SDLS191A - JANUARY 1981 - REVISED DECEMBER 2000

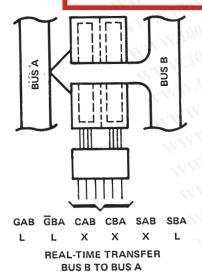
- Bus Transceivers/Registers
- Independent Registers and Enables for A and B Buses
- Multiplexed Real-Time and Stored Data
- Choice of True and Inverting Data Paths
- Choice of 3-State or Open-Collector Outputs to A Bus
- Dependable Texas Instruments Quality and Reliability

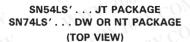
| DEVICE | A OUTPUT | B OUTPUT | LOGIC |
|--------|----------------|----------|-----------|
| 'LS651 | 3-State | 3-State | Inverting |
| 'LS652 | 3-State | 3-State | True |
| 'LS653 | Open-collector | 3-State | Inverting |

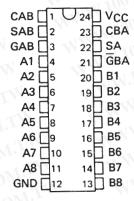
description

These devices consist of bus transceiver circuits, D-type flip-flops, and control circuitry arranged for multiplexed transmission of data directly from the data bus or from the internal storage registers. Enable GAB and GBA are provided to control the transceiver functions. SAB and SBA control pins are provided to select whether realtime or stored data is transferred. A low input level selects real-time data, and a high selects stored data. The following examples demonstrate the four fundamental bus-management functions that can be performed with the 'LS651, 'LS652, and 'LS653.

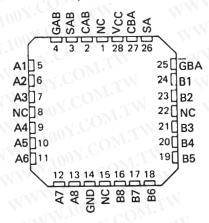
勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 Http://www.100y.com.tw



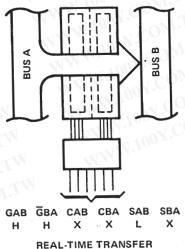




SN54LS'...FK PACKAGE
(TOP VIEW)



NC - No internal connection

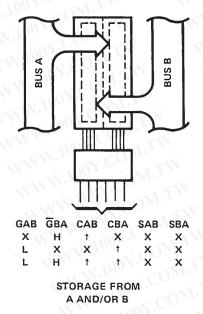


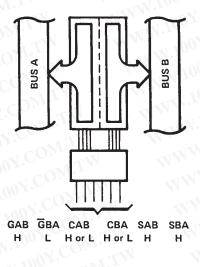
BUS A TO BUS B



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TRANSFER STORED DATA TO A AND/OR B

Data on the A or B data bus, or both, can be stored in the internal D flip-flop by low-to-high transitions at the appropriate clock pins (CAB or CBA) regardless of the select or enable control pins. When SAB or SBA are in the real-time transfer mode, it is also possible to store data without using the internal D-type flip-flops by simultaneously enabling GAB and $\overline{\text{GBA}}$. In this configuration each output reinforces its input. Thus, when all other data sources to the two sets of bus lines are at high impedance, each set of bus lines will remain at its last state.

The SN54LS651 through SN54LS653 are characterized for operation over the full military temperature range of $-55\,^{\circ}$ C to 125 °C. The SN74LS651 through SN74LS653 are characterized for operation from 0 °C to 70 °C.

