

HD74LS145

R04DS0007EJ0400
 (Previous: REJ03D0436-0300)
 Rev.4.00
 Dec 24, 2010

BCD-to-Decimal Decoder / Driver (with 15 V outputs)

This BCD-to-decimal decoder / driver consists of eight inverters and ten four-input NAND gates. The inverters are connected in pairs to make BCD input data available for decoding by the NAND gates. Full decoding of valid BCD input logic ensures that all outputs remain off for all invalid binary input conditions. This decoder features high-performance, n-p-n output transistors designed for use as indicator / relay drivers or as open-collector logic-circuit drivers.

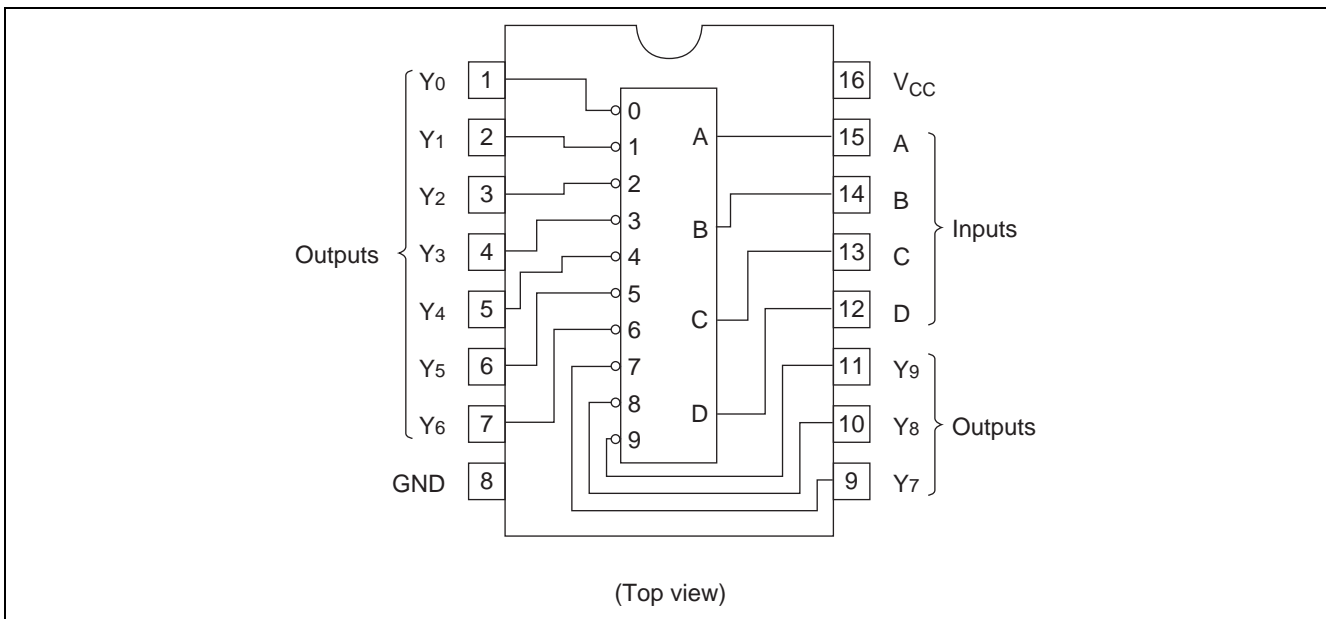
Features

- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LS145P	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74LS145FPEL	SOP-16 pin (JEITA)	PRSP0016DH-B (FP-16DAV)	FP	EL (2,000 pcs/reel)
HD74LS145RPEL	SOP-16 pin (JEDEC)	PRSP0016DG-A (FP-16DNV)	RP	EL (2,500 pcs/reel)

Note: Please consult the sales office for the above package availability.

