

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Add the word, "LINEAR" to the title block. Add notes to figure 1. Make changes to 6.3. Update the boilerplate paragraphs. - ro	09-02-11	R. HEBER
B	Update JEDEC case outline package from MS-012 to MS-012-AA along with dimensions b, c, E, and L. Update document paragraphs to current requirements. - ro	19-04-23	R. OFFICER
C	Delete IOH and IOL tests from paragraph 1.3. Delete paragraph 1.5 entirely. Make change to Figure 4 Timing waveform. Add quantity units to paragraph 6.3. - ro	25-02-07	L. LEEPER BRANHAM



**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

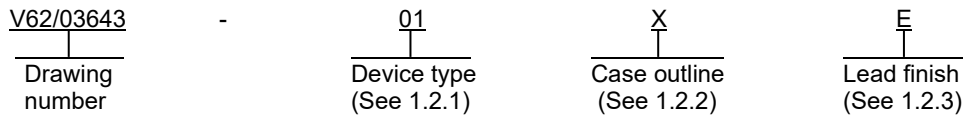
Revision Status of Sheets													
REV													
SHEET													
REV	C	C	C	C	C	C	C	C	C	C	C		
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	

PMIC N/A Original date of drawing 03-08-11	PREPARED BY RICK OFFICER				DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43218-3990 https://www.dla.mil/landandmaritime												
	CHECKED BY TOM HESS				TITLE MICROCIRCUIT, LINEAR, DUAL, MICROPOWER VOLTAGE COMPARATOR, MONOLITHIC SILICON												
	APPROVED BY RAYMOND MONNIN																
	SIZE A		CAGE CODE 16236				DWG NO. V62/03643										
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1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance dual, micropower voltage comparator microcircuit, with an operating temperature range of -55°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:



1.2.1 Device type.

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	TLC3702-EP	Dual, micropower voltage comparator

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

<u>Outline letter</u>	<u>Number of pins</u>	<u>JEDEC PUB 95</u>	<u>Package style</u>
X	8	MS-012	Plastic surface mount

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

<u>Finish designator</u>	<u>Material</u>
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

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1.3 Absolute maximum ratings. 1/

Supply voltage range (VDD)	-0.3 V to 18 V 2/
Differential input voltage	±18 V 3/
Input voltage range (VI)	-0.3 V to VDD
Output voltage range (VO)	-0.3 V to VDD
Input current (II)	±5 mA
Output current (IO) (each output)	±20 mA
Total supply current into VDD	40 mA
Total current out of ground	40 mA
Storage temperature range	-65°C to +150°C
Lead temperature, 1.6 mm (1/16 inch) from case for 10 seconds	+260°C

1.4 Recommended operating conditions. 4/

Supply voltage range (VDD)	4 V minimum to 16 V maximum
Common mode input voltage (VIC)	0 V minimum to VDD – 1.5 V maximum
Operating free air temperature range (TA)	-55°C to +125°C

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- 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/ All voltage values, except differential voltages, are with respect to network ground.
- 3/ Differential voltages are at the IN+ with respect to IN-.
- 4/ 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.

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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.

3.5.4 Timing waveforms and test circuit. The timing waveforms and test circuit shall be as shown in figure 4.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions ^{1/} VDD = 5 V unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Input offset voltage	VIO	VDD = 5 V to 10 V, ^{2/} VIC = VICR min	25°C	01		5	mV
			-55°C to +125°C			10	
Input offset current	IIO	VIC = 2.5 V	25°C	01	1 typical		pA
			+125°C			15	nA
Input bias current	IIB	VIC = 2.5 V	25°C	01	5 typical		pA
			+125°C			30	nA
Common mode input voltage range	VICR		25°C	01	0 to [VDD - 1]		V
			-55°C to +125°C		0 to [VDD - 1.5]		
Common mode rejection ratio	CMRR	VIC = VICR min	25°C	01	84 typical		dB
			+125°C		83 typical		
			-55°C		82 typical		
Supply voltage rejection ratio	KSVR	VDD = 5 V to 10 V	25°C	01	85 typical		dB
			+125°C		85 typical		
			-55°C		82 typical		
High level output voltage	VOH	VID = 1 V, IOH = -4 mA	25°C	01	4.5		V
			+125°C		4.2		
Low level output voltage	VOL	VID = -1 V, IOH = -4 mA	25°C	01		300	mV
			+125°C			500	
Supply current (both comparators)	IDD	Outputs low, no load	25°C	01		40	µA
			-55°C to +125°C			90	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – continued.

