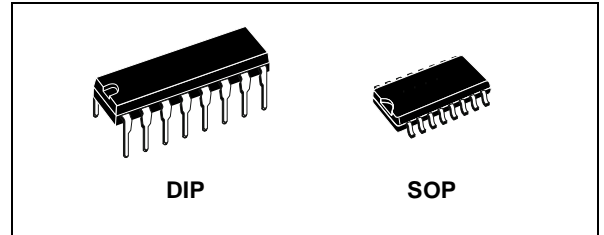


8-BIT PRIORITY ENCODER

- CONVERTS FROM 1 TO 8 TO INPUTS BINARY
- PROVIDES CASCADING FEATURE TO HANDLE ANY NUMBER OF INPUTS
- GROUP SELECT INDICATES ONE OR MORE PRIORITY INPUTS
- QUIESCENT CURRENT SPECIFIED UP TO 20V
- STANDARDIZED SYMMETRICAL OUTPUT CHARACTERISTICS
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT LEAKAGE CURRENT
 $I_l = 100\text{nA (MAX) AT } V_{DD} = 18\text{V } T_A = 25^\circ\text{C}$
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC JESD13B "STANDARD SPECIFICATIONS FOR DESCRIPTION OF B SERIES CMOS DEVICES"

DESCRIPTION

HCF4532B is a monolithic integrated circuit fabricated in Metal Oxide Semiconductor technology available in DIP and SOP packages. HCF4532B consists of a combinational logic that encodes the highest priority input (D7-D0) to a 3-bit binary code. The eight inputs, D7 through D0,



ORDER CODES

| PACKAGE | TUBE | T & R |
|---------|------------|---------------|
| DIP | HCF4532BEY | |
| SOP | HCF4532BM1 | HCF4532M013TR |

each have an assigned priority. D7 is the highest priority and D0 is the lowest. The priority encoder is inhibited when the chip enable input E_I is low. When E_I is high, the binary representation of the highest priority input appears on output lines Q2-Q0, and the group select line GS is high to indicate that priority inputs are present. The enable out (E_O) is high when no priority inputs are present. If any input is high, E_O is low and all cascaded lower order stages are disabled.

PIN CONNECTION

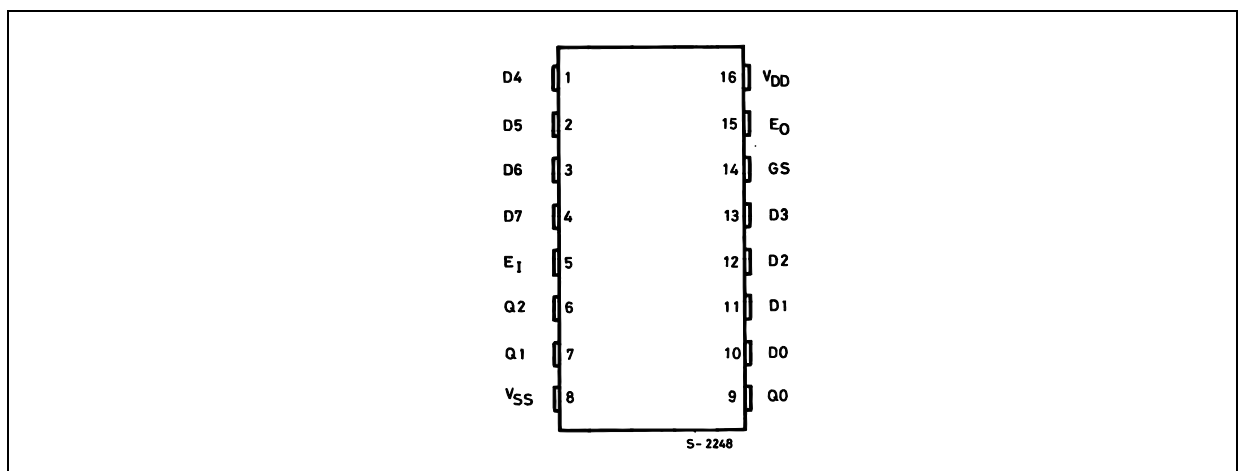


Figure 1: Input Equivalent Circuit

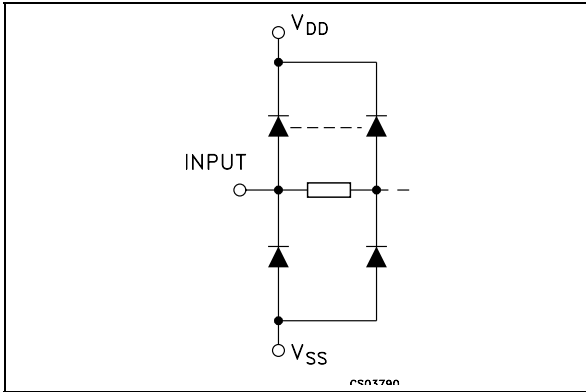


Table 1: Pin Description

| PIN N° | SYMBOL | NAME AND FUNCTION |
|----------------------------|----------|-------------------------|
| 10, 11, 12, 13, 1, 2, 3, 4 | D0 to D7 | Data Inputs |
| 9, 7, 6 | Q0 to Q2 | Data Output Lines |
| 5 | E_I | Chip Enable Input |
| 15 | E_O | Enable Output |
| 14 | GS | Group Select Line |
| 8 | V_{SS} | Negative Supply Voltage |
| 16 | V_{DD} | Positive Supply Voltage |