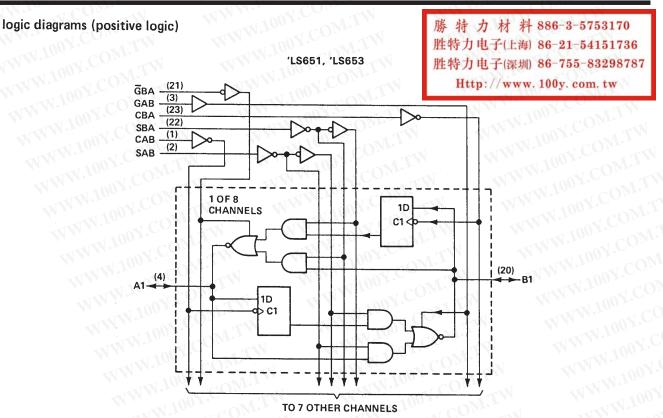
FUNCTION TABLE

| | | INP | UTS | | - N | DAT | A I/O* | OPERATION O | OR FUNCTION |
|-----|-----|----------|--------|-----|-----|---------------|---------------|---|---|
| GAB | ĞВА | CAB | СВА | SAB | SBA | A1 THRU A8 | B1 THRU B8 | 'LS651, 'LS653 | 'LS652, 'LS654 |
| L | Η | H or L | H or L | Х | X | A 100X | | Isolation | Isolation |
| L | Н | † | Ť | X | X | Input | Input | Store A and B Data | Store A and B Data |
| X | Η | † | H or L | Х | Х | Input | Not specified | Store A, Hold B | Store A, Hold B |
| Н | Н | † | † | Х | X | Input | Output | Store A in both registers | Store A in both registers |
| L | Х | H or L | Ť | Х | Х | Not specified | Input | Hold A, Store B | Hold A, Store B |
| L | L | † | † | Х | Х | Output | Input | Store B in both registers | Store B in both registers |
| L, | L | Х | X | Х | L | Output | O Lanua | Real-Time B Data to A Bus | Real-Time B Data to A Bus |
| L | L | X | H or L | X | Н | Output | Input | Stored B Data to A Bus | Stored B Data to A Bus |
| Н | Η | Х | X | L | Х | lanut | 1002 | Real-Time A Data to B Bus | Real-Time A Data to B Bus |
| Н | Н | H or L | X | н | Х | Input | Output | Stored A Data to B Bus | Stored A Data to B Bus |
| Н. | L | H or L | H or L | Н | н | Output | Output | Stored A Data to B Bus and Stored B Data to A Bus | Stored A Data to B Bus and Stored B Data to A Bus |

^{*} The data output functions may be enabled or disabled by various signals at the GAB and GBA inputs. Data input functions are always enabled, i.e., data at the bus pins will be stored on every low-to-high transition on the clock inputs.



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'LS652 (21)GBA (3) GAB (23) CBA (22)SBA (1) CAB (2) SAB 1 OF 8 1D CHANNELS C1< W.100Y.COM.TW (4) 1D D C1 TO 7 OTHER CHANNELS

Pin numbers shown are for DW, JT or NT packages.

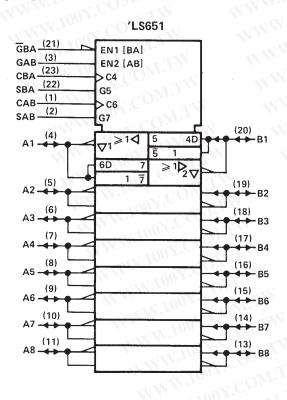


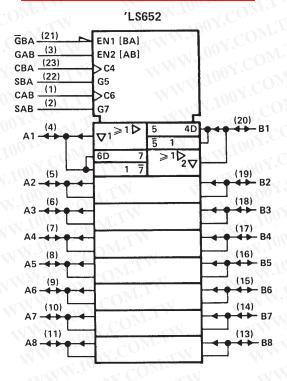
SN54LS651 THRU SN54LS653 SN74LS651 THRU SN74LS653 OCTAL BUS TRANSCEIVERS AND REGISTERS

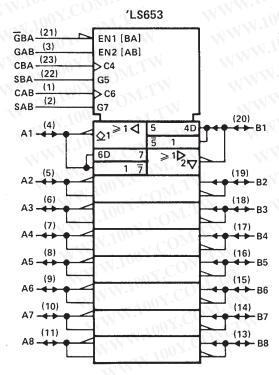
SDLS191A - JANUARY 1981 - REVISED DECEMBER 2000

logic symbols†

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[†]This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12. Pin numbers shown are for DW, JT, or NT packages.



 absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

 Supply voltage, V_{CC}
 .7 V

 Input voltage: Control inputs
 .7 V

 I/O ports
 .5.5 V

 Operating free-air temperature range: SN54LS651, SN54LS652
 - 55°C to 125°C

 SN74LS651, SN74LS652
 .0°C to 70°C

 Storage temperature range
 - 65°C to 150°C

recommended operating conditions

| | WWW.IOOY.C | 勝 特 力 材 料 886-3-5753170 | | SN54LS651 SN54LS652 | | | S | UNIT | | | |
|-----------------|-----------------------------------|-------------------------|------------------------|------------------------|------|--------|------|------|--------|-------|--------|
| | TIMM. | 胜特力电 | 1子(上海) 86-21-54 | 151736 | MIN | NOM | MAX | MIN | NOM | MAX | |
| Vcc | Supply voltage | 胜特力申 | 出子(深圳) 86-755-8 | 3298787 | 4.5 | 5 | 5,5 | 4.75 | 5 | 5.25 | V |
| VIH | High-level input voltage | · Calledon C | | 0 400 | 2 | W.T | | 2 | 7 | N 10 | V |
| VIL | Low-level input voltage | Http | ://www. 100y. cor | 1. tw | 7.C | - 11 | 0.7 | | 21/4/4 | 0.8 | V |
| ЮН | High-level output current | MOD | 1.1 | .10 | - 0 | ONE | - 12 | | -13 | - 15 | mA |
| loL | Low-level output current | M.C | THE V | -10 | 17. | 100 | 12 | | | 24 | mA |
| | TIMN'T | of CO | CBA or CAB high | ALVI VI | 15 | COF | TW. | 15 | W | Maria | .003 |
| t_W | Pulse duration | | CBA or CAB low | TINA. | 15 | | 1.1 | 15 | | | ns |
| | | | Data high or low | 11/11/11 | 15 | | | 15 | | N | st 100 |
| t _{su} | Setup time before CAB↑ or CBA↑ | 1100Y.C | A or B | MAIN | 15 | y.CO | T.MC | 15 | | WW | ns |
| t _h | Hold time after CAB† or CBA† | W.100Y. | A or B | MM | 1.10 | OY.C | OM. | 0 | | WY | ns |
| TA | Operating free-air temper | rature | | | - 55 | 00 x . | 125 | 0 | | 70 | °C |

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PA | ARAMETER | WWW. | | SN54LS651 SN54LS652 | | | SN74LS651 SN74LS652 | | | | | |
|------|----------------|------------------------|--------------------------|---------------------------|-------|--------|------------------------|--------|------|-------|----------|--|
| | | | MIN | TYP# | MAX | MIN | TYP‡ | MAX | | | | |
| VIK | | V _{CC} = MIN, | I ₁ = - 18 mA | M.I.V | | TANA! | - 1.5 | ON | | - 1.5 | V | |
| | | VCC = MIN, | V _{IH} = 2 V, | IOH = - 3 mA | 2.4 | 3.4 | 001. | 2.4 | 3.4 | | W | |
| ۷он | | VIL = MAX, | VIH - 2 V, | I _{OH} = - 12 mA | 2 | W. | | CO_2 | - | N |] v < | |
| | | AIT - MAY | 100 Y. | IOH = - 15 mA | | -TXN | 100 - | 2 | Mir | | 1 | |
| VOL | | VCC = MIN, | V _{IH} = 2 V, | IOL = 12 mA | | 0.25 | 0.4 | V.C | 0.25 | 0.4 | .4 | |
| | | VIL = MAX, | M.100 | IOL = 24 mA | | | N. P | <7 C | 0.35 | 0.5 | \ \ | |
| Iį | Control inputs | V _{CC} = MAX, | V ₁ = 7 V | | | 14 | 0.1 | U F | Mor | 0.1 | <u> </u> | |
| '' | A or B ports | V _{CC} = MAX, | V ₁ = 5.5 V | | | | 0.1 | ON! | | 0.1 | mA | |
| Ιн | Control inputs | V | v v=27v | | | -13 | 20 | <1 | COD | 20 | | |
| אוי | A or B ports¶ | V _{CC} = MAX, | V ₁ = 2.7 V | | | | 20 | 1003 | - 0 | 20 | μA | |
| HL | Control inputs | V _{CC} = MAX, | 1/ - 0 4 1/ | OV.CUP | N | 11 | - 0.4 | . 00 | V.C | - 0.4 | N. | |
| 111 | A or B ports¶ | ACC - MAY | $V_1 = 0.4 \text{ V}$ | | - 0.4 | | | - 0.4 | | | mA | |
| los§ | | V _{CC} = MAX, | V _O = 0 V | 1007. | - 40 | | - 225 | - 40 | 0 7. | - 225 | mA | |
| | | | | Outputs high | | 95 | 145 | 1 | 95 | 145 | 1 | |
| | LS651 | | 71 | Outputs low | | 103 | 165 | 111. | 103 | 165 | 1 | |
| Icc | 100 | V _{CC} = MAX | WW | Outputs disabled | WT | 103 | 165 | | 103 | 165 | 1. | |
| 100 | | ACC - MAX | TATAN | Outputs high | 1 | 95 145 | | | 95 | 145 | mA | |
| | LS652 | | 111 | Outputs low | VIII. | 103 | 165 | | 103 | 165 | 1 | |
| | | | WY | Outputs disabled | | 120 | 180 | | 120 | 180 | 1 | |

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

for I/O ports, the parameters IIH and IIL include the off-state output current.



