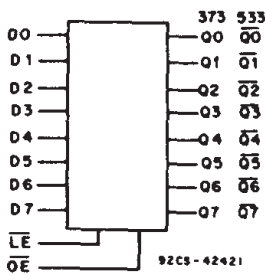


CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533



Data sheet acquired from Harris Semiconductor
SCHS289



FUNCTIONAL DIAGRAM

Octal Transparent Latch, 3-State

CD54/74AC/ACT373 - Non-Inverting
CD54/74AC/ACT533 - Inverting

Type Features:

- Buffered inputs
- Typical propagation delay:
4.3 ns @ $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$, $C_L = 50\text{ pF}$

The RCA-CD54/74AC373 and CD54/74AC533 and the CD54/74ACT373 and CD54/74ACT533 octal transparent 3-state latches use the RCA ADVANCED CMOS technology. The outputs are transparent to the inputs when the Latch Enable (\overline{LE}) is HIGH. When the Latch Enable (\overline{LE}) goes LOW, the data is latched. The Output Enable (\overline{OE}) controls the 3-state outputs. When the Output Enable (\overline{OE}) is HIGH, the outputs are in the high-impedance state. The latch operation is independent of the state of the Output Enable.

The CD74AC/ACT373 and CD74AC/ACT533 are supplied in 20-lead dual-in-line plastic packages (E suffix) and in 20-lead dual-in-line small-outline plastic packages (M suffix). Both package types are operable over the following temperature ranges: Commercial (0 to 70°C); Industrial (-40 to +85°C); and Extended Industrial/Military (-55 to +125°C).

The CD54AC/ACT373 and CD54AC/ACT533, available in chip form (H suffix), are operable over the -55 to +125°C temperature range.

Family Features:

- Exceeds 2-kV ESD Protection - MIL-STD-883, Method 3015
- SCR-Latchup-resistant CMOS process and circuit design
- Speed of bipolar FAST*/AS/S with significantly reduced power consumption
- Balanced propagation delays
- AC types feature 1.5-V to 5.5-V operation and balanced noise immunity at 30% of the supply
- $\pm 24\text{-mA}$ output drive current
 - Fanout to 15 FAST* ICs
 - Drives 50-ohm transmission lines

*FAST is a Registered Trademark of Fairchild Semiconductor Corp.

TRUTH TABLE

Output Enable	Latch Enable	Data	AC/ACT373 Output	AC/ACT533 Output
L	H	H	H	L
L	H	L	L	H
L	L	l	L	H
L	L	h	H	L
H	X	X	Z	Z

Note:

L = Low voltage level
H = High voltage level
l = Low voltage level one set-up time prior to the high to low latch enable transition

h = High voltage level one set-up time prior to the high to low latch enable transition.
X = Don't Care
Z = High Impedance State

This data sheet is applicable to the CD54/74AC373, CD54/74ACT373, and CD54ACT533. The CD74AC533 and CD74ACT533 were not acquired from Harris Semiconductor.

Technical Data

CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533

MAXIMUM RATINGS, Absolute-Maximum Values:

DC SUPPLY-VOLTAGE (V_{CC})	.....	-0.5 to 6 V
DC INPUT DIODE CURRENT, I_{IK} (for $V_i < -0.5$ V or $V_i > V_{CC} + 0.5$ V)	± 20 mA
DC OUTPUT DIODE CURRENT, I_{OK} (for $V_o < -0.5$ V or $V_o > V_{CC} + 0.5$ V)	± 50 mA
DC OUTPUT SOURCE OR SINK CURRENT per Output Pin, I_o (for $V_o > -0.5$ V or $V_o < V_{CC} + 0.5$ V)	± 50 mA
DC V_{CC} or GROUND CURRENT (I_{CC} or I_{GND})	± 100 mA*
POWER DISSIPATION PER PACKAGE (P_D):		
For $T_A = -55$ to $+100^\circ\text{C}$ (PACKAGE TYPE E)	.....	500 mW
For $T_A = +100$ to $+125^\circ\text{C}$ (PACKAGE TYPE E)	.....	Derate Linearly at 8 mW/ $^\circ\text{C}$ to 300 mW
For $T_A = -55$ to $+70^\circ\text{C}$ (PACKAGE TYPE M)	.....	400 mW
For $T_A = +70$ to $+125^\circ\text{C}$ (PACKAGE TYPE M)	.....	Derate Linearly at 6 mW/ $^\circ\text{C}$ to 70 mW
OPERATING-TEMPERATURE RANGE (T_A)	.....	-55 to $+125^\circ\text{C}$
STORAGE TEMPERATURE (T_{stg})	.....	-65 to $+150^\circ\text{C}$
LEAD TEMPERATURE (DURING SOLDERING):		
At distance $1/16 \pm 1/32$ in. (1.59 ± 0.79 mm) from case for 10 s maximum	.....	$+265^\circ\text{C}$
Unit inserted into PC board min. thickness $1/16$ in. (1.59 mm) with solder contacting lead tips only	.....	$+300^\circ\text{C}$

*For up to 4 outputs per device; add ± 25 mA for each additional output.

