

**GENERAL DESCRIPTION**

The RM709 and RC709 are monolithic, high gain DC operational amplifiers fabricated on a single silicon chip by the planar process.

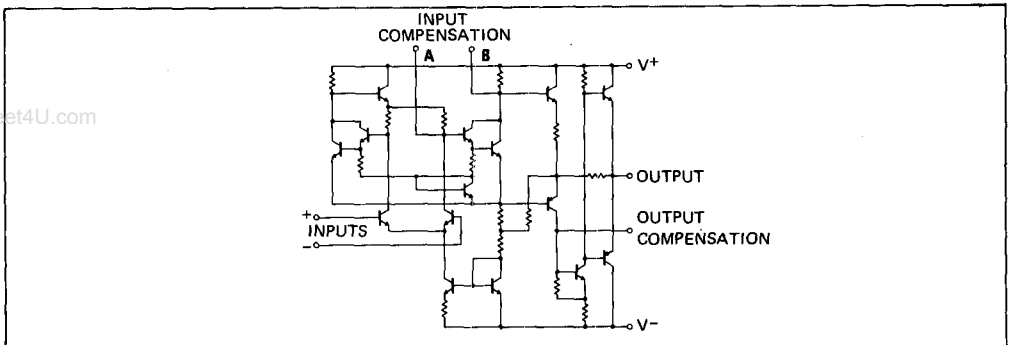
These devices are designed for use in operational amplifier signal processing, low level instrumentation, control systems and for the generation of special linear and non-linear transfer functions.

The RM709 operates over the full military temperature range from -55°C to +125°C. The RC709 is the commercial device intended to operate over a temperature range of 0°C to +70°C.

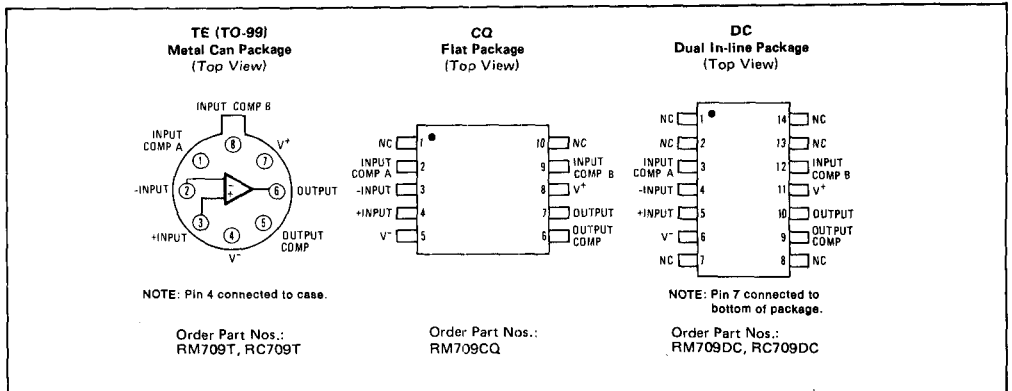
**DESIGN FEATURES**

- Low Input Offset Voltage  $\pm 1.0\text{mV}$  Maximum
- Low Temperature Drift of Input Offset Voltage  $\pm 6\mu\text{V}/^\circ\text{C}$  Maximum
- Low Temperature Drift of Input Offset Current (+25°C to +125°C)  $0.3\text{nA}/^\circ\text{C}$  Maximum (-55°C to +25°C)  $1.0\text{nA}/^\circ\text{C}$  Maximum
- Low Power Consumption 90mW Maximum
- High Performance Open Loop Gain Characteristics 45k Typical

**SCHEMATIC DIAGRAM**



**CONNECTION INFORMATION**



## ABSOLUTE MAXIMUM RATINGS

Supply Voltage	±18V	Output Short-Circuit Duration (T <sub>A</sub> = 25°C)	5 sec
Differential Input Voltage	±5V	Storage Temperature Range	-65°C to +150°C
Input Voltage	±10V	Operating Temperature Range	
Power Dissipation (Note)		RM709/709A	-55°C to +125°C
Dual In-line Package	300mW	RC709	0°C to +70°C
TO-5 Package	300mW	Lead Temperature (Soldering, 60s)	300°C
Flat Package	250mW		

