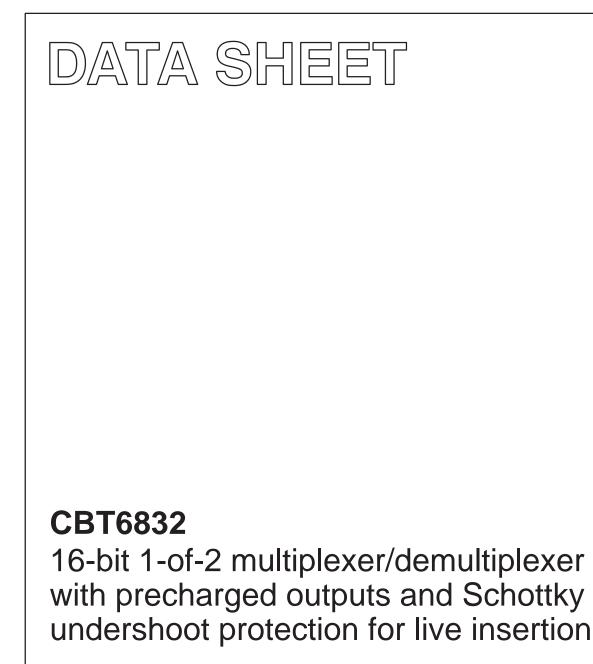
INTEGRATED CIRCUITS



Product specification

2000 Jul 18



CBT6832

• 5 Ω typical r _{0n} • Pull-up on B ports • Undershoot protection on A port only: -1.5 V • Near zero propagation delay • Controlled enable rate • Controlled enable rat	FEATURES	PIN CONFIGURATION	
Pull-up on B ports2B1 [2]S5 182Undershoot protection on A port only: -1.5 V2A [3]S6 282Near zero propagation delay3B1 [4]S3 3AControlled enable rate4B1 [5]S5 382V _{CC} operating range: $+4.5$ V to $+5.5$ V4A [5]S1 482> 100 MHz bandwidth (or clock rate) at 20 pF load capacitance5B1 [7]S9 5A56-pin TSSOP package6B1 [8]49 582• Bias voltage pre-charges the B output when the channel is disabled7B1 [10]47 7A• Latch-up protection exceeds 100 mA per JESD788A 12]46 882• ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C101Vcc 14Vcc• Provides PCI hot-plugging1081 [16]41 982• Provides PCI hot-plugging1081 [16]39 1182• DESCRIPTION1281 [19]39 114The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 in clude a propagation delay 0250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance, A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.1681 [26]31 1682• Undershoel1681 [26]31 168231 1682• Undershoel31 168231 1682• Undershoel31 168231 1682• Undershoel31 168231 1682• Undershoel31 168231 1682• Internet resistance, and low I/O capacitance, A port demultiplexes to either 1B and 2B, or to both. The switch is <b< th=""><th> 5 Ω typical r_{on} </th><th></th><th></th></b<>	 5 Ω typical r_{on} 		
• Undershoot protection on A port only: -1.5 V2A356382• Near zero propagation delay3B14533A• Controlled enable rate4B1552382• V _{CC} operating range: +4.5 V to +5.5 V4A651482• > 100 MHz bandwidth (or clock rate) at 20 pF load capacitance5B17505A• 56-pin TSSOP package6A948682• Bias voltage pre-charges the B output when the channel is disabled7B110477A• Latch-up protection exceeds 100 mA per JESD788B11146462• ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C101Vcc1447• Provides PC1 hot-plugging1081164949• Provides PC1 hot-plugging1081163911A• DESCRIPTION The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.1681128391162• Valuest 2730Valuest311682311682	Pull-up on B ports		
Near zero propagation delay3BI4533AControlled enable rate4BI533A V_{CC} operating range: +4.5 V to +5.5 V4A651482 V_{CC} operating range: +4.5 V to +5.5 V4A651482> > 100 MHz bandwidth (or clock rate) at 20 pF load capacitance5BI7505A\$ 56-pin TSSOP package6A948662• Bias voltage pre-charges the B output when the channel is disabled7BI60477A• Latch-up protection exceeds 100 mA per JESD228BI11467B2• Latch-up protection exceeds 2000 V HBM per JESD22-C1018A1246682• ESD protection exceeds 2000 V DM per JESD22-C101Vcc1443Vcc• Provides PCI hot-plugging10A17401082• Provides PCI hot-plugging10A17401082• Provides PCI hot-plugging12B193911A DESCRIPTION 12B12B3913AAdvantages of the CBT6832 is a 16-bit 1-of-2 multiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 in a 16-bit 1-of-2 multiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 in to both. The switch is bi-directional.14B2314A12B3914A3914A14A283914A14B2914B23914B214B2914A2	 Undershoot protection on A port only: –1.5 V 		
• Controlled enable rate481562382• V_{CC} operating range: +4.5 V to +5.5 V4A651482• > 100 MHz bandwidth (or clock rate) at 20 pF load capacitance5817505A• 56-pin TSSOP package681849682• Bias voltage pre-charges the B output when the channel is disabled7A48682• Latch-up protection exceeds 100 mA per JESD788A1745882• ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C101Wcc7A46• Provides PCI hot-plugging10A17401082• Provides PCI hot-plugging10A17401082• Provides PCI hot-plugging1181183811A• Provides PCI hot-plugging1281193811B2• Provides PCI hot-plugging1281193811B2• Provides PCI hot-plugging12811813A• Advantages of the CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 include a propagation delay of 250 ps, nesulting from 5 Ω channel resistance, and low // C capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.311482• VBMS128311682311682• VBMS128311682311682• VBMS128311682311682• Provides PCI	 Near zero propagation delay 		
• V_{CC} operating range: +4.5 V to +5.5 V4A651482• > 100 MHz bandwidth (or clock rate) at 20 pF load capacitance5B17595A• 56-pin TSSOP package6A948682• Bias voltage pre-charges the B output when the channel is disabled7B110477A• Latch-up protection exceeds 100 mA per JESD788A12488B2• ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C101Wcc149Wcc• Provides PCI hot-plugging10A174010B2• Provides PCI hot-plugging from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.11A2811A• ESE PRICE1515123315A• ESE PRICE16A28151515• Ide Cational.1616291629<	Controlled enable rate		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	• V _{CC} operating range: +4.5 V to +5.5 V		
