

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Update boilerplate paragraphs to current requirements. - ro	12-08-29	C. SAFFLE

**CURRENT DESIGN ACTIVITY CAGE CODE 16236  
HAS CHANGED NAMES TO:  
DLA LAND AND MARITIME  
COLUMBUS, OHIO 43218-3990**

Prepared in accordance with ASME Y14.24

Vendor item drawing

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REV STATUS OF PAGES	REV	A	A	A	A	A	A	A	A	A	A	A								
	PAGE	1	2	3	4	5	6	7	8	9	10									

PMIC N/A	PREPARED BY RICK OFFICER	DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990																		
Original date of drawing YY-MM-DD  05-11-15	CHECKED BY TOM HESS	TITLE MICROCIRCUIT, DIGITAL, TEMPERATURE SENSOR, MONOLITHIC SILICON																		
	APPROVED BY RAYMOND MONNIN																			
	SIZE A	CODE IDENT. NO. 16236	DWG NO. <b>V62/06608</b>																	
	REV	A	PAGE 1 OF 10																	

1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance temperature sensor microcircuit, with an operating temperature range of -40°C to +125°C.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:

<u>V62/06608</u> Drawing number	-	<u>01</u> Device type (See 1.2.1)	<u>X</u> Case outline (See 1.2.2)	<u>E</u> Lead finish (See 1.2.3)
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1.2.1 Device type(s).

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	TMP121-EP	Temperature sensor
02	TMP123-EP	Temperature sensor

1.2.2 Case outline(s). The case outline(s) are as specified herein.

<u>Outline letter</u>	<u>Number of pins</u>	<u>JEDEC PUB 95</u>	<u>Package style</u>
X	6	MO-178-AB	Plastic small outline package

1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacture:

<u>Finish designator</u>	<u>Material</u>
A	Hot solder dip
B	Tin-lead plate
C	Gold plate
D	Palladium
E	Gold flash palladium
Z	Other

1.3 Absolute maximum ratings. 1/

Power supply voltage (V <sub>+</sub> ) .....	7.0 V
Input voltage range (V <sub>IN</sub> ) .....	-0.3 V to 7.0 V 2/
Input current .....	10 mA
Operating temperature range (T <sub>A</sub> ) .....	-55°C to +150°C
Storage temperature range (T <sub>STG</sub> ) .....	-60°C to 150°C
Maximum junction temperature (T <sub>J</sub> ) .....	150°C
Leading temperature (soldering) .....	300°C
Thermal resistance, junction to ambient (θ <sub>JA</sub> ) .....	200°C/W typical

1/ Stresses beyond those listed under "absolute maximum rating" 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 under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

2/ Input voltage rating applies to all device types input voltages.

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	SIZE <b>A</b>	CODE IDENT NO. <b>16236</b>	DWG NO. <b>V62/06608</b>
		REV    A	PAGE    2

1.4 Recommended operating conditions. 3/

Supply voltage range (V+) ..... 2.7 V to 5.5 V  
Operating free-air temperature range (T<sub>A</sub>) ..... -40°C to +125°C

2. APPLICABLE DOCUMENTS

JEDEC Solid State Technology Association

JEDEC PUB 95 – Registered and Standard Outlines for Semiconductor Devices

(Applications for copies should be addressed to the Electronic Industries Alliance, 2500 Wilson Boulevard, Arlington, VA 22201-3834 or online at <http://www.jedec.org>)

3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer's part number as shown in 6.3 herein and as follows:

- A. Manufacturer's name, CAGE code, or logo
- B. Pin 1 identifier
- C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer's part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

3.5 Diagrams.

3.5.1 Case outline. The case outline shall be as shown in 1.2.2 and figure 1.

3.5.2 Terminal connections. The terminal connections shall be as shown in figure 2.

3.5.3 Logic diagram. The logic diagram shall be as shown in figure 3.

3/ Use of this product beyond the manufacturers design rules or stated parameters is done at the user's risk. The manufacturer and/or distributor maintain no responsibility or liability for product used beyond the stated limits.

