

**SCOPE: QUAD COMPARATOR WITH PROGRAMMABLE THRESHOLD**

<u>Device Type</u>	<u>Generic Number</u>
01	MAX516A(x)/883B
02	MAX516B(x)/883B

**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>
RG	GDIP1-T24 or CDIP2-T24	24 LEAD CERDIP	R24
LI	CQCC1-N28	28 LCC	L28

**Absolute Maximum Ratings:**

V <sub>DD</sub> to GND .....	-0.3V to +17V
V <sub>DD</sub> to V <sub>CC</sub> .....	-0.3V to +17V
V <sub>CC</sub> to GND .....	-0.3V, V <sub>DD</sub> +0.3V
Digital Input Voltage to DGND .....	-0.3V, V <sub>DD</sub> +0.3V
Comparator Input Voltage to GND .....	-0.3V, V <sub>DD</sub> +0.3V
REF to GND .....	-0.3V, V <sub>DD</sub> +0.3V
C0-C3 to GND .....	GND, V <sub>DD</sub> +0.3V
Continuous Current, V <sub>CC</sub> or GND .....	12mA
Lead Temperature (soldering, 10 seconds) .....	+300°C
Storage Temperature .....	-65°C to +150°C
Continuous Power Dissipation .....	T <sub>A</sub> =+70°C
24 pin CERDIP(derate 12.5mW/°C above +70°C) .....	1000mW
28 pin LCC(derate 10.2mW/°C above +70°C) .....	816mW
Junction Temperature T <sub>J</sub> .....	+150°C
Thermal Resistance, Junction to Case, Θ <sub>JC</sub>	
24 pin CERDIP.....	40°C/W
28 pin LCC .....	15°C/W
Thermal Resistance, Junction to Ambient, Θ <sub>JA</sub> :	
24 pin CERDIP.....	80°C/W
28 pin LCC .....	98°C/W

**Recommended Operating Conditions**

Ambient Operating Range (T <sub>A</sub> ) .....	-55°C to +125°C
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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 1/ Unless otherwise specified						
Resolution	N			1,2,3	All	8.0		Bits
Total Unadjusted Error	TUE	VREF=1.25V		1 2,3	01		±1.0	LSB
		VREF=10V		2,3			±1.5 ±1.0	
				1,2,3	02		±2.0	
Relative Accuracy	INL			1,2,3	01 02		±0.5 ±1.0	LSB
Differential Nonlinearity	DNL	Guaranteed monotonic		1,2,3	All		±1.0	LSB
Full Scale Error	AE			1,2,3	01 02		±0.5 ±1.0	LSB
Zero-Code Error		VREF=1.25V		1	01		±1.5	LSB
		VREF=10V		2,3			±0.5 ±2.5 ±1.0	
Zero-Code Error		VREF=1.25V		1	02		±2.5	LSB
		VREF=10V		2,3			±1.0 ±3.0 ±1.5	
<b>REFERENCE INPUT</b>		<b>4.75V ≤ V<sub>DD</sub> ≤ 16.5V</b>						
Reference Input Range	REF			1,2,3	All	1.25	V <sub>DD</sub> -3.5	V
Reference Input Resistance	RREF	Worst-case code		1,2,3	All	3.0		kΩ
Reference Input Capacitance	CREF	Worst-case code NOTE 2		4	All		250	pF
<b>COMPARATOR INPUT</b>		<b>4.75V ≤ V<sub>DD</sub> ≤ 16.5V</b>						
Comparator Input Range	V <sub>AIN</sub>			1,2,3	All	0	V <sub>DD</sub>	V
Comparator Input Bias Current	I <sub>B</sub>			1	All		300	nA
				2,3			400	
<b>DIGITAL INPUTS</b>		<b>4.75V ≤ V<sub>DD</sub> ≤ 16.5V</b> _____ <b>D0-D7, WR, CS</b>						
Input High Voltage	V <sub>IH</sub>			1,2,3	All	2.4		V
Digital Output Low Voltage	V <sub>IL</sub>			1,2,3	All		0.8	V
Input Leakage Current	I <sub>IN</sub>	V <sub>IN</sub> =0V and V <sub>DD</sub>		1,2,3	All	-1.0	+1.0	μA
Input Capacitance	C <sub>IN</sub>	NOTE 2		4	All		15	pF
<b>DIGITAL OUTPUTS</b>		<b>C0-C3, V<sub>CC</sub>=5V</b>						
Output High Voltage	V <sub>OH</sub>	I <sub>SOURCE</sub> =200μA		1,2,3	All	V <sub>CC</sub> -1		V
Output Low Voltage	V <sub>OL</sub>	I <sub>SINK</sub> =1.6mA		1,2,3	All		0.4	V

