



Support & training

SN54HCT74, SN74HCT74 SCLS169G - DECEMBER 1982 - REVISED OCTOBER 2022

SNx4HCT74 Dual D-Type Positive-Edge-Triggered Flip-Flips With Clear and Preset

1 Features

TEXAS

INSTRUMENTS

- Operating voltage range of 4.5 V to 5.5 V
- Outputs can drive up to 10 LSTTL loads
- Low power consumption, 40- μ A max I_{CC}
- Typical t_{pd} = 17 ns ٠
- ±4-mA output drive at 5 V
- Low input current of 1 µA max
- Inputs are TTL-voltage compatible

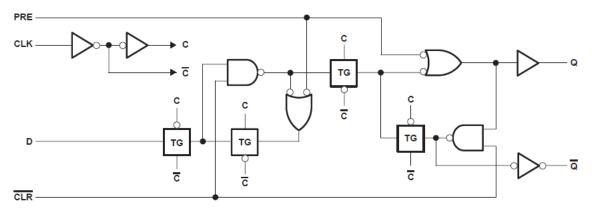
2 Description

The 'HCT74 devices contain two independent D-type positive-edge-triggered flip-flops. A low level at the preset (PRE) or clear (CLR) inputs sets or resets the outputs, regardless of the levels of the other inputs. When PRE and CLR are inactive (high), data at the data (D) input meeting the setup time requirements are transferred to the outputs on the positive-going edge of the clock (CLK) pulse. Clock triggering occurs at a voltage level and is not directly related to the rise time of CLK. Following the hold-time interval, data at the D input may be changed without affecting the levels at the outputs.

Device Information								
PART NUMBER	PACKAGE ⁽¹⁾	BODY SIZE (NOM)						
SN74HCT74D	SOIC (14)	8.65 mm × 3.90 mm						
SN74HCT74DB	SSOP (14)	6.20 mm × 5.30 mm						
SN74HCT74N	PDIP (14)	19.31 mm × 6.35 mm						
SN74HCT74NS	SO (14)	10.20 mm × 5.30 mm						
SN74HCT74PW	TSSOP (14)	5.00 mm × 4.40 mm						
SNJ54HCT74FK	LCCC (20)	8.89 mm × 8.45 mm						
SNJ54HCT74W	CFP (14)	9.21 mm × 6.29 mm						
SNJ54HCT74J	CDIP (14)	19.55 mm × 6.71 mm						

Davias Information

(1) For all available packages, see the orderable addendum at the end of the data sheet.



Functional Block Diagram





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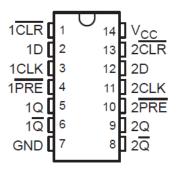
3 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

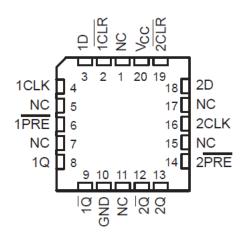
С	hanges from Revision F (February 2022) to Revision G (October 2022)	Page
•	Changed R0JA for packages: D (86 to 138.7); N (80 to 61.1); NS (76 to 88.4); PW (113 to 114.7)	4



4 Pin Configuration and Functions



J, W, D, DB, N, NS, or PW package 14-Pin CDIP, CFP, SOIC, SSOP, PDIP, SO, or TSSOP Top View



NC - No internal connection

FK Package 20-Pin LCCC Top View

5 Specifications

5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

			MIN	MAX	UNIT
V _{CC}	Supply voltage range		-0.5	7	V
I _{IK}	Input clamp current ⁽²⁾	$V_{I} < 0 \text{ or } V_{I} > V_{CC}$		± 20	mA
I _{ок}	Output clamp current ⁽²⁾	$V_{\rm O}$ < 0 or $V_{\rm O}$ > $V_{\rm CC}$		± 20	mA
I _O	Continuous output current	V_{O} = 0 to V_{CC}		± 25	mA
	Continuous current through V_{CC} or GND		± 50	mA	
TJ	Junction temperature			150	C°
T _{stg}	Storage temperature range		-65	150	°C

