Am54S/74S242 • Am54S/74S243

Quad Bus Transceivers with Three-State Outputs

DISTINCTIVE CHARACTERISTICS

- Three-state outputs drive bus lines directly
- Advanced Schottky processing
- Hysteresis at inputs improve noise margin
- PNP inputs reduce D.C. loading on bus lines
- V_{OL} of 0.55V at 64mA for Am74S; 48mA for Am54S
- Data-to-output propagation delay times:
  Am54S/74S242 Inverting – 7.0ns MAX
  Am54S/74S243 Noninverting – 9.0ns MAX
- Enable-to-output – 15.0ns MAX
- 100% reliability assurance testing in compliance with MIL-STD-883

FUNCTIONAL DESCRIPTION

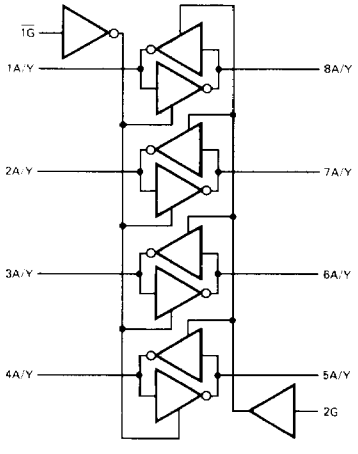
The Am54S/74S242 and Am54S/74S243 are quad bus transceivers designed for asynchronous two-way communications between data buses.

The Am54S/74S242 and Am54S/74S243 have the two 4-line data paths connected input-to-output on both sides to form an asynchronous transceiver/buffer with complementing enable inputs. The Am54S/74S242 is inverting, while the Am54S/74S243 presents noninverting data at the outputs. The outputs of the commercial temperature range versions have 64mA sink and 15mA source capability, which can be used to drive terminated lines down to 133Ω. The outputs of the military temperature range versions have 48mA sink and 12mA source current capability.

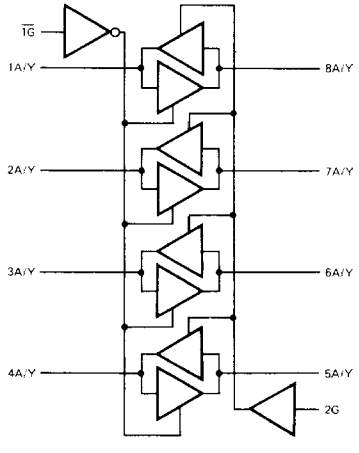
Featuring 0.2V minimum guaranteed hysteresis at each low-current PNP data input, they provide improved noise rejection and high-fan-out outputs to restore Schottky TTL levels completely.

LOGIC DIAGRAMS

Am54S/74S242

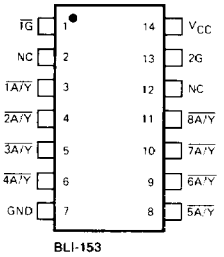


Am54S/74S243



CONNECTION DIAGRAMS
Top Views

Am54S/74S242



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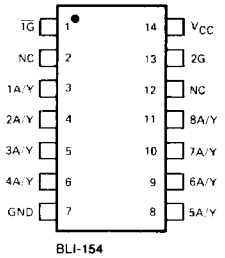
Am54S/74S243



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Note: Pin 1 is marked for orientation.

ORDERING INFORMATION

Package Type	Temperature Range	Am54S/74S242 Order Number	Am54S/74S243 Order Number
Hermetic	−55 to +125°C	SN54S242J	SN54S243J
Dice	−55 to +125°C	AM54S242X	AM54S243X
Hermetic	0 to +70°C	SN74S242J	SN74S243J
Molded	0 to +70°C		
Dice	0 to +70°C	AM74S242X	AM74S243X

LECTRICAL CHARACTERISTICS

ıe Following Conditions Apply Unless Otherwise Noted:

n54S242/S243 (MIL) T_A = −55 to +125°C V_{CC}(MIN.) = 4.50V V_{CC}(MAX.) = 5.50V
n74S242/S243 (COM'L) T_A = 0 to +70°C V_{CC}(MIN.) = 4.75V V_{CC}(MAX.) = 5.25V

