

Data sheet acquired from Harris Semiconductor SCHS087D - Revised October 2003

CMOS Dual Binary to 1 of 4 Decoder/Demultiplexers

High-Voltage Types (20-Volt Rating) CD4555B: Outputs High on Select CD4556B: Outputs Low on Select

■ CD4555B and CD4556B are dual one-of-four decoders/demultiplexers. Each decoder has two select inputs (A and B) an Enable input (E), and four mutually exclusive outputs. On the CD4555B the outputs are high on select; on the CD4556B the outputs are low on select.

When the Enable input is high, the outputs of the CD4555B remain low and the outputs of the CD4556B remain high regardless of the state of the select inputs A and B. The CD4555B and CD4556B are similar to types MC14555 and MC14556, respectively.

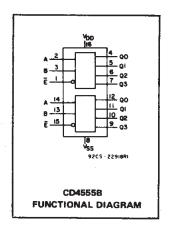
The CD4555B and CD4556B types are supplied in 16-lead hermetic dual-in-line ceramic packages (F3A suffix), 16-lead dual-in-line plastics packages (E suffix), and 16-lead small-outline packages (M, M96, and MT suffixes). The CD4555B is also supplied in 16-lead small-outline packages (NSR suffix) and 16-lead thin shrink small-outline packages (PW and PWR suffixes.)

Features:

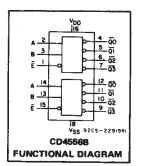
- Expandable with multiple packages
- Standard, symmetrical output characteristics
- 100% tested for quiescent current at 20 V
- Maximum input current of 1 μA at 18 V over full package temperature range; 100 nA at 18 V and 25°C
- Noise margin (full package-temperature range): $1 \text{ V at. V}_{DD} = 5 \text{ V}$

2 V at V_{DD} = 10 V

- 2.5 V at V_{DD} = 15 V 5-V, 10-V, and 15-V parametric ratings
- Meets all requirements of JEDEC Tentative Standard No. 13B, "Standard Specifications for Description of 'B' Series CMOS Devices" Applications
- Decoding ■ Code conversion
- Demultiplexing (using Enable input as a data input)
- Memory chip-enable selection
- Function selection



CD4555B, CD4556B Types



RECOMMENDED OPERATING CONDITIONS

For maximum reliability, nominal operating conditions should be selected so that operation is always within the following ranges.

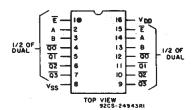
CHARACTERISTIC	V _{DD}	MIN.	MAX.	UNITS
Supply Voltage Range (For T _A = Full Package Temp. Range)	_	3	18	v

MAXIMUM RATINGS, Absolute-Maximum Values: DC SUPPLY-VOLTAGE RANGE, (VDD) Voltages referenced to VSS Terminal)-0.5V to +20V

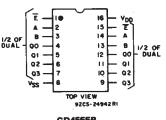
INPUT VOLTAGE RANGE, ALL INPUTS-0.5V to V_{DD} +0.5V DC INPUT CURRENT, ANY ONE INPUT ±10mA POWER DISSIPATION PER PACKAGE (PD): For T_A = -55°C to +100°C 500mW For TA = +100°C to +125°C Derate Linearity at 12mW/°C to 200mW DEVICE DISSIPATION PER OUTPUT TRANSISTOR

OPERATING-TEMPERATURE RANGE (TA)-55°C to +125°C STORAGE TEMPERATURE RANGE (Tsig)-65°C to +150°C LEAD TEMPERATURE (DURING SOLDERING):

