

**SCOPE: QUAD, SPST, HIGH SPEED ANALOG SWITCH**

| <u>Device Type</u> | <u>Generic Number</u> | <u>SMD Number</u> |
|--------------------|-----------------------|-------------------|
| 01                 | DG441A(x)/883B        | 5962-9204101M2C   |
| 02                 | DG442A(x)/883B        | 5962-9204102M2C   |

**Case Outline(s).** The case outlines shall be designated in Mil-Std-1835 and as follows:

| <u>Outline Letter</u> | <u>Mil-Std-1835</u>    | <u>Case Outline</u> | <u>Package Code</u> |
|-----------------------|------------------------|---------------------|---------------------|
| MAXIM SMD             |                        |                     |                     |
| K E                   | GDIP1-T16 or CDIP2-T16 | 16 LEAD CERDIP      | J16                 |
| Z 2                   | CQCC1-N20              | 20-Pin Ceramic LCC  | L20                 |

**Absolute Maximum Ratings**

Voltage Referenced to V<sup>-</sup>

|  |  |
|--|--|
| V <sup>+</sup> to V <sup>-</sup> .....                         | 44V  |
| V <sup>-</sup> to GND .....                                    | 25V  |
| Digital Inputs to V <sup>-</sup> 1/ .....                      | (GND-0.3V) to 44V dc   |
| Digital Inputs, V <sub>S</sub> , V <sub>D</sub> 1/ .....       | (V <sup>-</sup> ) -2V to (V <sup>+</sup> ) +2V<br>or 30mA whichever occurs first |
| Continuous Current, Any terminal .....                         | 30mA   |
| Peak Current, S or D (Pulsed at 1ms, 10% duty cycle max) ..... | 40mA   |
| Lead Temperature (soldering, 10 seconds) .....                 | +300°C   |
| Storage Temperature .....                                      | -65°C to +150°C  |
| Continuous Power Dissipation .....                             | T <sub>A</sub> =+70°C  |
| 16 lead CERDIP(derate 10.0mW/°C above +70°C) .....             | 800mW  |
| 20 lead LCC (derate 9.1mW/°C above +70°C) .....                | 727mW  |
| Junction Temperature T <sub>J</sub> .....                      | +150°C   |
| Thermal Resistance, Junction to Case, Θ <sub>JC</sub> :        |  |
| Case Outline 16 lead CERDIP.....                               | 50°C/W   |
| Case Outline 20 lead LCC .....                                 | 20°C/W   |
| Thermal Resistance, Junction to Ambient, Θ <sub>JA</sub> :     |  |
| Case Outline 16 lead CERDIP.....                               | 100°C/W  |
| Case Outline 20 lead LCC .....                                 | 110°C/W  |

**Recommended Operating Conditions**

|   |                 |
|---|-----------------|
| Ambient Operating Range (T <sub>A</sub> ) ..... | -55°C to +125°C |
| Positive Supply Voltage (V <sup>+</sup> ) ..... | +15V            |
| Negative Supply Voltage (V <sup>-</sup> ) ..... | -15V            |
| V <sub>AL</sub> (max) .....                     | 0.8V            |
| V <sub>AH</sub> (min) .....                     | 2.4V            |

NOTE 1: Signals on S, D, or IN exceeding V<sup>+</sup> or V<sup>-</sup> are clamped by internal diodes. Limit forward current to maximum current ratings.

Stresses beyond those listed under “Absolute Maximum Ratings” 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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**TABLE 1. ELECTRICAL TESTS:**

