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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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HD74BC245A

Octal Bus Transceivers With 3 State Outputs

REJ03D0282-0400Z
 (Previous ADE-205-008B (Z))
 Rev.4.00
 Jul.16.2004

Description

The HD74BC245A provides high drivability and operation equal to or better than high speed bipolar standard logic IC by using Bi-CMOS process. The device features low power dissipation that is about 1/5 of high speed bipolar logic IC, when the frequency is 10 MHz. The device has ten buffers with three state outputs in a 20 pin package. Each device has an active low enable input \overline{G} and a direction control input DiR. When DiR is high, data flows from the A inputs to the B outputs. When DiR is low, data flows from the B inputs to the A outputs. When \overline{G} is high, disables both A and B ports by placing them in a high impedance.

Features

- Input/Output are at high impedance state when power supply is off.
- Built in input pull up circuit can make input pins be open, when not used.
- TTL level input
- Wide operating temperature range
 $T_a = -40$ to $+85^\circ\text{C}$
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74BC245AP	DILP-20 pin	DP-20N, -20NEV	P	—
HD74BC245AFPEL	SOP-20 pin (JEITA)	FP-20DAV	FP	EL (2,000 pcs/reel)
HD74BC245ATELL	TSSOP-20 pin	TTP-20DAV	T	ELL (2,000 pcs/reel)

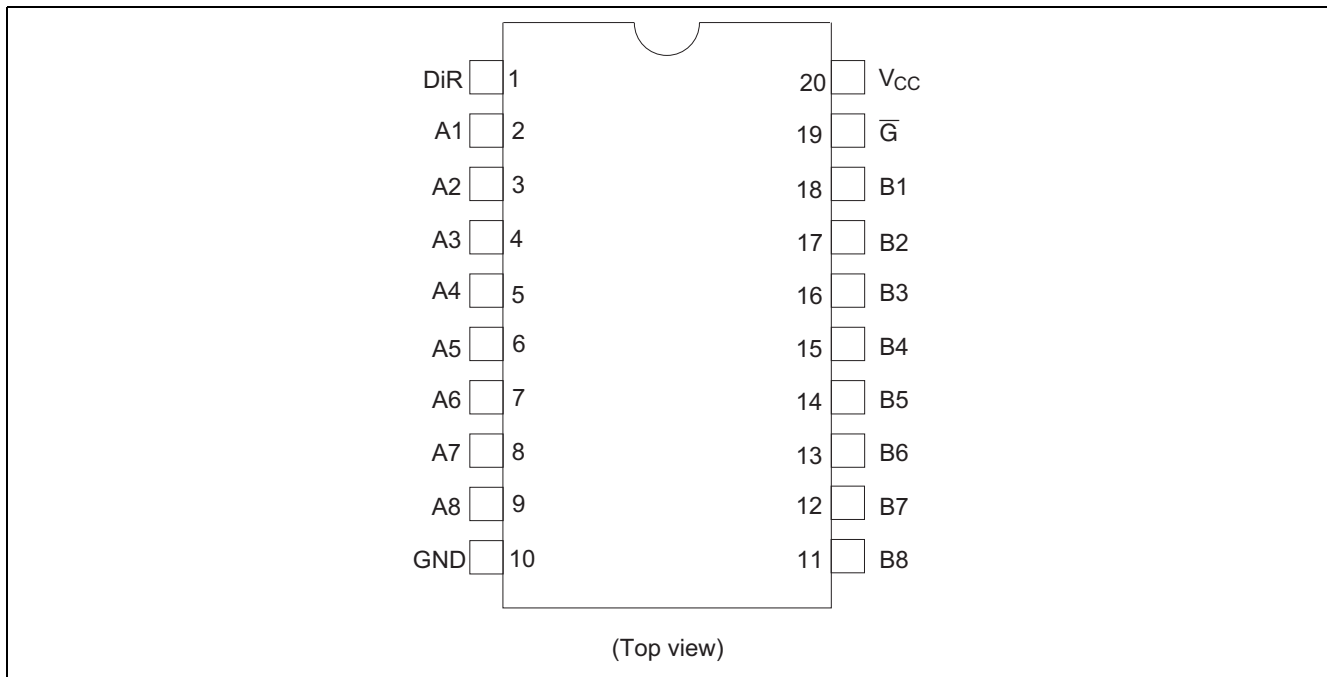
Note: Please consults the sales office for the above package availability.