(1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

5.2 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

			SN	54HCT74 ⁽²⁾)	SN	74HCT74		UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	UNIT
V _{CC}	Supply voltage		4.5	5	5.5	4.5	5	5.5	V
VIH	High-level input voltage	V_{cc} = 4.5 V to 5.5 V	2			2			V
VIL	Low-level input voltage	V_{cc} = 4.5 V to 5.5 V			0.8			0.8	V
VI	Input voltage		0		V _{CC}	0		V _{CC}	V
Vo	Output voltage		0		V _{CC}	0		V _{CC}	V
Δt/Δv	Input transition rise/fall time				500			500	ns
T _A	Operating free-air temperatu	ire	-55		125	-40		85	°C

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, Implications of Slow or Floating CMOS Inputs, literature number SCBA004.

(2) SN54HCT74 is in product preview.

5.3 Thermal Information

		D (SOIC)	DB (SSOP)	N (PDIP)	NS (SO)	PW (TSSOP)	
THERMAL METRIC		14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	UNIT
R _{θJA}	Junction-to-ambient thermal resistance ⁽¹⁾	138.7	109.8	61.1	88.4	114.7	°C/W
R _{θJC (top)}	Junction-to-case (top) thermal resistance	93.8	54.7	48.9	46	44.3	°C/W
R _{θJB}	Junction-to-board thermal resistance	94.7	58.6	40.9	48.9	57.6	°C/W
Ψ_{JT}	Junction-to-top characterization parameter	49.1	15.5	28.5	13.8	4.8	°C/W
Ψ_{JB}	Junction-to-board characterization parameter	94.3	58	40.6	48.4	57	°C/W
R _{θJC (bot)}	Junction-to-case (bottom) thermal resistance	N/A	N/A	N/A	N/A	N/A	°C/W

(1) For more information about traditional and new thermal metrics, see the Semiconductor and IC package thermal metrics application report.

5.4 Electrical Characteristics

PARAMETER	AMETER TEST CONDITIONS		V _{cc}	T _A = 25°C		SN54HCT74 ⁽²⁾		SN74HCT74		UNIT	
FARAMETER	1231 00	NDITIONS	▼cc	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
V	$V_{I} = V_{IH} \text{ or } V_{IL}$	I _{OH} = −20 μA	4.5 V	4.4	4.499		4.4		4.4		V
V _{OH}		I _{OH} = −4 mA	4.5 V	3.98	4.3		3.7		3.84		V
V	$V_{I} = V_{IH} \text{ or } V_{IL}$	I _{OL} = 20 μA	4.5 V		0.001	0.1		0.1		0.1	V
V _{OL}		I _{OL} = 4 mA			0.17	0.26		0.4		0.33	v
I _I	$V_{I} = V_{CC} \text{ or } 0$		5.5 V		±0.1	±100	·	±1000		±1000	nA
I _{CC}	$V_i = V_{CC} \text{ or } 0,$	I _O = 0	5.5 V			4		80		40	μA
$\Delta I_{CC}^{(1)}$	One input at 0.5 Other inputs at		5.5 V		1.4	2.4		3		2.9	mA
C _i			4.5 V to 5.5 V		3	10		10		10	pF

over recommended operating free-air temperature range (unless otherwise noted)

(1) This is the increase in supply current for each input that is at one of the specified TTL voltage levels, rather than 0 V or V_{CC} . (2) SN54HCT74 is in product preview.

