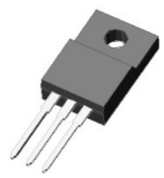
SN317x

[1.5 A Adjustable Output] Positive Voltage Regulator

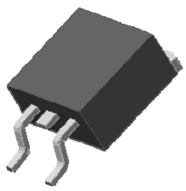
KODENSHI AUK

Semiconductor

http:// www.auk.co.kr



TO-220F-3L



D2PAK

Description

The SN317 is an adjustable 3−terminal positive voltage regulator capable of supplying in excess of 1.5 A over an output voltage range of 1.2 V to 37 V. This voltage regulator is exceptionally easy to use and requires only two external resistors to set the output voltage. Further, it employs internal current limiting, thermal shutdown and safe area compensation, making it essentially blow−out proof.

This device can also be used to make a programmable output regulator, or by connecting a fixed resistor between the adjustment and output, the SN317 can be used as a precision current regulator.

Application

◈ Consumer and personal electronics

◈ SMPS post-regulator / dc-to-dc modules

◈ High-efficiency linear power supplies

◈ LED Light Constant Current Controllers

Features and Benefits

◈ Output Current up to 1.5A

◈ Output Adjustable Level : 1.2V to 37V

◈ Built in OVP, CLP circuit.

◈ Built in TSD Protection.

◈ Output Transistor Safe Area Protection.

◈ Ultra High level of ESD [Built in ESD Protection Cell]

ORDERING INFORMATION

Product	Marking	Package
SN317PI	SN317PI	TO-220F-3L
SN317D2	SN317D2	D2PAK

▲ Marking Detail Information

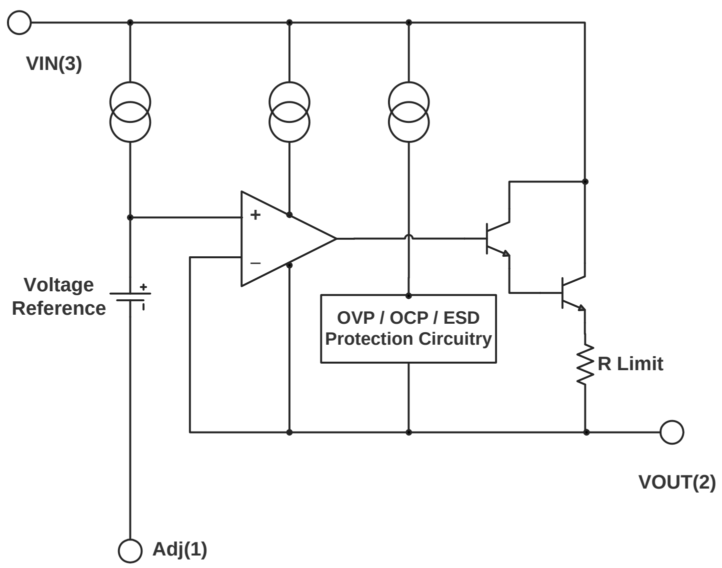
AUK(①)
G△YWW (②)
SN317PI (③)

① AUK Logo

② Grade & M Code & Year & Week Code

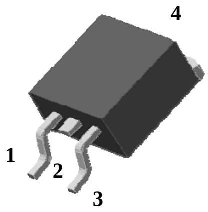
③ Device Code

Equivalent Circuit



October, 2010 REV. 00

◈ Pin Configuration



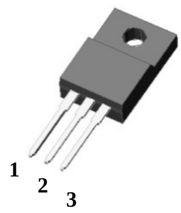
D2PAK

1: Adj.

