

DESCRIPTION

The AMC317 series is a 3-terminal adjustable regulator featuring output current of typical 1.2A over a wide output range from 1.2V to 20V. Only two external resistors are required to set the output voltage. This feature provides better line and load regulation than fixed regulators.

Also, the AMC317 series offers full overload protection, current limit, and thermal protection features. In most applications, no capacitor is required for the AMC317. However, if the device is located far from the input filter capacitor, then an input bypass will be required. Also, in order to improve the transient response, an output capacitor is recommended.

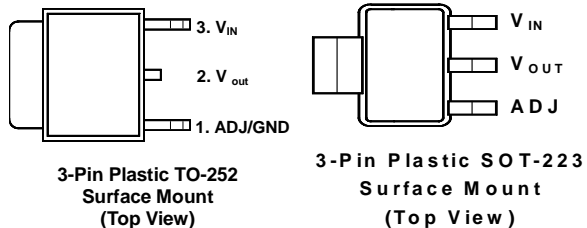
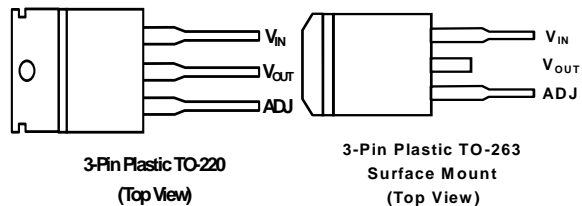
FEATURES

- **Output current capability of 1.2A**
- **Wide output voltage range – adjustable from 1.2V to 20V**
- **Ripple rejection typically 80 dB**
- **Typically 0.1% load regulation**
- **Built-in over current, over temperature and overload protection.**
- **Internal thermal overload protection**
- **Available in 3-Lead TO-220, and surface mount 3-Lead TO-263.**
- **Identical pin assignment to earlier LM317 series.**

APPLICATIONS

- Voltage Regulators
- Power Supplies
- Current Regulators
- Switching Regulators
- Current Limiter
- Constant Current Battery Charger
- Current Limited Charger

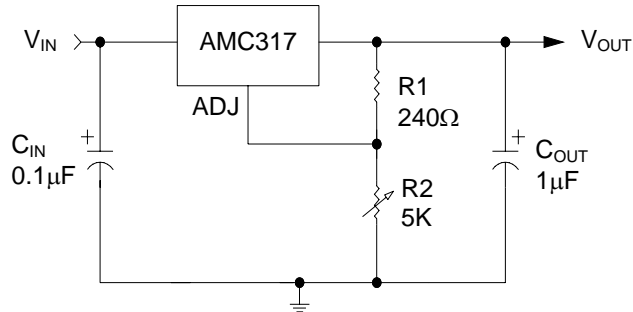
PACKAGE PIN OUT



ORDER INFORMATION

T _A (°C)	T	Plastic TO-220 3-pin	ST	Plastic TO-263 3-pin	SJ	Plastic TO-252 3-pin	SK	Plastic SOT-223 3-pin
	0 to 70		AMC317T		AMC317ST		AMC317SJ	
0 to 70		AMC317TF (Lead Free)		AMC317STF (Lead Free)		AMC317SJF (Lead Free)		AMC317SKF (Lead Free)

Note: 1.All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number (i.e. AMC317STT).
 2.The letter "F" is marked for Lead Free process.

TYPICAL APPLICATION


Note 1: C_{IN} is required if the regulator is far from the filter capacitor.

Note 2: C_{OUT} is recommended to improve the transient response.

