SN54AC574...J OR W PACKAGE SN74AC574...DB. DW. N. NS. OR PW PACKAGE

SCAS541E - OCTOBER 1995 - REVISED OCTOBER 2003

- 2-V to 6-V V_{CC} Operation
- Inputs Accept Voltages to 6 V
- Max t_{pd} of 8.5 ns at 5 V
- 3-State Outputs Drive Bus Lines Directly

description/ordering information

These 8-bit flip-flops feature 3-state outputs designed specifically for driving highly capacitive or relatively low-impedance loads. The devices are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

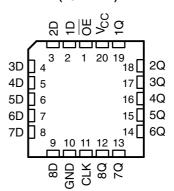
The eight flip-flops of the 'AC574 devices are D-type edge-triggered flip-flops. On the positive transition of the clock (CLK) input, the Q outputs are set to the logic levels set up at the data (D) inputs.

A buffered output-enable (\overline{OE}) input can be used to place the eight outputs in either a normal logic state (high or low logic levels) or the high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and the increased drive provide the capability to drive bus lines in a bus-organized system without need for interface or pullup components.

OE does not affect internal operations of the flip-flop. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

	(TC	P VI	EW)
OE [1	υ	20] V _{CC}] 1Q
1D [2D [2 3		19 18] 1Q] 2Q
3D [4		17] 3Q
4D [5		16	4Q
5D [6] 5Q
6D [7		14] 6Q
7D [8		13] 7Q
8D [12	8Q
GND [10		11] CLK

SN54AC574 ... FK PACKAGE (TOP VIEW)



T _A	PACKAGI	Et	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – N	Tube	SN74AC574N	SN74AC574N
-40°C to 85°C		Tube	SN74AC574DW	10574
	SOIC – DW	Tape and reel	SN74AC574DWR	AC574
	SOP – NS	Tape and reel	SN74AC574NSR	AC574
	SSOP – DB	Tape and reel	SN74AC574DBR	AC574
		Tube	SN74AC574PW	10574
	TSSOP – PW	Tape and reel	SN74AC574PWR	AC574
	CDIP – J	Tube	SNJ54AC574J	SNJ54AC574J
–55°C to 125°C	CFP – W	Tube	SNJ54AC574W	SNJ54AC574W
	LCCC – FK	Tube	SNJ54AC574FK	SNJ54AC574FK

ORDERING INFORMATION

[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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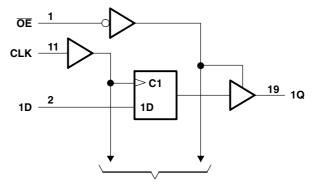
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description/ordering information (continued)

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

	FUNCTION TABLE (each flip-flop)											
	INPUTS	OUTPUT										
OE	CLK	D	Q									
L	\uparrow	Н	Н									
L	\uparrow	L	L									
L	H or L	Х	Q ₀									
н	Х	Х	Z									

logic diagram (positive logic)



To Seven Other Channels

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V _{CC}	
Input voltage range, V _I (see Note 1)	–0.5 V to V _{CC} + 0.5 V
Output voltage range, V _O (see Note 1)	–0.5 V to V _{CC} + 0.5 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	±20 mA
Output clamp current, I_{OK} (V _O < 0 or V _O > V _{CC})	±20 mA
	±50 mA
Continuous current through V _{CC} or GND	±200 mA
Package thermal impedance, θ_{JA} (see Note 2): [DB package
Γ	DW package 58°C/W
Ν	N package 69°C/W
Ν	NS package 60°C/W
F	PW package 83°C/W
Storage temperature range, T _{stg}	–65°C to 150°C

[†] 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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. The package thermal impedance is calculated in accordance with JESD 51-7.