5.5 Timing Requirements

overrecommended operating free-air temperature range (unless otherwise noted)

			V	V_{CC} $T_A = 25^{\circ}C$		SN54HC	T74 ⁽¹⁾	SN74HCT74		UNIT
			V CC	MIN	MAX	MIN	MAX	MIN	MAX	UNIT
f	r _{clock} Clock frequency		4.5 V		27		18		22	MHz
f _{clock}	Clock frequency		5.5 V		30		20		24	
t _w Pulse duration	PRE or CLR low	4.5 V	16		24		20			
		5.5 V	14		21		18		ns	
		CLK high or low	4.5 V	18		27		23		115
			5.5 V	16		24		21		
		Data	4.5 V	12		18		15		
	Satur time bafara CLKA	Dala	5.5 V	11		16		14		ns
usu	t _{su} Setup time before CLK↑	PRE or CLR inactive	4.5 V	0		0		0		115
			5.5 V	0		0		0		
t.	Hold time, data after CLK	*	4.5 V	0		0		0		nc
t _h		1	5.5 V	0		0		0		ns

(1) SN54HCT74 is in product preview.



5.6 Switching Characteristics

over recommended operating free-air temperature range, $C_L = 50 \text{ pF}$ (unless otherwise noted) (see Parameter Measurement Information)

PARAMETER	FROM	то	то	v	T⊿	= 25°C		SN54HC	T74 ⁽¹⁾	SN74HC	T74	UNIT
FARAMETER	(INPUT)	(OUTPUT)	V _{cc}	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT	
4			4.5 V	27	40		18		22		MHz	
f _{max}	max		5.5 V	30	46		20		24		IVITIZ	
	PRE or CLR		Q or \overline{Q}	4.5 V		21	35		53		44	
+			5.5 V		17	31		48		40	ns	
^t pd	CLK	Q or \overline{Q}	4.5 V		20	28		42		35	115	
	CLK	Q or Q	5.5 V		18	25		38		31		
+		Q or \overline{Q}	4.5 V		8	15		22		19	20	
t _t			5.5 V		7	14		20		17	ns	

(1) SN54HCT74 is in product preview.

5.7 Operating Characteristics

T_A = 25°C

	PARAMETER	TEST CONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance per flip-flop	No load	35	pF

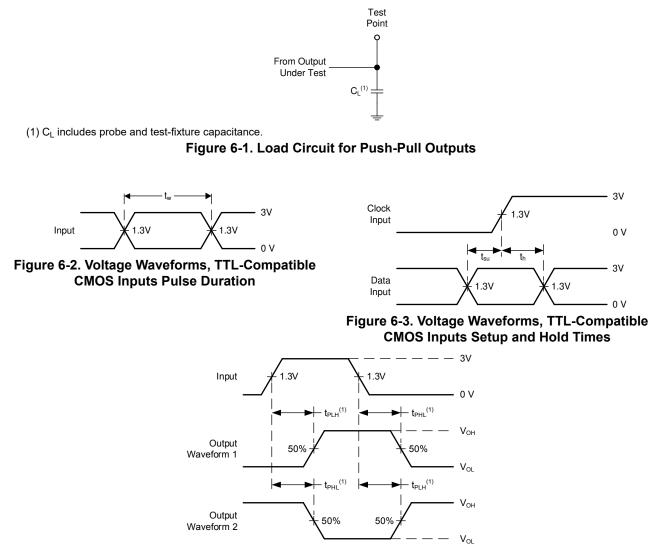


6 Parameter Measurement Information

Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, Z_O = 50 Ω , t_t < 6 ns.

For clock inputs, f_{max} is measured when the input duty cycle is 50%.

The outputs are measured one at a time with one input transition per measurement.