| TEST                       | Symbol                    | CONDITIONS   |  | Group A Subgroup | Device type | Limits Min  | Limits Max | Units |
|----------------------------|---------------------------|--|--|------------------|-------------|-------------|------------|-------|
|                            |                           | -55 °C ≤ T <sub>A</sub> ≤ +125°C<br>V <sup>+</sup> =+15V, V <sup>-</sup> =-15V, GND=0V<br>V <sub>AH</sub> =2.4V, V <sub>AL</sub> =0.8V<br>Unless otherwise specified |  |                  |             |             |            |       |
| <b>SWITCH</b>              |                           |  |  |                  |             |             |            |       |
| Analog-Signal Range        | V <sub>ANALOG</sub>       |  |  | 1,2,3            | All         | -15         | 15         | V     |
| Drain-Source Resistance    | ON<br>r <sub>DS(ON)</sub> | I <sub>S</sub> = -10mA, V <sub>D</sub> = ±8.5V,<br>V <sup>+</sup> = 13.5V, V <sup>-</sup> = -13.5V, V <sub>IN</sub> = 0.8V   |  | 1,3<br>2         | 01          |             | 85<br>100  | Ω     |
| Drain-Source Resistance    | ON<br>r <sub>DS(ON)</sub> | I <sub>S</sub> = -10mA, V <sub>D</sub> = ±8.5V,<br>V <sup>+</sup> = 13.5V, V <sup>-</sup> = -13.5V, V <sub>IN</sub> = 2.4V   |  | 1,3<br>2         | 02          |             | 85<br>100  | Ω     |
| Drain-Source Resistance    | ON<br>r <sub>DS(ON)</sub> | I <sub>S</sub> = -10mA, V <sub>D</sub> = 3.0V,<br>V <sup>+</sup> = 10.8V, V <sup>-</sup> = 0V, V <sub>IN</sub> = 0.8V  |  | 1,3<br>2         | 01          |             | 160<br>200 | Ω     |
| Drain-Source Resistance    | ON<br>r <sub>DS(ON)</sub> | I <sub>S</sub> = -10mA, V <sub>D</sub> = 8.0V,<br>V <sup>+</sup> = 10.8V, V <sup>-</sup> = 0V, V <sub>IN</sub> = 0.8V  |  | 1,3<br>2         | 01          |             | 160<br>200 | Ω     |
| Drain-Source Resistance    | ON<br>r <sub>DS(ON)</sub> | I <sub>S</sub> = -10mA, V <sub>D</sub> = 3.0V,<br>V <sup>+</sup> = 10.8V, V <sup>-</sup> = 0V, V <sub>IN</sub> = 2.4V  |  | 1,3<br>2         | 02          |             | 160<br>200 | Ω     |
| Drain-Source Resistance    | ON<br>r <sub>DS(ON)</sub> | I <sub>S</sub> = -10mA, V <sub>D</sub> = 8.0V,<br>V <sup>+</sup> = 10.8V, V <sup>-</sup> = 0V, V <sub>IN</sub> = 2.4V  |  | 1,3<br>2         | 02          |             | 160<br>200 | Ω     |
| Source-OFF Leakage Current | I <sub>S(OFF)</sub>       | V <sup>+</sup> = 16.5V, V <sup>-</sup> = -16.5V, V <sub>IN</sub> = 2.4V<br>V <sub>S</sub> = ±15.5V V <sub>D</sub> = ±15.5V   |  | 1<br>2,3         | 01          | -0.5<br>-20 | 0.5<br>20  | nA    |
| Source-OFF Leakage Current | I <sub>S(OFF)</sub>       | V <sup>+</sup> = 16.5V, V <sup>-</sup> = -16.5V, V <sub>IN</sub> = 0.8V<br>V <sub>S</sub> = ±15.5V V <sub>D</sub> = ±15.5V   |  | 1<br>2,3         | 02          | -0.5<br>-20 | 0.5<br>20  | nA    |
| Drain-OFF Leakage Current  | I <sub>D(OFF)</sub>       | V <sup>+</sup> = 16.5V, V <sup>-</sup> = -16.5V, V <sub>IN</sub> = 2.4V<br>V <sub>S</sub> = ±15.5V V <sub>D</sub> = ±15.5V   |  | 1<br>2,3         | 01          | -0.5<br>-20 | 0.5<br>20  | nA    |
| Drain-OFF Leakage Current  | I <sub>D(OFF)</sub>       | V <sup>+</sup> = 16.5V, V <sup>-</sup> = -16.5V, V <sub>IN</sub> = 0.8V<br>V <sub>S</sub> = ±15.5V V <sub>D</sub> = ±15.5V   |  | 1<br>2,3         | 02          | -0.5<br>-20 | 0.5<br>20  | nA    |
| Channel-On Leakage Current | I <sub>D(ON)</sub><br>+   | V <sup>+</sup> = 16.5V, V <sup>-</sup> = -16.5V, V <sub>IN</sub> = 0.8V<br>V <sub>S</sub> = ±15.5V V <sub>D</sub> = ±15.5V   |  | 1<br>2,3         | 01          | -0.5<br>-40 | 0.5<br>40  | nA    |
| Channel-On Leakage Current | I <sub>D(ON)</sub><br>+   | V <sup>+</sup> = 16.5V, V <sup>-</sup> = -16.5V, V <sub>IN</sub> = 2.4V<br>V <sub>S</sub> = ±15.5V V <sub>D</sub> = ±15.5V   |  | 1<br>2,3         | 02          | -0.5<br>-40 | 0.5<br>40  | nA    |
|                            | I <sub>S(ON)</sub>        |  |  |                  |             |             |            |       |
| <b>INPUT</b>               |                           |  |  |                  |             |             |            |       |
| Input Current/Voltage High | I <sub>INH</sub>          | V <sub>IN</sub> under test = 2.4V<br>All other = 0.8V  |  | 1,2,3            | All         | -0.5        | +0.5       | μA    |
| Input Current/Voltage Low  | I <sub>INL</sub>          | V <sub>IN</sub> under test = 0.8V<br>All other = 2.4V  |  | 1,2,3            | All         | -0.5        | +0.5       | μA    |
| <b>SUPPLY</b>              |                           |  |  |                  |             |             |            |       |
| Positive Supply Current    | I+                        | V <sup>+</sup> = 16.5V, V <sup>-</sup> = -16.5V,<br>V <sub>IN</sub> = 0 or 5V  |  | 1,2,3            | All         |             | 0.1        | mA    |
|                            |                           | V <sup>+</sup> = 13.2V, V <sup>-</sup> = 0V,<br>V <sub>IN</sub> = 0 or 5V  |  |                  |             |             |            |       |

