

REVISIONS

| LTR | DESCRIPTION  | DATE (YR-MO-DA) | APPROVED     |
|-----|--|-----------------|--------------|
| A   | Delete COPLANARITY limit and replace the min limits with the nominal limits under "b" dimensions as specified in Figure 1 table.<br>Update document paragraphs to current requirements. - ro | 23-01-26        | J. ESCHMEYER |



Prepared in accordance with ASME Y14.24

Vendor Item Drawing

Revision Status of Sheets

|       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |  |  |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|--|--|
| REV   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |  |  |
| SHEET |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |  |  |
| REV   | A | A | A | A | A | A | A | A | A | A  | A  | A  | A  | A  | A  | A  | A  | A  |  |  |
| SHEET | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |  |  |

|   |   |                           |  |  |
|---|---|---------------------------|--|--|
| <b>PMIC N/A</b><br><br>Original date of drawing<br>YY-MM-DD<br><br>17-10-12 | <b>PREPARED BY</b><br>RICK OFFICER      |                           | <b>DLA LAND AND MARITIME</b><br>COLUMBUS, OHIO 43218-3990<br><a href="https://www.dla.mil/landandmaritime">https://www.dla.mil/landandmaritime</a> |  |
|   | <b>CHECKED BY</b><br>RAJESH PITHADIA    |                           | <b>TITLE</b><br>MICROCIRCUIT, LINEAR, +3 V/+5 V/±5 V, CMOS, ANALOG MULTIPLEXER, MONOLITHIC SILICON   |  |
|   | <b>APPROVED BY</b><br>CHARLES F. SAFFLE |                           | <b>DWG NO.</b><br><b>V62/17613</b>   |  |
|   | <b>SIZE</b><br>A                        | <b>CAGE CODE</b><br>16236 | <b>PAGE</b> 1 OF 18  |  |

1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance +3 V / +5 V / ±5 V, CMOS, 8-channel analog multiplexer, microcircuit, with an operating temperature range of -55°C to +125°C.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:

|                                       |   |   |   |  |
|---------------------------------------|---|---|---|--|
| <u>V62/17613</u><br>Drawing<br>number | - | <u>01</u><br>Device type<br>(See 1.2.1) | <u>X</u><br>Case outline<br>(See 1.2.2) | <u>E</u><br>Lead finish<br>(See 1.2.3) |
|---------------------------------------|---|---|---|--|

1.2.1 Device type(s).

| <u>Device type</u> | <u>Generic</u> | <u>Circuit function</u>                                |
|--------------------|----------------|--|
| 01                 | ADG658         | +3 V / +5 V / ±5 V, CMOS, 8-channel analog multiplexer |

1.2.2 Case outline(s). The case outline(s) are as specified herein.

| <u>Outline letter</u> | <u>Number of pins</u> | <u>JEDEC PUB 95</u> | <u>Package style</u>              |
|-----------------------|-----------------------|---------------------|-----------------------------------|
| X                     | 16                    | MO-153-AB           | Thin shrink small outline package |

1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacturer:

| <u>Finish designator</u> | <u>Material</u>          |
|--------------------------|--------------------------|
| A                        | Hot solder dip           |
| B                        | Tin-lead plate           |
| C                        | Gold plate               |
| D                        | Palladium                |
| E                        | Gold flash palladium     |
| F                        | Tin-lead alloy (BGA/CGA) |
| Z                        | Other                    |

|   |                   |                            |                              |
|---|-------------------|----------------------------|------------------------------|
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1.3 Absolute maximum ratings. 1/

|  |  |
|--|--|
| Positive power supply (VDD) to negative power supply (VSS) .....                           | 13 V   |
| VDD to ground (GND) .....  | -0.3 V to +13 V  |
| VSS to GND .....   | +0.3 V to -6.5 V   |
| Analog inputs 2/ .....   | VSS - 0.3 V to VDD + 0.3 V                                     |
| Digital inputs 2/ .....  | GND - 0.3 V to VDD + 0.3 V or<br>10 mA, whichever occurs first |
| Peak current, source terminal (Sx) or drain (D) (pulsed at 1 ms, 10% duty cycle max) ..... | 40 mA  |
| Continuous current, Sx or D .....  | 20 mA  |
| Storage temperature range (TSTG) .....   | -65°C to +150°C  |
| Junction temperature range (TJ) .....  | 150°C  |
| Thermal resistance, junction to ambient (θJA) .....  | 150.4°C/W  |
| Lead temperature, soldering:   |  |
| Vapor phase (60 seconds) .....   | 215°C  |
| Infrared (15 seconds) .....  | 220°C  |
| Electrostatic discharge (ESD) rating:  |  |
| Human body model (HBM) .....   | 4.0 kV   |

1.4 Recommended operating conditions. 3/

|  |                 |
|--|-----------------|
| Operating temperature range (TA) ..... | -55°C to +125°C |
|--|-----------------|

- 1/ Stresses beyond those listed under “absolute maximum rating” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- 2/ Overvoltages at AX, EN, SX, or D are clamped by internal diodes. Current must be limited to the maximum ratings.
- 3/ Use of this product beyond the manufacturers design rules or stated parameters is done at the user’s risk. The manufacturer and/or distributor maintain no responsibility or liability for product used beyond the stated limits.

|   |                   |                            |                              |
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## 2. APPLICABLE DOCUMENTS

JEDEC Solid State Technology Association

JEDEC PUB 95 – Registered and Standard Outlines for Semiconductor Devices

(Copies of these documents are available online at <https://www.jedec.org>.)

