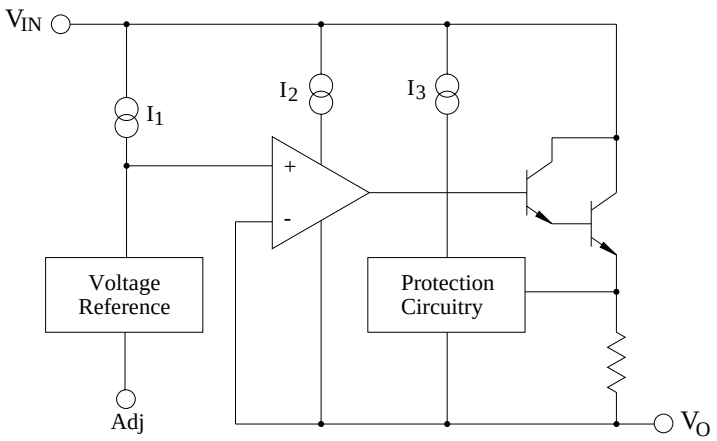
3-TERMINAL 1A POSITIVE ADJUSTABLE REGULATOR

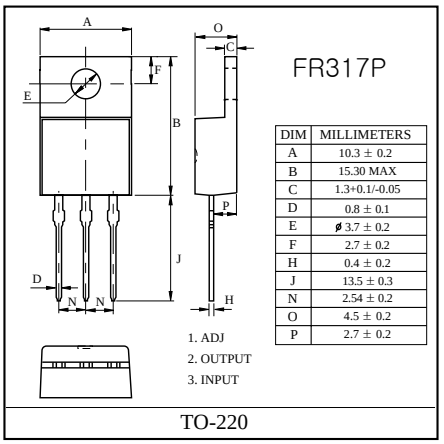
The FR317P/D/DD/T is adjustable 3-terminal positive voltage regulator capable of supplying in excess of 1.5A over a 1.2V to 37V output range.
This is exceptionally easy to use and require only two external resistors to set the output voltage.
Further, it employ internal current limiting, thermal shutdown and safe area compensation.

FEATURES

- Adjustable output between 1.2V and 37V
- Guaranteed 1.5A output current
- Line regulation typically 0.01%/V
- Load regulation typically 0.1%
- 80dB ripple rejection (with Cadj)
- Internal thermal overload protection
- Internal short-circuit current limiting
- Output transistor safe-area compensation

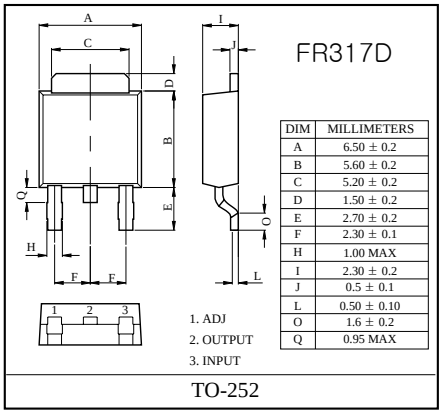
BLOCK DIAGRAM





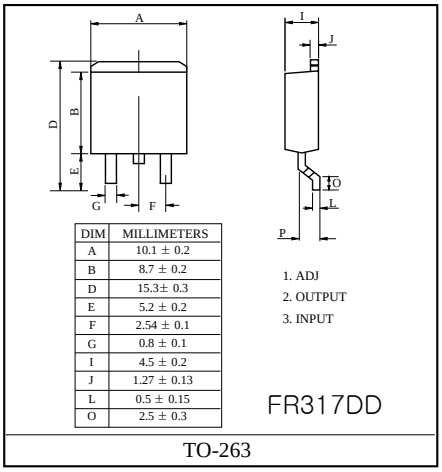
DIM	MILLIMETERS
A	10.3 ± 0.2
B	15.30 MAX
C	1.3+0.1/-0.05
D	0.8 ± 0.1
E	ϕ3.7 ± 0.2
F	2.7 ± 0.2
H	0.4 ± 0.2
J	13.5 ± 0.3
N	2.54 ± 0.2
O	4.5 ± 0.2
P	2.7 ± 0.2