**TABLE 1. ELECTRICAL TESTS:**

| TEST                    | Symbol           | CONDITIONS   | Group A Subgroup | Device type | Limits Min | Limits Max | Units |
|-------------------------|------------------|--|------------------|-------------|------------|------------|-------|
|                         |                  | -55 °C <=T <sub>A</sub> <= +125°C<br>V <sup>+</sup> =+15V, V <sup>-</sup> =15V, GND=0V<br>V <sub>AH</sub> =2.4V, V <sub>AL</sub> =0.8V<br>Unless otherwise specified |                  |             |            |            |       |
| Negative Supply Current | I <sup>-</sup>   | V <sup>+</sup> =16.5V, V <sup>-</sup> =-16.5V,<br>V <sub>IN</sub> =0 or 5V   | 1,3<br>2         | All         | -1<br>-100 |            | μA    |
|                         |                  | V <sup>+</sup> =13.2V, V <sup>-</sup> =0V,<br>V <sub>IN</sub> =0 or 5V   | 1,3<br>2         | All         | -1<br>-100 |            |       |
| Ground Current          | I <sub>GND</sub> | V <sup>+</sup> =16.5V, V <sup>-</sup> =-16.5V,<br>V <sub>IN</sub> =0 or 5V   | 1,2,3            | All         | -100       |            | μA    |
|                         |                  | V <sup>+</sup> =13.2V, V <sup>-</sup> =0V,<br>V <sub>IN</sub> =0 or 5V   |                  |             |            |            |       |
| Functional Tests        | FT               | Verify the Truth Table   | 7,8              |             |            |            |       |
| <b>DYNAMIC</b>          |                  |  |                  |             |            |            |       |
| Turn-On Time            | t <sub>ON</sub>  | V <sub>S</sub> =±10V, R <sub>L</sub> =1kΩ, C <sub>L</sub> =35pF  | 9                | 01<br>02    |            | 250<br>315 | ns    |
|                         |                  |  | 10,11            | 01<br>02    |            | 300<br>400 |       |
|                         |                  | V <sub>S</sub> =8.0V, R <sub>L</sub> =1kΩ, C <sub>L</sub> =35pF<br>V <sub>+</sub> =+12V, V <sub>-</sub> =0V  | 9                | 01<br>02    |            | 400<br>450 |       |
|                         |                  |  | 10,11            | 01<br>02    |            | 600<br>675 |       |
| Turn-Off Time           | t <sub>OFF</sub> | V <sub>S</sub> =±10V, R <sub>L</sub> =1kΩ, C <sub>L</sub> =35pF<br>Figure 2  | 9                | 01<br>02    |            | 120<br>210 | ns    |
|                         |                  |  | 10,11            | 01<br>02    |            | 150<br>250 |       |
|                         |                  | V <sub>S</sub> =8.0V, R <sub>L</sub> =1kΩ, C <sub>L</sub> =35pF<br>V <sub>+</sub> =+12V, V <sub>-</sub> =0V  | 9,10,11          | All         |            | 200        |       |

