

| REVISIONS |                                                                                                                                              |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |                |  |  |  |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|-----------------|--|--|--|--|----------------|--|--|--|
| LTR       | DESCRIPTION                                                                                                                                  |  |  |  |  |  |  |  |  |  | DATE (YR-MO-DA) |  |  |  |  | APPROVED       |  |  |  |
| C         | Changes in accordance with NOR 5962-R022-96.                                                                                                 |  |  |  |  |  |  |  |  |  | 95-12-19        |  |  |  |  | K.A. Cottongim |  |  |  |
| D         | Added device type 09 with cage 88739. Added device type 10 with cage 57363. Added case outlines U and Z to figure 1. Redrew entire document. |  |  |  |  |  |  |  |  |  | 96-02-22        |  |  |  |  | K.A. Cottongim |  |  |  |
|           |                                                                                                                                              |  |  |  |  |  |  |  |  |  |                 |  |  |  |  |                |  |  |  |

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|-------|----|----|----|----|----|----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| REV   |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SHEET |    |    |    |    |    |    |  |  |  |  |  |  |  |  |  |  |  |  |  |
| REV   | D  | D  | D  | D  | D  | D  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SHEET | 15 | 16 | 17 | 18 | 19 | 20 |  |  |  |  |  |  |  |  |  |  |  |  |  |

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|----------------------|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|---|---|---|
| REV STATUS OF SHEETS | REV   | D | D | D | D | D | D | D | D | D | D  | D  | D  | D  | D  | D | D | D |
|                      | SHEET | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |   |   |   |

|                                                                                                                                                            |                                   |                                                                                                                                                |                        |                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------|
| PMIC N/A                                                                                                                                                   | PREPARED BY<br>Gary Zahn          | <b>DEFENSE ELECTRONICS SUPPLY CENTER</b><br>DAYTON, OHIO 45444<br><br>MICROCIRCUIT, HYBRID, DIGITAL, DRIVER/RECEIVER,<br>DUAL CHANNEL, 12-VOLT |                        |                   |
| <b>STANDARD MICROCIRCUIT DRAWING</b><br><br>THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE<br><br>AMSC N/A | CHECKED BY<br>Robert M. Heber     |                                                                                                                                                |                        |                   |
|                                                                                                                                                            | APPROVED BY<br>William K. Heckman |                                                                                                                                                |                        |                   |
|                                                                                                                                                            | DRAWING APPROVAL DATE<br>91-01-25 |                                                                                                                                                |                        |                   |
|                                                                                                                                                            | REVISION LEVEL<br>D               |                                                                                                                                                |                        |                   |
|                                                                                                                                                            |                                   | SIZE <b>A</b>                                                                                                                                  | CAGE CODE <b>67268</b> | <b>5962-89826</b> |
|                                                                                                                                                            |                                   | SHEET 1 OF 20                                                                                                                                  |                        |                   |

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# 1. SCOPE

1.1 Scope. This drawing describes device requirements for class H hybrid microcircuits to be processed in accordance with MIL-PRF-38534.

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:

|                   |                            |                             |                            |
|-------------------|----------------------------|-----------------------------|----------------------------|
| <u>5962-89826</u> | <u>01</u>                  | <u>X</u>                    | <u>X</u>                   |
| Drawing number    | Device type<br>(see 1.2.1) | Case outline<br>(see 1.2.2) | Lead finish<br>(see 1.2.3) |

1.2.1 Device type(s). The device type(s) shall identify the circuit function as follows:

| Device type | Generic number           | Circuit function 1/                      | Coupling transformer turns ratio |        |
|-------------|--------------------------|------------------------------------------|----------------------------------|--------|
|             |                          |                                          | transformer                      | direct |
| 01          | BUS-63127II, BUS-63128II | Low power, dual channel, driver-receiver | 1:0.6                            | 1:0.83 |
| 02          | ARX3419                  | "                                        | 1:0.707                          | 1:1    |
| 03          | NHI-1502                 | "                                        | 1:0.7                            | 1:1    |
| 04          | NHI-1523                 | "                                        | 1:0.57                           | 1:0.8  |
| 05          | FC1553721                | "                                        | 1:1.66                           | 1:1.2  |
| 06          | CT1589D                  | "                                        | 1:0.707                          | 1:1    |
| 07          | FC1553722                | " 2/                                     | 1:1.66                           | 1:1.2  |
| 08          | FC1553726                | "                                        | 1:0.707                          | 1:1    |
| 09          | ARX3433                  | "                                        | 1:0.707                          | 1:1    |
| 10          | NHI-1522                 | " 2/                                     | 1:0.57                           | 1:0.8  |

1.2.2 Case outline(s). The case outline(s) shall be as designated in MIL-STD-1835 and as follows:

| Outline letter | Descriptive designator | Terminals | Package style |
|----------------|------------------------|-----------|---------------|
| U              | See figure 1           | 28        | Dual-in-line  |
| X              | See figure 1           | 36        | Dual-in-line  |
| Y              | See figure 1           | 36        | Flat package  |
| Z              | See figure 1           | 28        | Flat package  |

1.2.3 Lead finish. The lead finish shall be as specified in MIL-PRF-38534. Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

## 1.3 Absolute maximum ratings.

### Supply voltage range:

|                                                          |                               |
|----------------------------------------------------------|-------------------------------|
| V <sub>CC</sub> (devices 02, 03, 04, 06, 09, and 10)     | -0.3 V dc to +18 V dc         |
| V <sub>EE</sub> (devices 01, 02, 05, 06, 07, 08, and 09) | +0.3 V dc to -18 V dc         |
| V <sub>CC1</sub> (all devices)                           | -0.3 V dc to +7 V dc          |
| Logic input voltage range                                | -0.3 V dc to V <sub>CC1</sub> |
| Receiver differential voltage                            | 40 Vp-p                       |
| Receiver common mode voltage range                       | -10 V dc to +10 V dc          |
| Driver peak output current:                              |                               |
| (devices 01, 03, 04, 06, and 10)                         | 200 mA                        |
| (devices 05, 07, 08, and 09)                             | 250 mA                        |
| (device 02)                                              | 400 mA                        |

- 1/ Receiver standby low, compatible with manchester encoder-decoder described in DESC drawing 78029.  
2/ Receiver standby high, compatible with Smith's manchester encoder-decoder.