TO-220



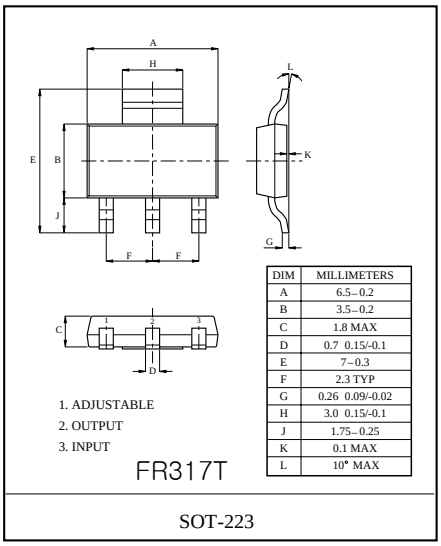
DIM	MILLIMETERS
A	6.50 ± 0.2
B	5.60 ± 0.2
C	5.20 ± 0.2
D	1.50 ± 0.2
E	2.70 ± 0.2
F	2.30 ± 0.1
H	1.00 MAX
I	2.30 ± 0.2
J	0.5 ± 0.1
L	0.50 ± 0.10
O	1.6 ± 0.2
Q	0.95 MAX

TO-252



DIM	MILLIMETERS
A	10.1 ± 0.2
B	8.7 ± 0.2
D	15.3± 0.3
E	5.2 ± 0.2
F	2.54 ± 0.1
G	0.8 ± 0.1
I	4.5 ± 0.2
J	1.27 ± 0.13
L	0.5 ± 0.15
O	2.5 ± 0.3

TO-263



DIM	MILLIMETERS
A	6.5–0.2
B	3.5–0.2
C	1.8 MAX
D	0.7 0.15/-0.1
E	7–0.3
F	2.3 TYP
G	0.26 0.09/-0.02
H	3.0 0.15/-0.1
J	1.75–0.25
K	0.1 MAX
L	10° MAX

SOT-223

MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Input-Output Voltage Differential	V_{IN} - V_{OUT}	40	V
Output Current	I_{OUT}	1.5	A
Power Dissipation (With infite heat sink)	P_D	Interally limited	W
Operating Temperature	T_{opr}	-40 ~ 125	℃
Storage Temperature	T_{stg}	-65 ~ 150	℃
Lead Temperature	Tlead	230	℃

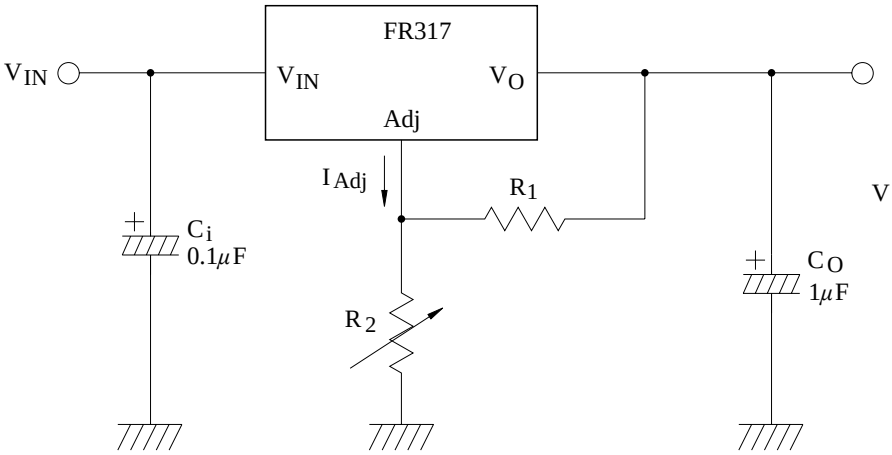
ELECTRICAL CHARACTERISTICS (Ta=25℃)

(V_I-V_O=5V, I_O=0.5A, 0℃≤Tj≤125℃, I_{MAX}=1.5A, P_{MAX}=20W, unless otherwise specified.)

