SINGLE BIT DUAL POWER SUPPLY TRANSLATING TRANSCEIVER WITH 3 STATE OUTPUTS

Description

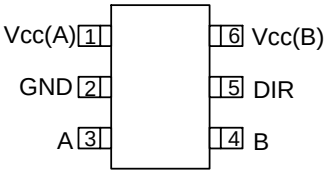
The 74AVCH1T45 is a single bit, dual supply transceiver with 3-state outputs suitable for transmitting a single logic bit across different voltage domains. The 74AVCH1T45 is a variant of the 74AVC1T45 that includes a bus hold feature at each input. The A input/output pin is designed to track V_{CCA} while the B input/output tracks V_{CCB}. This arrangement allows for universal low-voltage translation between any voltages from 1.2V to 3.6V. The Direction pin (DIR) controls the direction of the transceiver and in a logic voltage related to V_{CCA}. When a high logic level is applied to DIR the A pin becomes an input and the B pin becomes the output. Conversely the roles of A and B are reversed when DIR is asserted low.

The 3-state feature occurs when either of the power supply voltages are zero. This is also an Ioff feature and allows for the output to remain in a high impedance state with both power supplies at 0V preventing damaging backflow currents and providing power down electrical isolation up to 3.6 V as not to interfere with any logic activity on pin A or B.

The bus hold feature maintains the previous logic level therefore a valid logic level is always present eliminating the need for additional resistors for an unused or disconnected inputs.

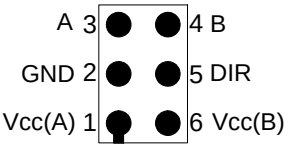
Pin Assignments

(Top View)



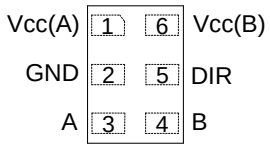
SOT26
SOT363

(Bottom View)



X2-DFN1409-6
Chip Scale
Alternative

(Top View)



X1-DFN1010-6
X2-DFN0910-6
X2-DFN1410-6

Features

- Wide Supply Voltage Range:
  - V_{CC}(A): from 1.2V to 3.6V
  - V_{CC}(B): from 1.2V to 3.6V
- ± 12mA Output Drive at 3.3V
- High Noise Immunity - (100mV hysteresis typical)
- I_{OFF} Supports Partial-Power-Down Mode Operation
- I_{OFF} controlled by either V_{CC} being at 0V
- Inputs accept up to 4.6V
- ESD Protection Exceeds JESD 22
  - 200-V Machine Model (A115)
  - 2000-V Human Body Model (A114)
  - 1000 V Charged Device Model (C101)
- Latch-Up Exceeds 100mA per JESD 78, Class I
- X2-DFN1409-6 package designed as a direct replacement for chip scale packaging.
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Applications

- Voltage Level Translation:
  Well suited to join logic types operating at different voltages
- Power Down Signal Isolation:
  If either voltage domain is turned off the signal is isolated and there is no loading on signal lines
- Wide array of products such as:
  - Cell Phones, Tablets, E-Readers
  - PCs, Notebooks, Netbooks, Ultrabooks
  - Networking, Routers, Gateways
  - Computer Peripherals, Hard Drives, CD/DVD ROMs
  - TVs, DVDs, DVRs, Set Top Boxes
  - Personal Navigation / GPS
  - MP3 players, Cameras, Video Recorders

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

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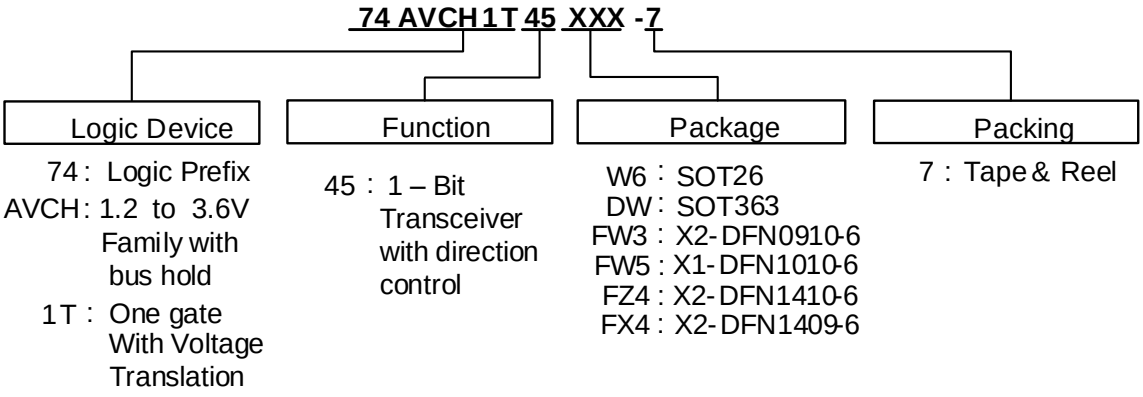
Ordering Information



Part Number	Package Code	Packaging	7" Tape and Reel (Note 7)	
			Quantity	Part Number Suffix
74AVCH1T45W6-7	W6	SOT26	3,000/Tape & Reel	-7
74AVCH1T45DW-7	DW	SOT363	3,000/Tape & Reel	-7
74AVCH1T45FW3-7	FW3	X2-DFN0910-6	5,000/Tape & Reel	-7
74AVCH1T45FW5-7	FW5	X1-DFN1010-6	5,000/Tape & Reel	-7
74AVCH1T45FZ4-7	FZ4	X2-DFN1410-6	5,000/Tape & Reel	-7
74AVCH1T45FX4-7	FX4	X2-DFN1409-6	5,000/Tape & Reel	-7