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Power dissipation ( $P_D$ ) at  $T_C = +125^\circ\text{C}$ :

|                          |                                 |
|--------------------------|---------------------------------|
| (device 01)              | 3 W                             |
| (device 02)              | 2 W $\frac{3}{4}$ $\frac{5}{3}$ |
| (devices 03, 04, and 10) | 0.96 W $\frac{3}{4}$            |
| (devices 05, 07, and 08) | 2 W $\frac{3}{4}$               |
| (devices 06 and 09)      | 3 W                             |

Storage temperature range . . . . .  $-65^\circ\text{C}$  to  $+150^\circ\text{C}$

Junction temperature ( $T_J$ ):

|                                              |                      |
|----------------------------------------------|----------------------|
| (devices 01, 03, 04, 05, 06, 07, 08, and 10) | $+160^\circ\text{C}$ |
| (devices 02 and 09)                          | $+167^\circ\text{C}$ |

Thermal resistance, junction-to-case ( $\theta_{JC}$ ):

|                          |                       |
|--------------------------|-----------------------|
| (device 01)              | $7.0^\circ\text{C/W}$ |
| (devices 02 and 09)      | $88^\circ\text{C/W}$  |
| (devices 03, 04, and 10) | $8.8^\circ\text{C/W}$ |
| (devices 05, 07, and 08) | $18^\circ\text{C/W}$  |
| (device 06)              | $80^\circ\text{C/W}$  |

Thermal resistance, junction-to-ambient ( $\theta_{JA}$ ):

|                          |                        |
|--------------------------|------------------------|
| (device 01)              | $27.0^\circ\text{C/W}$ |
| (device 02 and 09)       | $108^\circ\text{C/W}$  |
| (devices 03, 04, and 10) | $28.8^\circ\text{C/W}$ |
| (devices 05, 07, and 08) | $35^\circ\text{C/W}$   |
| (device 06)              | $80^\circ\text{C/W}$   |

#### 1.4 Recommended operating conditions.

Supply voltage range:

|                                                   |                              |
|---------------------------------------------------|------------------------------|
| $V_{CC}$ (devices 02, 03, 04, 06, 09, and 10)     | $+11.4$ V dc to $+12.6$ V dc |
| $V_{EE}$ (devices 01, 02, 05, 06, 07, 08, and 09) | $-11.2$ V dc to $-12.6$ V dc |
| $V_{CC1}$ (all devices)                           | $+4.5$ V dc to $+5.5$ V dc   |

Logic input voltage range . . . . . 0 V dc to  $+5$  V dc

Receiver differential voltage:

|                                      |          |
|--------------------------------------|----------|
| (devices 01, 05, 07, and 08)         | 30 V p-p |
| (devices 02, 03, 04, 06, 09, and 10) | 40 V p-p |

Receiver common voltage range:

|                                  |                          |
|----------------------------------|--------------------------|
| (devices 01, 02, 05, 07, and 08) | $-5$ V dc to $+5$ V dc   |
| (devices 03, 04, 06, 09, and 10) | $-10$ V dc to $+10$ V dc |

Driver peak output current:

|                                                  |        |
|--------------------------------------------------|--------|
| (devices 01, 03, 04, 05, 06, 07, 08, 09, and 10) | 220 mA |
| (device 02)                                      | 350 mA |

Serial data rate . . . . . 1.0 MHz maximum

Junction temperature ( $T_J$ ):

|                                              |                      |
|----------------------------------------------|----------------------|
| (devices 01, 03, 04, 05, 07, 08, 09, and 10) | $+150^\circ\text{C}$ |
| (devices 02 and 06)                          | $+160^\circ\text{C}$ |

Case operating temperature range ( $T_C$ ) . . . . .  $-55^\circ\text{C}$  to  $+125^\circ\text{C}$

$\frac{3}{4}$  One channel transmitting at 100 percent duty cycle and the second channel at standby.

$\frac{4}{5}$  Worst case operating junction temperature when case is held to  $+125^\circ\text{C}$ .

$\frac{5}{6}$  Maximum junction temperature rise above case temperature for the hottest device at 100 percent transmitting duty cycle shall be  $42^\circ\text{C}$ .

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## 2. APPLICABLE DOCUMENTS

2.1 Government specification and standards. Unless otherwise specified, the following specification and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

### SPECIFICATION

#### PERFORMANCE

MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.

### STANDARDS

#### MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.  
MIL-STD-973 - Configuration Management.  
MIL-STD-1835 - Microcircuit Case Outlines.

(Copies of the specification and standards required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

## 3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38534 and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38534 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.2.3 Timing waveforms. The timing waveforms shall be as specified on figure 3.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full specified operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-PRF-38534. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in QML-38534 (see 6.6 herein).

3.6 Manufacturer eligibility. In addition to the general requirements of MIL-PRF-38534, the manufacturer of the part described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, produced on the certified line, for each device type listed herein. The data should also include a summary of all parameters manually tested, and for those which, if any, are guaranteed. This data shall be maintained under document revision level control by the manufacturer and be made available to the preparing activity (DESC-EL) upon request.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in QML-38534 (see 6.6 herein). The certificate of compliance submitted to DESC-EL prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38534 and the requirements herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38534 shall be provided with each lot of microcircuits delivered to this drawing.

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TABLE 1. Electrical performance characteristics.

| Test                               | Symbol           | Conditions 1/<br>-55°C ≤ T <sub>C</sub> ≤ +125°C<br>unless otherwise specified | Group A<br>subgroups | Device<br>type                         | Limits |      | Unit  |
|------------------------------------|------------------|--------------------------------------------------------------------------------|----------------------|----------------------------------------|--------|------|-------|
|                                    |                  |                                                                                |                      |                                        | Min    | Max  |       |
| RECEIVER                           |                  |                                                                                |                      |                                        |        |      |       |
| Input level                        | V <sub>I</sub>   | Differential input pin 15<br>to pin 16 2/                                      | 4,5,6                | ALL                                    | 40     |      | Vp-p  |
| Input common mode<br>voltage range | V <sub>ICM</sub> | Independent of xfmr or in<br>accordance with 2/<br>MIL-HDBK-1553               | 4,5,6                | 01,02,<br>09                           |        | ±5   | V(pk) |
|                                    |                  |                                                                                |                      | 03,04,<br>05,06,<br>07,08,10           |        | ±10  |       |
| Output low voltage                 | V <sub>OL</sub>  | I <sub>OL</sub> = 16 mA                                                        | 1,2,3                | 01                                     |        | 0.5  | V     |
|                                    |                  | I <sub>OL</sub> = 4 mA                                                         |                      | 02,06,<br>09                           |        | 0.5  |       |
|                                    |                  | I <sub>OL</sub> = 8 mA                                                         |                      | 03,04,<br>05,07,<br>08,10              |        | 0.5  |       |
| Output high voltage                | V <sub>OH</sub>  | I <sub>OH</sub> = -0.4 mA                                                      | 1,2,3                | ALL                                    | 2.4    |      | V     |
| TRANSMITTER                        |                  |                                                                                |                      |                                        |        |      |       |
| Input low voltage                  | V <sub>IL</sub>  | 6/                                                                             | 1,2,3                | ALL                                    |        | 0.7  | V     |
| Input high voltage                 | V <sub>IH</sub>  | 6/                                                                             | 1,2,3                | ALL                                    | 2      |      | V     |
| Input low current                  | I <sub>IL</sub>  | V <sub>IL</sub> = 0.4 V                                                        | 1,2,3                | 01                                     | -0.72  |      | mA    |
|                                    |                  |                                                                                |                      | 02,03,<br>04,09,10                     | -0.4   |      |       |
|                                    |                  |                                                                                |                      | 05,07,<br>08                           | -1.6   |      |       |
|                                    |                  |                                                                                |                      | 06                                     | -1.0   |      |       |
| Input high current                 | I <sub>IH</sub>  | V <sub>IH</sub> = 2.7 V                                                        | 1,2,3                | 01,02,<br>03,04,<br>05,07,<br>08,09,10 |        | 0.04 | mA    |
|                                    |                  |                                                                                |                      | 06                                     |        | 0.10 |       |

See footnotes at end of table.