Note 3: $V_{OUT} = 1.25V \left(1 + \frac{R2}{R1} \right) + I_{ADJ}(R2)$

ABSOLUTE MAXIMUM RATINGS (Note 1)

Input-Output Differential Voltage V_D	20V
Operating Junction temperature	
Plastic (T, ST Package)	150°C
Storage Temperature Range	-65°C to 150°C
Lead temperature (Soldering, 10 seconds)	300°C

Note 1: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

THERMAL DATA
T, ST PACKAGE:

Thermal Resistance-Junction to Tab, θ_{JT}	3.0°C/W
Thermal Resistance-Junction to Ambient, θ_{JA}	45°C/W
Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.	
The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system.	
All of the above assume no ambient airflow.	

Maximum Power Calculation:

$$P_{D(MAX)} = \frac{T_{J(MAX)} - T_{A(MAX)}}{\theta_{JA}}$$

T_J (°C): Maximum recommended junction temperature

T_A (°C): Ambient temperature of the application

θ_{JA} (°C/W): Junction-to-junction temperature thermal resistance of the package, and other heat dissipating materials.

The maximum power dissipation for a single-output regulator is :

$$P_{D(MAX)} = [(V_{IN(MAX)} - V_{OUT(NOM)}) \times I_{OUT(NOM)}] + V_{IN(MAX)} \times I_Q$$

Where: $V_{OUT(NOM)}$ = the nominal output voltage

$I_{OUT(NOM)}$ = the nominal output current, and

I_Q = the quiescent current the regulator consumes at $I_{OUT(MAX)}$

$V_{IN(MAX)}$ = the maximum input voltage

$$\text{Then } \theta_{JA} = (150^\circ\text{C} - T_A) / P_D$$

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Recommended Operating			Units
		Min.	Typ.	Max.	
Input-Output differential Voltage	V_D	3		20	V
Load Current (with adequate heatsinking)	I_o	10		1200	mA
Input Capacitor (V_{IN} to GND)			0.1		μ F
Output Capacitor with ESR of 10 Ω max., (V_{OUT} to GND)			1.0		μ F

