

# GR62429 Serial Data Control Dual Electronic Volume

## 1. General Description

### 1.1 Description

The GR62429 is a dual channel electronic volume controlled with 2-wire serial data. The built-in reference circuit can compose of an electronic volume with less external parts.

(Independent control is allowed in each channel)

- Low noise and low distortion  
VNO = 5  $\mu$ Vrms (ATT =  $-\infty$ , JIS-A)  
THD = 0.01 % Typ. (V0 = 0.5 Vrms, DIN-AUDIO)

### 1.2 Features

- Built-in reference circuit
- Control with serial data  
Volume 0 to -83 dB (1 dB/step),  $-\infty$

### 1.3 Device Information

| PART NUMBER | PACKAGE |
|-------------|---------|
| GR62429     | DIP     |
|             | SOP     |

## 2. Pin Description and Functional Diagram

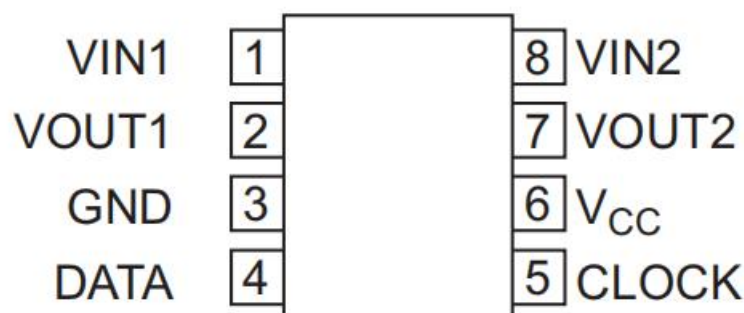


Figure 2.1 Top View

| PIN No. | NAME  | I/O | FUNCTION                                                           |
|---------|-------|-----|--------------------------------------------------------------------|
| 1       | VIN1  | I   | 1-ch input pin                                                     |
| 2       | VOUT1 | O   | 1-ch output pin                                                    |
| 3       | GND   | -   | Ground pin                                                         |
| 4       | DATA  | I   | Control data input pin. Inputs data in synchronization with clock. |
| 5       | CLOCK | I   | Clock input pin for transferring serial data.                      |
| 6       | Vcc   | -   | Power supply pin. Stabilize the pin with decoupling capacitor.     |
| 7       | VOUT2 | O   | 2-ch output pin                                                    |
| 8       | VIN2  | I   | 2-ch input pin                                                     |