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TABLE 1. Electrical performance characteristics - Continued.

| Test | Symbol | Conditions 1/<br>-55°C ≤ T <sub>C</sub> ≤ +125°C<br>unless otherwise specified | Group A<br>subgroups | Device<br>type | Limits |     | Unit |
|------|--------|--------------------------------------------------------------------------------|----------------------|----------------|--------|-----|------|
|      |        |                                                                                |                      |                | Min    | Max |      |

**TRANSMITTER - Continued**

|                      |                 |                 |       |                                        |     |     |       |
|----------------------|-----------------|-----------------|-------|----------------------------------------|-----|-----|-------|
| Output voltage       | V <sub>O</sub>  | Across 35Ω load | 1,2,3 | 01,02,<br>03,04,<br>05,07,<br>08,09,10 | 6   | 9   | Vp-p  |
|                      |                 |                 |       | 06                                     | 6.2 | 8.5 |       |
| Output noise voltage | V <sub>ON</sub> | Across 35Ω load | 4,5,6 | All                                    |     | 10  | mVp-p |

**RECEIVER STROBE**

|                    |                  |                          |       |                 |       |      |    |
|--------------------|------------------|--------------------------|-------|-----------------|-------|------|----|
| Input low voltage  | V <sub>SIL</sub> | 6/                       | 1,2,3 | All             |       | 0.7  | V  |
| Input high voltage | V <sub>SIH</sub> | 6/                       | 1,2,3 | All             | 2     |      | V  |
| Input low current  | I <sub>SIL</sub> | V <sub>SIL</sub> = 0.4 V | 1,2,3 | 01,03,<br>04,10 | -0.72 |      | mA |
|                    |                  |                          |       | 02,09           | -0.4  |      |    |
|                    |                  |                          |       | 05,07,<br>08    | -1.6  |      |    |
|                    |                  |                          |       | 06              | -1.0  |      |    |
| Input high current | I <sub>SIH</sub> | V <sub>SIH</sub> = 2.7 V | 1,2,3 | All             |       | 0.04 | mA |

**TRANSMITTER INHIBIT**

|                    |                  |                          |       |                    |       |     |    |
|--------------------|------------------|--------------------------|-------|--------------------|-------|-----|----|
| Input low voltage  | V <sub>IIL</sub> | 6/                       | 1,2,3 | All                |       | 0.7 | V  |
| Input high voltage | V <sub>IIL</sub> | 6/                       | 1,2,3 | All                | 2     |     | V  |
| Input low current  | I <sub>IIL</sub> | V <sub>SIL</sub> = 0.4 V | 1,2,3 | 01                 | -0.72 |     | mA |
|                    |                  |                          |       | 02,03,<br>04,09,10 | -0.4  |     |    |
|                    |                  |                          |       | 05,07,<br>08       | -1.6  |     |    |
|                    |                  |                          |       | 06                 | -1.0  |     |    |

See footnotes at end of table.

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TABLE 1. Electrical performance characteristics - Continued.

| Test                            | Symbol           | Conditions 1/<br>-55°C ≤ T <sub>C</sub> ≤ +125°C<br>unless otherwise specified | Group A<br>subgroups | Device<br>type                         | Limits |      | Unit |
|---------------------------------|------------------|--------------------------------------------------------------------------------|----------------------|----------------------------------------|--------|------|------|
|                                 |                  |                                                                                |                      |                                        | Min    | Max  |      |
| TRANSMITTER INHIBIT - Continued |                  |                                                                                |                      |                                        |        |      |      |
| Input high current              | I <sub>IHH</sub> | V <sub>SIH</sub> = 2.7 V                                                       | 1,2,3                | 01,02,<br>03,04,<br>05,07,<br>08,09,10 |        | 0.04 | mA   |
|                                 |                  |                                                                                |                      | 06                                     |        | 0.10 |      |

**POWER SUPPLY**

|               |                      |                 |       |                                                 |  |                                  |    |
|---------------|----------------------|-----------------|-------|-------------------------------------------------|--|----------------------------------|----|
| Total current | I <sub>CC</sub> -SB  | (standby mode)  | 1,2,3 | 02,09<br>04,10<br>03,06                         |  | 1<br>25<br>44                    | mA |
|               | I <sub>EE</sub> -SB  |                 |       | 01,05<br>07,08<br>02<br>06,09                   |  | 30<br>30<br>16.5<br>70           |    |
|               | I <sub>CC1</sub> -SB |                 |       | 01,05<br>07,08<br>02<br>03,04,10<br>06,09       |  | 45<br>45<br>35<br>25<br>90       |    |
|               | I <sub>CC</sub> -25  | Across 35Ω load | 4,5,6 | 02,09<br>04,10<br>03,06                         |  | 80<br>69<br>100                  |    |
|               | I <sub>EE</sub> -25  |                 |       | 01 2/<br>02,09<br>05,06<br>07,08                |  | 80<br>21<br>70<br>70             |    |
|               | I <sub>CC1</sub> -25 |                 |       | 01 2/<br>05,07<br>08<br>02,09<br>03,04,10<br>06 |  | 45<br>45<br>45<br>35<br>25<br>90 |    |
|               | I <sub>CC</sub> -50  | Across 35Ω load | 4,5,6 | 02,09<br>04,10<br>03,06                         |  | 160<br>118<br>155                |    |
|               | I <sub>EE</sub> -50  |                 |       | 01<br>02,09<br>05,07<br>08<br>06                |  | 155<br>25<br>120<br>120<br>70    |    |
|               |                      |                 |       |                                                 |  |                                  |    |
|               |                      |                 |       |                                                 |  |                                  |    |
|               |                      |                 |       |                                                 |  |                                  |    |
|               |                      |                 |       |                                                 |  |                                  |    |

See footnotes at end of table.

