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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.

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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.

# LM1558JAN

## Dual Operational Amplifier

### General Description

The LM1558 is a general purpose dual operational amplifier. The two amplifiers share a common bias network and power supply leads. Otherwise, their operation is completely independent.

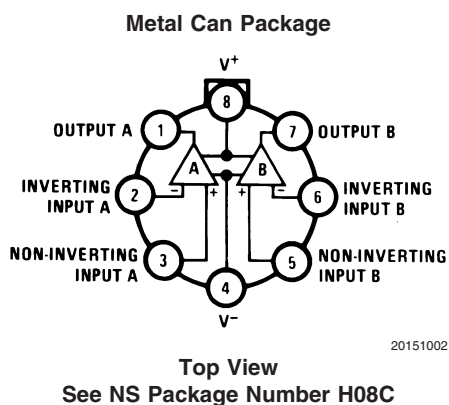
### Features

- No frequency compensation required
- Short-circuit protection
- Wide common-mode and differential voltage ranges
- Low-power consumption
- 8-lead can and 8-lead mini DIP
- No latch up when input common mode range is exceeded

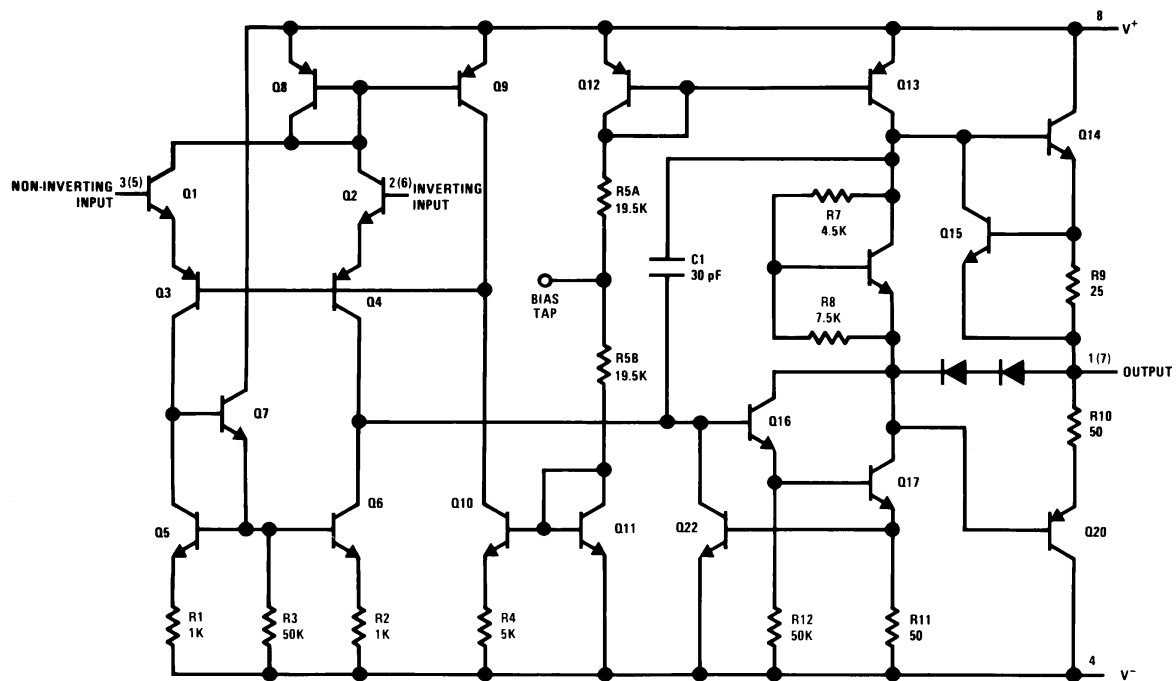
### Ordering Information

NS PART NUMBER	SMD PART NUMBER	NS PACKAGE NUMBER	PACKAGE DISCRIPTION
JL1558BGA	JM38510/10108BGA	H08C	8LD Metal Can

### Connection Diagram



## Schematic Diagram



Numbers in parentheses are pin numbers for amplifier B.