## 3. System Diagram

### 3.1 Logic Diagram

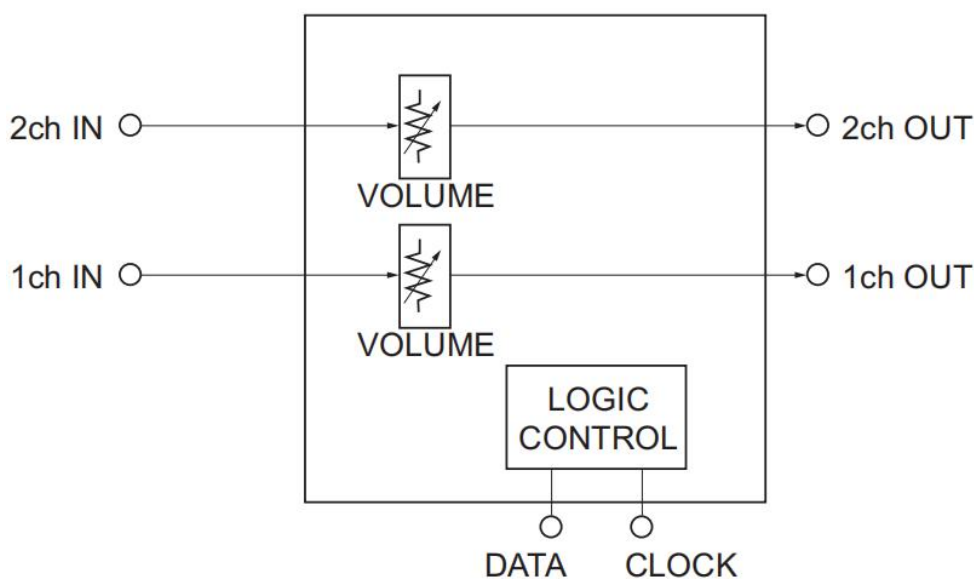


Figure 3.1: GR62429 Logic Diagram

### 3.2 Internal Block Diagram

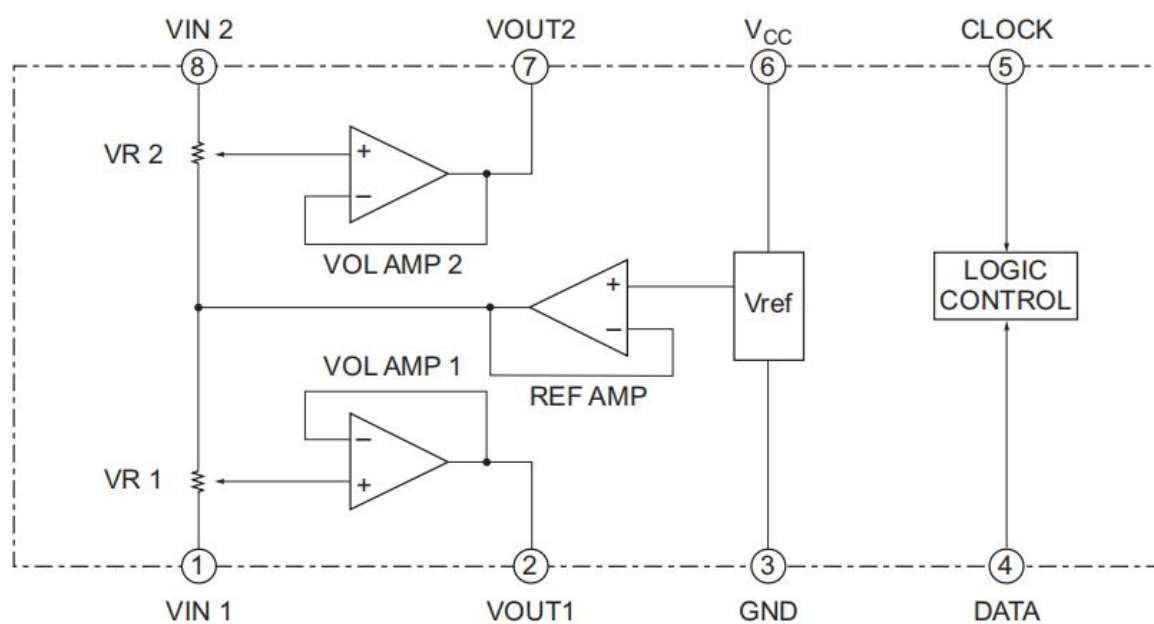
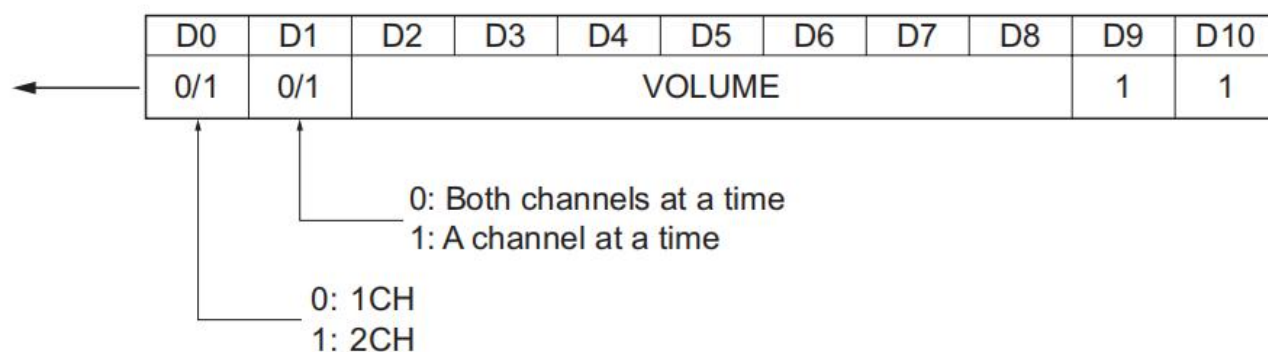


