SINGLE BIT DUAL POWER SUPPLY TRANSLATING TRANSCEIVER WITH 3 STATE OUTPUTS

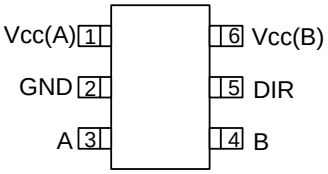
Description

The 74AVC1T45 is a single bit, dual supply transceiver with tri-state outputs suitable for transmitting a single logic bit across different voltage domains. 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 tri-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.

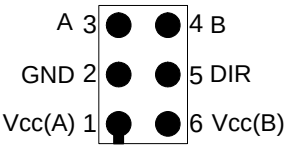
Pin Assignments

(Top View)



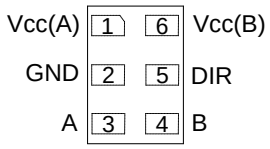
SOT26
SOT363

(Bottom View)



X2-DFN1409-6
Chip Scale
Alternative

(Top View)



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

Features

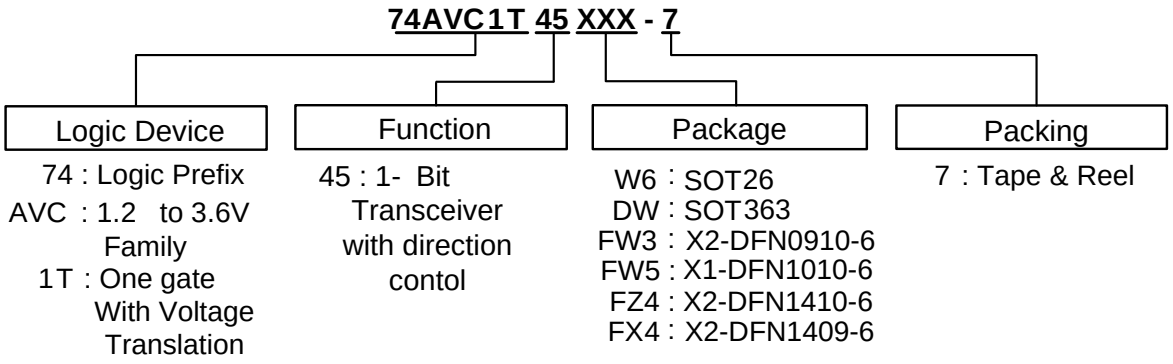
- Wide Supply Voltage Range:
  - V_{CC}(A): from 1.2V to 3.6V
  - V_{CC}(B): from 1.2V to 3.6V
- ± 12mA Output Drive at 3.3V
- High Noise Immunity—(100mV Hysteresis Typical)
- I_{OFF} Supports Partial-Power-Down Mode Operation
- I_{OFF} Controlled by Either V_{CC} at 0V
- Inputs Accept up to 4.6V
- ESD 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) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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.

Ordering Information



Part Number	Package Code	Packaging	7" Tape and Reel (Note 7)	
			Quantity	Part Number Suffix
74AVC1T45W6-7	W6	SOT26	3000/Tape & Reel	-7
74AVC1T45DW-7	DW	SOT363	3000/Tape & Reel	-7
74AVC1T45FW3-7	FW3	X2-DFN0910-6	5000/Tape & Reel	-7
74AVC1T45FW5-7	FW5	X1-DFN1010-6	5000/Tape & Reel	-7
74AVC1T45FZ4-7	FZ4	X2-DFN1410-6	5000/Tape & Reel	-7
74AVC1T45FX4-7	FX4	X2-DFN1409-6	5000/Tape & Reel	-7

Notes: 4. Taping orientation is located on our website at https://www.diodes.com/assets/Packaging-Support-Docs/Ap02007.pdf.

