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LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED																																																																																						
E	Convert to standardized military drawing format. Change CAGE code to 67268. 1.4: Change minimum operating voltage from 9.7 V dc to 10.45 V dc. Editorial changes throughout.	89 JAN 26	<i>M.A. Felt</i>																																																																																						
<p><b>CURRENT CAGE CODE 67268</b></p> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <tr><td>REV</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>SHEET</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>REV</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>SHEET</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td rowspan="2">REV STATUS OF SHEETS</td> <td>REV</td> <td>E</td><td>E</td><td>E</td><td>E</td><td>E</td><td>E</td><td>E</td><td>E</td><td>E</td><td></td><td></td> </tr> <tr> <td>SHEET</td> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td></td><td></td> </tr> </table>													REV													SHEET													REV													SHEET													REV STATUS OF SHEETS	REV	E	E	E	E	E	E	E	E	E			SHEET	1	2	3	4	5	6	7	8	9		
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PMIC N/A  <b>STANDARDIZED MILITARY DRAWING</b>  THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE  AMSC N/A			PREPARED BY <i>Joseph A. Herby</i> CHECKED BY <i>Ray Mounin</i> APPROVED BY <i>M.A. Felt</i>			DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444  MICROCIRCUITS, LINEAR, HIGH SPEED VOLTAGE COMPARATOR, MONOLITHIC SILICON			DRAWING APPROVAL DATE 19 JANUARY 1979  REVISION LEVEL E			SIZE <b>A</b>  SHEET 1 OF 9																																																																													
			CAGE CODE <b>14933</b>			<b>78018</b>																																																																																			

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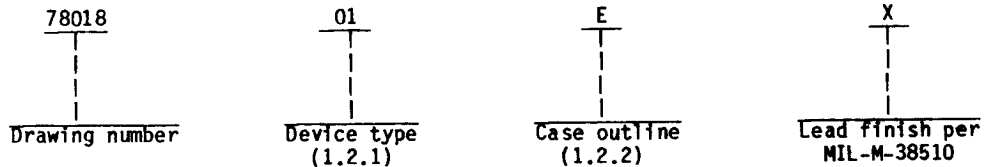
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5962-E1065

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:



1.2.1 Device type. The device type shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	AM686	Voltage comparator

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
E	D-2 (16-lead, .840" x .310" x .200"), dual-in-line package
I	A-2 (10-lead, .370" x .185"), can package

1.3 Absolute maximum ratings. 1/

Positive supply voltage range (V+) - - - - -	0 V dc to +7 V dc
Negative supply voltage range (V-) - - - - -	-7 V dc to 0 V dc
Input voltage range (V <sub>I</sub> ) - - - - -	-4 V dc to +4 V dc
Storage temperature range - - - - -	-65°C to +150°C
Maximum power dissipation (P <sub>D</sub> ):	
Case E - - - - -	400 mW
Case I - - - - -	350 mW
Lead temperature (soldering, 10 seconds) - - - - -	+300°C
Junction temperature (T <sub>J</sub> ) - - - - -	+150°C
Differential input voltage (V <sub>ID</sub> ) - - - - -	-6 V dc to +6 V dc
Thermal resistance, junction-to-case (θ <sub>JC</sub> ) - - - - -	See MIL-M-38510, appendix C
Thermal resistance, junction-to-ambient (θ <sub>JA</sub> ):	
Case E - - - - -	87°C/W
Case I - - - - -	146°C/W

1.4 Recommended operating conditions.

Positive supply voltage (V+) - - - - -	5 V dc
Negative supply voltage (V-) - - - - -	-6 V dc
Minimum operating voltage (V+ to V-) - - - - -	10.45 V dc
Ambient operating temperature (T <sub>A</sub> ) - - - - -	-55°C to +125°C
LATCH ENABLE:	
Input high voltage (V <sub>IH</sub> ) - - - - -	0 V dc
Input low voltage (V <sub>IL</sub> ) - - - - -	-2 V dc

1/ The device performance shall not be impaired when subject to maximum rating conditions.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	78018
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## 2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

### SPECIFICATION

#### MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

### STANDARD

#### MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

## 3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table 1 and apply over the full ambient operating temperature range.