Notes: 4. The taping orientation is located on our website at http://www.diodes.com/datasheets/ap02007.pdf

Pin Descriptions

Pin Name	Pin	Function
VCC(A)	1	Supply for I/O pin A and reference for DIR
GND	2	Ground
A	3	Data Input/Output
B	4	Data Input/Output
DIR	5	Direction Control
VCC(B)	6	Supply for I/O pin B

Function Table

Supply voltage	Input	Input/Output	
$V_{CC(A)}$, $V_{CC(B)}$	DIR (Direction Pin)	A	B
1.2 V to 3. 6 V	L	A=B	input
1.2 V to 3. 6 V	H	input	B=A
GND	X	Z	Z

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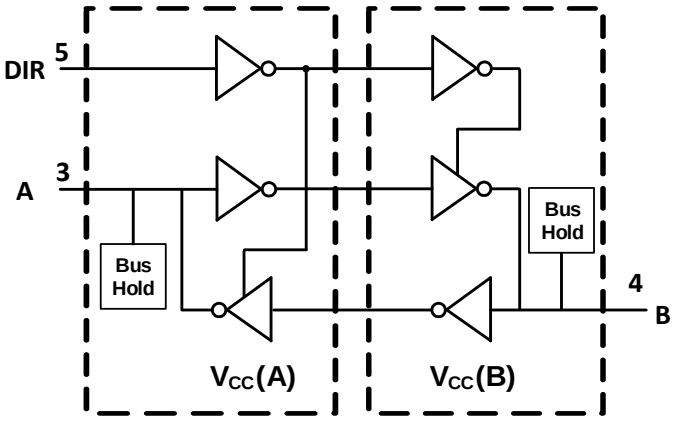
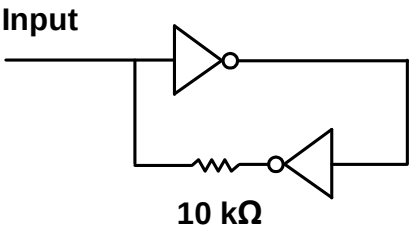
Logic Diagram





Bus Hold Circuit
Previous Input is Latched
Input Signals must be strong enough to override 10kΩ

Absolute Maximum Ratings (Note 5) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter		Rating	Unit
ESD HBM	Human Body Model ESD Protection		2	kV
ESD CDM	Charged Device Model ESD Protection		1	kV
ESD MM	Machine Model ESD Protection		200	V
V_{CC}(A), V_{CC}(B)	Supply Voltage Range		-0.5 to +4.6	V
V_I	Input Voltage Range		-0.5 to +4.6	V
V_O	Voltage Applied to Output in High Impedance or I_{OFF} State		-0.5 to +4.6	V
V_O	Voltage Applied to Output in High or Low State	A pin	-0.5 to V_{CC}(A) +0.5	V
		B pin	-0.5 to V_{CC}(B) +0.5	V
I_{IK}	Input Clamp Current V_I<0		-50	mA
I_{OK}	Output Clamp Current		-50	mA
I_O	Continuous Output Current		±50	mA
	Continuous Current Through V_{CC} or GND		±100	mA
T_J	Operating Junction Temperature		-40 to +150	°C
T_{STG}	Storage Temperature		-65 to +150	°C

Note: 5. Stresses beyond the absolute maximum may result in immediate failure or reduced reliability. These are stress values and device operation should be within recommend values.

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Recommended Operating Condition (Notes 6, 7 & 8) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter		V_{CCI}	V_{CCO}	Min	Max	Units
$V_{CC}(A)$	Operating Voltage		—	—	1.2	3.6	V
$V_{CC}(B)$	Operating Voltage		—	—	1.2	3.6	V
V_{IH}	High-Level Input Voltage	Data Inputs	1.2 to 1.95V	1.2 to 3.6V	0.65 x $V_{CC(A)}$	—	V
			1.95 to 2.7V	1.2 to 3.6V	1.6	—	
			2.7V to 3.6V	1.2 to 3.6V	2	—	
V_{IL}	Low-Level Input Voltage	Data Inputs	1.2 to 1.95V	1.2 to 3.6V	—	0.35 x $V_{CC(A)}$	V
			1.95 to 2.7V	1.2 to 3.6V	—	0.7	
			2.7V to 3.6V	1.2 to 3.6V	—	0.8	
V_{IH}	High-Level Input Voltage	DIR (referenced to V_{CCA})	1.2 to 1.95V	1.2 to 3.6V	0.65 x $V_{CC(B)}$	—	V
			1.95 to 2.7V	1.2 to 3.6V	1.6	—	
			2.7 to 3.6V	1.2 to 3.6V	2	—	
V_{IL}	Low-Level Input Voltage	DIR (referenced to V_{CCA})	1.2 to 1.95V	1.2 to 3.6V	—	0.35 x $V_{CC(B)}$	V
			1.95 to 2.7V	1.2 to 3.6V	—	0.7	
			2.7 to 3.6V	1.2 to 3.6V	—	0.8	
V_I	Input Voltage		—	—	0	3.6	V
V_O	Output Voltage	Active state	—	—	0	V_{CCO}	V
		3-state	—	—	0	3.6	V
I_{OH}	High-Level Output Current		1.2 to 3.6V	1.2V	—	-3	mA
			1.2 to 3.6V	1.4 to 1.6V	—	-6	
			1.2 to 3.6V	1.65 to 1.95V	—	-8	
			1.2 to 3.6V	2.3 to 2.7V	—	-9	
			1.2 to 3.6V	3 to 3.6V	—	-12	
I_{OL}	Low-Level Output Current		1.2 to 3.6V	1.2V	—	3	mA
			1.2 to 3.6V	1.4 to 1.6V	—	6	
			1.2 to 3.6V	1.65 to 1.95V	—	8	
			1.2 to 3.6V	2.3 to 2.7V	—	9	
			1.2 to 3.6V	3 to 3.6V	—	12	
Δt/ΔV	Input Transition Rise or Fall Rate		1.2 to 3.6V	1.2 to 3.6V	—	5	ns/V
T_A	Operating Free-Air Temperature				-40	+85	°C