56-pin TSSOP package6413• Bias voltage pre-charges the B output when the channel is disabled66966• Latch-up protection exceeds 100 mA per JESD788811166• ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C1018811166• Control13446ND• Provides PCI hot-plugging10A174010B2• Provides PCI hot-plugging12B183911A• Provides PCI hot-plugging12B193811B2• Provides PCI hot-plugging12B203712B2• Provides PCI hot-plugging12B13B13A• Provides PCI hot-plugging12B13B13A• Provides PCI hot-plugging12B13B13A<	 > 100 MHz bandwidth (or clock rate) at 20 pF load capacitance 	5B1 7	50 5A
• Bias voltage pre-charges the B output when the channel is disabled7B110477A• Latch-up protection exceeds 100 mA per JESD788B111467B2• ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C1018A12468B2• ESD protection exceeds 2000 V HBM per JESD22-C101 V_{CC} 146ND3446ND• Provides PCI hot-plugging10B116419B29A• Provides PCI hot-plugging10A174010B2• Provides PCI hot-plugging11B1183911A• DESCRIPTION The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.13B1213613A• BEI 123215A3315A• Inferctional.16B1283315A• Inferctional.16B1283116B2• Use Provides PCI hot-plugging16A283116B2• Provides PCI hot-plugging12A203712B2• Inferctional.13B1213613A• Provides PCI hot-plugging13B1213613A• Provides PCI hot-plugging12A203712B2• Inferctional.13B12136 <th>• 56-pin TSSOP package</th> <th>6B1 8</th> <th>49 5B2</th>	• 56-pin TSSOP package	6B1 8	49 5B2
disabled7B110477A \bullet Latch-up protection exceeds 100 mA per JESD788B111467B2 \bullet ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C1018A12488B2 \bullet Provides PCI hot-plugging10A174010B2 \bullet Provides PCI hot-plugging10A174010B2The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.12B112B13B \bullet 14A233414B2 \bullet 16A263116B2 ψ_{BIAST} 2730 ψ_{BIASZ}	 Bias voltage pre-charges the B output when the channel is 	6A 9	
• Latch-up protection exceeds 100 mA per JESD78BAT• ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C101GNDT• Provides PCI hot-plugging1082981• Provides PCI hot-plugging10AT• Provides PCI hot-plugging13B• Provides PCI hot-plu			
• ESD protection exceeds 2000 V HBM per JESD22-A114, 200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C101 V _{CC} 14 43 V _{CC} 9B1 15 42 9A APPLICATION • Provides PCI hot-plugging 10A 17 40 10B2 11B1 18 39 11A DESCRIPTION The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional. C ESD (State 1) (State 2) C ESD (State 2) (State 2) C ESD (State	 Latch-up protection exceeds 100 mA per JESD78 		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			
APPLICATION10B116419B2• Provides PCI hot-plugging10A174010B2• Provides PCI hot-plugging10A174010B2• 11B1183911A• 12B1193811B2• 12B23712B237• 12B23712B236• 13B1213613A• Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.14B1223513B2• 16B1253215B23115A363116B2• 16A263116B216A30VVVVVVVVVVNN <th>200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C101</th> <td>V_{CC} 14</td> <td>43 V_{CC}</td>	200 V MM per JESD22-A115 and 1000 V CDM per JESD22-C101	V _{CC} 14	43 V _{CC}
 Provides PCI hot-plugging 10A 17 10B2 11B1 18 11B1 18 11B2 12B1 19 11B2 12B2 12B2 13A 13A 13B1 21 13B2 13B4 14B2 14B2		9B1 15	42 9A
DESCRIPTION11B1183911ADESCRIPTION12B1193811B2The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.11B1183911A12B23712B214B1223513B214B1233414B215B1243315A16B1253215B216A263116B2VBIAS12730VBIAS2	APPLICATION	10B1 [16	41 9B2
DESCRIPTION12B 19The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.12B 1938 11B212A 2037 12B213B 12136 13A14B 12235 13B214B 12334 14B215A16B 12532 15B216A 2631 16B2VBIAS1 2730 VBIAS2	 Provides PCI hot-plugging 	10A 17	40 10B2
DESCRIPTION12A20The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion.12A20Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.12A2013B1213613A14B1223513B214B1233414B214B1243315A16B1253215B216A263116B2VBIAS12730VBIAS2		11B1 <u>18</u>	
The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with precharged outputs and Schottky protection for live insertion. Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.12A [20]37 12B213B1 [21]36 13A14B1 [22]35 13B214B1 [23]34 14B214A [23]34 14B215B1 [24]33 15A16B1 [25]32 15B216A [26]31 16B2VBIAS1 [27]30 VBIAS2	DESCRIPTION		
Advantages of the CBT6832 include a propagation delay of 250 ps, resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.14B122 353513B214B1223315A16B1253215B216A263116B2VBIAS12730VBIAS2	The CBT6832 is a 16-bit 1-of-2 multiplexer/demultiplexer with		
resulting from 5 Ω channel resistance, and low I/O capacitance. A port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional. 14A 23 34 14B2 33 15A 16B1 25 32 15B2 16A 26 31 16B2 V _{BIAS1} 27 30 V _{BIAS2}			
port demultiplexes to either 1B and 2B, or to both. The switch is bi-directional.			
bi-directional. 16B1 25 32 15B2 16A 26 31 16B2 VBIAS1 27 30 VBIAS2			
V _{BIAS1} 27 30 V _{BIAS2}	bi-directional.		
		1 4	
SEL1 28 29 SEL2		V _{BIAS1} 27	30 V _{BIAS2}
		SEL1 28	29 SEL2