2: V_{OUT}

3: V_{IN}

4: V_{OUT}



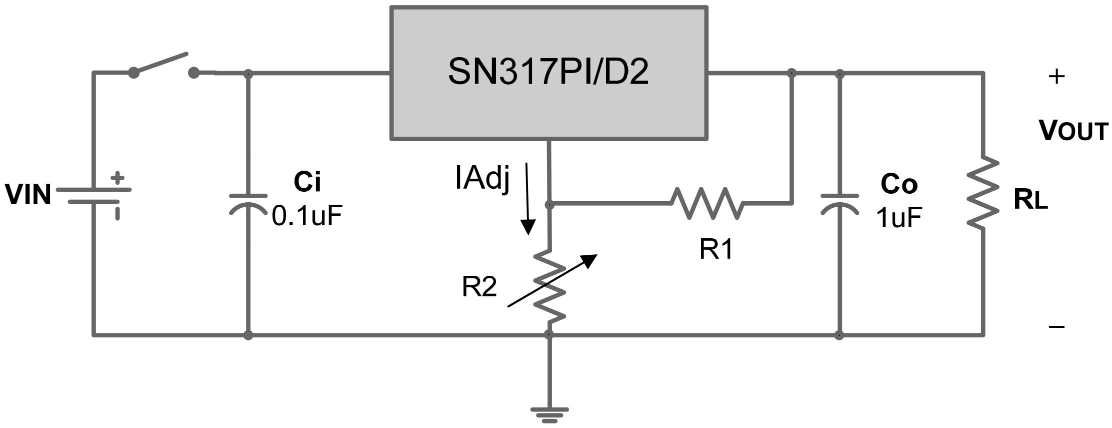
TO-220F-3L

1: Adj.

2: V_{OUT}

3: V_{IN}

◈ Standard Application



Ci is required if regulator is located an appreciable distance from power supply filter.

Co is not needed for stability, however, it is necessary to improve transient response.

Since I_{Adj} is controlled to less than 0.1mA, the error associated with this term is insignificant in most applications.

$$V_{OUT} = V_{ref(1.25V)} \times (1 + R_2/R_1) + I_{adj}R_2$$

◈ Absolute Maximum Ratings (Ta = 25℃)

Parameter		Symbol	Limits		Unit
			TO-220F-3L	D2PAK	
Input-Output Voltage Differential		V_I-V_O	40		V
Power Dissipation	D2PAK	P_d	Internally Limited		W
	TO-220F-3L				
Thermal Resistance Junction to Case		$R_{\Theta JC}$	5.0	5.0	°C/W
Thermal Resistance Junction to Air		$R_{\Theta JA}$	65	72	°C/W
Junction Temperature		T_J	150		℃
Operate Temperature Range		T_{opr}	0 ~ +125		℃
Storage Temperature Range		T_{stg}	-55 ~ +150		℃

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the recommended operating conditions is not implied. Extended exposure to Stresses above the Recommended Operating Conditions may affect device reliability.

The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(max)}$, the junction-to-ambient thermal resistance, θ_{JA}, and the ambient temperature, TA.
The maximum allowable power dissipation at any ambient temperature is calculated using:
$PD(max) = (T_{J(max)} - T_A) \div \theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

◈ Electrical characteristics

(V_I-V_O=5V, I_O = 0.5A, I_{MAX} = 1.5A, T_J=0℃~125℃, P_{DMAX}=20W ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN317x			Unit
				Min.	Typ.	Max.	
Line Regulation *	$\Delta V_{O(Line)}$	3.0V ≤ V_I-V_O ≤ 40V I_O=10mA	T_A=+25℃	-	0.01	0.04	% / V
		3.0V ≤ V_I-V_O ≤ 40V I_O=10mA	T_A=0~+125℃	-	0.02	0.07	
Load Regulation *	$\Delta V_{O(Load)}$	10mA ≤ I_O ≤ I_{MAX} T_A=+25℃	V_O < 5V V_O ≥ 5V	-	18.0 0.4	25.0 0.5	mV % / V_O
		10mA ≤ I_O ≤ I_{MAX} T_A=0~+125℃	V_O < 5V V_O ≥ 5V	-	40.0 0.8	70.0 1.5	mV % / V_O
Adjustable Pin Current	I_{ADJ}	-		-	50	100	uA
Adjustable Pin Current Change	ΔI_{ADJ}	3.0V ≤ V_I-V_O ≤ 40V 10mA ≤ I_O ≤ I_{MAX}, P_D≤P_{DMAX}		-	2.0	5.0	uA
Reference Voltage	V_{REF}	3.0V ≤ V_I-V_O ≤ 40V 10mA ≤ I_O ≤ I_{MAX} , P_D ≤ P_{DMAX}		1.20	1.25	1.30	V
Temperature Stability	ST_T	0℃ ≤ T_j ≤ 125℃		-	1.0	-	% / V_O
Ripple Rejection	RR	V_O=10V, f=120Hz without C_{ADJ}		-	65.0	-	dB
		V_O=10V, f=120Hz, C_{ADJ} = 10uF **		-	75.0	-	
Output Noise Voltage	V_{NO}	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	0.003	-	%
Minimum Load Current to Maintain Regulation	$I_{L(MIN)}$	V_I-V_O = 40V		-	3.5	12.0	mA
Maximum Output Current	$I_{O(MAX)}$	V_I-V_O ≤ 15V, P_D ≤ P_{DMAX}	T_A =25℃	1.0	2.2	-	A
		V_I-V_O ≤ 40V, P_D ≤ P_{DMAX}		-	0.3	-	
Long-Term Stability	ST	T_A = +25℃ for end point measurements, 1000HR		-	0.3	1.0	%

