

Am105/205/305/305A

Voltage Regulator

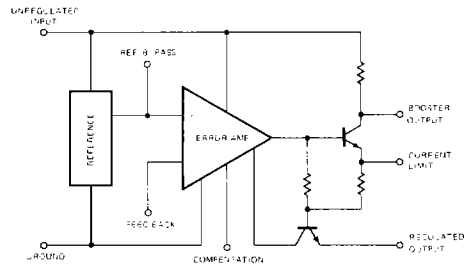
Distinctive Characteristics

- The Am105/205/305/305A are functionally, electrically, and pin-for-pin equivalent to the National LM105/205/305/305A.
- Output voltage adjustable from 4.5V to 40V.
- Output currents in excess of 10A possible by adding external transistors.
- 100% reliability assurance testing in compliance with MIL STD 883.
- Electrically tested and optically inspected die for assemblers of hybrid products.

FUNCTIONAL DESCRIPTION

The Am105/205/305/305A is a positive voltage regulator which can be used in the series, shunt, linear or switching modes of operation. The circuits feature low stand-by current drain, operation under minimum load conditions and an output current capability of up to 20 mA.

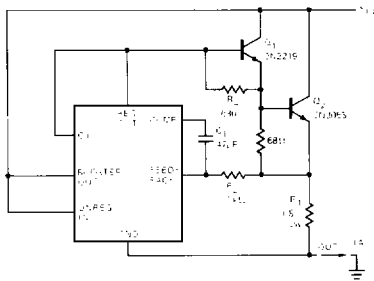
FUNCTIONAL DIAGRAM



LIC-832

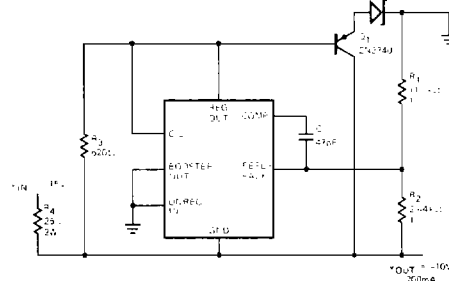
TYPICAL APPLICATIONS

Current Regulator



LIC-833

Shunt Regulation



LIC-834

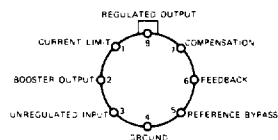
ORDERING INFORMATION

Part Number	Package Type	Temperature Range	Order Number
Am305A	TO-99	0°C to +70°C	LM305AH
Am305	TO-99 Dice	0°C to +70°C 0°C to +70°C	LM305H LD305
Am205	TO-99	-25°C to +85°C	LM205H
Am105	TO-99 Dice	-55°C to +125°C -55°C to +125°C	LM105H LD105

CONNECTION DIAGRAM

Top View

Metal Can



NOTES: (1) On Metal Can, pin 4 is connected to case.

LIC-835

Am105/205/305/305A

MAXIMUM RATINGS

Input Voltage Range	Am105/205/305A Am305	50 V 40 V
Input-Output Voltage Differential		40 V
Internal Power Dissipation (Note 1)	Metal Can (Similar to TO-99)	500 mW 800 mW
Operating Temperature Range	Am105 Am205 Am305/305A	-55°C to +125°C -25°C to +85°C 0°C to +70°C
Storage Temperature Range		-65°C to +150°C
Lead Temperature (Soldering, 60 sec.)		300°C

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified) (Note 2)