## 3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer's part number as shown in 6.3 herein and as follows:

- A. Manufacturer's name, CAGE code, or logo
- B. Pin 1 identifier
- C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer's part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

3.5 Diagrams.

3.5.1 Case outline. The case outline shall be as shown in 1.2.2 and figure 1.

3.5.2 Terminal connections. The terminal connections shall be as shown in figure 2.

3.5.3 Truth table. The truth table shall be as shown in figure 3.

|   |                   |                            |                              |
|---|-------------------|----------------------------|------------------------------|
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TABLE I. Electrical performance characteristics. 1/

| Test  | Symbol             | Conditions<br>Dual supply,<br><br>VDD = 5 V ±10%, VSS = -5 V ±10%,<br>GND = 0 V,<br>unless otherwise specified | Temperature,<br>TA | Device<br>type | Limits         |      | Unit |
|---|--------------------|--|--------------------|----------------|----------------|------|------|
|   |                    |  |                    |                | Min            | Max  |      |
| Analog switch                               |                    |  |                    |                |                |      |      |
| Analog signal range                         |                    | VDD = +4.5 V, VSS = -4.5 V   | -55°C to +125°C    | 01             | VSS            | VDD  | V    |
| On resistance                               | RON                | Source voltage (VS) = ±4.5 V,<br>source current (IS) = 1 mA  | +25°C              | 01             | 45 typical     |      | Ω    |
|   |                    |  | +25°C              |                |                | 75   |      |
|   |                    |  | -55°C to +125°C    |                |                | 100  |      |
| On resistance match<br>between channels     | ΔRON               | VS = 3.5 V, IS = 1 mA  | +25°C              | 01             | 1.3 typical    |      | Ω    |
|   |                    |  | +25°C              |                |                | 3    |      |
|   |                    |  | -55°C to +125°C    |                |                | 3.5  |      |
| On resistance flatness                      | RFLAT(ON)          | VDD = +5 V, VSS = -5 V,<br>VS = ±3 V, IS = 1 mA  | +25°C              | 01             | 10 typical     |      | Ω    |
|   |                    |  | +25°C              |                |                | 16   |      |
|   |                    |  | -55°C to +125°C    |                |                | 18   |      |
| Leakage currents VDD = +5.5 V, VSS = -5.5 V |                    |  |                    |                |                |      |      |
| Source off leakage                          | IS(OFF)            | Drain voltage (VD) = ±4.5 V,<br>VS = +4.5 V  | +25°C              | 01             | ±0.005 typical |      | nA   |
|   |                    |  | +25°C              |                |                | ±0.2 |      |
|   |                    |  | -55°C to +125°C    |                |                | ±5   |      |
| Drain off leakage                           | ID(OFF)            | VD = ±4.5 V, VS = +4.5 V   | +25°C              | 01             | ±0.005 typical |      | nA   |
|   |                    |  | +25°C              |                |                | ±0.2 |      |
|   |                    |  | -55°C to +125°C    |                |                | ±5   |      |
| Channel on leakage                          | ID(ON) ,<br>IS(ON) | VD = VS = ±4.5 V   | +25°C              | 01             | ±0.005 typical |      | nA   |
|   |                    |  | +25°C              |                |                | ±0.2 |      |
|   |                    |  | -55°C to +125°C    |                |                | ±5   |      |

See footnotes at end of table.

|   |                   |                            |                              |
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TABLE I. Electrical performance characteristics – Continued. 1/