* Load and line regulation are specified at constant temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

** C_{ADJ} is connected between the adjustable pin and ground.

Fig.1 Adjustable Pin Current vs. Junction Temperature

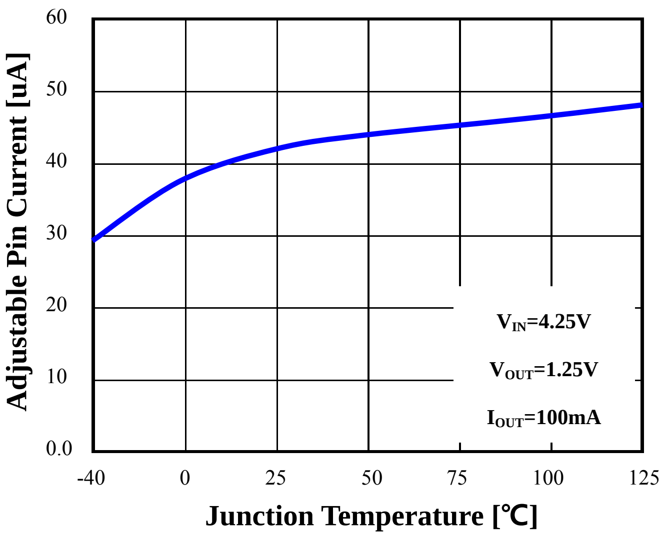


Fig.2 Load Regulation

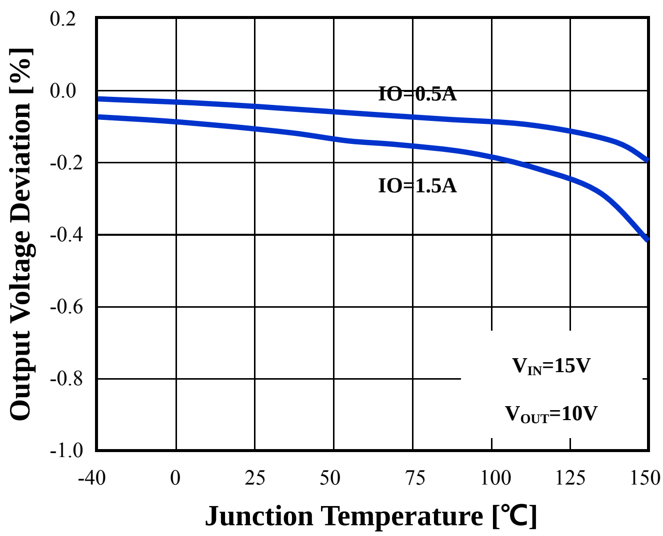


