5.05	5.65
B	5.80	6.40
C	6.25	6.85
D	2.20	2.40
E	0.40	0.60
F	9.71	10.31
G	5.05	5.65
H	2.10	2.50
I	0.70	0.90
J	0.50	0.70
K	0.40	0.60



SOT-223		
Dimension	**Min.**	**Max.**
A	6.10	6.50
B	3.30	3.70
C	1.50	1.70
D	0.66	0.82
E	0.90	1.15
F	2.90	3.10
G	2.20	2.40
H	0.02	0.10
I	1.52	1.80
J	0.20	0.40
K	6.70	7.30

Mounting Pad Layout (Unit: mm)

TO-252



SOT-223