ırameters	Description	Test Conditions (Note 1)			Min.	Typ. (Note 2)	Max.	Units
V_{IH}	High-Level Input Voltage				2.0			Volts
V_{IL}	Low-Level Input Voltage						0.8	Volts
V_{IK}	Input Clamp Voltage	V_{CC} = MIN., I_I = −18mA					−1.2	Volts
	Hysteresis ($V_{T+} - V_{T-}$)	V_{CC} = MIN.			0.2	0.4		Volts
V_{OH}	High-Level Output Voltage	V_{CC} = MIN., V_{IL} = 0.8V, I_{OH} = −3.0mA			2.4	3.4		Volts
		V_{CC} = MIN., V_{IL} = 0.5V	MIL, I_{OH} = −12mA		2.0			
			COM'L, I_{OH} = −15mA		2.0			
V_{OL}	Low-Level Output Voltage	V_{CC} = MIN.	MIL, I_{OL} = 48mA				0.55	Volts
			COM'L, I_{OL} = 64mA				0.55	
I_{OZH}	Off-State Output Current, High Level Voltage Applied	V_{CC} = MAX., V_{IH} = 2.0V, V_{IL} = 0.8V		V_O = 2.4V			50	μA
I_{OZL}	Off-State Output Current, Low-Level Voltage Applied			V_O = 0.5V			−50	
I_I	Input Current at Maximum Input Voltage	V_{CC} = MAX., V_I = 5.5V					1.0	mA
I_{IH}	High-Level Input Current, Any Input	V_{CC} = MAX., V_{IH} = 2.7V					50	μA
I_{IL}	Low-Level Input Current	Any A	V_{CC} = MAX., V_{IL} = 0.5V				−400	μA
		Any G					−2.0	mA
I_{OS}	Short-Circuit Output Current (Note 3)	V_{CC} = MAX.			−50		−225	mA
I_{CC}	Supply Current	Am54S/74S242	All Outputs HIGH	V_{CC} = MAX., Outputs open	MIL		80	123	mA
					COM'L		80	135	
			All Outputs LOW		MIL		100	145	
					COM'L		100	150	
			Outputs at Hi-Z		MIL		100	145	
					COM'L		100	150	
		Am54S/74S243	All Outputs HIGH		MIL		95	147	mA
					COM'L		95	160	
			All Outputs LOW		MIL		120	170	
					COM'L		120	180	
			Outputs at Hi-Z		MIL		120	170	
					COM'L		120	180	

otes: 1. For conditions shown as MIN. or MAX., use the appropriate value specified under recommended operating conditions.
2. All typical values are V_{CC} = 5.0V, T_A = 25° C.
3. Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

NITCHING CHARACTERISTICS (V_{CC} = 5V, T_A = 25°C)

ırameter	Description	Test Conditions	Am54S/74S242 Min.	Typ.	Max.	Am54S/74S243 Min.	Typ.	Max.	Units
t_{PLH}	Propagation Delay Time, Low-to-High-Level Output	C_L = 50pF, R_L = 90Ω (Note 3)		4.5	7.0		6.0	9.0	ns
t_{PHL}	Propagation Delay Time, High-to-Low-Level Output			4.5	7.0		6.0	9.0	ns
t_{ZL}	Output Enable Time to Low Level			10	15		10	15	ns
t_{ZH}	Output Enable Time to High Level			6.5	10		8.0	12	ns
t_{LZ}	Output Disable Time from Low Level	C_L = 5.0pF, R_L = 90Ω (Note 3)		10	15		10	25	ns
t_{HZ}	Output Disable Time from High Level			6.0	9.0		6.0	9.0	ns

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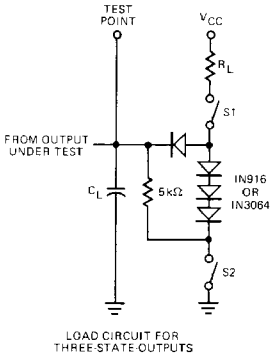
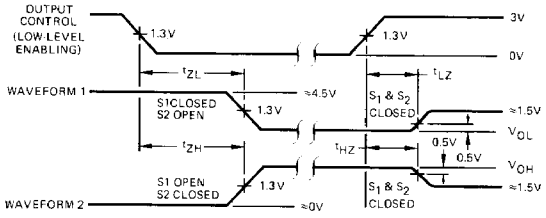
LOAD CIRCUIT FOR THREE-STATE OUTPUTS



VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES, THREE-STATE OUTPUTS



Notes: 1. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
2. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
3. In the examples above, the phase relationships between inputs and outputs have been chosen arbitrarily. PRR ≤ 1.0MHz, $Z_{OUT} \approx 50\Omega$ and $t_r \leq 2.5$ns, $t_f \leq 2.5$ns.

FUNCTION TABLES

Am54S/74S242

CONTROL INPUTS		DATA OUTPUTS	
$\overline{1G}$	2G	A	B
H	H	$\overline{O}$	I
L	H	*	*
H	L	ISOLATED	
L	L	I	$\overline{O}$

I = Input
$\overline{O}$ = Output
$\overline{O}$ = Inverting Output
H = High
L = Low

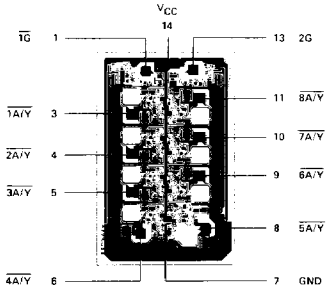
*Possible destructive oscillation may occur if the transceivers are enabled in both directions at once.

Am54S/74S243

CONTROL INPUTS		DATA OUTPUTS	
$\overline{1G}$	2G	A	B
H	H	O	I
L	H	*	*
H	L	ISOLATED	
L	L	I	O

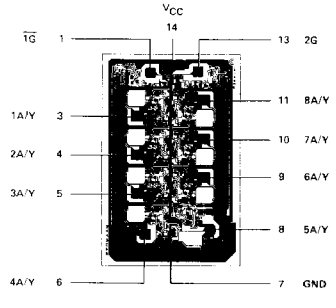
Metallization and Pad Layouts

Am54S/74S242



DIE SIZE 0.060" X 0.103"

Am54S/74S243



DIE SIZE 0.060" X 0.103"