Fig.3 Output Voltage vs. Junction Temperature

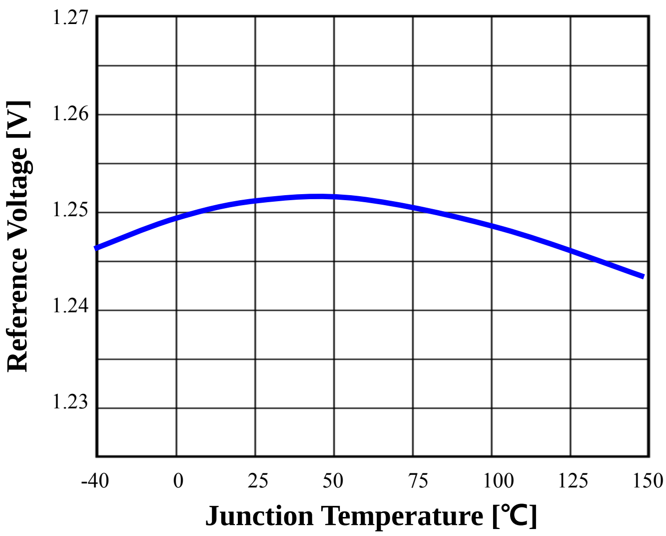


Fig.4 Dropout Voltage vs. Input Voltage

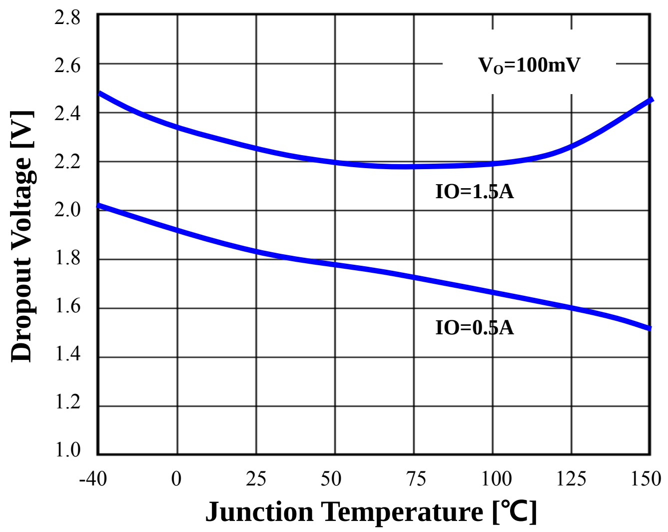


Fig.5 Line Transient Response

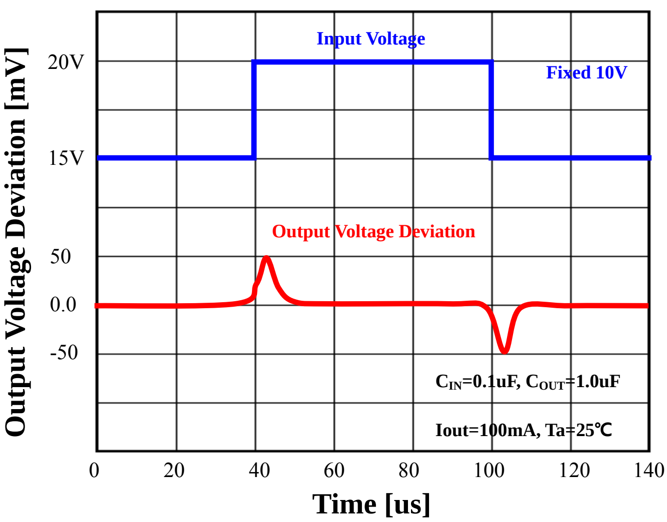
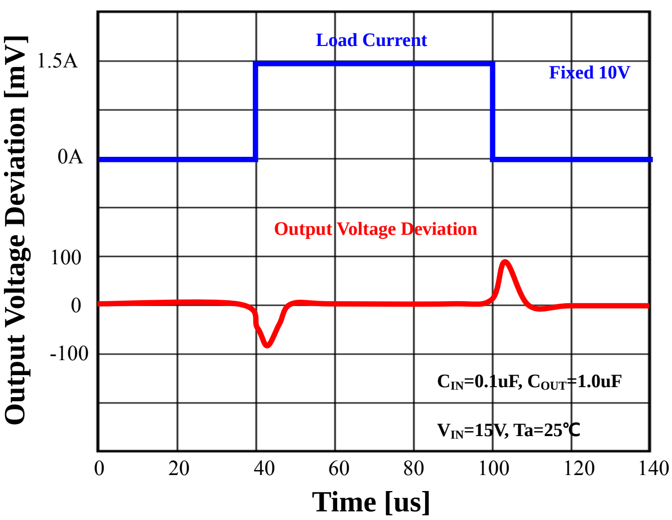
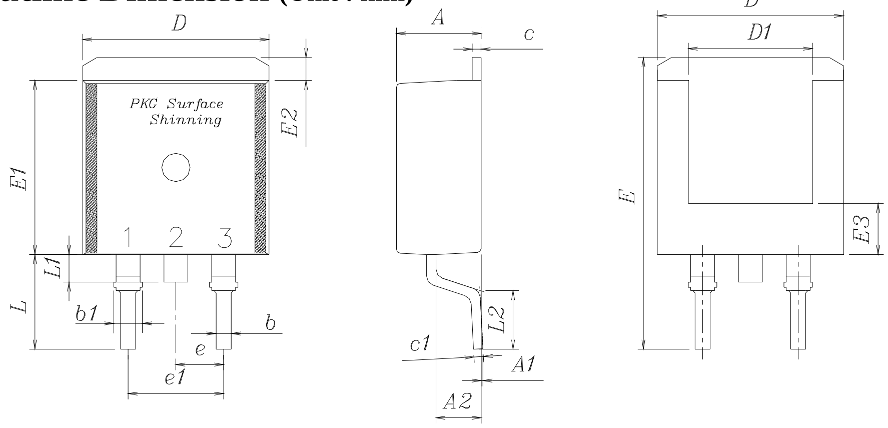


