

**MCC1709
MCC1709C**

Advance Information

MONOLITHIC OPERATIONAL AMPLIFIER CHIP

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

The MCC1709 and MCC1709C employ phosphorsilicate passivation that protects the entire die surface area, including metalization interconnects. All dice have a minimum gold-backed thickness of 4000 Angstroms. The interconnecting metalization and bonding pads are of evaporated aluminum.

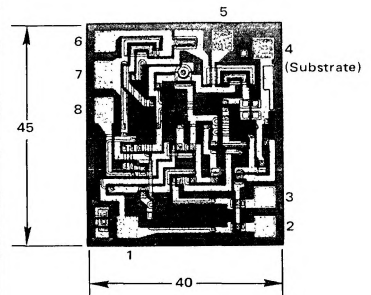
- High-Performance Open Loop Gain Characteristics
AVOL = 45,000 typical
- Low Temperature Drift – $\pm 3.0 \mu\text{V}/^\circ\text{C}$
- Large Output Voltage Swing – $\pm 14 \text{ V}$ typical @ $\pm 15 \text{ V}$ Supply
- Low Output Impedance – $Z_{\text{out}} = 150 \text{ ohms}$ typical

MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Power Supply Voltage	V^+	+18	Vdc
	V^-	-18	
Differential Input Signal	V_{in}	± 5.0	Volts
Common Mode Input Swing	CMV_{in}	$\pm V^+$	Volts
Load Current	I_L	10	mA
Output Short Circuit Duration	t_S	5.0	s
Operating Temperature Range	T_A	-55 to +125	$^\circ\text{C}$
Junction Temperature Range	T_J	-55 to +150	$^\circ\text{C}$

**OPERATIONAL AMPLIFIER CHIP
INTEGRATED CIRCUIT
MONOLITHIC SILICON**

**OUTLINE DIMENSIONS
and BONDING DIAGRAM**



All dimensions are nominal and in mils (10^{-3} inches).
Die Dimensions
Thickness = 8.0
Bonding Pads = 4.0×4.0

FIGURE 1 – CIRCUIT SCHEMATIC

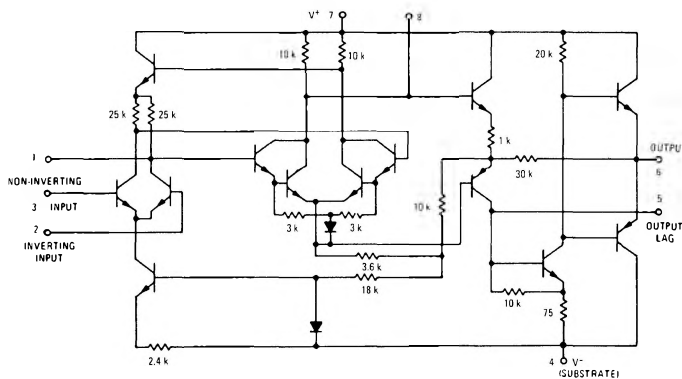
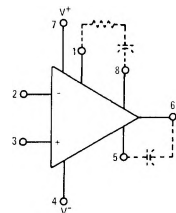


FIGURE 2 – EQUIVALENT CIRCUIT



MCC1709, MCC1709C (continued)

ELECTRICAL CHARACTERISTICS ($V^+ = +15$ Vdc, $V^- = -15$ Vdc, $T_A = +25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	MCC1709			MCC1709C			Unit
		Min	Typ	Max	Min	Typ	Max	
Open Loop Voltage Gain ($V_O = \pm 10$ V)	A_{VOL}	25,000	45,000	70,000	15,000	45,000	—	—
Output Impedance ($f = 20$ Hz)	Z_{out}	—	150	—	—	150	—	Ω
Input Impedance ($f = 20$ Hz)	Z_{in}	—	400	—	—	250	—	$k\Omega$
Output Voltage Swing ($R_L = 10$ $k\Omega$) ($R_L = 2.0$ $k\Omega$)	V_O	± 12 ± 10	± 14 ± 13	— —	± 12 ± 10	± 14 ± 13	— —	V_{peak}
Input Common-Mode Voltage Swing	CMV_{in}	—	± 10	—	—	± 10	—	V_{peak}
Common-Mode Rejection Ratio ($f = 20$ Hz)	CM_{rej}	—	90	—	—	90	—	dB
Input Bias Current	I_B	—	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_f	—	0.8	—	—	0.8	—	μs
	t_{pd}	—	0.38	—	—	0.38	—	μs
	dV_{out}/dt	—	12	—	—	12	—	$\text{V}/\mu\text{s}$
Gain = 10, 10% overshoot	t_f	—	0.6	—	—	0.6	—	μs
	t_{pd}	—	0.34	—	—	0.34	—	μs
	dV_{out}/dt	—	1.7	—	—	1.7	—	$\text{V}/\mu\text{s}$
Gain = 1, 5.0% overshoot	t_f	—	2.2	—	—	2.2	—	μs
	t_{pd}	—	1.3	—	—	1.3	—	μs
	dV_{out}/dt	—	0.25	—	—	0.25	—	$\text{V}/\mu\text{s}$
Power Supply Current	I_{D^+}	—	2.7	5.5	—	2.7	6.7	mA_{dc}
	I_{D^-}	—	2.7	5.5	—	2.7	6.7	mA_{dc}
DC Quiescent Power Dissipation (Power Supply = ± 15 V, $V_O = 0$)	P_D	—	80	165	—	80	200	mW
Positive Supply Sensitivity (V^- constant)	S^+	—	25	150	—	25	200	$\mu\text{V}/\text{V}$
Negative Supply Sensitivity (V^+ constant)	S^-	—	25	150	—	25	200	$\mu\text{V}/\text{V}$

See current MCC1709/1709C data sheet for additional information

PACKAGING AND HANDLING

The MCC1709/MCC1709C operational amplifier is now available as a single monolithic die or encapsulated in a variety of hermetic and plastic packages. The phosphorsilicate passivation protects the metalization and active area of the die but care must be exercised when removing the dice from the shipping carrier to avoid scratching the bonding pads. A vacuum pickup is useful for 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.