Figure 3.2: GR62429 Internal Block Diagram



### 3.3 Data Input Format



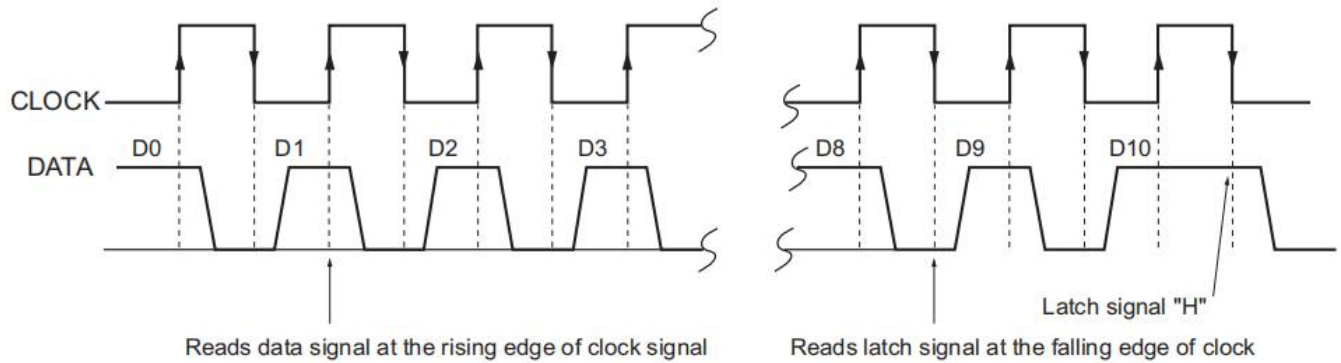
### 3.4 Volume Code

| ATT1  | D2 | D3 | D4 | D5 | D6 |
|-------|----|----|----|----|----|
| 0db   | 1  | 0  | 1  | 0  | 1  |
| -4db  | 0  | 0  | 1  | 0  | 1  |
| -8db  | 1  | 1  | 0  | 0  | 1  |
| -12db | 0  | 1  | 0  | 0  | 1  |
| -16db | 1  | 0  | 0  | 0  | 1  |
| -20db | 0  | 0  | 0  | 0  | 1  |
| -24db | 1  | 1  | 1  | 1  | 0  |
| -28db | 0  | 1  | 1  | 1  | 0  |
| -32db | 1  | 0  | 1  | 1  | 0  |
| -36db | 0  | 0  | 1  | 1  | 0  |
| -40db | 1  | 1  | 0  | 1  | 0  |
| -44db | 0  | 1  | 0  | 1  | 0  |
| -48db | 1  | 0  | 0  | 1  | 0  |
| -52db | 0  | 0  | 0  | 1  | 0  |
| -56db | 1  | 1  | 1  | 0  | 0  |
| -60db | 0  | 1  | 1  | 0  | 0  |
| -64db | 1  | 0  | 1  | 0  | 0  |
| -68db | 0  | 0  | 1  | 0  | 0  |
| -72db | 1  | 1  | 0  | 0  | 0  |
| -76db | 0  | 1  | 0  | 0  | 0  |
| -80db | 1  | 0  | 0  | 0  | 0  |
| -∞    | 0  | 0  | 0  | 0  | 0  |