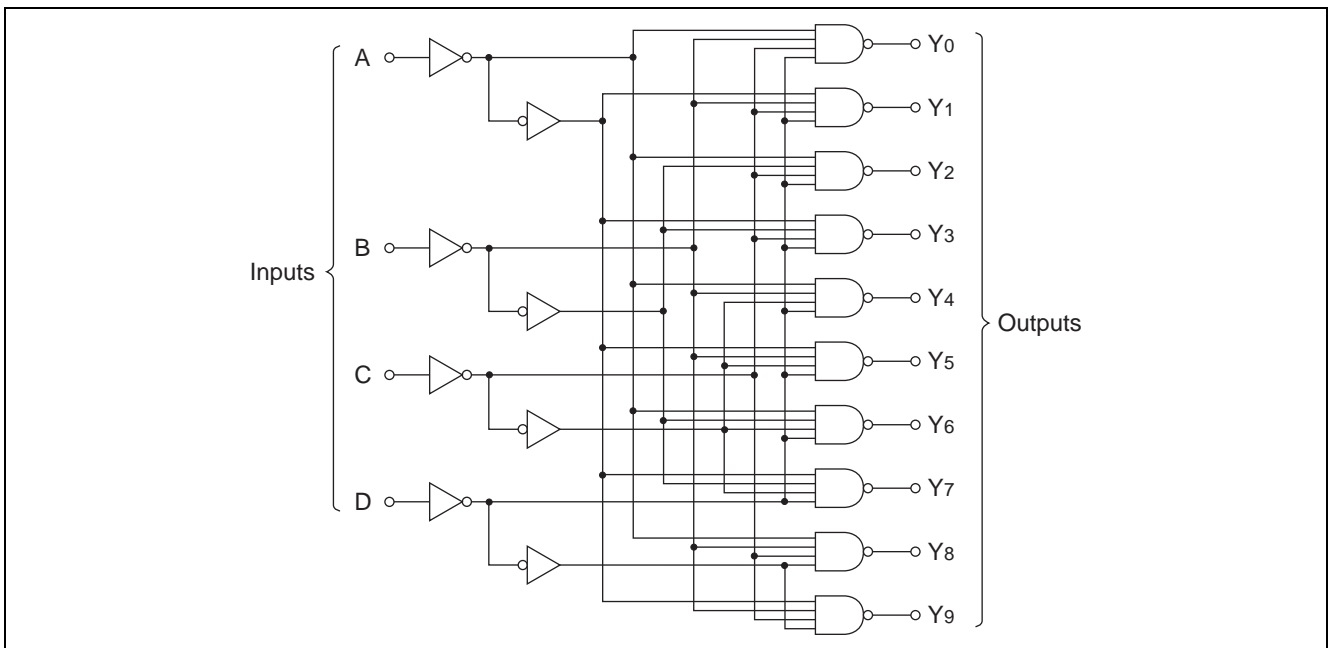
Pin Arrangement



Function Table

No.	Inputs				Outputs									
	D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	H	H	H	L	H	H	H	H	H	H
4	L	H	L	L	H	H	H	H	L	H	H	H	H	H
5	L	H	L	H	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H
7	L	H	H	H	H	H	H	H	H	H	H	L	H	H
8	H	L	L	L	H	H	H	H	H	H	H	H	L	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
Invalid	H	L	H	L	H	H	H	H	H	H	H	H	H	H
	H	L	H	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	L	H	H	H	H	H	H	H	H	H	H
	H	H	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	L	H	H	H	H	H	H	H	H	H	H
	H	H	H	H	H	H	H	H	H	H	H	H	H	H

Block Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}	7	V
Input voltage	V_{IN}	7	V
Power dissipation	P_T	400	mW
Storage temperature	T_{stg}	-65 to +150	°C

Note: Voltage value, unless otherwise noted, are with respect to network ground terminal.

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.75	5.00	5.25	V
Off-state output voltage	$V_{O(off)}$	—	—	15	V
Low level output current	I_{OL}	—	—	80	mA
Operating temperature	T_{opr}	-20	25	75	°C

Electrical Characteristics

(Ta = -20 to +75 °C)

Item	Symbol	min.	typ.*	max.	Unit	Condition
Input voltage	V_{IH}	2.0	—	—	V	
	V_{IL}	—	—	0.8	V	
Off-state output current	$I_{O(off)}$	—	—	250	μA	$V_{CC} = 4.75\text{ V}$, $V_{IH} = 2\text{ V}$, $V_{IL} = 0.8\text{ V}$, $V_{O(off)} = 15\text{ V}$
On-state output voltage	$V_{O(on)}$	—	—	0.4	V	$V_{CC} = 4.75\text{ V}$, $V_{IH} = 2\text{ V}$, $V_{IL} = 0.8\text{ V}$
		—	—	0.5		
		—	—	3.0		
Input current	I_{IH}	—	—	20	μA	$V_{CC} = 5.25\text{ V}$, $V_I = 2.7\text{ V}$
	I_{IL}	—	—	-0.4	mA	$V_{CC} = 5.25\text{ V}$, $V_I = 0.4\text{ V}$
	I_I	—	—	0.1	mA	$V_{CC} = 5.25\text{ V}$, $V_I = 7\text{ V}$
Supply current**	I_{CC}	—	7	13	mA	$V_{CC} = 5.25\text{ V}$
Input clamp voltage	V_{IK}	—	—	-1.5	V	$V_{CC} = 4.75\text{ V}$, $I_{IN} = -18\text{ mA}$

Notes: * $V_{CC} = 5\text{ V}$, $T_a = 25^\circ\text{C}$ ** I_{CC} is measured with all outputs open and all inputs grounded.