Function Table

Control Inputs		Operation
\overline{G}	DiR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Z

H : High level
 L : Low level
 Z : High impedance

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply voltage	V_{CC}	-0.5 to +7.0	V
Input diode current	I_{IK}	± 30	mA
Input voltage	V_{IN}	-0.5 to +7.5	V
Output voltage	V_{OUT}	-0.5 to +7.5	V
Off state output voltage	$V_{OUT(off)}$	-0.5 to +5.5	V
Storage temperature	T_{stg}	-65 to +150	$^{\circ}C$

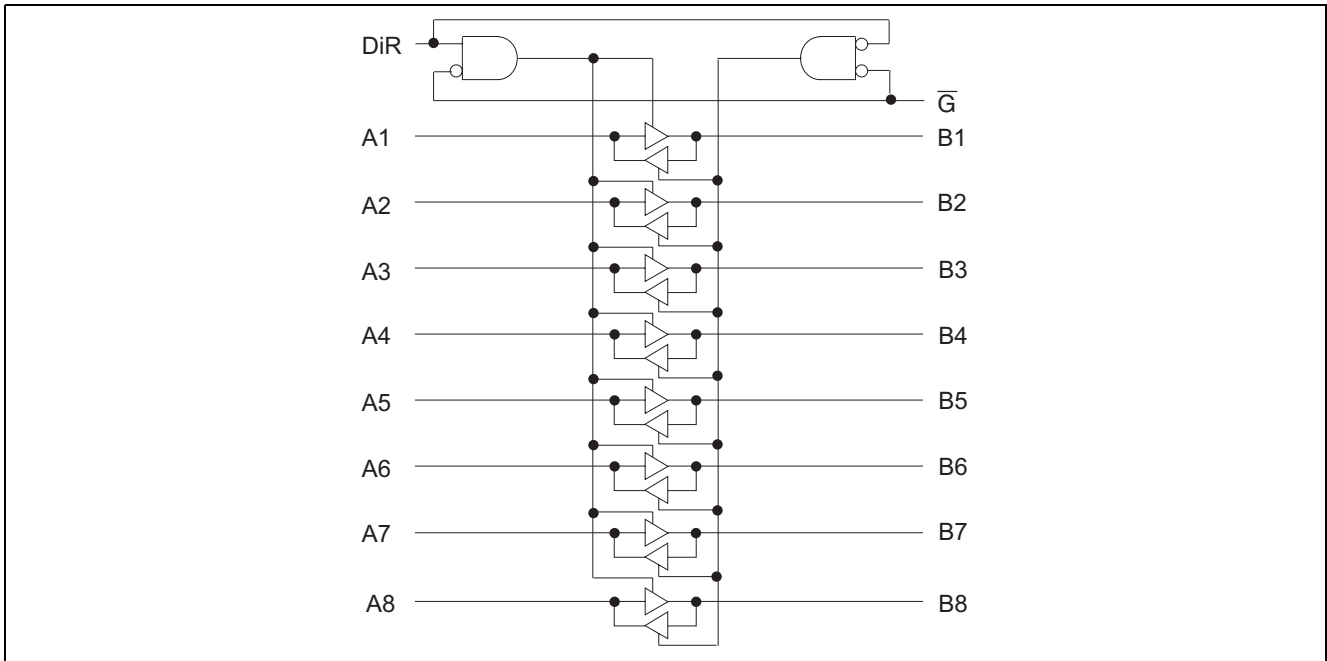
Note: 1. The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.5	5.0	5.5	V
Input voltage	V_{IN}	0	—	V_{CC}	V
Output voltage	V_{OUT}	0	—	V_{CC}	V
Operating temperature	T_{opr}	-40	—	85	$^{\circ}C$
Input rise/fall time*1	t_r, t_f	0	—	8	ns/V

Note: 1. This item guarantees maximum limit when one input switches.
Waveform: Refer to test circuit of switching characteristics.

