

AN6530, AN6531

4-pin Positive Adjustable Voltage Regulator

Overview

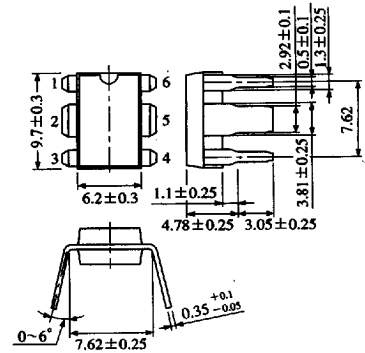
The AN6530 and the AN6531 are the monolithic 4-pin positive adjustable voltage regulators. They provide any stabilized output voltage between 5V and 30V with external resistor, and are ideal for power circuits with current capacitance up to 0.5A. Moreover, these voltage regulators are highly reliable with various internal protection circuits. The AN6530 is in a 6-pin DIL plastic package, and the AN6531 is in a 4-pin SIL plastic package.

Features

- Wide range of output voltage : $V_O = 5$ to 30V
- Internal thermal overload protection
- Internal short-circuit protection
- Output transistor safe area compensation

AN6530

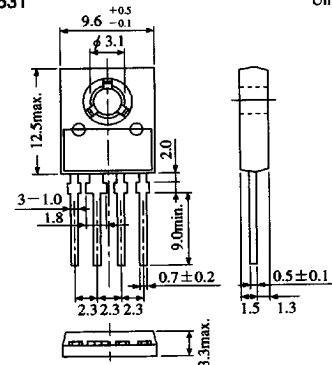
Unit : mm



6-pin DIL Plastic Package with Fin (HDIP006-P-0300)

AN6531

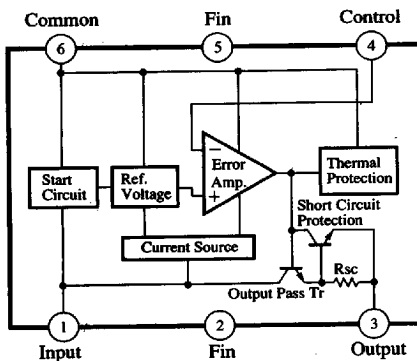
Unit : mm



4-pin SIL Plastic Package with Fin (HSIP004-P-0000)

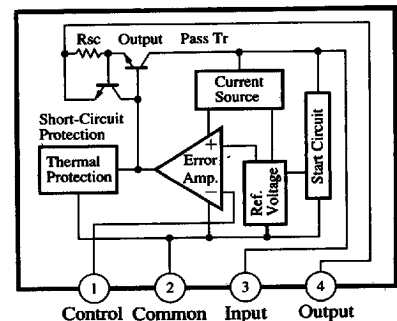
Block Diagram

AN6530



Note) Pin② and ⑤ are electrically in common, and can be connected as Common like Pin⑥. Always use Pin⑥ as Common.

AN6531



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■ Absolute Maximum Ratings (Ta=25℃)

Parameter		Symbol	Rating	Unit
Supply voltage		V _{CC}	40	V
Supply current		I _{CC} *1	1.5	A
Power dissipation	AN6530	P _D	1.5 *2	W
	AN6531		7.5	
Operating ambient temperature		T _{opr}	-20 to +75	℃
Storage temperature		T _{stg}	-55 to +150	℃

*1 The internal circuit is provided with a current limiting circuit.
*2 Maximum power dissipation value in the case where there is no heat sink (The value varies with the external heat dissipation state.)

■ Electrical Characteristics (Ta=25℃)