| Test                            | Symbol  | Conditions<br>Dual supply,<br><br>VDD = 5 V ±10%, VSS = -5 V ±10%,<br>GND = 0 V,<br>unless otherwise specified                             | Temperature,<br>TA | Device<br>type | Limits        |     | Unit |
|---------------------------------|---|--|--------------------|----------------|---------------|-----|------|
|                                 |   |  |                    |                | Min           | Max |      |
| Digital inputs                  |   |  |                    |                |               |     |      |
| Input high voltage              | V <sub>INH</sub>                              |  | -55°C to +125°C    | 01             | 2.4           |     | V    |
| Input low voltage               | V <sub>INL</sub>                              |  | -55°C to +125°C    | 01             |               | 0.8 | V    |
| Input current                   | I <sub>INL</sub> or I <sub>INH</sub>          | Input voltage (V <sub>IN</sub> ) = V <sub>INL</sub> or V <sub>INH</sub>  | +25°C              | 01             | 0.005 typical |     | μA   |
|                                 |   |  | -55°C to +125°C    |                |               | ±1  |      |
| Digital input capacitance       | C <sub>IN</sub>                               |  | +25°C              | 01             | 2 typical     |     | pF   |
| Dynamic characteristics 2/      |   |  |                    |                |               |     |      |
| Transition time                 | t <sub>TRANSITION</sub>                       | Load resistance (R <sub>L</sub> ) = 300 Ω,<br>load capacitance (C <sub>L</sub> ) = 35 pF,<br>V <sub>S</sub> = 3 V                          | +25°C              | 01             | 80 typical    |     | ns   |
|                                 |   |  | +25°C              |                |               | 115 |      |
|                                 |   |  | -55°C to +125°C    |                |               | 165 |      |
| $\overline{\text{EN}}$ on time  | t <sub>ON</sub> , ( $\overline{\text{EN}}$ )  | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF,<br>V <sub>S</sub> = 3 V  | +25°C              | 01             | 80 typical    |     | ns   |
|                                 |   |  | +25°C              |                |               | 115 |      |
|                                 |   |  | -55°C to +125°C    |                |               | 165 |      |
| $\overline{\text{EN}}$ off time | t <sub>OFF</sub> , ( $\overline{\text{EN}}$ ) | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF,<br>V <sub>S</sub> = 3 V  | +25°C              | 01             | 30 typical    |     | ns   |
|                                 |   |  | +25°C              |                |               | 45  |      |
|                                 |   |  | -55°C to +125°C    |                |               | 55  |      |
| Break-before-make time delay    | t <sub>BBM</sub>                              | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF,<br>Source 1 voltage (V <sub>S1</sub> ) = 3 V,<br>source 2 voltage (V <sub>S2</sub> ) = 3 V | +25°C              | 01             | 50 typical    |     | ns   |
|                                 |   |  | -55°C to +125°C    |                | 10            |     |      |
| Charge injection                |   | V <sub>S</sub> = 0 V, R <sub>S</sub> = 0 Ω, C <sub>L</sub> = 1 nF  | +25°C              | 01             | 2 typical     |     | pC   |
|                                 |   |  | -55°C to +125°C    |                |               | 4   |      |
| Off isolation                   |   | R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 1 MHz  | +25°C              | 01             | -90 typical   |     | dB   |

See footnotes at end of table.

|   |                   |                            |                              |
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TABLE I. Electrical performance characteristics – Continued. 1/

| Test  | Symbol  | Conditions<br>Dual supply,<br><br>VDD = 5 V ±10%, VSS = -5 V ±10%,<br>GND = 0 V,<br>unless otherwise specified | Temperature,<br>TA | Device<br>type | Limits        |     | Unit |
|---|---------|--|--------------------|----------------|---------------|-----|------|
|   |         |  |                    |                | Min           | Max |      |
| Dynamic characteristics – continued. 2/       |         |  |                    |                |               |     |      |
| Total harmonic distortion plus noise          | THD + D | RL = 600 Ω, 2 Vp-p,<br>f = 20 Hz to 20 kHz   | +25°C              | 01             | 0.025 typical |     | %    |
| -3 dB bandwidth                               |         | RL = 50 Ω, CL = 5 pF   | +25°C              | 01             | 210 typical   |     | MHz  |
| Source capacitance                            | CS(OFF) | f = 1 MHz  | +25°C              | 01             | 4 typical     |     | pF   |
| Drain capacitance                             | CD(OFF) | f = 1 MHz  | +25°C              | 01             | 23 typical    |     | pF   |
| CD, CS (ON)                                   |         | f = 1 MHz  | +25°C              | 01             | 28 typical    |     | pF   |
| Power requirements VDD = +5.5 V, VSS = -5.5 V |         |  |                    |                |               |     |      |
| Positive power supply current                 | IDD     | Digital inputs = 0 V or 5.5 V  | +25°C              | 01             | 0.01 typical  |     | μA   |
|   |         |  | -55°C to +125°C    |                | 1             |     |      |
| Negative power supply current                 | ISS     | Digital inputs = 0 V or 5.5 V  | +25°C              | 01             | 0.01 typical  |     | μA   |
|   |         |  | -55°C to +125°C    |                | 1             |     |      |

See footnotes at end of table.

