

## ABT/H16 family characteristics

## Family specifications

### GENERAL

These family specifications cover the common electrical ratings and characteristics of the entire 74ABT/H16 family, unless otherwise specified in the individual device data sheet.

### INTRODUCTION

The 74ABT/H16 Advanced BiCMOS families combine the low power dissipation and low noise of BiCMOS with the high speed and high output drive of bipolar products.

The basic family of devices designated as 74ABT/H16XXXA will operate at TTL logic input levels or CMOS logic input levels. The devices operate from a power supply of 4.5 to 5.5V.

### HANDLING BICMOS DEVICES

Inputs and outputs are protected against electrostatic effects in a wide variety of device-handling situations.

However, to be totally safe, it is wise to use ESD handling precautions at all times.

### ABSOLUTE MAXIMUM RATINGS<sup>NO TAG, NO TAG</sup>

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
$V_{CC}$	DC supply voltage		-0.5 to +7.0	V
$I_{IK}$	DC input diode current	$V_I < 0$	-18	mA
$V_I$	DC input voltage <sup>NO TAG</sup>		-1.2 to +7.0	V
$I_{OK}$	DC output diode current	$V_O < 0$	-50	mA
$V_{OUT}$	DC output voltage <sup>NO TAG</sup>	Output in Off or High state	-0.5 to +5.5	V
$I_{OUT}$	DC output current	Output in Low state	128	mA
		Output in High state	-64	
$T_{stg}$	Storage temperature range		-65 to +150	°C

#### 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.
- The input and output negative voltage ratings may be exceeded if the input and output clamp current ratings are observed.

### RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS		UNIT
		MIN	MAX	
$V_{CC}$	DC supply voltage	4.5	5.5	V
$V_I$	Input voltage	0	$V_{CC}$	V
$V_{IH}$	High-level input voltage	2.0		V
$V_{IL}$	Input voltage		0.8	V
$I_{OH}$	High-level output current		-32	mA
$I_{OL}$	Low-level output current		64	mA
$\Delta t/\Delta v$	Input transition rise or fall rate; Outputs enabled		10	ns/V
$T_{amb}$	Operating free-air temperature range	-40	+85	°C

