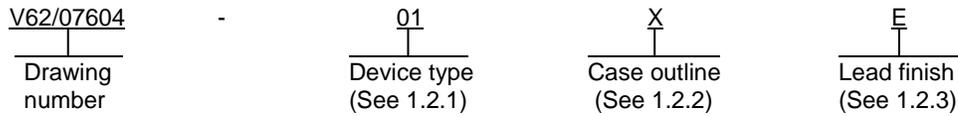




1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance nanowatt 1.8 V SOT23 comparators with voltage reference microcircuit, with an extended 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(s).

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	TLV3011-EP	Nanowatt 1.8 V SOT23 comparators with voltage reference
02	TLV3012-EP	Nanowatt 1.8 V SOT23 comparators with voltage reference.

1.2.2 Case outline(s). The case outlines 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	Plastic small outline
Y	6	MO-203	Plastic small outline

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
Z	Other

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1.3 <u>Absolute maximum ratings.</u> 1/	
Supply voltage.....	7.0 V maximum
Signal input terminals:	
Voltage 2/.....	-0.5 V to (V+) + 0.5 V
Current 2/.....	±10 mA maximum
Output short circuit .....	Continuous 3/
Operating temperature range ( T <sub>A</sub> ).....	-55°C to +125°C
Storage temperature range (T <sub>STG</sub> ).....	-65°C to 150°C
Junction temperature T <sub>J</sub> .....	150°C
Lead ambient temperature(soldering, 10 s) .....	300°C
ESD rating (Human Body Model) .....	2000 V

2. APPLICABLE DOCUMENTS

JEDEC – SOLID STATE TECHNOLOGY ASSOCIATION (JEDEC)

JEP95 – Registered and Standard Outlines for Semiconductor Devices

(Copies of these documents are available online at <http://www.jedec.org> or from JEDEC – Solid State Technology Association, 3103 North 10th Street, Suite 240–S, Arlington, VA 22201-2107).

. 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 Schematic diagram. The schematic diagram shall be as shown in figure 3.

3.5.4 Output low and high vs output current. The timing waveform shall be as shown in figure 4.

3.5.5 Timing waveform. The timing waveform shall be as shown in figure 5.

1/ 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 under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

2/ All voltage values are with respect to the network ground terminal.

3/ Short circuit to ground.

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TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions -55°C ≤ T <sub>A</sub> ≤ 125°C unless otherwise specified	Device type	Limits		Unit	
				Min	Max		
<b>Offset Voltage</b>							
Input offset voltage	V <sub>OS</sub>	V <sub>CM</sub> = 0 V, I <sub>O</sub> = 0 V	All		15	mV	
Input offset voltage vs temperature	dV <sub>OS</sub> /dT			±12 TYP		μV/°C	
Power rejection ratio	PSRR	V <sub>S</sub> = 1.8 V to 5.5 V			1000	μV/V	
<b>Input Bias Current</b>							
Input bias current	I <sub>S</sub>	V <sub>CM</sub> = V <sub>S</sub> /2	All	±10 TYP		pA	
Input offset current	I <sub>OS</sub>			±10 TYP		pA	
<b>Input Voltage Range</b>							
Common-mode voltage range	V <sub>CM</sub>		All	(V-) - 0.2	(V+) + 0.2	V	
Common-mode rejection ratio	CMRR	V <sub>CM</sub> = -0.2 V to (V+) - 1.5 V		60		dB	
		V <sub>CM</sub> = -0.2 V to (V+) + 0.2 V	54				
<b>Input Impedance</b>							
Common mode			All	10 <sup>13</sup>    2 TYP		Ω    pF	
Differential				10 <sup>13</sup>    4 TYP		Ω    pF	
<b>Switching Characteristics</b>							
Propagation delay time	Low to high	f = 10 kHz, V <sub>STEP</sub> = 1V, input overdrive = 10 mV	All	12 TYP		μs	
		f = 10 kHz, V <sub>STEP</sub> = 1V, input overdrive = 100 mV		6 TYP			
	High to low	f = 10 kHz, V <sub>STEP</sub> = 1V, input overdrive = 10 mV		13.5 TYP			
		f = 10 kHz, V <sub>STEP</sub> = 1V, input overdrive = 100 mV		6.5 TYP			
Rise time	t <sub>r</sub>		1	2/			
		C <sub>L</sub> = 10 pF	2 3/	100 TYP		ns	
Fall time	t <sub>f</sub>	C <sub>L</sub> = 10 pF	All	100 TYP		ns	
<b>Output</b>							
Voltage output low from rail	V <sub>OL</sub>	V <sub>S</sub> = 5 V	All		200	mV	
Voltage output high from rail		I <sub>OUT</sub> = -5 mA	2 3/		200	mV	
Short circuit current		I <sub>OUT</sub> = 5 mA	2 3/		4/		
<b>Voltage Reference</b>							
Output voltage	V <sub>OUT</sub>		All	1.208	1.276	V	
Initial accuracy					±1%		
Temperature drift	dV <sub>OUT</sub> /dT					100	ppm/°C
Load regulation	Sourcing	0 mA < I <sub>SOURCE</sub> ≤ 0.5 mA				1	mV/mA
	Sinking				6.6 TYP		
Output current	I <sub>LOAD</sub>				0.5 TYP		mA
Line regulation	dV <sub>OUT</sub> /dV <sub>IN</sub>	1.8 V ≤ V <sub>IN</sub> ≤ 5.5 V				100	μV/V

