REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Update boilerplate paragraphs to current requirements. - ro	12-08-29	C. SAFFLE
B	Update maximum “L” dimension from 0.55 mm to 0.60 mm as specified under figure 1. Update document paragraphs to current requirements. - ro	19-02-07	C. SAFFLE
C	Add typical limits to tested parameters as specified under Table I. Update Figure 1 JEDEC package from MO-178-AB to MO-178. Update document to current requirements. - ro	24-08-15	J. ESCHMEYER

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

Revision Status of Sheets

REV																						
SHEET																						
REV	C	C	C	C	C	C	C	C	C	C												
SHEET	1	2	3	4	5	6	7	8	9	10												

PMIC N/A

Original date of drawing
YY-MM-DD
05-11-15

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TITLE
MICROCIRCUIT, DIGITAL, TEMPERATURE SENSOR, MONOLITHIC SILICON

SIZE	CAGE CODE
A	16236

DWG NO. **V62/06608**

REV C

PAGE 1 OF 10

AMSC N/A

5962-V101-24

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

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:

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

1.2.1 Device types.

Device type	Generic	Circuit function
01	TMP121-EP	Temperature sensor
02	TMP123-EP	Temperature sensor

1.2.2 Case outline. The case outline are as specified herein.

Outline letter	Number of pins	JEDEC PUB 95	Package style
X	6	MO-178	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 manufacturer:

Finish designator	Material
A	Hot solder dip
B	Tin-lead plate
C	Gold plate
D	Palladium
E	Gold flash palladium
F	Tin-lead alloy (BGA/CGA)
Z	Other

1.3 Absolute maximum ratings. 1/

Power supply voltage (V+)	7.0 V
Input voltage range (V_{IN})	-0.3 V to 7.0 V 2/
Input current	10 mA
Operating temperature range (T_A)	-55°C to +150°C
Storage temperature range (T_{STG})	-60°C to 150°C
Maximum junction temperature (T_J)	150°C
Leading temperature (soldering)	300°C
Thermal resistance, junction to ambient (θ_{JA})	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.

1.4 Recommended operating conditions. 3/

Supply voltage range (V+) ..... 2.7 V to 5.5 V
Operating free-air temperature range (T_A) ..... -40°C to +125°C

2. APPLICABLE DOCUMENTS

JEDEC Solid State Technology Association

JEDEC PUB 95 – Registered and Standard Outlines for Semiconductor Devices

(Copies of these documents are available online at https://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.

TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions V_{DD} = 2.7 V to 5.5 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
					±0.5 typical		
			-40°C to +125°C			±2	
					±1 typical		
			-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 V ≤ V_{IN} ≤ V+	-40°C to +125°C	01, 02		±1	µA
Output logic levels	V_{OL} SO	I_{SINK} = 3 mA	-40°C to +125°C	01, 02		0.4	V
	V_{OH} SO	I_{SOURCE} = 2 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
					240 typical		
Conversion period 2/		12 bit	-40°C to +125°C	01, 02		640	ms
					480 typical		

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions V_{DD} = 2.7 V to 5.5 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	µA
					35 typical		
Shutdown current	I_{SD}	Serial bus inactive	-40°C to +125°C	01		1	µA
					0.1 typical		
			-40°C to +125°C	02		3	
					0.1 typical		
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	θ_{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.

