Rochester Electronics

Datasheet

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
  - Class Q Military
  - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
  - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

JM38510/10104

JAN SINGLE LOW-INPUT-CURRENT OPERATIONAL AMPLIFIER (EXTERNALLY COMPENSATED)

GENERAL DESCRIPTION

This data sheet covers the electrical requirements for a monolithic, low input-current, externally-compensated operational amplifier as specified in MIL-M-38510/101 for device type 04. Devices supplied to this data sheet are manufactured and tested at PMI's MIL-M-38510 certified facility and are listed in QPL-38510.

Complete device requirements will be found in MIL-M-38510 and MIL-M-38510/101 for Class B processed devices.

GENERIC CROSS-REFERENCE INFORMATION

This cross-reference information is presented for the convenience of the user. The generic-industry types listed may not have identical operational performance characteristics across the military temperature range or reliability factors equivalent to the MIL-M-38510 device.

Military Device Type	Generic-Industry Type
04	LM108A

CASE OUTLINE

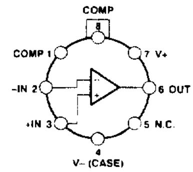
Per MIL-M-38510, Appendix C, Case Outline A-1 (8 Lead Can), Package Type Designator "G"; and Appendix C, Case Outline D-4 (8 Lead Dual-in-Line), Package Type Designator "P".

ORDERING INFORMATION

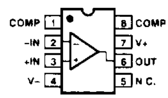
JAN SLASH SHEET	PMI DEVICE
JM38510/10104BGC	PM108AJ1/38510
JM38510/10104BGA	PM108AJ5/38510
JM38510/10104SGA*	PM108SAJ5/38510*
JM38510/10104BPB	PM108AZ2/38510
JM38510/10104BPA	PM108AZ5/38510

* JM38510/10104SGA, Class S device currently undergoing part I qualification. Consult PMI for availability.

PIN CONNECTIONS

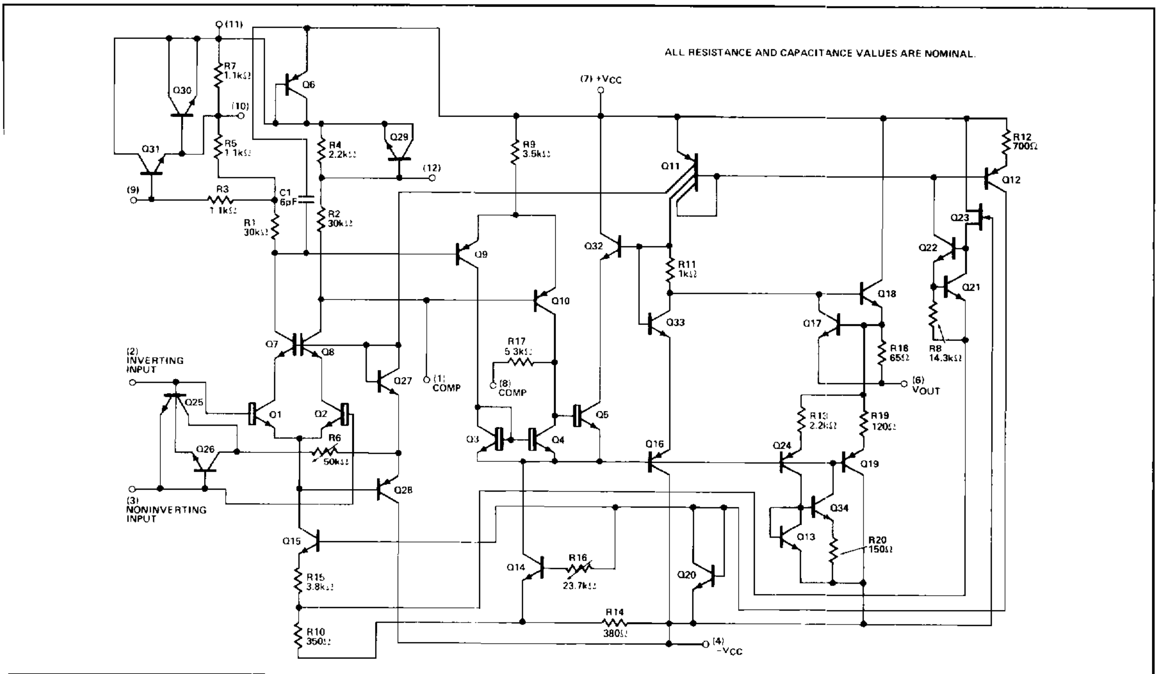


TO-99
GOLD PLATE LEAD TYPE
(J1-Suffix)
SOLDER DIPPED LEAD TYPE
(J5-Suffix)