Figure 2: Functional Diagram

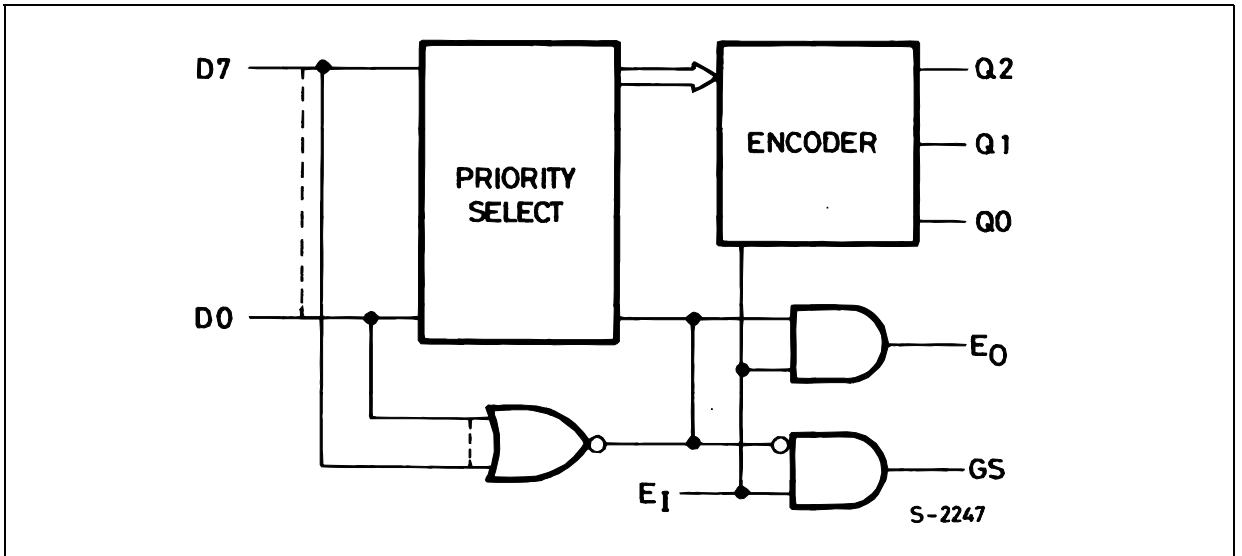


Table 2: Truth Table

| INPUTS | | | | | | | | | OUTPUTS | | | | |
|--------|----|----|----|----|----|----|----|----|---------|----|----|----|-------|
| E_I | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | GS | Q2 | Q1 | Q0 | E_O |
| L | X | X | X | X | X | X | X | X | L | L | L | L | L |
| H | L | L | L | L | L | L | L | L | L | L | L | L | H |
| H | H | X | X | X | X | X | X | X | H | H | H | H | L |
| H | L | H | X | X | X | X | X | X | H | H | H | L | L |
| H | L | L | H | X | X | X | X | X | H | H | L | H | L |
| H | L | L | L | H | X | X | X | X | H | H | L | L | L |
| H | L | L | L | L | H | X | X | X | H | L | H | H | L |
| H | L | L | L | L | L | H | X | X | H | L | H | L | L |
| H | L | L | L | L | L | L | H | X | H | L | L | H | L |
| H | L | L | L | L | L | L | L | H | H | L | L | L | L |