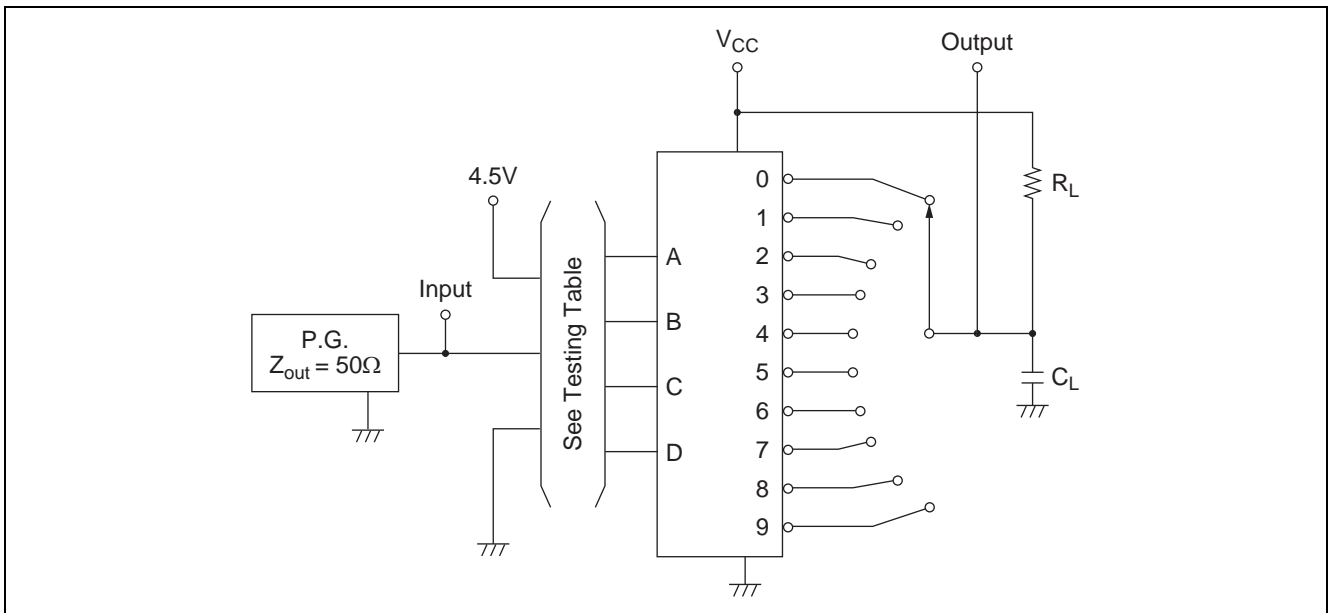
Switching Characteristics

(V_{CC} = 5 V, Ta = 25°C)