Fig.6 Load Transient Response

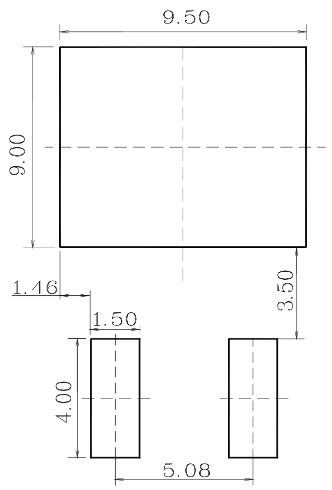


◈ D2PAK Outline Dimension (Unit : mm)

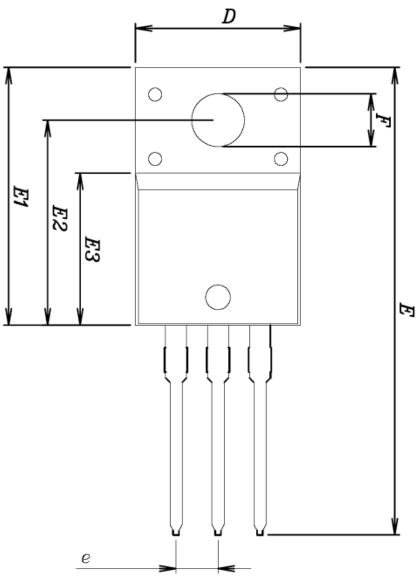


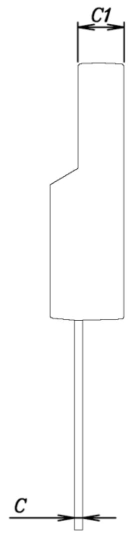
SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	4.35	4.50	4.65	
A1	–	–	0.15	
A2	2.20	2.40	2.60	
b	0.70	0.80	0.90	
b1	1.17	1.27	1.37	
c	0.40	0.50	0.60	
c1	0.40	0.50	0.60	
D	9.80	10.00	10.20	
D1	6.40	6.60	6.80	
E	15.00	15.40	15.80	
E1	9.05	9.20	9.35	
E2	1.00	1.20	1.40	
E3	2.50	2.70	2.90	
e	2.34	2.54	2.74	
e1	4.88	5.08	5.28	
L	4.60	5.00	5.40	
L1	1.40	1.45	1.50	
L2	2.50	–	–	

※ Recommend PCB solder land [Unit: mm]



◈ TO-220F-3L Outline Dimension (Unit : mm)





SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	–	–	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	–	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.10	3.20	3.30	
G	3.30	3.40	3.50	
e	2.54 BSC			
L	12.40	–	13.00	
L1	3.46 BSC