(1) The greater between t_{PLH} and t_{PHL} is the same as $t_{\mathsf{pd}}.$

Figure 6-4. Voltage Waveforms, Propagation Delays for TTL-Compatible Inputs

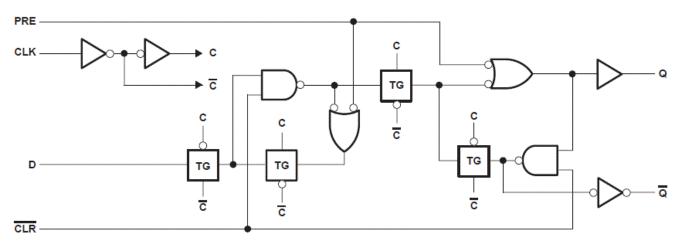


7 Detailed Description

7.1 Overview

The 'HCT74 devices contain two independent D-type positive-edge-triggered flip-flops. A low level at the preset (\overline{PRE}) or clear (\overline{CLR}) inputs sets or resets the outputs, regardless of the levels of the other inputs. When \overline{PRE} and \overline{CLR} are inactive (high), data at the data (D) input meeting the setup time requirements are transferred to the outputs on the positive-going edge of the clock (CLK) pulse. Clock triggering occurs at a voltage level and is not directly related to the rise time of CLK. Following the hold-time interval, data at the D input may be changed without affecting the levels at the outputs.

7.2 Functional Block Diagram



7.3 Device Functional Modes

Table 7-1. Function Tabl	Table	7-1.	Function	Table
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	INP	OUTPUT							
PRE	CLR	CLK	D	Q	Q				
L	Н	Х	Х	Н	L				
Н	L	Х	Х	L	Н				
L	L	Х	Х	H ⁽¹⁾	H ⁽¹⁾				
Н	Н	1	Н	Н	L				
Н	Н	1	L	L	Н				
Н	Н	L	Х	Q ₀	\overline{Q}_0				

(1) This configuration is nonstable; that is, it does not persist when PRE or CLR returns to its inactive (high) level.



8 Application and Implementation

Note

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes, as well as validating and testing their design implementation to confirm system functionality.

8.1 Power Supply Recommendations

The power supply can be any voltage between the minimum and maximum supply voltage rating located in the *Recommended Operating Conditions*. Each V_{CC} terminal should have a good bypass capacitor to prevent power disturbance. A 0.1- μ F capacitor is recommended for this device. It is acceptable to parallel multiple bypass capacitors to reject different frequencies of noise. The 0.1- μ F and 1- μ F capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results.

8.2 Layout

8.2.1 Layout Guidelines

When using multiple-input and multiple-channel logic devices, inputs must not ever be left floating. In many cases, functions or parts of functions of digital logic devices are unused; for example, when only two inputs of a triple-input AND gate are used or only 3 of the 4 buffer gates are used. Such unused input pins must not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. All unused inputs of digital logic devices must be connected to a logic high or logic low voltage, as defined by the input voltage specifications, to prevent them from floating. The logic level that must be applied to any particular unused input depends on the function of the device. Generally, the inputs are tied to GND or V_{CC} , whichever makes more sense for the logic function or is more convenient.



9 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

9.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

9.2 Support Resources

TI E2E[™] support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

9.3 Trademarks

TI E2E[™] is a trademark of Texas Instruments. All trademarks are the property of their respective owners.

9.4 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

9.5 Glossary

TI Glossary This glossary lists and explains terms, acronyms, and definitions.

10 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.



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
JM38510/65352B2A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 65352B2A	Samples
JM38510/65352BCA	ACTIVE	CDIP	J	14	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 65352BCA	Samples
JM38510/65352BDA	ACTIVE	CFP	W	14	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 65352BDA	Samples
M38510/65352B2A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 65352B2A	Samples
M38510/65352BCA	ACTIVE	CDIP	J	14	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 65352BCA	Samples
M38510/65352BDA	ACTIVE	CFP	W	14	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 65352BDA	Samples
SN74HCT74DBR	ACTIVE	SSOP	DB	14	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HT74	Samples
SN74HCT74DR	ACTIVE	SOIC	D	14	2500	RoHS & Green	NIPDAU SN	Level-1-260C-UNLIM	-40 to 85	HCT74	Samples
SN74HCT74DRE4	ACTIVE	SOIC	D	14	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT74	Samples
SN74HCT74N	ACTIVE	PDIP	N	14	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	SN74HCT74N	Samples
SN74HCT74NE4	ACTIVE	PDIP	N	14	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	SN74HCT74N	Samples
SN74HCT74NSR	ACTIVE	SO	NS	14	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HCT74	Samples
SN74HCT74PWR	ACTIVE	TSSOP	PW	14	2000	RoHS & Green	NIPDAU SN	Level-1-260C-UNLIM	-40 to 85	HT74	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.