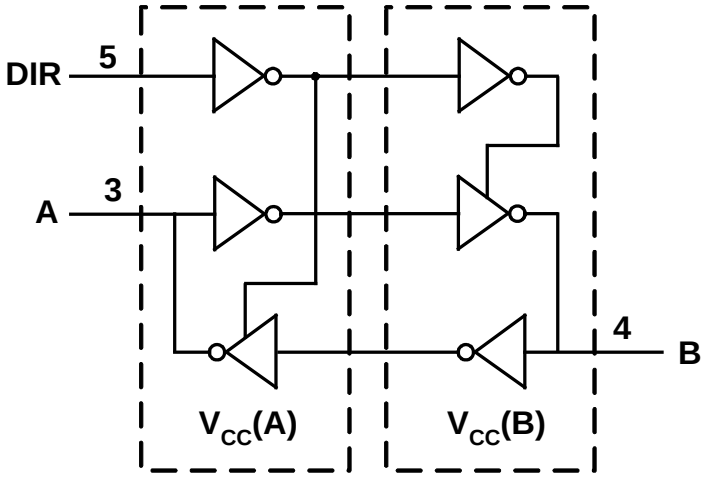
Pin Descriptions

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

Logic Diagram



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 can result in immediate failure or reduced reliability. These are stress values and device operation should be within recommend values.

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	1.2V to 1.95V	1.2V to 3.6V	0.65 × $V_{CC(A)}$	—	V
			1.95V to 2.7V	1.2V to 3.6V	1.6	—	
			2.7V to 3.6V	1.2V to 3.6V	2	—	
V_{IL}	Low-Level Input Voltage	Data Inputs	1.2V to 1.95V	1.2V to 3.6V	—	0.35 × $V_{CC(A)}$	V
			1.95V to 2.7V	1.2V to 3.6V	—	0.7	
			2.7V to 3.6V	1.2V to 3.6V	—	0.8	
V_{IH}	High-Level Input Voltage	DIR (Referenced to V_{CCA})	1.2V to 1.95V	1.2V to 3.6V	0.65 × $V_{CC(B)}$	—	V
			1.95V to 2.7V	1.2V to 3.6V	1.6	—	
			2.7V to 3.6V	1.2V to 3.6V	2	—	
V_{IL}	Low-Level Input Voltage	DIR (Referenced to V_{CCA})	1.2V to 1.95V	1.2V to 3.6V	—	0.35 × $V_{CC(B)}$	V
			1.95V to 2.7V	1.2V to 3.6V	—	0.7	
			2.7 to 3.6V	1.2V 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		1.2V to 3.6V	1.2V	—	-3	mA
			1.2V to 3.6V	1.4V to 1.6V	—	-6	
			1.2V to 3.6V	1.65V to 1.95V	—	-8	
			1.2V to 3.6V	2.3V to 2.7V	—	-9	
			1.2V to 3.6V	3V to 3.6V	—	-12	
I_{OL}	Low-Level Output Current		1.2V to 3.6V	1.2V	—	3	mA
			1.2V to 3.6V	1.4V to 1.6V	—	6	
			1.2V to 3.6V	1.65V to 1.95V	—	8	
			1.2V to 3.6V	2.3V to 2.7V	—	9	
			1.2V to 3.6V	3V to 3.6V	—	12	
Δt/ΔV	Input Transition Rise or Fall Rate		1.2V to 3.6V	1.2V 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.

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		1.2V 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		1.2V 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	1.2V to 3.6V	1.2V 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 = 0V to 3.6V	0V	0V to 3.6V	-1	±0.1	1	-5	5	µA
		B Pin		0V to 3.6V	0V	-1	±0.1	1	-5	5	
I_{OZ}	3-State Leakage Current	B Pin	V_O = V_{CCO} or GND	0V	0V to 3.6V	-2.5	±0.5	2.5	-5	5	µA
		A Pin	V_I= V_{CCI} or GND	0V to 3.6V	0V	-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	11.2V 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		1.2V to 3.6V	1.2V 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		1.2V to 3.6V	1.2V 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.

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.

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.

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)

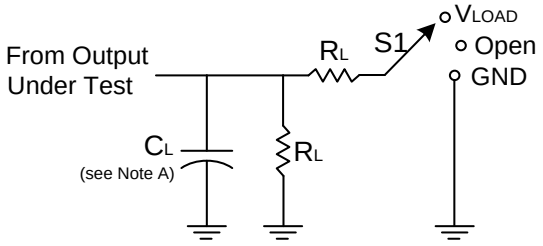
These times represent the length of time from a direction change plus the propagation time through the part.