 $^{^{\}ddagger}$ All typical values are at V_{CC} = 5 V, T_A = 25 °C.

[§] Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

SN54LS651, SN54LS652, SN74LS651, SN74LS652 **OCTAL BUS TRANSCEIVERS AND REGISTERS**

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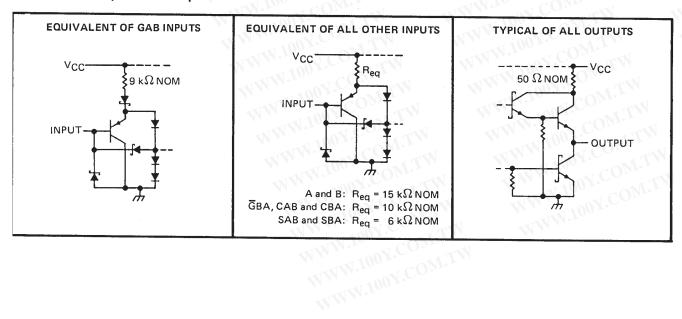
switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$

| PARAMETER | FROM | ТО | TEST COMPLICATE | | LS651 | | 'LS652 | -1 CO | W | |
|------------------|------------------------|---------|---|-------|-------|-------|-------------|-------|------|--|
| 4///// | (INPUT) | (OUTPUT |) TEST CONDITIONS | MIN | TYP | MAX | MIN TYP MAX | | UNIT | |
| ^t PLH | Clock | Bus | my da la la del con o respon | | 14 | 24 | 15 | 25 | ns | |
| ^t PHL | GIOCK | bus | 勝 特 力 材 料 886-3-57531 | | 23 | 35 | 24 | 36 | ns | |
| tPLH \ | Bus | Bus | 胜特力电子(上海) 86-21-54151 | 736 | 9 | 18 | 12 | 18 | ns | |
| t _{PHL} | Dus. | Obus | 胜特力电子(深圳) 86-755-8329 | 8787 | 20 | 30 | 13 | 20 | ns | |
| ^t PLH | Select, with bus input | COM | Http://www.100y.com.tw | | 31 | N .47 | 23 | 35 | ns | |
| ^t PHL | high [†] | COM | R _L = 667 Ω, C _L = 45 pF, | CO | 22 | 33 | 21 | 32 | ns | |
| tPLH | Select, with | Bus | See Note 2 | V.C | 23 | 35 | 33 | 50 | ns | |
| ^t PHL | low [†] | CC. | WITH WANTE | V.C | 19 | 30 | 15 | 23 | ns | |
| ^t PZH | Ğва | A P. 10 | UNITY CONTRACTOR | -1 | 29 | 44 | 30 | 45 | ns | |
| ^t PZL | GBA | A Bus | TITW WY | 00 2 | 40 | 60 | 36 | 54 | ns | |
| ^t PZH | GAB | B Bus | COM. WANN | . 003 | 19 | 29 | 20 | 30 | ns | |
| ^t PZL | GAB | D Dus | OM.I | 700 | 26 | 40 | 25 | 38 | ns | |
| ^t PHZ | Ğва | A P. | · V - ALON W | 1 10 | 25 | 38 | 25 | 38 | ns | |
| ^t PLZ | GBA | A Bus | R _L = 667 Ω, C _L = 5 pF, | | 19 | 30 | 19 | 30 | ns | |
| ^t PHZ | GAB | B Bus | See Note 2 | W.Y | 25 | 38 | 25 | 38 | ns | |
| ^t PLZ | GAB | D Dus | OLU TAN MA | - 41 | 19 | 30 | 19 | 30 | ns | |

tpLH = propagation delay time, low-to-high-level output.