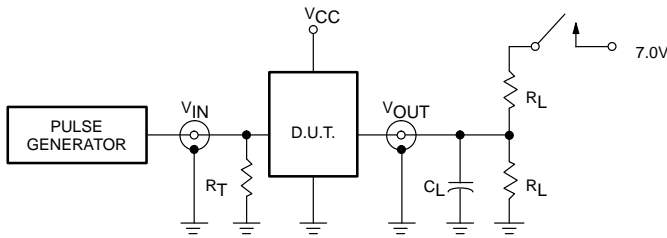
## DC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS					UNIT	
			T <sub>amb</sub> = +25°C			T <sub>amb</sub> = -40°C to +85°C			
			MIN	TYP	MAX	MIN	MAX		
V <sub>IK</sub>	Input clamp voltage	V <sub>CC</sub> = 4.5V; I <sub>IK</sub> = -18mA		-0.8	-1.2		-1.2	V	
V <sub>OH</sub>	High-level output voltage	V <sub>CC</sub> = 4.5V; I <sub>OH</sub> = -3mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	2.5	2.9		2.5		V	
		V <sub>CC</sub> = 5.0V; I <sub>OH</sub> = -3mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	3.0	4.0		3.0		V	
		V <sub>CC</sub> = 4.5V; I <sub>OH</sub> = -32mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>	2.0	2.4		2.0		V	
V <sub>OL</sub>	Low-level output voltage	V <sub>CC</sub> = 4.5V; I <sub>OL</sub> = 64mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>		0.35	0.55		0.55	V	
V <sub>RST</sub>	Power-up output voltage <sup>NO TAG</sup>	V <sub>CC</sub> = 5.5V; I <sub>O</sub> = 1mA; V <sub>I</sub> = GND or V <sub>CC</sub>		0.13	0.55		0.55	V	
I <sub>I</sub>	Input leakage current	V <sub>CC</sub> = 5.5V; V <sub>I</sub> = GND or 5.5V	Control pins		±0.01	±1.0		±1.0	µA
I <sub>HOLD</sub>	Bus Hold current A and B ports 74ABTH16501A	V <sub>CC</sub> = 4.5V; V <sub>I</sub> = 0.8V		35			35		µA
		V <sub>CC</sub> = 4.5V; V <sub>I</sub> = 2.0V		-75			-75		µA
I <sub>OFF</sub>	Power-off leakage current	V <sub>CC</sub> = 0.0V; V <sub>O</sub> or V <sub>I</sub> ≤ 4.5V		±2	±100		±100	µA	
I <sub>PU/PD</sub>	Power-up/down 3-State output current <sup>NO TAG</sup>	V <sub>CC</sub> = 2.1V; V <sub>O</sub> = 0.0V or V <sub>CC</sub> ; V <sub>I</sub> = GND or V <sub>CC</sub> ; V <sub>OE</sub> = Don't care		±2	±50		±50	µA	
I <sub>IH</sub> + I <sub>OZH</sub>	3-State output High current	V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 5.5V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>		1.0	10		10	µA	
I <sub>IL</sub> + I <sub>OZL</sub>	3-State output Low current	V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 0.0V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>		-1.0	-10		-10	µA	
I <sub>CEx</sub>	Output High leakage current	V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 5.5V; V <sub>I</sub> = GND or V <sub>CC</sub>		2.0	50		50	µA	
I <sub>O</sub>	Output current <sup>NO TAG</sup>	V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 2.5V		-50	-80	-180	-50	-180	mA
I <sub>CCH</sub>	Quiescent supply current	V <sub>CC</sub> = 5.5V; Outputs High, V <sub>I</sub> = GND or V <sub>CC</sub>		0.5	2		2	mA	
I <sub>CCL</sub>		V <sub>CC</sub> = 5.5V; Outputs Low, V <sub>I</sub> = GND or V <sub>CC</sub>		9	19		19	mA	
I <sub>CCZ</sub>		V <sub>CC</sub> = 5.5V; Outputs 3-State; V <sub>I</sub> = GND or V <sub>CC</sub>		0.5	2		2	mA	
ΔI <sub>CC</sub>	Additional supply current per input pin <sup>NO TAG</sup> 74ABT16501A	V <sub>CC</sub> = 5.5V; one input at 3.4V, other inputs at V <sub>CC</sub> or GND		5.0	50		50	µA	
ΔI <sub>CC</sub>	Additional supply current per input pin <sup>NO TAG</sup> 74ABTH16501A	V <sub>CC</sub> = 5.5V; one input at 3.4V, other inputs at V <sub>CC</sub> or GND		200	500		500	µA	

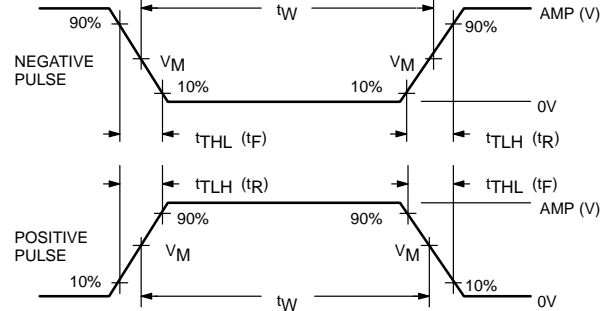
## NOTES:

1. Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
2. This is the increase in supply current for each input at 3.4V.
3. For valid test results, data must not be loaded into the flip-flops (or latches) after applying the power.
4. This parameter is valid for any V<sub>CC</sub> between 0V and 2.1V, with a transition time of up to 10msec. From V<sub>CC</sub> = 2.1V to V<sub>CC</sub> = 5V ± 10% a transition time of up to 100µsec is permitted.

**TEST CIRCUIT AND WAVEFORMS**



**Test Circuit for 3-State Outputs**



**VM = 1.5V  
Input Pulse Definition**

**SWITCH POSITION**

TEST	SWITCH
t <sub>PLZ</sub>	closed
t <sub>pZL</sub>	closed
All other	open

**DEFINITIONS**

R<sub>L</sub> = Load resistor; see AC CHARACTERISTICS for value.  
 C<sub>L</sub> = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.  
 R<sub>T</sub> = Termination resistance should be equal to Z<sub>OUT</sub> of pulse generators.

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	t <sub>W</sub>	t <sub>R</sub>	t <sub>F</sub>
74ABT/H16	3.0V	1MHz	500ns	2.5ns	2.5ns

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