X : Don't Care

Figure 3: Logic Diagram

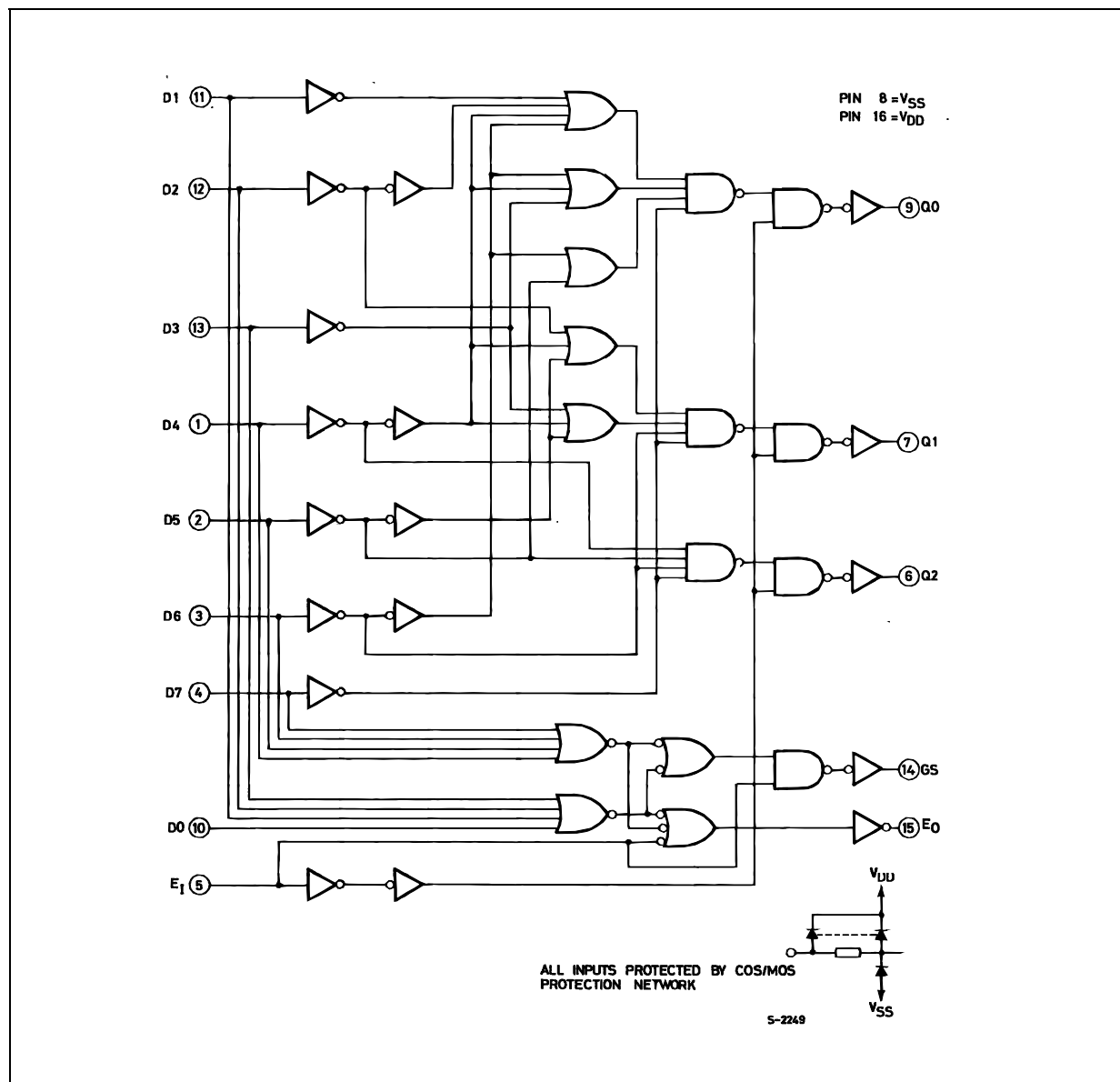


Table 3: Absolute Maximum Ratings

| Symbol | Parameter | Value | Unit |
|------------------|---|-------------------------------|------|
| V _{DD} | Supply Voltage | -0.5 to +22 | V |
| V _I | DC Input Voltage | -0.5 to V _{DD} + 0.5 | V |
| I _I | DC Input Current | ± 10 | mA |
| P _D | Power Dissipation per Package | 200 | mW |
| | Power Dissipation per Output Transistor | 100 | mW |
| T _{op} | Operating Temperature | -55 to +125 | °C |
| T _{stg} | Storage Temperature | -65 to +150 | °C |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

All voltage values are referred to V_{SS} pin voltage.

Table 4: Recommended Operating Conditions

| Symbol | Parameter | Value | Unit |
|----------|-----------------------|---------------|------|
| V_{DD} | Supply Voltage | 3 to 20 | V |
| V_I | Input Voltage | 0 to V_{DD} | V |
| T_{op} | Operating Temperature | -55 to 125 | °C |

Table 5: DC Specifications

| Symbol | Parameter | Test Condition | | | | Value | | | | | | Unit | |
|----------|---------------------------|----------------|--------------|--------------------------|-----------------|--------------------------|---------------|-----------|-------------|---------|--------------|---------|---------|
| | | V_I (V) | V_O (V) | $ I_{ol} $ (μ A) | V_{DD} (V) | $T_A = 25^\circ\text{C}$ | | | -40 to 85°C | | -55 to 125°C | | |
| | | | | | | Min. | Typ. | Max. | Min. | Max. | Min. | | Max. |
| I_L | Quiescent Current | 0/5 | | | 5 | | 0.04 | 5 | | 150 | | 150 | μ A |
| | | 0/10 | | | 10 | | 0.04 | 10 | | 300 | | 300 | |
| | | 0/15 | | | 15 | | 0.04 | 20 | | 600 | | 600 | |
| | | 0/20 | | | 20 | | 0.08 | 100 | | 3000 | | 3000 | |
| V_{OH} | High Level Output Voltage | 0/5 | | <1 | 5 | 4.95 | | | 4.95 | | 4.95 | | V |
| | | 0/10 | | <1 | 10 | 9.95 | | | 9.95 | | 9.95 | | |
| | | 0/15 | | <1 | 15 | 14.95 | | | 14.95 | | 14.95 | | |
| V_{OL} | Low Level Output Voltage | 5/0 | | <1 | 5 | | 0.05 | | | 0.05 | | 0.05 | V |
| | | 10/0 | | <1 | 10 | | 0.05 | | | 0.05 | | 0.05 | |
| | | 15/0 | | <1 | 15 | | 0.05 | | | 0.05 | | 0.05 | |
| V_{IH} | High Level Input Voltage | | 0.5/4.5 | <1 | 5 | 3.5 | | | 3.5 | | 3.5 | | V |
| | | | 1/9 | <1 | 10 | 7 | | | 7 | | 7 | | |
| | | | 1.5/13.5 | <1 | 15 | 11 | | | 11 | | 11 | | |
| V_{IL} | Low Level Input Voltage | | 4.5/0.5 | <1 | 5 | | | 1.5 | | 1.5 | | 1.5 | V |
| | | | 9/1 | <1 | 10 | | | 3 | | 3 | | 3 | |
| | | | 13.5/1.5 | <1 | 15 | | | 4 | | 4 | | 4 | |
| I_{OH} | Output Drive Current | 0/5 | 2.5 | <1 | 5 | -1.36 | -3.2 | | -1.1 | | -1.1 | | mA |
| | | 0/5 | 4.6 | <1 | 5 | -0.44 | -1 | | -0.36 | | -0.36 | | |
| | | 0/10 | 9.5 | <1 | 10 | -1.1 | -2.6 | | -0.9 | | -0.9 | | |
| | | 0/15 | 13.5 | <1 | 15 | -3.0 | -6.8 | | -2.4 | | -2.4 | | |
| I_{OL} | Output Sink Current | 0/5 | 0.4 | <1 | 5 | 0.44 | 1 | | 0.36 | | 0.36 | | mA |
| | | 0/10 | 0.5 | <1 | 10 | 1.1 | 2.6 | | 0.9 | | 0.9 | | |
| | | 0/15 | 1.5 | <1 | 15 | 3.0 | 6.8 | | 2.4 | | 2.4 | | |
| I_I | Input Leakage Current | 0/18 | Any Input | | 18 | | $\pm 10^{-5}$ | ± 0.1 | | ± 1 | | ± 1 | μ A |
| C_I | Input Capacitance | | Any Input | | | | 5 | 7.5 | | | | | pF |

The Noise Margin for both "1" and "0" level is: 1V min. with $V_{DD}=5V$, 2V min. with $V_{DD}=10V$, 2.5V min. with $V_{DD}=15V$