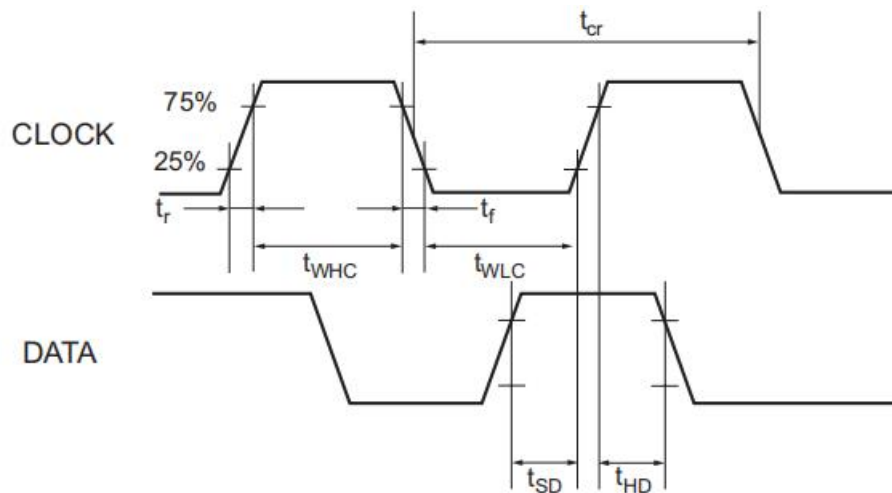


| ATT2 | D7 | D8 |
|------|----|----|
| 0db  | 1  | 1  |
| -1db | 0  | 1  |
| -2db | 1  | 0  |
| -3db | 0  | 0  |

### 3.5 Relationship between Data and Clock



### 3.6 Clock and Data Timing



## 4. Specifications

### 4.1 Absolute Maximum Ratings

| Symbol           | Parameter             | MIN | MAX | Unit |
|------------------|-----------------------|-----|-----|------|
| $V_{CC}, V_{DD}$ | Supply Voltage        | -   | 6   | V    |
| $T_{OPR}$        | Operating Temperature | -20 | 75  | °C   |
| $T_{stg}$        | Storage Temperature   | -55 | 125 | °C   |

Absolute maximum ratings are those values beyond which the device could be permanently damaged. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under normal operating conditions.



## 4.2 Electrical Characteristics

| Symbol          | Parameter                 | Test Condition                         | MIN | TYP  | MAX  | Unit       |
|-----------------|---------------------------|----------------------------------------|-----|------|------|------------|
| $I_{cc}$        | Circuit Current           | --                                     | --  | 8    | 16   | mA         |
| $A_{TT}$        | Maximum attenuation       | $A_{TT}=-\infty$                       | --  | -90  | -80  | db         |
| $\Delta A_{TT}$ | Attenuation error         | $A_{TT}=0$                             | -2  | 0    | 2    | db         |
| VIM             | Maximum input voltage     | THD=1%, $A_{TT} = -6$ dB               | 1.5 | 1.7  | --   | Vrms       |
| VOM             | Maximum output voltage    | THD=1%                                 | 0.8 | 1.3  | --   | Vrms       |
| $V_{no1}$       | Output noise voltage      | $A_{TT} = 0$ , $R_g = 0$ , JIS-A       | --  | 4    | 10   | $\mu$ Vrms |
| $V_{no2}$       |                           | $A_{TT} = -\infty$ , $R_g = 0$ , JIS-A | --  | 5    | 10   |            |
| THD             | Total harmonic distortion | $f=1$ kHz, $V_o=0.5$ Vrms, $A_{TT}=0$  | --  | 0.01 | 0.05 | %          |
| CS              | Channel separation        | $f=1$ kHz, JIS-A                       | --  | -80  | -70  | db         |

## 4.3 DC Characteristics of Digital Block

| Item                    | Symbol | Limits  |     |         | Unit    | Test Conditions |                |
|-------------------------|--------|---------|-----|---------|---------|-----------------|----------------|
|                         |        | Min     | Typ | Max     |         |                 |                |
| "L" level input voltage | VIL    | 0       | --  | 0.2 Vcc | V       | Data,clock pin  |                |
| "H" level input voltage | VIH    | 0.8 Vcc | --  | Vcc     | V       |                 |                |
| "L" level input current | IIl    | -10     | --  | 10      | $\mu$ A | V1=0            | Data,clock pin |
| "H" level input current | IIH    | --      | --  | 10      | $\mu$ A | V1=5V           |                |



