

GS317

3-Terminal Adjustable Regulator

Product Description

The GS317 are adjustable 3-terminal positive voltage regulators capable of supplying in excess of 1.5A over a 3V to 40V output range. They are exceptionally easy to use and require only two external resistors to set the output voltage. Further, both line and load regulation is better than standard fixed regulators.

In addition to higher performance than fixed regulators, the GS317 series offers full overload protection available only in IC's. Included on the chip are current limit, thermal overload protection and safe area protection.

All overload protection circuitry remains fully functional even if the adjustment terminal is disconnected. Normally, no capacitors are needed unless the device is situated far from the input filter capacitor in which case an input bypass is needed. An optional output capacitor can be added to improve transient response.

The primary applications of each of these regulators is that of a programmable output regulator, but by connecting a fixed resistor between the adjustment terminal and the output terminal, each device can be used as a precision current regulator.

Even though the regulator is "floating" and sees only input-to-output differential voltage, use of these devices to regulate output voltage that would cause the maximum-rated differential voltage to be exceeded if the output became shorted to ground is not recommended.

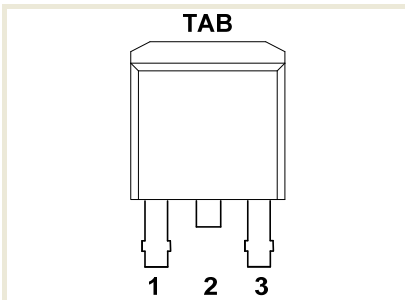
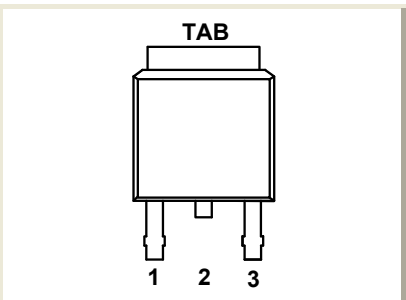
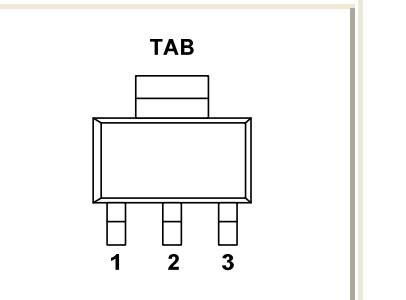
Features

- Output Voltage Range Adjustable from 1.2V to 37V
- Output Current Capability of 1.5A Max
- 1% Output Voltage Tolerance
- Guaranteed max. 0.01% line regulation
- Guaranteed max. 0.1% load regulation
- Current limit constant with temperature
- 80dB Ripple Rejection

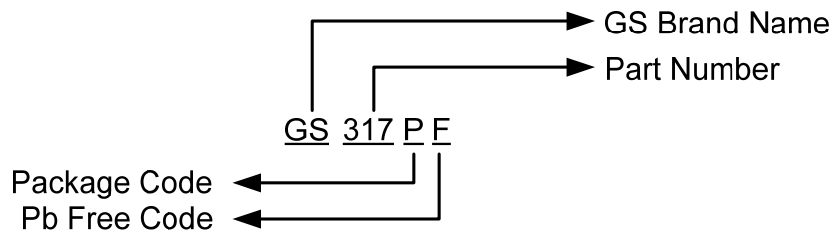
Applications

- High Efficiency Linear Regulators
- Post Regulators for Switching Supplies
- 5V to 3.3V Linear Regulator
- Battery Chargers
- Active SCSI Terminators
- Power Management for Note Book
- Battery Powered Instrumentation

Packages & Pin Assignments

GS317M (TO-263)		GS317D (TO-252)		GS317X (SOT-223)	
					
1	ADJ	1	ADJ	1	ADJ
2	V _{OUT}	2	V _{OUT}	2	V _{OUT}
3	V _{IN}	3	V _{IN}	3	V _{IN}

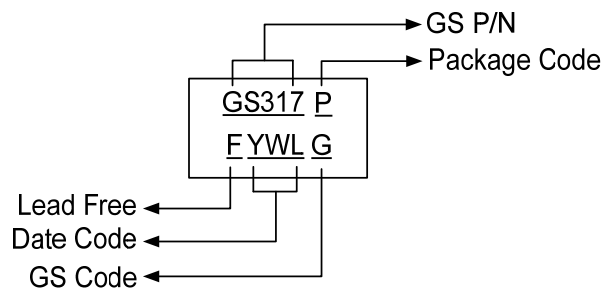
Ordering Information



Device Pack	Package
GS317MF	TO-263
GS317DF	TO-252
GS317XF	SOT-223

*Request for other voltages, please contact factory directly.