Parameter (see definitions)	Conditions	Am305			Am305A			Am105 Am205			Units
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Input Voltage Range		8.5		40	8.5		50	8.5		50	V
Output Voltage Range		4.5		30	4.5		40	4.5		40	V
Input-Output Voltage Differential		3.0		30	3.0		30	3.0		30	V
Line Regulation (Note 3)	$V_{in} - V_{out} \leq 5\text{ V}$ $V_{in} - V_{out} \geq 5\text{ V}$		0.025	0.06		0.025	0.06		0.025	0.06	%/V
Load Regulation (Note 3)	$0 \leq I_O \leq 12\text{ mA}$		0.02	0.05					0.02	0.05	%
	$R_{SC} = 18\ \Omega, T_A = 25^\circ\text{C}$		0.03	0.1							%
	$R_{SC} = 15\ \Omega, T_A = T_A(\text{max})$								0.03	0.1	%
	$R_{SC} = 10\ \Omega, T_A = T_A(\text{max})$								0.03	0.1	%
	$R_{SC} = 18\ \Omega, T_A = T_A(\text{min})$		0.03	0.1							%
	$0 \leq I_O \leq 45\text{ mA}$										
	$R_{SC} = 0\ \Omega, T_A = 25^\circ\text{C}$					0.02	0.2				%
	$R_{SC} = 0\ \Omega, T_A = T_A(\text{max})$					0.03	0.4				%
	$R_{SC} = 0\ \Omega, T_A = T_A(\text{min})$					0.03	0.4				%
Feedback Sense Voltage		1.63	1.70	1.81	1.55	1.70	1.85	1.63	1.70	1.81	V
Ripple Rejection	$C_{REF} = 10\ \mu\text{f}, f = 120\text{ Hz}$		0.003	0.01		0.003			0.003	0.01	%/V
Output Noise Voltage	$10\text{ Hz} \leq f \leq 10\text{ kHz}$										%
	$C_{REF} = 0$		0.005			0.005			0.005		%
	$C_{REF} > 0.1\ \mu\text{f}$		0.002			0.002			0.002		%
Standby Current Drain	$V_o = 40\text{ V}$		0.8	2.0		0.8	2.0		0.8	2.0	mA
	$V_{in} = 50\text{ V}$										
Long Term Stability			0.1	1.0		0.1	1.0		0.1	1.0	%
Temperature Stability			0.3	1.0		0.3	1.0		0.3	1.0	%
Current Limit Sense Voltage (Note 4)	$R_{SC} = 10\ \Omega, T_A = 25^\circ\text{C}$ $V_{out} = 0\text{ V}$	225	300	375	225	300	375	225	300	375	mV

Notes: 1. Derate Metal Can package at $6.8\text{ mW}/^\circ\text{C}$ for operation at ambient temperatures above 25°C .

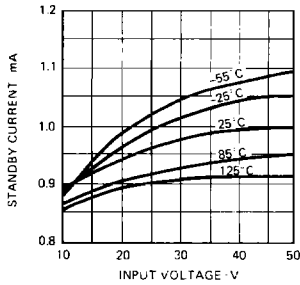
2. These specifications apply over the operating temperature range, for input and output voltages within the ranges given, and for a divider impedance seen by the feedback terminal of $2\text{ k}\Omega$, unless otherwise specified. The load and line regulation specifications are for constant junction temperature. Temperature drift effects must be taken into account separately when the unit is operating under conditions of high dissipation.

3. The output currents given, as well as the load regulation, can be increased by the addition of external transistors. The improvement factor will be roughly equal to the composite current gain of the added transistors.

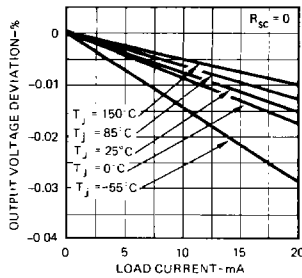
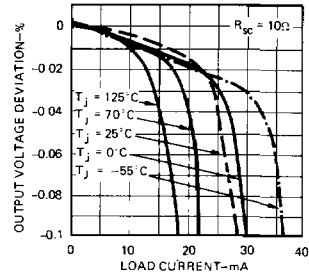
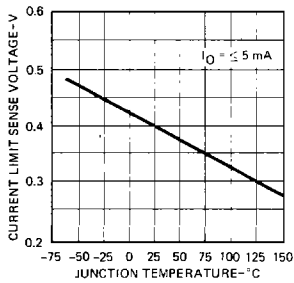
4. With no external pass transistor.