See footnote at end of table

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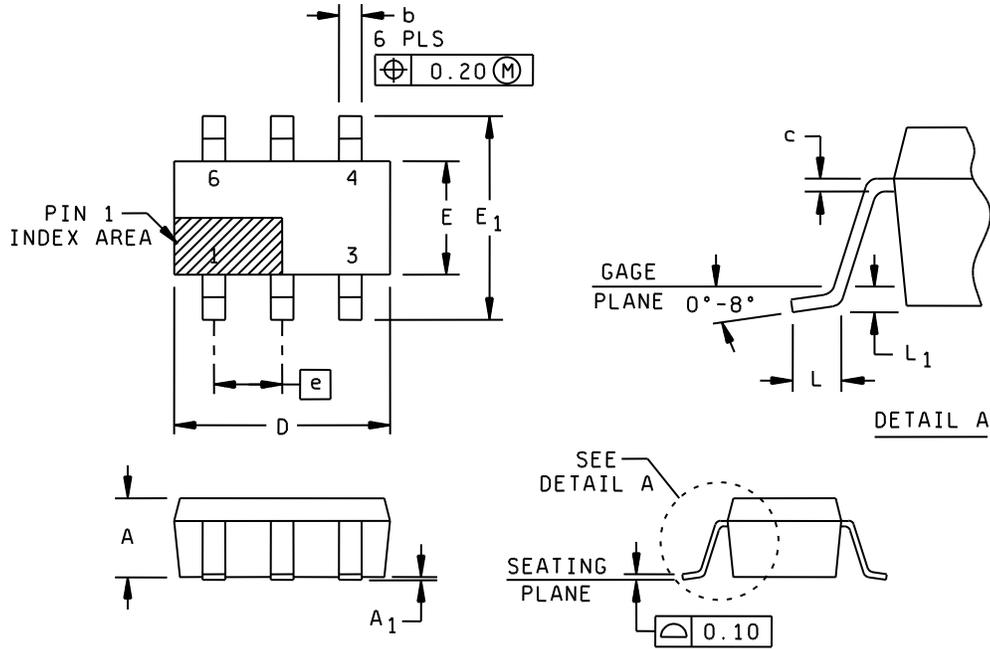
TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions -55°C ≤ T <sub>A</sub> ≤ 125°C unless otherwise specified	Device type	Limits		Unit
				Min	Max	
<b>Noise</b>						
Reference voltage noise		f = 0.1 Hz to 10 Hz	All	0.2 TYP		mV <sub>PP</sub>
<b>Power supply</b>						
Specified voltage	V <sub>S</sub>		All	1.8	5.5	V
Operating voltage range				1.8	5.5	V
Quiescent current	I <sub>Q</sub>	V <sub>S</sub> = 5 V, V <sub>O</sub> = High			5	μA

- 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/ tr dependent on R<sub>PULLUP</sub> and C<sub>LOAD</sub>.
- 3/ Product review.
- 4/ See figure 4.

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Case X



Dimension					
Symbol	Millimeters		Symbol	Millimeters	
	Min	Max		Min	Max
A		1.45	E	1.45	1.75
A1	0.00	0.15	E1	2.60	3.00
b	0.25	0.50	e	0.95 TYP	
c	0.08	0.22	L	0.30	0.55
D	2.75	3.05	L1	0.25 TYP	