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TABLE 1. Electrical performance characteristics - Continued.

| Test                     | Symbol                | Conditions 1/<br>-55°C ≤ T <sub>C</sub> ≤ +125°C<br>unless otherwise specified | Group A<br>subgroups | Device<br>type                               | Limits                                   |                                          | Unit |
|--------------------------|-----------------------|--------------------------------------------------------------------------------|----------------------|----------------------------------------------|------------------------------------------|------------------------------------------|------|
|                          |                       |                                                                                |                      |                                              | Min                                      | Max                                      |      |
| POWER SUPPLY - Continued |                       |                                                                                |                      |                                              |                                          |                                          |      |
| Total current            | I <sub>CC1</sub> -50  | Across 35Ω load                                                                | 4,5,6                | 01,05<br>07,08<br>02,09<br>03,04,10<br>06    |                                          | 45<br>45<br>35<br>25<br>90               | mA   |
|                          | I <sub>CC</sub> -100  | Across 35Ω load                                                                | 1,2,3                | 02,09<br>04,10<br>03,06                      |                                          | 325<br>209<br>260                        |      |
|                          | I <sub>EE</sub> -100  | Across 35Ω load 2/                                                             |                      | 01<br>02,09<br>05,07<br>08<br>06             |                                          | 255<br>30<br>270<br>270<br>70            |      |
|                          | I <sub>CC1</sub> -100 | Across 35Ω load 2/                                                             |                      | 01<br>02,09<br>03,04,10<br>05,07<br>08<br>06 |                                          | 45<br>35<br>25<br>55<br>55<br>90         |      |
| RECEIVER                 |                       |                                                                                |                      |                                              |                                          |                                          |      |
| Input resistance         | R <sub>IN</sub>       | 1 MHz sine wave 2/                                                             | 4,5,6                | 01<br>02,03<br>04,06,10<br>05,07<br>08,09    | 4<br>7<br>7<br>8<br>8                    |                                          | kΩ   |
| Input capacitance        | C <sub>IN</sub>       | 1 MHz sine wave 2/                                                             | 4                    | 01,02<br>03,04,10<br>06<br>05,07<br>08,09    |                                          | 5<br>5<br>5<br>7<br>7                    | pF   |
| Threshold voltage        | V <sub>TH</sub>       | 3/                                                                             | 1,2,3                | 01<br>02,09<br>03,04,10<br>06<br>05,07<br>08 | 0.5<br>0.6<br>0.56<br>0.56<br>0.8<br>0.8 | 1.2<br>1.05<br>1.0<br>1.05<br>1.2<br>1.2 | Vp-p |
|                          | V <sub>TH</sub>       | Group C end-point 3/<br>electricals                                            |                      | 01,02<br>03,04,10<br>06<br>05,07<br>08,09    | 0.05<br>0.05<br>0.05<br>0.8<br>0.8       | 1.1<br>1.1<br>1.1<br>1.2<br>1.2          |      |

See footnotes at end of table.

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TABLE 1. Electrical performance characteristics - Continued.

| Test                                    | Symbol            | Conditions 1/<br>-55°C ≤ T <sub>C</sub> ≤ +125°C<br>unless otherwise specified                                    | Group A<br>subgroups | Device<br>type                      | Limits     |            | Unit   |
|-----------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------|------------|------------|--------|
|                                         |                   |                                                                                                                   |                      |                                     | Min        | Max        |        |
| TRANSMITTER                             |                   |                                                                                                                   |                      |                                     |            |            |        |
| Output resistance<br>(transmitter off)  | R <sub>OUT</sub>  | 1 MHz sine wave 2/                                                                                                | 4,5,6                | ALL                                 | 10         |            | kΩ     |
| Output capacitance<br>(transmitter off) | C <sub>OUT</sub>  | 1 MHz sine wave 2/                                                                                                | 4                    | ALL                                 |            | 5          | pF     |
| Output offset voltage                   | V <sub>OS</sub>   | 2/ 4/                                                                                                             | 4,5,6                | ALL                                 |            | ±90        | mV(pk) |
| Peak amplitude<br>variation             | A <sub>V</sub>    | 2/ 5/ 7/                                                                                                          | 4,5,6                | ALL                                 |            | ±15        | %      |
| RECEIVER                                |                   |                                                                                                                   |                      |                                     |            |            |        |
| Delay time, input to<br>output          | t <sub>DR</sub>   | Delay time from dif-<br>ferential input zero____<br>crossing to DATA or DATA<br>(see figure 3) 2/                 | 9,10,11              | ALL                                 |            | 400        | ns     |
| Strobe delay                            | t <sub>DS</sub>   | Delay time from strobe<br>rising or falling edge to<br>DATA or DATA<br>(see figure 3) 2/                          | 9,10,11              | 01,03,<br>04,05,<br>06,07,<br>08,10 |            | 200        |        |
|                                         |                   |                                                                                                                   |                      | 02,09                               |            | 250        |        |
| TRANSMITTER                             |                   |                                                                                                                   |                      |                                     |            |            |        |
| Rise time                               | t <sub>R</sub>    | Device types 01,02,03,05,<br>07,08,09 output load =<br>35Ω, Device type 04<br>output load = 70Ω<br>(see figure 3) | 9,10,11              | 01-08<br>09                         | 100<br>100 | 300<br>200 | ns     |
| Fall time                               | t <sub>F</sub>    |                                                                                                                   | 9,10,11              | 01-08<br>09                         | 100<br>100 | 300<br>200 |        |
| Delay time                              | t <sub>DT</sub>   | 2/ (see figure 3)                                                                                                 | 9,10,11              | 01,03,<br>04,05,<br>07,08,10        |            | 250        | ns     |
|                                         |                   |                                                                                                                   |                      | 02,09                               |            | 350        |        |
|                                         |                   |                                                                                                                   |                      | 06                                  |            | 150        |        |
| Inhibit delay<br>inhibiting             | t <sub>DI-H</sub> | 2/ (see figure 3)                                                                                                 | 9,10,11              | 02,03,<br>04,09,10                  |            | 200        | ns     |
|                                         |                   |                                                                                                                   |                      | 01,05,<br>06,07,<br>08              |            | 500        |        |

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

| Test                    | Symbol            | Conditions 1/<br>-55°C ≤ T <sub>C</sub> ≤ +125°C<br>unless otherwise specified | Group A<br>subgroups | Device<br>type            | Limits |     | Unit |
|-------------------------|-------------------|--------------------------------------------------------------------------------|----------------------|---------------------------|--------|-----|------|
|                         |                   |                                                                                |                      |                           | Min    | Max |      |
| TRANSMITTER - Continued |                   |                                                                                |                      |                           |        |     |      |
| Inhibit delay active    | t <sub>DI-L</sub> | 2/ (see figure 3)                                                              | 9,10,11              | 01,02,<br>06,09           |        | 350 | ns   |
|                         |                   |                                                                                |                      | 03,04,<br>05,07,<br>08,10 |        | 150 |      |

- 1/  $V_{CC} = 12\text{ V}$ ,  $V_{EE} = -12\text{ V}$ ,  $V_{CC1} = +5\text{ V}$ . All specifications and limits are for single channel with no connections made to the other channel.
- 2/ This parameter is tested initially and after any process or design change which might affect this parameter.
- 3/ Threshold is measured in the direct coupled mode including the transformer. For device types 01, 02, 03, 04, 06, 09, and 10 threshold is the maximum level on the BUS at which there are no pulses on either receiver output. For device types 05, 07, and 08 threshold is defined as the minimum signal on the BUS to maintain TTL compatible outputs on both receiver outputs. Divide by 1.4 to obtain threshold in transformer coupled mode. Add 0.14 V in direct coupled mode or 0.10 V in transformer coupled mode to obtain threshold at which no errors are observed when receiver is used with 15530 CMOS manchester encoder-decoder.
- 4/ Measured across 35 $\Omega$  loads, 2.5  $\mu\text{S}$  after parity bit mid-bit zero crossing of a 660  $\mu\text{S}$  message.
- 5/ Measured across 35 $\Omega$  loads, variation of average peak amplitude.
- 6/ These parameters are not directly testable. The maintenance of logic drive levels within the specified voltage window during tests guarantees conformance.
- 7/ For device type 01, these parameters are guaranteed by design; but not tested.

