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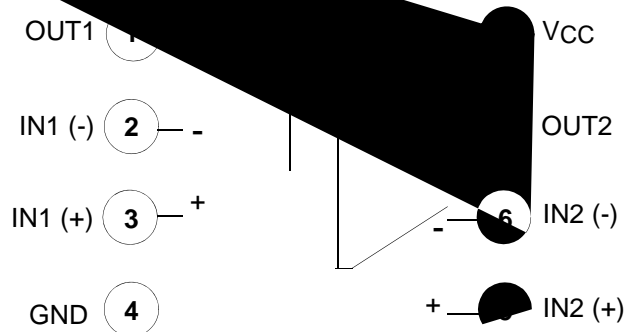
Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (\_), the underscore (\_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (\_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at [www.onsemi.com](http://www.onsemi.com). Please email any questions regarding the system integration to [Fairchild\\_questions@onsemi.com](mailto:Fairchild_questions@onsemi.com).

# LM2904, LM358/LM358A, LM258/ LM258A

## Dual Operational Amplifier

### Features

- Internally Frequency Compensated for Unity Gain
- Large DC Voltage Gain: 100dB
- Wide Power Supply Range:  
LM258/LM258A, LM358/LM358A: 3V~32V (or  $\pm 1.5V$  ~ 16V)  
LM2904 : 3V~26V (or  $\pm 1.5V$  ~ 13V)
- Input Common Mode Voltage Range Includes Ground
- Large Output Voltage Swing: 0V DC to  $V_{CC} - 1.5V$  DC
- Power Drain Suitable for Battery Operation.



## Absolute Maximum Ratings

Parameter	Symbol	LM258/LM258A	LM358/LM358A	LM2904	Unit
Supply Voltage	VCC	±16 or 32	±16 or 32	±13 or 26	V
Differential Input Voltage	V <sub>I(DIFF)</sub>	32	32	26	V
Input Voltage	V <sub>I</sub>	-0.3 to +32	-0.3 to +32	-0.3 to +26	V
Output Short Circuit to GND VCC ≤ 15V, T <sub>A</sub> = 25°C (One Amp)	-	Continuous	Continuous	Continuous	-
Operating Temperature Range	T <sub>OPR</sub>	-25 ~ +85	0 ~ +70	-40 ~ +85	°C
Maximum Junction Temperature	T <sub>J(MAX)</sub>	+150	+150	+150	°C
Storage Temperature Range	T <sub>STG</sub>	-65 ~ +150	-65 ~ +150	-65 ~ +150	°C

## Electrical Characteristics

(V<sub>CC</sub>

**Electrical Characteristics** (Continued)

(VCC = 5.0V, VEE = GND, unless otherwise specified)

The following specifications apply over the range of  $-25^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$  for the LM258; and the  $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$  for the LM358; and the  $-40^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$  for the LM2904

Parameter	Symbol	Conditions	LM258			LM358			LM2904			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Input Offset Voltage	$V_{IO}$	$V_{CM} = 0\text{V}$ to $V_{CC} - 1.5\text{V}$ $V_{O(P)} = 1.4\text{V}$ , $R_S = 0\Omega$	-	-	7.0	-	-	9.0	-	-	10.0	mV
Input Offset Voltage Drift R	$\Delta V_{IO}/\Delta T$	$R_S = 0\Omega$	-	7.0	-	-	7.0	-	-	7.0	-	$\mu\text{V}/^{\circ}\text{C}$

**Electrical Characteristics** (Continued)(V<sub>CC</sub> = 5.0V, V<sub>EE</sub> = GND, T<sub>A</sub> = 25°C, unless otherwise specified)

Parameter	Symbol	Conditions	LM258A		LM358A		Unit
			Min.	Typ.	Max.	Min.	
Input Offset Voltage	V <sub>IO</sub>	V <sub>CM</sub> = 0V to V <sub>CC</sub> -1.5V V <sub>O(P)</sub> = 1.4V, R <sub>S</sub> = 0					

**Note:**

1. This parameter, although guaranteed, is not 100% tested in production.

**Electrical Characteristics** (Continued)(V<sub>CC</sub> = 5.0V, V<sub>EE</sub> = GND, unless otherwise specified)The following specification apply over the range of -25°C ≤ T<sub>A</sub> ≤ +85°C for the LM258A; and the 0°C ≤ T<sub>A</sub> ≤ +70°C for the LM358A

