MCC1539
MCC1439

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. For detailed information see Motorola Application Note AN-439.

The MCC1539 and MCC1439 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.

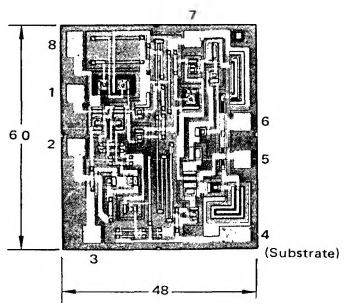
- Low Input Offset Voltage – 3.0 mV max
- Low Input Offset Current – 60 nA max
- Large Power-Bandwidth – 20 V_{p-p} Output Swing at 20 kHz min
- Output Short-Circuit Protection
- Input Over-Voltage Protection
- Class AB Output for Excellent Linearity
- Slew Rate – 34 V/μs typ

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

Rating	Symbol	Value	Unit
Power Supply Voltage	V^+ V^-	+18 -18	Vdc Vdc
Differential Input Signal	V_{in}	$\pm\|V^+ + \|V^-\|\|$	Vdc
Common Mode Input Swing	CMV_{in}	$+V^+, -\|V^-\|$	Vdc
Load Current	I_L	15	mA
Output Short Circuit Duration	t_S	Continuous	
Operating Temperature Range	T_A	-55 to +125	°C
Junction Temperature Range	T_J	-65 to +150	°C

OPERATIONAL AMPLIFIER CHIP INTEGRATED CIRCUIT

MONOLITHIC SILICON



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

FIGURE 1 – CIRCUIT SCHEMATIC

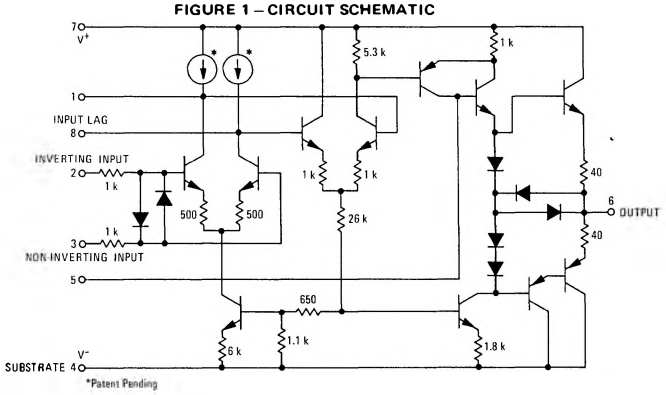
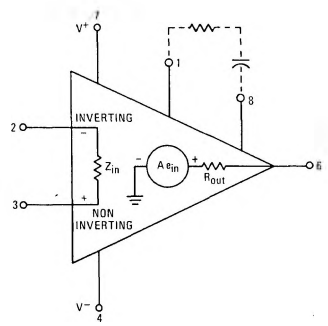


FIGURE 2 – EQUIVALENT CIRCUIT



This is advance information on a new introduction and specifications are subject to change without notice.

ELECTRICAL CHARACTERISTICS (V^+ = +15 Vdc, V^- = -15 Vdc, T_A = +25°C unless otherwise noted)

Characteristic	Symbol	MCC1539 Min	MCC1539 Typ	MCC1539 Max	MCC1439 Min	MCC1439 Typ	MCC1439 Max	Unit
Input Bias Current	I_b	–	0.20	0.50		0.20	1.0	μA
Input Offset Current	$\|I_{io}\|$	–	20	60		20	100	nA
Input Offset Voltage	$\|V_{io}\|$	–	1.0	3.0	–	2.0	7.5	mV
Average Temperature Coefficient of Input Offset Voltage (R_S = 50 Ω)	$\|TC_{Vio}\|$	–	3.0	–	–	3.0	–	μV/°C
Input Impedance	Z_{in}	–	300	–	–	300	–	kΩ
Input Common-Mode Voltage Swing	CMV_{in}	–	±12	–	–	±12	–	V_{pk}
Common Mode Rejection Ratio (f = 1.0 kHz)	CM_{rej}	–	110	–	–	110	–	dB
Open-Loop Voltage Gain (V_O = ±10 V, R_L = 10 kΩ, R_S = ∞) (T_A = +25°C to T_{high}) (T_A = T_{low})	A_{VOL}	50,000 25,000	120,000 100,000	–	15,000 15,000	100,000 100,000	–	–
Power Bandwidth (A_v = 1, THD ≤ 5%, V_O = 20 Vp-p, R_L = 1.0 kΩ)	PBW	–	50	–	–	50	–	kHz
Step Response								
Gain = 1000, no overshoot,	t_f	–	130	–	–	130	–	ns
	t_{pd}	–	190	–	–	190	–	ns
	dV_{out}/dt	–	6.0	–	–	6.0	–	V/μs
Gain = 1000, 15% overshoot,	t_f	–	80	–	–	80	–	ns
	t_{pd}	–	100	–	–	100	–	ns
	dV_{out}/dt	–	14	–	–	14	–	V/μs
Gain = 100, no overshoot,	t_f	–	60	–	–	60	–	ns
	t_{pd}	–	100	–	–	100	–	ns
	dV_{out}/dt	–	34	–	–	34	–	V/μs
Gain = 10, 15% overshoot,	t_f	–	120	–	–	120	–	ns
	t_{pd}	–	80	–	–	80	–	ns
	dV_{out}/dt	–	6.25	–	–	6.25	–	V/μs
Gain = 1, 15% overshoot,	t_f	–	160	–	–	160	–	ns
	t_{pd}	–	80	–	–	80	–	ns
	dV_{out}/dt	–	4.2	–	–	4.2	–	V/μs
Output Impedance (f = 20 Hz)	Z_{out}	–	4.0	–	–	4.0	–	kΩ
Output Voltage Swing (R_L = 2.0 kΩ, f = 1.0 kHz)	V_{out}	–	–	–	±10	±13	–	V_{pk}
(R_L = 1.0 kΩ, f = 1.0 kHz)		±10	±13	–	–	–	–	
Positive Supply Sensitivity (V^- constant)	S^+	–	50	150	–	50	200	μV/V
Negative Supply Sensitivity (V^+ constant)	S^-	–	50	150	–	50	200	pV/V
Power Supply Current (V_o = 0)	I_{D^+}	–	3.0	5.0	–	3.0	6.7	mAdc
	I_{D^-}	–	3.0	5.0	–	3.0	6.7	
DC Quiescent Power Dissipation (V_o = 0)	P_D	–	90	150	–	90	200	mW

See current MC1539/1439 data sheet for additional information.

PACKAGING AND HANDLING

The MCC1539/MCC1439 operational amplifier is now available as a single monolithic die or encapsulated in the TO-99 and TO-116 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.