Table 6: Dynamic Electrical Characteristics ($T_{amb} = 25^{\circ}\text{C}$, $C_L = 50\text{pF}$, $R_L = 200\text{K}\Omega$, $t_r = t_f = 20\text{ ns}$)

| Symbol | Parameter | Test Condition | | Value (*) | | | Unit |
|---------------------|---|----------------|--|-----------|------|------|------|
| | | V_{DD} (V) | | Min. | Typ. | Max. | |
| t_{PLH} t_{PHL} | Propagation Delay Time (E_I to E_O , E_I to GS) | 5 | | | 110 | 220 | ns |
| | | 10 | | | 55 | 110 | |
| | | 15 | | | 45 | 85 | |
| t_{PLH} t_{PHL} | Propagation Delay Time (E_I to Q_m , D_n to GS) | 5 | | | 170 | 340 | ns |
| | | 10 | | | 85 | 170 | |
| | | 15 | | | 65 | 125 | |
| t_{PLH} t_{PHL} | Propagation Delay Time (D_n to Q_m) | 5 | | | 220 | 440 | ns |
| | | 10 | | | 110 | 220 | |
| | | 15 | | | 85 | 160 | |
| t_{TLH} t_{THL} | Transition Time | 5 | | | 100 | 200 | ns |
| | | 10 | | | 50 | 100 | |
| | | 15 | | | 40 | 80 | |

(*) Typical temperature coefficient for all V_{DD} value is 0.3 %/°C.