Logic Diagram



Electrical Characteristics (Ta = -40°C to +85°C)

Item	Symbol	V _{CC} (V)	Min	Max	Unit	Test Conditions
Input voltage	V _{IH}		2.0	—	V	
	V _{IL}		—	0.8	V	
Output voltage	V _{OH}	4.5	2.4	—	V	I _{OH} = -3 mA
		4.5	2.0	—	V	I _{OH} = -15 mA
	V _{OL}	4.5	—	0.5	V	I _{OL} = 48 mA
		4.5	—	0.55	V	I _{OL} = 64 mA
Input diode voltage	V _{IK}	4.5	—	-1.2	V	I _{IN} = -18 mA
Input current	I _I	5.5	—	-250	μA	V _{IN} = 0 V
		5.5	—	100	μA	An or Bn, V _{IN} = 5.5 V
		5.5	—	1.0	μA	DiR or \overline{G} , V _{IN} = 5.5 V
		5.5	—	100	μA	DiR or \overline{G} , V _{IN} = 7.0 V
Short circuit output current*1	I _{OS}	5.5	-100	-225	mA	V _O = 0 V, V _{IN} = 5.5 V
Off state output current	I _{OZH}	5.5	—	-100	μA	V _O = 2.7 V
	I _{OZL}	5.5	—	-250	μA	V _O = 0.5 V
Supply current	I _{CCL}	5.5	—	31.5	mA	V _{IN} = 0 or 5.5 V All outputs is "L"
	I _{CCH}	5.5	—	0.5	mA	V _{IN} = 0 or 5.5 V All outputs is "H"
	I _{CCZ}	5.5	—	4.5	mA	V _{IN} = 0 or 5.5 V All outputs is "Z"
	I _{CCT} *2	5.5	—	1.5	mA	V _{IN} = 3.4 or 0.5 V

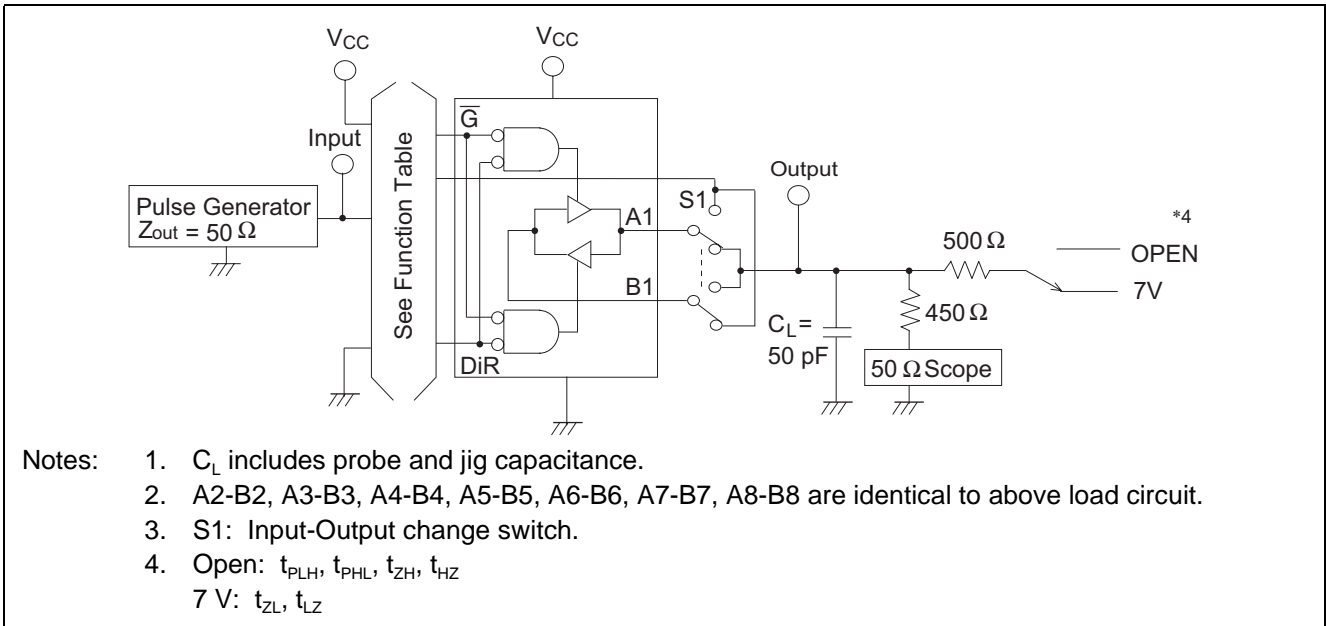
Notes : 1. Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.