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

schematics of inputs and outputs



tpHL = propagation delay time, high-to-low-level output

tpzH = output enable time to high level

tpzL = output enable time to low level

tpHZ = output disable time from high level

 $tp_Z = 0$ output disable time from low level $tp_Z = 0$ output dis

absolute maximum ratings over operating free-air temperature range (unless otherwise noted) SN74LS653 0°C to 70°C Storage temperature range recommended operating conditions SN54LS653 SN74LS653 勝 特 力 材 料 886-3-5753170 UNIT 胜特力电子(上海) 86-21-54151736 MIN MOM MAX MIN NOM MAX 4.75 ٧ 5.25 Vcc 4.5 Supply voltage 5.5 胜特力电子(深圳) 86-755-83298787 High-level input voltage 2 2 V V_{IH} Http://www. 100y. com. tw Low-level input voltage 0.7 8.0 ٧ VIL 5.5 5.5 V A ports High-level output voltage VOH High-level output current B ports - 12 - 15 mA ЮН 12 24 IOL Low-level output current mA CBA or CAB high 15 15 CBA or CAB low 30 30 Pulse duration ns Data high or low 30 30 Setup time t_{su} A or B 15 15 before CAB † or CBA † Hold time th A or B 0 0 ns after CAB† or CBA†

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

- 55

125

0

70

°C

| PARAMETER | | TEST CONDITIONS [†] | | | | V54LS6 | 53 C | SI | UNIT | | | | |
|----------------|-----------------------|------------------------------|--------------------------|---------------------------|------|--------|-------|------|------------------------------------|------------|-------|--|--|
| | | M. 1001. ONIT. | | | | TYP‡ | MAX | MIN | TYP‡ | MAX | 1 | | |
| VIK | | VCC = MIN, | I ₁ = - 18 mA | IN | MA | -311 | - 1.5 | Mo | 11.14 | - 1.5 | V | | |
| | | VCC = MIN, | V _{IH} = 2 V, | I _{OH} = - 3 mA | 2.4 | 3.4 | and! | 2.4 | 3,4 | | | | |
| Vон | B ports | VIL = MAX | 100 r | I _{OH} = - 12 mA | 2 | W. | Inc | COL | 1. | « 1 | V | | |
| | | 1001.C | 10H = - 15 mA | W | 7 | 100 | 2 | LL | | | | | |
| ЮН | A ports | V _{CC} = MIN, | V _{OH} = 5.5 V | | 1 | | 0.1 | CC | 11 | 0.1 | mA | | |
| Vol | | V _{CC} = MIN, | V _{IH} = 2 V, | IOL = 12 mA | | 0.25 | 0.4 | - 0 | 0.25 | 0.4 | V | | |
| VOL | | VIL = MAX | J. VOOY.C | IOL = 24 mA | | WAL | -110 | DA. | 0.35 | 0.5 | \ \ \ | | |
| l _l | Control inputs | V _{CC} = MAX, | V ₁ = 7 V | COM. | | - T | 0.1 | - oV | $\mathbb{C} \cap_{\mathbb{Z}_{+}}$ | 0.1 | mA | | |
| '1 | A or B ports | V _{CC} = MAX, | V1 = 5.5 V | -0M.1 | | - 4- | 0.1 | 00 - | 0 | 0.1 |] InA | | |
| Lee | Control inputs | V _{CC} = MAX, | V ₁ = 2.7 V | I.CO TIN | | | 20 | 100 | | 20 | μА | | |
| ΙΗ | A or B ports | VCC - MAX, | V -2.7 V | | | | 20 | 1.0 | SI CC | 20 | μΑ | | |
| IIL | Control inputs | V _{CC} = MAX, | V ₁ = 0.4 V | J. O. W. J. A. | | | - 0.4 | 1100 | F. | -0.4 | mA | | |
| 11 | A or B ports¶ | VCC - MAX, | MWW | ox.Com | N | - | - 0.4 | 10 | OY. | - 0.4 | WW. | | |
| loss | B ports | V _{CC} = MAX, | V _O = 0 V | COM | - 40 | | - 225 | - 40 | ~ 1 | - 225 | mA | | |
| | | | 1 | Outputs high | 114 | 95 | 145 | | 95 | 145 | | | |
| LS653 | LS653 | | | Outputs low | W | 103 | 165 | 144 | 103 | 165 |] | | |
| | V _{CC} = MAX | Outputs disab | | 7. | 103 | 165 | | 103 | 165 | mA | | | |
| | | VCC = IVIAX | | Outputs high | | 95 | 145 | | 95 | 145 | | | |
| | LS654 | | | Outputs low | | 105 | 170 | | 105 | 170 | | | |
| | | | | Outputs disabled | | 120 | 180 | | 120 | 180 | 7 | | |

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

 T_A

Operating free-air temperature

For I/O ports, the parameters IIH and IIL include the off-state output current.