TEST	Symbol	CONDITIONS		Group A Subgroup	Device type	Limits Min	Limits Max	Units
		-55 °C ≤ T <sub>A</sub> ≤ +125 °C 1/ Unless otherwise specified						
<b>DYNAMIC PERFORMANCE</b>								
Digital Input to Comparator Out Delay	t <sub>DCO</sub>	NOTE 3		4,5,6	All		2.0	μs
Analog Input to Comparator Out Delay	t <sub>ACO</sub>	NOTE 4		4,5,6	All		1.5	μs
CS to WR Setup Time	t <sub>CS</sub>			9,10,11	All	0		ns
CS to WR Hold Time	t <sub>CH</sub>			9,10,11	All	0		ns
Address to WR to Setup Time	t <sub>AS</sub>			9,10,11	All	50		ns
Address to WR to Hold Time	t <sub>AH</sub>			9,10,11	All	5		ns
Data Valid to WR to Setup Time	t <sub>DS</sub>			9,10,11	All	50		ns
Data Valid after WR to Hold Time	t <sub>DH</sub>			9,10,11	All	5		ns
WRITE Pulse Width	t <sub>WR</sub>			9,10,11	All	120		ns
<b>POWER SUPPLIES</b>								
V <sub>DD</sub> Range	V <sub>DD</sub>			1,2,3	All	4.75	16.5	V
V <sub>CC</sub> Range	V <sub>CC</sub>			1,2,3	All	4.75	V <sub>DD</sub> +0.3	V
Supply Current	I <sub>DD</sub>			1,2,3	All		10	mA
Logic Supply	I <sub>CC</sub>			1,2,3	All		10	μA

NOTE 1: V<sub>DD</sub>=V<sub>CC</sub>=+4.75V, REF=0V or V<sub>DD</sub>=V<sub>CC</sub>=+16.5V, REF=+10V, GND=0V unless otherwise specified.

NOTE 2: Guaranteed by design but not production tested.

NOTE 3: V<sub>DD</sub>=5V, differential comparator input voltage changes by 1.25 with 5mV overdrive. V<sub>IN</sub> must be less than V<sub>DD</sub> or longer propagation delays will result.

NOTE 4: Not tested but guaranteed by correlation to T<sub>DCO</sub>.

#### TERMINAL CONNECTIONS:

Pin	R24	L28	Pin	R24	L28
1	C1	NC	15	D3	NC
2	C0	C1	16	D2	D5
3	V <sub>CC</sub>	C0	17	D1	D4
4	AIN1	V <sub>CC</sub>	18	D0	D3
5	AIN0	AIN1	19	REF	D2
6	GND	AIN0	20	AIN3	D1
7	CS	GND	21	AIN2	D0
8	WR	NC	22	V <sub>DD</sub>	NC
9	A1	CS	23	C3	REF
10	A0	WR	24	C2	AIN3
11	D7	A1	25		AIN2
12	D6	A0	26		V <sub>DD</sub>
13	D5	D7	27		C3
14	D4	D6	28		C2

**ORDERING INFORMATION:**

	Package	Pkg. Code	MAXIM PART #
01	24 pin CERDIP	R24	MAX516AMRG/883B
01	28 pin LCC	L28	MAX516AMLI/883B
02	24 pin CERDIP	R24	MAX516BMRG/883B
02	28 pin LCC	L28	MAX516BMLI/883B

**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, 4, 5, 6, 9, 10, 11
Group A Test Requirements Method 5005	1, 2, 3, 4, 5, 6, 9, 10, 11
Group C and D End-Point Electrical Parameters Method 5005	1

\* PDA applies to Subgroup 1 only.