RECOMMENDED OPERATING CONDITIONS:

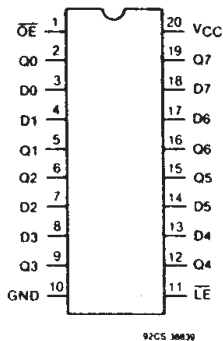
For maximum reliability, normal operating conditions should be selected so that operation is always within the following ranges:

CHARACTERISTIC	LIMITS		UNITS
	MIN.	MAX.	
Supply-Voltage Range, V_{CC} *: (For $T_A =$ Full Package-Temperature Range) AC Types ACT Types	1.5 4.5	5.5 5.5	V
DC Input or Output Voltage, V_i, V_o	0	V_{CC}	V
Operating Temperature, T_A	-55	+125	$^\circ\text{C}$
Input Rise and Fall Slew Rate, dt/dv at 1.5 V to 3 V (AC Types) at 3.6 V to 5.5 V (AC Types) at 4.5 V to 5.5 V (ACT Types)	0 0 0	50 20 10	ns/V ns/V ns/V

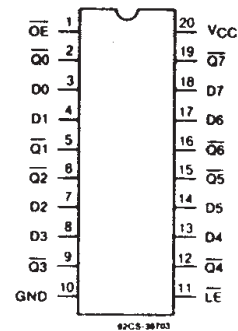
*Unless otherwise specified, all voltages are referenced to ground.

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TERMINAL ASSIGNMENT DIAGRAMS



CD54/74AC373, CD54/74ACT373



CD54/74AC533, CD54/74ACT533

CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533

STATIC ELECTRICAL CHARACTERISTICS: AC Series

CHARACTERISTICS	TEST CONDITIONS		V _{CC} (V)	AMBIENT TEMPERATURE (T _A) - °C						UNITS
				+25		-40 to +85		-55 to +125		
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
High-Level Input Voltage V _{IH}			1.5	1.2	—	1.2	—	1.2	—	V
			3	2.1	—	2.1	—	2.1	—	
			5.5	3.85	—	3.85	—	3.85	—	
Low-Level Input Voltage V _{IL}			1.5	—	0.3	—	0.3	—	0.3	V
			3	—	0.9	—	0.9	—	0.9	
			5.5	—	1.65	—	1.65	—	1.65	
High-Level Output Voltage V _{OH}	V _{IH} or V _{IL}	#, *	-0.05	1.5	1.4	—	1.4	—	1.4	V
			-0.05	3	2.9	—	2.9	—	2.9	
			-0.05	4.5	4.4	—	4.4	—	4.4	
			-4	3	2.58	—	2.48	—	2.4	
			-24	4.5	3.94	—	3.8	—	3.7	
			-75	5.5	—	—	3.85	—	—	
Low-Level Output Voltage V _{OL}	V _{IH} or V _{IL}	#, *	0.05	1.5	—	0.1	—	0.1	—	V
			0.05	3	—	0.1	—	0.1	—	
			0.05	4.5	—	0.1	—	0.1	—	
			12	3	—	0.36	—	0.44	—	
			24	4.5	—	0.36	—	0.44	—	
			75	5.5	—	—	—	1.65	—	
Input Leakage Current I _I	V _{CC} or GND		5.5	—	±0.1	—	±1	—	±1	μA
3-State Leakage Current I _{OZ}	V _{IH} or V _{IL} V _O = V _{CC} or GND		5.5	—	±0.5	—	±5	—	±10	μA
Quiescent Supply Current, MSI I _{CC}	V _{CC} or GND	0	5.5	—	8	—	80	—	160	μA

#Test one output at a time for a 1-second maximum duration. Measurement is made by forcing current and measuring voltage to minimize power dissipation.

*Test verifies a minimum 50-ohm transmission-line-drive capability at +85°C, 75 ohms at +125°C.