TYPICAL APPLICATIONS

Figure 4: 16-Level Priority Encoder

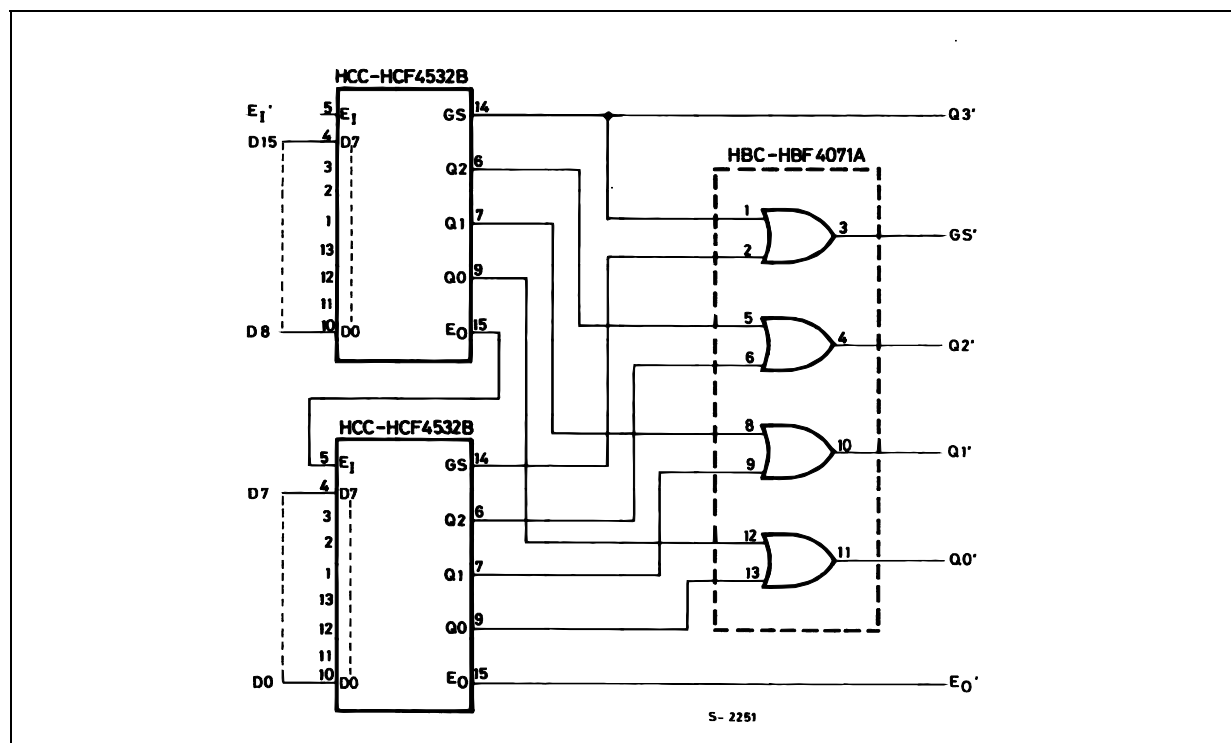


Figure 5: 0 To 9 Keyboard Encoder

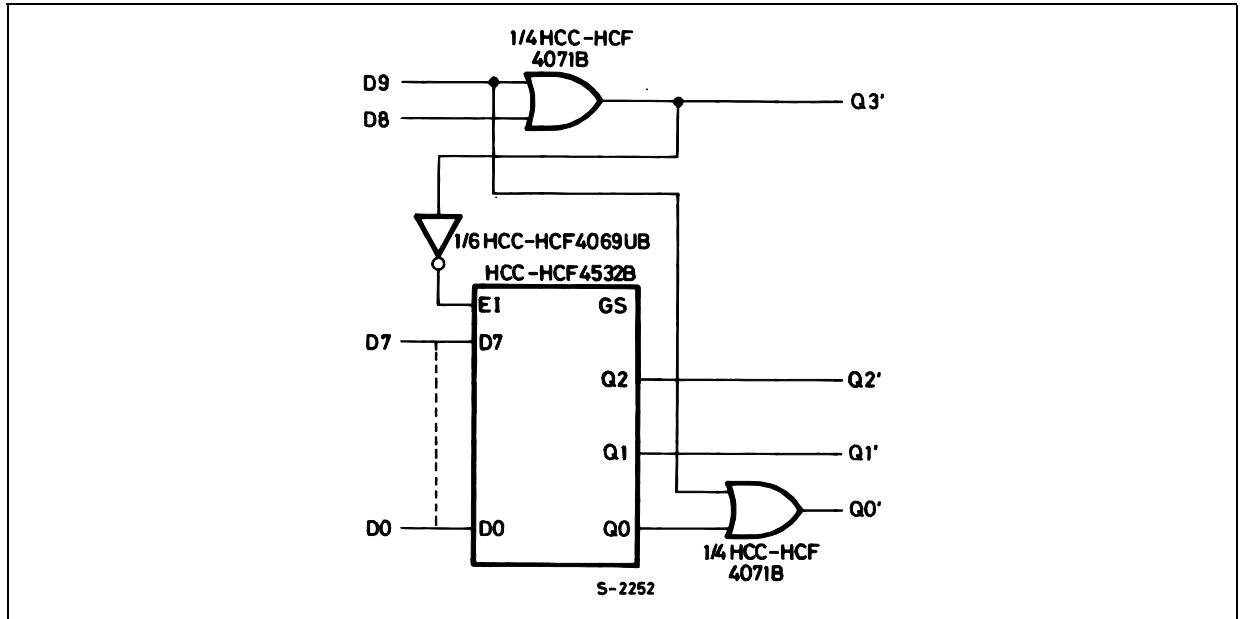


Table 7: Truth Table

| INPUTS | | | | | | | | | | OUTPUTS | | | | |
|--------|----|----|----|----|----|----|----|----|----|---------|-----|-----|-----|----|
| D9 | D8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | GS | Q3' | Q2' | Q1' | Q0 |
| H | X | X | X | X | X | X | X | X | X | L | H | L | L | H |
| L | H | X | X | X | X | X | X | X | X | L | H | L | L | L |
| L | L | H | X | X | X | X | X | X | X | H | L | H | H | H |
| L | L | L | H | X | X | X | X | X | X | H | L | H | H | L |
| L | L | L | L | H | X | X | X | X | X | H | L | H | L | H |
| L | L | L | L | L | H | X | X | X | X | H | L | H | L | L |
| L | L | L | L | L | L | H | X | X | X | H | L | L | H | H |
| L | L | L | L | L | L | L | H | X | X | H | L | L | H | L |
| L | L | L | L | L | L | L | L | H | X | H | L | L | L | H |
| L | L | L | L | L | L | L | L | L | H | H | L | L | L | L |