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C < T <sub>A</sub> < +125°C unless otherwise specified 1/	Group A subgroups	Limits		Unit
				Min	Max	
Input offset voltage	V <sub>IO</sub>	R <sub>S</sub> = 100Ω, V <sub>CM</sub> = 0 V	1		2	mV
			2, 3		3	
Input offset voltage average temperature coefficient 2/	$\frac{\Delta V_{IO}}{\Delta T}$	R <sub>S</sub> ≤ 100Ω	2, 3		10	μV/°C
Input offset current	I <sub>IO</sub>	R <sub>S</sub> = 100Ω, V <sub>CM</sub> = 2.7 V dc	1, 2		1.0	μA
			3		1.6	
Input bias current	I <sub>IB</sub>	R <sub>S</sub> = 100Ω, V <sub>CM</sub> = 2.7 V dc	1, 2		10	μA
			3		16	
Input voltage range	V <sub>CM</sub>		1, 2, 3	-3.3	2.7	V
Input voltage common mode rejection ratio	CMRR	R <sub>S</sub> = 100Ω, -3.3 V ≤ V <sub>CM</sub> ≤ 2.7 V	4, 5, 6	80		dB
Power supply rejection ratio	PSRR	R <sub>S</sub> = 100Ω, ΔV <sup>+</sup> = ±5 % ΔV <sup>-</sup> = ±5 %	4, 5, 6	60		dB
Output high voltage	V <sub>OH</sub>	I <sub>LOAD</sub> = -1.0 mA, V <sup>+</sup> = +4.5 V V <sup>-</sup> = -5.4 V	1, 2, 3	2.5		V
Output low voltage	V <sub>OL</sub>	I <sub>LOAD</sub> = 10 mA, V <sup>+</sup> = +5.5 V V <sup>-</sup> = -6.6 V	1, 2, 3		0.5	V
Positive supply current	I <sup>+</sup>		1, 2, 3		40	mA
Negative supply current	I <sup>-</sup>		1, 2, 3		-32	mA

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T <sub>A</sub> < +125°C unless otherwise specified 1/	Group A subgroups	Limits		Unit
				Min	Max	
Propagation delay, input to output high	t <sub>PD</sub> <sup>+</sup>	3/ 4/	9, 11 10		12 15	ns
Propagation delay, input to output low	t <sub>PD</sub> <sup>-</sup>	3/ 4/	9, 11 10		12 15	ns
Difference in propagation delay between outputs	Δt <sub>PD</sub>	T <sub>A</sub> = +25°C 3/ 4/	9		2	ns

1/ Unless otherwise specified V<sup>+</sup> = 5.0 V, V<sup>-</sup> = -6.0 V and latch enable input is at V<sub>OL</sub>.

2/ Guaranteed if not tested.

3/ V<sub>IN</sub> = 100 mV, V<sub>OD</sub> = 5.0 mV, C<sub>L</sub> = 15 pF, t<sub>PD</sub><sup>+</sup> tested on output of Q, t<sub>PD</sub><sup>-</sup> on output of Q.

4/ The outputs are unstable when biased into their linear range. To prevent oscillation, the rate of change of the input signal as it passes through the threshold of the comparator must be at least 1 V/μs. For slower input signals, a small amount of external positive feedback may be applied to give a few millivolts of hysteresis.

3.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.8 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

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Device type	01	
Case outlines	I	E
Terminal number	Terminal symbol	
1	V+	NC
2	NC	NC
3	NONINVERTING INPUT	V+
4	INVERTING INPUT	NONINVERTING INPUT
5	V-	INVERTING INPUT
6	LATCH ENABLE	V-
7	GROUND	NC
8	Q OUTPUT	NC
9	$\bar{Q}$ OUTPUT	NC
10	NC	NC
11		LATCH ENABLE
12		GROUND
13		Q OUTPUT
14		$\bar{Q}$ OUTPUT
15		NC
16		NC

NC = no connection

FIGURE 1. Terminal connections.

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**4. QUALITY ASSURANCE PROVISIONS**

**4.1 Sampling and inspection.** Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

**4.2 Screening.** Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

- a. Burn-in test, method 1015 of MIL-STD-883.
  - (1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).
  - (2)  $T_A = +125^{\circ}\text{C}$ , minimum.
- b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

**4.3 Quality conformance inspection.** Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

**4.3.1 Group A inspection.**

- a. Tests shall be as specified in table II herein.
- b. Subgroups 7 and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

**4.3.2 Groups C and D inspections.**

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
  - (1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).
  - (2)  $T_A = +125^{\circ}\text{C}$ , minimum.
  - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

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TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004)	1*, 2, 3, 4
Group A test requirements (method 5005)	1, 2, 3, 4, 5, 6, 9, 10**, 11**
Groups C and D end-point electrical parameters (method 5005)	1

\* PDA applies to subgroup 1.

\*\* Subgroups 10 and 11, if not tested, shall be guaranteed to the specified limits in table I.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

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6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>
7801801EX	34335	AM686/BEA
7801801IX	34335	AM686/BIC

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number

34335

Vendor name and address

Advanced Micro Devices, Incorporated  
901 Thompson Place  
Sunnyvale, CA 94086

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