

# SCOPE: CMOS TTL COMPATIBLE ANALOG SWITCHES

## ORDERING INFORMATION

| Device Type | Generic Number | SMD       | Circuit Function             |
|-------------|----------------|-----------|------------------------------|
| 01          | IH5040MJE/883B | 8100601EA | One Channel, 75Ω SPST switch |
| 02          | IH5041MJE/883B | 8100602EA | Two Channel, 75Ω Dual SPST   |
| 03          | IH5042MJE/883B | 8100603EA | One Channel, 75Ω SPDT        |
| 04          | IH5043MJE/883B | 8100604EA | Two Channel, 75Ω Dual SPDT   |
| 05          | IH5044MJE/883B | 8100605EA | One Channel, 75Ω DPST        |
| 06          | IH5045MFD/883B | 8100606XC | Two Channel, 75Ω Dual DPST   |
| 06          | IH5045MJE/883B | 8100606EA | Two Channel, 75Ω Dual DPST   |
| 08          | IH5047MJE/883B | 8100608EA | One Channel, 75Ω 4 PST       |
| 09          | IH5140MJE/883B | 8100609EA | One Channel, 75Ω SPST switch |
| 10          | IH5141MJE/883B | 8100610EA | Two Channel, 75Ω Dual SPST   |
| 11          | IH5142MJE/883B | 8100611EA | One Channel, 75Ω SPDT        |
| 12          | IH5143MJE/883B | 8100612EA | Two Channel, 30Ω Dual SPDT   |
| 13          | IH5144MJE/883B | 8100613EA | One Channel, 30Ω DPST        |
| 14          | IH5145MJE/883B | 8100614EA | Two Channel, 75Ω Dual DPST   |
| 16          | IH5047MJE/883B | 8100616EA | One Channel, 75Ω 4 PST       |
| 20          | IH5149MJE/883B | 8100620EA | Two Channel, 30Ω DPST        |
| 21          | IH5150MJE/883B | 8100621EA | One Channel, 30Ω SPDT        |
| 22          | IH5151MJE/883B | 8100622EA | Two Channel, 30Ω Dual SPDT   |

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

| Outline Letter | Mil-Std-1835           | Case Outline   | Package Code |
|----------------|------------------------|----------------|--------------|
| Maxim SMD      |                        |                |              |
| JE E           | GDIP1-T16 or CDIP2-T16 | 16 LEAD Cerdip | J16          |
| FD X           | CDFP3-F14              | 14 LEAD Cerdip | F14          |

## Absolute Maximum Ratings:

|                                                                |                           |
|----------------------------------------------------------------|---------------------------|
| $V^+$ to $V^-$ .....                                           | 33V                       |
| $V^+$ to $V_D$ .....                                           | 30V                       |
| $V_D$ to $V^-$ .....                                           | 30V                       |
| $V_D$ to $V_S$ .....                                           | ±22V                      |
| $V_L$ to $V^-$ .....                                           | 33V                       |
| $V_L$ to $V_{IN}$ .....                                        | 30V                       |
| $V_L$ to $V_R$ .....                                           | 20V                       |
| $V_{IN}$ to $V_R$ .....                                        | 20V                       |
| $V_R$ to $V^-$ .....                                           | 33V                       |
| $V_R$ to $V_{IN}$ .....                                        | 2V                        |
| Continuous Current, Any terminal (except S or D).....          | 30mA                      |
| Peak Current, S or D (Pulsed at 1ms, 10% duty cycle max) ..... | 80mA                      |
| Lead Temperature (soldering, 10 seconds) .....                 | +300°C                    |
| Storage Temperature .....                                      | -65°C to +150°C           |
| Continuous Power Dissipation .....                             | $T_A = +70^\circ\text{C}$ |
| 16 lead Cerdip (derate 10.0mW/°C above +70°C) .....            | 800mW                     |
| 14 lead Flatpack (derate 5.7mW/°C above +70°C) .....           | 457mW                     |
| Junction Temperature $T_J$ .....                               | +150°C                    |
| Thermal Resistance, Junction to Case, $\Theta_{JC}$ :          |                           |
| Case Outline 16 lead Cerdip.....                               | 50°C/W                    |
| Case Outline 14 lead Flatpack .....                            | 70°C/W                    |
| Thermal Resistance, Junction to Ambient, $\Theta_{JA}$ :       |                           |
| Case Outline 16 lead Cerdip.....                               | 100°C/W                   |
| Case Outline 14 lead Flatpack .....                            | 175°C/W                   |