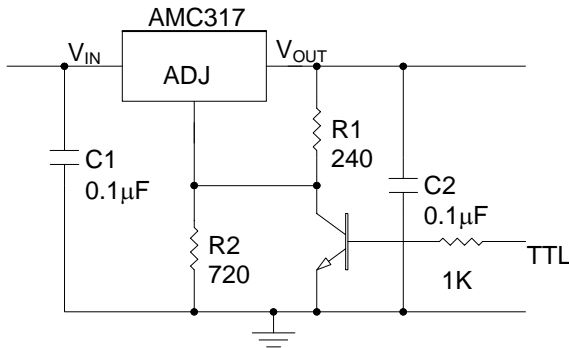
ELECTRICAL CHARACTERISTICS

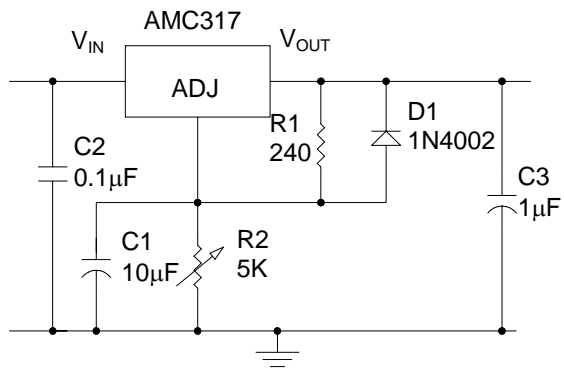
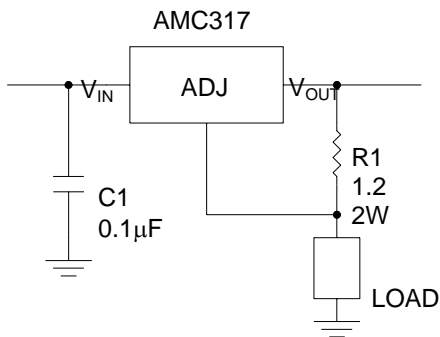
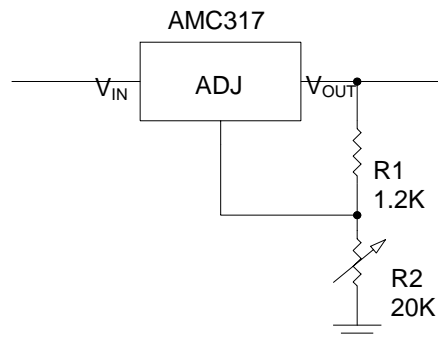
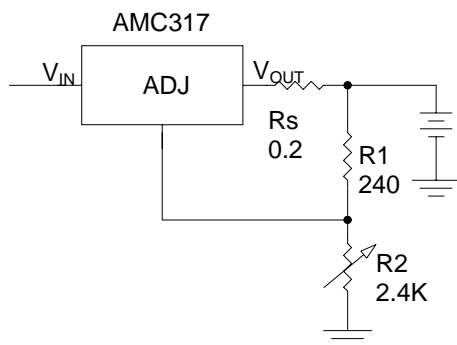
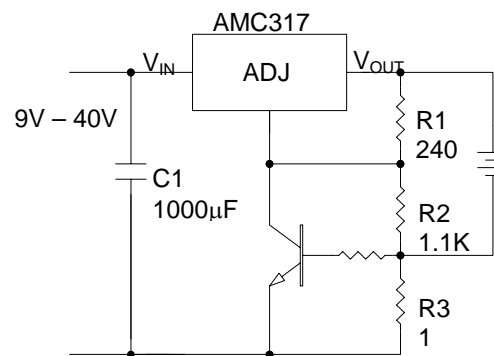
Unless otherwise specified, these specifications in **bold type** apply over the operating ambient temperature of 0°C to +70°C, $V_{IN} - V_{OUT} = 5V$, $I_{OUT} = 10mA$, $C_{IN} = 0.1\mu F$, $C_{OUT} = 1.0\mu F$, and are for DC characteristics only. (Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

Parameter	Symbol	Test Conditions	AMC317			Units
			Min.	Typ.	Max.	
Reference Voltage	V_{REF}	$3V \leq V_{IN} - V_{OUT} \leq 20V$, $10mA \leq I_{OUT} \leq 1.2A$, $P \leq 15W$	1.20	1.25	1.30	V
Line Regulation (see note 2)	ΔV_{OI}	$3V \leq V_{IN} - V_{OUT} \leq 20V$, $T_J = 25^\circ C$		0.01	0.04	% / V
		$3V \leq V_{IN} - V_{OUT} \leq 20V$		0.02	0.07	
Load regulation	ΔV_{OL}	$10mA \leq I_{OUT} \leq 1.2A$, $T_J = 25^\circ C$		0.1	0.5	%
		$10mA \leq I_{OUT} \leq 1.2A$		0.3	1.5	
Minimum Load Current	$I_{OUT(MIN)}$	$V_{IN} - V_{OUT} \leq 20V$		3.5	10	mA
Adjustment Pin Current	I_{ADJ}			50	100	μ A
Adjustment Pin Current Change	ΔI_{ADJ}	$3V \leq V_{IN} - V_{OUT} \leq 20V$ $10mA \leq I_{OUT} \leq 1.2A$		0.2	5.0	μ A
Current Limit	I_{CL}	$(V_{IN} - V_{OUT}) \leq 10V$	1.2	2.2	3.4	A
		$(V_{IN} - V_{OUT}) \leq 15V$	0.8	1.1		
		$(V_{IN} - V_{OUT}) = 20V$	0.15	0.4		
Ripple Rejection Ratio (Note 3)	R_R	$V_{OUT} = 10V$, $f = 120Hz$		65		dB
		$V_{OUT} = 10V$, $f = 120Hz$, 10 μ F capacitor between ADJ and GND	66	80		
Output Noise Voltage (Note 3)	V_{ORMS}	$10Hz \leq f \leq 10KHz$, $T_J = 25^\circ C$		0.003		%
Long Term Stability (Note 3)		$T_J = 125^\circ C$, and $V_{IN} - V_{OUT} = 20V$		0.3	1	% / 1000hr
Temperature Stability (Note 3)	$\Delta V_{O(Temp)}$	$T_{MIN} \leq T_J \leq T_{MAX}$		1		%