Case X

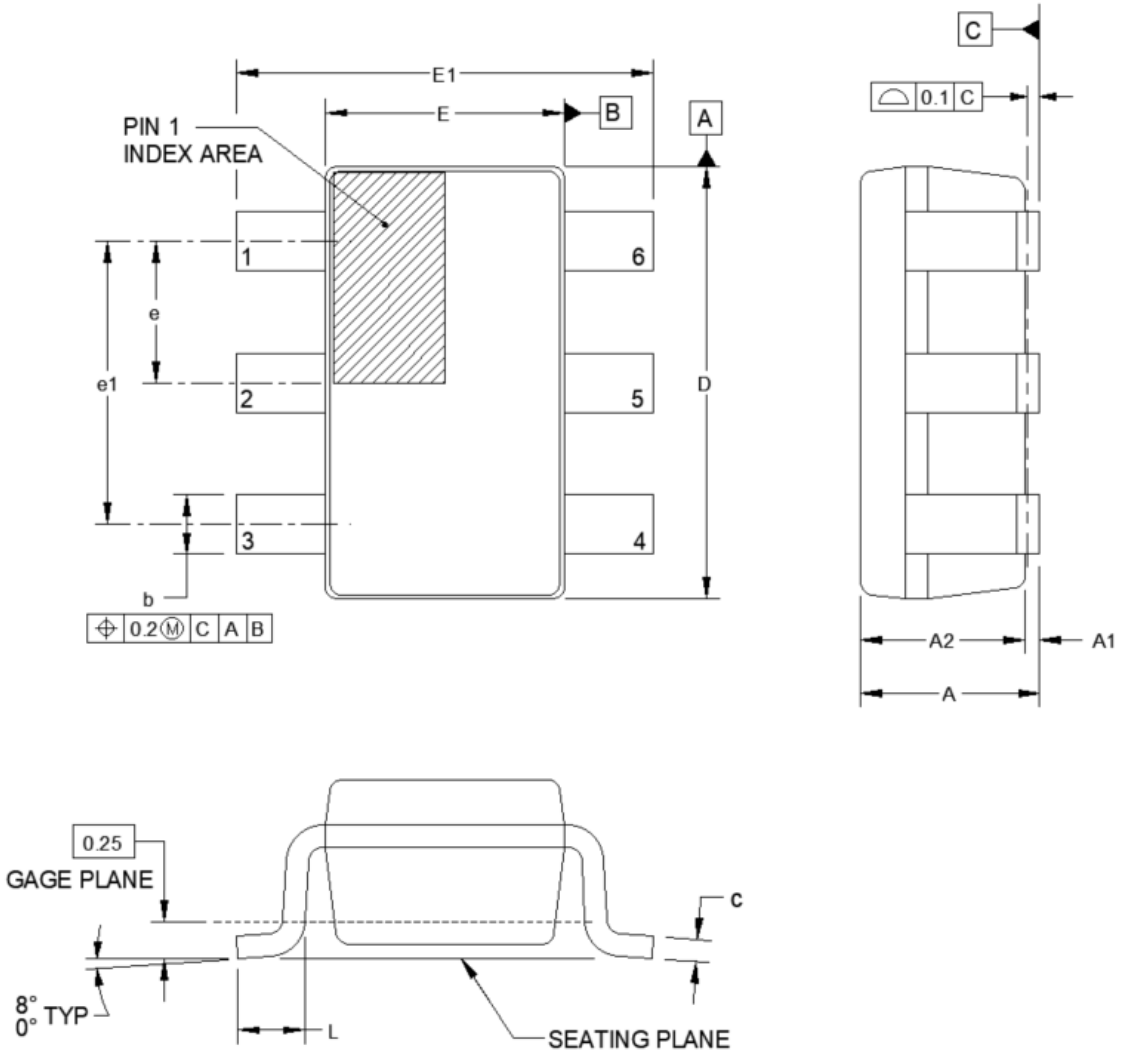


FIGURE 1. Case outline.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CAGE CODE 16236	DWG NO. V62/06608
		REV C	PAGE 6

Symbol	Dimensions			
	Inches		Millimeters	
	Minimum	Maximum	Minimum	Maximum
A	---	.057	---	1.45
A1	.000 TYP	.006 TYP	0.00 TYP	0.15 TYP
A2	.043 REF		1.1 REF	
b	.010	.020	0.25	0.50
c	.003 TYP	.009 TYP	0.08 TYP	0.22 TYP
D	.108	.120	2.75	3.05
E	.057	.069	1.45	1.75
E1	.102	.118	2.60	3.00
e	.037 BSC		0.95 BSC	
e1	.075 BSC		1.90 BSC	
L	.012 TYP	.024 TYP	0.30 TYP	0.60 TYP

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 0.25 mm (.010 inch) per side.
3. Leads 1, 2, 3 may be wider than leads 4, 5, 6 for package orientation.
4. Falls within reference to JEDEC MO-178.

FIGURE 1. Case outline - Continued.

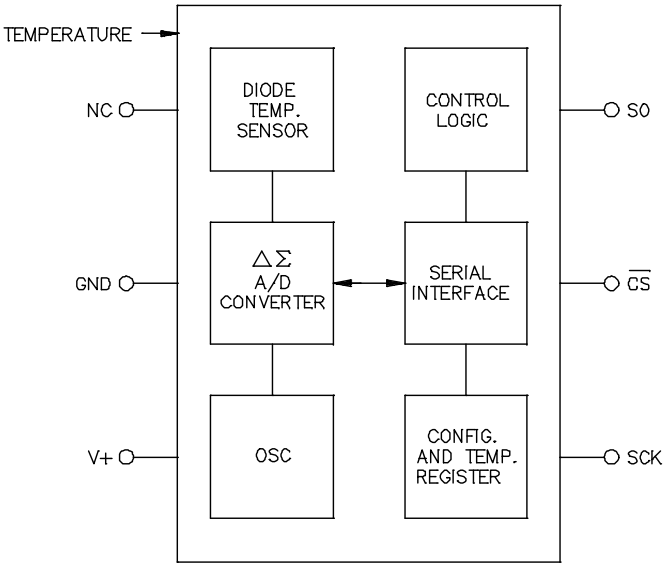
Device types	01	02
Case outline	X	
Terminal number	Terminal symbol	
1 (See note 1)	NC (See note 2)	GND
2	GND	NC (See note 2)
3	V+	V+
4	SCK	SCK
5	$\overline{CS}$	$\overline{CS}$
6	SO	SO

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

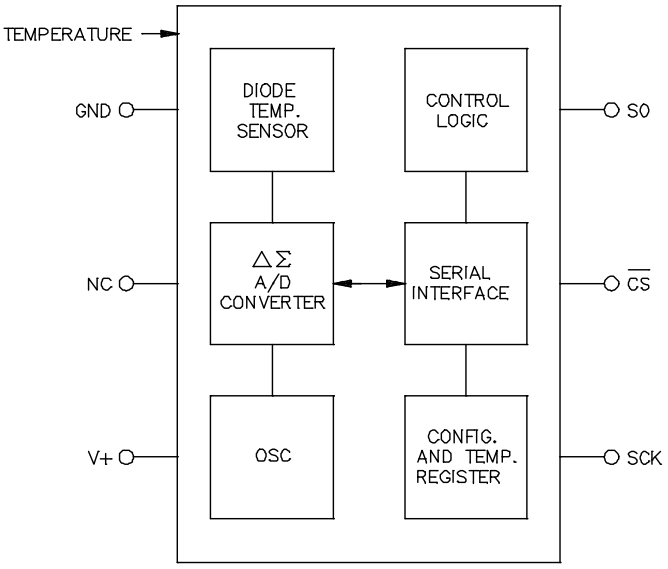
NOTES:

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.



DEVICE TYPE 01



DEVICE TYPE 02

FIGURE 3. Logic diagram.

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 https://landandmaritimeapps.dla.mil/programs/smcr/.

Vendor item drawing administrative control number 1/	Device manufacturer CAGE code	Package 2/	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.

CAGE code	Source of supply
01295	Texas Instruments, Incorporated 12500 TI Blvd. Dallas, TX 75243