Marking Information



Absolute Maximum Ratings

Symbol	Parameter	Maximum Ratings		Units
V_{IN} Input	Voltage	40		V
I_{OUT} Output	Current	1.5		A
θ_{JC}	Thermal Resistance (Junction to Case)	TO-263	5	$^{\circ}\text{C/W}$
		TO-252	10	
		SOT-223	23.5	
θ_{JA}	Thermal Resistance (Junction to Ambient)	TO-263	50	$^{\circ}\text{C/W}$
		TO-252	83	
		SOT-223 1	11	
P_D	Power Dissipation (Internal Limited)	TO-263	2	W
		TO-252	1.2	
		SOT-223	0.9	
T_J Operating	Junction Temperature	-40 to 125		$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-65 to 150		$^{\circ}\text{C}$
T_{LEAD}	Lead Temperature (Soldering 10sec)	260		$^{\circ}\text{C}$

Caution: Stress above the listed absolute maximum rating may cause permanent damage to the device

Electrical Characteristics

$I_{OUT} = 0$ mA, and $T_J = +25^\circ\text{C}$, unless otherwise noted.

Parameter	Conditions	Min	Typ	Max	Units
Reference Voltage (output to ADJ)	$V_{IN}-V_{OUT}=3\text{V to }40\text{V}$, $I_{OUT}=10\text{mA to }1.5\text{A}$, $P \leq 15\text{W}$	1.2	1.25	1.3	V
Input Regulation(Note 2)	$3\text{V}(V_{IN}-V_{OUT})40\text{V}$, (Note 3)	$T_J = \text{Min to Max}$	0.01	0.04	%V
		$I_{OUT} = 10\text{mA to }1.5\text{A}$	0.02	0.07	
Ripple Rejection	$V_{OUT} = 10\text{V}$, $f=120\text{Hz}$		65		dB
	$V_{OUT} = 10\text{V}$, $f=120\text{Hz}$ 10uF Capacitor between ADJ and Ground	66 80			
Output Regulation	$I_{OUT} = 10\text{mA to }1.5\text{A}$ $T_J=25^\circ\text{C}$ (Note 3)	$V_{OUT} \leq 5\text{V}$	5	25	mV
		$V_{OUT} > 5\text{V}$	0.1	0.5	%
	$I_{OUT} = 10\text{mA to }1.5\text{A}$ (Note 3)	$V_{OUT} \leq 5\text{V}$	20	70	mV
		$V_{OUT} > 5\text{V}$	0.3	1.5	%
Output Voltage Change with temperature	$T_J = \text{Min to Max}$		1		%
Output Voltage Long Term Drift (Note 4)	After 1000 Hr @ $T_J = \text{Max}$ and $V_{IN} - V_{OUT} = 40\text{V}$	0.3		1	%
Output Noise Voltage	$F=10\text{Hz to }10\text{KHz}$, $T_J=25^\circ\text{C}$	0.003			%
Minimum Output Current to Maintain Regulation	$V_{IN} - V_{OUT} = 40\text{V}$		3.5	10	mA
Peak Output Current	$V_{IN} - V_{OUT} \leq 15\text{V}$	1.5	2.2		A
	$V_{IN} - V_{OUT} \leq 40\text{V}$, $T_J=25^\circ\text{C}$	0.15	0.4		
Adjustment-Terminal Current			50	100	uA
Change in adjustment-terminal current	$V_{IN} - V_{OUT} = 2.5\text{V to }40\text{V}$ $I_{OUT} = 10\text{mA to }1.5\text{A}$	0.2		0.5	uA

*Unless otherwise noted, these specifications apply for the following test conditions: $V_{IN} - V_{OUT} = 5\text{V}$ & $I_{OUT} = 0.5\text{A}$. For conditions shown at Min or Max, use the appropriate value specified under recommended operating conditions.

Note 1: All characteristics are measured with a 0.1uF capacitor across the input and 1uF capacitor across the output.

Note 2: Input regulation is expressed here as the percentage change in output voltage per 1V change at the input.

Note 3: Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Note 4: Since long-term drift cannot be measured on the individual devices prior to shipment, this specification is not intended to be a guarantee or warranty. It is an engineering estimate of the average drift to be expected from lot to lot.

