MCCF1709
MCCF1709C

MONOLITHIC OPERATIONAL AMPLIFIER FLIP-CHIP

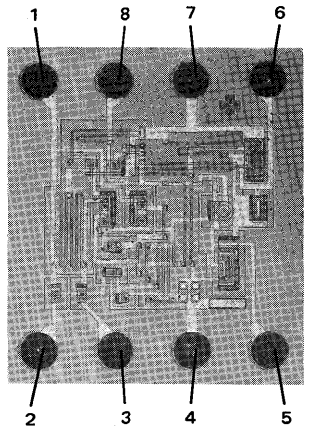
. . . designed for use as a summing amplifier, integrator, or amplifier with operating characteristics as a function of the external feedback components.

The MCCF1709 and MCCF1709C employ phosphorsilicate passivation that protects the entire die surface area, including metalization interconnects. The bumps are 95-5 solder on a chrome-copper-gold base. The interconnecting metalization is evaporated aluminum.

- High-Performance Open Loop Gain Characteristics
  A_{vol} = 45,000 typical
- Low Temperature Drift – ±3.0 μV/°C
- Large Output Voltage Swing – ±14 V typical @ ±15 V Supply
- Low Output Impedance – z_o = 150 ohms typical

FLIP-CHIP
OPERATIONAL AMPLIFIER

MONOLITHIC SILICON INTEGRATED CIRCUIT



MAXIMUM RATINGS (T_A = +25°C unless otherwise noted.)

Rating		Symbol	Value	Unit
Power Supply Voltage		V_{CC} V_{EE}	+18 -18	Vdc
Differential Input Signal		V_{ID}	±5.0	Volts
Common Mode Input Swing		V_{IC}	$\pm V_S$	Volts
Load Current		I_L	10	mA
Output Short Circuit Duration		t_S	5.0	s
Operating Temperature Range	MCCF1709 MCCF1709C	T_A	-55 to +125 0 to +75	°C
Junction Temperature Range		T_J	-55 to +150	°C

FIGURE 1 – CIRCUIT SCHEMATIC

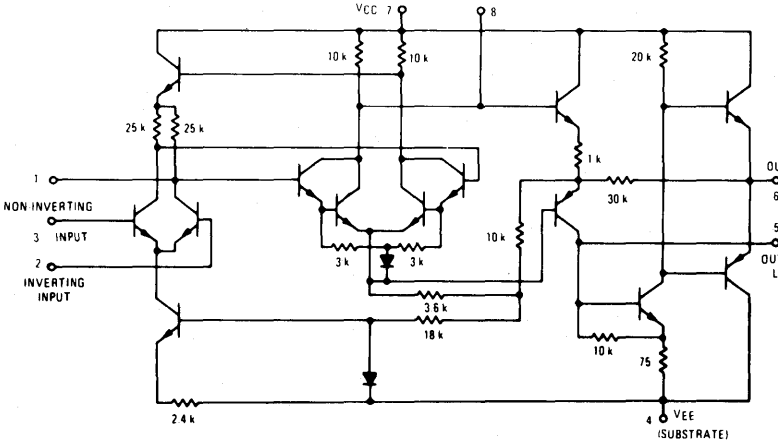
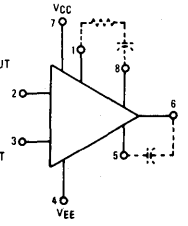


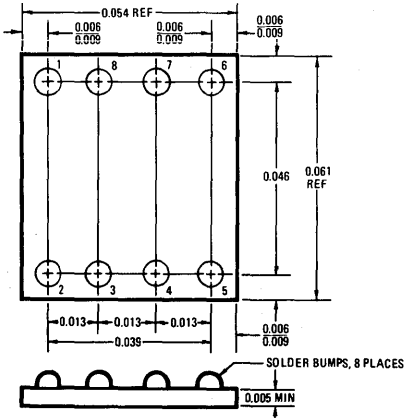
FIGURE 2 – EQUIVALENT CIRCUIT



ELECTRICAL CHARACTERISTICS (V_{CC} = +15 Vdc, V_{EE} = -15 Vdc, T_A = +25°C unless otherwise noted.)

Characteristic	Symbol	MCCF1709			MCCF1709C			Unit
		Min	Typ	Max	Min	Typ	Max	
Open Loop Voltage Gain (V_O = ±10V)	A_{vol}	25,000	45,000	70,000	15,000	45,000	–	–
Output Impedance (f = 20 Hz)	z_o	–	150	–	–	150	–	Ω
Input Impedance (f = 20 Hz)	z_{in}	–	400	–	–	250	–	kΩ
Output Voltage Swing (R_L = 10 kΩ) (R_L = 2.0 kΩ)	V_O	±12 ±10	±14 ±13	– –	±12 ±10	±14 ±13	– –	V_{peak}
Input Common-Mode Voltage Swing	V_{IC}	–	±10	–	–	±10	–	V_{peak}
Common-Mode Rejection Ratio (f = 20 Hz)	CMRR	–	90	–	–	90	–	dB
Input Bias Current	I_{IB}	–	0.2	0.5	–	0.3	1.5	μA
Input Offset Current	$\|I_{IO}\|$	–	0.05	0.2	–	0.1	0.5	μA
Input Offset Voltage	$\|V_{IO}\|$	–	1.0	5.0	–	2.0	7.5	mV
Step Response								
Gain = 100, 5.0% overshoot	t_{THL} t_d dV_O/dt	– – –	0.8 0.38 12	– – –	– – –	0.8 0.38 12	– – –	μs μs V/μs
Gain = 10, 10% overshoot	t_{THL} t_d dV_O/dt	– – –	0.6 0.34 1.7	– – –	– – –	0.6 0.34 1.7	– – –	μs μs V/μs
Gain = 1, 5.0% overshoot	t_{THL} t_d dV_O/dt	– – –	2.2 1.3 0.25	– – –	– – –	2.2 1.3 0.25	– – –	μs μs V/μs
Power Supply Current	I_{DCC} I_{DEE}	– –	2.7 2.7	5.5 5.5	– –	2.7 2.7	6.7 6.7	mAdc
DC Quiescent Power Dissipation (Power Supply = ±15 V, V_O = 0)	P_D	–	80	165	–	80	200	mW
Positive Supply Sensitivity (V_{EE} constant)	S^+	–	25	150	–	25	200	μV/V
Negative Supply Sensitivity (V_{CC} constant)	S^-	–	25	150	–	25	200	μV/V

See current MC1709/1709C data sheet for additional information.



Bump Dia. at Base: 0.006 ± 0.001 in. Bump Height: 0.0040 ± 0.0005 in.
Each bump centerline to be located within 0.001 in. of its true position with respect to any other bump centerline.

PACKAGING AND HANDLING

The popular 1709 type operational amplifier is now available in three chip forms: 1) conventional chips, 2) beam-lead chips and 3) flip-chips, as well as in a variety of plastic and hermetic packages. The flip-chip consists of a silicon chip with solder bumps on the geometry surface to provide easy mechanical mounting and electrical connection. *These devices are protected by a thin layer of* phosphorsilicate passivation which covers the interconnect metalization and active areas of the die.

Care must be exercised when removing the dice from the shipping carrier to avoid scratching the solder bumps. A vacuum pickup is useful for the handling of dice. Tweezers are not recommended for this purpose.

The non-spill type shipping carrier consists of a compartmentalized tray and fitted cover. Die are placed in the carrier with geometry side up.