HD74HC442, HD74HC443, HD74HC444

Quad. Tridirectional Bus Transceiver
(with noninverted 3-state outputs)
Quad. Tridirectional Bus Transceiver
(with inverted 3-state outputs)
Quad Tridirectional Bus Transceiver
(with noninverted/inverted 3-state outputs)

REJ03D0627-0200
(Previous ADE-205-506)
Rev.2.00
Mar 30, 2006

Description

These bus transceivers are designed for a synchronous three-way communication between four-line data buses. They give the designer a choice of selecting inverting, noninverting or a combination of inverting and noninverting data paths with 3-state outputs.

The S_0 and S_1 inputs select the bus from which data are to be transferred. The $\overline{G}$ inputs enable the bus or buses to which data are to be transferred. The port for any bus selected for input and any other bus not enabled for output will be at high impedance.

Not recommend for new design

Features

- High Speed Operation
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: V_{CC} = 2 to 6 V
- Low Input Current: 1 µA max
- Low Quiescent Supply Current: I_{CC} (static) = 4 µA max (Ta = 25°C)
- Ordering Information

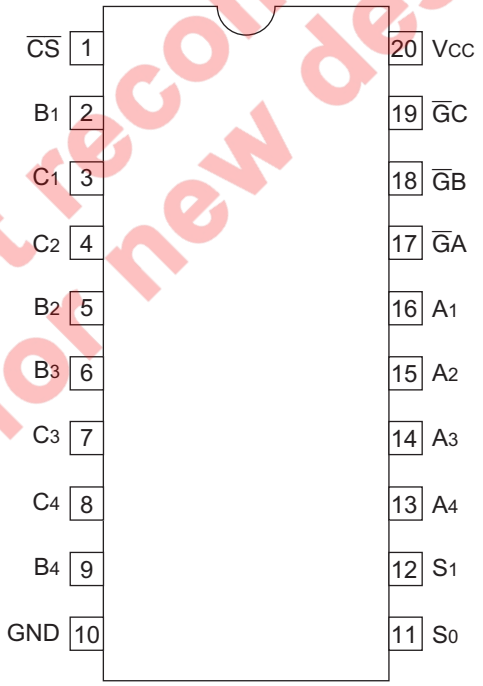
Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HC442RPEL HD74HC443RPEL HD74HC444RPEL	SOP-20 pin (JEDEC)	PRSP0020DC-A (FP-20DBV)	RP	EL (1,000 pcs/reel)

Function Table

Inputs						Transfers Between Buses		
$\overline{CS}$	S_1	S_0	$\overline{G}A$	$\overline{G}B$	$\overline{G}C$	HD74HC442	HD74HC443	HD74HC444
H	X	X	X	X	X	None	None	None
X	H	H	X	X	X	None	None	None
X	X	X	H	H	H	None	None	None
X	L	L	X	H	H	None	None	None
X	L	H	H	X	H	None	None	None
X	H	L	H	H	X	None	None	None
L	L	L	X	L	L	A → B, A → C	$\overline{A}$ → B, $\overline{A}$ → C	$\overline{A}$ → B, $\overline{A}$ → C
L	L	H	L	X	L	B → C, B → A	$\overline{B}$ → C, $\overline{B}$ → A	B → C, $\overline{B}$ → A
L	H	L	L	L	X	C → A, C → B	$\overline{C}$ → A, $\overline{C}$ → B	$\overline{C}$ → A, C → B
L	L	L	X	L	H	A → B	$\overline{A}$ → B	$\overline{A}$ → B
L	L	H	H	X	L	B → C	$\overline{B}$ → C	B → C
L	H	L	L	H	X	C → A	$\overline{C}$ → A	$\overline{C}$ → A
L	L	L	X	H	L	A → C	$\overline{A}$ → C	$\overline{A}$ → C
L	L	H	L	X	H	B → A	$\overline{B}$ → A	$\overline{B}$ → A
L	H	L	H	L	X	C → B	$\overline{C}$ → B	C → B

H : high level
L : low level
X : irrelevant

Pin Arrangement



(Top view)