A new input signal must not be applied until the new input pin has been disabled.

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

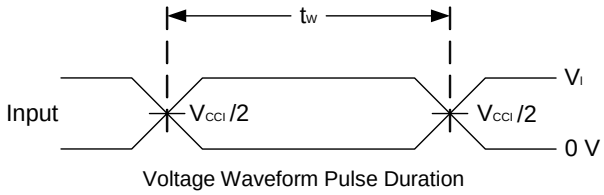
Parameter Power Dissipation Capacitance		Test Conditions	V_{CC}(A) = V_{CC}(B) = 1.8V	V_{CC}(A) = V_{CC}(B) = 2.5V	V_{CC}(A) = V_{CC}(B) = 3.3V	V_{CC}(A) = V_{CC}(B) = 5V	Unit
			Typ	Typ	Typ	Typ	
C_{pd} (A)	A- Input, B- Output	C_L = 0 pF f = 10 MHz tr = tf = 1 ns	3	4	4	4	pF
	B- Input, A- Output		18	19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

Parameter Measurement Information

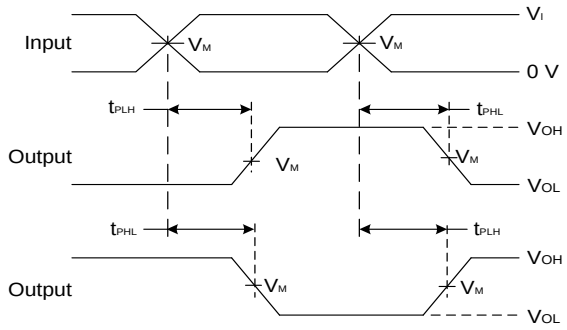


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	Vload
t_{PHZ}/t_{PZH}	GND

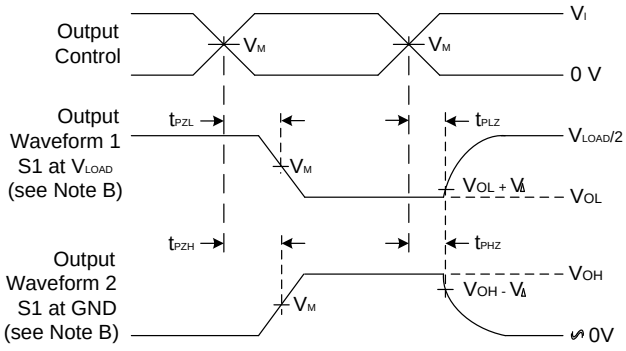
V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	$V\Delta$
	V_I	t_r/t_f					
1.2V	V_{CCI}	≤2ns	$V_{CCO}/2$	2 × V_{CCO}	15pF	2KΩ	0.15V
1.8V±0.15V	V_{CCI}	≤2ns	$V_{CCO}/2$	2 × V_{CCO}	15pF	2KΩ	0.15V
2.5V±0.2V	V_{CCI}	≤2ns	$V_{CCO}/2$	2 × V_{CCO}	15pF	2KΩ	0.15V
3.3V±0.3V	V_{CCI}	≤2.5ns	$V_{CCO}/2$	2 × V_{CCO}	15pF	2KΩ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



Voltage Waveform Pulse Duration



Voltage Waveform Propagation Delay Times
Inverting and Non Inverting Outputs



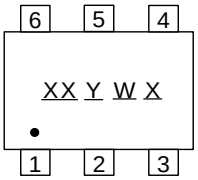
Voltage Waveform Enable and Disable Times
Low and High Level Enabling

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.