|   |                   |                            |                              |
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TABLE I. Electrical performance characteristics – Continued. 1/

| Test                                    | Symbol             | Conditions<br>Single supply,<br><br>VDD = 5 V ±10%, VSS = 0 V,<br>GND = 0 V,<br>unless otherwise specified | Temperature,<br>TA | Device<br>type | Limits         |      | Unit |
|---|--------------------|--|--------------------|----------------|----------------|------|------|
|   |                    |  |                    |                | Min            | Max  |      |
| Analog switch                           |                    |  |                    |                |                |      |      |
| Analog signal range                     |                    | VDD = +4.5 V, VSS = 0 V  | -55°C to +125°C    | 01             | 0              | VDD  | V    |
| On resistance                           | RON                | Source voltage (VS) = 0 V to 4.5 V,<br>source current (IS) = 1 mA  | +25°C              | 01             | 85 typical     |      | Ω    |
|   |                    |  | +25°C              |                |                | 150  |      |
|   |                    |  | -55°C to +125°C    |                |                | 200  |      |
| On resistance match<br>between channels | ΔRON               | VS = 3.5 V, IS = 1 mA  | +25°C              | 01             | 4.5 typical    |      | Ω    |
|   |                    |  | +25°C              |                |                | 8    |      |
|   |                    |  | -55°C to +125°C    |                |                | 10   |      |
| On resistance flatness                  | RFLAT(ON)          | VDD = +5 V, VSS = 0 V,<br>VS = 1.5 V to 4 V, IS = 1 mA   | +25°C              | 01             | 13 typical     |      | Ω    |
|   |                    |  | -55°C to +125°C    |                | 16 typical     |      |      |
| Leakage currents                        |                    | VDD = 5.5 V  |                    |                |                |      |      |
| Source off leakage                      | IS(OFF)            | Drain voltage (VD) = 4.5 V / 1 V,<br>VS = 1 V / 4.5 V  | +25°C              | 01             | ±0.005 typical |      | nA   |
|   |                    |  | +25°C              |                |                | ±0.2 |      |
|   |                    |  | -55°C to +125°C    |                |                | ±5   |      |
| Drain off leakage                       | ID(OFF)            | VD = 4.5 V / 1 V, VS = 1 V / 4.5 V   | +25°C              | 01             | ±0.005 typical |      | nA   |
|   |                    |  | +25°C              |                |                | ±0.2 |      |
|   |                    |  | -55°C to +125°C    |                |                | ±5   |      |
| Channel on leakage                      | ID(ON) ,<br>IS(ON) | VS = VD = 1 V or 4.5 V   | +25°C              | 01             | ±0.005 typical |      | nA   |
|   |                    |  | +25°C              |                |                | ±0.2 |      |
|   |                    |  | -55°C to +125°C    |                |                | ±5   |      |

See footnotes at end of table.

|   |                   |                            |                              |
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TABLE I. Electrical performance characteristics – Continued. 1/

| Test                            | Symbol  | Conditions<br>Single supply,<br><br>VDD = 5 V ±10%, VSS = 0 V,<br>GND = 0 V,<br>unless otherwise specified                                 | Temperature,<br>TA | Device<br>type | Limits        |     | Unit |
|---------------------------------|---|--|--------------------|----------------|---------------|-----|------|
|                                 |   |  |                    |                | Min           | Max |      |
| Digital inputs                  |   |  |                    |                |               |     |      |
| Input high voltage              | V <sub>INH</sub>                              |  | -55°C to +125°C    | 01             | 2.4           |     | V    |
| Input low voltage               | V <sub>INL</sub>                              |  | -55°C to +125°C    | 01             |               | 0.8 | V    |
| Input current                   | I <sub>INL</sub> or I <sub>INH</sub>          | Input voltage (V <sub>IN</sub> ) = V <sub>INL</sub> or V <sub>INH</sub>  | +25°C              | 01             | 0.005 typical |     | μA   |
|                                 |   |  | -55°C to +125°C    |                |               | ±1  |      |
| Digital input capacitance       | C <sub>IN</sub>                               |  | +25°C              | 01             | 2 typical     |     | pF   |
| Dynamic characteristics 2/      |   |  |                    |                |               |     |      |
| Transition time                 | t <sub>TRANSITION</sub>                       | Load resistance (R <sub>L</sub> ) = 300 Ω,<br>load capacitance (C <sub>L</sub> ) = 35 pF,<br>V <sub>S</sub> = 3 V                          | +25°C              | 01             | 120 typical   |     | ns   |
|                                 |   |  | +25°C              |                |               | 200 |      |
|                                 |   |  | -55°C to +125°C    |                |               | 300 |      |
| $\overline{\text{EN}}$ on time  | t <sub>ON</sub> , ( $\overline{\text{EN}}$ )  | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF,<br>V <sub>S</sub> = 3 V  | +25°C              | 01             | 120 typical   |     | ns   |
|                                 |   |  | +25°C              |                |               | 190 |      |
|                                 |   |  | -55°C to +125°C    |                |               | 280 |      |
| $\overline{\text{EN}}$ off time | t <sub>OFF</sub> , ( $\overline{\text{EN}}$ ) | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF,<br>V <sub>S</sub> = 3 V  | +25°C              | 01             | 35 typical    |     | ns   |
|                                 |   |  | +25°C              |                |               | 50  |      |
|                                 |   |  | -55°C to +125°C    |                |               | 70  |      |
| Break-before-make time delay    | t <sub>BBM</sub>                              | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF,<br>Source 1 voltage (V <sub>S1</sub> ) = 3 V,<br>source 2 voltage (V <sub>S2</sub> ) = 3 V | +25°C              | 01             | 100 typical   |     | ns   |
|                                 |   |  | -55°C to +125°C    |                | 10            |     |      |
| Charge injection                |   | V <sub>S</sub> = 2.5 V, R <sub>S</sub> = 0 Ω, C <sub>L</sub> = 1 nF  | +25°C              | 01             | 0.5 typical   |     | pC   |
|                                 |   |  | -55°C to +125°C    |                |               | 1   |      |
| Off isolation                   |   | R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 1 MHz  | +25°C              | 01             | -90 typical   |     | dB   |