## 4.4 AC Characteristics of Digital Block

| Item                             | Symbol | Limits |     |     | Unit |
|----------------------------------|--------|--------|-----|-----|------|
|                                  |        | Min    | Typ | Max |      |
| Cycle time of clock              | tcr    | 4      | --  | --  | μs   |
| Pulse width of clock ("H" level) | twHC   | 1.6    | --  | --  | srl  |
| Pulse width of clock("L" level)  | twLc   | 1.6    | --  | --  | srl  |
| Clock rising time                | tr     | --     | --  | 0.4 | μs   |
| Clock falling time               | tr     | --     | --  | 0.4 | sr   |
| Data setup time                  | tsD    | 0.8    | --  | --  | srl  |
| Data hold time                   | tHD    | 0.8    | --  | --  | sr   |

## 5. Application Information

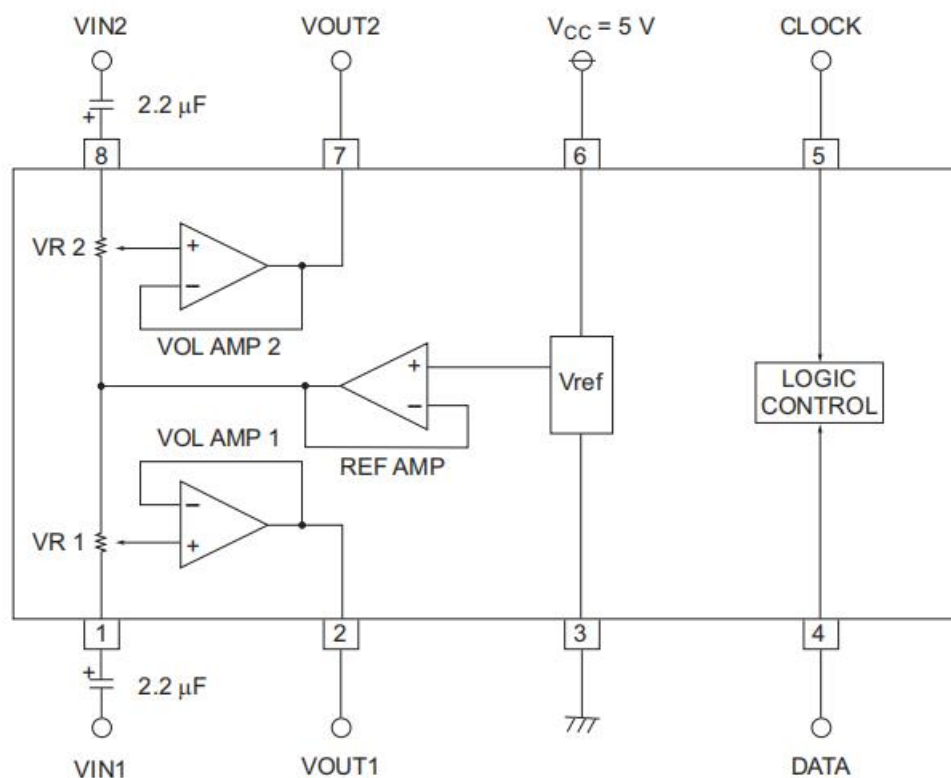


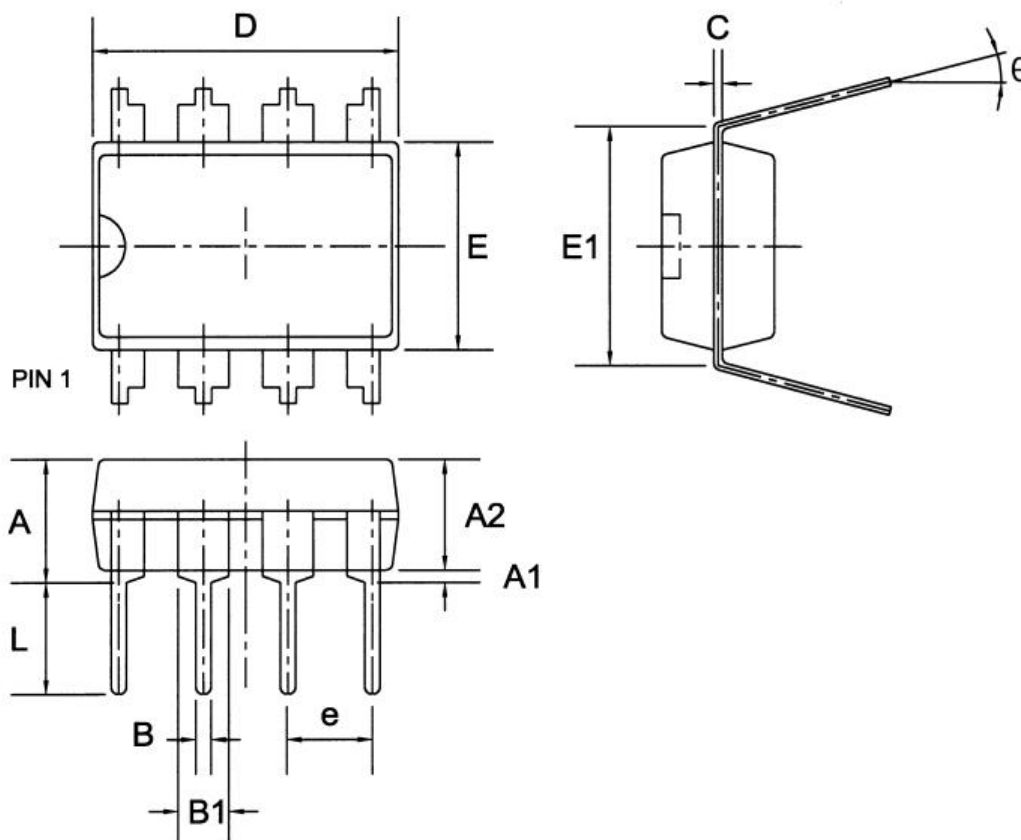
Figure 5.1: GR62429 Typical Circuit

## 6. Ordering Information

| Orderable Device | Package Type | Pins | Packing     | Package Qty |
|------------------|--------------|------|-------------|-------------|
| GR62429ND08ATEQ  | DIP          | 8    | Tube        | 50          |
| GR62429NS08ARDQ  | SOP          | 8    | Tape & Reel | 4000        |