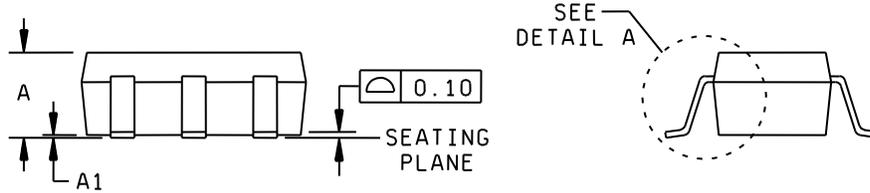
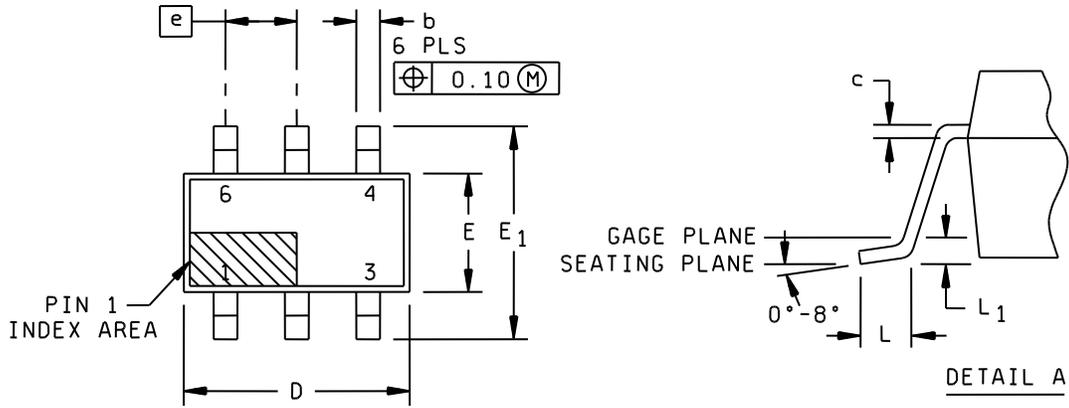
NOTES:

1. This drawing is subject to change without notice.
2. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 mm 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.

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Case Y



Dimension					
Symbol	Millimeters		Symbol	Millimeters	
	Min	Max		Min	Max
A	0.80	1.10	E	1.10	1.40
A1	0.00	0.10	E1	1.80	2.40
b	0.15	0.30	e	0.65 TYP	
c	0.08	0.22	L	0.26	0.46
D	1.85	2.15	L1	0.15 TYP	

NOTES:

1. This drawing is subject to change without notice.
2. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 mm per side.
3. Falls within JEDEC MO-203 variation AB.

FIGURE 1. Case outline - Continued.

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Case X and Y

Terminal number	Terminal symbol	Terminal number	Terminal symbol
1	OUT	4	IN-
2	V-	5	REF
3	IN+	6	V+

FIGURE 2. Terminal connections.

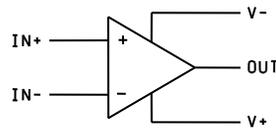


FIGURE 3. Schematic diagram.

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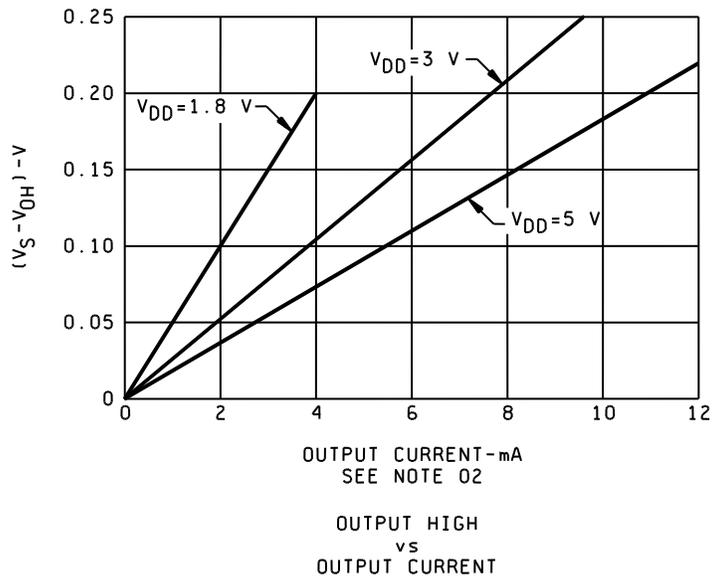
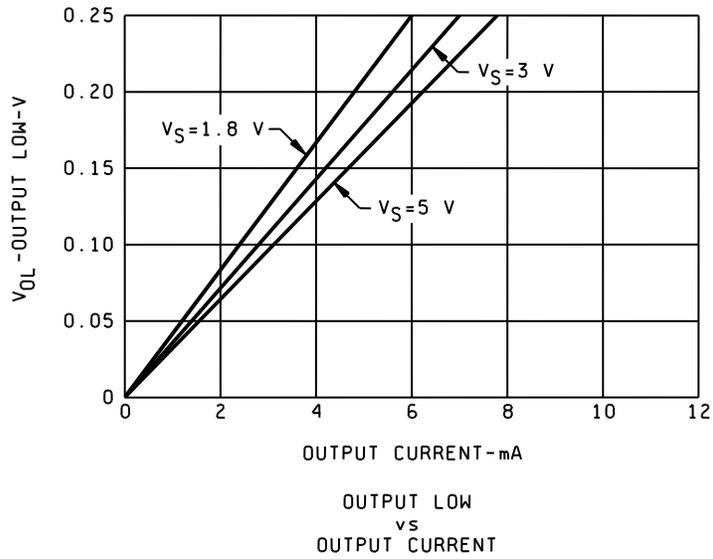


FIGURE 4. Output low and high vs output current.