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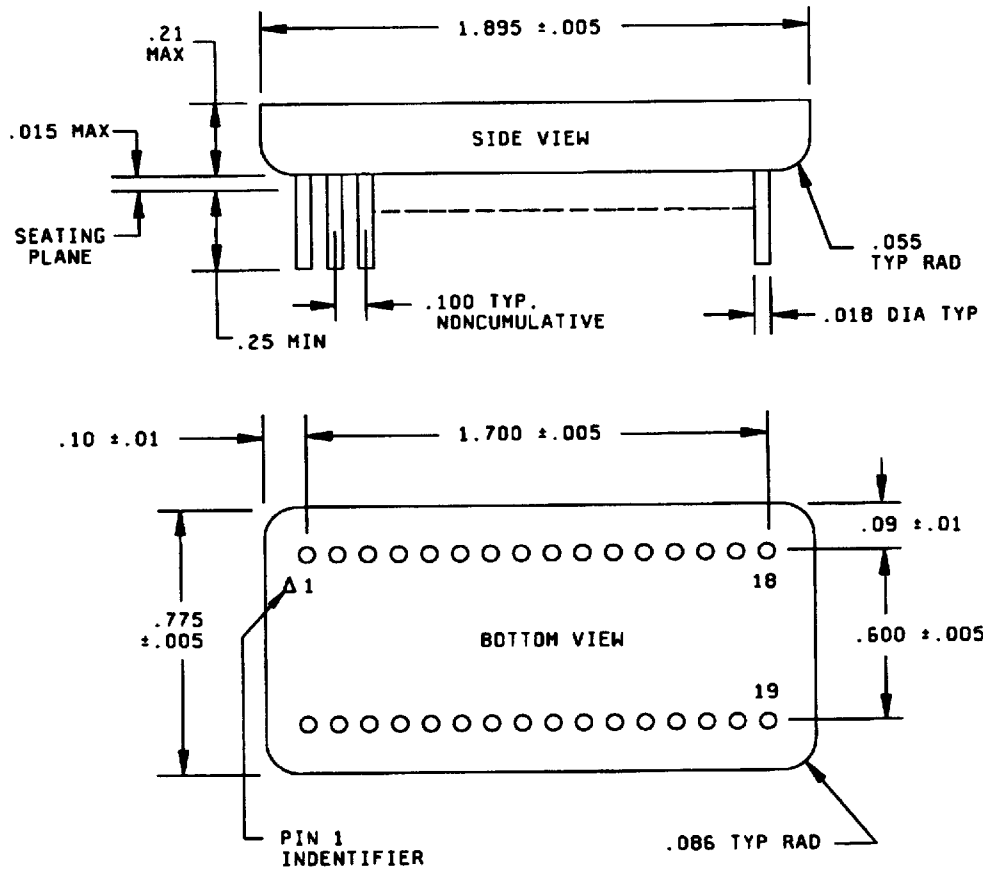
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Case X



| Inches | mm    |
|--------|-------|
| .005   | 0.13  |
| .01    | 0.3   |
| .015   | 0.38  |
| .018   | 0.46  |
| .055   | 1.40  |
| .086   | 2.18  |
| .09    | 2.3   |
| .10    | 2.5   |
| .100   | 2.54  |
| .600   | 15.24 |
| .775   | 19.68 |
| 1.700  | 43.18 |
| 1.895  | 48.13 |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Lead identification numbers are for reference only.
4. Lead spacing dimensions apply only at seating plane.

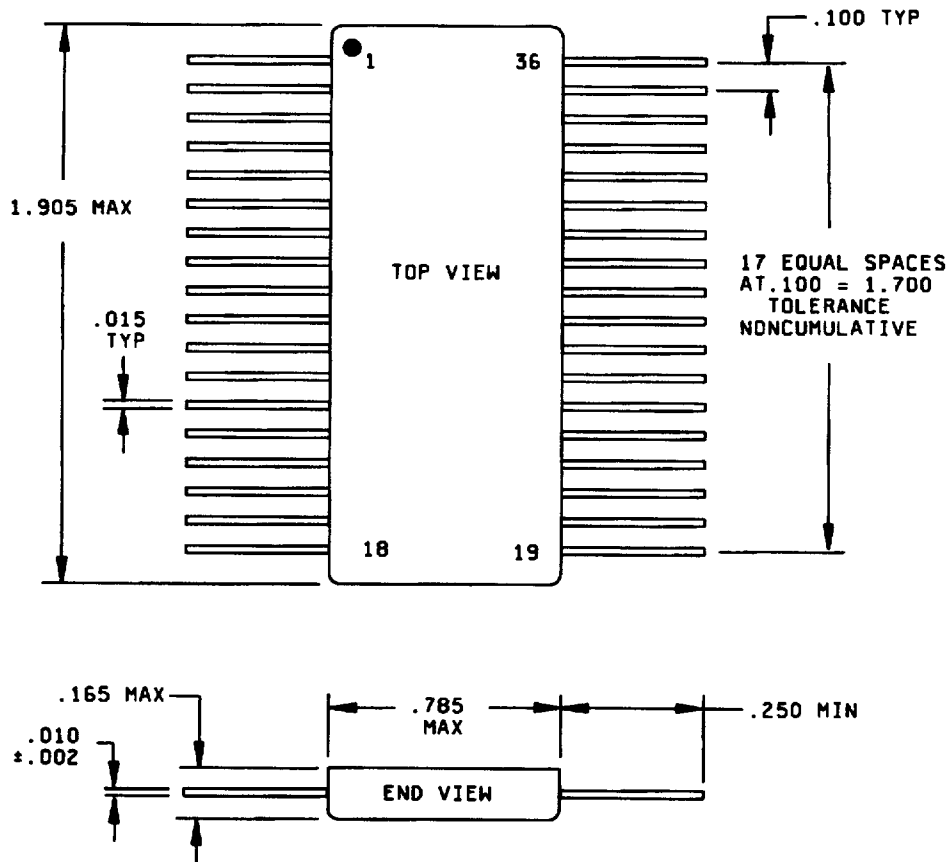
FIGURE 1. Case outlines.

|                                                                                             |                  |                     |             |
|---------------------------------------------------------------------------------------------|------------------|---------------------|-------------|
| STANDARD<br>MICROCIRCUIT DRAWING<br>DEFENSE ELECTRONICS SUPPLY CENTER<br>DAYTON, OHIO 45444 | SIZE<br><b>A</b> |                     | 5962-89826  |
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Case Y



| Inches | mm    |
|--------|-------|
| .002   | 0.05  |
| .010   | 0.25  |
| .015   | 0.38  |
| .100   | 2.54  |
| .165   | 4.19  |
| .250   | 6.35  |
| .785   | 19.94 |
| 1.700  | 43.18 |
| 1.905  | 48.39 |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Lead identification numbers are for reference only.
4. Lead spacing dimensions apply only at seating plane.

