THOMSON SEMICONDUCTORS

LM105
LM205
LM305

T-58-11-23

ADJUSTABLE POSITIVE VOLTAGE REGULATORS

The LM105/LM205/LM305 are positive voltage regulators designed for a wide range of applications from digital power supplies to precision regulators for analog circuitry.

Important characteristics of these circuits are :

- Output voltage adjustable from 4.5 V to 40 V
- Output current in excess of 10 A possible by adding external transistors.
- Load regulation better than 0.1%, full load with current limiting.
- DC line regulation guaranteed at 0.03%/V
- Ripple rejection of 0.01%/V

Additional features are : fast response to both load and line transients, freedom from oscillation with varying resistive or reactive loads and the ability to start reliably on any load within rating.

ADJUSTABLE POSITIVE VOLTAGE REGULATORS

3

CASE CB-11
(TO-99)

H SUFFIX
METAL CAN

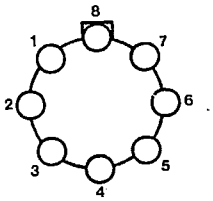
ORDERING INFORMATION

Hi-Rel versions available - See chapter 14

PART NUMBER	TEMPERATURE RANGE	PACKAGE H
LM105	−55°C to +125°C	•
LM205	−25°C to + 85°C	•
LM305	0°C to + 70°C	•
Examples : LM105H, LM205H		

PIN ASSIGNMENT

(Top view)



1 - Current limit
2 - Booster output
3 - Unregulated input
4 - Ground
5 - Reference bypass
6 - Feedback
7 - Compensation
8 - Regulated output

Ref. 00105

THOMSON SEMICONDUCTORS
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THOMSON COMPONENTS

78C 06194 D

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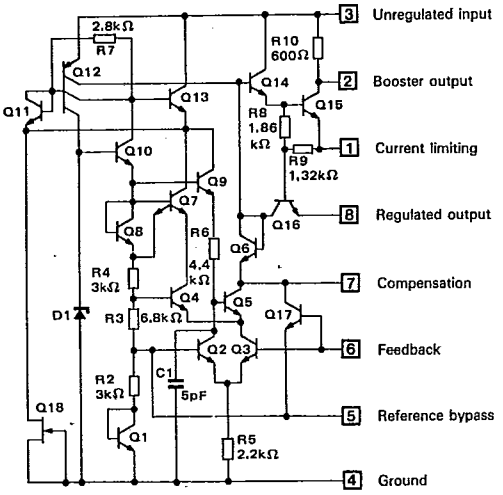
MAXIMUM RATINGS

Rating		Symbol	Value	Unit
Input voltage	LM105, LM205 LM305	V_I	50 40	V
Input-output voltage differential		$V_I - V_O$	40	V
Internal power dissipation		P_{tot}	500	mW
Short-circuit output current		I_{OS}	25	mA
Operating free-air temperature range	LM105 LM205 LM305	T_{oper}	 −55 to +125 −25 to + 85 0 to + 70	°C
Storage temperature range		T_{stg}	−65 to +150	°C

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Maximum junction-case thermal resistance	$R_{th(j-c)}$	45	°C/W
Maximum junction-ambient thermal resistance	$R_{th(j-a)}$	150	°C/W

SCHEMATIC DIAGRAM



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ELECTRICAL CHARACTERISTICS

LM105 : $-55°C \leq T_j \leq +125°C$
LM205 : $-25°C \leq T_j \leq +85°C$
LM305 : $0°C \leq T_j \leq +70°C$
(Unless otherwise specified)

Characteristic	Symbol	LM105 - LM205			LM305			Unit
		Min	Typ	Max	Min	Typ	Max	
Input voltage range	V_I	8.5	–	50	8.5	–	40	V
Output voltage range	V_O	4.5	–	40	4.5	–	30	V
Input-output voltage differential	$V_I - V_O$	3	–	30	3	–	30	V
Line regulation $V_I - V_O \leq 5$ V $V_I - V_O \geq$	K_V	– –	0.025 0.015	0.06 0.03	– –	0.025 0.015	0.06 0.03	%/V
Load regulation ($0 \leq I_O \leq 12$ mA, $R_{sc} = 10\ \Omega$) - Note 2 $T_j = +25°C$ $T_j = T_{j(min)}$ $T_j = T_{j(max)}$	K_{VO}	– – –	0.02 0.03 0.03	0.05 0.1 0.1	– – –	0.02 0.03 0.03	0.05 0.1 0.1	%
Ripple rejection ($C_{ref} = 10\ \mu F$, $f = 100$ Hz)	R_{vf}	–	0.003	0.01	–	0.03	0.01	%/V
Standby current drain $V_I = 50$ V LM105, LM205 $V_I = 40$ V LM305	I_{IB}	– –	0.8 –	2 –	– –	– 0.8	– 2	mA
Reference voltage	V_{ref}	1.63	1.7	1.81	1.63	1.7	1.81	V
Output noise voltage (10 Hz ≤ f ≤ 10 kHz) $C_{ref} = 0$ $C_{ref} > 0.1\ \mu F$	V_{NO}	– –	0.005 0.002	– –	– –	0.005 0.002	– –	%
Average temperature coefficient of output voltage	αV_O	–	0.3	1	–	0.3	1	%
Long term stability	K_{VH}	–	0.1	1	–	0.1	1	%
Current limit sense voltage ($T_j = +25°C$, $R_{sc} = 10\ \Omega$, $V_O = 0$)	V_{sense}	225	300	375	225	300	375	mV

Note 1 : These specifications apply for a junction temperature between $T_{j(min)}$ and $T_{j(max)}$, for input and output voltages within the ranges given, and for a divider impedance seen by the feeback terminal of 2 kΩ, 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.

Note 2 : The output current 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.

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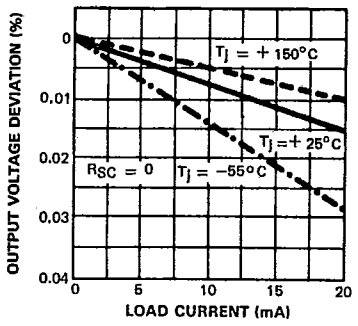
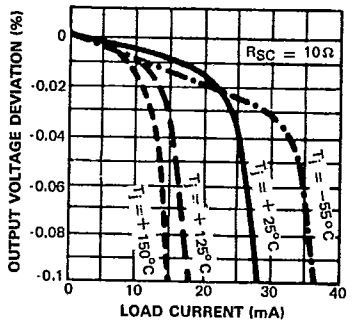
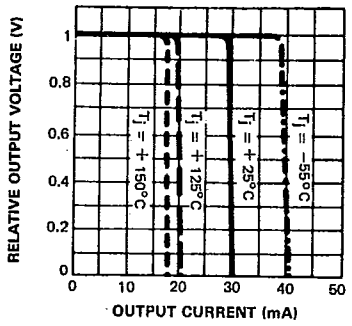
LOAD REGULATION WITHOUT CURRENT LIMITING



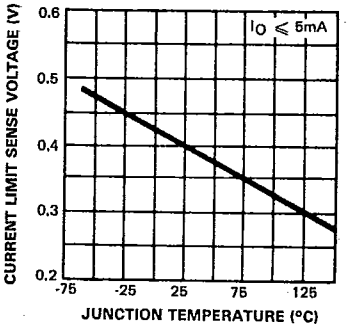
LOAD REGULATION WITH CURRENT LIMITING



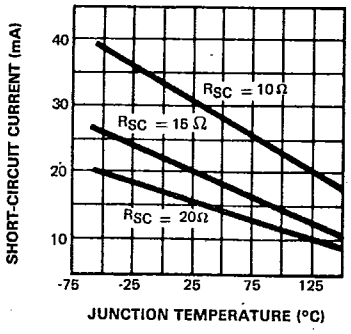
CURRENT LIMITING CHARACTERISTICS



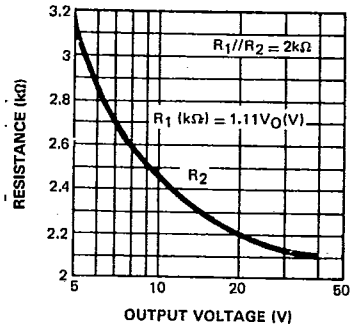
CURRENT LIMITING SENSE VOLTAGE



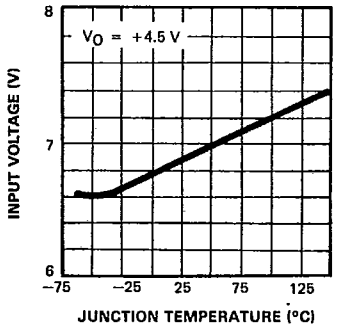
SHORT-CIRCUIT CURRENT



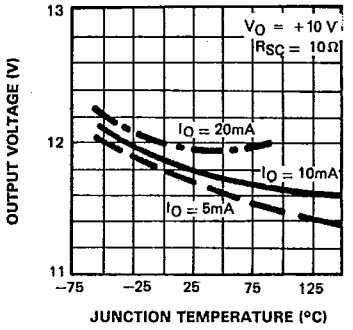
OPTIMUM DIVIDER RESISTANCE VALUE



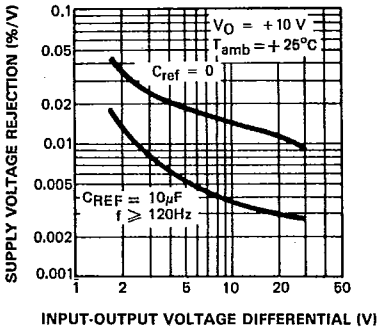
MINIMUM INPUT VOLTAGE



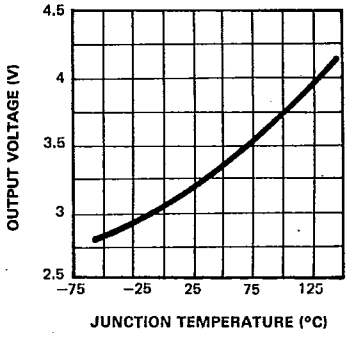
DROPOUT VOLTAGE



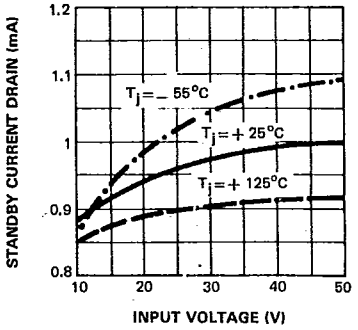
SUPPLY VOLTAGE REJECTION



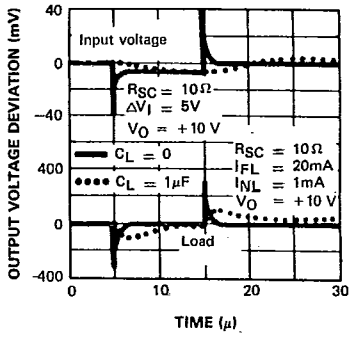
MINIMUM OUTPUT VOLTAGE



STANDBY CURRENT DRAIN

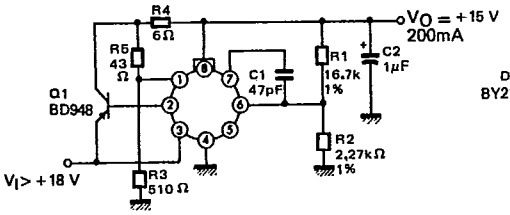


TRANSIENT RESPONSE

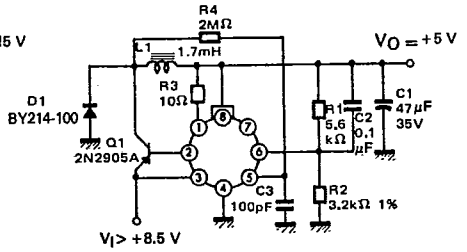


TYPICAL APPLICATIONS

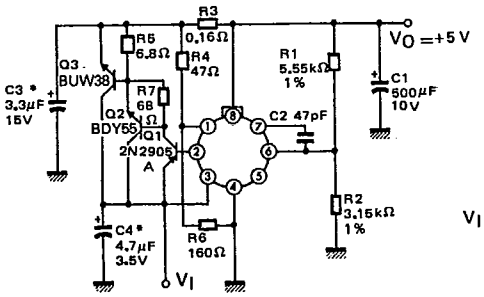
LINEAR REGULATOR WITH FOLDBACK CURRENT LIMITING



SWITCHING REGULATOR

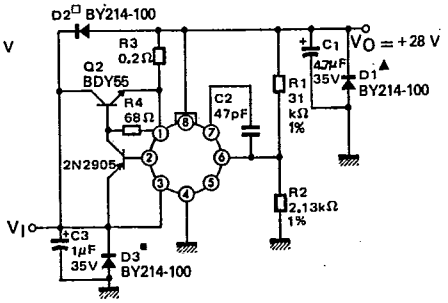


10 A REGULATOR WITH FOLDBACK CURRENT LIMITING



* Solid tantalum

1 A REGULATOR WITH PROTECTIVE DIODES

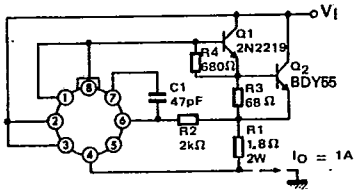


□ Protects against shorted input or inductive loads on unregulated supply.

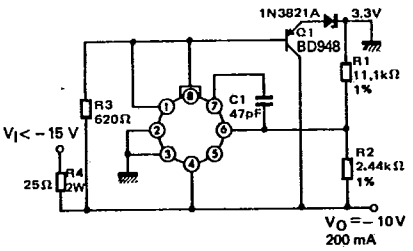
■ Protects against input voltage reversal.

▲ Protects against output voltage reversal.

CURRENT REGULATOR



SHUNT REGULATOR (V_O<0)



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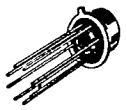

H SUFFIX
METAL CAN

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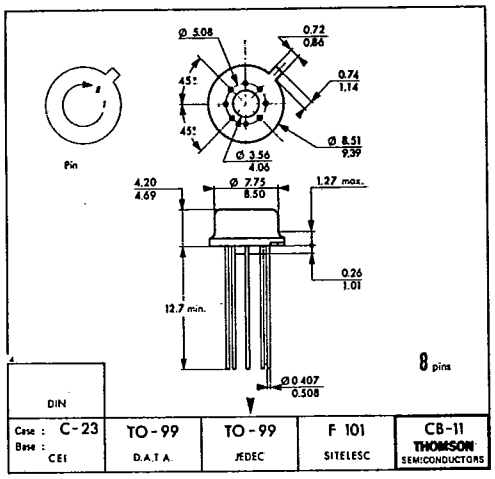

These specifications are subject to change without notice.
Please inquire with our sales offices about the availability of the different packages.