X : Don't Care

Figure 6: Digital To Analog Conversion

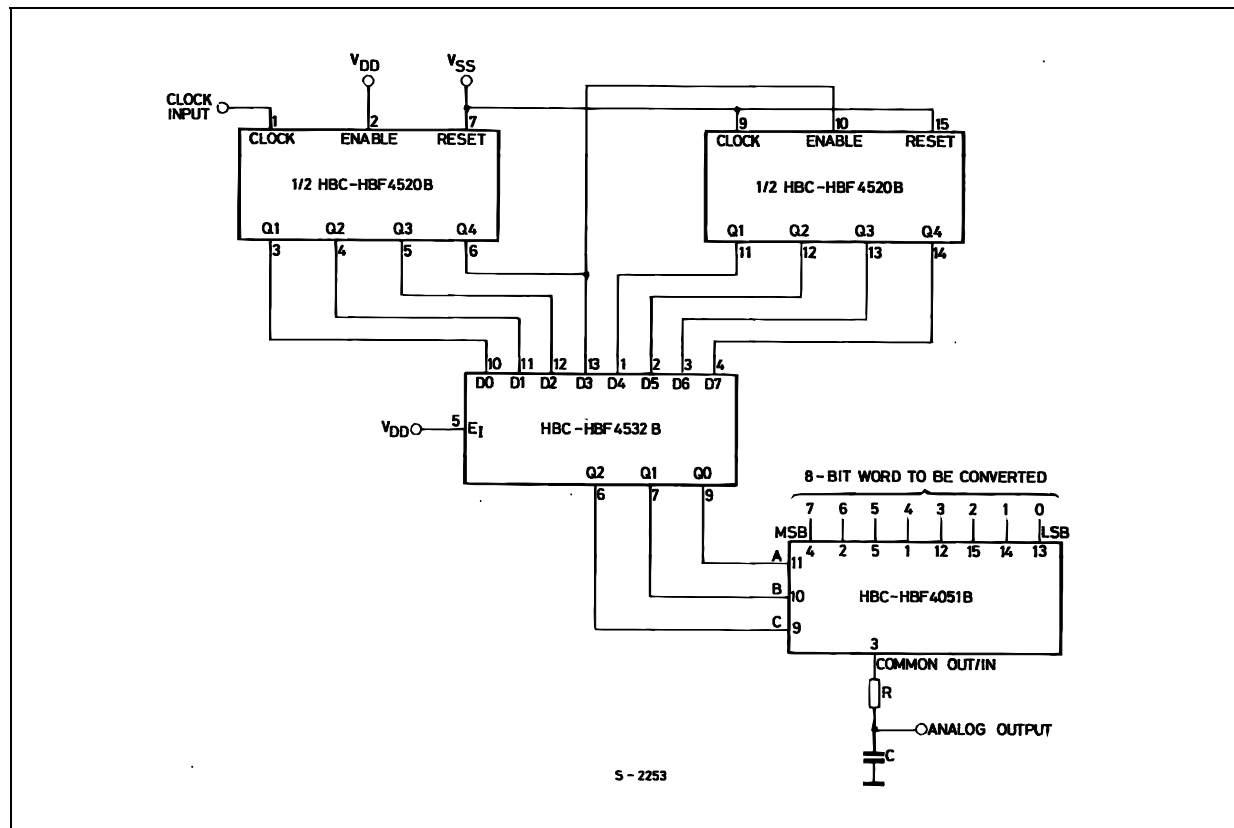
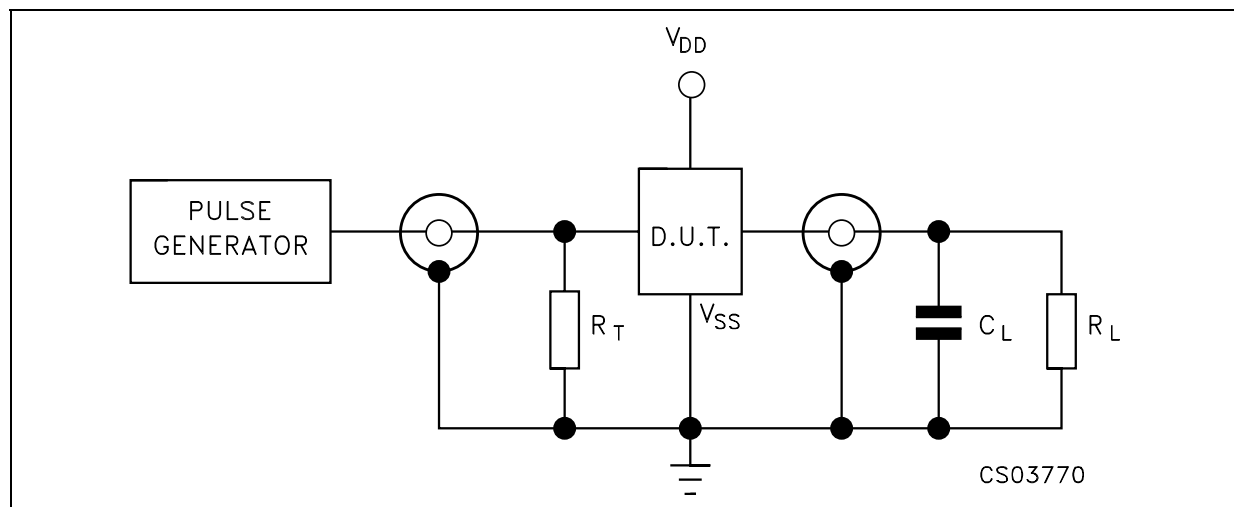
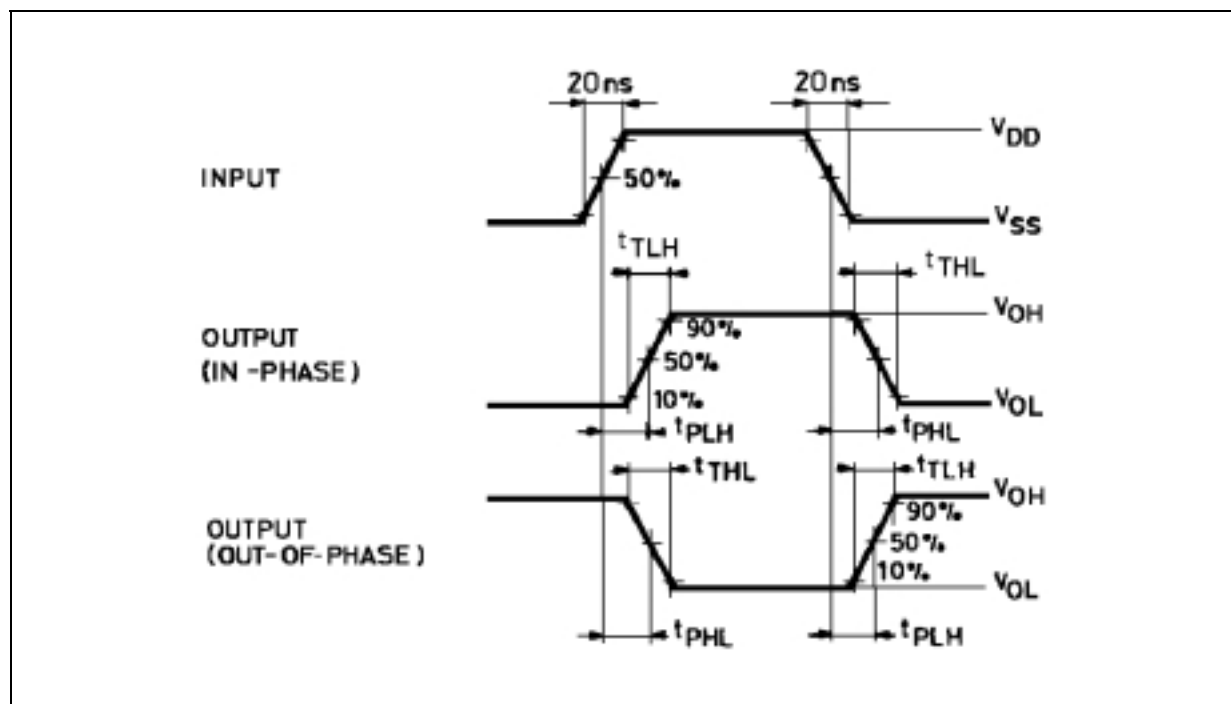