20151001

## Absolute Maximum Ratings (Note 1)

Supply Voltage	±22V
Power Dissipation (Note 2)	
8LD Metal Can	500 mW
Differential Input Voltage	±30V
Input Voltage (Note 3)	±15V
Output Short-Circuit Duration	Continuous
Operating Temperature Range	$-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$
Maximum Junction Temperature	150°C
Storage Temperature Range	$-65^{\circ}\text{C} \leq T_A \leq +150^{\circ}\text{C}$
Lead Temperature (Soldering, 10 sec.)	260°C
Thermal Resistance	
$\theta_{JA}$	
Still Air	150°C/W
500LF/Min Air flow	85°C/W
$\theta_{JC}$	30°C/W
ESD tolerance (Note 4)	300V

## Quality Conformance Inspection

MIL-STD-883, Method 5005 - Group A

Subgroup	Description	Temp ( C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55

## LM1558 JAN Electrical Characteristics

### DC Parameters

The following conditions apply, unless otherwise specified.  $V_{CC} = \pm 20V$ ,  $V_{CM} = 0V$

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
$V_{IO}$	Input Offset Voltage	$+V_{CC} = 35V$ , $-V_{CC} = -5V$ , $V_{CM} = -15V$		-3.0	+3.0	mV	1
		$+V_{CC} = 35V$ , $-V_{CC} = -5V$ , $V_{CM} = -15V$		-4.0	+4.0	mV	2, 3
		$+V_{CC} = 5V$ , $-V_{CC} = -35V$ , $V_{CM} = +15V$		-3.0	+3.0	mV	1
		$+V_{CC} = 5V$ , $-V_{CC} = -35V$ , $V_{CM} = +15V$		-4.0	+4.0	mV	2, 3
		$V_{CM} = 0$		-3.0	+3.0	mV	1
		$V_{CM} = 0$		-4.0	+4.0	mV	2, 3
		$+V_{CC} = 5V$ , $-V_{CC} = -5V$ , $V_{CM} = 0V$		-3.0	+3.0	mV	1
		$+V_{CC} = 5V$ , $-V_{CC} = -5V$ , $V_{CM} = 0V$		-4.0	+4.0	mV	2, 3
$I_{IO}$	Input Offset Current	$+V_{CC} = 35V$ , $-V_{CC} = -5V$ , $V_{CM} = -15V$		-30	+30	nA	1, 2
		$+V_{CC} = 35V$ , $-V_{CC} = -5V$ , $V_{CM} = -15V$		-70	+70	nA	3
		$+V_{CC} = 5V$ , $-V_{CC} = -35V$ , $V_{CM} = +15V$		-30	+30	nA	1, 2
		$+V_{CC} = 5V$ , $-V_{CC} = -35V$ , $V_{CM} = +15V$		-70	+70	nA	3
		$V_{CM} = 0V$		-30	+30	nA	1, 2
		$V_{CM} = 0V$		-70	+70	nA	3
		$+V_{CC} = 5V$ , $-V_{CC} = -5V$ , $V_{CM} = 0V$		-30	+30	nA	1, 2
		$+V_{CC} = 5V$ , $-V_{CC} = -5V$ , $V_{CM} = 0V$		-70	+70	nA	3
$-I_{IB}$	Input Bias Current	$+V_{CC} = 35V$ , $-V_{CC} = -5V$ , $V_{CM} = -15V$		-0.1	110	nA	1, 2
		$+V_{CC} = 35V$ , $-V_{CC} = -5V$ , $V_{CM} = -15V$		-0.1	265	nA	3
		$+V_{CC} = 5V$ , $-V_{CC} = -35V$ , $V_{CM} = +15V$		-0.1	110	nA	1, 2
		$+V_{CC} = 5V$ , $-V_{CC} = -35V$ , $V_{CM} = +15V$		-0.1	265	nA	3
		$V_{CM} = 0V$		-0.1	110	nA	1, 2
		$V_{CM} = 0V$		-0.1	265	nA	3
		$+V_{CC} = 5V$ , $-V_{CC} = -5V$ , $V_{CM} = 0V$		-0.1	110	nA	1, 2
		$+V_{CC} = 5V$ , $-V_{CC} = -5V$ , $V_{CM} = 0V$		-0.1	265	nA	3

**LM1558 JAN Electrical Characteristics** (Continued)**DC Parameters** (Continued)

The following conditions apply, unless otherwise specified.  $V_{CC} = \pm 20V$ ,  $V_{CM} = 0V$