8-PIN HERMETIC DIP
TIN REFLOW LEAD TYPE
(Z2-Suffix)
SOLDER DIPPED LEAD TYPE
(Z5-Suffix)

SIMPLIFIED SCHEMATIC



ELECTRICAL CHARACTERISTICS at $5V \le \pm V_{CC} \le 20V$ and $-55°C \le T_A \le +125°C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	MAX	UNITS
Input Offset Voltage	V_{IO}	(Note 2) $T_A = +25°C$ $R_S = 50\Omega$ $-55°C \le T_A \le +125°C$	−0.5 −1.0	+0.5 +1.0	mV
Input Offset Voltage Temperature Sensitivity	$\Delta V_{IO}/\Delta T$	ΔT_A from −55°C to +25°C ΔT_A from +25°C to +125°C	−5.0 −5.0	+5.0 +5.0	μV/C°
Input Offset Current	I_{IO}	(Note 2) $T_A = +25°C$ $-55°C \le T_A \le +125°C$	−0.2 −0.4	+0.2 +0.4	nA
Input Offset Current Temperature Sensitivity	$\Delta I_{IO}/\Delta T$	ΔT_A from −55°C to +25°C ΔT_A from +25°C to +125°C	−2.5 −2.5	+2.5 +2.5	pA/°C
Input Bias Current	$+I_{IB}, -I_{IB}$	(Note 2) $T_A = +25°C$ $T_A = -55°C$ $T_A = +125°C$	−0.1 −0.1 −1.0	2.0 3.0 2.0	nA
Power Supply Rejection Ratio	+PSRR	$+V_{CC} = 10V$, $-V_{CC} = 20V$, $R_S = 50\Omega$ $T_A = +25°C$ $-55°C \le T_A \le +125°C$	−16 −16	+16 +16	μV/V
Power Supply Rejection Ratio	−PSRR	$+V_{CC} = 20V$, $-V_{CC} = -10V$, $R_S = 50\Omega$ $T_A = +25°C$ $-55°C \le T_A \le +125°C$	−16 −16	+16 +16	μV/V
Input Voltage Common-Mode Rejection	CMR	$\pm V_{CC} = 20V$ $V_{IN} = \pm 15V$ $R_S = 50\Omega$	96	—	dB
Adjustment For Input Offset Voltage	V_{IO} ADJ(+)	$\pm V_{CC} = 20V$	No External Adjustment		mV
Adjustment For Input Offset Voltage	V_{IO} ADJ(−)	$\pm V_{CC} = 20V$	No External Adjustment		mV
Output Short-Circuit Current (For Positive Output)	$I_{OS(+)}$	$\pm V_{CC} = 15V$, $t \le 25ms$ (Note 3)	15	—	mA
Output Short-Circuit Current (For Negative Output)	$I_{OS(-)}$	$\pm V_{CC} = 15V$, $t \le 25ms$ (Note 3)	—	15	mA
Supply Current	I_{CC}	$\pm V_{CC} = 15V$ $T_A = -55°C$ $T_A = +25°C$ $T_A = +125°C$	— — —	0.8 0.6 0.6	mA
Output Voltage Swing (Maximum)	V_{OP}	$\pm V_{CC} = 20V$, $R_L = 10k\Omega$ $\pm V_{CC} = 20V$, $R_L = 2k\Omega$	+16 —	— —	V
Open-Loop Voltage Gain (Single Ended) (Note 1)	$A_{VS(\pm)}$	$\pm V_{CC} = 20V$, $R_L = 10k\Omega$, $V_{OUT} = \pm 15V$ $T_A = +25°C$ $-55°C \le T_A \le +125°C$	80 40	— —	V/mV
Open-Loop Voltage Gain (Single Ended) (Note 1)	A_{VS}	$\pm V_{CC} = 5V$ $R_L = 10k\Omega$ $V_{OUT} = \pm 2V$	80	—	V/mV
Transient Response Rise Time	$TR_{(tr)}$	$C_F = 10pF$	—	1000	ns
Transient Response Overshoot	$TR_{(OS)}$	$C_F = 10pF$	—	50	%
Noise (Referred to Input) Broadband	N_I (BB)	$V_{CC} = 20V$ Bandwidth = 5kHz $T_A = +25°C$	—	15	μV rm
Noise (Referred to Input) Popcorn	N_I (PC)	$\pm V_{CC} = 20V$ Bandwidth = 5kHz $T_A = +25°C$	—	40	μV pea

