

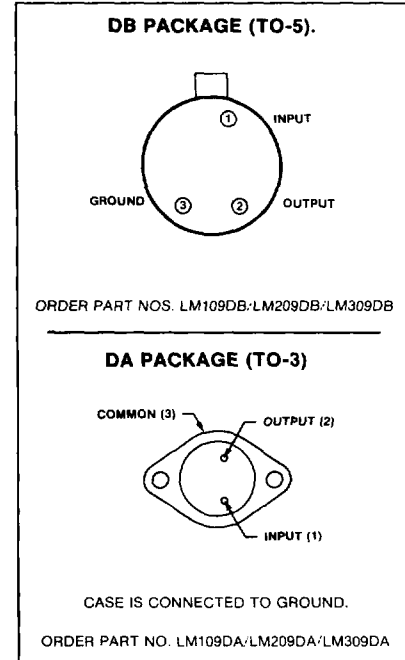
DESCRIPTION

The LM109/209/309 are complete 5 volt regulators fabricated on a single silicon chip. These regulators are designed for local "on card" regulation to eliminate many of the noise and ground loop problems associated with single-point regulation. They employ internal current limiting, thermal shutdown, and safe-area compensation which makes the circuitry essentially blow-out proof. If adequate heat sinking is provided, the devices can deliver output currents in excess of 200mA from the TO-5 package, and 1A from the TO-3 package. In addition to their use as fixed 5 volt regulators, these devices may be used with external components to obtain adjustable output levels. They may also be used as the power pass element in precision regulators.

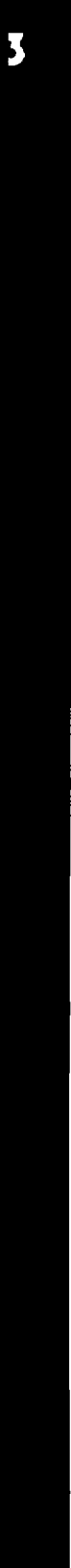
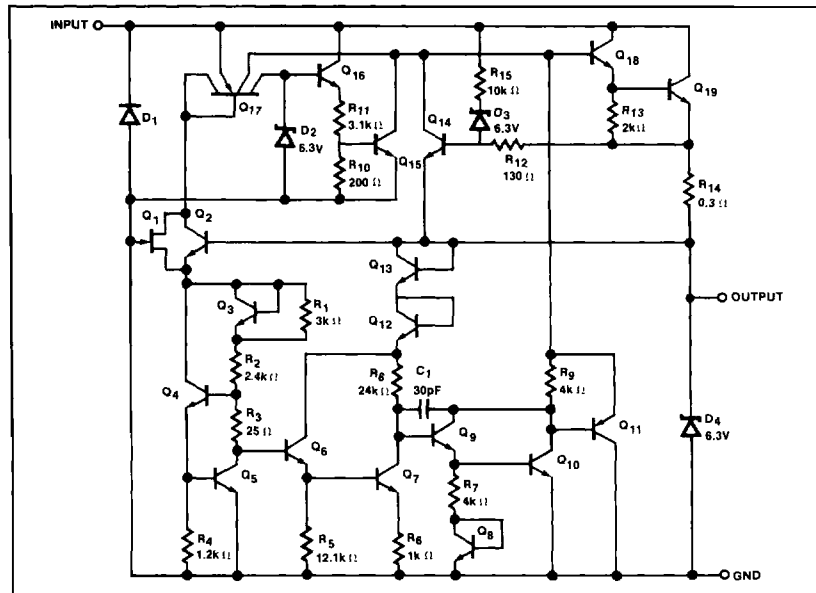
FEATURES

- Output currents in excess of 1mA
- Internal thermal overload protection
- Internal current limiting
- No external components required
- LM109 military qualifications pending

PIN CONFIGURATION



EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Input voltage	35	V
Power dissipation	Internally limited	
Operating junction temperature range		
LM109	-55 to 150	°C
LM209	-25 to 150	°C
LM309	0 to 125	°C
Storage temperature range	-65 to 150	°C
Lead temperature (soldering, 10 sec)	300	°C