 $^{^{\}ddagger}$ All typical values are at V_{CC} = 5 V, T_A = 25 °C.

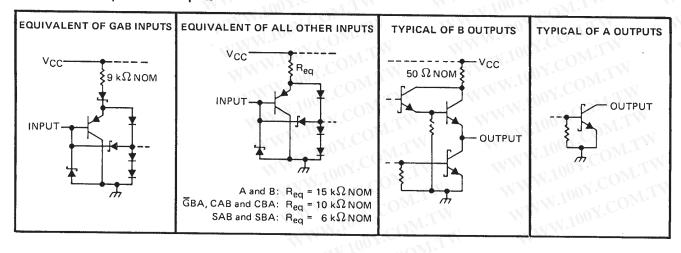
[§] Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

switching characteristics, VCC = 5 V, TA = 25 °C

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------|------------------|----------------|--|-------------------------|----------|----------|-------|
| ^t PLH | СВА | A Bus | I W. ON. CO. | WW | 25 | 38 | 1 |
| tPHL | My CBA | A bus | NN.100 COM. | | 26 | 39 | ns |
| tPLH | CAB | B Bus | 100Y. OM.TW | - 1/1 | 15 | 23 | -01 |
| tPHL | CAB | D Dus | JWW. TOY.COM | 1 | 24 | 36 | ns |
| ^t PLH | A Bus | B Bus | COM.1 | | 10 | 18 | et CU |
| tPHL | A bus | D Dus | MM. 100X.CONT.TM | | 20 | 30 | ns |
| ^t PLH | B Bus | A Bus | MWW. TO V.COM | | 21 | 32 | 17.5 |
| ^t PHL | B bus | A bus | W.100 COM.1 | | 16 | 24 | ns |
| ^t PLH | SBA [†] | WTI | $R_L = 667 \Omega, C_L = 45 pF,$ | C ₁ = 45 pF. | | | |
| tPHL | (with B high) | A Bus | See Note 2 | | 38 26 | 57 39 | ns |
| tPLH | SBA [†] | OM | WW.100 COM. | osi. | 34 | 51 | 100 |
| ^t PHL | (with B low) | A Bus | 1005 | | 23 | 35 | ns |
| ^t PLH | SAB [†] | CUZZTW | 勝 特 力 材 料 886-3-5753170 | | 32 | 48 | - |
| [†] PHL | (with A high) | B Bus | 胜特力电子(上海) 86-21-54151 | 736 | 22 | 33 | ns |
| tPLH | SAB† | | White to the 7 (25 Mill) OC 755 00000007 | | 24 | 36 | vV. |
| ^t PHL | (with A low) | B Bus | | | 20 | 30 | ns |
| ^t PLH | 701 | A CON | Http://www. 100y. com. tv | | 23 | 35 | |
| ^t PHL | ĞВА | A Bus | TW. In | (NA) | 37 | 55 | ns |
| ^t PZH | CAR | | W W 100 E | | 19 | 29 | N. V. |
| tPZL | GAB | B Bus | $R_L = 667 \Omega, C_L = 5 pF,$ | 97 | 25 | 38 | ns |
| ^t PHZ | CAR | 1002 | See Note 2 | -OM | 26 | 39 | ns |
| tpLZ | GAB | B Bus | YOU WY TOOK | | 19 | 29 | |

[†]These parameters are measured with the internal output state of the storage register opposite to that of the bus input. NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

schematics of inputs and outputs





PACKAGE OPTION ADDENDUM

勝 特 力 材 料 886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787

Http://www. 100y. com. tw

6-Dec-2006

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | e Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp (3) |
|------------------|------------|-----------------|--------------------|------|----------------|---------------------------|------------------|--------------------|
| SN74LS651DW | OBSOLETE | SOIC | DW | 24 | CO_{Mr} | TBD | Call TI | Call TI |
| SN74LS651DWR | OBSOLETE | SOIC | DW | 24 | COM | TBD | Call TI | Call TI |
| SN74LS651NT | OBSOLETE | PDIP | NT | 24 | | TBD | Call TI | Call TI |
| SN74LS652DW | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS652DWE4 | ACTIVE | SOIC | DW | 24 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS652DWR | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS652DWRE4 | ACTIVE | SOIC | DW | 24 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS652NT | ACTIVE | PDIP | NT | 24 | 15 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74LS652NTE4 | ACTIVE | PDIP | NT | 24 | 15 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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