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/06608</b>
		REV    A	PAGE    3

TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions $V_{DD} = 2.7\text{ V to }5.5\text{ V}$	Temperature, $T_A$	Device type	Limits		Unit
					Min	Max	
Temperature input section.							
Range			-40°C to +125°C	01, 02			
Accuracy (temperature error)			-25°C to +85°C	01, 02		±1.5	°C
			-40°C to +125°C			±2	
			-40°C to +150°C		±1.5 typical		
Accuracy versus supply			-40°C to +125°C	01, 02	0.1 typical		°C/V
Resolution			-40°C to +125°C	01, 02	±0.0625 typical		°C
Digital input/output section.							
High input logic level	$V_{IH}$		-40°C to +125°C	01, 02	0.7 (V+)		V
Low input logic level	$V_{IL}$		-40°C to +125°C	01, 02		0.3 (V+)	V
Input current, SO, SCK, $\overline{CS}$	$I_{IN}$	$0\text{ V} \leq V_{IN} \leq V+$	-40°C to +125°C	01, 02		±1	µA
Output logic levels	$V_{OL\ SO}$	$I_{SINK} = 3\text{ mA}$	-40°C to +125°C	01, 02		0.4	V
	$V_{OH\ SO}$	$I_{SOURCE} = 2\text{ mA}$	-40°C to +125°C	01, 02	(V+)-0.4		
Resolution			-40°C to +125°C	01, 02	12 typical		bits
Input capacitance, SO, SCK, $\overline{CS}$	$C_{IN}$		-40°C to +125°C	01, 02	2.5 typical		pF
Conversion time		12 bit	-40°C to +125°C	01, 02		320	ms
Conversion period <u>2/</u>		12 bit	-40°C to +125°C	01, 02		640	ms

See footnotes at end of table.

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	SIZE <b>A</b>	CODE IDENT NO. <b>16236</b>	DWG NO. <b>V62/06608</b>
		REV <b>A</b>	PAGE <b>4</b>

TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions $V_{DD} = 2.7 \text{ V to } 5.5 \text{ V}$	Temperature, $T_A$	Device type	Limits		Unit
					Min	Max	
Power supply section.							
Operating range			-40°C to +125°C	01, 02	2.7	5.5	V
Quiescent current	$I_Q$	Serial bus inactive	-40°C to +125°C	01, 02		50	$\mu\text{A}$
Shutdown current	$I_{SD}$	Serial bus inactive	-40°C to +125°C	01		1	$\mu\text{A}$
			-40°C to +125°C	02		3	
Temperature range section.							
Specified range			-40°C to +125°C	01, 02			
Operating range			-55°C to +150°C	01, 02			
Storage range			-60°C to +150°C	01, 02			
Thermal resistance	$\theta_{JA}$	Case X	-40°C to +125°C	01, 02	200 typical		°C/W

1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

2/ Period indicates time between conversion starts.

