

**SCOPE: CMOS TTL COMPATIBLE ANALOG SWITCHES**

**ORDERING INFORMATION**

<u>Device Type</u>	<u>Generic Number</u>	<u>SMD</u>	<u>Circuit Function</u>
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:

<u>Outline Letter</u>	<u>Mil-Std-1835</u>	<u>Case Outline</u>	<u>Package Code</u>
<b>Maxim SMD</b>			
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	Group A Subgroup	Device type	Limits Min	Limits Max	Units
		-55 °C <=T <sub>A</sub> <= +125°C V <sup>+</sup> =+15V, V <sup>-</sup> =-15V, GND=0V V <sub>AH</sub> =2.4V, V <sub>AL</sub> =0.8V, V <sub>L</sub> =5V Unless otherwise specified					
<b>INPUT</b>							
Input Current, Input Voltage High	I <sub>IH</sub>	V <sub>IN</sub> =2.4V, 5V	1,3 2	All	-1 -1	1 10	μA
Input Current, Input Voltage Low	I <sub>IL</sub>	V <sub>IN</sub> =0.0V	1,3 2	All	-1 -10	1 1	μA
<b>SWITCH</b>							
Drain-Source ON Resistance	r <sub>DS(ON)</sub>	I <sub>S</sub> =±10mA, V <sub>D</sub> =±10V,	1,3 2	01 - 16		75 150	Ω
Drain-Source ON Resistance	r <sub>DS(ON)</sub>	I <sub>S</sub> =±10mA, V <sub>S</sub> =±10V,	1,3 2	17 - 22		45 50	Ω
Drain-Source ON Resistance	r <sub>DS(ON)</sub>	I <sub>S</sub> =±10mA, V <sub>D</sub> =±7.5V, NOTE 2 V <sub>CC</sub> =±10V	1,3 2	All		75 150	Ω
Source- OFF 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 2,3	All		±1 ±100	nA
Drain- OFF 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 2,3	All		±1 ±100	nA
Channel-On Leakage Current	I <sub>D(ON)</sub>	V <sub>D</sub> =V <sub>S</sub> =±10V, V <sub>IN</sub> = <u>3</u> /	1 2,3	All		±2 ±200	nA
<b>SUPPLY</b>							
Positive Supply Current	I <sub>+</sub>	V <sub>IN</sub> =0V, 5V	1,3 2	01-08		10 100	μA
Positive Supply Current	I <sub>+</sub>	V <sub>IN</sub> =0V, 5V	1 2,3	09-22		200 300	μA
Negative Supply Current	I <sub>-</sub>	V <sub>A</sub> =0V, 5V	1,3 2	01-08	-10 -100		μA
Negative Supply Current	I <sub>-</sub>	V <sub>IN</sub> =0V, 5V	1 2,3	09-22	-200 -300		μA
Logic Supply Current	I <sub>L+</sub>	V <sub>IN</sub> =0V, 5V	1,3 2	01-08		10 100	μA
Logic Supply Current	I <sub>L+</sub>	V <sub>IN</sub> =0V, 5V	1 2,3	09-22		-200 -300	μA
Reference Supply Current	I <sub>-</sub>	V <sub>A</sub> =0V, 5V	1,3 2	01-08	-10 -100		μA
Reference Supply Current	I <sub>-</sub>	V <sub>IN</sub> =0V, 5V	1 2,3	09-22	-200 -300		μA

TEST	Symbol	CONDITIONS		Group A Subgroup	Device type	Limits Min	Limits Max	Units
		-55 °C <=T <sub>A</sub> <= +125°C V <sup>+</sup> =+15V, V <sup>-</sup> =-15V, GND=0V V <sub>AH</sub> =2.4V, V <sub>AL</sub> =0.8V, V <sub>L</sub> =5V Unless otherwise specified						
Turn-On Time	t <sub>ON</sub>	Figure 1	9	01-08			450	ns
			10				550	
			11				375	
Turn-On Time	t <sub>ON</sub>	Figure 1	9	09-22			500	ns
			10				800	
			11				450	
Turn-Off Time	t <sub>OFF</sub>	Figure 1	9,11	01-08			250	ns
			10				400	
Turn-Off Time	t <sub>OFF</sub>	Figure 1	9	09-22			450	ns
			10				600	
			11				350	
Single channel Isolation	V <sub>ISO</sub>	R <sub>L</sub> =100Ω, f=100kHz, V <sub>IN</sub> =2Vp-p, 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> =2Vp-p, 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 0.8V	1	1
02, 10	2.4V 0.8V	1, 2	1, 2
03, 05, 11, 13	2.4V 0.8V	1 2	2 1
04, 12	2.4V 0.8V	1, 2 3, 4	3, 4 1, 2
21	2.4V 0.8V	2, 3 1, 4	1,4 2,3
06, 08, 14, 16, 20, 22	2.4V 0.8V	1, 2, 3, 4	1, 2, 3, 4

Figure 1. Switching Time: See Commercial Data Sheet.

**TERMINAL CONNECTIONS**

<b>TERMINAL NUMBER</b>	<b>01, 09 IH5040 IH5140</b>	<b>02, 10 IH5041 IH5141</b>	<b>03,11,21 IH5042 IH5142 IH5150</b>	<b>04,12,22 IH5043 IH5143 IH5151</b>	<b>05, 13 IH5044 IH5144</b>	<b>06 IH5045</b>	<b>06,14,20 IH5045 IH5145 IH5149</b>	<b>08,16 IH5047</b>	<b>08,16 IH5047</b>
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

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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 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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