Typical Applications

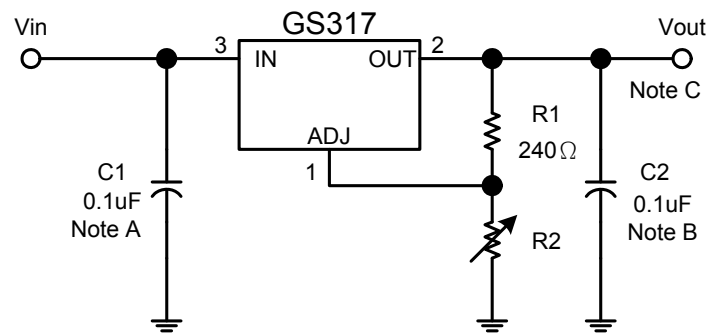


Figure1. Adjustable Voltage Regulator

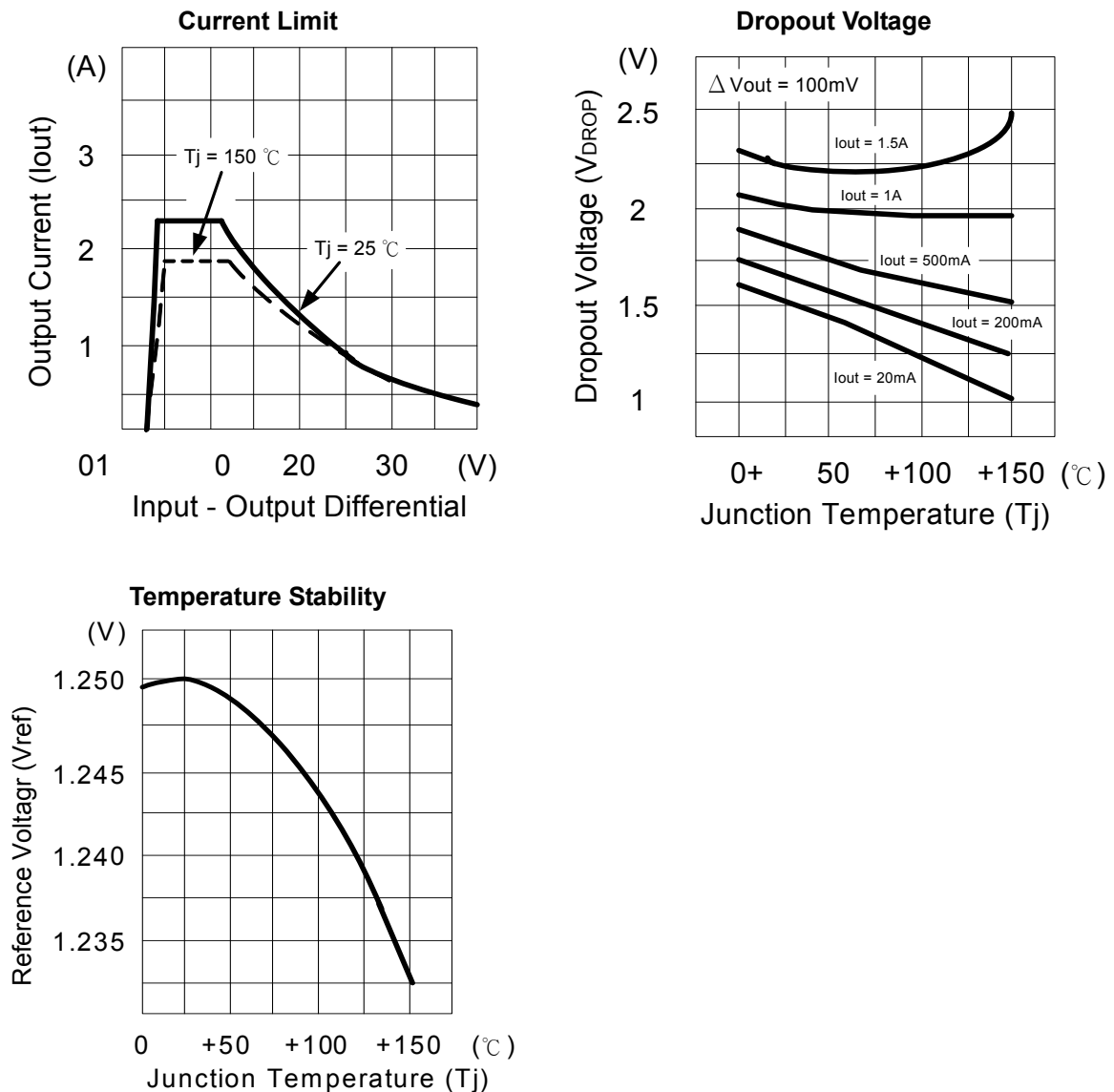
Note A: Use of an input bypass capacitor is recommended if regulator is far from filter capacitors.