Test	Symbol	Conditions ^{1/} V _{DD} = 5 V unless otherwise specified	Temperature, T _A	Device type	Limits		Unit
					Min	Max	
Propagation delay ^{3/} time, low-to-high level output	t _{PLH}	Overdrive = 2 mV, f = 10 kHz, C _L = 50 pF	25°C	01	4.5 typical		μs
		Overdrive = 5 mV, f = 10 kHz, C _L = 50 pF			2.7 typical		
		Overdrive = 10 mV, f = 10 kHz, C _L = 50 pF			1.9 typical		
		Overdrive = 20 mV, f = 10 kHz, C _L = 50 pF			1.4 typical		
		Overdrive = 40 mV, f = 10 kHz, C _L = 50 pF			1.1 typical		
Propagation delay ^{3/} time, high-to-low level output	t _{PHL}	V _I = 1.4 V step at IN+	25°C	01	1.1 typical		μs
		Overdrive = 2 mV, f = 10 kHz, C _L = 50 pF			4 typical		
		Overdrive = 5 mV, f = 10 kHz, C _L = 50 pF			2.3 typical		
		Overdrive = 10 mV, f = 10 kHz, C _L = 50 pF			1.5 typical		
		Overdrive = 20 mV, f = 10 kHz, C _L = 50 pF			0.95 typical		
		Overdrive = 40 mV, f = 10 kHz, C _L = 50 pF			0.65 typical		
		V _I = 1.4 V step at IN+			0.15 typical		
Fall time	t _F	Overdrive = 50 mV, f = 10 kHz, C _L = 50 pF	25°C	01	50 typical		ns
Rise time	t _R	Overdrive = 50 mV, f = 10 kHz, C _L = 50 pF	25°C	01	125 typical		ns

^{1/} All characteristics are measured with zero common-mode voltage unless otherwise noted.

^{2/} The offset voltage limits given are the maximum values required to drive the output up to 4.5 V or down to 0.3 V.

^{3/} Simultaneous switching of inputs causes degradation in output response.