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Line Regulation	ΔV_O(Line)	Ta=25℃, Io=10mA	3V≤ V_{IN} -V_{OUT}≤ 40V	-	0.01	0.04	%/V
Load Regulation	ΔV_O(Load)	V_{IN} ≥ 5V	10mA≤ I_{OUT}≤ I_{MAX} Ta=25℃	-	0.1	0.5	%/V
		V_{IN} < 5V		-	5	25	mV
Adjustable Pin Current	I_{Adj}			-	50	100	μA
Adjustable Pin Current Change	ΔI_{Adj}	10mA≤ Io≤ I_{MAX}, 2.5V≤ V_{IN} -V_{OUT}≤40V		-	0.2	5	μA
Reference Voltage	V_{ref}	10mA≤ Io≤ I_{MAX}, 3V≤ V_{IN} -V_{OUT}≤ 40V, P≤ P_{MAX}		1.20	1.25	1.30	V
Temperature Stability	ST_T	T_{Min}≤ Tj≤ T_{MAX}		-	1	-	%
Minimum Load Current to Maintain Regulation	$Io_{(MIN)}$	(V_{IN} -V_{OUT}) = 40V		-	3.5	10	mA
Current Limit	$Io_{(MAX)}$	(V_{IN} -V_{OUT})≤15V, P≤ P_{MAX}		1.5	2.2	-	A
		(V_{IN} -V_{OUT})= 40V, P≤ P_{MAX}, Ta=25℃		0.15	0.4	-	A
Output Noise Voltage	V_{NO}	Ta=25℃, 10H_Z≤ f ≤10kH_Z,	% of V_{OUT}	-	0.003	-	%
Ripple Rejection Ratio	RR	Vo=10V, f=120H_Z		-	65	-	dB
		C_{Adj}=10μF		66	80	-	
Long Term Stability	ST	Ta=25℃ for end point measurement, 1000 Hr		-	0.3	1	℃/W

Note : Load and line regulation are specified at constant junction temperature.
Change in Vo due to heating effects must be taken into account separately. Pulse testing with low duty is used. (P_{MAX} = 20W)

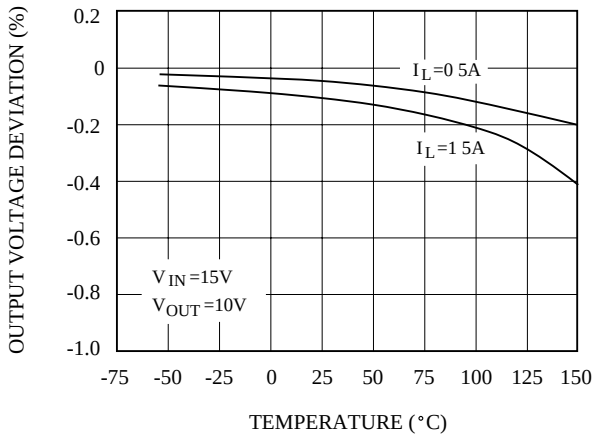
TYPICAL APPLICATION (PROGRAMMABLE REGULATOR)



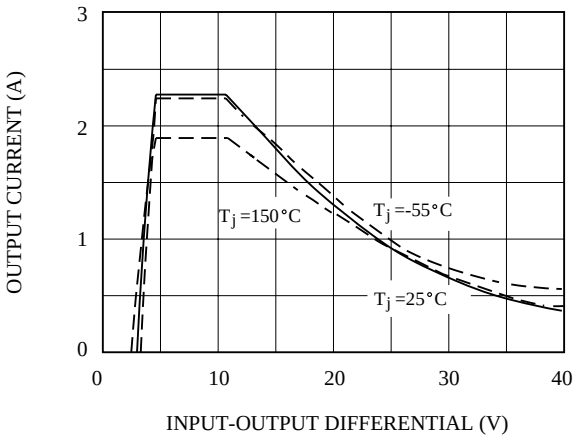
$$V_{OUT} = 1.25V\ (1 + \frac{R_2}{R_1}) + I_{Adj}\ R_2$$

Ci is required when regulator is located an appreciable distance from power supply filter.
Co is not needed for stability, however, in the range of 1μF to 100μF of aluminum or tantalum electrolytic are commonly used to provide improved output impedance and rejection of transients.
Since I_{Adj} is controlled to less then 100μA , the error associated with this term is negligible in most applications.

