

1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance 16-bit bus transceiver with three-state outputs 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:

<u>V62/06609</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	SN74ABT16245A-EP	16-bit bus transceiver with three-state outputs

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	48	JEDEC MO-118	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
F	Tin-lead alloy
Z	Other

1.3 Absolute maximum ratings. 1/

Supply voltage range (V_{CC})	-0.5 V to +7 V
Input voltage range (except I/O ports) (V_i)	-0.5 V to +7 V 2/
Voltage applied to any output in the high or power-off state (V_o).....	-0.5 V to +5.5 V
Maximum current into any output in the low state (I_o).....	96 mA
Maximum input clamp current ($V_i < 0$) (I_{IK}).....	-18 mA
Maximum output clamp current ($V_o < 0$) (I_{OK}).....	-50 mA
Package thermal impedance (θ_{JA}).....	94°C/W 3/
Storage temperature range (T_{STG}).....	-65°C to 150°C 4/

- 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/ The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- 3/ The package thermal impedance is calculated in accordance with JESD 51.
- 4/ Long-term high-temperature storage and/or extended use at maximum recommended operating conditions may result in a reduction of overall device life. See figure 1 for additional information on thermal derating.

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1.4 Recommended operating conditions. 1/

Supply voltage range (V_{CC})	4.5 V to 5.5 V
Minimum high-level input voltage (V_{IH}).....	2 V
Maximum low-level input voltage (V_{IL}).....	0.8 V
Input voltage range (V_i).....	0 V to V_{CC}
Maximum high-level output current (I_{OH})	-24 mA
Maximum low-level output current (I_{OL}).....	48 mA
Maximum input transition rise or fall rate (Outputs enabled) ($\Delta t/\Delta v$).....	10 ns/V
Minimum power-up ramp rate ($\Delta t/\Delta V_{CC}$).....	200 μ s/V
Operating free-air temperature range (T_A)	-55°C to +125°C

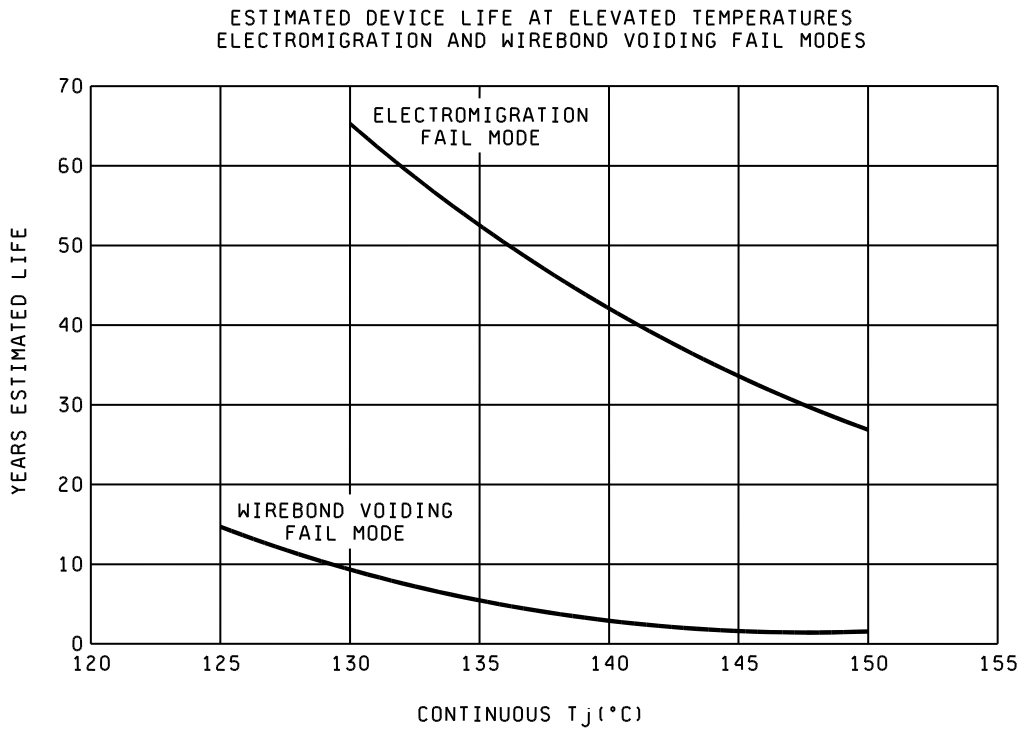


FIGURE 1. Estimated device life at elevated temperatures.