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Case X

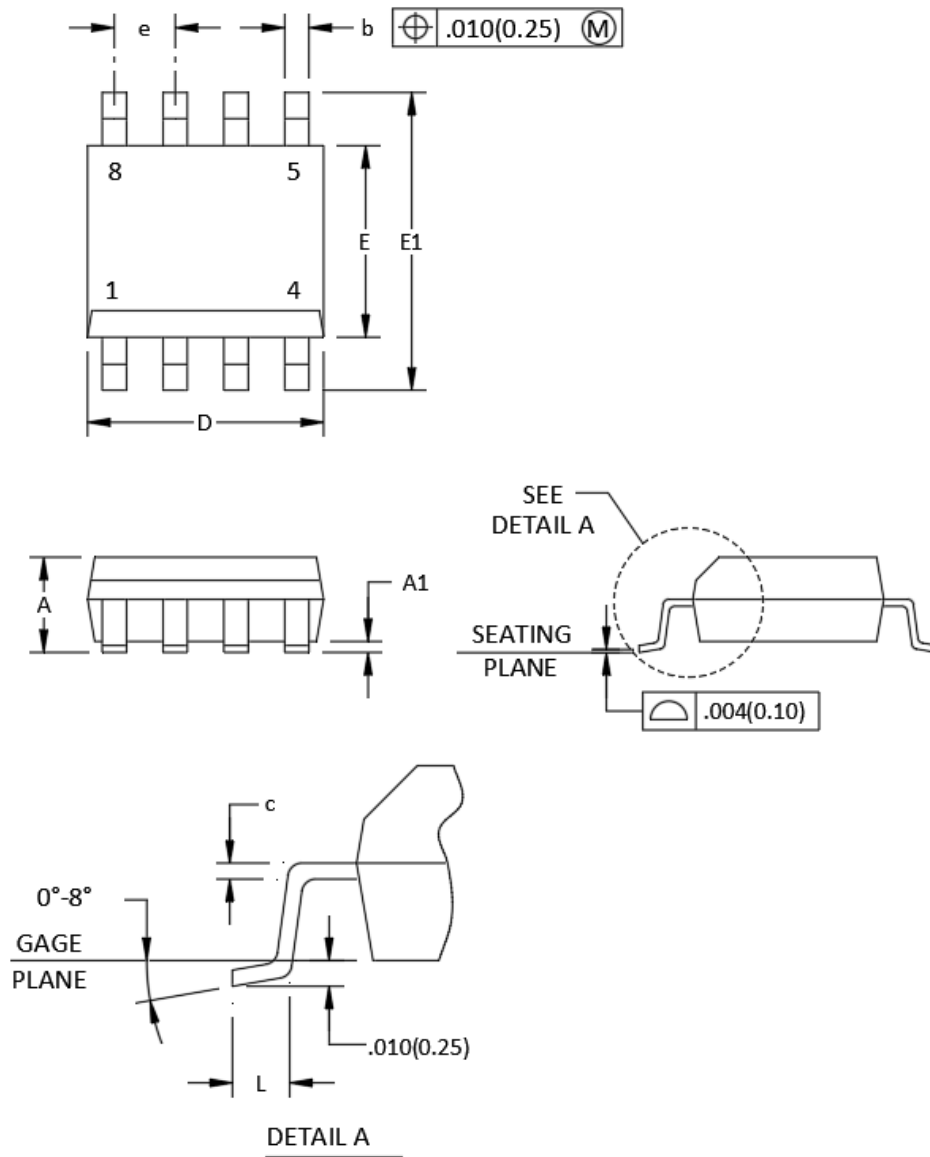


FIGURE 1. Case outline.

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Case X

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	---	0.069	---	1.75
A1	0.004	0.010	0.10	0.25
b	0.012	0.020	0.31	0.51
c	0.004	0.010	0.10	0.25
D	0.189	0.197	4.80	5.00
e	0.050 BSC		1.27 BSC	
E	0.150	0.157	3.81	4.00
E1	0.228	0.244	5.80	6.20
L	0.016	0.050	0.40	1.27
n	8 leads		8 leads	

NOTE:

1. Controlling dimensions are inch, millimeter dimensions are given for reference only.
2. Dimension D, body length does not include mold flash, protrusion, or gate burrs. Mold flash, protrusion, or gate burrs shall not exceed 0.006 inch (0.15 mm) each side.
3. Dimension E, body width does not include interlead flash. Interlead flash shall not exceed 0.017 inch (0.43 mm) each side.
4. Falls within reference to JEDEC MS-012-AA.

FIGURE 1. Case outline. – continued.

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Device type	01
Case outline	X
Terminal number	Terminal symbol
1	1 OUT
2	1 IN-
3	1 IN+
4	GND
5	2 IN+
6	2 IN-
7	2 OUT
8	VDD

FIGURE 2. Terminal connections.

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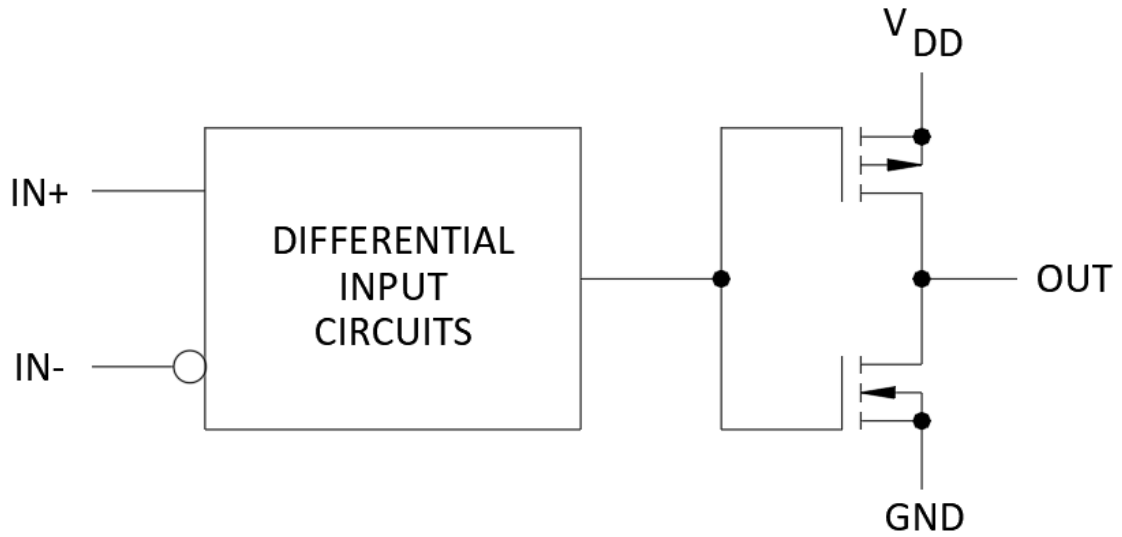


FIGURE 3. Block diagram.