TERMINAL ASSIGNMENTS



CD4556B



CD4555B

STATIC ELECTRICAL CHARACTERISTICS

CHARACTER-	CONE	MOITIC	IS	LIMI	TS AT	INDICA	red te	MPERA	ATURES	(°C)	UNITS
ISTIC	v _o	VIN	V _{DD}		,				+25		
	(V).	(V)	(V)	-55	40	+85	+125	Min.	Typ.	Max.	
Quiescent Device	_ ;]	0,5	-5	5	5	150	150	_	. 0.04	5	
Current,	-	0,10	10	10	10	300	300	न्द्रमः	0.04	10	μΑ
IDD Max.		0,15	15	20	20	600	600	177	0.04	20	μΑ.
	_	0,20	20	100	100	3000	3000	المالها وال	0.08	100	N 50
Output Low	0.4	0,5	5	0.64	0.61	0.42	0.36	0.51	1 } .	- 1: -	5.5
(Sink) Current	Q.5	0,10	10	1.6	1.5	1.1	0.9	1.3	. 2.6	: :-	A - 18
IOL Min.	∴ 1.5	0,15	15	4.2	4	2.8	2.4	3 4	6.8	, - <u>, -</u>]
Output High	4.6	0,5	5	-0.64	-0.61	-0.42	-0.36	-0.51	-1	-	mA
(Source)	2.5	0,5	5	-2	-1.8	1.3	-1.15	-1.6	-3.2	-	
Current, IOH-Min	9.5	0,10	10	-1.6	-1.5	-1.1	-0.9	-1.3	-2.6	1	
IOH anni.	13.5	0,15	15	-4.2	-4	-2.8	2.4	-3.4	-6.8		- × -
Output Voltage:	· –	0,5	5		0	.05		_	0	0.05	
Low-Level, VOI Max.	-	0,10	10		0	.05	100		0	0.05	
AOL Max.		0,15	15		0	.05			0	0.05	l v
Output Voltage:		0,5	5		4	.95		4.95	5	- 7	
High-Level,	-	0,10	10		9	.95		9,95	10		
VOH Min.		0,15	15		14	1.95	-	14.95	15	_	
Input Low	0.5,4.5	-	5		1	1.5		_	_	1.5	
Voltage,	1,9		10			3			<u> </u>	3	
VIL Max.	1.5,13.5	-	15			4		-	_	4	
Input High	0.5,4.5	_	5		3	3.5		3.5			
Voltage,	1,9	_	10			7		7			
VIH Min.	1.5,13.5	_	15			11		11	_	_	
Input Current IIN Max.		0,18	18	±0.1	±0.1	±1	±1	-	±10 ⁻⁵	±0.1	μА

DYNAMIC ELECTRICAL CHARACTERISTICS at T_A = 25° C; Input t_p , t_f = 20 ns, C_L = 50 pF, R_L = 200 K Ω

	TEST COND	ITIONS	LIM	LIMITS			
CHARACTERISTIC		V _{DD} Volts	TYP.	MAX.	UNITS		
Propagation Delay Time, tpHL,		5	220	440			
A or B Input to ^t PLH		10	95	190	ns		
Any Output		15	70	140			
		5	200	400			
E Input to Any		10	85	170	ns		
Output		15	65	130	, .		
		5	100	200			
Transition Time tTHL, tTLH		10	50	100	ns		
4 1 4 4 7		15	40	80			
Input Capacitance CIN	Any Input	·	5	7.5	ρF		

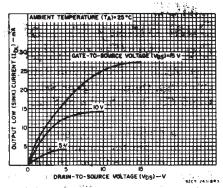


Fig. 1 — Typical output low (sink) current characteristics.

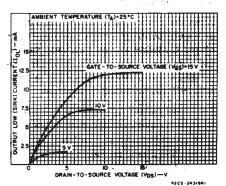


Fig. 2 — Minimum output low (sink) current characteristics.

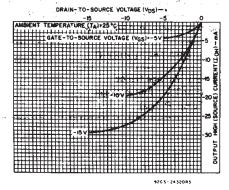


Fig. 3 - Typical output high (source) current characteristics.

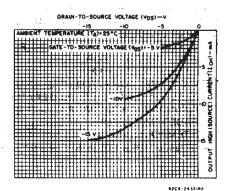


Fig. 4 — Minimum output high (source) current characteristics.

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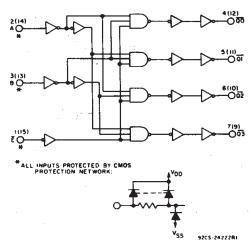


Fig. 5 — CD4556B logic diagram (1 of 2 identical circuits).

Fig. 6 — CD4555B logic diagram (1 of 2 identical circuits).