1/ All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

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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 <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 2.

3.5.2 Function table. The function table shall be as shown in figure 3.

3.5.3 Logic diagram. The logic diagram shall be as shown in figure 4.

3.5.4 Terminal connections. The terminal connections shall be as shown in figure 5.

3.5.5 Timing waveforms and test circuit. The timing waveforms and test circuit shall be as shown in figure 6.

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TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions	V _{CC}	Temperature, T _A	Limits		Unit
					Min	Max	
Input clamp voltage	V _{IK}	I _I = -18 mA	4.5 V	25°C		-1.2	V
				-55°C to +125°C		-1.2	
High level output voltage	V _{OH}	I _{OH} = -3 mA	4.5 V	25°C, -55°C to +125°C	2.5		V
		I _{OH} = -3 mA	5 V	25°C, -55°C to +125°C	3		
		I _{OH} = -24 mA	4.5 V	25°C, -55°C to +125°C	2		
		I _{OH} = -32 mA			2		
Low level output voltage	V _{OL}	I _{OL} = 48 mA	4.5 V	25°C, -55°C to +125°C		0.55	V
		I _{OL} = 64 mA		25°C		0.55	
Hysteresis voltage	V _{hys}		5 V	25°C	100 TYP		mV
Input current	I _I	Control inputs, V _I = V _{CC} or GND	0 V to 5.5 V	25°C, -55°C to +125°C		±1	μA
		A or B port, V _I = V _{CC} or GND	2.1 V to 5.5 V	25°C		±20	
				-55°C to +125°C		±100	
Three-state output current, power-up	I _{OZPU}	V _O = 0.5 V to 2.7 V, $\overline{OE} = X$	0 V to 2.1 V	25°C		±50	μA
Three-state output current, power-down	I _{OZPD}	V _O = 0.5 V to 2.7 V, $\overline{OE} = X$	2.1 V to 0 V	25°C		±50	μA
Three-state output current, high	I _{OZH} 2/	V _O = 2.7 V, $\overline{OE} \geq 2 V$	2.7 V to 5.5 V	25°C		10 3/	μA
				-55°C to +125°C		10	
Three-state output current, low	I _{OZL} 2/	V _O = 0.5 V, $\overline{OE} \geq 2 V$	2.7 V to 5.5 V	25°C		-10 3/	μA
				-55°C to +125°C		-10	
Input/output power-off leakage current	I _{off}	V _I or V _O ≤ 5.5 V	0 V	25°C		±100	μA
Output high leakage current	I _{CEX}	V _O = 5.5 V, Outputs high	5.5 V	25°C, -55°C to +125°C		50	μA
Output current	I _O 4/	V _O = 2.5 V	5.5 V	25°C, -55°C to +125°C	-50	-180	mA
Supply current	I _{CC}	A or B port, V _I = V _{CC} or GND, I _O = 0, Outputs high	5.5 V	25°C, -55°C to +125°C		2	μA
		A or B port, V _I = V _{CC} or GND, I _O = 0, Outputs low				32	
		A or B port, V _I = V _{CC} or GND, I _O = 0, Outputs disabled				2	

See footnotes at end of table.