See footnotes at end of table.

|   |                   |                            |                              |
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| <b>DLA LAND AND MARITIME<br/>COLUMBUS, OHIO</b> | <b>SIZE<br/>A</b> | <b>CAGE CODE<br/>16236</b> | <b>DWG NO.<br/>V62/17613</b> |
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TABLE I. Electrical performance characteristics – Continued. 1/

| Test                                    | Symbol  | Conditions<br>Single supply,<br><br>VDD = 5 V ±10%, VSS = 0 V,<br>GND = 0 V,<br>unless otherwise specified | Temperature,<br>TA | Device<br>type | Limits       |     | Unit |
|---|---------|--|--------------------|----------------|--------------|-----|------|
|   |         |  |                    |                | Min          | Max |      |
| Dynamic characteristics – continued. 2/ |         |  |                    |                |              |     |      |
| -3 dB bandwidth                         |         | RL = 50 Ω, CL = 5 pF   | +25°C              | 01             | 180 typical  |     | MHz  |
| Source capacitance                      | CS(OFF) | f = 1 MHz  | +25°C              | 01             | 5 typical    |     | pF   |
| Drain capacitance                       | CD(OFF) | f = 1 MHz  | +25°C              | 01             | 29 typical   |     | pF   |
| CD, CS (ON)                             |         | f = 1 MHz  | +25°C              | 01             | 30 typical   |     | pF   |
| Power requirements VDD = +5.5 V         |         |  |                    |                |              |     |      |
| Positive power supply<br>current        | IDD     | Digital inputs = 0 V or 5.5 V  | +25°C              | 01             | 0.01 typical |     | μA   |
|   |         |  | -55°C to +125°C    |                | 1            |     |      |

See footnotes at end of table.

|   |                   |                            |                              |
|---|-------------------|----------------------------|------------------------------|
| <b>DLA LAND AND MARITIME<br/>COLUMBUS, OHIO</b> | <b>SIZE<br/>A</b> | <b>CAGE CODE<br/>16236</b> | <b>DWG NO.<br/>V62/17613</b> |
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TABLE I. Electrical performance characteristics – Continued. 1/

| Test                                    | Symbol             | Conditions<br>Single supply,<br><br>VDD = 2.7 V to 3.6 V, VSS = 0 V,<br>GND = 0 V,<br>unless otherwise specified | Temperature,<br>TA | Device<br>type | Limits         |      | Unit |
|---|--------------------|--|--------------------|----------------|----------------|------|------|
|   |                    |  |                    |                | Min            | Max  |      |
| Analog switch                           |                    |  |                    |                |                |      |      |
| Analog signal range                     |                    | VDD = 2.7 V, VSS = 0 V   | -55°C to +125°C    | 01             | 0              | VDD  | V    |
| On resistance                           | RON                | Source voltage (VS) = 0 V to 2.7 V,<br>source current (IS) = 0.1 mA  | +25°C              | 01             | 185 typical    |      | Ω    |
|   |                    |  | +25°C              |                |                | 300  |      |
|   |                    |  | -55°C to +125°C    |                |                | 400  |      |
| On resistance match<br>between channels | ΔRON               | VS = 1.5 V, IS = 0.1 mA  | +25°C              | 01             | 2 typical      |      | Ω    |
|   |                    |  | +25°C              |                |                | 4.5  |      |
|   |                    |  | -55°C to +125°C    |                |                | 7    |      |
| Leakage currents VDD = +3.3 V           |                    |  |                    |                |                |      |      |
| Source off leakage                      | IS(OFF)            | Drain voltage (VD) = 3 V / 1 V,<br>VS = 1 V / 3 V  | +25°C              | 01             | ±0.005 typical |      | nA   |
|   |                    |  | +25°C              |                |                | ±0.2 |      |
|   |                    |  | -55°C to +125°C    |                |                | ±5   |      |
| Drain off leakage                       | ID(OFF)            | VD = 3 V / 1 V, VS = 1 V / 3 V   | +25°C              | 01             | ±0.005 typical |      | nA   |
|   |                    |  | +25°C              |                |                | ±0.2 |      |
|   |                    |  | -55°C to +125°C    |                |                | ±5   |      |
| Channel on leakage                      | ID(ON) ,<br>IS(ON) | VD = VS = 1 V or 3 V   | +25°C              | 01             | ±0.005 typical |      | nA   |
|   |                    |  | +25°C              |                |                | ±0.2 |      |
|   |                    |  | -55°C to +125°C    |                |                | ±5   |      |