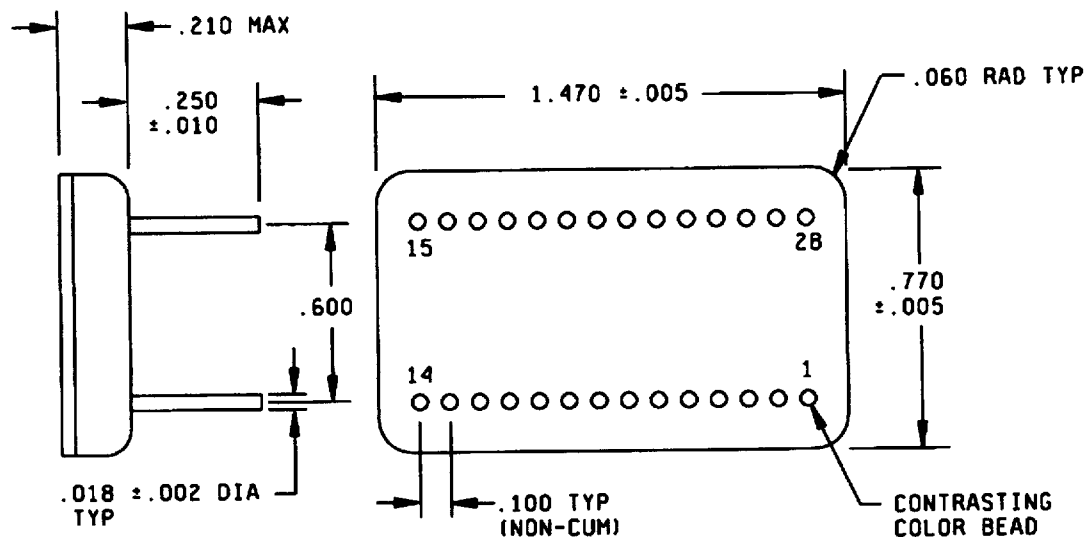
FIGURE 1. Case outlines - Continued.

|                                                                                                       |                   |                             |                     |
|-------------------------------------------------------------------------------------------------------|-------------------|-----------------------------|---------------------|
| <b>STANDARD<br/>MICROCIRCUIT DRAWING<br/>DEFENSE ELECTRONICS SUPPLY CENTER<br/>DAYTON, OHIO 45444</b> | <b>SIZE<br/>A</b> |                             | <b>5962-89826</b>   |
|                                                                                                       |                   | <b>REVISION LEVEL<br/>D</b> | <b>SHEET<br/>12</b> |

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9004708 0019169 108

Case U



| Inches | mm    |
|--------|-------|
| .002   | 0.05  |
| .005   | 0.13  |
| .010   | 0.25  |
| .018   | 0.46  |
| .060   | 1.52  |
| .100   | 2.54  |
| .210   | 5.33  |
| .250   | 6.35  |
| .600   | 15.24 |
| .770   | 19.56 |
| 1.470  | 37.34 |

NOTES:

1. Dimensions are inches.
2. Metric equivalents are given for general information only.
3. Lead identification numbers are for reference only.
4. Lead spacing dimensions only apply at seating plane.

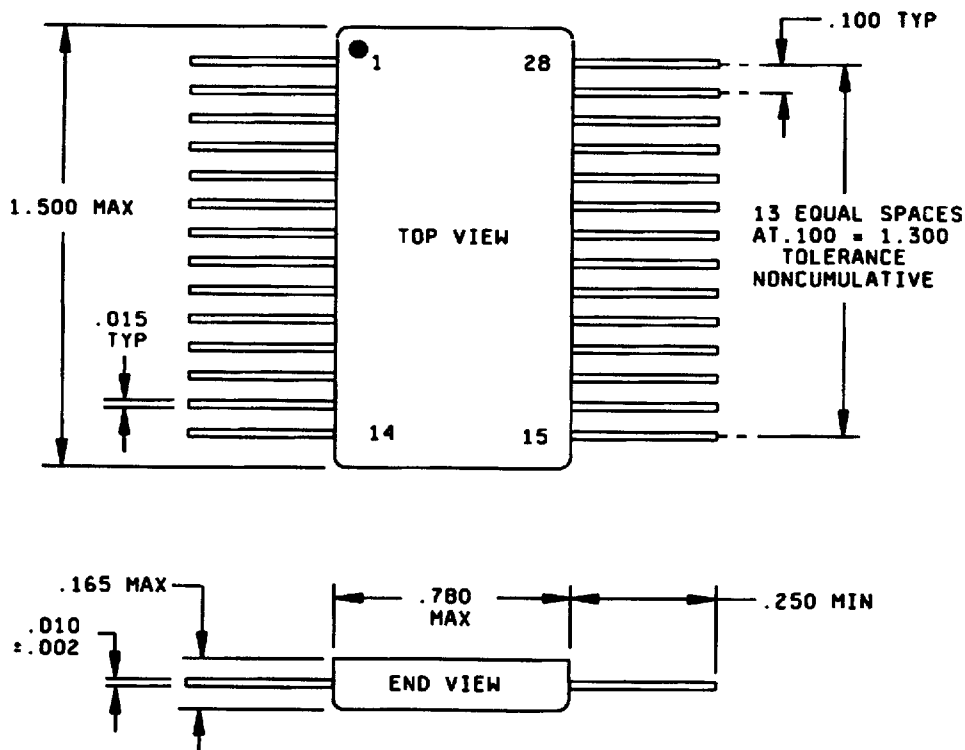
FIGURE 1. Case outlines - Continued.

|                                                                                             |           |                     |             |
|---------------------------------------------------------------------------------------------|-----------|---------------------|-------------|
| STANDARD<br>MICROCIRCUIT DRAWING<br>DEFENSE ELECTRONICS SUPPLY CENTER<br>DAYTON, OHIO 45444 | SIZE<br>A |                     | 5962-89826  |
|                                                                                             |           | REVISION LEVEL<br>D | SHEET<br>13 |

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9004708 0019170 92T

Case Z



| Inches | mm    |
|--------|-------|
| .002   | 0.05  |
| .010   | 0.25  |
| .015   | 0.38  |
| .100   | 2.54  |
| .165   | 4.19  |
| .250   | 6.35  |
| .780   | 19.81 |
| 1.300  | 33.02 |
| 1.500  | 38.10 |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Lead identification numbers are for reference only.
4. Lead spacing dimensions apply only at seating plane.