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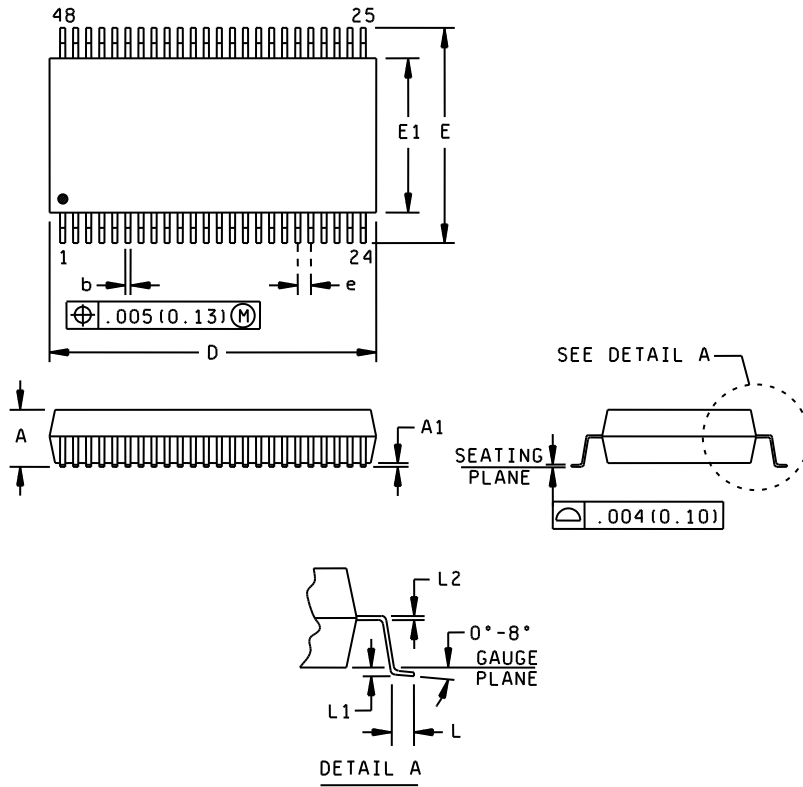
TABLE I. Electrical performance characteristics - Continued. 1/

Test	Symbol	Conditions	V _{CC}	Temperature, T _A	Limits		Unit
					Min	Max	
Supply current delta	ΔI_{CC} 5/	Data inputs, Outputs enabled, One input at 3.4 V, other inputs at V _{CC} or GND	5.5 V	25°C		2	mA
				-55°C to +125°C		1.5	
		25°C			0.05		
		-55°C to +125°C			1		
		Control inputs, Outputs disabled, One input at 3.4 V, other inputs at V _{CC} or GND		25°C, -55°C to +125°C		1.5	
Input capacitance	C _I	Control inputs, V _I = 2.5 V or 0.5 V	5 V	25°C	3 TYP		pF
Output capacitance	C _O	A or B port, V _O = 2.5 V or 0.5 V	5 V	25°C	6 TYP		pF
Propagation delay time, from A or B to B or A	t _{PLH}	CL = 50 pF, See figure 5.	5 V	25°C	0.5	3.4	ns
			4.5 V to 5.5 V	-55°C to +125°C	0.5	4	
Propagation delay time, from A or B to B or A	t _{PHL}		5 V	25°C	0.5	3.8	ns
			4.5 V to 5.5 V	-55°C to +125°C	0.5	4.6	
Propagation enable time, OE to B or A	t _{PZH}	CL = 50 pF, See figure 5.	5 V	25°C	0.8	5.2	ns
			4.5 V to 5.5 V	-55°C to +125°C	0.8	5.5	
Propagation enable time, OE to B or A	t _{PZL}		5 V	25°C	0.9	6.1	
			4.5 V to 5.5 V	-55°C to +125°C	0.1	7.3	
Propagation disable time, OE to B or A	t _{PHZ}		5 V	25°C	1.3	5.8	
			4.5 V to 5.5 V	-55°C to +125°C	1.3	6.3	
Propagation disable time, OE to B or A	t _{PLZ}		5 V	25°C	1.4	4.7	
			4.5 V to 5.5 V	-55°C to +125°C	1.4	5.5	

- 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/ The parameters I_{OZH} and I_{OZL} include the input leakage current.
- 3/ This limit may vary.
- 4/ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
- 5/ This is the increase in supply current for each input that is at the specified TTL voltage level, rather than V_{CC} or GND.