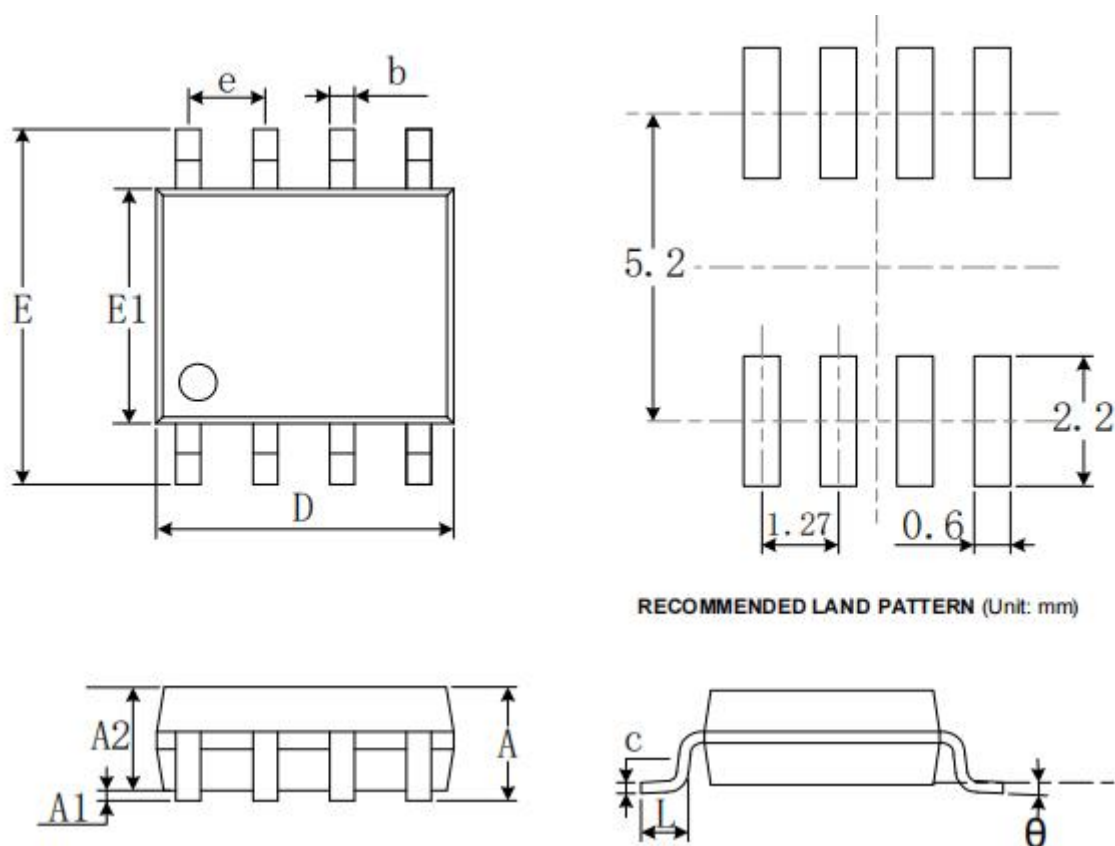
## 7. Package Information

### 7.1 DIP8



| Symbol | Dimensions In Millimeters |      |      | Dimensions In Inches |       |       |
|--------|---------------------------|------|------|----------------------|-------|-------|
|        | Min                       | Nom  | Max  | Min                  | Nom   | Max   |
| A      | —                         | —    | 4.31 | —                    | —     | 0.170 |
| A1     | 0.38                      | —    | —    | 0.015                | —     | —     |
| A2     | 3.15                      | 3.40 | 3.65 | 0.124                | 0.134 | 0.144 |
| B      | 0.38                      | 0.46 | 0.51 | 0.015                | 0.018 | 0.020 |
| B1     | 1.27                      | 1.52 | 1.77 | 0.050                | 0.060 | 0.070 |
| C      | 0.20                      | 0.25 | 0.30 | 0.008                | 0.010 | 0.012 |
| D      | 8.95                      | 9.20 | 9.45 | 0.352                | 0.362 | 0.372 |
| E      | 6.15                      | 6.40 | 6.65 | 0.242                | 0.252 | 0.262 |
| E1     | —                         | 7.62 | —    | —                    | 0.300 | —     |
| e      | —                         | 2.54 | —    | —                    | 0.100 | —     |
| L      | 3.00                      | 3.30 | 3.65 | 0.118                | 0.130 | 0.142 |
| θ      | 0°                        | —    | 15°  | 0°                   | —     | 15°   |

## 7.2 SOP8



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 1.350                     | 1.750 | 0.053                | 0.069 |
| A1       | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2       | 1.350                     | 1.550 | 0.053                | 0.061 |
| b        | 0.330                     | 0.510 | 0.013                | 0.020 |
| c        | 0.170                     | 0.250 | 0.007                | 0.010 |
| D        | 4.800                     | 5.000 | 0.189                | 0.197 |
| e        | 1.270(BSC)                |       | 0.050(BSC)           |       |
| E        | 5.800                     | 6.200 | 0.228                | 0.244 |
| E1       | 3.800                     | 4.000 | 0.150                | 0.157 |
| L        | 0.400                     | 1.270 | 0.016                | 0.050 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |