

THOMSON SEMICONDUCTORS

LM109
LM209
LM309

T-58-11-13

THREE-TERMINAL 5-VOLT REGULATORS

The LM 109, LM 209 and LM 309 are 5 V regulators. They are designed for local regulation on digital logic cards.

In CB-7 package, they can deliver output current in excess of 200 mA if adequate heatsink is provided. With CB-19 power package, the available output current is greater than 1 A.

These regulators are essentially blow-out proof. Current limiting is included and thermal shut down is provided to keep the ICs from overheating. If internal dissipation becomes too great, the regulator will shut down to prevent excessive heating.

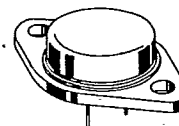
- Fixed voltage regulator requires no external component for adjusting
- Can provide other values of regulated voltages above 5 V using separate, bias resistors.
- Specified to be compatible, worst case, with TTL and DTL.

THREE-TERMINAL 5-VOLT REGULATORS

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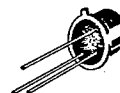
CASES

CB-19 (TO-3)



K SUFFIX
STEEL CAN

CB-7 (TO-39)



H SUFFIX
METAL CAN

ORDERING INFORMATION

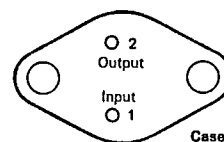
Hi-Rel versions available - See chapter 14

PART NUMBER	TEMPERATURE RANGE	PACKAGE	
		H	K
LM109	-55°C to +150°C	•	•
LM209	-25°C to +150°C	•	•
LM309	0°C to +125°C	•	•
Examples : LM109H, LM109K			

PIN ASSIGNMENTS

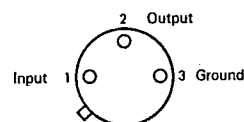
(Bottom views)

CB-19



Case is ground

CB-7



Réf. 00110

THOMSON SEMICONDUCTORS

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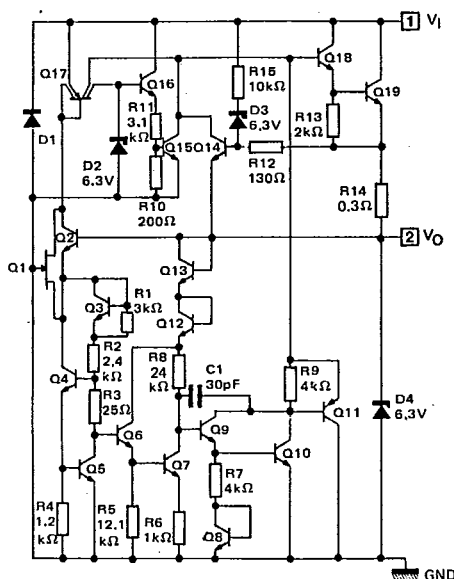
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Input voltage	V_I	35	V
Internal power dissipation	P_D	Internally limited	W
Short-circuit output current	I_{OS}	Internally limited	A
Operating free-air temperature range	T_{oper}	-65 to +150 -25 to +150 0 to +125	°C
Storage temperature range	T_{stg}	-65 to +150	°C

THERMAL CHARACTERISTICS

Rating	Symbol	Min	Typ	Max	Unit
Junction-case thermal resistance	$R_{th(j-c)}$	—	—	15 4	°C/W
Junction-ambient thermal resistance	$R_{th(j-a)}$	—	—	185 35	°C/W

SCHEMATIC DIAGRAM



CASE	V_I	V_O	GND
CB-19	1	2	Case 3
CB-7	1	2	3

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ELECTRICAL CHARACTERISTICS

LM109 : $-55^{\circ}\text{C} \leq T_j \leq +150^{\circ}\text{C}$ LM209 : $-25^{\circ}\text{C} \leq T_j \leq +150^{\circ}\text{C}$ LM309 : $0^{\circ}\text{C} \leq T_j \leq +150^{\circ}\text{C}$ $V_I = +10\text{ V}$, $I_O = 0.1\text{ A}$ (CB-7) or 0.5 A (CB-19)

(Unless otherwise specified)

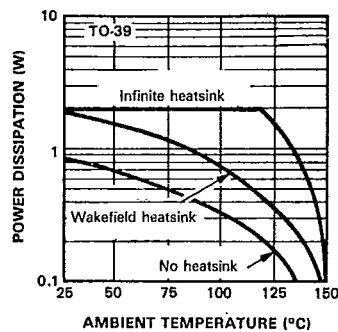
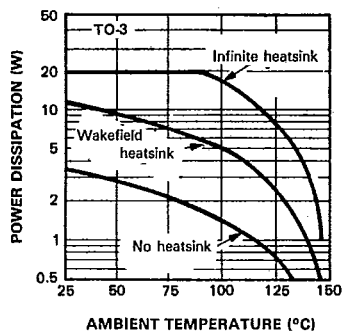
Characteristic	Symbol	LM109 - LM209			LM309			Unit
		Min	Typ	Max	Min	Typ	Max	
Output voltage range $T_j = +25^{\circ}\text{C}$ $T_{\min} \leq T_{\text{amb}} \leq T_{\max}$ $+7\text{ V} \leq V_I \leq +25\text{ V}$, $5\text{ mA} \leq I_O \leq 200\text{ mA}$, $P < 2\text{ W}$ CB-7 $5\text{ mA} \leq I_O \leq 1\text{ A}$, $P < 20\text{ W}$ CB-19	V_O	4.7	5.05	5.3	4.8	5.05	5.2	V
Line regulation ($+7\text{ V} \leq V_I \leq +25\text{ V}$, $T_j = +25^{\circ}\text{C}$)	K_{V_I}	—	4	50	—	4	50	mV
Load regulation ($T_j = +25^{\circ}\text{C}$) $5\text{ mA} \leq I_O \leq 0.5\text{ A}$ CB-7 $5\text{ mA} \leq I_O \leq 1.5\text{ A}$ CB-19	K_{V_O}	—	20	50	—	20	50	mV
Quiescent current ($+7\text{ V} \leq V_I \leq +25\text{ V}$)	I_{IB}	—	5.2	10	—	5.2	10	mA
Quiescent current deviation $+7\text{ V} \leq V_I \leq +25\text{ V}$ $5\text{ mA} \leq I_O \leq 200\text{ mA}$ CB-7 $5\text{ mA} \leq I_O \leq 1\text{ A}$ CB-19	ΔI_{IB}	—	—	0.5	—	—	0.5	mA
Output noise voltage ($T_{\text{amb}} = +25^{\circ}\text{C}$, $10\text{ Hz} \leq f \leq 100\text{ kHz}$)	V_{NO}	—	—	40	—	—	40	μV
Long term stability	K_{VH}	—	—	10	—	—	20	mV

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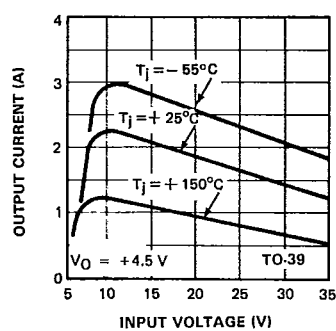
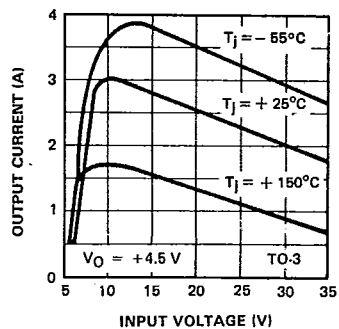
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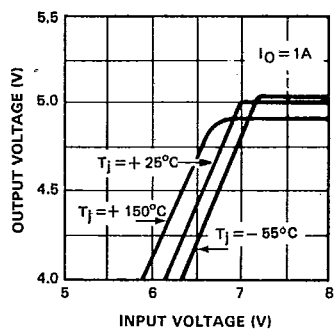
MAXIMUM AVERAGE POWER DISSIPATION



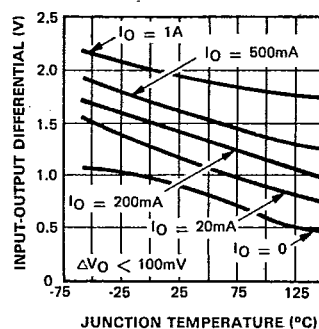
PEAK OUTPUT CURRENT



DROPOUT CHARACTERISTICS



DROPOUT VOLTAGE

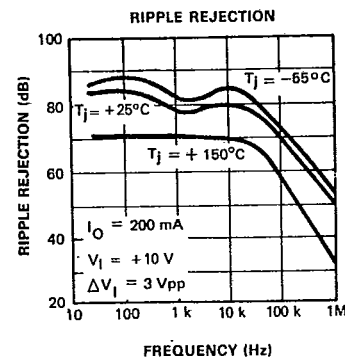
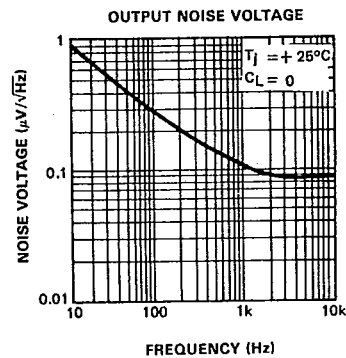
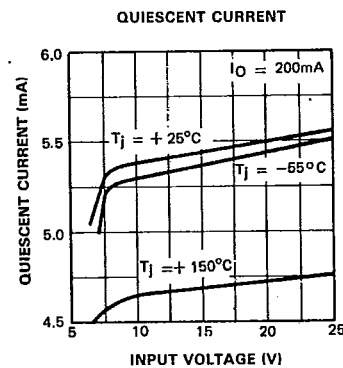
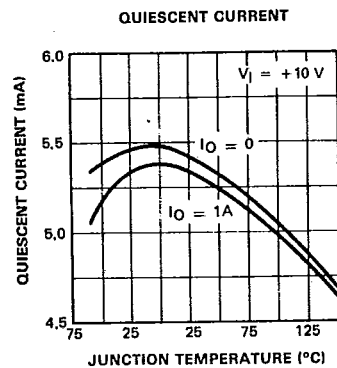
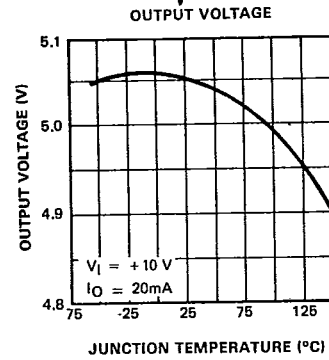
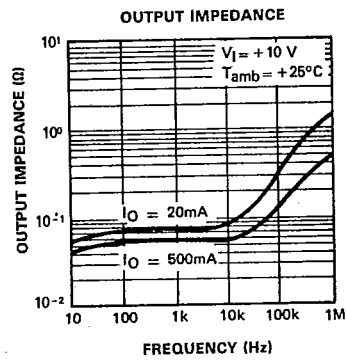