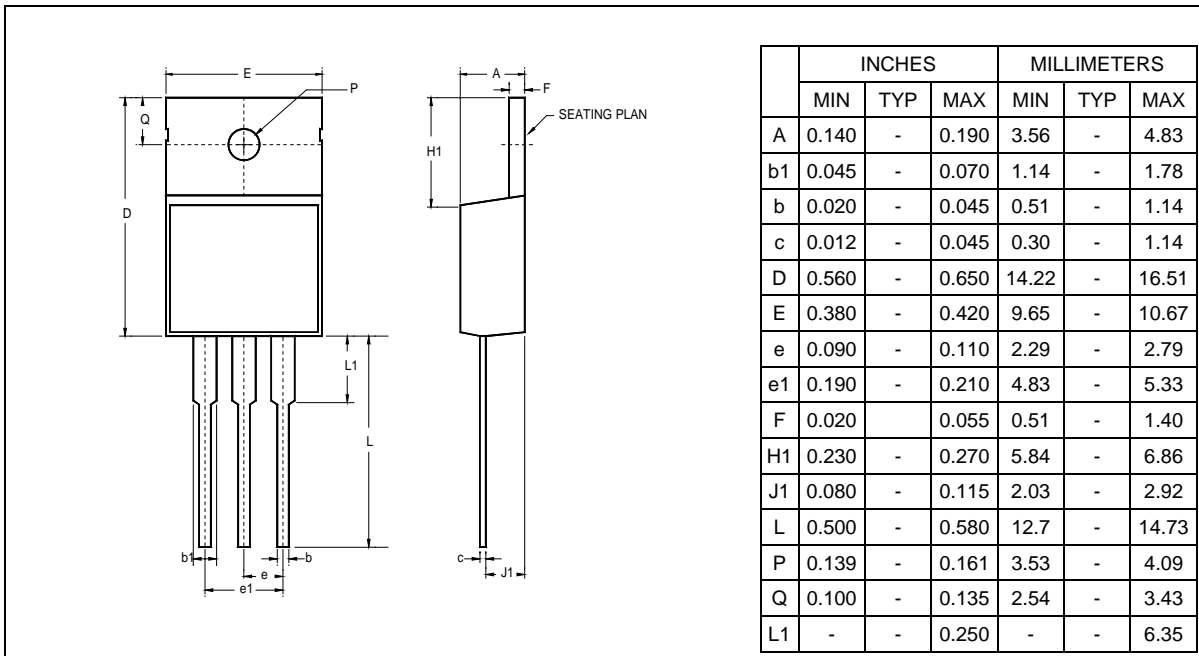
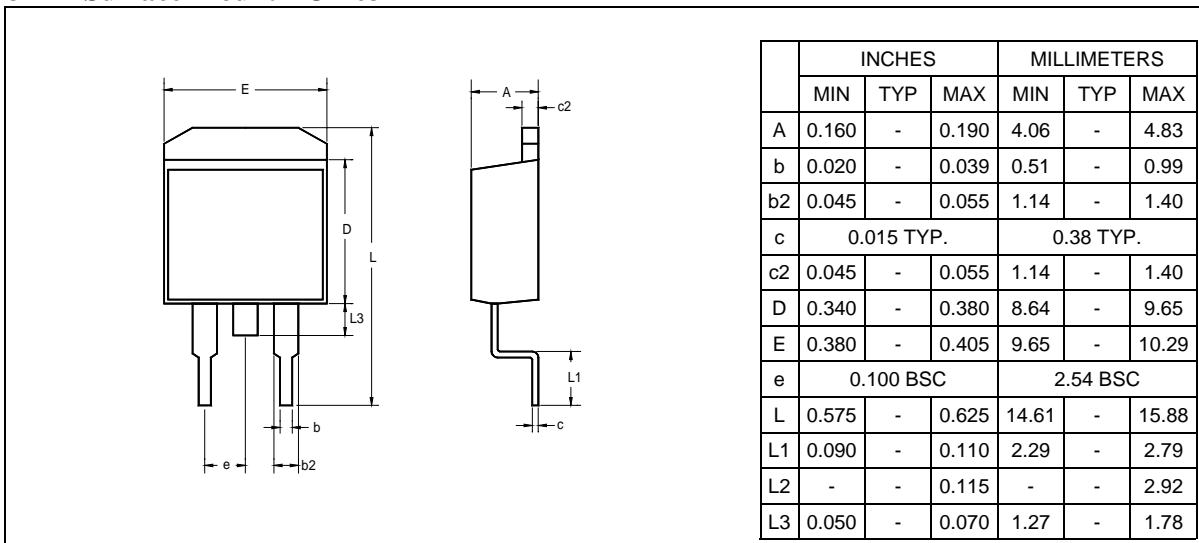
Note 2: Line regulation is defined as the percentage change in output voltage every 1V change at the input