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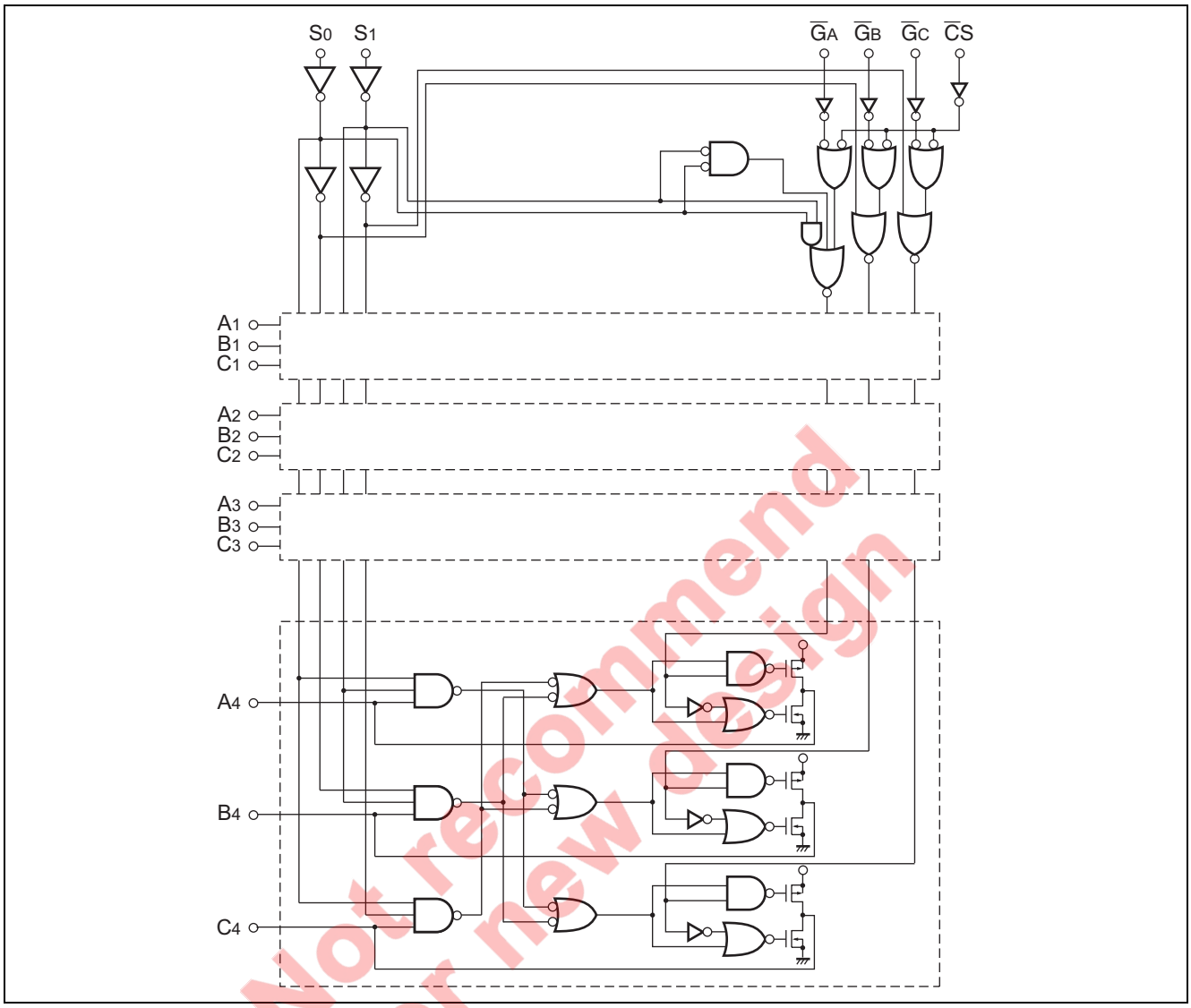
Logic Diagram

