**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°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, ΘJC:
Case Outline 16 lead CERDIP..... 50°C/W
Case Outline 14 lead Flatpack ..... 70°C/W
Thermal Resistance, Junction to Ambient, ΘJA:
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 <=$T_A$<= +125°C<br>$V^+$=+15V, $V^-$=-15V, GND=0V<br>$V_{AH}$=2.4V, $V_{AL}$=0.8V, $V_L$=5V<br>Unless otherwise specified | Group A Subgroup | Device type | Limits Min | Limits Max | Units |
|---|---|---|---|---|---|---|---|
| **INPUT** | | | | | | | |
| Input Current, Input Voltage High | $I_{IH}$ | $V_{IN}$=2.4V, 5V | 1,3<br>2 | All | -1<br>-1 | 1<br>10 | µA |
| Input Current, Input Voltage Low | $I_{IL}$ | $V_{IN}$=0.0V | 1,3<br>2 | All | -1<br>-10 | 1<br>1 | µA |
| **SWITCH** | | | | | | | |
| Drain-Source ON Resistance | $r_{DS(ON)}$ | $I_S$ =±10mA, $V_D$=±10V, | 1,3<br>2 | 01 - 16 | | 75<br>150 | Ω |
| Drain-Source ON Resistance | $r_{DS(ON)}$ | $I_S$ =±10mA, $V_S$=±10V, | 1,3<br>2 | 17 - 22 | | 45<br>50 | Ω |
| Drain-Source ON Resistance | $r_{DS(ON)}$ | $I_S$ =±10mA, $V_D$=±7.5V, NOTE 2<br>$V_{CC}$=±10V | 1,3<br>2 | All | | 75<br>150 | Ω |
| Source- OFF Leakage Current | $I_{S(OFF)}$ | $V_S$=±10V, $V_D$=±10V, $V_{IN}$=3/ | 1<br>2,3 | All | | ±1<br>±100 | nA |
| Drain- OFF Leakage Current | $I_{D(OFF)}$ | $V_S$=±10V, $V_D$=±10V, $V_{IN}$=3/ | 1<br>2,3 | All | | ±1<br>±100 | nA |
| Channel-On Leakage Current | $I_{D(ON)}$ | $V_D$=$V_S$=±10V, $V_{IN}$=3/ | 1<br>2,3 | All | | ±2<br>±200 | nA |
| **SUPPLY** | | | | | | | |
| Positive Supply Current | I+ | $V_{IN}$=0V, 5V | 1,3<br>2 | 01-08 | | 10<br>100 | µA |
| Positive Supply Current | I+ | $V_{IN}$=0V, 5V | 1<br>2,3 | 09-22 | | 200<br>300 | µA |
| Negative Supply Current | I- | $V_A$=0V, 5V | 1,3<br>2 | 01-08 | -10<br>-100 | | µA |
| Negative Supply Current | I- | $V_{IN}$=0V, 5V | 1<br>2,3 | 09-22 | -200<br>-300 | | µA |
| Logic Supply Current | $I_L$+ | $V_{IN}$=0V, 5V | 1,3<br>2 | 01-08 | | 10<br>100 | µA |
| Logic Supply Current | $I_L$+ | $V_{IN}$=0V, 5V | 1<br>2,3 | 09-22 | | -200<br>-300 | µA |
| Reference Supply Current | I- | $V_A$=0V, 5V | 1,3<br>2 | 01-08 | -10<br>-100 | | µA |
| Reference Supply Current | I- | $V_{IN}$=0V, 5V | 1<br>2,3 | 09-22 | -200<br>-300 | | µA |

| TEST | Symbol | CONDITIONS<br>-55 °C <=$T_A$<= +125°C<br>$V^+$=+15V, $V^-$=-15V, GND=0V<br>$V_{AH}$=2.4V, $V_{AL}$=0.8V, $V_L$=5V<br>Unless otherwise specified | Group A Subgroup | Device type | Limits Min | Limits Max | Units |
|---|---|---|---|---|---|---|---|
| Turn-On Time | $t_{ON}$ | Figure 1 | 9<br>10<br>11 | 01-08 | | 450<br>550<br>375 | ns |
| Turn-On Time | $t_{ON}$ | Figure 1 | 9<br>10<br>11 | 09-22 | | 500<br>800<br>450 | ns |
| Turn-Off Time | $t_{OFF}$ | Figure 1 | 9,11<br>10 | 01-08 | | 250<br>400 | ns |
| Turn-Off Time | $t_{OFF}$ | Figure 1 | 9<br>10<br>11 | 09-22 | | 450<br>600<br>350 | ns |
| Single channel Isolation | $V_{ISO}$ | $R_L$=100Ω, f=100kHz, $V_{IN}$=2Vp-p, CL=5pF, NOTE 2 | 9 | All | 60 | | dB |
| Crosstalk between channel | $V_{CT}$ | $R_L$=100Ω, f=100kHz, $V_{IN}$=2Vp-p, CL=5pF, NOTE 2 | 9 | All | 60 | | dB |
| Charge Transfer Error | $V_{CTE}$ | $V_{IN}$=0V, CL=10nF, NOTE 2 | 9 | All | | 30 | mV |
| Break before Make Time Delay | $t_D$ | NOTE 2 | 9 | 03, 05 | 5 | | |
| Driver Input Capacitance | $C_A$ | $V_{IN}$=0V, NOTE 2 | 9 | All | | 45 | pF |
| Switch Input Capacitance | $C_{IS}$ | Switch OFF, NOTE 2 | 9 | All | | 60 | pF |
| Switch Output Capacitance | $C_{OS}$ | 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 | $V_{IN}$ | Channels ON | Channels OFF |
|---|---|---|---|
| 01, 09 | 2.4V<br>0.8V | 1<br> | <br>1 |
| 02, 10 | 2.4V<br>0.8V | 1, 2<br> | <br>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<br> | <br>1, 2, 3, 4 |

Figure 1. Switching Time: See Commercial Data Sheet.

**TERMINAL CONNECTIONS**

| TERMINAL NUMBER | 01, 09 IH5040 IH5140 | 02, 10 IH5041 IH5141 | 03,11,21 IH5042 IH5142 IH5150 | 04,12,22 IH5043 IH5143 IH5151 | 05, 13 IH5044 IH5144 | 06 IH5045 | 06,14,20 IH5045 IH5145 IH5149 | 08,16 IH5047 | 08,16 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 |
|---|---|---|---|
| 01 | IH5040MJE/883B | 8100601EA | One Channel, 75Ω SPST |
| 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 |

**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 per Method 5005, Table 1 |
|---|---|
| Interim Electric Parameters Method 5004 | 1 |
| Final Electrical Parameters Method 5005 | 1*, 2, 3, 9 |
| Group A Test Requirements Method 5005 | 1, 2, 3, 9, 10, 11 |
| Group C and D End-Point Electrical Parameters Method 5005 | 1 |

* PDA applies to Subgroup 1 only.

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