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/06608</b>
		REV A	PAGE 5

Case X

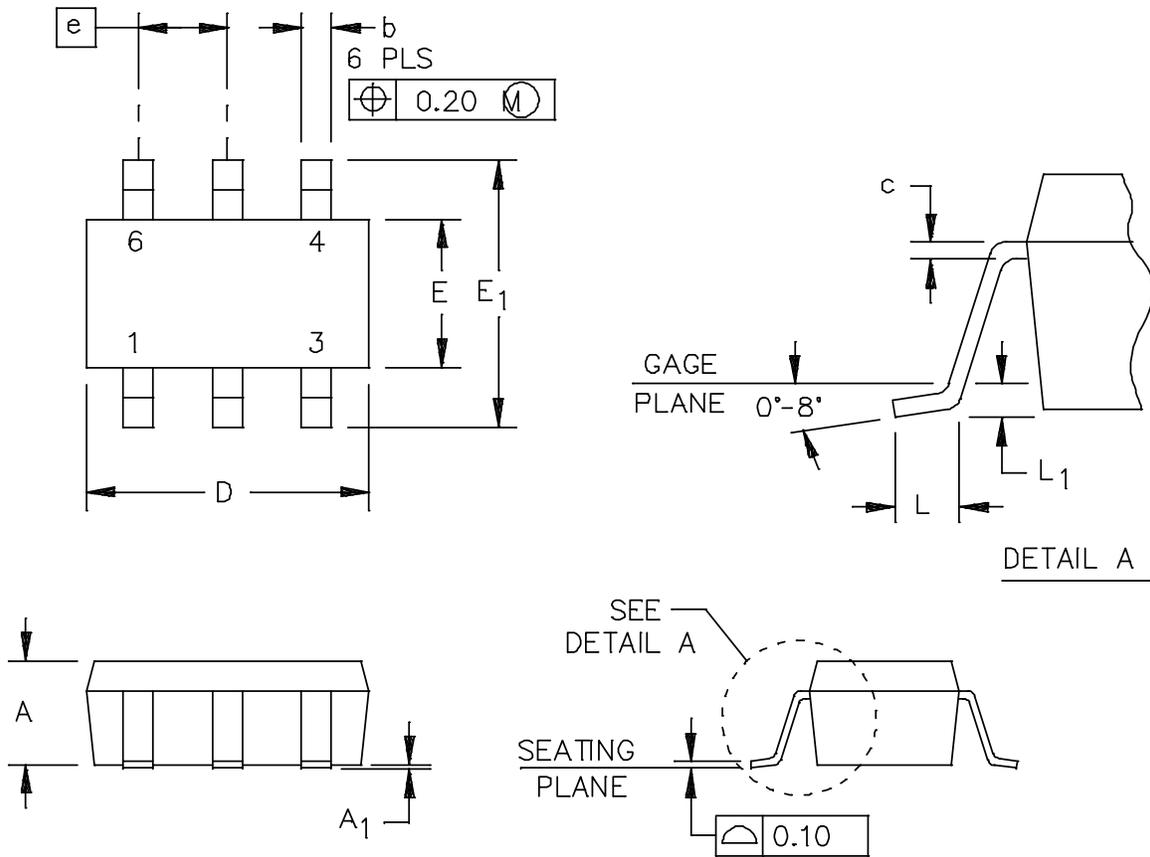


FIGURE 1. Case outline.

<p><b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b></p>	<p><b>SIZE A</b></p>	<p><b>CODE IDENT NO. 16236</b></p>	<p><b>DWG NO. V62/06608</b></p>
		<p>REV A</p>	<p>PAGE 6</p>

Case X

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	---	0.057	---	1.45
A1	0.000	0.005	0.00	0.15
b	0.009	0.019	0.25	0.50
c	0.003	0.008	0.08	0.22
D	0.108	0.120	2.75	3.05
E	0.057	0.068	1.45	1.75
E1	0.102	0.118	2.60	3.00
e	0.037 BSC		0.95 BSC	
L	0.011	0.021	0.30	0.55
L1	0.009 BSC		0.25 BSC	
n	6		6	

NOTES:

1. Controlling dimensions are millimeter, inch dimensions are given for reference only.
2. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 mm ( 0.005 inch ) per side.
3. Leads 1, 2, 3 may be wider than leads 4, 5, 6 for package orientation.
4. Falls within JEDEC MO-178 variation AB, except minimum lead width.

FIGURE 1. Case outline – Continued.

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/06608</b>
		REV A	PAGE 7

Device types	01	02
Case outline	X	
Terminal number	Terminal symbol	
1 (See note 1)	NC (See note 2)	GND
2	GND	NC (See note 2)
3	V+	V+
4	SCK	SCK
5	$\overline{\text{CS}}$	$\overline{\text{CS}}$
6	SO	SO

Terminal symbol	I / O	Description
SCK	I	Serial clock.
GND	---	Ground.
$\overline{\text{CS}}$	I	Chip select
SO	O	Serial output
V+	---	Supply voltage.
NC	---	No connection.