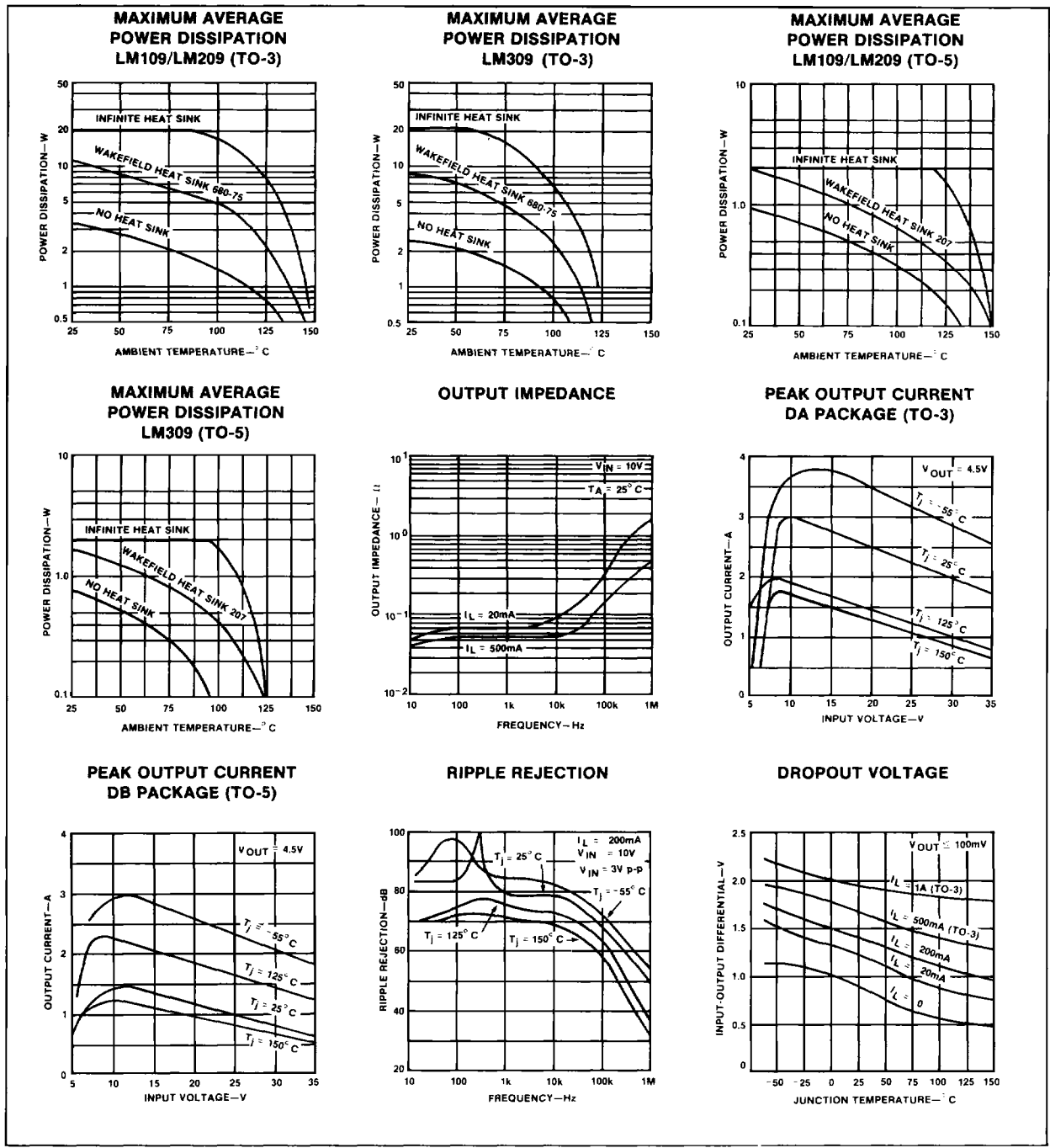
DC ELECTRICAL CHARACTERISTICS $T_J = 25^\circ\text{C}$, $V_{IN} = 10\text{V}$ unless otherwise specified^{1,2}

PARAMETER	TEST CONDITIONS	LM109/LM209			LM309			UNIT
		Min	Typ	Max	Min	Typ	Max	
Output voltage		4.7	5.05	5.3	4.8	5.05	5.2	V
Line regulation	$7\text{V} \leq V_{IN} \leq 25\text{V}$		4	50		4	50	mV
Load regulation								
TO-5	$5\text{mA} \leq I_{OUT} \leq 0.5\text{A}$		20	50		20	50	mV
TO-3	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$		50	100		50	100	mV
Output voltage	$5\text{mA} \leq I_{OUT} \leq I_{max}$, $P < P_{max}$ over temp. $8\text{V} \leq V_{IN} \leq 20\text{V}$ $7\text{V} \leq V_{IN} \leq 25\text{V}$	4.6		5.4	4.75		5.25	V V
Quiescent current	$7\text{V} \leq V_{IN} \leq 25\text{V}$, over temp.		5.2	10		5.2	10	mA
Quiescent current change	$5\text{mA} \leq I_{OUT} \leq I_{max}$ $8\text{V} \leq V_{IN} \leq 25\text{V}$ $7\text{V} \leq V_{IN} \leq 25\text{V}$			0.5 0.8			0.5 0.8	mA mA mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$		40			40		μV
Long term stability				10			20	mV
Thermal resistance junction to case ²								
TO-5			15			15		°C/W
TO-3			3			3		°C/W

NOTES

1. Unless otherwise specified, $I_{OUT} = 0.1\text{A}$ for the TO-5 package or $I_{OUT} = 0.5\text{A}$ for the TO-3 package. For the TO-5 package, $I_{max} = 0.2\text{A}$ and $P_{max} = 2.0\text{W}$. For the TO-3 package, $I_{max} = 1.0\text{A}$ and $P_{max} = 20\text{W}$.
2. Without a heat sink, the thermal resistance of the TO-5 package is about 150°C/W , while that of the TO-3 package is approximately 35°C/W . With a heat sink, the effective thermal resistance can only approach the values specified, depending on the efficiency of the sink.

TYPICAL PERFORMANCE CHARACTERISTICS



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