HD74HC442



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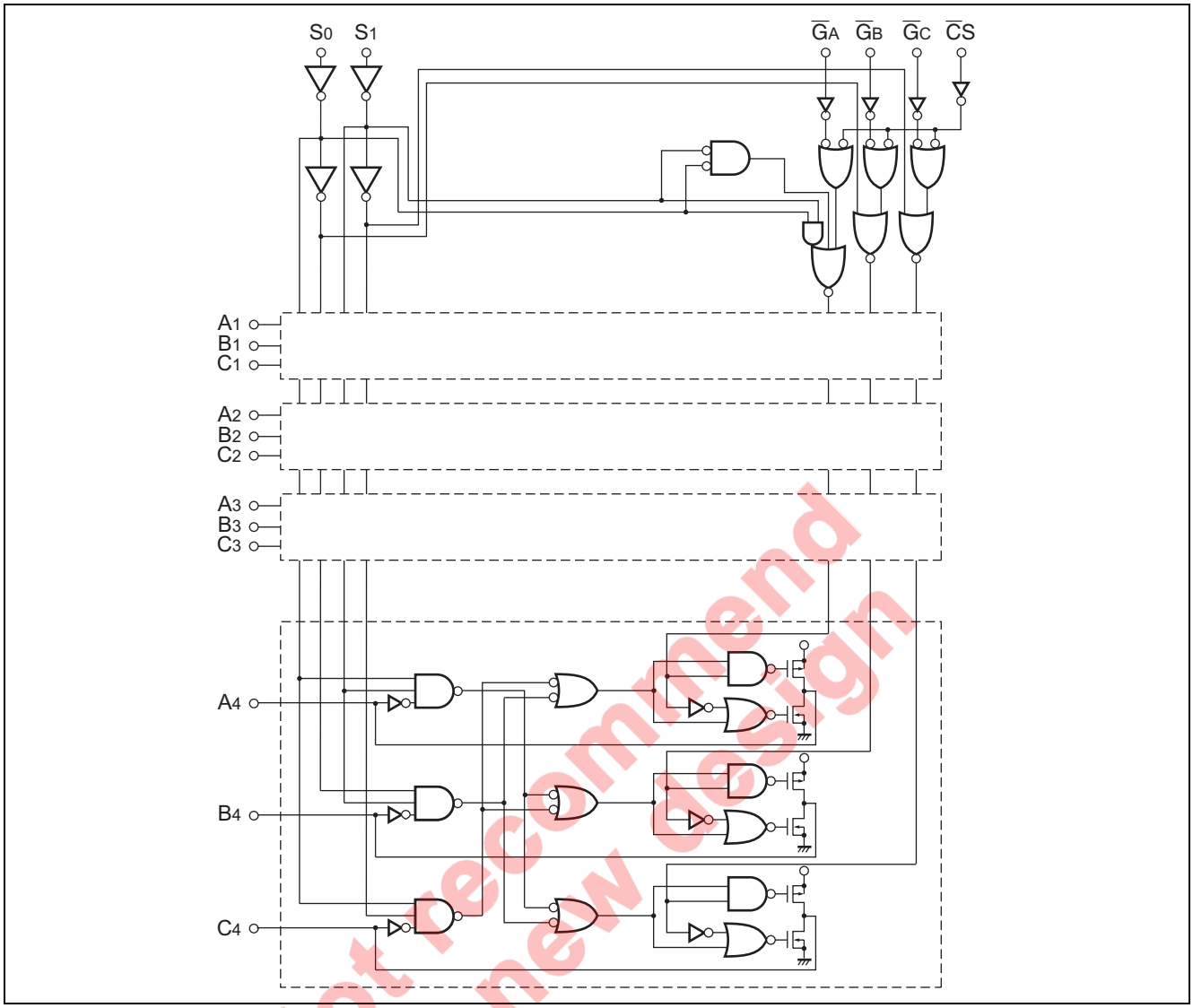
HD74HC443