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Case X



Dimensions									
Symbol	Inches		Millimeters		Symbol	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	---	0.110	---	2.79	E1	0.291	0.299	7.39	7.59
A1	0.008	---	0.20	---	e	0.025 BSC		0.635 BSC	
b	0.008	0.0135	0.203	0.343	L	0.020	0.040	0.51	1.02
D	0.620	0.630	15.75	16.00	L1	0.010 TYP		0.25 TYP	
E	0.395	0.420	10.03	10.67	L2	0.005	0.010	0.13	0.25

NOTES:

1. All linear dimensions are shown in inches (millimeters). Millimeters equivalents are given for general information only.
2. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0.15).
3. Falls within JEDEC MO-118.

FIGURE 2. Case outline.

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Inputs		Operation
\overline{OE}	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H = High voltage level
L = Low voltage level
X = Don't care

FIGURE 3. Function table.

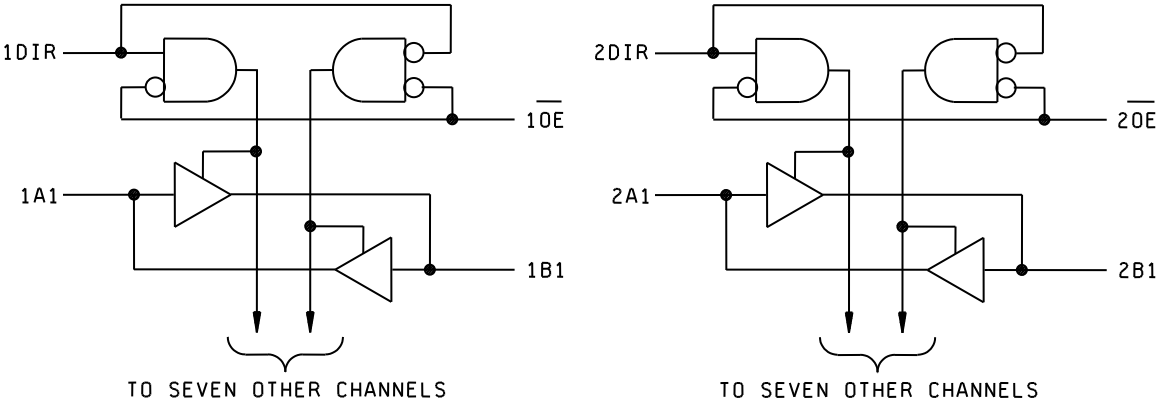


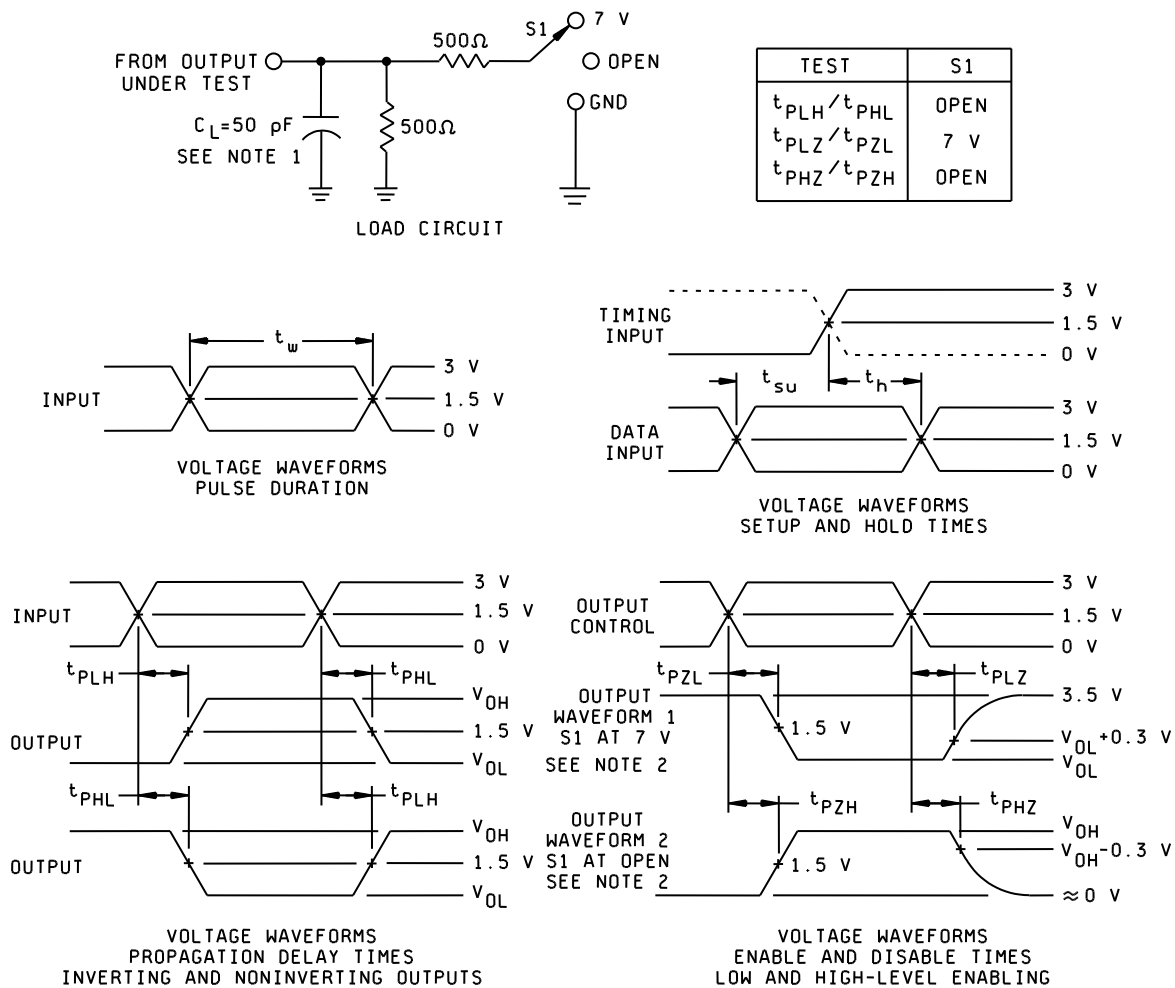
FIGURE 4. Logic diagram.

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Device type:	01		
Case outline:	X		
Terminal number	Terminal symbol	Terminal number	Terminal symbol