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS T _{amb} = 25°C; GND = 0 V	TYPICAL	UNIT
t _{PLH} t _{PHL}	Propagation delay An to Bn or Bn to An	C _L = 50 pF; V _{CC} = 5 V	0.25	ns
C _{IN}	Input capacitance	$V_I = 0 V \text{ or } V_{CC}$	4.5	pF
C _{OUT} B	B capacitance	Outputs disabled; $V_O = 0 V$	8	pF
C _{OUT} A	A capacitance	Outputs disabled; $V_O = 0 V$	13	pF
C on 1	One channel on capacitance	One B enabled; $V_0 = 0 V$	21	pF
C on 2	Both channels on capacitance	Both B channels enabled; $V_0 = 0 V$	34	pF

ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	ORDER CODE	DWG NUMBER
56-Pin Plastic TSSOP Type II	0°C to +70°C	CBT6832 DGG	SOT364-1

SW00478

CBT6832

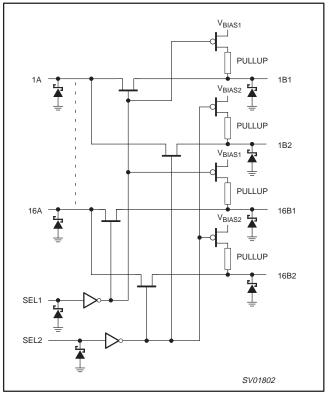
PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND FUNCTION
3, 6, 9, 12, 17, 20, 23, 26, 33, 36, 39, 42, 47, 50, 53, 56	1A1–16A1	Inputs
1, 2, 4, 5, 7, 8, 10, 11, 15, 16, 18, 19, 21, 22, 24, 25	1B1–16B1	Outputs
31, 32, 34, 35, 37, 38, 40, 41, 45, 46, 48, 49, 51, 52, 54, 55	1B2–16B2	Outputs
27, 30	V _{BIAS1} , V _{BIAS2}	Precharge bias voltage inputs
28, 29	SEL1, SEL2	Select-control inputs
13, 44	GND	Ground (0 V)
14, 43	V _{CC}	Positive supply voltage

