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DATA SHEET

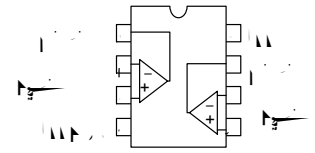
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SOIC-8  
D, VD SUFFIX  
CASE 751

**PIN CONNECTIONS**





# LM258, LM358, LM358A, LM358E, LM2904, LM2904A, LM2904E, LM2904V, NCV2904

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

| Rating   | Symbol                            | Value                                | Unit               |
|--|-----------------------------------|--------------------------------------|--------------------|
| Power Supply Voltages<br>Single Supply<br>Split Supplies | $V_{CC}$<br>$V_{CC}, V_{EE}$      | 32<br>16                             | Vdc                |
| Input Differential Voltage Range (Note 1)                | $V_{IDR}$                         | 32                                   | Vdc                |
| Input Common Mode Voltage Range                          | $V_{ICR}$                         | -0.3 to 32                           | Vdc                |
| Output Short Circuit Duration                            | $t_{SC}$                          | Continuous                           |                    |
| Junction Temperature                                     | $T_J$                             | 150                                  | $^\circ\text{C}$   |
| Thermal Resistance, Junction-to-Air (Note 2)             | Case 846A<br>Case 751<br>Case 626 | $R_{\theta JA}$<br>238<br>212<br>161 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case                     | Case 751                          | $R_{\theta JC}$<br>72                | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Board                    | Case 751                          | 42                                   | $^\circ\text{C/W}$ |



# LM258, LM358, LM358A, LM358E, LM2904, LM2904A, LM2904E, LM2904V, NCV2904

## ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5.0\text{ V}$ , $V_{EE} = \text{Gnd}$ , $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

| Characteristic   | Symbol                   | LM2904/LM2904E |     |      | LM2904A |     |      | LM2904V, NCV2904 |     |      | Unit                         |
|--|--------------------------|----------------|-----|------|---------|-----|------|------------------|-----|------|------------------------------|
|  |                          | Min            | Typ | Max  | Min     | Typ | Max  | Min              | Typ | Max  |                              |
| Input Offset Voltage<br>$V_{CC} = 5.0\text{ V to }30\text{ V}$ , $V_{IC} = 0\text{ V to }V_{CC} - 1.7\text{ V}$ ,<br>$V_O = 1.4\text{ V}$ , $R_S = 0\ \Omega$<br>$T_A = 25^\circ\text{C}$<br>$T_A = T_{\text{high}}$ (Note 7)<br>$T_A = T_{\text{low}}$ (Note 7) | $V_{IO}$                 | -              | 2.0 | 7.0  | -       | 2.0 | 7.0  | -                | -   | 7.0  | mV                           |
| Average Temperature Coefficient of Input Offset Voltage<br>$T_A = T_{\text{high}}$ to $T_{\text{low}}$ (Note 7)  | $\Delta V_{IO}/\Delta T$ | -              | 7.0 | -    | -       | 7.0 | -    | -                | 7.0 | -    | $\mu\text{V}/^\circ\text{C}$ |
| Input Offset Current<br>$T_A = T_{\text{high}}$ to $T_{\text{low}}$ (Note 7)   | $I_{IO}$                 | -              | 5.0 | 50   | -       | 5.0 | 50   | -                | 5.0 | 50   | nA                           |
| Input Bias Current<br>$T_A = T_{\text{high}}$ to $T_{\text{low}}$ (Note 7)   | $I_{IB}$                 | -              | 45  | 200  | -       | 45  | 200  | -                | 45  | 200  |                              |
|  |                          | -              | -45 | -250 | -       | -45 | -100 | -                | -45 | -250 |                              |
|  |                          | -              | -50 | -500 | -       |     |      |                  |     |      |                              |

|





Figure 6. Large-







Figure 15. Function Generator



Figure 16. Multiple Feedback Bandpass Filter

|        |
|--------|
| g†     |
| & Reel |
| Rail   |
| & Reel |
| & Reel |
| & Reel |
| Rail   |
| Rail   |
| & Reel |

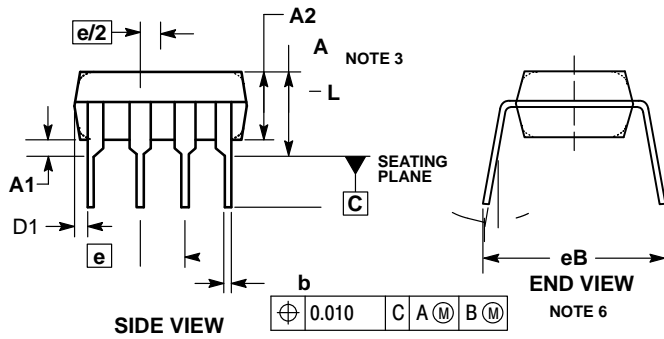
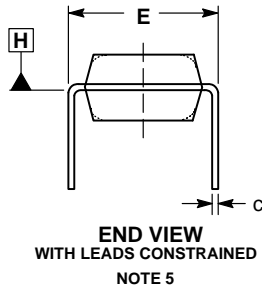
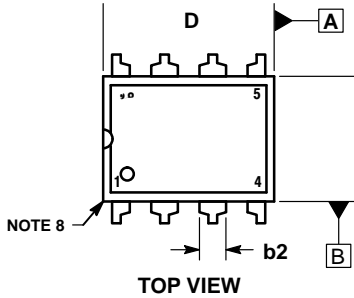
MARKING DIAGRAMS

PDIP-8  
N SUFFIX  
CASE 626

SOIC-8  
D SUFFIX  
CASE 751

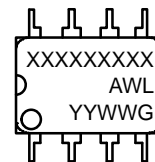
**PDIP-8**  
CASE 626-05  
ISSUE P

DATE 22 APR 2015



| DIM | INCHES    |       |      |      |
|-----|-----------|-------|------|------|
|     | MIN       | MAX   |      |      |
| A   | -----     | 0.210 |      |      |
| A1  | 0.015     | ----- |      |      |
| A2  | 0.115     | 0.195 | 2.92 | 4.95 |
| b   | 0.014     | 0.022 |      |      |
| C   | 0.008     | 0.014 |      |      |
| D   | 0.355     | 0.400 |      |      |
| D1  | 0.005     | ----- |      |      |
| E   | 0.300     | 0.325 |      |      |
| e   | 0.100 BSC |       |      |      |
| L   | 0.115     | 0.150 | 2.92 | 3.81 |

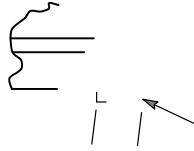
**GENERIC  
MARKING DIAGRAM\***



- XXXX = Specific Device Code
- A = Assembly Location
- WL = Wafer Lot
- YY = Year
- WW = Work Week
- G = Pb-Free Package

SOIC 8 NB  
CASE 751-07  
ISSUE AK

DATE 16 FEB 2011



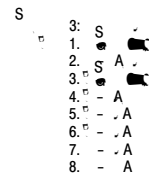
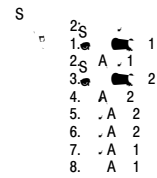
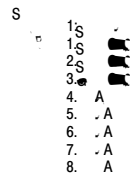
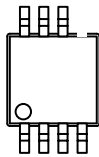




SCALE 2:1

Micro8  
CASE 846A-02  
ISSUE K

DATE 16 JUL 2020



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