Note: 6. V_{CCO} is the V_{CC} associated with the output port.
7. V_{CCI} is the V_{CC} associated with the input port.
8. All unused inputs of the device must be held at V_{CCI} of GND.

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Electrical Characteristics (Notes 9 & 10) (@T_A = +40°C to +85°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions		V_{CC} (A)	V_{CC} (B)	T_A = +25°C			T_A = -40°C to +85°C		Unit
						Min	Typ	Max	Min	Max	
V_{OH}	High Level Output Voltage	I_{OH} = -100µA		1.2 to 3.6V	1.2V to 3.6V	—	—	—	V_{CC} – 0.2	—	V
		I_{OH} = -3mA		1.2V	1.2V	—	0.95	—	—	—	
		I_{OH} = -6mA		1.4V	1.4V	—	—	—	1.05	—	
		I_{OH} = -8mA		1.65V	1.65V	—	—	—	1.2	—	
		I_{OH} = -9mA		2.3V	2.3V	—	—	—	1.75	—	
		I_{OH} = -12mA		3V	3V	—	—	—	2.3	—	
V_{OL}	Low-Level Output Voltage	I_{OL} = 100µA		1.2 to 3.6V	1.2V to 3.6V	—	—	—	—	0.2	V
		I_{OL} = 3mA		1.2V	1.2V	—	0.15	—	—	—	
		I_{OL} = 6mA		1.4V	1.4V	—	—	—	—	0.35	
		I_{OL} = 8mA		1.65V	1.65V	—	—	—	—	0.45	
		I_{OL} = 9mA		2.3V	2.3V	—	—	—	—	0.55	
		I_{OL} = 12mA		3V	3V	—	—	—	—	0.7	
I_I	Input Current	DIR	V_I = V_{CC}(A) or GND	1.2 to 3.6V	1.2 to 3.6V	-0.25	±0.25	0.25	-1	1	µA
I_{OFF}	Power Down Leakage Current	A Pin	V_I or V_O = 0 to 3.6V	0V	0 to 3.6V	-1	±0.1	1	-5	5	µA
		B Pin		0 to 3.6V	0	-1	±0.1	1	-5	5	
I_{OZ}	3-State Leakage Current	B Pin	V_O = V_{CCO} or Gnd	0V	0 to 3.6V	-2.5	±0.5	2.5	-5	5	µA
		A Pin	V_I= V_{CCI} or Gnd	0 to 3.6V	0	-2.5	±0.5	2.5	-5	5	
I_{CCA}	Supply Current	V_I = V_{CCI} or GND I_O = 0		1.2 to 3.6V	11.2 to 3.6V	—	—	—	—	10	µA
				3.6V	0V	—	—	—	—	-2	
				0V	3.6V	—	—	—	—	10	
I_{CCB}	Supply Current	V_I = V_{CCI} or GND I_O = 0		1.2 to 3.6V	1.2 to 3.6V	—	—	—	—	10	µA
				0V	3.6V	—	—	—	—	10	
				3.6V	0V	—	—	—	—	-2	
I_{CCA} + I_{CCB}	Supply Current	V_I = V_{CCI} or GND I_O = 0		1.2 to 3.6V	1.2 to 3.6V	—	—	—	—	20	µA
C_I	Input Capacitance	DIR	V_I= V_{CC}(A) or GND	3.3V	3.3V	—	2.5	—	—	—	pF
C_{IO}	Input/Output Capacitance	A or B pin	V_I= V_{CC}(A)/(B) or GND	3.3V	3.3V	—	6.0	—	—	—	pF

Notes: 9. V_{CCO} is the V_{CC} associated with the output port.
10. V_{CCI} is the V_{CC} associated with the input port.

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Package Characteristics (V_{CC} = 3.3V, T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Package	Test Conditions	Min	Typ	Max	Unit
θ_{JA}	Thermal Resistance Junction-to-Ambient	SOT26	(Note 11)	—	166	—	°C/W
		SOT363		—	371	—	
		X2-DFN0910-6		—	530	—	
		X2- DFN1410-6		—	430	—	
		X2-DFN1409-6		—	450	—	
		X1-DFN1010-6		—	510	—	
θ_{JC}	Thermal Resistance Junction-to-Case	SOT26	(Note 11)	—	46	—	°C/W
		SOT363		—	143	—	
		X2-DFN0910-6		—	260	—	
		X2- DFN1410-6		—	190	—	
		X2-DFN1409-6		—	200	—	
		X1-DFN1010-6		—	250	—	

Note: 11. Test condition for all packages: Device mounted on FR-4 substrate PC board, 2oz copper with minimum recommended pad layout.