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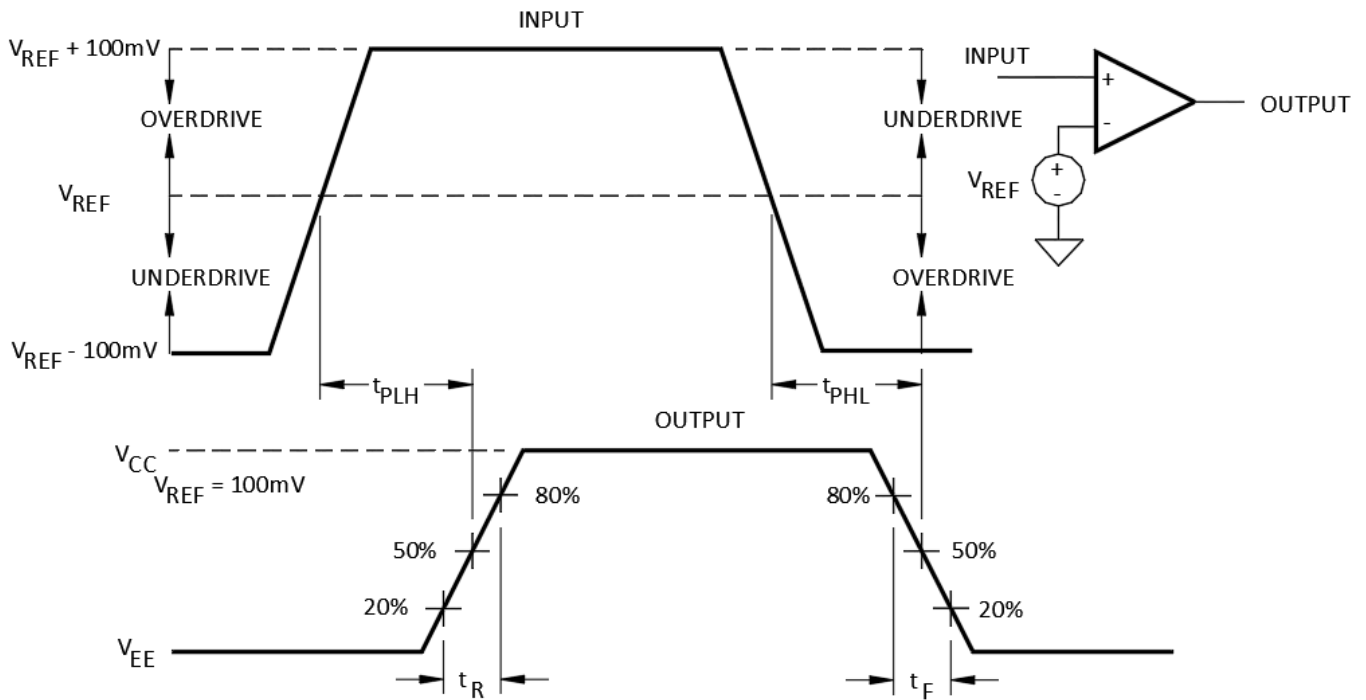


FIGURE 4. Timing waveforms and test circuit.

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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 <u>1/</u>	Device manufacturer CAGE code	Mode of transportation and quantity	Top side marking	Vendor part number
V62/03643-01XE	01295	Tape and reel, 2,500 units	3702ME	TLC3702MDREP

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

2/ Package drawings, standard packaging quantities, thermal data, symbolization, and printed circuit board (PCB) design guidelines are available from the manufacturer.

CAGE code

01295

Source of supply

Texas Instruments, Inc.
12500 TI Blvd.
Dallas, TX 75243

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