FIGURE 1. Case outlines - Continued.

|                                                                                                                   |                         |                                   |                           |
|-------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------|---------------------------|
| <b>STANDARD<br/>MICROCIRCUIT DRAWING</b><br><b>DEFENSE ELECTRONICS SUPPLY CENTER</b><br><b>DAYTON, OHIO 45444</b> | <b>SIZE</b><br><b>A</b> |                                   | <b>5962-89826</b>         |
|                                                                                                                   |                         | <b>REVISION LEVEL</b><br><b>D</b> | <b>SHEET</b><br><b>14</b> |

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9004708 0019171 866

Cases X and Y

| Pin | Function                | Channel |
|-----|-------------------------|---------|
| 1   | TX <u>data</u> out      | One     |
| 2   | TX data out             | One     |
| 3   | GND                     | One     |
| 4   | NC                      |         |
| 5   | RX data out             | One     |
| 6   | Strobe                  | One     |
| 7   | GND                     | One     |
| 8   | RX data out             | One     |
| 9   | GND                     | One     |
| 10  | TX <u>data</u> out      | Two     |
| 11  | TX data out             | Two     |
| 12  | GND                     | Two     |
| 13  | NC                      |         |
| 14  | RX data out             | Two     |
| 15  | Strobe                  | Two     |
| 16  | GND                     | Two     |
| 17  | RX data out             | Two     |
| 18  | NC                      |         |
| 19  | V <sub>CC</sub> , or NC | Two     |
| 20  | RX <u>data</u> in       | Two     |
| 21  | RX data in              | Two     |
| 22  | GND                     | Two     |
| 23  | V <sub>EE</sub>         | Two     |
| 24  | V <sub>CC1</sub>        | Two     |
| 25  | Inhibit                 | Two     |
| 26  | TX <u>data</u> in       | Two     |
| 27  | TX data in              | Two     |
| 28  | V <sub>CC</sub> , or NC | One     |
| 29  | RX <u>data</u> in       | One     |
| 30  | RX data in              | One     |
| 31  | GND                     | One     |
| 32  | V <sub>EE</sub>         | One     |
| 33  | V <sub>CC1</sub>        | One     |
| 34  | Inhibit                 | One     |
| 35  | TX <u>data</u> in       | One     |
| 36  | TX data in              | One     |

NOTE: GND pins should all be connected externally.  
Pins 19 and 28 are +12 V dc for device types  
02, 03, 04, 06, and 10 only, no connect (NC)  
for device types 01, 05, 07, and 08. Device  
types 05, 07, and 08 pins 3, 12, 22, and 31  
are no connect (NC).

FIGURE 2. Terminal connections.

|                                                                                                       |                   |                             |                     |
|-------------------------------------------------------------------------------------------------------|-------------------|-----------------------------|---------------------|
| <b>STANDARD<br/>MICROCIRCUIT DRAWING<br/>DEFENSE ELECTRONICS SUPPLY CENTER<br/>DAYTON, OHIO 45444</b> | <b>SIZE<br/>A</b> |                             | <b>5962-89826</b>   |
|                                                                                                       |                   | <b>REVISION LEVEL<br/>D</b> | <b>SHEET<br/>15</b> |

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9004708 0019172 7T2

Cases U and Z

| Pin | Function                                                       | Channel |
|-----|----------------------------------------------------------------|---------|
| 1   | TX data out/ RX data in                                        | One     |
| 2   | TX $\overline{\text{data}}$ out/RX $\overline{\text{data}}$ in | One     |
| 3   | Gnd                                                            | One     |
| 4   | RX strobe                                                      | One     |
| 5   | RX $\overline{\text{data}}$ out                                | One     |
| 6   | RX data out                                                    | One     |
| 7   | Case                                                           |         |
| 8   | TX data out/RX data in                                         | Two     |
| 9   | TX $\overline{\text{data}}$ out/RX $\overline{\text{data}}$ in | Two     |
| 10  | Gnd                                                            | Two     |
| 11  | RX strobe                                                      | Two     |
| 12  | RX $\overline{\text{data}}$ out                                | Two     |
| 13  | RX data out                                                    | Two     |
| 14  | No connection                                                  |         |
| 15  | Gnd                                                            | Two     |
| 16  | V <sub>EE</sub>                                                | Two     |
| 17  | V <sub>CC1</sub>                                               | Two     |
| 18  | TX inhibit                                                     | Two     |
| 19  | TX $\overline{\text{data}}$ in                                 | Two     |
| 20  | TX data in                                                     | Two     |
| 21  | V <sub>CC</sub>                                                | Two     |
| 22  | Gnd                                                            | One     |
| 23  | V <sub>EE</sub>                                                | One     |
| 24  | V <sub>CC1</sub>                                               | One     |
| 25  | Inhibit                                                        | One     |
| 26  | TX $\overline{\text{data}}$ in                                 | One     |
| 27  | TX data in                                                     | One     |
| 28  | V <sub>CC</sub>                                                | One     |

NOTE: GND pins should all be connected externally.  
Pins 14 is a no connect. Connect pin 7 to external ground.

FIGURE 2. Terminal connections - Continued.

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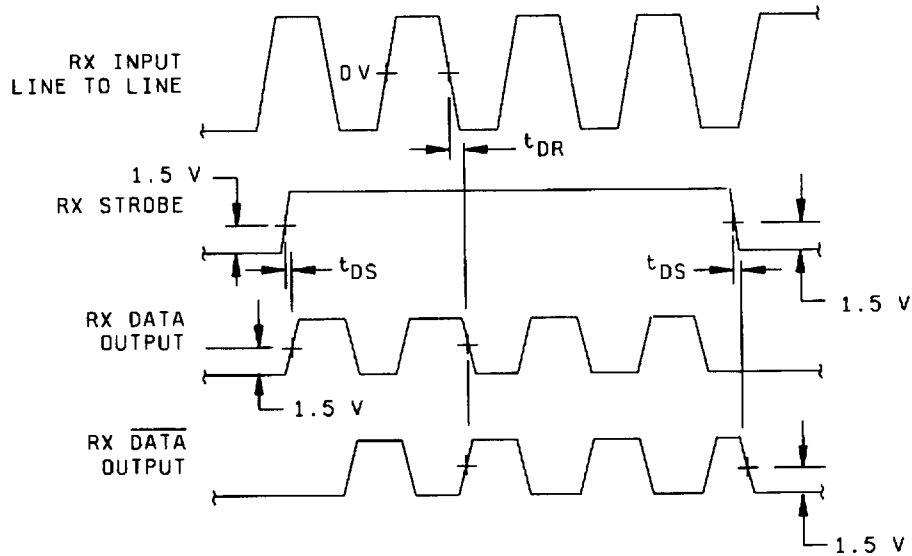
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Device types 01-06, 08, and 10