Switching Characteristics

V_{CC} (A) = 1.2V, T_A = -40°C to +85°C, See Figure 1

Parameter	From (Input)	To (Output)	V_{CC}(B) = 1.2V	V_{CC}(B) = 1.5V ±0.1	V_{CC}(B) = 1.8V ±0.15V	V_{CC}(B) = 2.5V ±0.2V	V_{CC}(B) = 3.3V ±0.3V	Unit
			TYP	TYP	TYP	TYP	TYP	
t_{PLH}	A	B	3.3	2.7	2.4	2.3	2.4	ns
t_{PHL}			3.3	2.7	2.4	2.3	2.4	
t_{PLH}	B	A	3.3	3.1	2.9	2.8	2.7	ns
t_{PHL}			3.3	3.1	2.9	2.8	2.7	
t_{PHZ}	DIR	A	5.1	5.2	5.3	5.2	3.7	ns
t_{PLZ}			5.1	5.2	5.3	5.2	3.7	
t_{PHZ}	DIR	B	5.3	4.3	4.0	3.3	3.7	ns
t_{PLZ}			5.3	4.3	4.0	3.3	3.7	
t_{PZH}*	DIR	A	8.6	7.3	6.8	6.1	6.4	ns
t_{PZL}*			8.6	7.3	6.8	6.1	6.4	
t_{PZH}*	DIR	B	8.3	7.8	7.7	7.5	5.8	ns
t_{PZL}*			8.3	7.8	7.7	7.5	5.8	

*Enable times are calculated vales see table at end of switching characteristics.

V_{CC} (A) = 1.5V ± 0.1V, T_A = -40°C to +85°C, See Figure 1

Parameter	From (Input)	To (Output)	V_{CC}(B) = 1.2V	V_{CC}(B) = 1.5V ±0.1		V_{CC}(B) = 1.8V ±0.15V		V_{CC}(B) = 2.5V ±0.2V		V_{CC}(B) = 3.3V ±0.3V		Unit
			TYP	Min	Max	Min	Max	Min	Max	Min	Max	
t_{PLH}	A	B	2.9	0.7	5.6	0.6	5.2	0.5	4.2	0.5	3.8	ns
t_{PHL}			2.9	0.7	5.6	0.6	5.2	0.5	4.2	0.5	3.8	
t_{PLH}	B	A	2.6	0.6	5.5	0.4	5.3	0.3	4.9	0.3	4.8	ns
t_{PHL}			2.6	0.6	5.5	0.4	5.3	0.3	4.9	0.3	4.8	
t_{PHZ}	DIR	A	3.8	1.6	6.7	1.5	6.8	0.3	6.9	0.9	6.9	ns
t_{PLZ}			3.8	1.6	6.7	1.5	6.8	0.3	6.9	0.9	6.9	
t_{PHZ}	DIR	B	5.1	1.8	8.1	1.6	7.1	1.1	4.7	1.4	4.5	ns
t_{PLZ}			5.1	1.8	8.1	1.6	7.1	1.1	4.7	1.4	4.5	
t_{PZH}*	DIR	A	7.7	—	13.6	—	12.4	—	9.6	—	9.3	ns
t_{PZL}*			7.7	—	13.6	—	12.4	—	9.6	—	9.3	
t_{PZH}*	DIR	B	6.7	—	12.3	—	12	—	11.1	—	10.7	ns
t_{PZL}*			6.7	—	12.3	—	12	—	11.1	—	10.7	

*Enable times are calculated vales see table at end of switching characteristics.

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Switching Characteristics (Continued)

V_{CC} (A) = 1.8V ± 0.15V, T_A = -40°C to +85°C, See Figure 1

Parameter	From (Input)	To (Output)	V_{CC}(B) = 1.2V	V_{CC}(B) = 1.5V ±0.1		V_{CC}(B) = 1.8V ±0.15V		V_{CC}(B) = 2.5V ±0.2V		V_{CC}(B) = 3.3V ±0.3V		Unit
			TYP	Min	Max	Min	Max	Min	Max	Min	Max	
t_{PLH}	A	B	2.7	0.6	5.3	0.5	5.0	0.4	3.9	0.4	3.4	ns
t_{PHL}			2.7	0.6	5.3	0.5	5.0	0.4	3.9	0.4	3.4	
t_{PLH}	B	A	2.3	0.5	5.2	0.4	5.0	0.3	4.6	0.2	4.4	ns
t_{PHL}			2.3	0.5	5.2	0.4	5.0	0.3	4.6	0.2	4.4	
t_{PHZ}	DIR	A	3.8	1.6	5.9	1.6	5.9	1.6	5.9	0.5	6.0	ns
t_{PLZ}			3.8	1.6	5.9	1.6	5.9	1.6	5.9	0.5	6.0	
t_{PHZ}	DIR	B	5.0	1.8	7.7	1.4	6.8	1.0	4.4	1.4	5.3	ns
t_{PLZ}			5.0	1.8	7.7	1.4	6.8	1.0	4.4	1.4	5.3	
t_{PZH}*	DIR	A	7.3	—	12.9	—	11.8	—	9.0	—	8.7	ns
t_{PZL}*			7.3	—	12.9	—	11.8	—	9.0	—	8.7	
t_{PZH}*	DIR	B	6.5	—	11.2	—	10.9	—	9.8	—	9.4	ns
t_{PZL}*			6.5	—	11.2	—	10.9	—	9.8	—	9.4	

*Enable times are calculated vales see table at end of switching characteristics.