## Recommended Operating Conditions

|                                         |                 |
|-----------------------------------------|-----------------|
| Ambient Operating Range ( $T_A$ ) ..... | -55°C to +125°C |
| Positive Supply Voltage ( $V^+$ ) ..... | +15V            |
| Negative Supply Voltage ( $V^-$ ) ..... | -15V            |
| $V_R$ .....                             | 0V              |
| $V_L$ .....                             | 5 V             |

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<br>-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, V <sub>L</sub> =5V<br>Unless otherwise specified | Group A<br>Subgroup | Device<br>type | Limits<br>Min | Limits<br>Max | Units |
|-----------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------|---------------|---------------|-------|
| <b>INPUT</b>                            |                             |                                                                                                                                                                                                        |                     |                |               |               |       |
| Input Current,<br>Input Voltage<br>High | I <sub>IH</sub>             | V <sub>IN</sub> =2.4V, 5V                                                                                                                                                                              | 1,3<br>2            | All            | -1<br>-1      | 1<br>10       | μA    |
| Input Current,<br>Input Voltage<br>Low  | I <sub>IL</sub>             | V <sub>IN</sub> =0.0V                                                                                                                                                                                  | 1,3<br>2            | All            | -1<br>-10     | 1<br>1        | μA    |
| <b>SWITCH</b>                           |                             |                                                                                                                                                                                                        |                     |                |               |               |       |
| Drain-Source ON<br>Resistance           | r <sub>DS(ON)</sub>         | I <sub>S</sub> =±10mA, V <sub>D</sub> =±10V,                                                                                                                                                           | 1,3<br>2            | 01 - 16        |               | 75<br>150     | Ω     |
| Drain-Source ON<br>Resistance           | r <sub>DS(ON)</sub>         | I <sub>S</sub> =±10mA, V <sub>S</sub> =±10V,                                                                                                                                                           | 1,3<br>2            | 17 - 22        |               | 45<br>50      | Ω     |
| Drain-Source ON<br>Resistance           | r <sub>DS(ON)</sub>         | I <sub>S</sub> =±10mA, V <sub>D</sub> =±7.5V, NOTE 2<br>V <sub>CC</sub> =±10V                                                                                                                          | 1,3<br>2            | All            |               | 75<br>150     | Ω     |
| Source- OFF<br>Leakage Current          | I <sub>S(OFF)</sub>         | V <sub>S</sub> =±10V, V <sub>D</sub> =±10V, V <sub>IN</sub> = <u>3</u> /                                                                                                                               | 1<br>2,3            | All            |               | ±1<br>±100    | nA    |
| Drain- OFF<br>Leakage Current           | I <sub>D(OFF)</sub>         | V <sub>S</sub> =±10V, V <sub>D</sub> =±10V, V <sub>IN</sub> = <u>3</u> /                                                                                                                               | 1<br>2,3            | All            |               | ±1<br>±100    | nA    |
| Channel-On<br>Leakage Current           | I <sub>D(ON)</sub>          | V <sub>D</sub> =V <sub>S</sub> =±10V, V <sub>IN</sub> = <u>3</u> /                                                                                                                                     | 1<br>2,3            | All            |               | ±2<br>±200    | nA    |
| <b>SUPPLY</b>                           |                             |                                                                                                                                                                                                        |                     |                |               |               |       |
| Positive Supply<br>Current              | I <sup>+</sup>              | V <sub>IN</sub> =0V, 5V                                                                                                                                                                                | 1,3<br>2            | 01-08          |               | 10<br>100     | μA    |
| Positive Supply<br>Current              | I <sup>+</sup>              | V <sub>IN</sub> =0V, 5V                                                                                                                                                                                | 1<br>2,3            | 09-22          |               | 200<br>300    | μA    |
| Negative Supply<br>Current              | I <sup>-</sup>              | V <sub>A</sub> =0V, 5V                                                                                                                                                                                 | 1,3<br>2            | 01-08          | -10<br>-100   |               | μA    |
| Negative Supply<br>Current              | I <sup>-</sup>              | V <sub>IN</sub> =0V, 5V                                                                                                                                                                                | 1<br>2,3            | 09-22          | -200<br>-300  |               | μA    |
| Logic Supply<br>Current                 | I <sub>L</sub> <sup>+</sup> | V <sub>IN</sub> =0V, 5V                                                                                                                                                                                | 1,3<br>2            | 01-08          |               | 10<br>100     | μA    |
| Logic Supply<br>Current                 | I <sub>L</sub> <sup>+</sup> | V <sub>IN</sub> =0V, 5V                                                                                                                                                                                | 1<br>2,3            | 09-22          |               | -200<br>-300  | μA    |
| Reference Supply<br>Current             | I <sup>-</sup>              | V <sub>A</sub> =0V, 5V                                                                                                                                                                                 | 1,3<br>2            | 01-08          | -10<br>-100   |               | μA    |
| Reference Supply<br>Current             | I <sup>-</sup>              | V <sub>IN</sub> =0V, 5V                                                                                                                                                                                | 1<br>2,3            | 09-22          | -200<br>-300  |               | μA    |