TRUTH TABLE

INF ENABLE	UTS SEL	.ECT			JTPL D455				PUT	_
Ē	В	Α	O3	Q2	Q1	QO	<u>03</u>	02	Ωī	<u>a</u>
0	0	0	0	0	0	1	1	1	1	0
0	0	1	0	0	1	0	1	1	0	1
0	1 -	0	0	1	0	0	1	0	1	1
0	1	1	1	0	0	0	0	1	1	1 %
1	Х	х	0	0	0	0	1	1	1	1

X = DON'T CARE

LOGIC 1 ≡ HIGH LOGIC 0 ≡ LOW

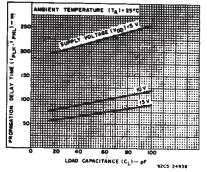


Fig. 7 — Typical propagation delay time vs. load capacitance (A or B input to any output).

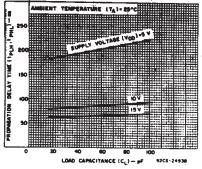


Fig. 8 — Typical propagation delay time vs., load capacitance (E input to any output).

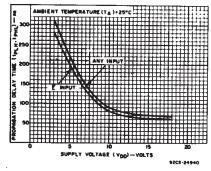


Fig. 9 — Typical propagation delay time vs. supply voltage.

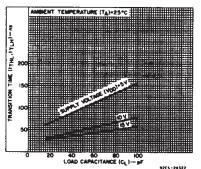


Fig. 10 - Typical transition time vs. load capacitance.

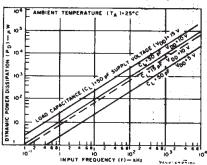


Fig. 11 — Typical dynamic power dissipation vs. frequency.

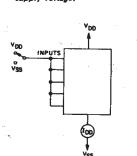


Fig. 12 — Quiescent device current test circuit.

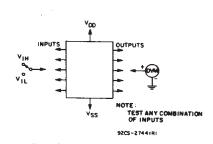


Fig. 13 — Input voltage test circuit.

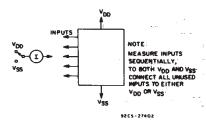


Fig. 14 - Input current test circuit.

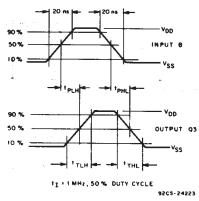


Fig. 15 — CD45558 B input to Q3 output dynamic signal waveforms.

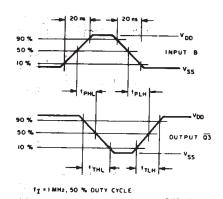


Fig. 16 - CD4556B B input to Q3 output dynamic signal waveforms.

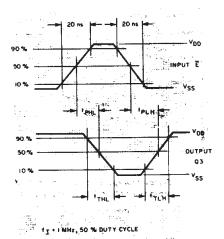


Fig. 17 — CD45558 E input to Q3 output dynamic signal waveforms.

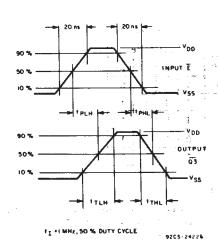
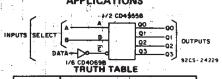
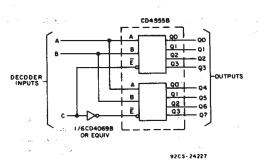


Fig. 18 – CD45568 E input to Q3 output dynamic signal waveforms.



SEL		OUTPUTS								
В	Α	000	Q1	02	Q3					
0	0	DATA	.0.	. 0	. 0					
0	1	. 0	DATA	0	0					
1	0	0	0	DATA	0					
1:	1	0	0	0	DATA					

Fig. 19 — 1 of 4 line data demultiplexer usin CD4555B.



				TR	UTI	H T	AB	LE				
	IN	PUT	S		Q OUTPUTS							
	С	В	Α	0	1	2	3	4	5	6	7	
	0	0	0	1	0	0	0	0			0	
	0	0	1	0	1	0	0	0	0	0	0	
1	0	1	0	0	0	1	0	0	0	0	0	
- 1	. 0	1	1	0	0	0	1	0	0	0	0	
-1	1	0	0	0	0	0	0	1	0	0	0	
	1	0	1	0	0	0	0	0	1	0	0	
	1	1	0	0	0	0	0	0	0	1	0	
	1	1	1	0	0	0	0	0	0	0	1	

Fig. 20 - 1-of-8 decoder using CD45558.