See footnotes at end of table.

|   |                   |                            |                              |
|---|-------------------|----------------------------|------------------------------|
| <b>DLA LAND AND MARITIME<br/>COLUMBUS, OHIO</b> | <b>SIZE<br/>A</b> | <b>CAGE CODE<br/>16236</b> | <b>DWG NO.<br/>V62/17613</b> |
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TABLE I. Electrical performance characteristics – Continued. 1/

| Test                            | Symbol  | Conditions<br>Single supply,<br><br>VDD = 2.7 V to 3.6 V, VSS = 0 V,<br>GND = 0 V,<br>unless otherwise specified                               | Temperature,<br>TA | Device<br>type | Limits        |     | Unit |
|---------------------------------|---|--|--------------------|----------------|---------------|-----|------|
|                                 |   |  |                    |                | Min           | Max |      |
| Digital inputs                  |   |  |                    |                |               |     |      |
| Input high voltage              | V <sub>INH</sub>                              |  | -55°C to +125°C    | 01             | 2.0           |     | V    |
| Input low voltage               | V <sub>INL</sub>                              |  | -55°C to +125°C    | 01             |               | 0.5 | V    |
| Input current                   | I <sub>INL</sub> or I <sub>INH</sub>          | Input voltage (V <sub>IN</sub> ) = V <sub>INL</sub> or V <sub>INH</sub>  | +25°C              | 01             | 0.005 typical |     | μA   |
|                                 |   |  | -55°C to +125°C    |                |               | ±1  |      |
| Digital input capacitance       | C <sub>IN</sub>                               |  | +25°C              | 01             | 2 typical     |     | pF   |
| Dynamic characteristics 2/      |   |  |                    |                |               |     |      |
| Transition time                 | t <sub>TRANSITION</sub>                       | Load resistance (R <sub>L</sub> ) = 300 Ω,<br>load capacitance (C <sub>L</sub> ) = 35 pF,<br>V <sub>S</sub> = 1.5 V                            | +25°C              | 01             | 200 typical   |     | ns   |
|                                 |   |  | +25°C              |                |               | 370 |      |
|                                 |   |  | -55°C to +125°C    |                |               | 490 |      |
| $\overline{\text{EN}}$ on time  | t <sub>ON</sub> , ( $\overline{\text{EN}}$ )  | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF,<br>V <sub>S</sub> = 1.5 V  | +25°C              | 01             | 230 typical   |     | ns   |
|                                 |   |  | +25°C              |                |               | 370 |      |
|                                 |   |  | -55°C to +125°C    |                |               | 490 |      |
| $\overline{\text{EN}}$ off time | t <sub>OFF</sub> , ( $\overline{\text{EN}}$ ) | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF,<br>V <sub>S</sub> = 1.5 V  | +25°C              | 01             | 50 typical    |     | ns   |
|                                 |   |  | +25°C              |                |               | 80  |      |
|                                 |   |  | -55°C to +125°C    |                |               | 110 |      |
| Break-before-make time delay    | t <sub>BBM</sub>                              | R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF,<br>Source 1 voltage (V <sub>S1</sub> ) = 1.5 V,<br>source 2 voltage (V <sub>S2</sub> ) = 1.5 V | +25°C              | 01             | 200 typical   |     | ns   |
|                                 |   |  | -55°C to +125°C    |                | 10            |     |      |
| Charge injection                |   | V <sub>S</sub> = 1.5 V, R <sub>S</sub> = 0 Ω, C <sub>L</sub> = 1 nF  | +25°C              | 01             | 1 typical     |     | pC   |
|                                 |   |  | -55°C to +125°C    |                |               | 2   |      |
| Off isolation                   |   | R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 1 MHz  | +25°C              | 01             | -90 typical   |     | dB   |

See footnotes at end of table.