Parameter	Symbol	Conditions	LM258A			LM358A			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Input Offset Voltage	V <sub>IO</sub>	V <sub>CM</sub> = 0V to V <sub>CC</sub> - 1.5V V <sub>O(P)</sub> = 1.4V, R <sub>S</sub> = 0Ω	-	-	4.0	-	-	5.0	mV
Input Offset Voltage Drift	ΔV <sub>IO</sub> /ΔT	-	-	7.0	15	-	7.0	20	μV/°C
Input Offset Current	I <sub>IO</sub>	-	-	-	30	-	-	75	nA
Input Offset Current Drift	ΔI <sub>IO</sub> /ΔT	-	-	10	200	-	10	300	pA/°C
Input Bias Current	I <sub>BIAS</sub>	-	-	40	100	-	40	200	nA
Input Common-Mode Voltage Range	V <sub>I(R)</sub>	V <sub>CC</sub> = 30V	0	-	V <sub>CC</sub> -2.0	0	-	V <sub>CC</sub> -2.0	V
Output Voltage Swing	V <sub>O(H)</sub>	V <sub>CC</sub> = 30V R <sub>L</sub> = 2kΩ							





Typical Performance Characteristics (Continued)

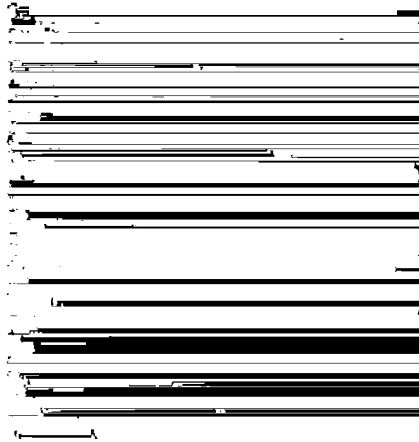


Figure 7. Input Voltage Range vs Supply Voltage

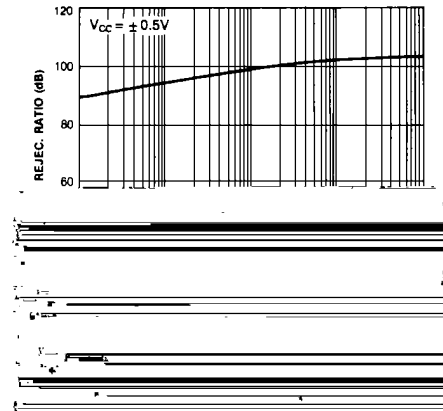


Figure 8. Common-Mode Rejection Ratio

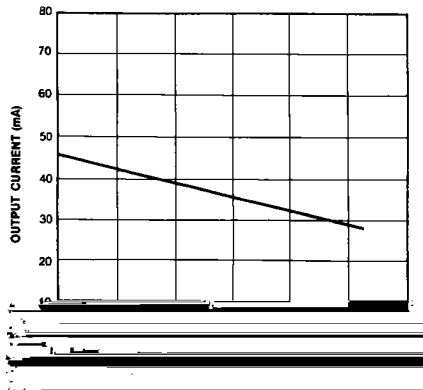


Figure 9. Output Current vs Temperature (Current Limiting)

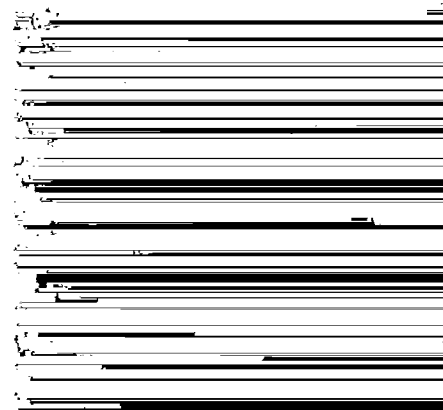


Figure 10. Input Current vs Temperature

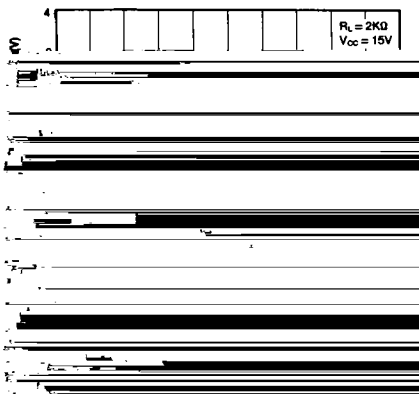


Figure 11. Voltage Follower Pulse Response

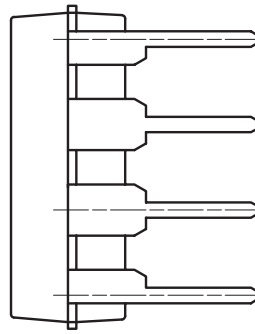
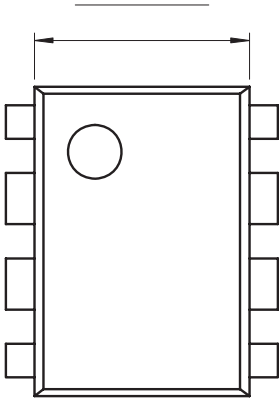