Receiver timing



Transmitter timing

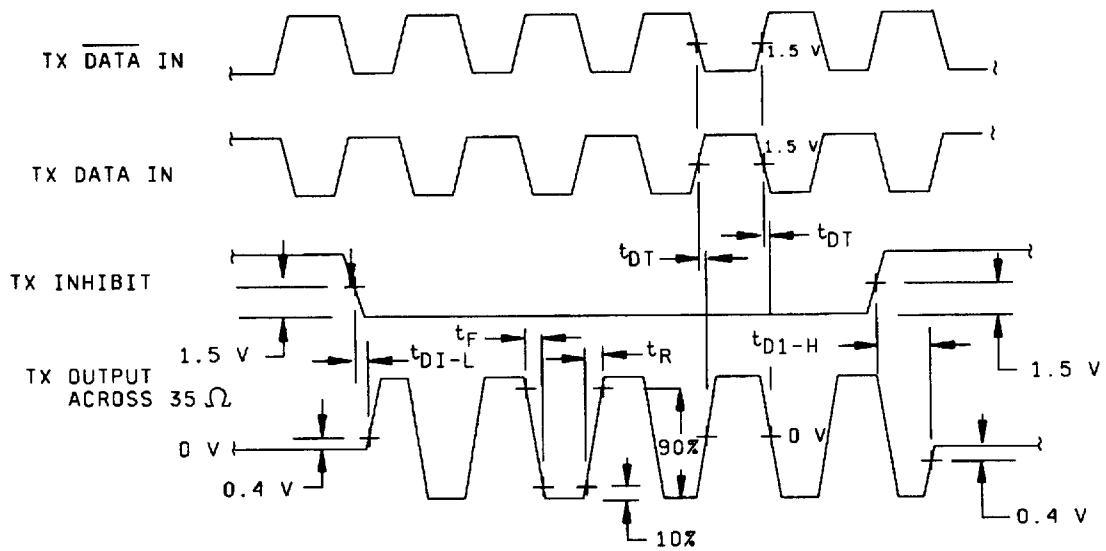


FIGURE 3. Timing waveforms.

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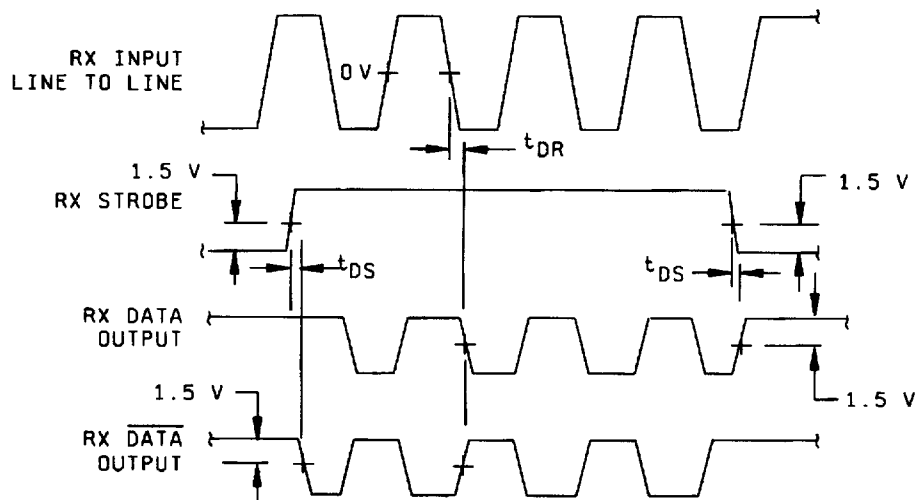
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Device types 07 and 09

Receiver timing



Transmitter timing

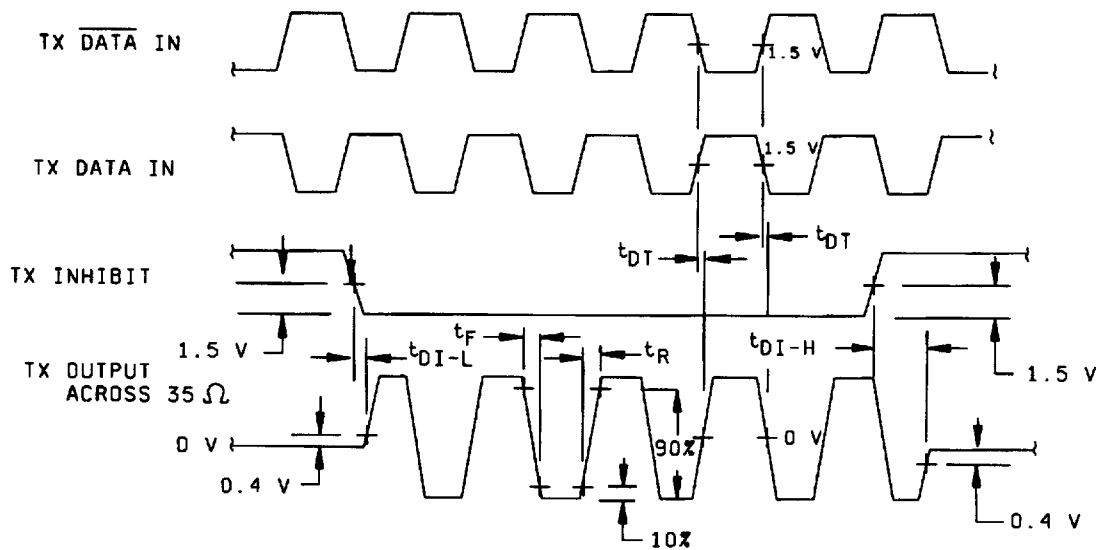


FIGURE 3. Timing waveforms - Continued.

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#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38534.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DESC-EL or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

(2)  $T_C$  as specified in accordance with table I of method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

TABLE II. Electrical test requirements.

| MIL-PRF-38534 test requirements            | Subgroups<br>(in accordance with<br>MIL-PRF-38534, group<br>A test table) |
|--------------------------------------------|---------------------------------------------------------------------------|
| Interim electrical parameters              | - - -                                                                     |
| Final electrical test parameters           | 1*, 2, 3, 4, 5, 6, 9,<br>10, 11                                           |
| Group A test requirements                  | 1, 2, 3, 4, 5, 6, 9,<br>10, 11                                            |
| Group C end-point electrical<br>parameters | 1, 2, 3                                                                   |

\* PDA applies to subgroup 1.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection. Group A inspection shall be in accordance with MIL-PRF-38534 and as follows:

- Tests shall be as specified in table II herein.
- Subgroups 7 and 8 shall be omitted.

4.3.2 Group B inspection. Group B inspection shall be in accordance with MIL-PRF-38534.

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4.3.3 Group C inspection. Group C inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test, method 1005 of MIL-STD-883.
  - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DESC-EL or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.
  - (2)  $T_C$  as specified in accordance with table I of method 1005 of MIL-STD-883.
  - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.3.4 Group D inspection. Group D inspection shall be in accordance with MIL-PRF-38534.

## 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38534.

## 6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-973 using DD Form 1692, Engineering Change Proposal.

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-EL, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EL, Dayton, Ohio 45444, or telephone (513) 296-5373.

6.6 Approved sources of supply. Approved sources of supply are listed in QML-38534. Additional sources will be added to QML-38534 as they become available. The vendors listed in QML-38534 have agreed to this drawing and a certificate of compliance (see 3.7 herein) has been submitted to and accepted by DESC-EL.

|                                                                                             |           |                |             |
|---------------------------------------------------------------------------------------------|-----------|----------------|-------------|
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