|   |                   |                            |                              |
|---|-------------------|----------------------------|------------------------------|
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TABLE I. Electrical performance characteristics – Continued. 1/

| Test   | Symbol  | Conditions<br>Single supply,<br><br>VDD = 2.7 V to 3.6 V, VSS = 0 V,<br>GND = 0 V,<br>unless otherwise specified | Temperature,<br>TA | Device<br>type | Limits       |         | Unit |
|--|---------|--|--------------------|----------------|--------------|---------|------|
|  |         |  |                    |                | Min          | Max     |      |
| Dynamic characteristics – continued. <u>2/</u> |         |  |                    |                |              |         |      |
| -3 dB bandwidth                                |         | RL = 50 Ω, CL = 5 pF   | +25°C              | 01             | 160          | typical | MHz  |
| Source capacitance                             | CS(OFF) | f = 1 MHz  | +25°C              | 01             | 5            | typical | pF   |
| Drain capacitance                              | CD(OFF) | f = 1 MHz  | +25°C              | 01             | 29           | typical | pF   |
| CD, Cs (ON)                                    |         | f = 1 MHz  | +25°C              | 01             | 30           | typical | pF   |
| Power requirements VDD = +3.6 V                |         |  |                    |                |              |         |      |
| Positive power supply current                  | IDD     | Digital inputs = 0 V or 3.6 V  | +25°C              | 01             | 0.01 typical |         | μA   |
|  |         |  | -55°C to +125°C    |                |              | 1       |      |

1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

2/ Guaranteed by design; not subject to production test.

|   |                   |                            |                              |
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Case X

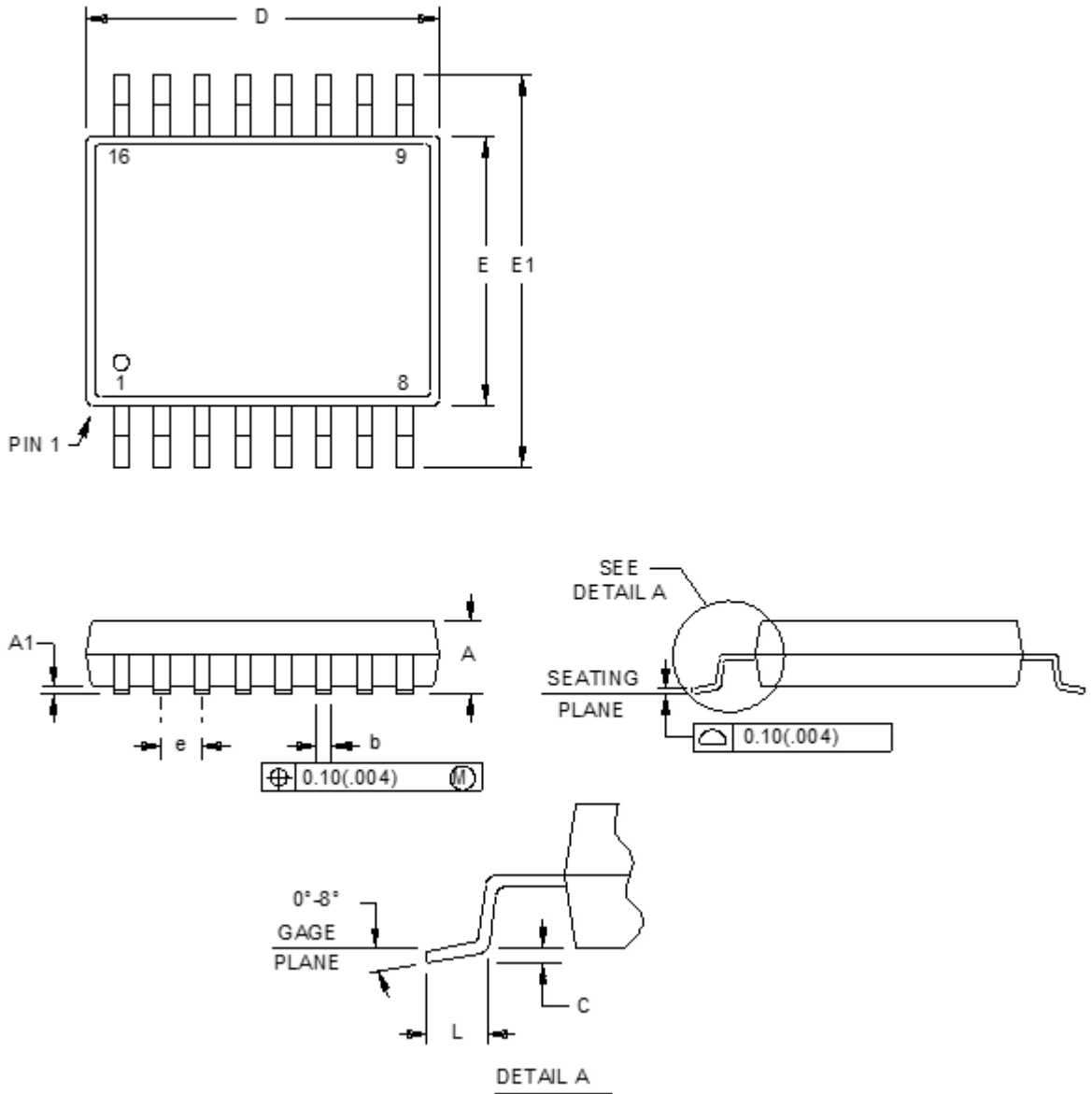


FIGURE 1. Case outline.

