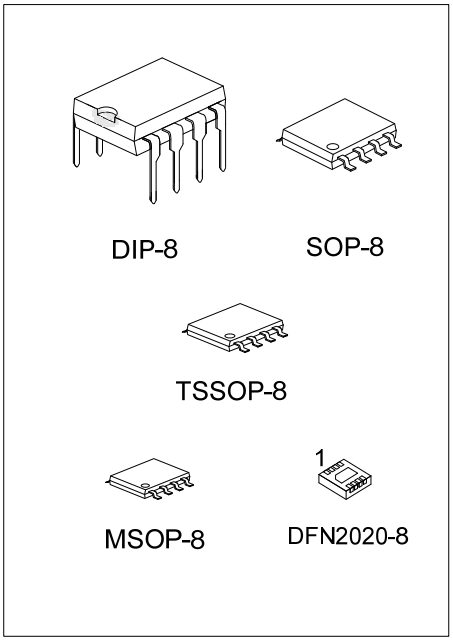
# LM2903B

**LINEAR INTEGRATED CIRCUIT**

# DUAL DIFFERENTIAL COMPARATOR




## ■ DESCRIPTION

The UTC **LM2903B** consists of two independent voltage comparators, designed specifically to operate from a single power supply over a wide voltage range.

## ■ FEATURES

* Single or dual supply operation
* Wide operating supply range
  ($V_{CC}$=2V ~ 36V or ±1 ~ ±18V)
* Input common-mode voltage includes ground
* Low supply current drain $I_{CC}$=0.55mA (Typical)
* Output compatible with TTL, DTL, and CMOS logic system
* High ESD (2kV, HBM)

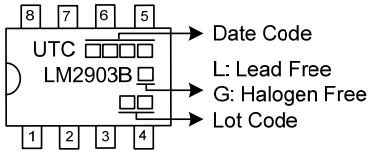
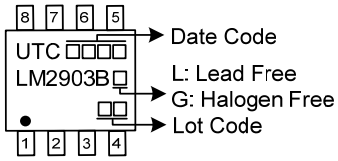
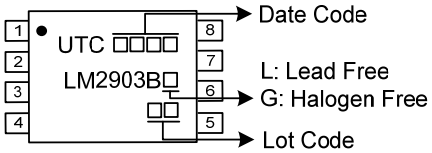
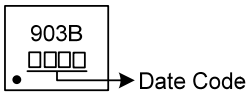
## ■ ORDERING INFORMATION

| Ordering Number | | Package | Packing |
|---|---|---|---|
| Lead Free | Halogen-Free | | |
| LM2903BL-D08-T | LM2903BG-D08-T | DIP-8 | Tube |
| LM2903BL-S08-R | LM2903BG-S08-R | SOP-8 | Tape Reel |
| LM2903BL-P08-R | LM2903BG-P08-R | TSSOP-8 | Tape Reel |
| LM2903BL-SM1-R | LM2903BG-SM1-R | MSOP-8 | Tape Reel |
| LM2903BL-K08-2020-R | LM2903BG-K08-2020-R | DFN2020-8 | Tape Reel |

LM2903BG-D08-T
(1) Packing Type
(2) Package Type
(3) Green Package

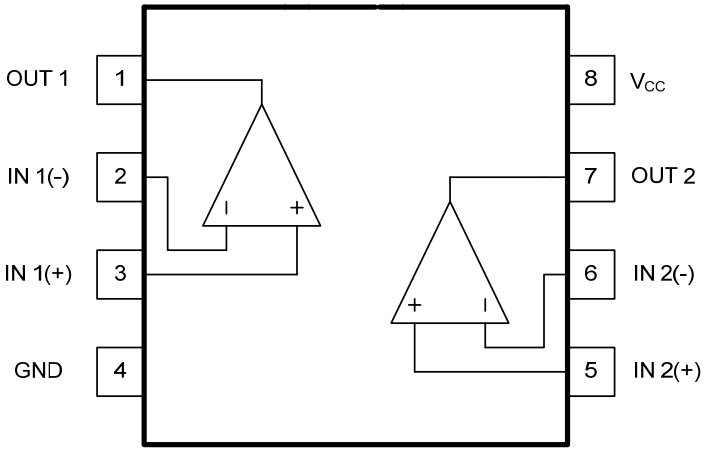
(1) T: Tube, R: Tape Reel
(2) D08: DIP-8, S08: SOP-8, P08: TSSOP-8, SM1: MSOP-8, K08-2020: DFN2020-8
(3) G: Halogen Free and Lead Free, L: Lead Free