2. When input by the TTL level, it shows I_{CC} increase at per one input pin.

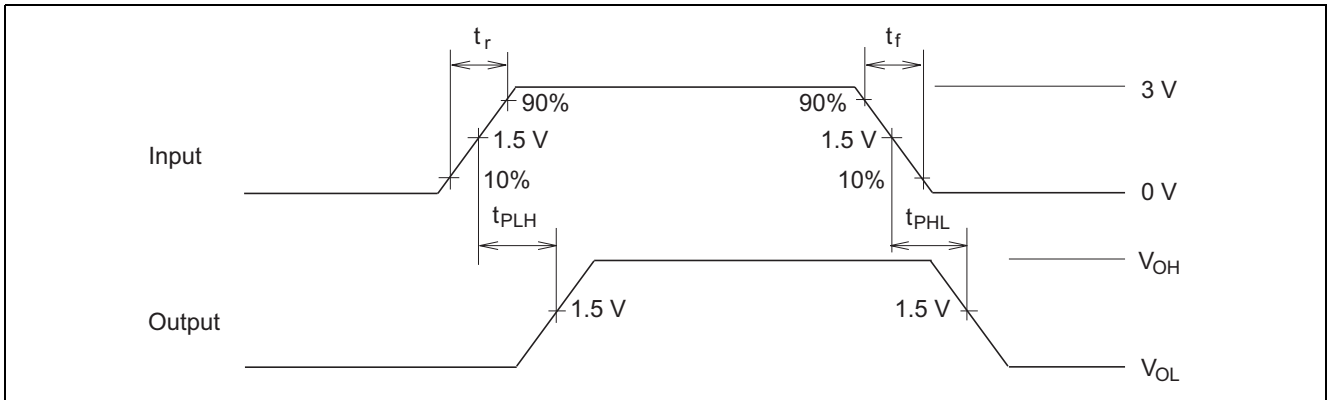
Switching Test Method (C_L = 50 pF)

Item	Symbol	Ta = 25°C V _{CC} = 5.0 V		Ta = -40 to 85°C V _{CC} = 5.0 V ±10%		Unit	Test Conditions
		Min	Max	Min	Max		
Propagation delay time	t _{PLH}	3.0	6.0	3.0	7.0	ns	An to Bn
	t _{PHL}	3.0	6.0	3.0	7.0		
	t _{PLH}	3.0	6.0	3.0	7.0	ns	Bn to An
	t _{PHL}	3.0	6.0	3.0	7.0		
Output enable time	t _{ZH}	3.0	9.0	3.0	11.0	ns	\overline{G} to Bn
	t _{ZL}	3.0	9.0	3.0	11.0		
	t _{ZH}	3.0	9.0	3.0	11.0	ns	\overline{G} to An
	t _{ZL}	3.0	9.0	3.0	11.0		
Output disable time	t _{HZ}	3.0	8.0	3.0	10.0	ns	\overline{G} to Bn
	t _{LZ}	3.0	8.0	3.0	10.0		
	t _{HZ}	3.0	8.0	3.0	10.0	ns	\overline{G} to An
	t _{LZ}	3.0	8.0	3.0	10.0		
Input capacitance	C _{IN}	3.0(Typ)		—		pF	V _{IN} = V _{CC} or GND
Input/output capacitance	C _{I/O}	15.0(Typ)		—		pF	V _{I/O} = V _{CC} or GND