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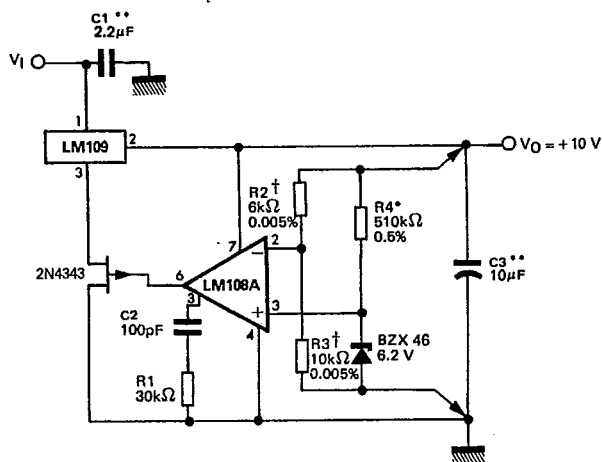
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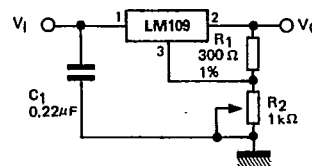
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TYPICAL APPLICATIONS

★ HIGH STABILITY REGULATOR

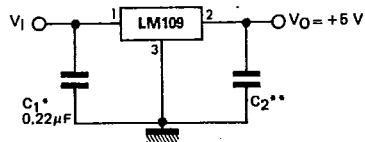


ADJUSTABLE OUTPUT REGULATOR



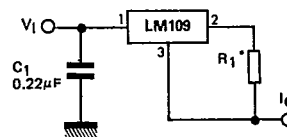
- ★ Regulation better than 0.01% load, line and temperature can be obtained
- * Determines zener current. May be adjusted to minimize thermal drift
- ** Solid tantalum
- † High stability resistors

FIXED 5 V REGULATOR



- * Required if regulator is located an appreciable distance from power supply filter capacitor.
- ** Although no output capacitor is needed for stability, it does improve transient response.

CURRENT REGULATOR

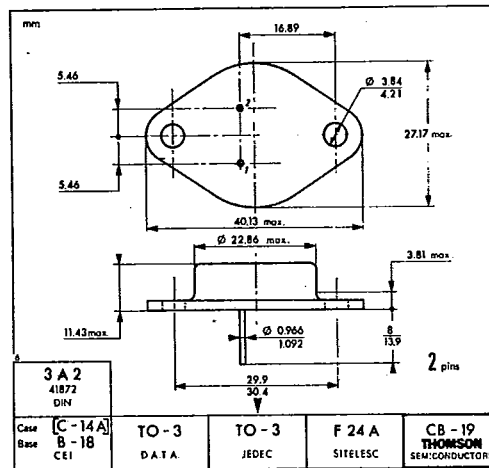
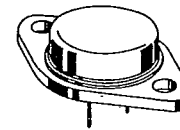


- * Determines output current

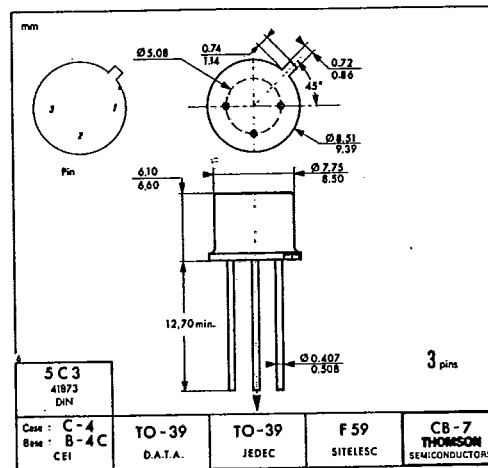
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CB-19
(TO-3)K SUFFIX
STEEL CAN.

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CB-7
(TO-39)H SUFFIX
METAL CAN

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

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