NOTES:

1. Note that gain is not specified at $V_{IO\ (ADJ)}$ extremes. Some gain reduction is usually seen at $V_{IO\ (ADJ)}$ extremes. For closed-loop applications (closed-loop gain less than 1,000), the open-loop tests (A_{VS}) prescribed herein should guarantee a positive, reasonably linear, transfer characteristic. They do not, however, guarantee that the open-loop gain is linear, or even positive, over the operating range. If either of these requirements exist (positive open-loop gain or open-loop gain linearity), they should be specified in the individual procurement document as additional requirements.
2. Tests at common-mode $V_{CM} = 0$, $V_{CM} = -15V$, and $V_{CM} = +15V$.
3. Continuous short-circuit limits will be considerably less than the indicated te limits. Continuous I_{OS} at T_A −75°C will cause T_j to exceed the maximum 175°C

ELECTRICAL CHARACTERISTICS at $5V \le \pm V_{CC} \le 20V$ and $-55°C \le T_A \le +125°C$, unless otherwise noted. (Continued)

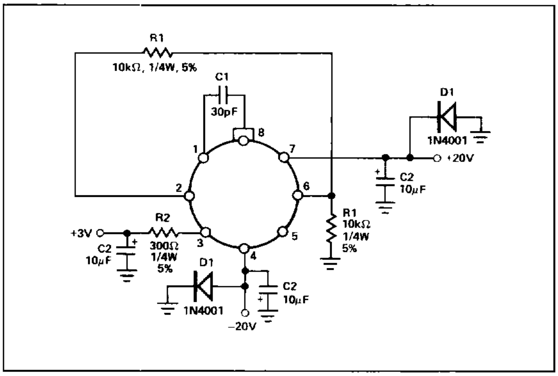
PARAMETER	SYMBOL	CONDITIONS		MIN	MAX	UNITS
Slew Rate	SR (+)	$A_V = 1$	$-55°C \le T_A \le 25°C$	0.05	—	V/μsec
		$V_{IN} = +5V$	$T_A = 125°C$	0.05	—	
Slew Rate	SR (−)	$A_V = 1$	$-55°C \le T_A \le 25°C$	0.05	—	V/μsec
		$V_{IN} = \pm 5V$	$T_A = 125°C$	0.05	—	

NOTES:

1. Note that gain is not specified at $V_{IO\,(ADJ)}$ extremes. Some gain reduction is usually seen at $V_{IO\,(ADJ)}$ extremes. For closed-loop applications closed-loop gain less than 1,000), the open-loop tests (A_{VS}) prescribed herein should guarantee a positive, reasonably linear, transfer characteristic. They do not, however, guarantee that the open-loop gain is linear, or even positive, over the operating range. If either of these requirements exist ; positive open-loop gain or open-loop gain linearity , they should be specified in the individual procurement document as additional requirements.
2. Tests at common-mode $V_{CM} = 0$, $V_{CM} = -15V$, and $V_{CM} = +15V$.
3. Continuous short-circuit limits will be considerably less than the indicated test limits. Continuous I_{OS} at $T_A \le 75°C$ will cause T_j to exceed the maximum of 175°C.

For Other Test Circuit Diagrams, See MIL-M-38510/101

BURN-IN CIRCUIT



POWER AND THERMAL CHARACTERISTICS

Package	Case outline	Maximum allowable power dissipation	Maximum θJ—C	Maximum θJ—A
8 Lead Can (TO-99)	G	330mW at $T_A = 125°C$	40°C/W	150°C/W
8 Lead Hermetic (Dual-in-Line)	P	417mW at $T_A = 125°C$	50°C/W	120°C/W

5

OPERATIONAL AMPLIFIERS/BUFFERS