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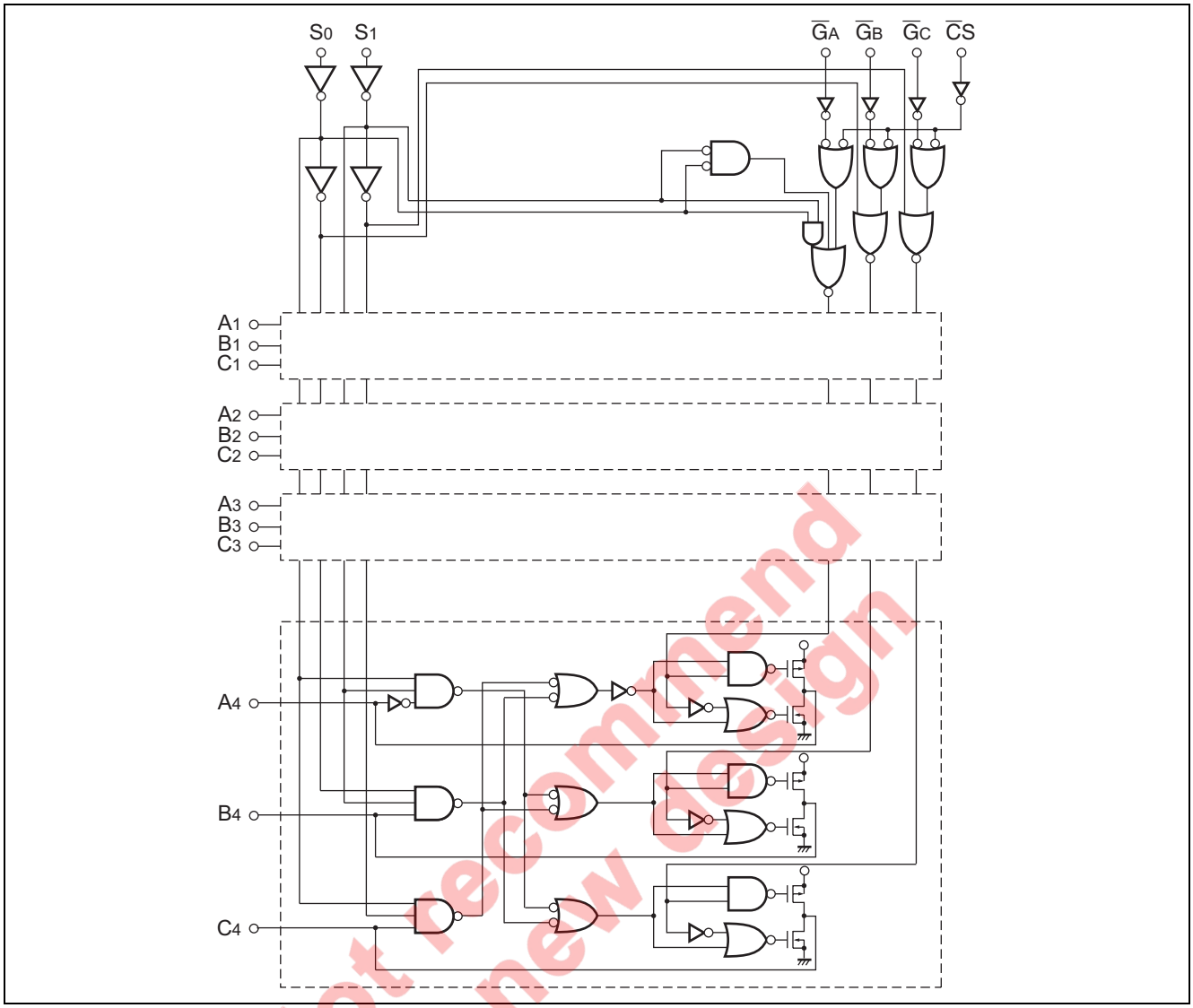
HD74HC444



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Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage range	V_{CC}	–0.5 to 7.0	V
Input / Output voltage	V_{IN}, V_{OUT}	–0.5 to V_{CC} +0.5	V
Input / Output diode current	I_{IK}, I_{OK}	±20	mA
Output current	I_O	±35	mA
V_{CC}, GND current	I_{CC} or I_{GND}	±75	mA
Power dissipation	P_T	500	mW
Storage temperature	Tstg	–65 to +150	°C

Note: 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	Ratings	Unit	Conditions
Supply voltage	V_{CC}	2 to 6	V	
Input / Output voltage	V_{IN}, V_{OUT}	0 to V_{CC}	V	
Operating temperature	Ta	–40 to 85	°C	
Input rise / fall time*1	t_r, t_f	0 to 1000	ns	V_{CC} = 2.0 V
		0 to 500		V_{CC} = 4.5 V
		0 to 400		V_{CC} = 6.0 V