Note B: Use of an output capacitor improves transient response but is optional

Note C: Output voltage is calculated from the equation: $V_{OUT} = V_{REF} (1 + R2/R1)$

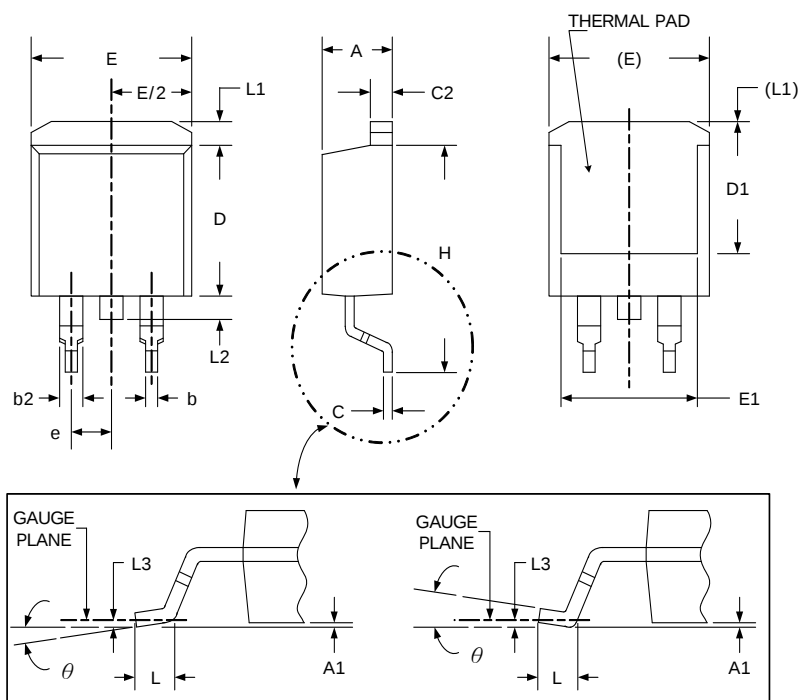
V_{REF} equals the different between the output and adjustment terminal voltages