FUNCTION TABLE

SEL1	SEL2	FUNCTION
L	Н	nA to nB1
Н	L	nA to nB2
L	L	nA to nB1 and nB2
Н	Н	nB1, nB2 = V _{BIAS}

LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS^{1, 2}

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V _{CC}	DC supply voltage		-0.5 to +7.0	V
I _{IK}	DC input diode current	V ₁ < 0	-50	mA
VI	DC input voltage ³		-0.5 to +7.0	V
V _{OUT}	DC output voltage ³	output in Off or High state	-0.5 to +7.0	V
I _{OUT}	DC output current	output in Low state	120	mA
T _{stg}	Storage temperature range		-65 to +150	°C
Θ_{JA}	Power dissipation		95	°C/W

NOTES:

 Stresses beyond those listed 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.

 The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature of this integrated circuit should not exceed 150°C.

3. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

RECOMMENDED OPERATING CONDITIONS

SYMBOL PARAMETER	DADAMETED	LIM	UNIT	
STWBUL	FARAWETER	MIN	MAX	
V _{CC}	DC supply voltage	4.5	5.5	V
V _{IH}	High-level input voltage	2.0		V
V _{IL}	Low-level Input voltage		0.8	V
T _{amb}	Operating free-air temperature range	0	+70	°C

CBT6832

DC ELECTRICAL CHARACTERISTICS

Over operating temperature range T_{amb} = 0°C to +70°C; V_{CC} = 5 V ±10%; V_{BIAS} = 1.3 V to V_{CC}, unless otherwise specified.

SYMBOL PARAMETER T	DADAMETED	TEST CONDITIONS	LIMITS			UNIT
	TEST CONDITIONS	MIN	TYP ¹	MAX		
VIH	Input HIGH voltage	Guaranteed logic HIGH level	2.0			V
V _{IL}	Input LOW voltage	Guaranteed logic LOW level	-0.5		0.8	V
I _{IH}	Input HIGH current	$V_{CC} = 5.5 \text{ V}, V_{IN} = V_{CC}$			±5	μΑ
ЦL	Input LOW current	V _{CC} = 5.5 V, V _{IN} = GND			±5	μΑ
I _{OZH}	High impedance output current				±1	μA
I _{OZL}	Low impedance output current		-0.2		-2	mA
V _{IK}	Input clamp voltage	$V_{CC} = 4.5 \text{ V}; I_{I} = -18 \text{ mA}$			-1.2	V
	Switch on resistance ²	$V_{CC} = 4.5 \text{ V}; \text{ V}_{I} = 0 \text{ V}; \text{ I}_{I} = 48 \text{ mA}$		5	8	Ω
r _{on}	Switch on resistance=	$V_{CC} = 4.5 \text{ V}; \text{ V}_{I} = 2.4 \text{ V}; \text{ I}_{I} = -15 \text{ mA}$		10	15	Ω
Capacitanc	ce ³ (T _{amb} = +25°C; f = 1 MHz)	-		-		
C _{IN}	Input capacitance	$V_{I} = 0 V$		4.5		pF
C _{OFF} B	B capacitance, switch off	V _I = 0 V		8		pF
C _{OFF} A	A capacitance, switch off	V _I = 0 V		13		pF
C _{ON} 1	One B channel on capacitance	V _I = 0 V		21		pF
C _{ON} 2	Both B channels on capacitance	V _I = 0 V		34		pF
Power sup	ply	-	-	-	-	-
I _{CC}	Quiescent supply current	$V_{CC} = 5.5 \text{ V}; \text{ V}_{I} = V_{CC} \text{ or GND}$			200	μΑ
ΔI_{CC}	Additional supply current per input pin ⁵	V_{CC} = 5.5 V, one input at 3.4 V, other inputs at V _{CC} or GND			2.5	mA

NOTES:

All typical values are at V_{CC} = 5 V, T_{amb} = +25°C ambient and maximum loading.
 Measured by the voltage drop between the A and the B terminals at the indicated current through the switch.

On-state resistance is determined by the lowest voltage of the two (A or B) terminals.

These parameters are determined by device characterization, but is not production tested. 3.

4. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.