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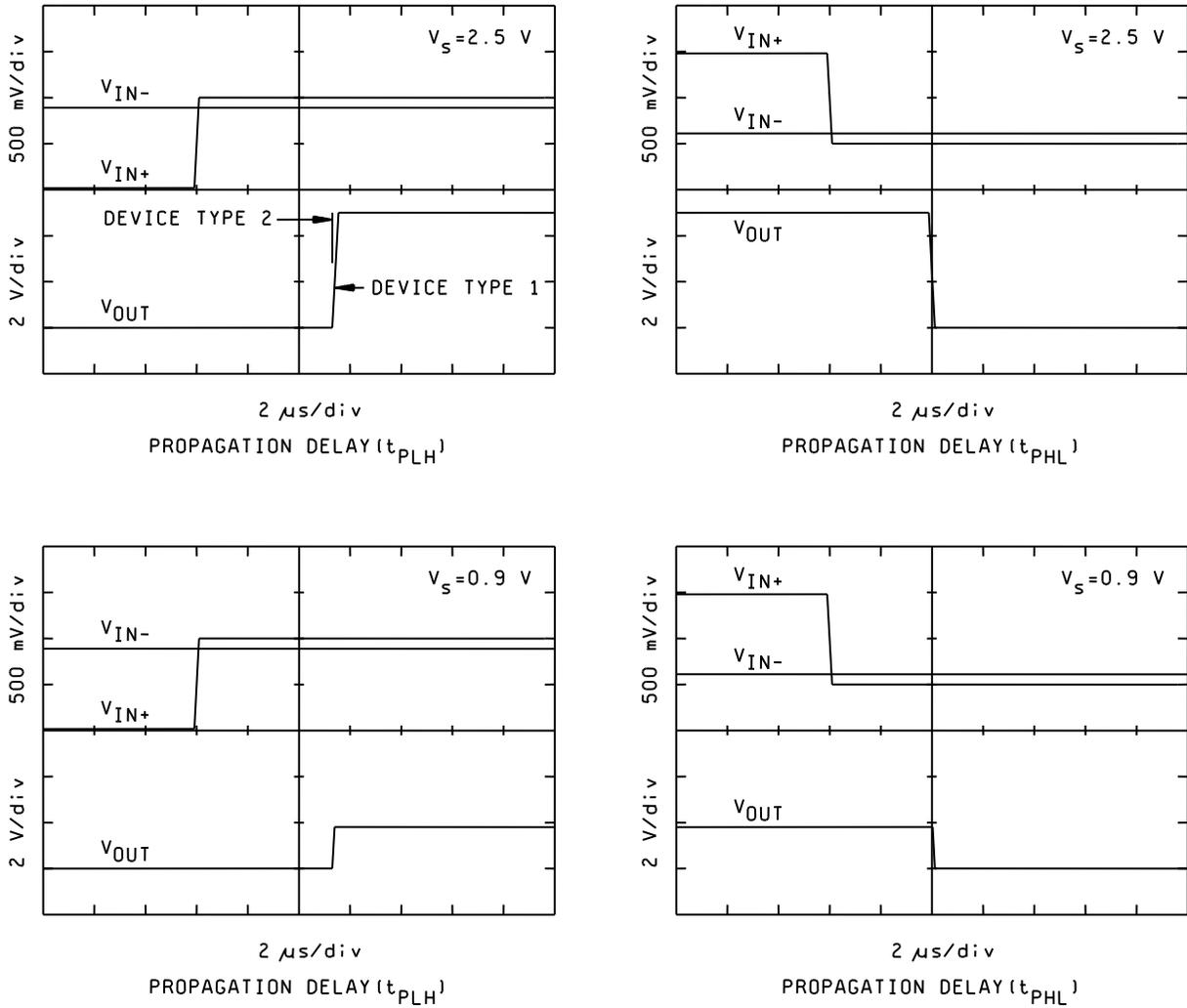


FIGURE 5. Timing waveforms.

<p><b>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</b></p>	<p>SIZE <b>A</b></p>	<p>CODE IDENT NO. <b>16236</b></p>	<p>DWG NO. <b>V62/07604</b></p>
		<p>REV    <b>A</b></p>	<p>PAGE    <b>10</b></p>

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	Vendor part number	Top side Marking
V62/07604-01XE	01295	TLV3011AMDBVREP	BTV
V62/07604-02XE	01295	TLV3012AMDBVREP <u>2/</u>	TBD

- 1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.
- 2/ Not available from an approved source of supply.

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

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