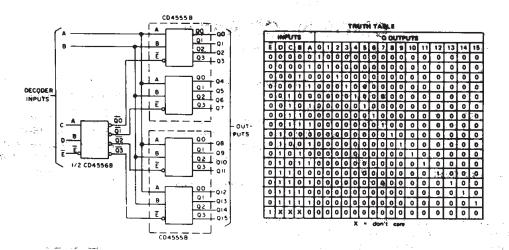
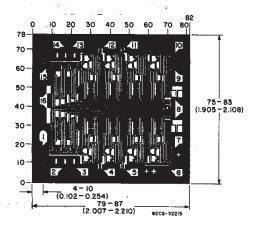
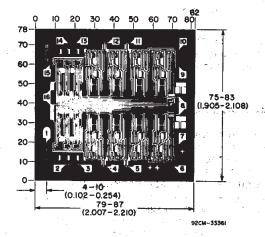


Fig. 21 — 1-of-16 decoder using CD4555B and CD4556B.





DIMENSIONS AND PAD LAYOUT FOR CD4555BH.

DIMENSIONS AND PAD LAYOUT FOR CD4556BH.

Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated. Grid graduations are in mils (10⁻³ inch).



7-Jun-2010

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
7704701EA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	Purchase Samples
7704801EA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	Purchase Samples
CD4555BE	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Contact TI Distribute or Sales Office
CD4555BEE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Contact TI Distribute or Sales Office
CD4555BF3A	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	Purchase Samples
CD4555BM	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BM96	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BM96E4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BM96G4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BME4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BMG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BMT	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BMTE4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BMTG4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BNSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BNSRE4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BNSRG4	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BPW	ACTIVE	TSSOP	PW	16	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples



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Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
CD4555BPWE4	ACTIVE	TSSOP	PW	16	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BPWG4	ACTIVE	TSSOP	PW	16	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BPWR	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BPWRE4	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4555BPWRG4	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4556BE	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Contact TI Distributor or Sales Office
CD4556BEE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Contact TI Distributor or Sales Office
CD4556BF	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	Purchase Samples
CD4556BF3A	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	Purchase Samples
CD4556BF3AS2283	OBSOLETE	CDIP	J	16		TBD	Call TI	Call TI	Samples Not Availab
CD4556BM	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4556BM96	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4556BM96E4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4556BM96G4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4556BME4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4556BMG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4556BMT	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4556BMTE4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
CD4556BMTG4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples



PACKAGE OPTION ADDENDUM

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(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.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF CD4555B, CD4555B-MIL, CD4556B, CD4556B-MIL:

Catalog: CD4555B, CD4556B

Military: CD4555B-MIL, CD4556B-MIL

NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Military QML certified for Military and Defense Applications

PACKAGE MATERIALS INFORMATION

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TAPE AND REEL INFORMATION





	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

All ulmensions are nominal												
Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CD4555BM96	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
CD4555BNSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
CD4555BPWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
CD4556BM96	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1

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*All dimensions are nominal

7 till difficilities die Hellimian							
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD4555BM96	SOIC	D	16	2500	333.2	345.9	28.6
CD4555BNSR	SO	NS	16	2000	346.0	346.0	33.0
CD4555BPWR	TSSOP	PW	16	2000	346.0	346.0	29.0
CD4556BM96	SOIC	D	16	2500	333.2	345.9	28.6

14 LEADS SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package is hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
- E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN

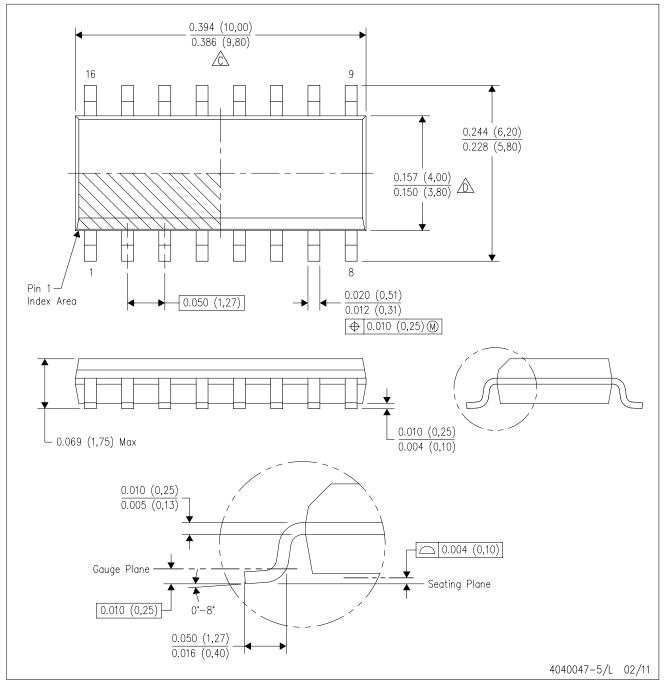


- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.



D (R-PDS0-G16)

PLASTIC SMALL OUTLINE

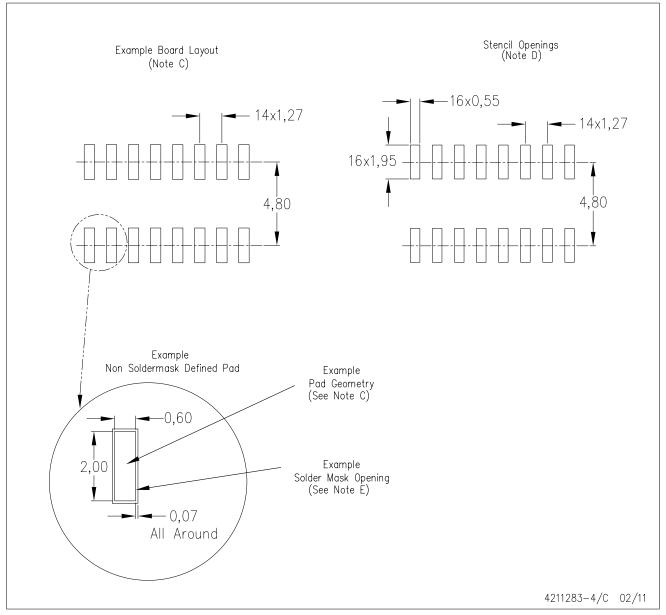


- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AC.



D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



PW (R-PDSO-G16)

PLASTIC SMALL OUTLINE

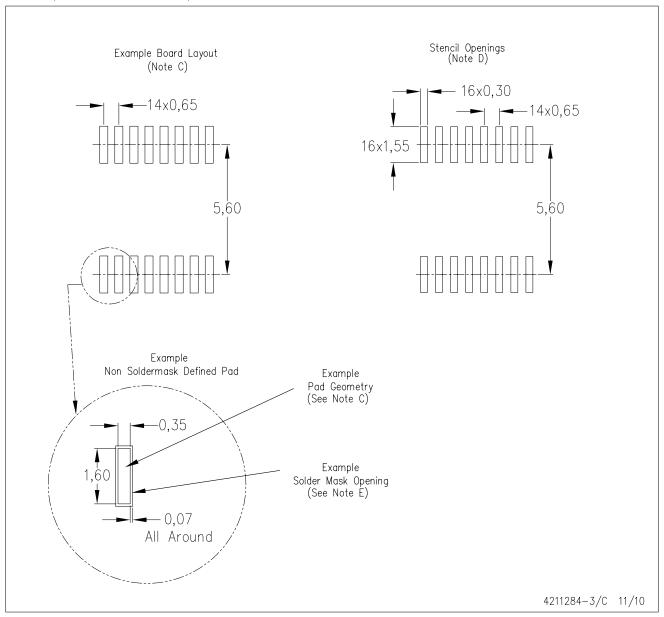


- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M—1994.
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
- E. Falls within JEDEC MO-153



PW (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



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