Marking Information

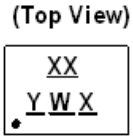
(1) SOT363, SOT563



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
74AVC1T45W6-7	SOT26	7A
74AVC1T45DW-7	SOT363	7B

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



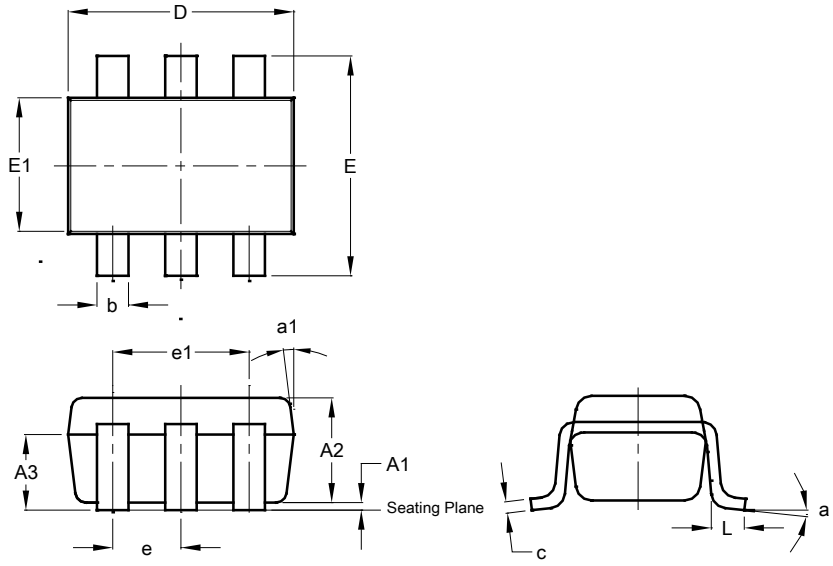
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Internal code

Part Number	Package	Identification Code
74AVC1T45FW3-7	X2-DFN0910-6	7A
74AVC1T45FW5-7	X1-DFN1010-6	7X
74AVC1T45FX4-7	X2-DFN1409-6	7B
74AVC1T45FZ4-7	X2-DFN1410-6	7C

Package Outline Dimensions (All dimensions in mm.)

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

SOT26 (SC74R)



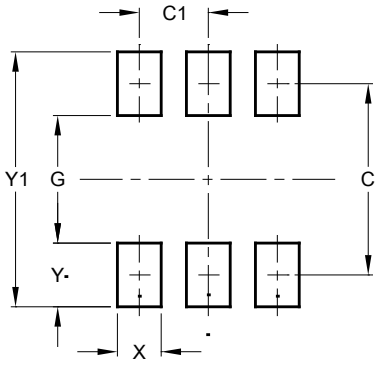
SOT26 (SC74R)			
Dim	**Min**	**Max**	**Typ**
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
All Dimensions in mm			

\

Suggested Pad Layout

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

SOT26 (SC74R)

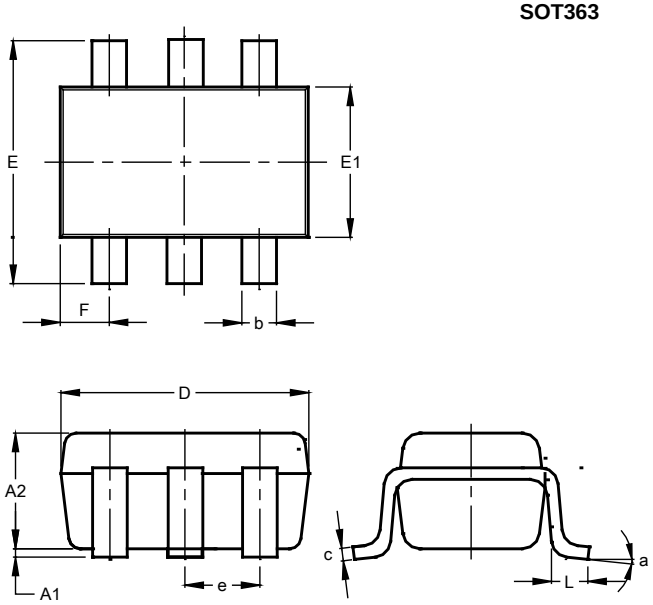


Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

Package Outline Dimensions (All dimensions in mm.)