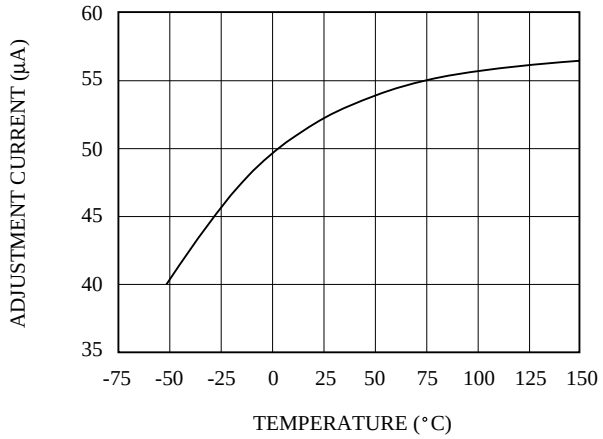
Load Regulation



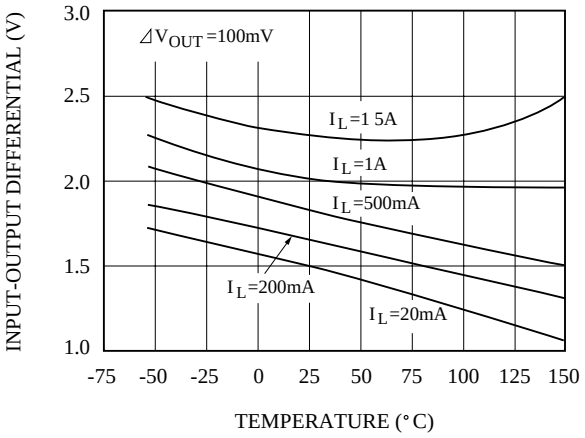
Current Limit



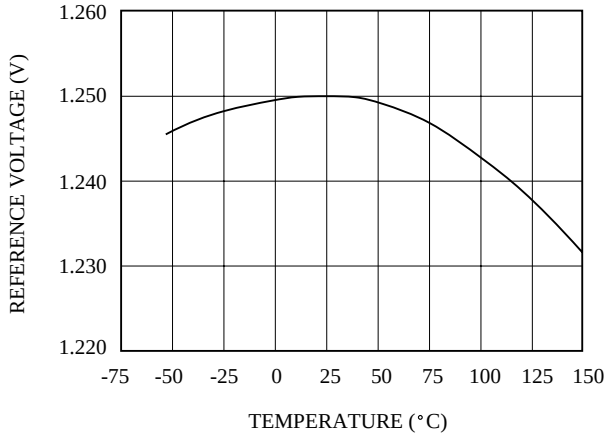
Adjustment Current



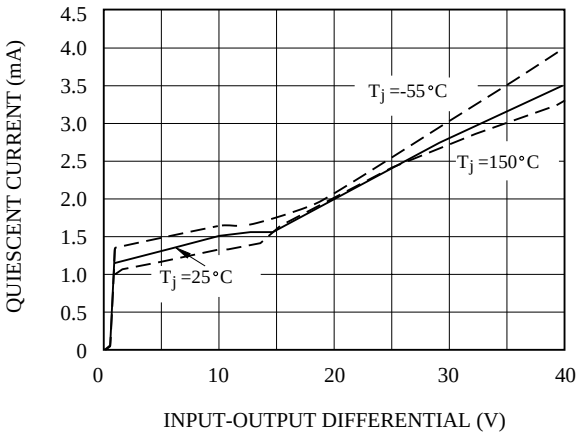
Dropout Voltage



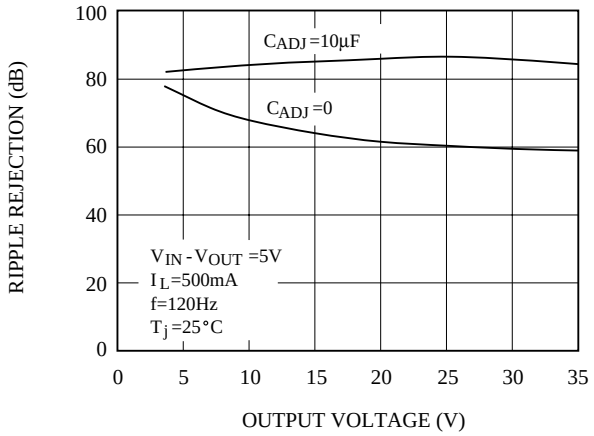
Temperature Stability