| TEST                         | Symbol           | <b>CONDITIONS</b><br>-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, V <sub>L</sub> =5V<br>Unless otherwise specified | Group A Subgroup | Device type | Limits Min | Limits Max        | Units |
|------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|------------|-------------------|-------|
| Turn-On Time                 | t <sub>ON</sub>  | Figure 1                                                                                                                                                                                                      | 9<br>10<br>11    | 01-08       |            | 450<br>550<br>375 | ns    |
| Turn-On Time                 | t <sub>ON</sub>  | Figure 1                                                                                                                                                                                                      | 9<br>10<br>11    | 09-22       |            | 500<br>800<br>450 | ns    |
| Turn-Off Time                | t <sub>OFF</sub> | Figure 1                                                                                                                                                                                                      | 9,11<br>10       | 01-08       |            | 250<br>400        | ns    |
| Turn-Off Time                | t <sub>OFF</sub> | Figure 1                                                                                                                                                                                                      | 9<br>10<br>11    | 09-22       |            | 450<br>600<br>350 | ns    |
| Single channel Isolation     | V <sub>ISO</sub> | R <sub>L</sub> =100Ω, f=100kHz, V <sub>IN</sub> =2V <sub>p-p</sub> , CL=5pF, NOTE 2                                                                                                                           | 9                | All         | 60         |                   | dB    |
| Crosstalk between channel    | V <sub>CT</sub>  | R <sub>L</sub> =100Ω, f=100kHz, V <sub>IN</sub> =2V <sub>p-p</sub> , CL=5pF, NOTE 2                                                                                                                           | 9                | All         | 60         |                   | dB    |
| Charge Transfer Error        | V <sub>CTE</sub> | V <sub>IN</sub> =0V, CL=10nF, NOTE 2                                                                                                                                                                          | 9                | All         |            | 30                | mV    |
| Break before Make Time Delay | t <sub>D</sub>   | NOTE 2                                                                                                                                                                                                        | 9                | 03, 05      | 5          |                   |       |
| Driver Input Capacitance     | C <sub>A</sub>   | V <sub>IN</sub> =0V, NOTE 2                                                                                                                                                                                   | 9                | All         |            | 45                | pF    |
| Switch Input Capacitance     | C <sub>IS</sub>  | Switch OFF, NOTE 2                                                                                                                                                                                            | 9                | All         |            | 60                | pF    |
| Switch Output Capacitance    | C <sub>OS</sub>  | Switch OFF, NOTE 2                                                                                                                                                                                            | 9                | All         |            | 60                | pF    |

NOTE 1: The listed resistance limits correspond to the following voltage values:

45Ω and 75Ω = ±9.25V, ±6.75V

50Ω and 150Ω = ±8.55V, ±6.0V

NOTE 2: Guaranteed if not tested to the limits specified.