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

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Electrical Characteristics

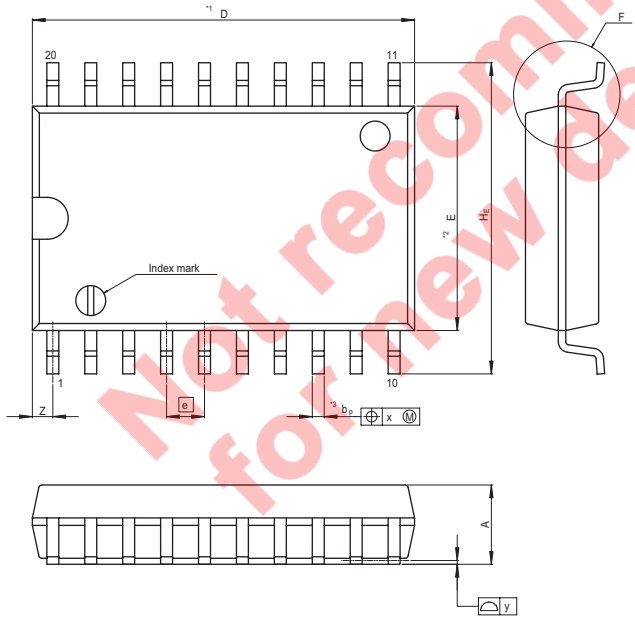
Item	Symbol	V_{CC} (V)	Ta = 25°C			Ta = –40 to+85°C		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V_{IL}	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin = V_{IH} or V_{IL}	I_{OH} = –20 µA
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—			I_{OH} = –6 mA
		6.0	5.68	—	—	5.63	—			I_{OH} = –7.8 mA
	V_{OL}	2.0	—	0.0	0.1	—	0.1	V	Vin = V_{IH} or V_{IL}	I_{OL} = 20 µA
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			I_{OL} = 6 mA
		6.0	—	—	0.26	—	0.33			I_{OL} = 7.8 mA
Off-state output current	I_{OZ}	6.0	—	—	±0.5	—	±5.0	µA	Vin = V_{IH} or V_{IL}, Vout = V_{CC} or GND	
Input current	Iin	6.0	—	—	±0.1	—	±1.0	µA	Vin = V_{CC} or GND	
Quiescent supply current	I_{CC}	6.0	—	—	4.0	—	40	µA	Vin = V_{CC} or GND, Iout = 0 µA	

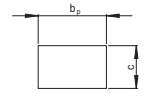
Switching Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	V_{CC} (V)	Ta = 25°C			Ta = –40 to +85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Propagation delay time	t_{PLH} t_{PHL}	2.0	—	—	200	—	250	ns	
		4.5	—	—	40	—	50		
		6.0	—	—	34	—	43		
Output enable time	t_{ZH} t_{ZL}	2.0	—	—	150	—	190	ns	
		4.5	—	—	30	—	38		
		6.0	—	—	26	—	33		
Output disable time	t_{HZ} t_{LZ}	2.0	—	—	150	—	190	ns	
		4.5	—	—	30	—	38		
		6.0	—	—	26	—	33		
Output rise/fall time	t_{TLH} t_{THL}	2.0	—	—	60	—	75	ns	
		4.5	—	—	12	—	15		
		6.0	—	—	10	—	13		
Input capacitance	Cin	—	—	—	5	10	—	10	pF	

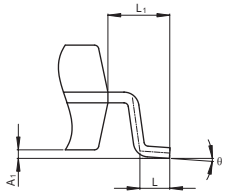
Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP20-7.5x12.8-1.27	PRSP0020DC-A	FP-20DBV	0.52g





Terminal cross section
(Ni/Pd/Au plating)



Detail F

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	—	12.80	13.2
E	—	7.50	—
A_2	—	—	—
A_1	0.10	0.20	0.30
A	—	—	2.65
b_p	0.34	0.40	0.46
b_1	—	—	—
c	0.20	0.25	0.30
c_1	—	—	—
θ	0°	—	8°
H_E	10.00	10.40	10.65
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.935
L	0.40	0.70	1.27
L_1	—	1.45	—

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