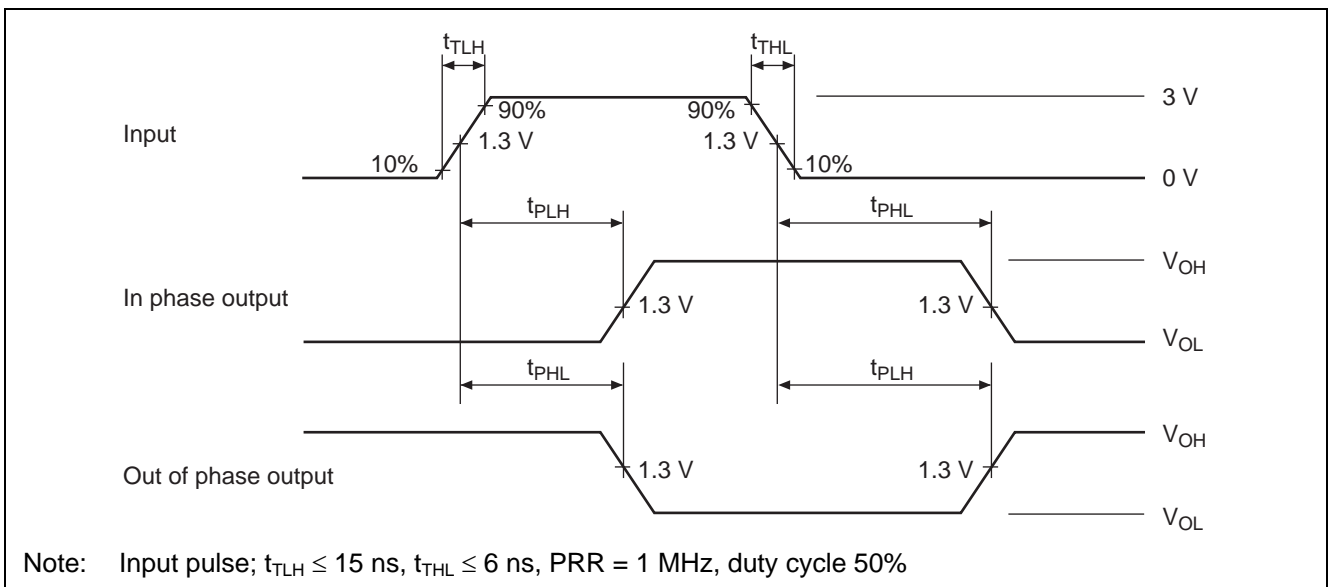
Item	Symbol	min.	typ.	max.	Unit	Condition
Propagation delay time	t_{PLH}	—	—	50	ns	$C_L = 45\text{ pF}$, $R_L = 665\ \Omega$
	t_{PHL}	—	—	50		

Testing Method

Test Circuit

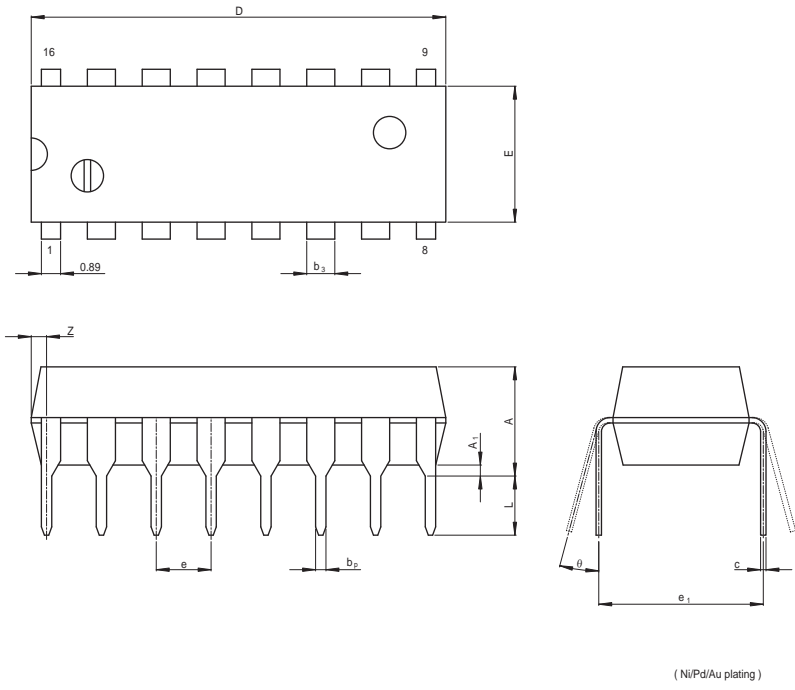


Waveform



Package Dimensions

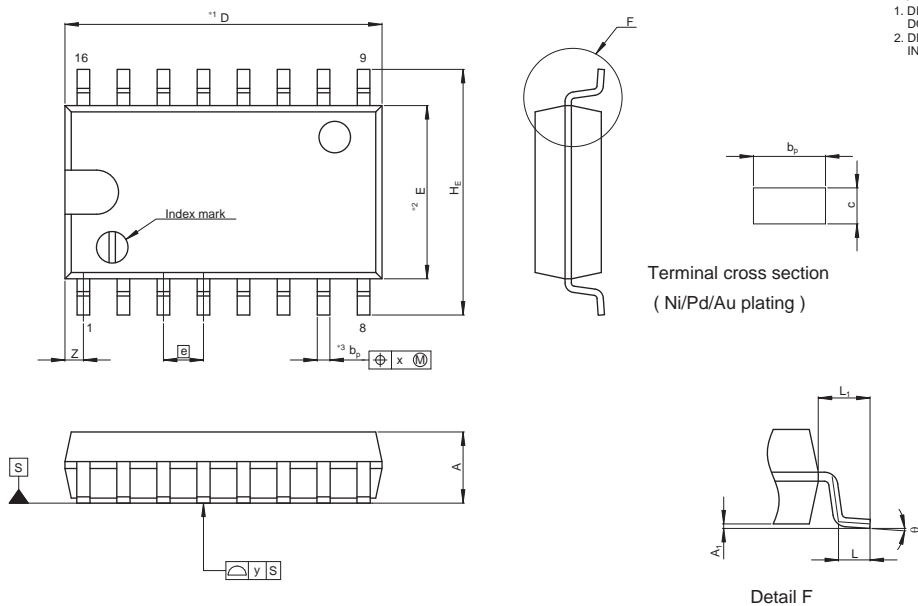
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP16-6.3x19.2-2.54	PRDP0016AE-B	DP-16FV	1.05g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e ₁	—	7.62	—
D	—	19.2	20.32
E	—	6.3	7.4
A	—	—	5.06
A ₁	0.51	—	—
b _p	0.40	0.48	0.56
b ₃	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	1.12
L	2.54	—	—