## ■ MARKING

| DIP-8 | SOP-8 / MSOP-8 |
|---|---|
|  |  |
| **TSSOP-8** | **DFN2020-8** |
|  |  |

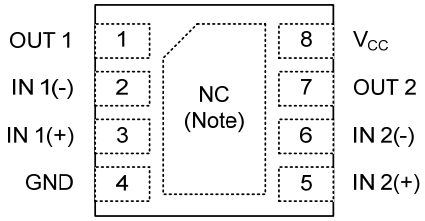


## ■ PIN DESCRIPTION





DIP-8 / SOP-8 / MSOP-8 / TSSOP-8

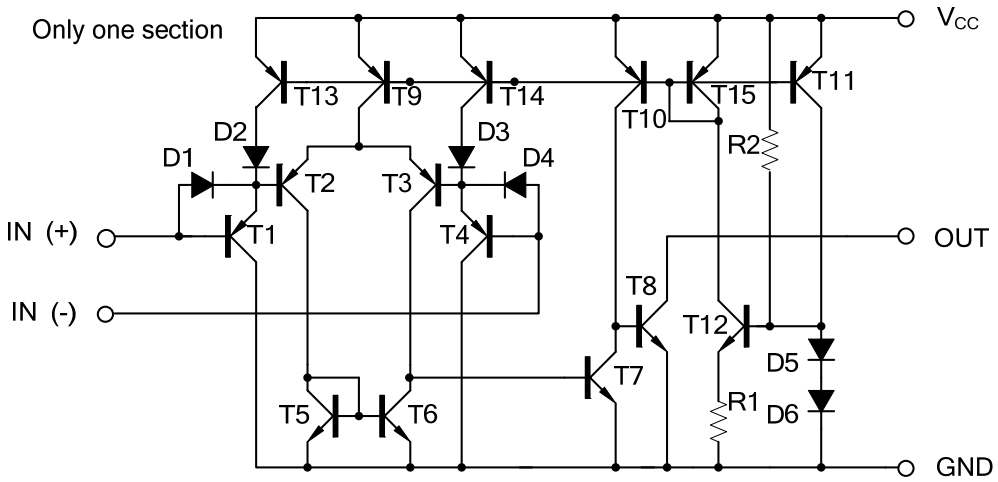




DFN2020-8
(Top View)

Note: No connect.

## ■ BLOCK DIAGRAM



## ■ ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C, unless otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Supply Voltage | | $V_{CC}$ | ±18 or 36 | V |
| Differential Input Voltage | | $V_{I(DIFF)}$ | ±36 | V |
| Input Voltage | | $V_{IN}$ | -0.3 ~ +36 | V |
| Power Dissipation ($T_A$=25°C) | DIP-8 | $P_D$ | 780 | mW |
| | SOP-8 | | 420 | mW |
| | TSSOP-8 | | 350 | mW |
| | MSOP-8 | | 300 | mW |
| | DFN2020-8 | | 830 | mW |
| Electrostatic Discharge | Human-Body Model (HBM) Per JESD22-A114/115 | $V_{ESD}$ | 2000 | V |
| Junction Temperature | | $T_J$ | +150 | °C |
| Operating Temperature Range (Note 2) | | $T_{OPR}$ | -40 ~ +125 | °C |
| Storage Temperature Range | | $T_{STG}$ | -65 ~ +150 | °C |

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. It is guarantee by design, not 100% be tested.

## ■ ELECTRICAL CHARACTERISTICS

($V_{CC}$=5.0V, $T_A$=25°C, All voltage referenced to GND unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Input Offset Voltage | $V_{I(OFF)}$ | $V_{CM}$=0V to$V_{CC}$-1.5V, $V_{O(P)}$=1.4V, $R_S$=0Ω | | 1.0 | 2.5 | mV |
| | | $T_A$=-40~125°C | -4 | | -4 | |
| Input Offset Current | $I_{I(OFF)}$ | $T_A$=-40~125°C | | 5 | 50 | nA |
| Input Bias Current | $I_{I(BIAS)}$ | $T_A$=-40~125°C | | 25 | 250 | nA |
| Output Saturation Voltage | $V_{SAT}$ | $V_I$(-)>1V, $V_I$(+)=0V, $I_{SINK}$=4mA | | 280 | 400 | mV |
| | | $T_A$=-40~125°C | | | 550 | |
| Input Common Mode Voltage | $V_{I(CM)}$ | $V_{CC}$=3~36V | 0 | | $V_{CC}$-1.5 | V |
| | | $T_A$=-40~125°C | 0 | | $V_{CC}$-2.0 | |
| Large Signal Voltage Gain | $G_V$ | $V_{CC}$=15V, $R_L$≧15KΩ | 50 | 90 | | dB |
| Power Supply Current | $I_{CC}$ | $R_L$=∞, $V_{CC}$=36V | | 0.55 | 0.8 | mA |
| | | $T_A$=-40~125°C | | | 1.0 | mA |
| Output Sink Current | $I_{O(SINK)}$ | $V_I$(-)>1V, $V_I$(+)=0V, Vo(p)<1.5V | 6 | 16 | | mA |
| Output Leakage Current | $I_{O(LEAK)}$ | $V_I$(+)=1V, $V_I$(-)=0, $V_O$(p)= 5V | | 0.1 | | nA |
| | | $V_I$(+)=1V, $V_I$(-)=0, $V_O$(p)=36V | | | 1.0 | μA |
| Large Signal Response Time | $t_R$ | $V_{IN}$=TTL logic wing, $V_{REF}$=1.4V, $V_{RL}$=5V, $R_L$=5.1kΩ | | 350 | | ns |
| Response Time | $t_R$ | $V_{RL}$=5V,$R_L$=5.1kΩ | | 1400 | | ns |

## ■ TYPICAL CHARACTERISTICS