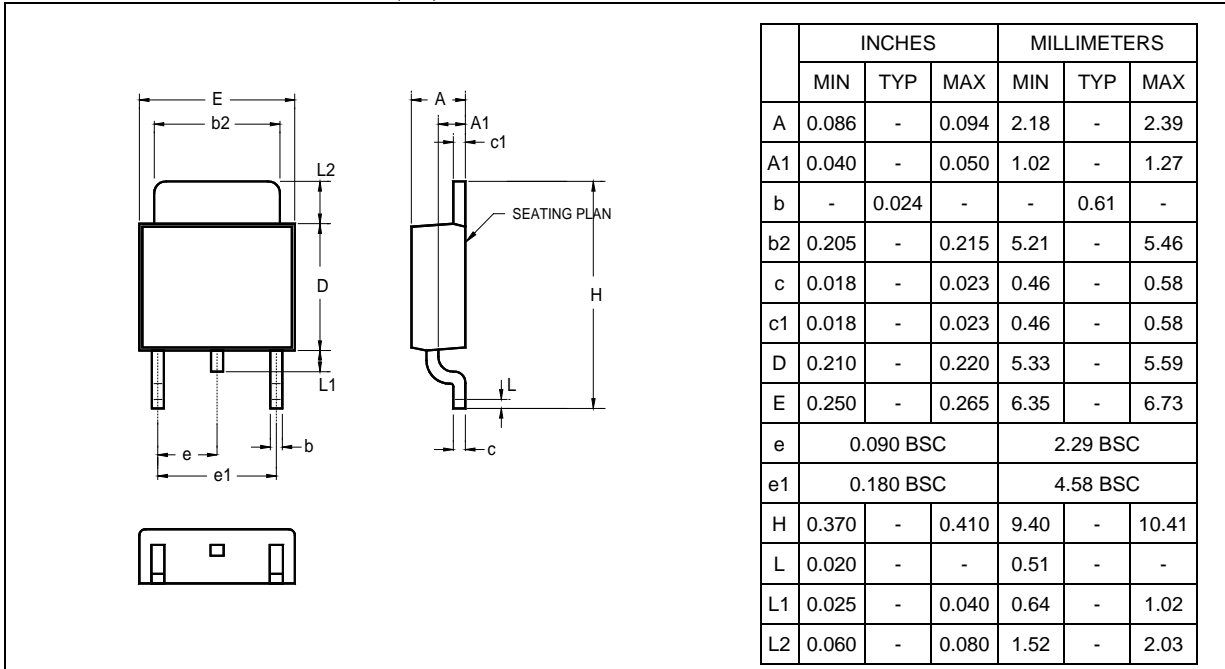
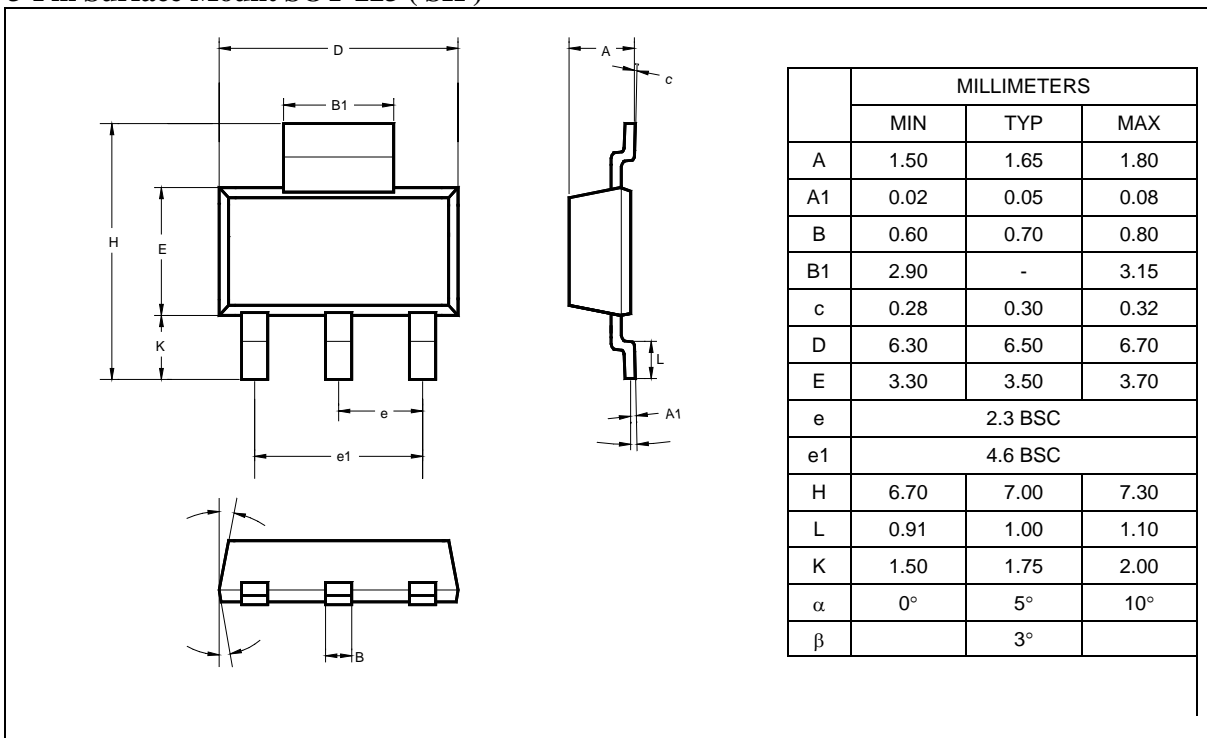
Note 3: These parameters, although guaranteed, are not tested in production prior to shipment

TYPICAL APPLICATIONS

5V Logic Regulator with Shutdown

 (Minimum output $\approx 1.2V$)

Adjustable Regulator with Improved Ripple Rejection

1A Current Regulator

1.2V - 20V Regulator with Minimum Current ($\approx 4\text{ mA}$)

12V Battery Charger

Current Limited 6V Charger

(Peak Current = 0.6A with 1Ω resistor)

PACKAGE
3-Pin Plastic TO-220

3-Pin Surface Mount TO-263


3-Pin Surface Mount TO-252 (SJ)

3-Pin Surface Mount SOT-223 (SK)


IMPORTANT NOTICE

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