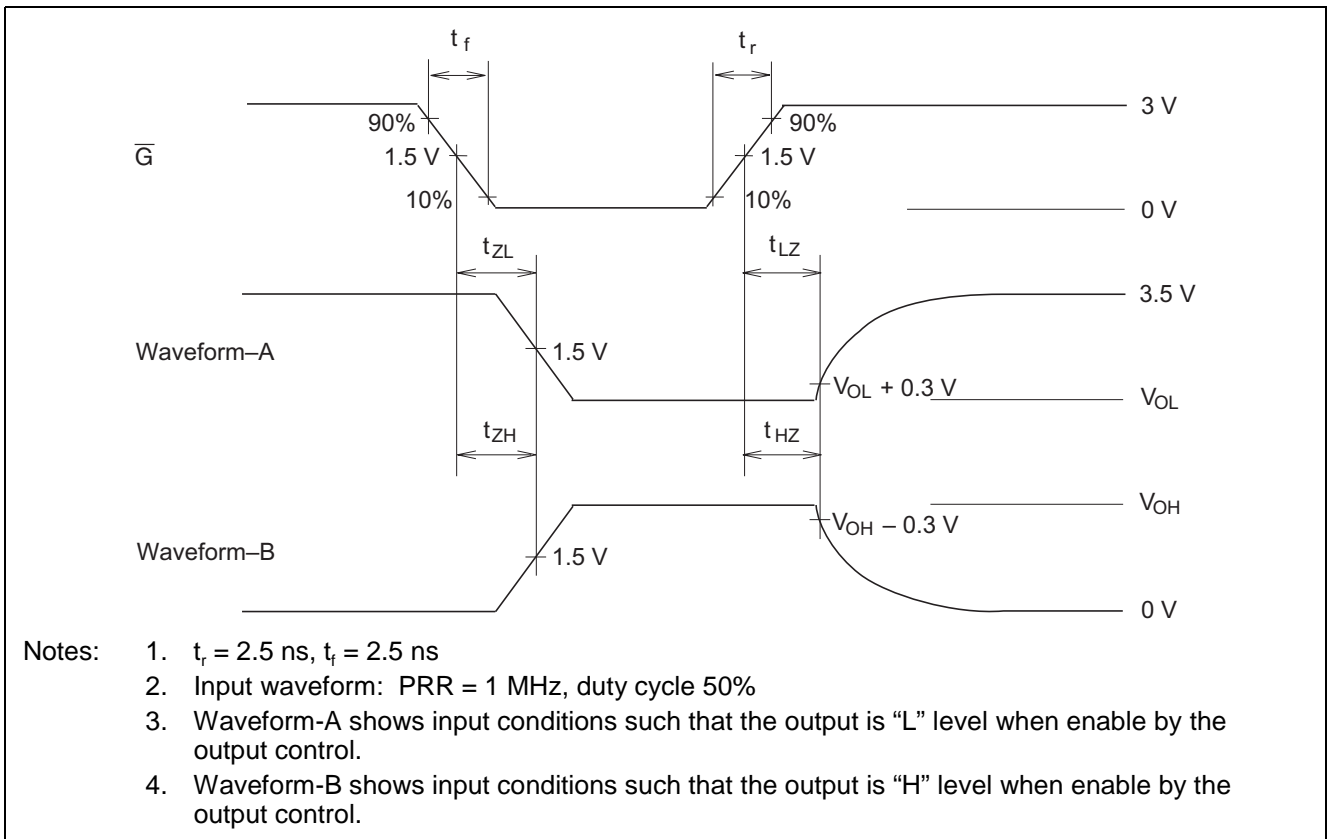
Test Circuit



Waveforms-1

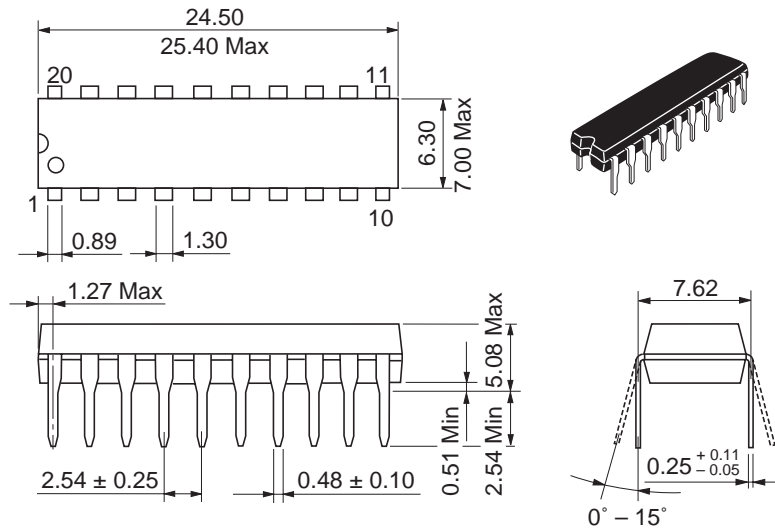


Waveforms-2



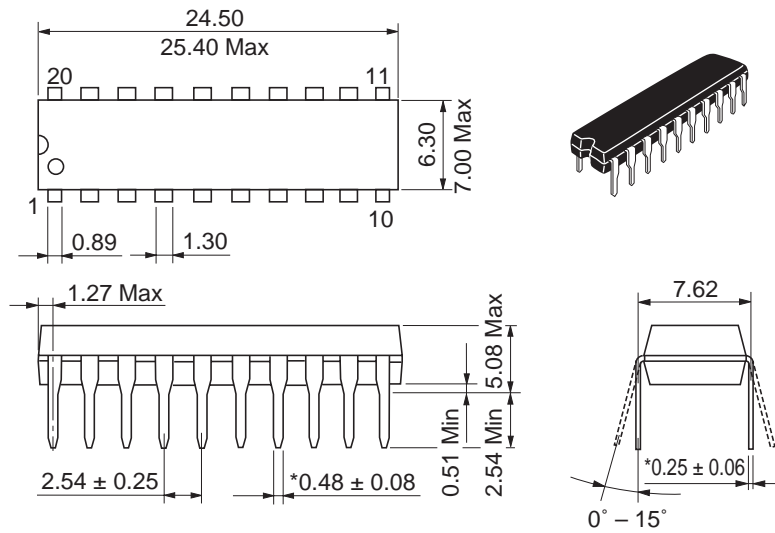
Package Dimensions

As of January, 2003
Unit: mm



Package Code	DP-20N
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.26 g

Unit: mm

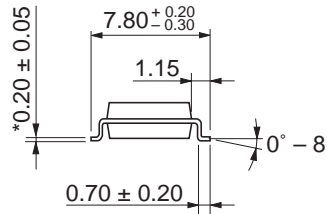
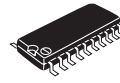
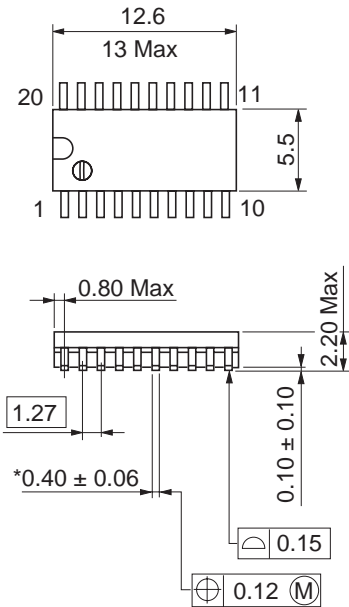


*Ni/Pd/AU Plating