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
$+I_{IB}$	Input Bias Current	$+V_{CC} = 35V, -V_{CC} = -5V, V_{CM} = -15V$		-0.1	110	nA	1, 2
		$+V_{CC} = 35V, -V_{CC} = -5V, V_{CM} = -15V$		-0.1	265	nA	3
		$+V_{CC} = 5V, -V_{CC} = -35V, V_{CM} = +15V$		-0.1	110	nA	1, 2
		$+V_{CC} = 5V, -V_{CC} = -35V, V_{CM} = +15V$		-0.1	265	nA	3
		$V_{CM} = 0V$		-0.1	110	nA	1, 2
		$V_{CM} = 0V$		-0.1	265	nA	3
		$+V_{CC} = 5V, -V_{CC} = -5V, V_{CM} = 0V$		-0.1	110	nA	1, 2
		$+V_{CC} = 5V, -V_{CC} = -5V, V_{CM} = 0V$		-0.1	265	nA	3
$+PSRR$	Power Supply Rejection Ratio	$+V_{CC} = 10V, -V_{CC} = -20V$		-50	50	$\mu V/V$	1
		$+V_{CC} = 10V, -V_{CC} = -20V$		-100	100	$\mu V/V$	2, 3
$-PSRR$	Power Supply Rejection Ratio	$+V_{CC} = 20V, -V_{CC} = -10V$		-50	50	$\mu V/V$	1
		$+V_{CC} = 20V, -V_{CC} = -10V$		-100	100	$\mu V/V$	2, 3
CMRR	Common Mode Rejection Ratio	$V_{CM} = \pm 15V, V_{CC} = \pm 35V$ to $\pm 5V$		80		dB	1, 2, 3
$+I_{OS}$	Output Short Circuit Current	$+V_{CC} = +15V, -V_{CC} = -15V, V_{CM} = -15V, t \pm 25mS$		-60		mA	1, 2, 3
$-I_{OS}$	Output Short Circuit Current	$+V_{CC} = +15V, -V_{CC} = -15V, V_{CM} = 15V, t \pm 25mS$			+60	mA	1, 2, 3
$I_{CC}$	Power Supply Current	$+V_{CC} = +15V, -V_{CC} = -15V$			7.6	mA	1
		$+V_{CC} = +15V, -V_{CC} = -15V$			6.8	mA	2
		$+V_{CC} = +15V, -V_{CC} = -15V$			8.4	mA	3
$\Delta V_{IO} / \Delta T$	Temperature Coefficient of Input Offset Voltage	$25^\circ C \leq T_A \leq 125^\circ C$	(Note 5)	-15	+15	$\mu V/^\circ C$	2
		$-55^\circ C \leq T_A \leq 25^\circ C$	(Note 5)	-20	+20	$\mu V/^\circ C$	3
$\Delta I_{IO} / \Delta T$	Temperature Coefficient of Input Offset Current	$25^\circ C \leq T_A \leq 125^\circ C$	(Note 5)	-200	200	$pA/^\circ C$	2
		$-55^\circ C \leq T_A \leq 25^\circ C$		-500	500	$pA/^\circ C$	3
$+A_{VS}$	Large Signal (Open Loop) Voltage Gain	$V_O = +15V, R_L = 2K\Omega$		50		V/mV	4
		$V_O = +15V, R_L = 2K\Omega$		25		V/mV	5, 6
		$V_O = +15V, R_L = 10K\Omega$		50		V/mV	4
		$V_O = +15V, R_L = 10K\Omega$		25		V/mV	5, 6
$-A_{VS}$	Large Signal (Open Loop) Voltage Gain	$V_O = -15V, R_L = 2K\Omega$		50		V/mV	4
		$V_O = -15V, R_L = 2K\Omega$		25		V/mV	5, 6
		$V_O = -15V, R_L = 10K\Omega$		50		V/mV	4
		$V_O = -15V, R_L = 10K\Omega$		25		V/mV	5, 6
$A_{VS}$	Large Signal (Open Loop) Voltage Gain	$\pm V_{CC} = \pm 5V, V_O = \pm 2V, R_L = 2K\Omega$		10		V/mV	4, 5, 6
		$\pm V_{CC} = \pm 5V, V_O = \pm 2V, R_L = 10K\Omega$		10		V/mV	4, 5, 6
$+V_{OP}$	Output Voltage Swing	$R_L = 10K\Omega$		+16		V	4, 5, 6
		$R_L = 2K\Omega$		+15		V	4, 5, 6
$-V_{OP}$	Output Voltage Swing	$R_L = 10K\Omega$			-16	V	4, 5, 6
		$R_L = 2K\Omega$			-15	V	4, 5, 6

## LM1558 JAN Electrical Characteristics (Continued)

### AC Parameters

The following conditions apply, unless otherwise specified.  $V_{CC} = \pm 20V$ ,  $V_{CM} = 0V$