Technical Data

CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533

STATIC ELECTRICAL CHARACTERISTICS: ACT Series

CHARACTERISTICS	TEST CONDITIONS		V _{CC} (V)	AMBIENT TEMPERATURE (T _A) - °C						UNITS	
				+25		-40 to +85		-55 to +125			
	V _I (V)	I _O (mA)		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.		
High-Level Input Voltage	V _{IH}		4.5 to 5.5	2	—	2	—	2	—	V	
Low-Level Input Voltage	V _{IL}		4.5 to 5.5	—	0.8	—	0.8	—	0.8	V	
High-Level Output Voltage	V _{OH}	V _{IH} or V _{IL} #, *	-0.05	4.5	4.4	—	4.4	—	4.4	—	V
			-24	4.5	3.94	—	3.8	—	3.7	—	
			-75	5.5	—	—	3.85	—	—	—	
			-50	5.5	—	—	—	—	3.85	—	
Low-Level Output Voltage	V _{OL}	V _{IH} or V _{IL} #, *	0.05	4.5	—	0.1	—	0.1	—	0.1	V
			24	4.5	—	0.36	—	0.44	—	0.5	
			75	5.5	—	—	—	1.65	—	—	
			50	5.5	—	—	—	—	—	1.65	
Input Leakage Current	I _I	V _{CC} or GND	5.5	—	±0.1	—	±1	—	±1	μA	
3-State Leakage Current	I _{OZ}	V _{IH} or V _{IL} V _O = V _{CC} or GND	5.5	—	±0.5	—	±5	—	±10	μA	
Quiescent Supply Current, MSI	I _{CC}	V _{CC} or GND	0	5.5	—	8	—	80	—	160	μA
Additional Quiescent Supply Current per Input Pin TTL Inputs High 1 Unit Load	ΔI _{CC}	V _{CC} -2.1	4.5 to 5.5	—	2.4	—	2.8	—	3	mA	

#Test one output at a time for a 1-second maximum duration. Measurement is made by forcing current and measuring voltage to minimize power dissipation.

*Test verifies a minimum 50-ohm transmission-line-drive capability at +85°C, 75 ohms at +125°C.

ACT INPUT LOADING TABLE

INPUT	UNIT LOAD*	
	ACT373	ACT533
\overline{OE}	0.87	0.87
Dn	0.5	0.5
\overline{LE}	0.8	0.8

*Unit load is ΔI_{CC} limit specified in Static Characteristics Chart, e.g., 2.4 mA max. @ 25°C.

CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533

PREREQUISITE FOR SWITCHING: AC Series

CHARACTERISTICS	SYMBOL	V _{CC} (V)	AMBIENT TEMPERATURE (T _A) - °C				UNITS
			-40 to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
LE Pulse Width	t _w	1.5	44	—	50	—	ns
		3.3*	4.9	—	5.6	—	
		5†	3.5	—	4	—	
Setup Time Data to LE	t _{su}	1.5	2	—	2	—	ns
		3.3	2	—	2	—	
		5	2	—	2	—	
Hold Time Data to LE	t _h	1.5	33	—	38	—	ns
		3.3	3.7	—	4.2	—	
		5	2.6	—	3	—	

*3.3 V: min. is @ 3 V

†5 V: min. is @ 4.5 V

SWITCHING CHARACTERISTICS: AC Series; t_r, t_f = 3 ns, C_L = 50 pF

CHARACTERISTICS	SYMBOL	V _{CC} (V)	AMBIENT TEMPERATURE (T _A) - °C				UNITS
			-40 to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
Propagation Delays: Data to Qn 373	t _{PLH} t _{PHL}	1.5	—	96	—	106	ns
		3.3*	3.1	10.8	3	11.9	
		5†	2.2	7.7	2.1	8.5	
533	t _{PLH} t _{PHL}	1.5	—	119	—	131	ns
		3.3	3.8	13.4	3.7	14.7	
		5	2.7	9.5	2.6	10.5	
LE on Qn 373	t _{PLH} t _{PHL}	1.5	—	136	—	150	ns
		3.3	4.3	15.2	4.2	16.8	
		5	3.1	10.9	3	12	
533	t _{PLH} t _{PHL}	1.5	—	136	—	150	ns
		3.3	4.3	15.3	4.2	16.8	
		5	3.1	10.9	3	12	
Output Enable Times	t _{PZL} t _{PZH}	1.5	—	119	—	131	ns
		3.3	4.1	14.4	4	15.8	
		5	2.7	9.5	2.6	10.5	
Output Disable Times	t _{PLZ} t _{PHZ}	1.5	—	131	—	144	ns
		3.3	3.7	13.1	3.6	14.4	
		5	3	10.5	2.9	11.5	
Power Dissipation Capacitance	C _{PD} §	—	63 Typ.		63 Typ.		pF
Min. (Valley) V _{OH} During Switching of Other Outputs (Output Under Test Not Switching)	V _{OHV} See Fig. 1	5	4 Typ. @ 25°C				V
Max. (Peak) V _{OL} During Switching of Other Outputs (Output Under Test Not Switching)	V _{OLP} See Fig. 1	5	1 Typ. @ 25°C				V
Input Capacitance	C _I	—	—	10	—	10	pF
3-State Output Capacitance	C _O	—	—	15	—	15	pF

*3.3 V: min. is @ 3.6 V
max. is @ 3 V

†5 V: min. is @ 5.5 V
max. is @ 4.5 V

§C_{PD} is used to determine the dynamic power consumption, per latch.
P_D = V_{CC}² f_i (C_{PD} + C_L) where f_i = input frequency
C_L = output load capacitance
V_{CC} = supply voltage.