V_{CC} (A) = 2.5V ± 0.2V, T_A = -40°C to +85°C, See Figure 1

Parameter	From (Input)	To (Output)	V_{CC}(B) = 1.2V	V_{CC}(B) = 1.5V ±0.1		V_{CC}(B) = 1.8V ±0.15V		V_{CC}(B) = 2.5V ±0.2V		V_{CC}(B) = 3.3V ±0.3V		Unit
			TYP	Min	Max	Min	Max	Min	Max	Min	Max	
t_{PLH}	A	B	2.6	0.5	4.9	0.4	4.6	0.3	3.4	0.3	3.0	ns
t_{PHL}			2.6	0.5	4.9	0.4	4.6	0.3	3.4	0.3	3.0	
t_{PLH}	B	A	2.2	0.4	4.2	0.3	3.8	0.2	3.4	0.2	3.3	ns
t_{PHL}			2.2	0.4	4.2	0.3	3.8	0.2	3.4	0.2	3.3	
t_{PHZ}	DIR	A	2.8	0.3	3.8	0.8	3.8	0.4	3.8	0.5	3.8	ns
t_{PLZ}			2.8	0.3	3.8	0.8	3.8	0.4	3.8	0.5	3.8	
t_{PHZ}	DIR	B	4.9	2.0	7.6	1.5	6.5	0.6	4.1	1.0	4.0	ns
t_{PLZ}			4.9	2.0	7.6	1.5	6.5	0.6	4.1	1.0	4.0	
t_{PZH}*	DIR	A	7.1	—	11.8	—	10.3	—	7.5	—	7.3	ns
t_{PZL}*			7.1	—	11.8	—	10.3	—	7.5	—	7.3	
t_{PZH}*	DIR	B	5.4	—	8.6	—	8.1	—	7.0	—	6.6	ns
t_{PZL}*			5.4	—	8.6	—	8.1	—	7.0	—	6.6	

*Enable times are calculated vales see table at end of switching characteristics.

V_{CC} (A) = 3.3V ± 0.3V, T_A = -40°C to +85°C, See Figure 1

Parameter	From (Input)	To (Output)	V_{CC}(B) = 1.2V	V_{CC}(B) = 1.5V ±0.1		V_{CC}(B) = 1.8V ±0.15V		V_{CC}(B) = 2.5V ±0.2V		V_{CC}(B) = 3.3V ±0.3V		Unit
			TYP	Min	Max	Min	Max	Min	Max	Min	Max	
t_{PLH}	A	B	2.6	0.4	4.7	0.3	4.4	0.2	3.3	0.2	2.8	ns
t_{PHL}			2.6	0.4	4.7	0.3	4.4	0.2	3.3	0.2	2.8	
t_{PLH}	B	A	2.2	0.4	3.8	0.3	3.4	0.2	3	0.1	2.8	ns
t_{PHL}			2.2	0.4	3.8	0.3	3.4	0.2	3	0.1	2.8	
t_{PHZ}	DIR	A	3.1	1.3	4.3	1.3	4.3	1.3	4.3	1.3	4.3	ns
t_{PLZ}			3.1	1.3	4.3	1.3	4.3	1.3	4.3	1.3	4.3	
t_{PHZ}	DIR	B	4	0.7	7.4	0.6	6.5	0.7	4	1.5	4.9	ns
t_{PLZ}			4	0.7	7.4	0.6	6.5	0.7	4	1.5	4.9	
t_{PZH}*	DIR	A	6.2	—	11.2	—	9.9	—	7	—	6.7	ns
t_{PZL}*			6.2	—	11.2	—	9.9	—	7	—	6.7	
t_{PZH}*	DIR	B	5.7	—	8.9	—	8.5	—	7.2	—	6.8	ns
t_{PZL}*			5.7	—	8.9	—	8.5	—	7.2	—	6.8	

*Enable times are calculated vales see table at end of switching characteristics.

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Enable Time Calculations

Enable times can be calculated as follows:

- t_{PZH} (DIR to A) = t_{PLZ} (DIR to B) + t_{PLH} (B to A)
- t_{PZL} (DIR to A) = t_{PHZ} (DIR to B) + t_{PHL} (B to A)
- t_{PZH} (DIR to B) = t_{PLZ} (DIR to A) + t_{PLH} (A to B)
- t_{PZL} (DIR to B) = t_{PHZ} (DIR to A) + t_{PHL} (A to B)

These times represent the length of time from a direction change plus the propagation time through the part.
A new input signal should not be applied until the new input pin has been disabled.

Operating Characteristics (T_A = +25°C, unless otherwise specified.)

Parameter Power Dissipation Capacitance		Test Conditions	V_{CC}(A) = V_{CC}(B) = 1.8V	V_{CC}(A) = V_{CC}(B) = 2.5V	V_{CC}(A) = V_{CC}(B) = 3.3V	V_{CC}(A) = V_{CC}(B) = 5V	Unit
			Typ	Typ	Typ	Typ	
C_{PD} (A)	A- input, B- output	C_L = 0 pF f = 10 MHz tr = tf = 1 ns	3	4	4	4	pF
	B- input, A- output		18	19	20	21	
C_{PD} (B)	A- input, B- output	C_L = 0 pF f = 10 MHz tr = tf = 1 ns	18	19	20	21	pF
	B- input, A- output		3	4	4	4	

