

**SCOPE: 8-CHANNEL/DUAL 4-CHANNEL CMOS, ANALOG SWITCHES**

<u>Device Type</u>	<u>Generic Number</u>	<u>SMD Number</u>
01	DG408A(x)/883B	5962-9204201
02	DG409A(x)/883B	5962-9204202

**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
L X	CDFP3-F16	16 LEAD FLATPACK	F16
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 Overvoltage Range <u>1/</u> .....	(V <sup>-</sup> -2V) to (V <sup>+</sup> +2V) or 20mA whichever occurs first.
Continuous Current, Any terminal except S or D .....	30mA
Continuous Current, S or D .....	20mA
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
16 lead FLATPACK(derate 6.1mW/°C above +70°C) .....	485mW
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 16 lead FLATPACK .....	65°C/W
Case Outline 20 lead LCC .....	55°C/W
Thermal Resistance, Junction to Ambient, Θ <sub>JA</sub> :	
Case Outline 16 lead CERDIP.....	100°C/W
Case Outline 16 lead FLATPACK .....	165°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

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 V <sup>+</sup> =+15V, V <sup>-</sup> =-15V, GND=0V V <sub>AH</sub> =2.4V, V <sub>AL</sub> =0.8V, V <sub>EN</sub> =2.4V Unless otherwise specified						
<b>SWITCH</b>								
Analog-Signal Range	V <sub>ANALOG</sub>	NOTE 2		1,2,3	All	-15	15	V
Drain-Source ON Resistance	r <sub>DS(ON)</sub>	I <sub>S</sub> =-10mA, V <sub>D</sub> =±10V		1,3 2	All		100 125	Ω
r <sub>DS(ON)</sub> Matching Between Channels	Δr <sub>DS(ON)</sub>	I <sub>S</sub> =-10mA, V <sub>D</sub> =±10V, NOTE 3		1	All		15	Ω
Source-OFF Leakage Current	I <sub>S(OFF)</sub>	V <sub>S</sub> =±10V, V <sub>D</sub> =±10V, V <sub>EN</sub> =0V		1 2	All	-0.5 -50	0.5 50	nA
Drain-OFF Leakage Current	I <sub>D(OFF)</sub>	V <sub>S</sub> =±10V, V <sub>D</sub> =±10V, V <sub>EN</sub> =0V		1 2 2	All 01 02	-1.0 -100 -50	1.0 100 50	nA
Drain-ON Leakage Current	I <sub>D(ON)+</sub> I <sub>S(ON)</sub>	V <sub>S</sub> =±10V, V <sub>D</sub> =±10V, sequence each switch on		1 2 2	All 01 02	-1.0 -100 -50	1.0 100 50	nA
<b>INPUT</b>								
Input Current/Voltage High	I <sub>AH</sub>	V <sub>A</sub> = 2.4V, 15V		1,2,3	All	-10	10	μA
Input Current/Voltage Low	I <sub>AL</sub>	V <sub>A</sub> =0V, V <sub>EN</sub> = 0V, 2.4V		1,2,3	All	-10	10	μA
Standby Positive Supply Current	+I <sub>SBY</sub>	V <sub>A</sub> =0V, V <sub>EN</sub> = 0V		1,2,3	All		75	μA
Standby Negative Supply Current	-I <sub>SBY</sub>	V <sub>A</sub> =0V, V <sub>EN</sub> = 0V		1,2,3	All	-75		μA
<b>SUPPLY</b>								
Positive Supply Current	I <sub>+</sub>	V <sub>A</sub> =0V, V <sub>EN</sub> = 2.4V		1,3 2	All		0.5 2.0	mA
Negative Supply Current	I <sub>-</sub>	V <sub>A</sub> =0V, V <sub>EN</sub> = 2.4V		1,2,3	All	-0.5		mA
<b>DYNAMIC</b>								
Transition Time	t <sub>TRANS</sub>	Figure 2		9,10,11	All		250	ns
Break Before Make Time	t <sub>OPEN</sub>	Figure 4		9	All	10		ns
Enable Turn-On Time	t <sub>ON(EN)</sub>	Figure 3		9,11 10	All		150 225	ns
Enable Turn-Off Time	t <sub>OFF(EN)</sub>	Figure 3		9,10,11	All		150	ns

NOTE 2: Guaranteed by design.

NOTE 3: Δr<sub>DS(ON)</sub>= Δr<sub>DS(ON)max</sub>-Δr<sub>DS(ON)min</sub>

**FIGURE 2: TRANSITION TIME TEST CIRCUIT:** See Commercial Data Sheet

**FIGURE 3: ENABLE SWITCHING TIME:** See Commercial Data Sheet

**FIGURE 4: BREAK-BEFORE-MAKE INTERVAL:** See Commercial Data Sheet

**ORDERING INFORMATION:**

	SMD NUMBER	CIRCUIT FUNCTION	PKG CODE
DG408AK/883B	5962-9204201MEA	8-channel analog multiplexer	16 CERDIP
DG408AL/883B	5962-9204201MXC	8-channel analog multiplexer	16 FLATPACK
DG408AZ/883B	5962-9204201M2C	8-channel analog multiplexer	20 LCC
DG409AK/883B	5962-9204202MEA	Dual 4-channel analog multiplexer	16 CERDIP
DG409AL/883B	5962-9204202MXC	Dual 4-channel analog multiplexer	16 FLATPACK
DG409AZ/883B	5962-9204202M2C	Dual 4-channel analog multiplexer	20 LCC

**TRUTH TABLES:**

**TERMINAL CONNECTION**

A2	A1	A0	EN	DG408A ON SWITCH	Terminal Number	DG408	DG408	DG409	DG409
X	X	X	L	None		J16 & F16	LCC20	J16 & F16	LCC20
L	L	L	H	1	1	A0	NC	A0	NC
L	L	H	H	2	2	EN	A0	EN	A0
L	H	L	H	3	3	V-	EN	V-	EN
L	H	H	H	4	4	S1	V-	S1a	V-
H	L	L	H	5	5	S2	S1	S2a	S1a
H	L	H	H	6	6	S3	NC	S3a	NC
H	H	L	H	7	7	S4	S2	S4a	S2a
H	H	H	H	8	8	D	S3	Da	S3a
					9	S8	S4	Db	S4a
				DG409A ON SWITCH	10	S7	D	S4b	DA
				None	11	S6	NC	S3b	NC
	X	X	X	None	12	S5	S8	S2b	DB
	L	L	H	1	13	V+	S7	S1b	S4b
	L	H	H	2	14	GND	S6	V+	S3b
	H	L	H	3	15	A2	S5	GND	S2b
	H	H	H	4	16	A1	NC	A1	NC
					17		V+		S1b
					18		GND		V+
					19		A2		GND
					20		A1		A1

## 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, 7, 8, 9, 10, 11
Group A Test Requirements Method 5005	1, 2, 3, 7**, 8**, 9, 10, 11
Group C and D End-Point Electrical Parameters Method 5005	1

\* PDA applies to Subgroup 1 only.

\*\* Subgroups 7 and 8 tests shall be sufficient to verify the truth table.