## ELECTRICAL CHARACTERISTICS (±9 ≤ V<sub>S</sub> ≤ ±15V, T<sub>A</sub> = 25°C unless otherwise specified)

PARAMETER	CONDITIONS	RM709			RC709			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	R <sub>S</sub> ≤ 10kΩ	1.0	3.0	2.0	7.5			mV
Input Offset Current		25	100	100	500			nA
Input Bias Current		180	300	300	1500			nA
Input Resistance		220	400	50	250			kΩ
Output Resistance			150		150			Ω
Supply Current	V <sub>S</sub> = ±15V	2.6	4.0		6.6			mA
Power Consumption	V <sub>S</sub> = ±15V	80	120		80	200		mW
Transient Response	R <sub>L</sub> = 2kΩ, V <sub>S</sub> = ±15V, V <sub>IN</sub> = 20mV							
Rise Time	C <sub>1</sub> = 5nF, R <sub>1</sub> = 1.5k, C <sub>2</sub> = 200pF, R <sub>2</sub> = 50Ω	0.3	1.0	0.3	1.0			μs
Overshoot	C <sub>L</sub> ≤ 100pF	10	30	10	30			%
Slew Rate	V <sub>S</sub> = ±15V, R <sub>L</sub> ≥ 10kΩ, A <sub>V</sub> = 1	0.15	0.4		0.4			V/μs
Large Signal Voltage Gain	V <sub>S</sub> = ±15V, R <sub>L</sub> = 2k, V <sub>OUT</sub> = ±10V				15	45		kV/V
<b>The following specifications apply for -55°C ≤ T<sub>A</sub> ≤ +125°C for RM; 0°C ≤ T<sub>A</sub> ≤ 70°C for RC.</b>								
Large Signal Voltage Gain	V <sub>S</sub> = ±15V, R <sub>L</sub> ≥ 2k, V <sub>OUT</sub> = ±10V	25	45	70	12			kV/V
Input Offset Voltage	R <sub>S</sub> ≤ 10kΩ			4.0		10		mV
Input Offset Current	T <sub>A</sub> = max			10		100		nA
	T <sub>A</sub> = min			50		300		750
Input Bias Current	T <sub>A</sub> = min			400		1000		2000
Average Temperature of Coefficient of Input Offset Voltage	R <sub>S</sub> = 50Ω, T <sub>A</sub> = 25°C to T <sub>A</sub> = max			1.8		10		
	R <sub>S</sub> = 50Ω, T <sub>A</sub> = 25°C to T <sub>A</sub> = min			1.8		10		
	R <sub>S</sub> = 10k, T <sub>A</sub> = 25°C to T <sub>A</sub> = max			2.0		15		
	R <sub>S</sub> = 10k, T <sub>A</sub> = 25°C to T <sub>A</sub> = min			6.0		15		
Average Temperature Coefficient of Input Offset Current	T <sub>A</sub> = +25°C to max							
	T <sub>A</sub> = +25°C to min							
Input Voltage Range	V <sub>S</sub> = ±15V	±8.0	±10		±8.0	±10		V
Output Voltage Swing	V <sub>S</sub> = ±15V, R <sub>L</sub> ≥ 10kΩ	±12	±14		±12	±14		V
	V <sub>S</sub> = ±15V, R <sub>L</sub> ≥ 2kΩ	±10	±13		±10	±13		
Input Resistance	T <sub>A</sub> = min	50	125		35	125		kΩ
Common Mode Rejection Ratio	R <sub>S</sub> ≤ 10kΩ	70	90		65	90		dB
Supply Voltage Rejection Ratio	R <sub>S</sub> ≤ 10kΩ		25	150		25	200	μV/V
Supply Current	V <sub>S</sub> = ±15V, T <sub>A</sub> = max							mA
	V <sub>S</sub> = ±15V, T <sub>A</sub> = min							
Power Consumption	V <sub>S</sub> = ±15V, T <sub>A</sub> = max							mW
	V <sub>S</sub> = ±15V, T <sub>A</sub> = min							

### NOTE:

Derate linearly the maximum power dissipation of the dual in-line package at 8.6mW/°C for ambient temperature above +115°C, of the TO-5 package at 5.6mW/°C for ambient temperature above +95°C and of the flat package at 5.4mW/°C for ambient temperature above +103°C. For RC709, rating applies for case temperatures to +70°C.