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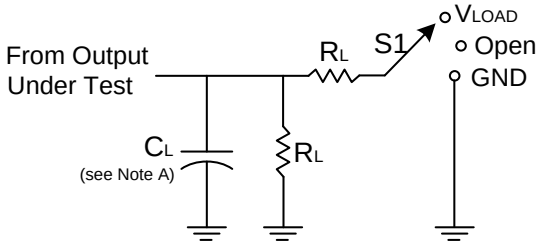
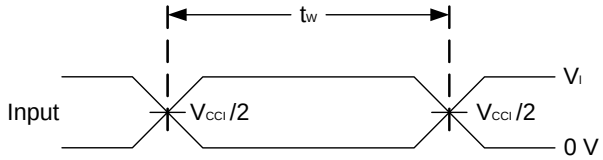
Parameter Measurement Information

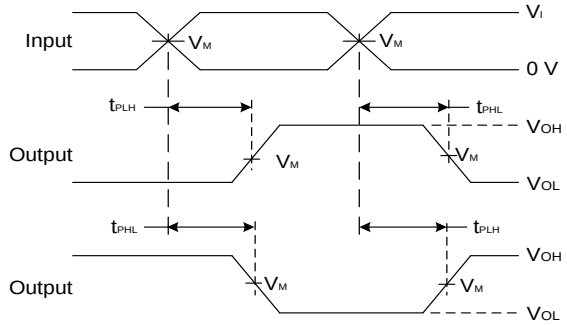


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	Vload
t_{PHZ}/t_{PZH}	GND

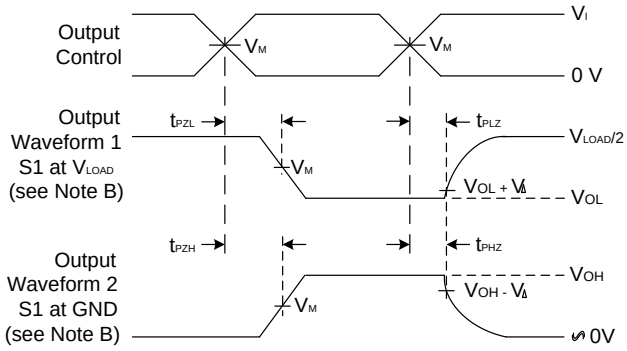
V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	$V\Delta$
	V_I	t_R/t_F					
1.2V	V_{CCI}	≤2ns	$V_{CCO}/2$	2 x V_{CCO}	15pF	2KΩ	0.15V
1.8V±0.15V	V_{CCI}	≤2ns	$V_{CCO}/2$	2 x V_{CCO}	15pF	2KΩ	0.15V
2.5V±0.2V	V_{CCI}	≤2ns	$V_{CCO}/2$	2 x V_{CCO}	15pF	2KΩ	0.15V
3.3V±0.3V	V_{CCI}	≤2.5ns	$V_{CCO}/2$	2 x V_{CCO}	15pF	2KΩ	0.3V



Voltage Waveform Pulse Duration



Voltage Waveform Propagation Delay Times
Inverting and Non Inverting Outputs



Voltage Waveform Enable and Disable Times
Low and High Level Enabling

Figure 1 Load Circuit and Voltage Waveforms

Notes:
A. Includes test lead and test apparatus capacitance.
B. Waveform 1 is for an output with input set up as a low and device coming out or into 3-state via DIR control.
Waveform 2 is for an output with input set up as a high and device coming out or into 3-state via DIR control.
C. All pulses are supplied at pulse repetition rate ≤ 10 MHz.
D. t_{PLZ} and t_{PHZ} are the same as t_{DIS}.
E. t_{PZL} and t_{PZH} are the same as t_{EN}.
F. t_{PLH} and t_{PHL} are the same as t_{PD}.
G. V_{CCI} is the V_{CC} associated with the input.
F. V_{CCO} is the V_{CC} associated with the output.

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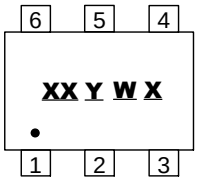
Marking Information

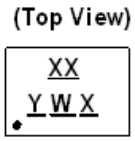
(1) SOT26, SOT363



XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Internal Code

Part Number	Package	Identification Code
74AVCH1T45W6-7	SOT26	VT
74AVCH1T45DW-7	SOT363	VR

(2) X2-DFN0910-6, X2-DFN1010-6, X2-DFN1410-6, and X2-DFN1409-6



XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Internal code

Part Number	Package	Identification Code
74AVCH1T45FW3-7	X2-DFN0910-6	ZR
74AVCH1T45FW5-7	X1-DFN1010-6	VR
74AVCH1T45FX4-7	X2-DFN1409-6	VT
74AVCH1T45FZ4-7	X2-DFN1410-6	VS

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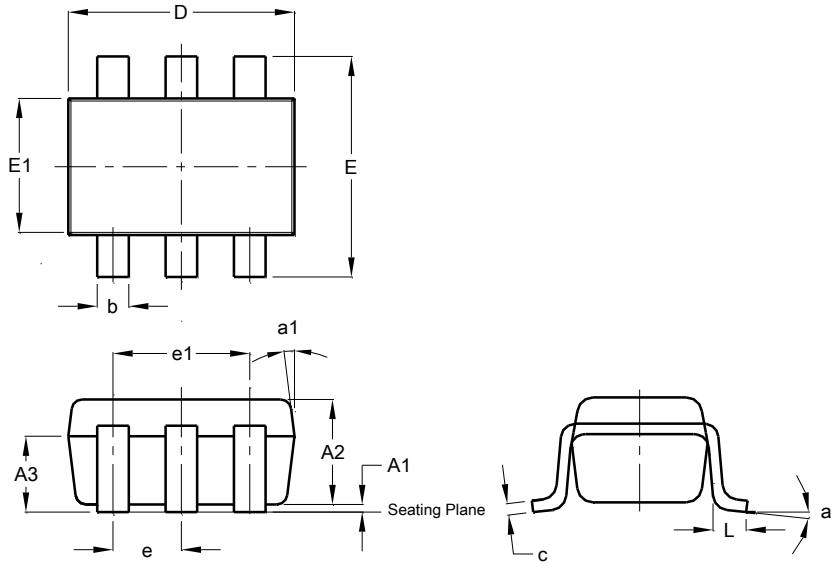
Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT26