| ORDERING INFORMATION: | SMD NUMBER      | Pkg. Code |
|-----------------------|-----------------|-----------|
| DG441AK/883B          | 5962-9204101MEA | 16 CDIP   |
| DG441AZ/883B          | 5962-9204101M2C | 20 LCC    |
| DG442AK/883B          | 5962-9204102MEA | 16 CDIP   |
| DG442AZ/883B          | 5962-9204102M2C | 20 LCC    |

**TRUTH TABLE**

**TERMINAL CONNECTION**

| <b>LOGIC</b> | <b>DG441A SWITCH</b> | <b>TERMINAL NUMBER</b> | <b>01 DG441A</b> | <b>01 DG441A</b> | <b>02 DG442A</b> | <b>02 DG442A</b> |
|--------------|----------------------|------------------------|------------------|------------------|------------------|------------------|
| 0            | ON                   |                        | J16              | 20LCC            | J16              | 20LCC            |
| 1            | OFF                  | 1                      | IN1              | NC               | IN1              | NC               |
|              |                      | 2                      | D1               | IN1              | D1               | IN1              |
|              |                      | 3                      | S1               | D1               | S1               | D1               |
| <b>LOGIC</b> | <b>DG442A SWITCH</b> | 4                      | V-               | S1               | V-               | S1               |
|              |                      | 5                      | GND              | V-               | GND              | V-               |
| 0            | OFF                  | 6                      | S4               | NC               | S4               | NC               |
| 1            | ON                   | 7                      | D4               | GND              | D4               | GND              |
|              |                      | 8                      | IN4              | S4               | IN4              | S4               |
|              |                      | 9                      | IN3              | D4               | IN3              | D4               |
|              |                      | 10                     | D3               | IN4              | D3               | IN4              |
|              |                      | 11                     | S3               | NC               | S3               | NC               |
|              |                      | 12                     | NC               | IN3              | NC               | IN3              |
|              |                      | 13                     | V+               | D3               | V+               | D3               |
|              |                      | 14                     | S2               | S3               | S2               | S3               |
|              |                      | 15                     | D2               | NC               | D2               | NC               |
|              |                      | 16                     | IN2              | NC               | IN2              | NC               |
|              |                      | 17                     |                  | V+               |                  | V+               |
|              |                      | 18                     |                  | S2               |                  | S2               |
|              |                      | 19                     |                  | D2               |                  | D2               |
|              |                      | 20                     |                  | IN2              |                  | IN2              |

## QUALITY ASSURANCE

Sampling and inspection procedures shall be in accordance with MIL-Prf-38535, Appendix A as specified in Mil-Std-883.

Screening shall be in accordance with Method 5004 of Mil-Std-883. Burn-in test Method 1015:

1. Test Condition, A, B, C, or D.
2. TA = +125°C minimum.
3. Interim and final electrical test requirements shall be specified in Table 2.

Quality conformance inspection shall be in accordance with Method 5005 of Mil-Std-883, including Groups A, B, C, and D inspection.

Group A inspection:

1. Tests as specified in Table 2.
2. Selected subgroups in Table 1, Method 5005 of Mil-Std-883 shall be omitted.

Group C and D inspections:

- a. End-point electrical parameters shall be specified in Table 1.
- b. Steady-state life test, Method 1005 of Mil-Std-883:
  1. Test condition A, B, C, D.
  2. TA = +125°C, minimum.
  3. Test duration, 1000 hours, except as permitted by Method 1005 of Mil-Std-883.

**TABLE 2. ELECTRICAL TEST REQUIREMENTS**

| Mil-Std-883 Test Requirements                                | Subgroups<br>per Method 5005, Table 1 |
|--|---------------------------------------|
| Interim Electric Parameters<br>Method 5004                   | 1                                     |
| Final Electrical Parameters<br>Method 5005                   | 1*, 2, 3, 9                           |
| Group A Test Requirements<br>Method 5005                     | 1, 2, 3, 7, 8, 9,10,11                |
| Group C and D End-Point Electrical Parameters<br>Method 5005 | 1                                     |

\* PDA applies to Subgroup 1 only.