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

SOT363

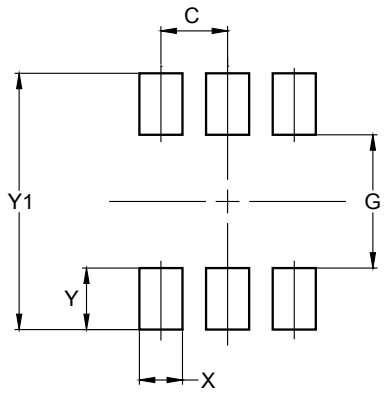


SOT363			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT363

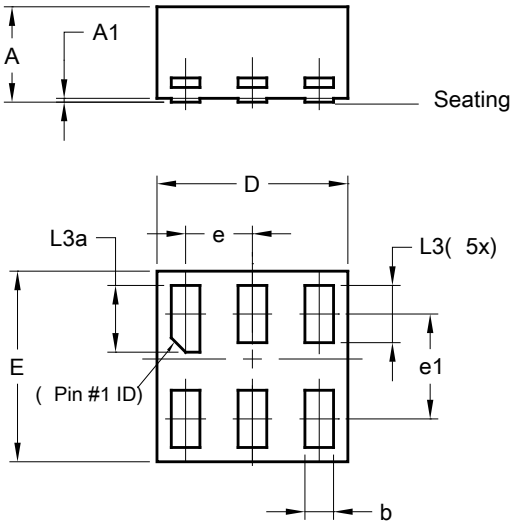


Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

Package Outline Dimensions (All dimensions in mm.)

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

X1-DFN1010-6 (Type B)

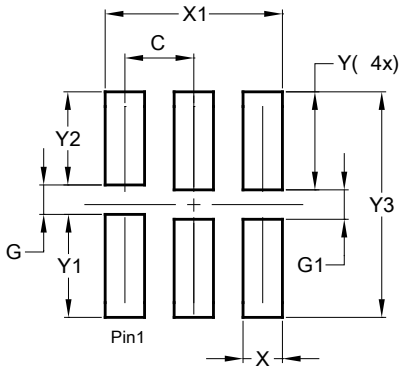


X1-DFN1010-6 (Type B)			
Dim	**Min**	**Max**	**Typ**
A	-	0.50	0.39
A1	-	0.04	-
b	0.12	0.20	0.15
D	0.95	1.050	1.00
E	0.95	1.050	1.00
e	0.35 BSC		
e1	0.55 BSC		
L3	0.27	0.30	0.30
L3a	0.32	0.40	0.35
All Dimensions in mm			

Suggested Pad Layout

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

X1-DFN1010-6 (Type B)

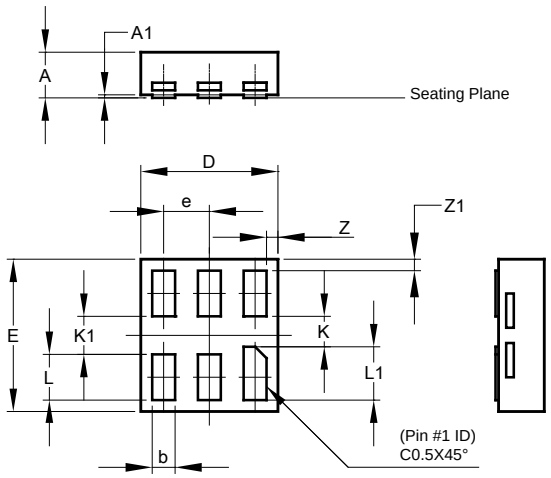


Dimensions	Value (in mm)
C	0.350
G	0.150
G1	0.150
X	0.200
X1	0.900
Y	0.500
Y1	0.525
Y2	0.475
Y3	1.150

Package Outline Dimensions (All dimensions in mm.)