Figure 12. Voltage Follower Pulse Response (Small Signal)

## Mechanical Dimensions

### Package

Dimensions in millimeters

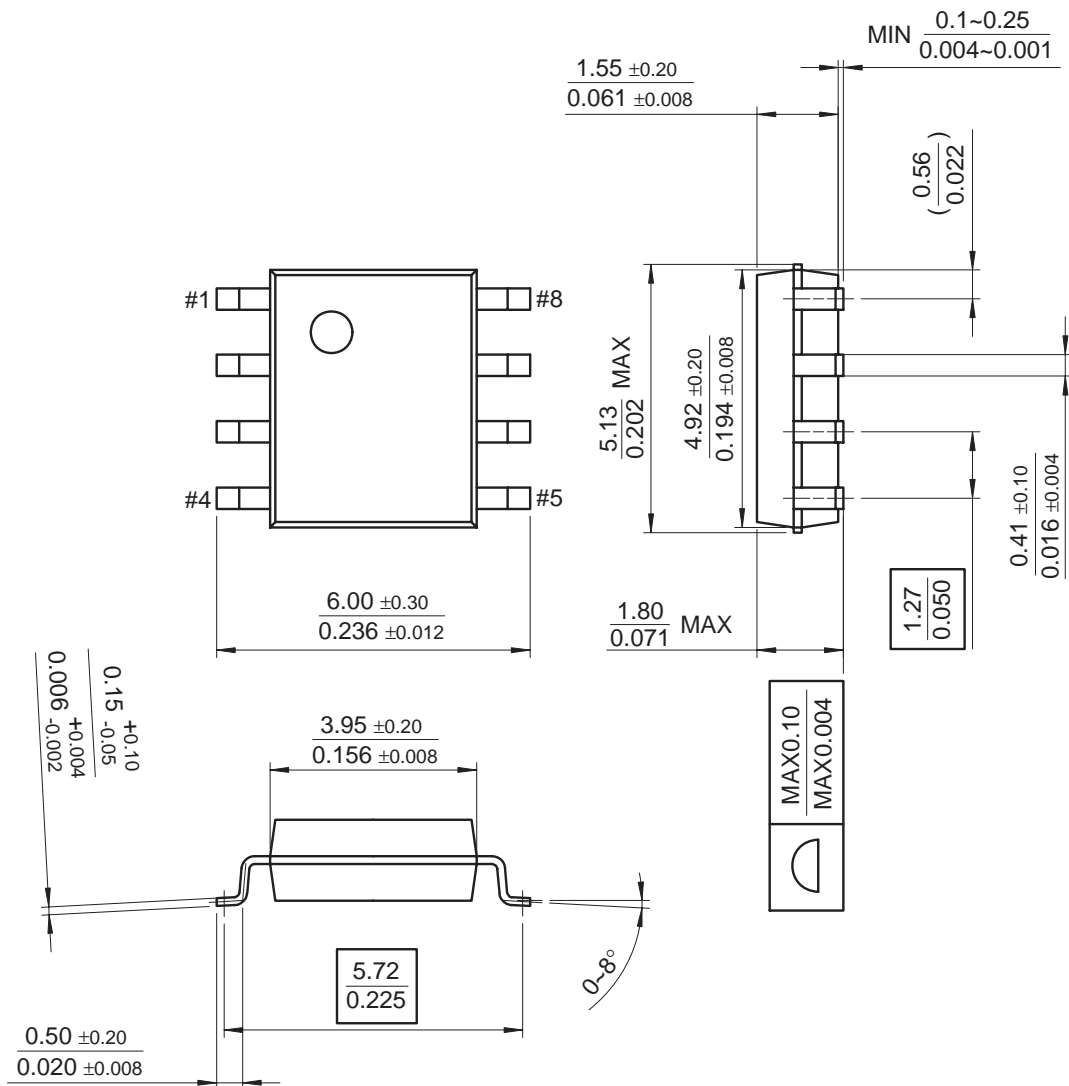


**Mechanical Dimensions** (Continued)

**Package**

Dimensions in millimeters

**8-SOP**



## Ordering Information

Product Number	Package	Operating Temperature
LM358N	8-DIP	0 ~ +70°C
LM358AN		
LM358M	8-SOP	
LM358AM		
LM2904N	8-DIP	-40 ~ +85°C
LM2904M	8-SOP	
LM258N	8-DIP	-25 ~ +85°C
LM258AN		
LM258M	8-SOP	
LM258AM		


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