NOTES:

1. Pin 1 of case X package is determined by orienting the package marking.
2. Pins labeled NC should be left floating or connected to GND.

FIGURE 2. Terminal connections.

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/06608</b>
		REV A	PAGE 8

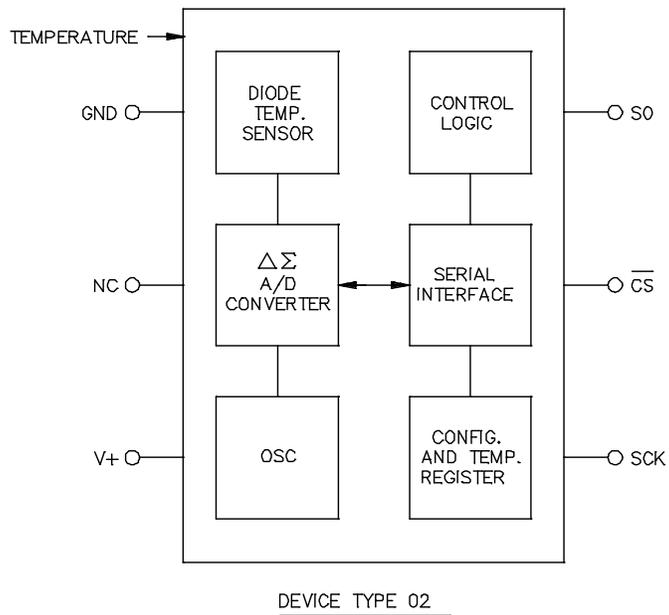
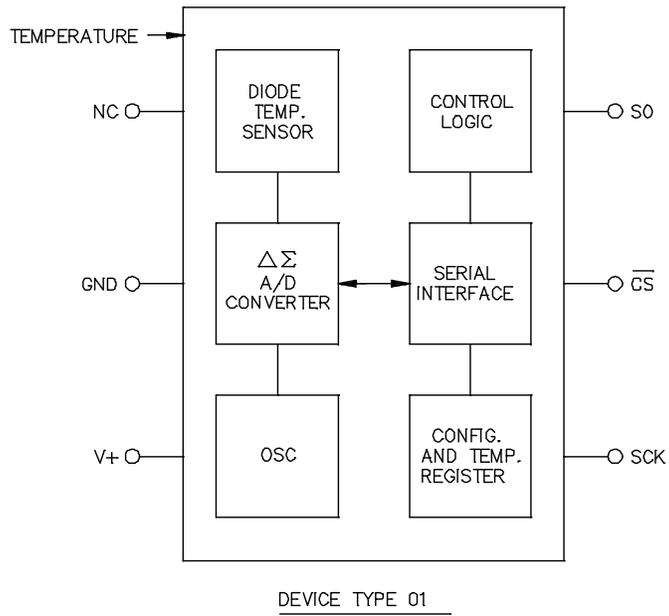


FIGURE 3. Logic diagram.

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/06608</b>
		REV    A	PAGE    9

4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer's standard commercial practices for electrostatic discharge sensitive devices.

6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 1 minimum.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer's data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at <http://www.landandmaritime.dla.mil/Programs/Smcr/>.

Vendor item drawing administrative control number <u>1/</u>	Device manufacturer CAGE code	Package <u>2/</u>	Package marking	Vendor part number
V62/06608-01XE	01295	SOT23-6 (DBV)	121E	TMP121AQDBVREP
V62/06608-02XE	01295	SOT23-6 (DBV)	123E	TMP123AQDBVREP

1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.

2/ Available in reel of 3000.

3/ Product preview. For additional ordering and product information, please contact the manufacturer.

CAGE code

01295

Source of supply

Texas Instruments, Inc.  
 Semiconductor Group  
 8505 Forest Lane  
 P.O. Box 660199  
 Dallas, TX 75243  
 Point of contact: U.S. Highway 75 South  
 P.O. Box 84, M/S 853  
 Sherman, TX 75090-9493

<b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/06608</b>
		<b>REV     A</b>	<b>PAGE    10</b>