|   |           |                    |                      |
|---|-----------|--------------------|----------------------|
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Case X – continued.

| Symbol | Dimensions |         |         |             |         |         |
|--------|------------|---------|---------|-------------|---------|---------|
|        | Inches     |         |         | Millimeters |         |         |
|        | Minimum    | Nominal | Maximum | Minimum     | Nominal | Maximum |
| A      | ---        | ---     | .0472   | ---         | ---     | 1.20    |
| A1     | .0019      | --      | .0059   | 0.05        | --      | 0.15    |
| b      | .0074      | ---     | .0118   | 0.19        | ---     | 0.30    |
| c      | .0035      | ---     | .0078   | 0.09        | ---     | 0.20    |
| D      | .1929      | .1968   | .2007   | 4.90        | 5.00    | 5.10    |
| E      | .1692      | .1732   | .1771   | 4.30        | 4.40    | 4.50    |
| E1     | .2519 BSC  |         |         | 6.40 BSC    |         |         |
| e      | .0255 BSC  |         |         | 0.65 BSC    |         |         |
| L      | .0177      | .0236   | .0295   | 0.45        | 0.60    | 0.75    |

NOTES:

1. Controlling dimensions are millimeter, inch dimensions are given for reference only.
2. Falls within reference to JEDEC MO-153-AB.

FIGURE 1. Case outline - continued.

|   |                   |                            |                              |
|---|-------------------|----------------------------|------------------------------|
| <b>DLA LAND AND MARITIME<br/>COLUMBUS, OHIO</b> | <b>SIZE<br/>A</b> | <b>CAGE CODE<br/>16236</b> | <b>DWG NO.<br/>V62/17613</b> |
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|                 |                        |
|-----------------|------------------------|
| Device type     | 01                     |
| Case outline    | X                      |
| Terminal number | Terminal symbol        |
| 1               | S5                     |
| 2               | S7                     |
| 3               | D                      |
| 4               | S8                     |
| 5               | S6                     |
| 6               | $\overline{\text{EN}}$ |
| 7               | Vss                    |
| 8               | GND                    |
| 9               | A2                     |
| 10              | A1                     |
| 11              | A0                     |
| 12              | S4                     |
| 13              | S1                     |
| 14              | S2                     |
| 15              | S3                     |
| 16              | VDD                    |

| Terminal symbol        | Description  |
|------------------------|--|
| S1 to S8               | Source terminals. Can be an input or output.   |
| D                      | Drain terminal. Can be an input or output.   |
| $\overline{\text{EN}}$ | Active low digital input. When high, device is disabled and all switches are off. When low, Ax logic inputs determine on switch. |
| Vss                    | Most negative power supply potential.  |
| GND                    | Ground (0 V) reference.  |
| A0 to A2               | Logic control inputs.  |
| VDD                    | Most positive power supply potential.  |

FIGURE 2. Terminal connections.

|   |                   |                            |                              |
|---|-------------------|----------------------------|------------------------------|
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| A2            | A1            | A0            | $\overline{EN}$ | Switch condition |
|---------------|---------------|---------------|-----------------|------------------|
| X<br>SEE NOTE | X<br>SEE NOTE | X<br>SEE NOTE | 1               | None             |
| 0             | 0             | 0             | 0               | 1                |
| 0             | 0             | 1             | 0               | 2                |
| 0             | 1             | 0             | 0               | 3                |
| 0             | 1             | 1             | 0               | 4                |
| 1             | 0             | 0             | 0               | 5                |
| 1             | 0             | 1             | 0               | 6                |
| 1             | 1             | 0             | 0               | 7                |
| 1             | 1             | 1             | 0               | 8                |

X = Don't care

FIGURE 3. Truth table.

|   |                   |                            |                              |
|---|-------------------|----------------------------|------------------------------|
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4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer's standard commercial practices for electrostatic discharge sensitive devices.

6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 1 minimum.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer's data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at <https://landandmaritimeapps.dla.mil/programs/smcr/>.

| Vendor item drawing administrative control number <sup>1/</sup> | Device manufacturer CAGE code | Mode of transportation and quantity | Vendor part number |
|---|-------------------------------|-------------------------------------|--------------------|
| V62/17613-01XE  | 24355                         | Tube, 96 units                      | ADG658TRUZ-EP      |
| V62/17613-01XE  | 24355                         | Reel, 1000 units                    | ADG658TRUZ-EP-RL7  |

<sup>1/</sup> The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.

CAGE code

24355

Source of supply

Analog Devices  
 Route 1 Industrial Park  
 P.O. Box 9106  
 Norwood, MA 02062  
 Point of contact: 20 Alpha Road  
 Chelmsford, MA 01824-4123

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