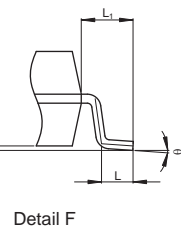
(Ni/Pd/Au plating)

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP16-5.5x10.06-1.27	PRSP0016DH-B	FP-16DAV	0.24g



NOTE)
 1. DIMENSIONS*1 (Nom)*AND*2*
 DO NOT INCLUDE MOLD FLASH.
 2. DIMENSION*3*DOES NOT
 INCLUDE TRIM OFFSET.

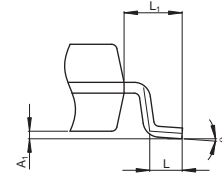
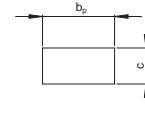
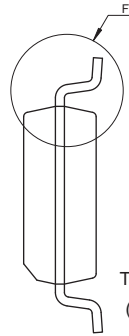
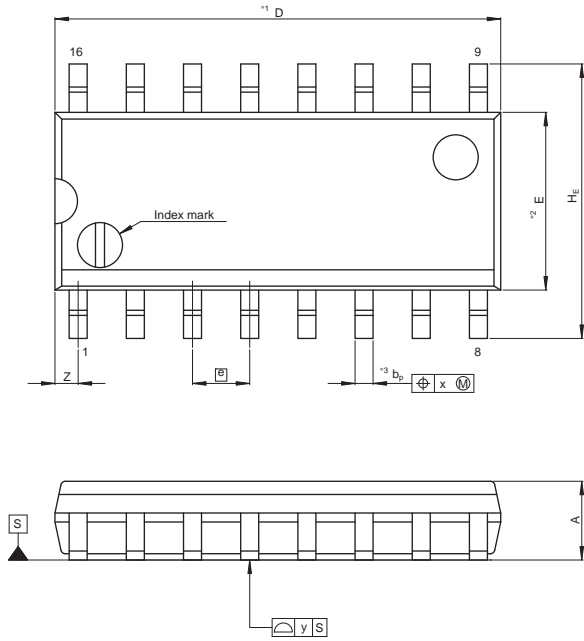
Terminal cross section
 (Ni/Pd/Au plating)



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	10.06	10.5
E	—	5.50	—
A ₂	—	—	—
A ₁	0.00	0.10	0.20
A	—	—	2.20
b _p	0.34	0.40	0.46
b ₁	—	—	—
c	0.15	0.20	0.25
c ₁	—	—	—
θ	0°	—	8°
HE	7.50	7.80	8.00
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.80
L	0.50	0.70	0.90
L ₁	—	1.15	—

HD74LS145

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP16-3.95x9.9-1.27	PRSP0016DG-A	FP-16DNV	0.15g



NOTE)
 1. DIMENSIONS*1 (Nom)*AND*2*
 DO NOT INCLUDE MOLD FLASH.
 2. DIMENSION*3*DOES NOT
 INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	9.90	10.30
E	—	3.95	—
A ₂	—	—	—
A ₁	0.10	0.14	0.25
A	—	—	1.75
b _p	0.34	0.40	0.46
b ₁	—	—	—
c	0.15	0.20	0.25
c ₁	—	—	—
θ	0°	—	8°
H _E	5.80	6.10	6.20
e	—	1.27	—
x	—	—	0.25
y	—	—	0.15
Z	—	—	0.635
L	0.40	0.60	1.27
L ₁	—	1.08	—

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