NOTE 3:

| Device Types           | V <sub>IN</sub> | Channels ON  | Channels OFF |
|------------------------|-----------------|--------------|--------------|
| 01, 09                 | 2.4V<br>0.8V    | 1            | 1            |
| 02, 10                 | 2.4V<br>0.8V    | 1, 2         | 1, 2         |
| 03, 05, 11, 13         | 2.4V<br>0.8V    | 1<br>2       | 2<br>1       |
| 04, 12                 | 2.4V<br>0.8V    | 1, 2<br>3, 4 | 3, 4<br>1, 2 |
| 21                     | 2.4V<br>0.8V    | 2, 3<br>1, 4 | 1,4<br>2,3   |
| 06, 08, 14, 16, 20, 22 | 2.4V<br>0.8V    | 1, 2, 3, 4   | 1, 2, 3, 4   |

Figure 1. Switching Time: See Commercial Data Sheet.

# **TERMINAL CONNECTIONS**

| TERMINAL<br>NUMBER | 01, 09<br>IH5040<br>IH5140 | 02, 10<br>IH5041<br>IH5141 | 03,11,21<br>IH5042<br>IH5142<br>IH5150 | 04,12,22<br>IH5043<br>IH5143<br>IH5151 | 05, 13<br>IH5044<br>IH5144 | 06<br>IH5045 | 06,14,20<br>IH5045<br>IH5145<br>IH5149 | 08,16<br>IH5047 | 08,16<br>IH5047 |
|--------------------|----------------------------|----------------------------|----------------------------------------|----------------------------------------|----------------------------|--------------|----------------------------------------|-----------------|-----------------|
| 0                  | J16                        | J16                        | J16                                    | J16                                    | J16                        | F14          | J16                                    | F14             | J16             |
| 1                  | D                          | D1                         | D1                                     | D1                                     | D1                         | D1           | D1                                     | D2              | D2              |
| 2                  |                            |                            |                                        |                                        |                            | S3           |                                        | S1              |                 |
| 3                  |                            |                            | D2                                     | D3                                     | D2                         | D3           | D3                                     | D1              | D1              |
| 4                  |                            |                            | S2                                     | S3                                     | S2                         | D4           | S3                                     | D4              | S1              |
| 5                  |                            |                            |                                        | S4                                     |                            | S4           | S4                                     | S4              | S4              |
| 6                  |                            |                            |                                        | D4                                     |                            | D2           | D4                                     | D3              | D4              |
| 7                  |                            |                            |                                        |                                        |                            | S2           |                                        | S3              |                 |
| 8                  |                            | D2                         |                                        | D2                                     |                            | IN2          | D2                                     |                 | D3              |
| 9                  |                            | S2                         |                                        | S2                                     |                            | V+           | S2                                     | V+              | S3              |
| 10                 |                            | IN2                        |                                        | IN2                                    |                            | VL           | IN2                                    | VL              |                 |
| 11                 | V+                         | V+                         | V+                                     | V+                                     | V+                         | VR           | V+                                     | VR              | V+              |
| 12                 | VL                         | VL                         | VL                                     | VL                                     | VL                         | V-           | VL                                     | V-              | VL              |
| 13                 | VR                         | VR                         | VR                                     | VR                                     | VR                         | IN1          | VR                                     | IN              | VR              |
| 14                 | V-                         | V-                         | V-                                     | V-                                     | V-                         | S1           | V-                                     | S2              | V-              |
| 15                 | IN                         | IN1                        | IN                                     | IN1                                    | IN                         |              | IN1                                    |                 | IN1             |
| 16                 | S                          | S1                         | S1                                     | S1                                     | S1                         |              | S1                                     |                 | S2              |

## **ORDERING INFORMATION**

### Device Type

### Generic Number

### SMD

### Circuit Function

|    |                |           |                              |
|----|----------------|-----------|------------------------------|
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## 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, 9, 10, 11                    |
| Group C and D End-Point Electrical Parameters<br>Method 5005 | 1                                     |

\* PDA applies to Subgroup 1 only.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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