Figure 7: Test Circuit

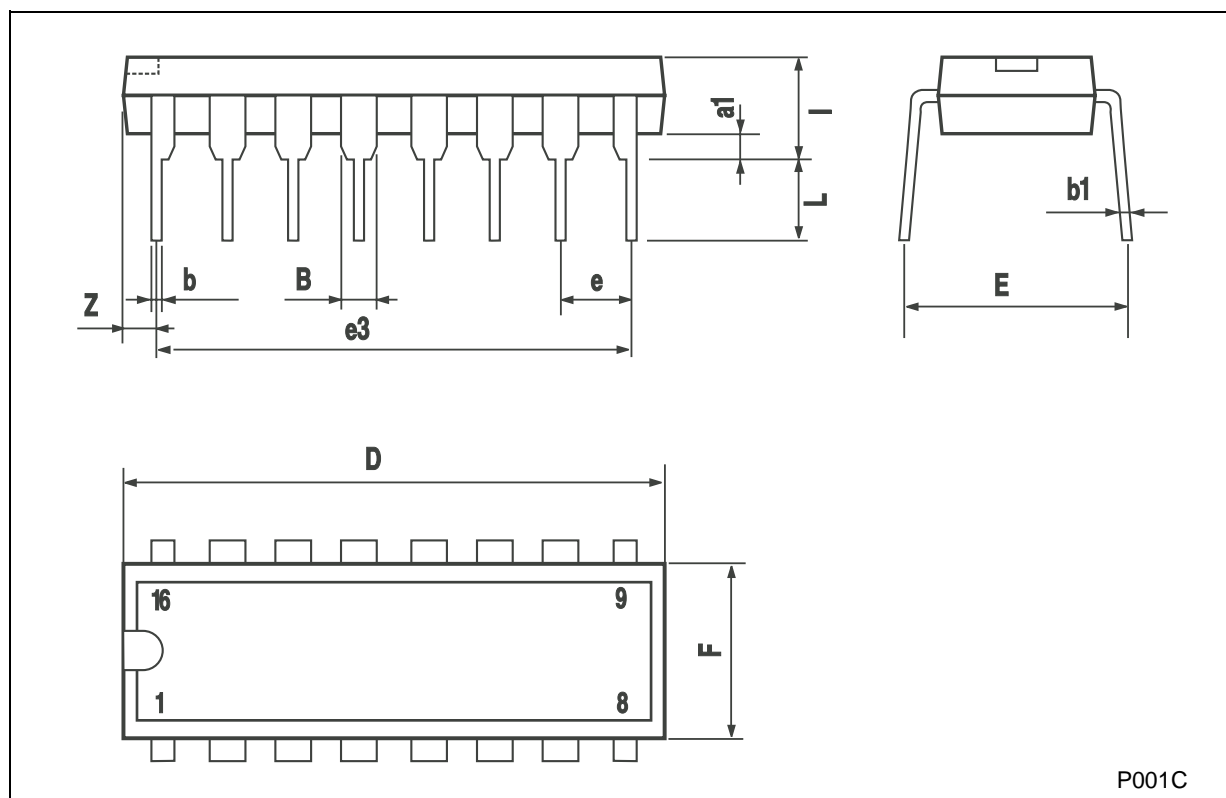


$C_L = 50\text{pF}$ or equivalent (includes jig and probe capacitance)
 $R_L = 200\text{K}\Omega$
 $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

Figure 8: Waveform - Propagation Delay Times ($f=1\text{MHz}$; 50% duty cycle)

Plastic DIP-16 (0.25) MECHANICAL DATA

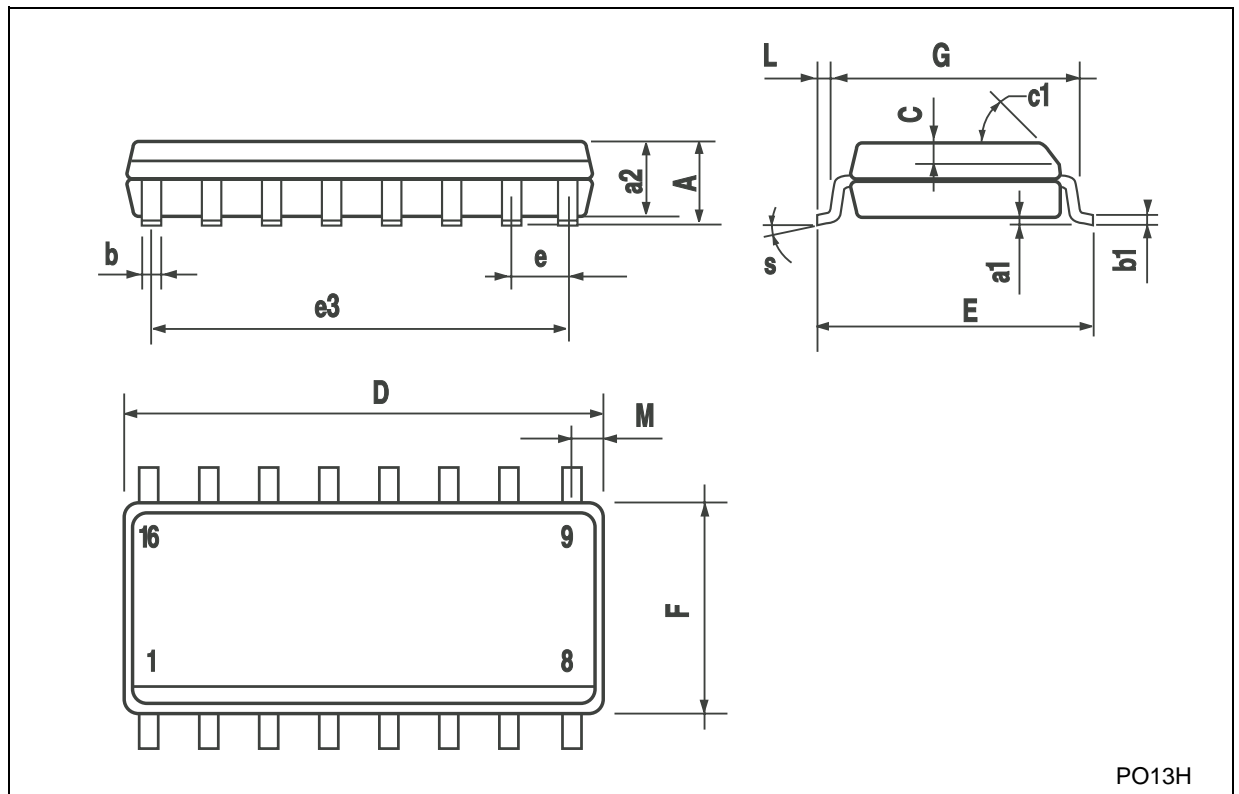
| DIM. | mm. | | | inch | | |
|------|------|-------|------|-------|-------|-------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| a1 | 0.51 | | | 0.020 | | |
| B | 0.77 | | 1.65 | 0.030 | | 0.065 |
| b | | 0.5 | | | 0.020 | |
| b1 | | 0.25 | | | 0.010 | |
| D | | | 20 | | | 0.787 |
| E | | 8.5 | | | 0.335 | |
| e | | 2.54 | | | 0.100 | |
| e3 | | 17.78 | | | 0.700 | |
| F | | | 7.1 | | | 0.280 |
| I | | | 5.1 | | | 0.201 |
| L | | 3.3 | | | 0.130 | |
| Z | | | 1.27 | | | 0.050 |