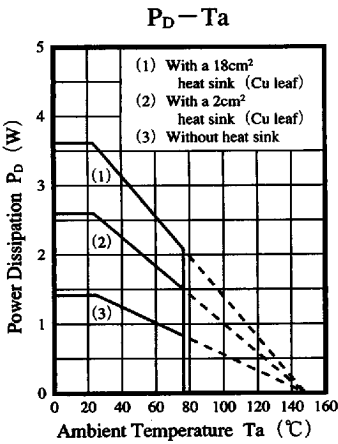
Parameter	Symbol	Condition	min	typ	max	Unit	
Output voltage tolerance	V _O	V _I =V _O +3V to V _O +15V, I _O =5 to 350mA, T _J =25℃	—	—	4	%	
Line regulation	REG _{IN}	V _O =5V, I _O =200mA, V _I =7.5 to 25V, T _J =25℃	—	—	1	%	
		V _O =18V, I _O =5mA, V _I =21 to 33V, T _J =25℃	—	—	0.75	%	
		V _O =18V, I _O =200mA, V _I =21 to 25V, T _J =25℃	—	—	0.67	%	
Load regulation	REG _L	V _O =5V, V _I =12V, I _O =5 to 500mA, T _J =25℃	—	—	1	%	
Bias current	I _{bias}	T _J =25℃	—	3	5	mA	
Control pin current	I _{cont}	T _J =25℃	—	1	8	μA	
Ripple rejection ratio	RR	V _I =8 to 18V, V _O =5V, f=120Hz	62	80	—	dB	
Output noise voltage	V _{no}	V _O =5V, f=10Hz to 100kHz	—	40	—	μV	
Minimum input/output voltage difference	V _{DIF(min.)}	I _O =500mA, T _J =25℃	—	2	—	V	
Short circuit current	I _{OS}	V _I =35V, V _O =5V, T _J =25℃	—	50	600	mA	
Peak output current	I _{OP}	V _O =5V, T _J =25℃	0.4	1	1.4	A	
Output voltage temperature coefficient	ΔV _O /T _a	V _O =5V	T _J = -55 to +25℃	—	0.5	—	mV/℃
		I _O =5mA	T _J =25 to 150℃	—	-0.5	—	mV/℃
Control pin voltage	V _{cont}	T _J =25℃	4.8	5	5.2	V	

Note1) The specified condition T_J=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note2) When not specified, V_I=10V, V_O=5V, I_O=350mA, C_I=0.33 μF and C_O=0.1 μF.

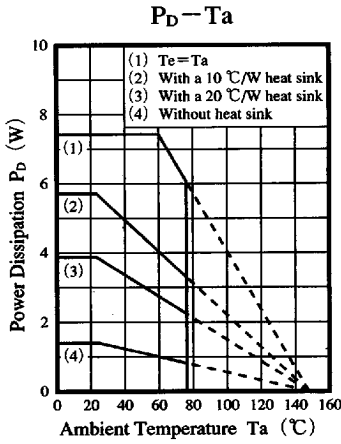
Voltage
Regu-
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■ Characteristics Curve