OBSOLETE: 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".



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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 (CI) 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 SN54HCT74, SN74HCT74 :

• Catalog : SN74HCT74

• Military : SN54HCT74

NOTE: Qualified Version Definitions:

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

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Texas

STRUMENTS

TAPE AND REEL INFORMATION





QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions 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
SN74HCT74DBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74HCT74DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HCT74DR	SOIC	D	14	2500	330.0	16.4	6.6	9.3	2.1	8.0	16.0	Q1
SN74HCT74DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HCT74NSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74HCT74PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74HCT74PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1



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PACKAGE MATERIALS INFORMATION

5-May-2024



Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HCT74DBR	SSOP	DB	14	2000	356.0	356.0	35.0
SN74HCT74DR	SOIC	D	14	2500	356.0	356.0	35.0
SN74HCT74DR	SOIC	D	14	2500	366.0	364.0	50.0
SN74HCT74DR	SOIC	D	14	2500	356.0	356.0	35.0
SN74HCT74NSR	so	NS	14	2000	356.0	356.0	35.0
SN74HCT74PWR	TSSOP	PW	14	2000	356.0	356.0	35.0
SN74HCT74PWR	TSSOP	PW	14	2000	356.0	356.0	35.0

TEXAS INSTRUMENTS

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5-May-2024

TUBE



- B - Alignment groove width

*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
JM38510/65352B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
JM38510/65352BDA	W	CFP	14	25	506.98	26.16	6220	NA
M38510/65352B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
M38510/65352BDA	W	CFP	14	25	506.98	26.16	6220	NA
SN74HCT74N	N	PDIP	14	25	506	13.97	11230	4.32
SN74HCT74N	N	PDIP	14	25	506	13.97	11230	4.32
SN74HCT74NE4	N	PDIP	14	25	506	13.97	11230	4.32
SN74HCT74NE4	N	PDIP	14	25	506	13.97	11230	4.32

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only.
 - E. Falls within MIL STD 1835 GDFP1-F14



FK 20

8.89 x 8.89, 1.27 mm pitch

GENERIC PACKAGE VIEW

LCCC - 2.03 mm max height

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary. Refer to the product data sheet for package details.





GENERIC PACKAGE VIEW

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



Images above are just a representation of the package family, actual package may vary. Refer to the product data sheet for package details.



J0014A



PACKAGE OUTLINE

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



NOTES:

- 1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
- 2. This drawing is subject to change without notice.
- 3. This package is hermitically sealed with a ceramic lid using glass frit.
- Index point is provided on cap for terminal identification only and on press ceramic glass frit seal only.
 Falls within MIL-STD-1835 and GDIP1-T14.



J0014A

EXAMPLE BOARD LAYOUT

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE





D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



NOTES: 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 AB.





NOTES: 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-G14)

PLASTIC SMALL OUTLINE



A. An integration of the information o

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





NOTES: 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.



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).
- \triangle The 20 pin end lead shoulder width is a vendor option, either half or full width.



MECHANICAL DATA

MSSO002E - JANUARY 1995 - REVISED DECEMBER 2001

DB (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



NOTES: 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.
- D. Falls within JEDEC MO-150



MECHANICAL DATA

PLASTIC SMALL-OUTLINE PACKAGE

0,51 0,35 ⊕0,25⊛ 1,27 8 14 0,15 NOM 5,60 8,20 5,00 7,40 \bigcirc Gage Plane ₽ 0,25 7 1 1,05 0,55 0-10 Δ 0,15 0,05 Seating Plane — 2,00 MAX 0,10PINS ** 14 16 20 24 DIM 10,50 10,50 12,90 15,30 A MAX A MIN 9,90 9,90 12,30 14,70 4040062/C 03/03

NOTES: A. All linear dimensions are in millimeters.

NS (R-PDSO-G**)

14-PINS SHOWN

- 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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