5. Connect booster output to unregulated input when no external pass transistor is used.

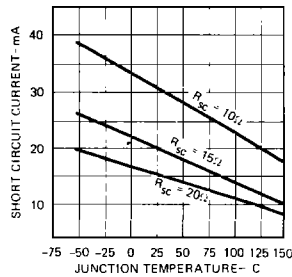
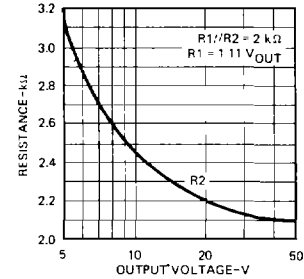
PERFORMANCE CURVES

Standby Current Drain
As A Function Of
Input Voltage

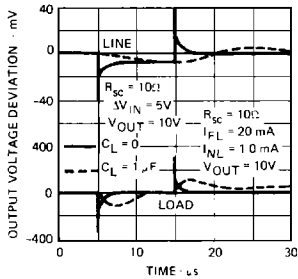
Load Regulation

Load Regulation
Characteristics With
Current LimitingCurrent Limiting
Sense Voltage As A
Function of Junction
Temperature

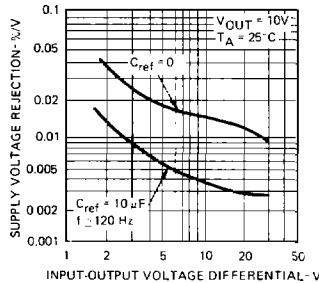
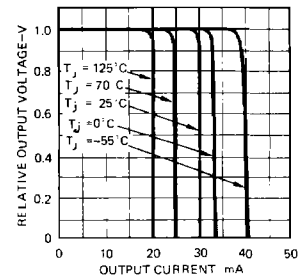
Short Circuit Current

Optimum Divider
Resistance Values

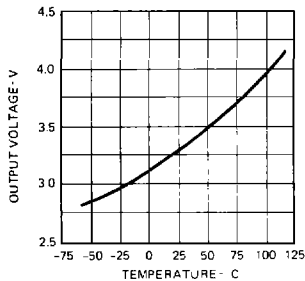
Transient Response



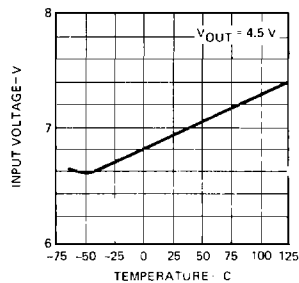
Supply Voltage Rejection

Current Limiting
Characteristics

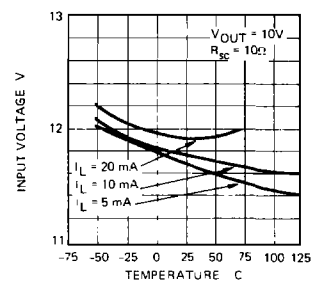
Minimum Output Voltage



Minimum Input Voltage

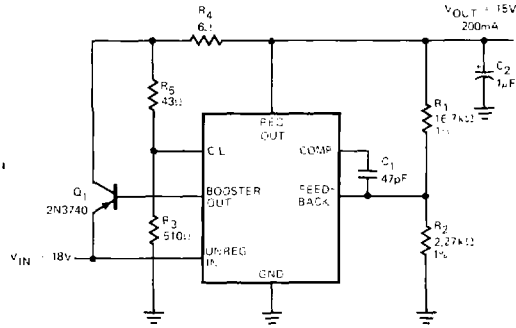


Regulator Dropout Voltage



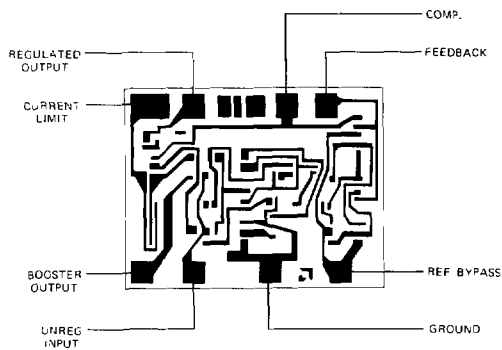
ADDITIONAL APPLICATIONS

Linear Regulator with Foldback Current Limiting



LIC-837

Metallization and Pad Layout



38 x 48 Mils