5. Per TTL driven input (V_1 = 3.4 V, control inputs only); A and B pins do not contribute to I_{CC}. 6. This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The A and B inputs generate no significant AC or DC currents as they transition. this parameter is not tested, but is guaranteed by design.

CBT6832

AC CHARACTERISTICS

 V_{CC} = 5.0 V ±0.5 V; GND = 0 V; C_L = 50 pF, R_L = 500 Ω

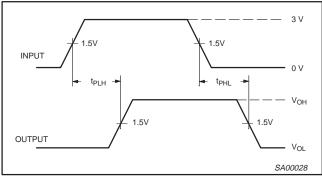
SYMPOL	SYMBOL PARAMETER TEST CONDITIONS	LIMITS			UNIT	
STWBUL	PARAIVIETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH} t _{PHL}	Propagation delay ¹ A to B			0.25		ns
t _{PZH} t _{PZL}	Bus enable time SEL to A, B		1 1		7.0 6.0	ns
t _{PHZ} t _{PLZ}	Bus disable time SEL to A, B		1 1		7.0 6.5	ns

NOTES:

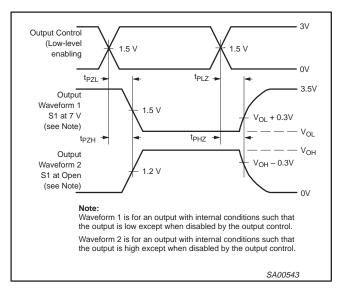
1. This parameter is warranted but not production tested. The propagation delay is based on the RC time constant of the typical on-state resistance of the switch and a load capacitance of 50 pF, when driven by an ideal voltage source (zero output impedance).

AC WAVEFORMS

 V_{M} = 1.5 V, V_{IN} = GND to 3.0 V

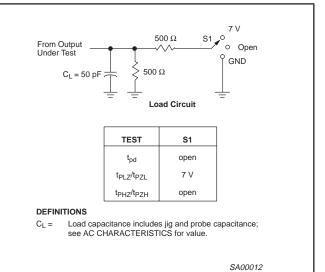


Waveform 1. Input (An) to Output (Bn) Propagation Delays

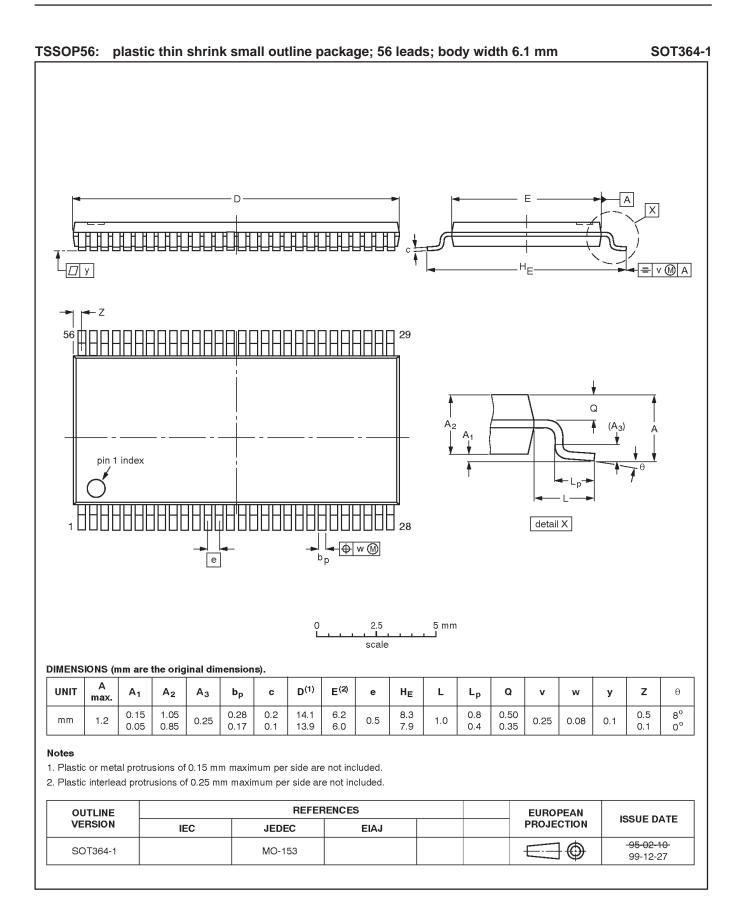


Waveform 2. 3-State Output Enable and Disable Times

TEST CIRCUIT AND WAVEFORMS



CBT6832



CBT6832

NOTES

CBT6832

Data sheet status

Data sheet status	Product status	Definition ^[1]
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

[1] Please consult the most recently issued datasheet before initiating or completing a design.

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Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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