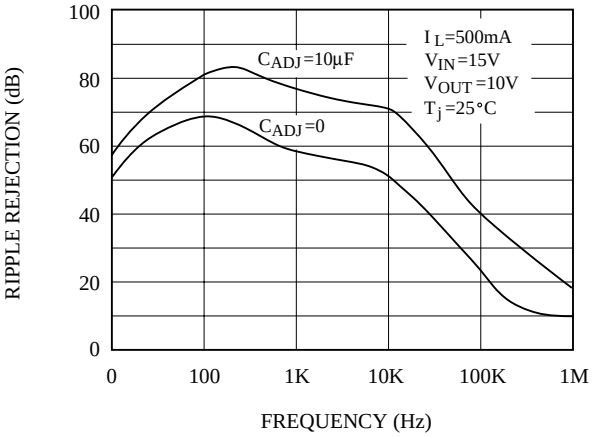
Minimum Operating Current



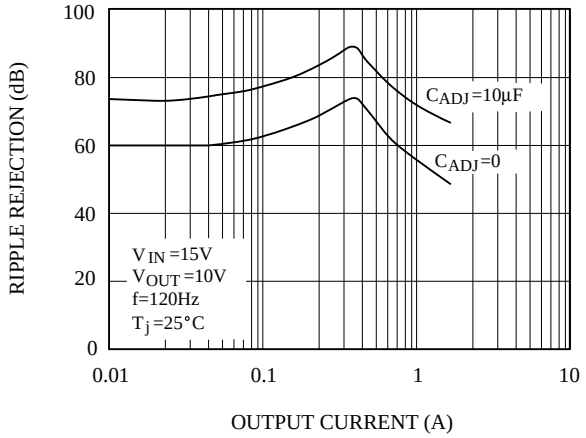
Ripple Rejection



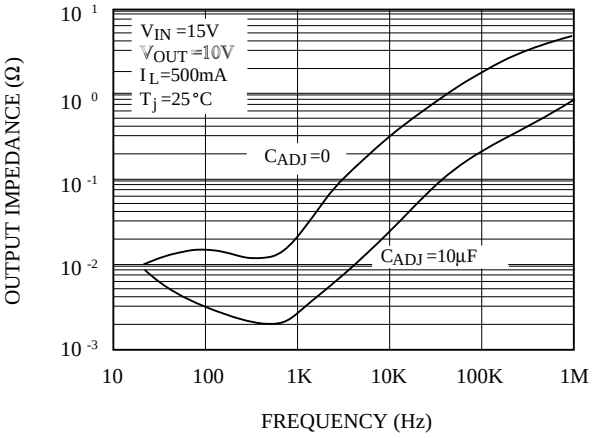
Ripple Rejection



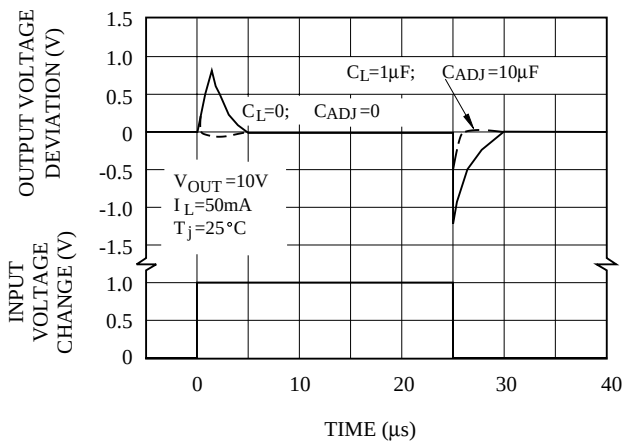
Ripple Rejection



Output Impedance



Line Transient Response



Line Transient Response