1	1DIR	25	$\overline{2OE}$
2	1B1	26	2A8
3	1B2	27	2A7
4	GND	28	GND
5	1B3	29	2A6
6	1B4	30	2A5
7	V _{cc}	31	V _{cc}
8	1B5	32	2A4
9	1B6	33	2A3
10	GND	34	GND
11	1B7	35	2A2
12	1B8	36	2A1
13	2B1	37	1A8
14	2B2	38	1A7
15	GND	39	GND
16	2B3	40	1A6
17	2B4	41	1A5
18	V _{cc}	42	V _{cc}
19	2B5	43	1A4
20	2B6	44	1A3
21	GND	45	GND
22	2B7	46	1A2
23	2B8	47	1A1
24	2DIR	48	$\overline{1OE}$

FIGURE 5. Terminal connections.

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NOTES:

1. C_L includes probe and jig capacitance.
2. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
3. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10$ MHz, $Z_o = 50 \Omega$, $t_r \leq 2.5$ ns, $t_f \leq 2.5$ ns.
4. The outputs are measured one at a time, with one transition per measurement.

FIGURE 6. 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 <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
V62/06609-01XE	01295	CABT16245AMDREP	ABT16245AMEP

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

CAGE code

01295

Source of supply

Texas Instruments, Inc.
Semiconductor Group
8505 Forest Lane
P.O. Box 660199
Dallas, TX 75243

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