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
$TR_{TR}$	Rise Time	$R_L = 2K\Omega$ , $C_L = 100pF$ , $V_I = +50mV$ , $A_V = 1$ , $f < 1KHz$			800	nS	7, 8A, 8B
$TR_{OS}$	Overshoot	$R_L = 2K\Omega$ , $C_L = 100pF$ , $V_I = +50mV$ , $A_V = 1$ , $f < 1KHz$			25	%	7, 8A, 8B
SR+	Slew Rate (Rise)	$A_V = 1$ , $V_I = -5V$ to $+5V$		0.4		V/ $\mu$ S	7, 8A, 8B
SR-	Slew Rate (Fall)	$A_V = 1$ , $V_I = +5V$ to $-5V$		0.4		V/ $\mu$ S	7, 8A, 8B
$NI_{BB}$	Noise Input Broadband	$BW = 10Hz$ to $5KHz$ , $R_S = 0\Omega$			15	$\mu V_{RMS}$	7
$NI_{PC}$	Noise Input Popcorn	$BW = 10Hz$ to $5KHz$ , $R_S = 20K\Omega$			40	$\mu V_{PK}$	7
CS	Channel Separation			80		dB	7

### Drift Values

The following conditions apply, unless otherwise specified.  $V_{CC} = \pm 20V$ ,  $V_{CM} = 0V$

Symbol	Parameter	Conditions	Notes	Min	Max	Unit	Sub-groups
$V_{IO}$	Input Offset Voltage	$V_{CM} = 0$		-0.5	0.5	mV	1
$-I_{IB}$	Input Bias Current	$V_{CM} = 0V$		-12	12	nA	1
$+I_{IB}$	Input Bias Current	$V_{CM} = 0V$		-12	12	nA	1

**Note 1:** "Absolute Maximum Ratings" indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed.

**Note 2:** The maximum power dissipation must be derated at elevated temperatures and is dictated by  $T_{Jmax}$  (maximum junction temperature),  $\theta_{JA}$  (package junction to ambient thermal resistance), and  $T_A$  (ambient temperature). The maximum allowable power dissipation at any temperature is  $P_{Dmax} = (T_{Jmax} - T_A)/\theta_{JA}$  or the number given in the Absolute Maximum Ratings, whichever is lower.

**Note 3:** For supply Voltages less than  $\pm 15V$ , the absolute maximum input Voltage is equal to the supply Voltage.

**Note 4:** Human body model,  $1.5 K\Omega$  in series with  $100 pF$ .

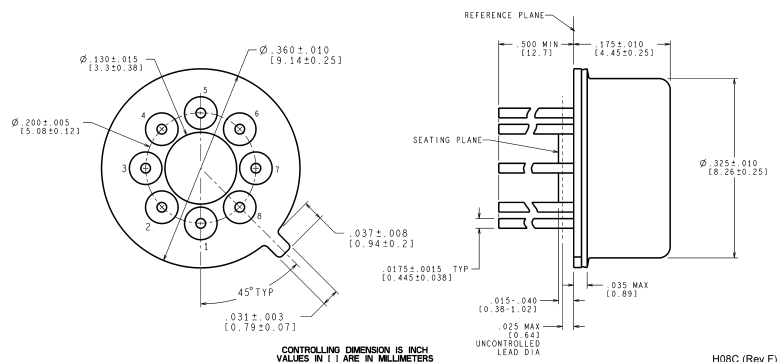
**Note 5:** Calculated parameter.

## Revision History Section

Date Released	Revision	Section	Originator	Changes
05/24/05	A	New Released Corporate format. Electrical Section	R. Malone	1 MDS data sheet converted into one corp. data sheet format. MDS data MJLM1558-X, Rev. 1A1 will be achrived.
08/04/05	B	Added Thermal Resistance limit in the Absolute Maximum Ratings Section for H package.	R. Malone	Added Thermal Resistance limit in the Absolute Maximum Ratings Section for H package.



## Physical Dimensions inches (millimeters) unless otherwise noted



**Metal Can Package (H)**  
**NS Package Number H08C**

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Deutsch Tel: +49 (0) 69 9508 6208  
English Tel: +44 (0) 870 24 0 2171  
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**Asia Pacific Customer**  
**Support Center**  
Email: [ap.support@nsc.com](mailto:ap.support@nsc.com)

**National Semiconductor**  
**Japan Customer Support Center**  
Fax: 81-3-5639-7507  
Email: [jpn.feedback@nsc.com](mailto:jpn.feedback@nsc.com)  
Tel: 81-3-5639-7560