P001C

SO-16 MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|------------|------|------|----------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.75 | | | 0.068 |
| a1 | 0.1 | | 0.2 | 0.004 | | 0.008 |
| a2 | | | 1.65 | | | 0.064 |
| b | 0.35 | | 0.46 | 0.013 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | | 0.5 | | | 0.019 | |
| c1 | 45° (typ.) | | | | | |
| D | 9.8 | | 10 | 0.385 | | 0.393 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 8.89 | | | 0.350 | |
| F | 3.8 | | 4.0 | 0.149 | | 0.157 |
| G | 4.6 | | 5.3 | 0.181 | | 0.208 |
| L | 0.5 | | 1.27 | 0.019 | | 0.050 |
| M | | | 0.62 | | | 0.024 |
| S | 8 | | | ° (max.) | | |



PO13H

Tape & Reel SO-16 MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|------|-----|------|-------|------|--------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | | | 330 | | | 12.992 |
| C | 12.8 | | 13.2 | 0.504 | | 0.519 |
| D | 20.2 | | | 0.795 | | |
| N | 60 | | | 2.362 | | |
| T | | | 22.4 | | | 0.882 |
| Ao | 6.45 | | 6.65 | 0.254 | | 0.262 |
| Bo | 10.3 | | 10.5 | 0.406 | | 0.414 |
| Ko | 2.1 | | 2.3 | 0.082 | | 0.090 |
| Po | 3.9 | | 4.1 | 0.153 | | 0.161 |
| P | 7.9 | | 8.1 | 0.311 | | 0.319 |

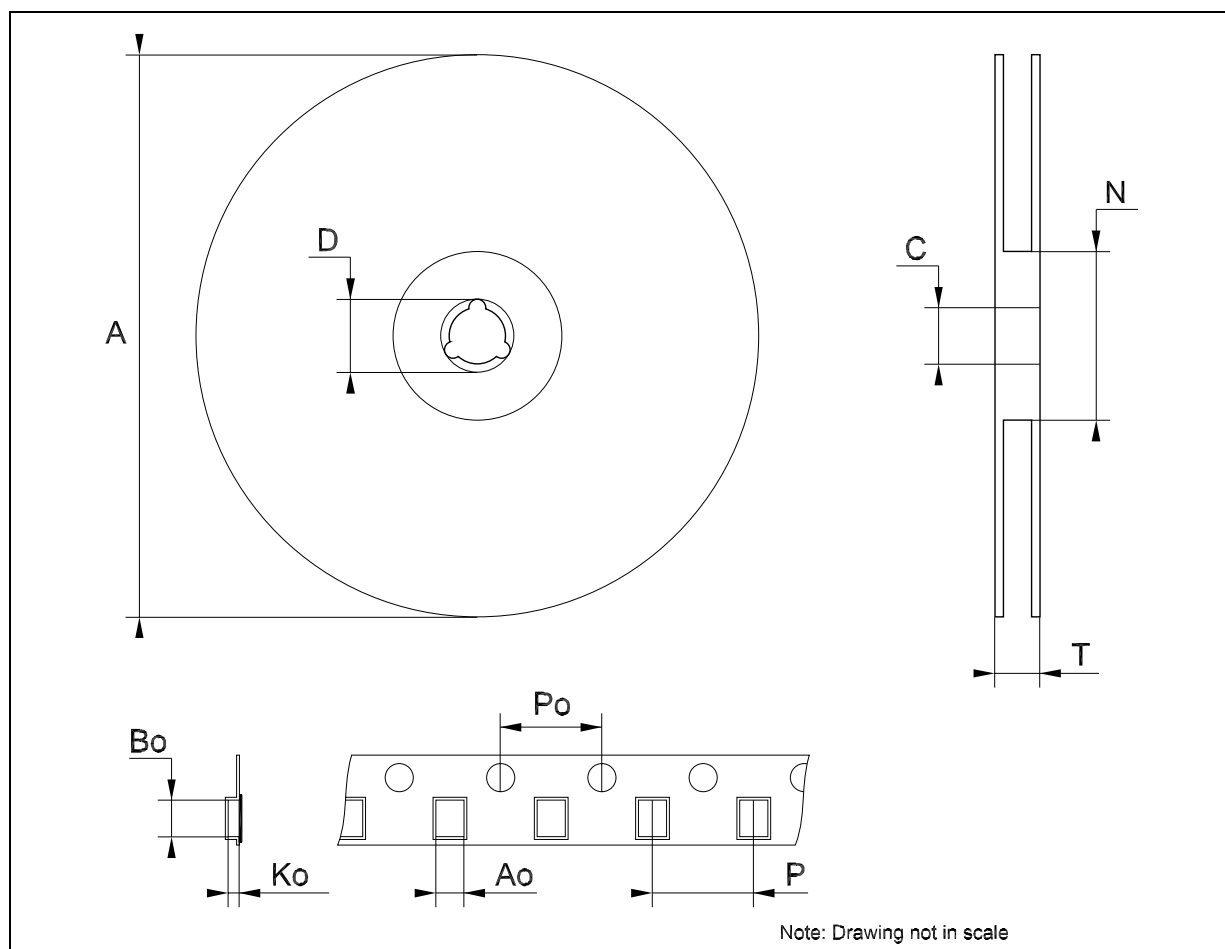


Table 8: Revision History

| Date | Revision | Description of Changes |
|-------------|-----------------|--|
| 07-May-2004 | 2 | Mistake Truth Table - Table 2 - Pag. 2 |

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