Typical Performance Characteristics



Package Dimension

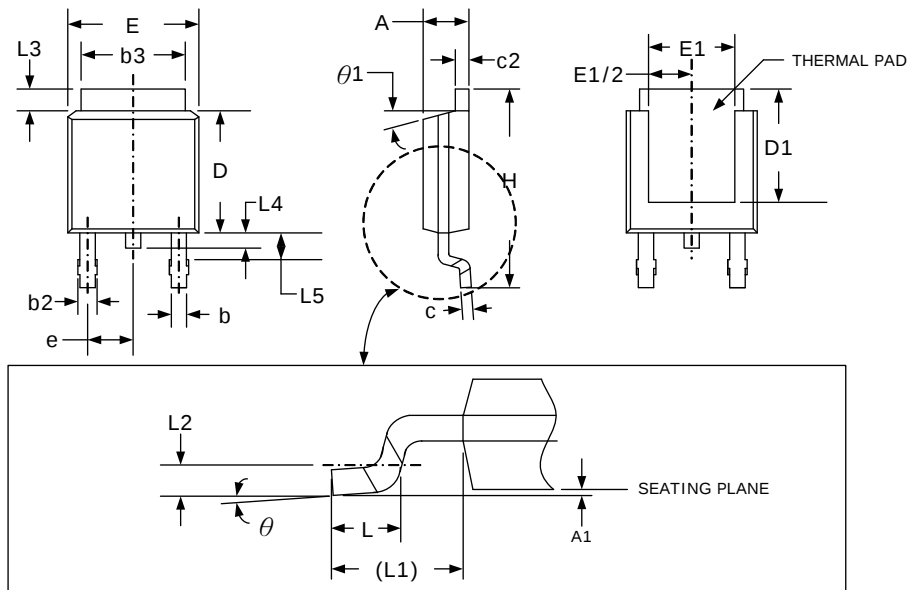
TO-263 PLASTIC PACKAGE



Dimensions

SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	4.06	4.83	.160	.190
A1	0	0.25	.000	.010
b	0.51	0.99	.020	.039
b2	1.14	1.78	.045	.070
C	0.38	0.74	.015	.029
C2	1.14	1.65	.045	.065
D	8.38	9.65	.330	.380
D1	6.86	-	.270	-
E	9.65	10.67	.380	.420
E1	6.22	-	.245	-
e	2.54 (TYP)		.100 (TYP)	
H	14.61	15.88	.575	.625
L	1.78	2.79	.070	.110
L1	-	1.68	-	.066
L2	-	1.78	-	.070
L3	0.25 (TYP)		.010 (TYP)	
θ	0°	8°	0°	8°

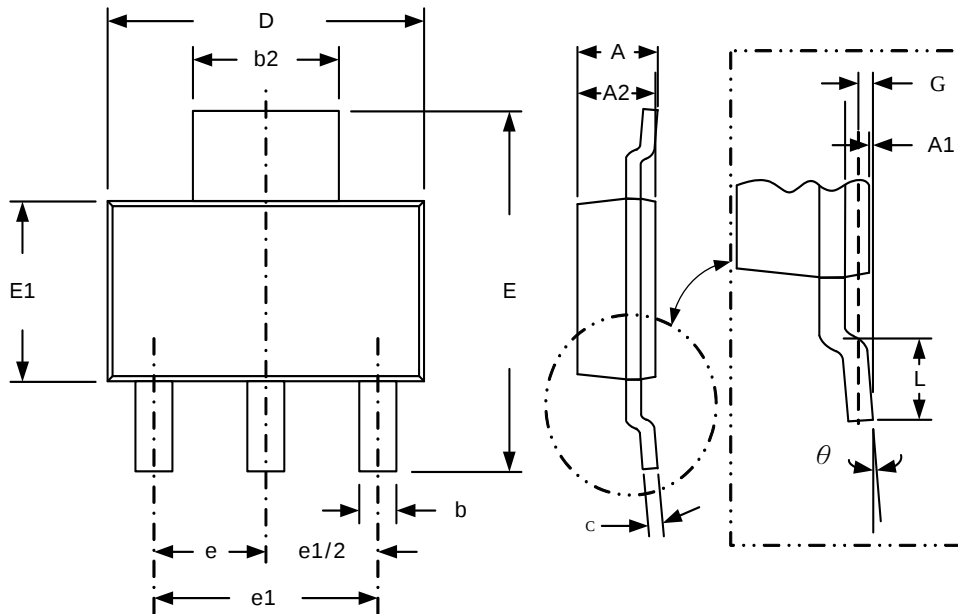
TO-252 PLASTIC PACKAGE



Dimensions

SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	2.18	2.39	.086	.094
A1	-	0.13	-	.005
b	0.64	0.89	.025	.035
b2	0.76	1.14	.030	.045
b3	4.95	5.46	.195	.215
C	0.46	0.61	.018	.024
C2	0.46	0.89	.018	.035
D	5.97	6.22	.235	.245
D1	5.21	-	.205	-
E	6.35	6.73	.250	.265
E1	4.32	-	.170	-
e	2.29 (TYP)		.090 (TYP)	
H	9.40	10.41	.370	.410
L	1.40	1.78	.055	.070
L1	2.74 (TYP)		.108 (TYP)	
L2	0.51 (TYP)		.020 (TYP)	
L3	0.89	1.27	.035	.050
L4	-	1.02	-	.040
L5	1.14	1.52	.045	.060
θ	0° 10		0° 10	°
θ1	0° 15		0° 15	°

TO-223 PLASTIC PACKAGE



Dimensions

SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	-	1.80	-	.071
A1	0.02	0.10	.001	.004
A2	1.55	1.65	.061	.065
b	0.66	0.84	.026	.033
b2	2.90	3.10	.114	.122
c	0.23	0.33	.009	.013
D	6.30	6.70	.248	.264
E	6.70	7.30	.264	.288
E1	3.30	3.70	.130	.146
e	2.30 (TYP)		.091 (TYP)	
e1	4.60 (TYP)		.181 (TYP)	
L	0.90	-	.035	-
G	0.25 (TYP)		.010 (TYP)	
θ	0°	8°	0°	8°

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