CD54/74AC373, CD54/74AC533 CD54/74ACT373, CD54/74ACT533

PREREQUISITE FOR SWITCHING: ACT Series

CHARACTERISTICS	SYMBOL	V _{CC} (V)	AMBIENT TEMPERATURE (T _A) -°C				UNITS
			-40 to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
LE Pulse Width	t _w	5†	3.6	—	4	—	ns
Setup Time Data to LE	t _{su}	5	2	—	2	—	ns
Hold Time Data to LE	t _h	5	2.7	—	3	—	ns

†5 V: min. is @ 4.5 V

SWITCHING CHARACTERISTICS: ACT Series; t_r, t_f = 3 ns, C_L = 50 pF

CHARACTERISTICS	SYMBOL	V _{CC} (V)	AMBIENT TEMPERATURE (T _A) -°C				UNITS
			-40 to +85		-55 to +125		
			MIN.	MAX.	MIN.	MAX.	
Propagation Delays: Data to Qn 373	t _{PLH}	5†	2.7	9.5	2.6	10.4	ns
	t _{PHL}		3	10.4	2.9	11.4	
LE to Qn 373 533	t _{PLH} t _{PHL}	5	3.1	11.4	3	12.5	ns
Output Enable Times	t _{PZL} t _{PZH}	5	3.5	12.3	3.4	13.5	ns
Output Disable Times	t _{PLZ} t _{PHZ}	5	3.2	11.4	3.1	12.5	ns
Power Dissipation Capacitance	C _{PD} §	—	63 Typ.		63 Typ.		pF
Min. (Valley) V _{OH} During Switching of Other Outputs (Output Under Test Not Switching)	V _{OHV} See Fig. 1	5	4 Typ. @ 25°C				V
Max. (Peak) V _{OL} During Switching of Other Outputs (Output Under Test Not Switching)	V _{OLP} See Fig. 1	5	1 Typ. @ 25°C				V
Input Capacitance	C _I	—	—	10	—	10	pF
3-State Output Capacitance	C _O	—	—	15	—	15	pF

†5 V: min. is @ 5.5 V
max. is @ 4.5 V

§C_{PD} is used to determine the dynamic power consumption, per latch.

$$P_D = V_{CC}^2 f_i (C_{PD} + C_L) + V_{CC} \Delta I_{CC} \text{ where } f_i = \text{input frequency}$$

C_L = output load capacitance
V_{CC} = supply voltage.

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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
CD54AC373F3A	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	CD54AC373F3A	Samples
CD54ACT373F3A	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	CD54ACT373F3A	Samples
CD74AC373E	ACTIVE	PDIP	N	20	20	RoHS & Green	NIPDAU	N / A for Pkg Type	-55 to 125	CD74AC373E	Samples
CD74AC373M96	ACTIVE	SOIC	DW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC373M	Samples
CD74ACT373E	ACTIVE	PDIP	N	20	20	RoHS & Green	NIPDAU	N / A for Pkg Type	-55 to 125	CD74ACT373E	Samples
CD74ACT373M	LIFEBUY	SOIC	DW	20	25	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT373M	
CD74ACT373M96	ACTIVE	SOIC	DW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	ACT373M	Samples

(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.

OBSELETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "-" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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OTHER QUALIFIED VERSIONS OF CD54AC373, CD54ACT373, CD74AC373, CD74ACT373 :

- Catalog : [CD74AC373](#), [CD74ACT373](#)
- Military : [CD54AC373](#), [CD54ACT373](#)

NOTE: Qualified Version Definitions:

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

TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CD74AC373M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
CD74ACT373M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74AC373M96	SOIC	DW	20	2000	367.0	367.0	45.0
CD74ACT373M96	SOIC	DW	20	2000	367.0	367.0	45.0

TUBE


*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
CD74AC373E	N	PDIP	20	20	506	13.97	11230	4.32
CD74ACT373E	N	PDIP	20	20	506	13.97	11230	4.32
CD74ACT373M	DW	SOIC	20	25	507	12.83	5080	6.6

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- NOTES:
- 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.

DW0020A



PACKAGE OUTLINE

SOIC - 2.65 mm max height

SOIC



4220724/A 05/2016

NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
5. Reference JEDEC registration MS-013.

EXAMPLE BOARD LAYOUT

DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

4220724/A 05/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

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

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