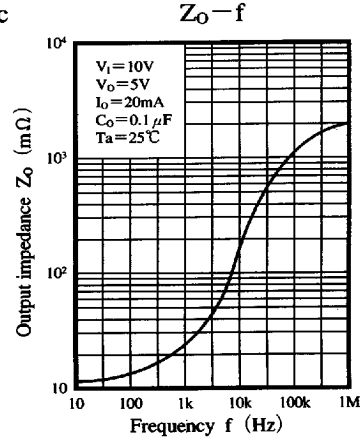
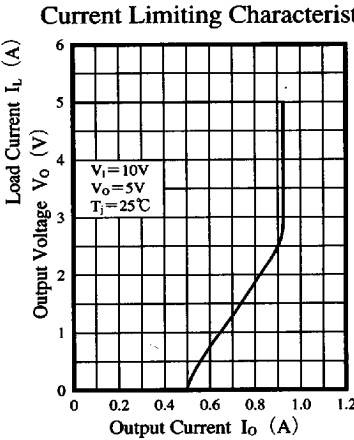
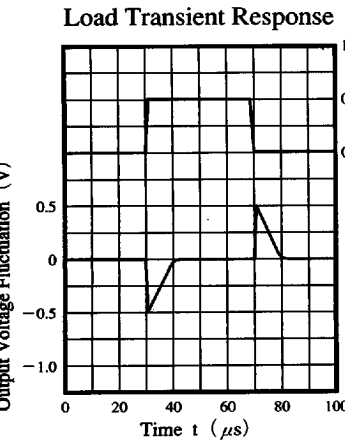
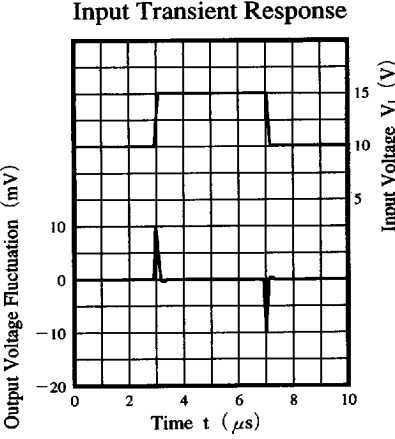
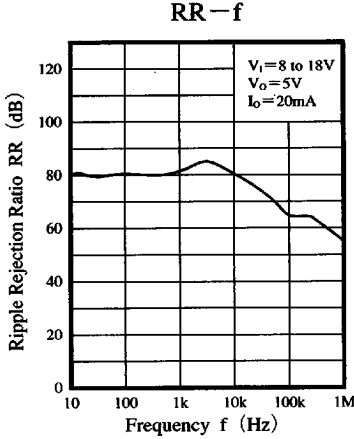
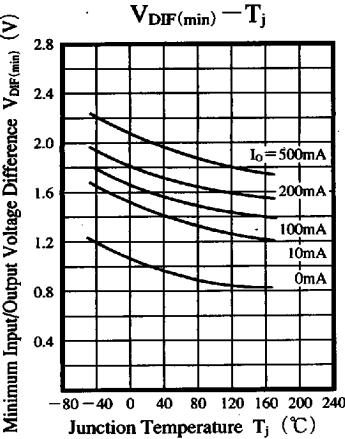
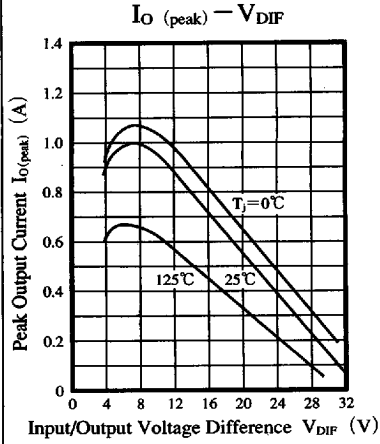
AN6530 Characteristics



AN6531 Characteristics



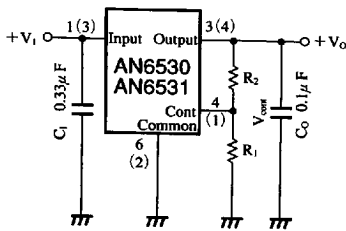
Common Characteristics



■ 6932852 0012473 365 ■

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Basic Regulator Circuit

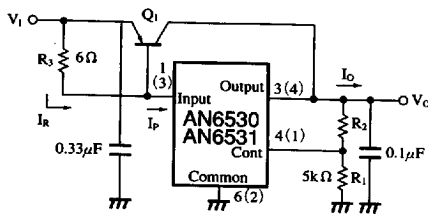


- $V_0 = V_{cont} \left(\frac{R_1 + R_2}{R_1} \right)$
($V_{cont} \approx 5V, R_1 = 5k\Omega$)
- C_1 is necessary when the line of V_1 is long.
- C_0 improves the transient response.

() Pin No. : AN6531

Application Circuits

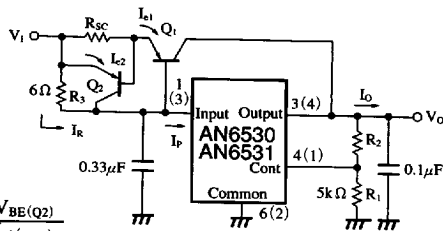
(1) Current Boost Circuit



$$R_3 = \frac{V_{BE(Q1)} \cdot \beta}{(\beta + 1) I_P - I_O}$$

() Pin No. : AN6531

(2) Current Boost Circuit (With Current Limiting Circuit)



$$R_{SC} = \frac{V_{BE(Q2)}}{I_{e1(max.)}}$$
$$R_3 = \frac{V_{BE(Q1)} + I_{e1} R_{SC}}{I_O - I_{e1}}$$
$$I_{e2(max.)} = I_{P(max.)} - \frac{V_{BE(Q1)} + V_{BE(Q2)}}{R_3}$$

Voltage
Regu-
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