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

X2-DFN0910-6

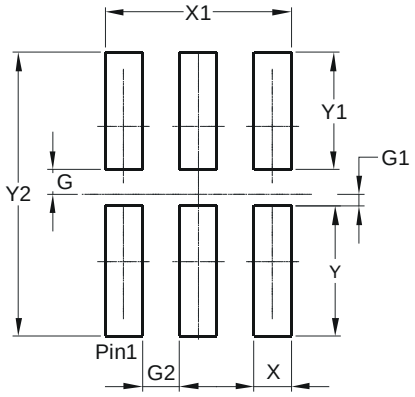


X2-DFN0910-6			
Dim	**Min**	**Max**	**Typ**
A	-	0.35	0.30
A1	0	0.03	0.02
b	0.10	0.20	0.15
D	0.85	0.95	0.90
E	0.95	1.05	1.00
e	-	-	0.30
K	0.20	-	-
K1	0.25	-	-
L	0.25	0.35	0.30
L1	0.30	0.40	0.35
Z	-	-	0.075
Z1	-	-	0.075
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN0910-6

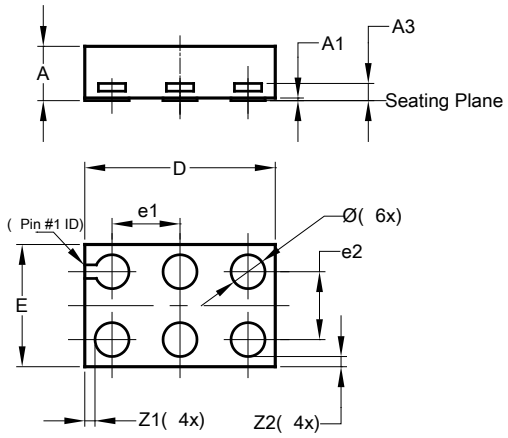


Dimensions	Value (in mm)
G	0.100
G1	0.050
G2	0.150
X	0.150
X1	0.750
Y	0.525
Y1	0.475
Y2	1.150

Package Outline Dimensions (All dimensions in mm.)

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

X2-DFN1409-6

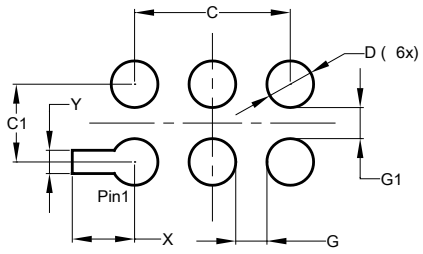


X2-DFN1409-6			
Dim	**Min**	**Max**	**Typ**
A	-	0.40	0.39
A1	0	0.05	0.02
A3	-	-	0.13
Ø	0.20	0.30	0.25
D	1.35	1.45	1.40
E	0.85	0.95	0.90
e1	-	-	0.50
e2	-	-	0.50
Z1	-	-	0.075
Z2	-	-	0.075
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN1409-6

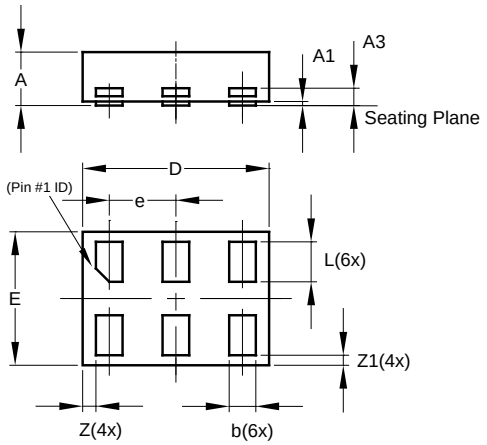


Dimensions	Value (in mm)
C	1.000
C1	0.500
D	0.300
G	0.200
G1	0.200
X	0.400
Y	0.150

Package Outline Dimensions (All dimensions in mm.)

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

X2-DFN1410-6

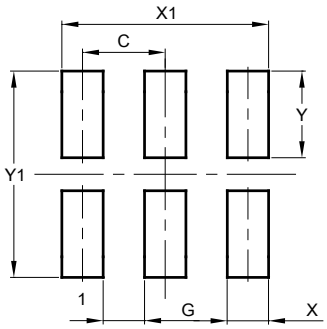


X2-DFN1410-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.40	0.39
A1	0.00	0.05	0.02
A3	—	—	0.13
b	0.15	0.25	0.20
D	1.35	1.45	1.40
E	0.95	1.05	1.00
e	—	—	0.50
L	0.25	0.35	0.30
Z	—	—	0.10
Z1	0.045	0.105	0.075
All Dimensions in mm			

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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