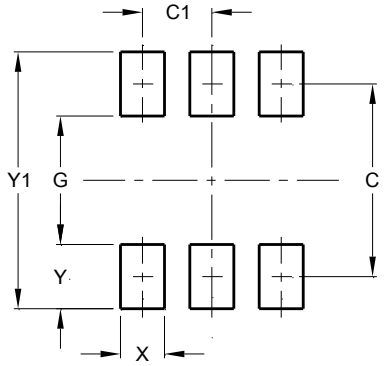


SOT26			
Dim	**Min**	**Max**	**Typ**
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT26



Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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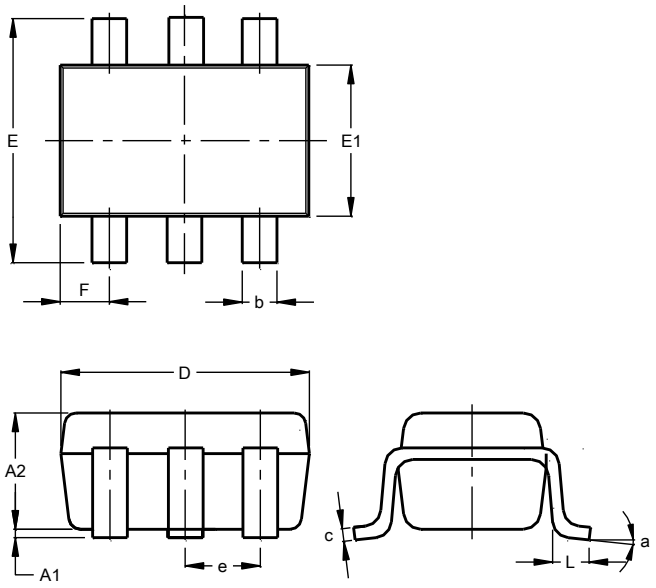
Package Outline Dimensions (Cont.)

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT363

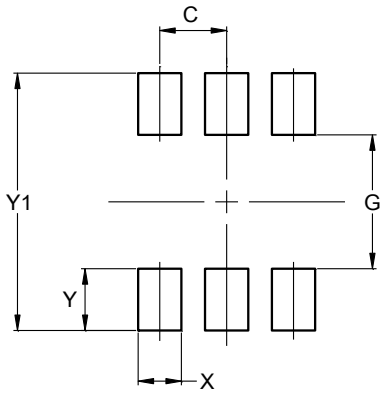


SOT363			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	1.00
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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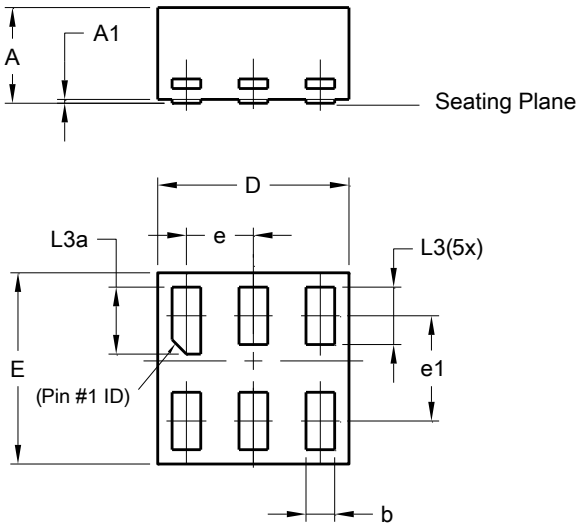
Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

X1-DFN1010-6 (Type B)

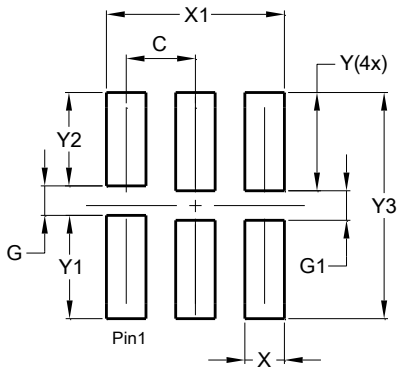


X1-DFN1010-6 (Type B)			
Dim	**Min**	**Max**	**Typ**
A	-	0.50	0.39
A1	-	0.04	-
b	0.12	0.20	0.15
D	0.95	1.050	1.00
E	0.95	1.050	1.00
e	0.35 BSC		
e1	0.55 BSC		
L3	0.27	0.30	0.30
L3a	0.32	0.40	0.35
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

X1-DFN1010-6 (Type B)



Dimensions	Value (in mm)
C	0.350
G	0.150
G1	0.150
X	0.200
X1	0.900
Y	0.500
Y1	0.525
Y2	0.475
Y3	1.150