Package Code	DP-20NEV
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.26 g

As of January, 2003

Unit: mm

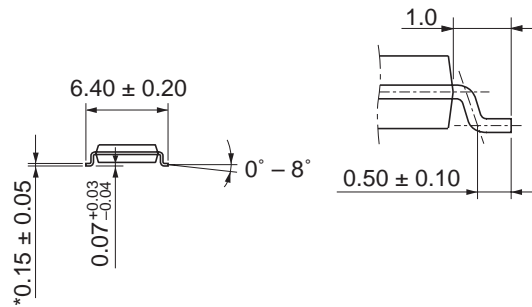
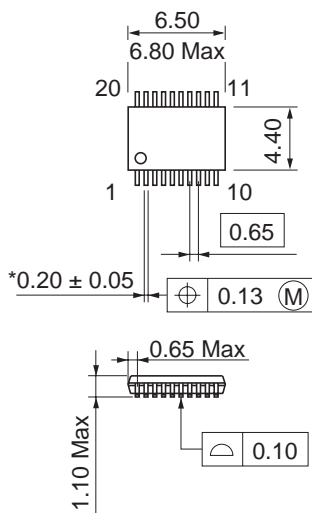


*Ni/Pd/Au plating

Package Code	FP-20DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.31 g

As of January, 2003

Unit: mm



*Ni/Pd/Au plating

Package Code	TTP-20DAV
JEDEC	—
JEITA	—
Mass (reference value)	0.07 g

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