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Package Outline Dimensions

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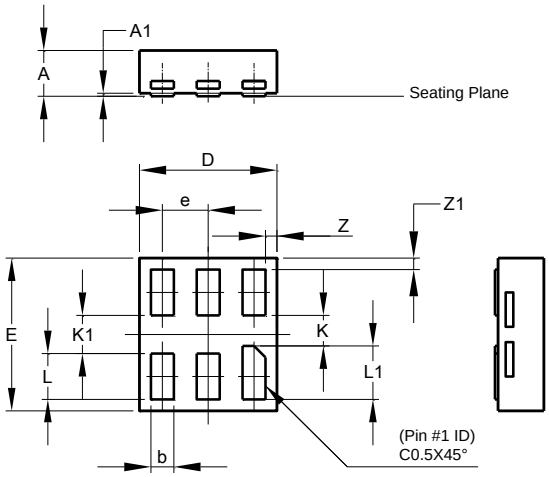
X2-DFN0910-6

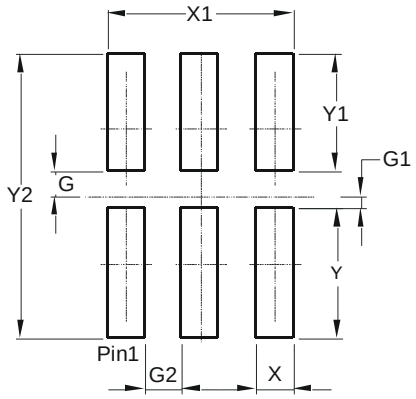


X2-DFN0910-6			
Dim	**Min**	**Max**	**Typ**
A	-	0.35	0.30
A1	0	0.03	0.02
b	0.10	0.20	0.15
D	0.85	0.95	0.90
E	0.95	1.05	1.00
e	-	-	0.30
K	0.20	-	-
K1	0.25	-	-
L	0.25	0.35	0.30
L1	0.30	0.40	0.35
Z	-	-	0.075
Z1	-	-	0.075
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN0910-6



Dimensions	Value (in mm)
G	0.100
G1	0.050
G2	0.150
X	0.150
X1	0.750
Y	0.525
Y1	0.475
Y2	1.150

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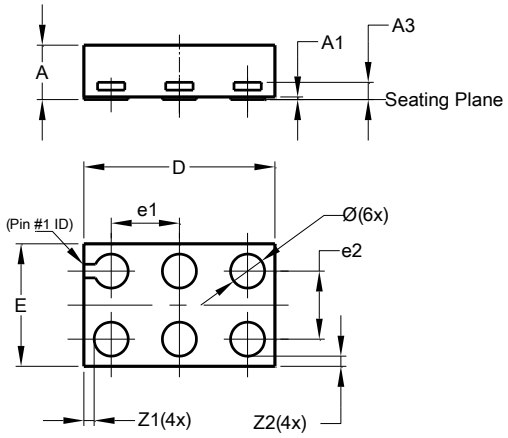
Package Outline Dimensions (Cont.)

Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN1409-6

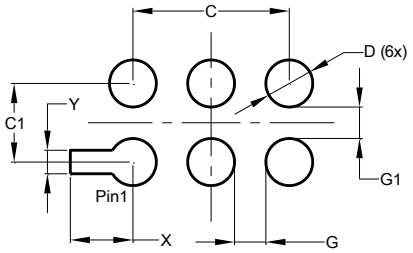


X2-DFN1409-6			
Dim	**Min**	**Max**	**Typ**
A	-	0.40	0.39
A1	0	0.05	0.02
A3	-	-	0.13
Ø	0.20	0.30	0.25
D	1.35	1.45	1.40
E	0.85	0.95	0.90
e1	-	-	0.50
e2	-	-	0.50
Z1	-	-	0.075
Z2	-	-	0.075
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN1409-6



Dimensions	Value (in mm)
C	1.000
C1	0.500
D	0.300
G	0.200
G1	0.200
X	0.400
Y	0.150

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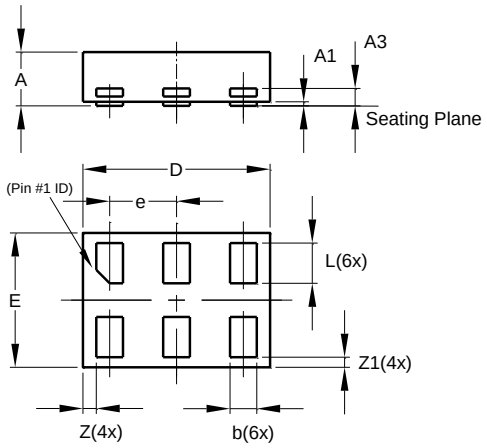
Package Outline Dimensions (Cont.)

Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN1410-6

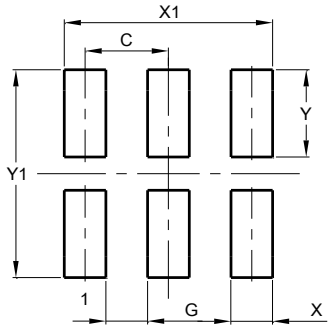


X2-DFN1410-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.15	0.25	0.20
D	1.35	1.45	1.40
E	0.95	1.05	1.00
e	—	—	0.50
L	0.25	0.35	0.30
Z	—	—	0.10
Z1	0.045	0.105	0.075
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

X2-DFN1410-6



Dimensions	Value (in mm)
C	0.500
G	0.250
X	0.250
X1	1.250
Y	0.525
Y1	1.250

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