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recommended operating conditions (see Note 3)

			SN54	AC574	SN74	AC574	
			MIN	МАХ	MIN	MAX	UNIT
V _{CC}	Supply voltage		2	6	2	6	V
		$V_{CC} = 3 V$	2.1		2.1		
VIH	High-level input voltage	$V_{CC} = 4.5 V$	3.15		3.15		V
		V _{CC} = 5.5 V	3.85		3.85		
		V _{CC} = 3 V		0.9		0.9	
VIL	Low-level input voltage	$V_{CC} = 4.5V$		1.35		1.35	v
		V _{CC} = 5.5 V		1.65		1.65	
VI	Input voltage		0	V _{CC}	0	V _{CC}	V
Vo	Output voltage		0	V _{CC}	0	V _{CC}	V
		V _{CC} = 3 V		-12		-12	
l _{OH}	High-level output current	V _{CC} = 4.5 V		-24		-24	mA
		V _{CC} = 5.5 V		-24		-24	
		V _{CC} = 3 V		12		12	
l _{OL}	Low-level output current	V _{CC} = 4.5 V		24		24	mA
-		V _{CC} = 5.5 V		24		24	
$\Delta t/\Delta v$	Input transition rise or fall rate			8		8	ns/V
T _A	Operating free-air temperature		-55	125	-40	85	°C

NOTE 3: 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.

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

			1	Γ _A = 25°	C	SN54	AC574	SN74	AC574			
PARAMETER	TEST CONDITIONS	V _{CC}	MIN	ТҮР	MAX	MIN	MAX	MIN	MAX	UNIT		
		3 V	2.9			2.9		2.9				
	I _{OH} = -50 μA	4.5 V	4.4			4.4		4.4				
V		5.5 V	5.4			5.4		5.4		v		
V _{OH}	I _{OH} = -12 mA	3 V	2.56			2.4		2.46		v		
		4.5 V	3.94			3.7		3.76				
	I _{OH} = –24 mA	5.5 V	4.94			4.7		4.76				
		3 V			0.1		0.1		0.1			
	l _{OL} = 50 μA	4.5 V			0.1		0.1		0.1	N/		
		5.5 V			0.1		0.1		0.1			
V _{OL}	I _{OL} = 12 mA	3 V			0.36		0.5		0.44	V		
		4.5 V			0.36		0.5		0.44			
	I _{OL} = 24 mA	5.5 V			0.36		0.5		0.44			
l	$V_I = V_{CC}$ or GND	5.5 V			±0.1		±1		±1	μA		
I _{OZ}	$V_O = V_{CC}$ or GND	5.5 V			±0.5		±5		±2.5	μA		
I _{CC}	$V_{I} = V_{CC} \text{ or GND}, \qquad I_{O} = 0$	5.5 V			4		80		40	μA		
Ci	$V_{I} = V_{CC} \text{ or } GND$	5 V		4.5						pF		



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timing requirements over recommended operating free-air temperature range, V_{CC} = 3.3 V \pm 0.3 V (unless otherwise noted) (see Figure 1)

		T _A = 25°C SN54AC574			C574	SN74A	C574	
		MIN	MAX	MIN	MAX	MIN	MAX	UNIT
f _{clock}	Clock frequency		75		55		60	MHz
tw	Pulse duration, CLK high or low	6		7.5		7		ns
t _{su}	Setup time, data before CLK1	2.5		6.5		3		ns
t _h	Hold time, data after CLK↑	1.5		2.5		1.5		ns

timing requirements over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

		T _A = 2	25°C	SN54A	C574	SN74AC574		
		MIN	MAX	MIN	MAX	MIN	MAX	UNIT
f _{clock}	Clock frequency		95		85		85	MHz
t _w	Pulse duration, CLK high or low	4		5		5		ns
t _{su}	Setup time, data before CLK1	1.5		3.5		2		ns
t _h	Hold time, data after CLK^\uparrow	1.5		2.5		1.5		ns

switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

DADAMETER	то	то	T _A = 25°C			SN54AC574		SN74AC574		UNIT	
PARAMETER	(INPUT)	(OUTPUT)	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT	
f _{max}			75	112		55		60		MHz	
t _{PLH}		0	3.5	8.5	13.5	1	16.5	3.5	15		
t _{PHL}	CLK	Q	3.5	7.5	12	1	15	3.5	13.5	ns	
t _{PZH}	<u>AE</u>	0	2.5	7	11	1	13	2.5	12		
t _{PZL}	ŌĒ	Q	3	6.5	10.5	1	12.5	3	11.5	ns	
t _{PHZ}		Q	3.5	7.5	12	1	14	2.5	13	ns	
t _{PLZ}	ŌĒ	Ŷ	2	5.5	9	1	10.5	1.5	10	115	

switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

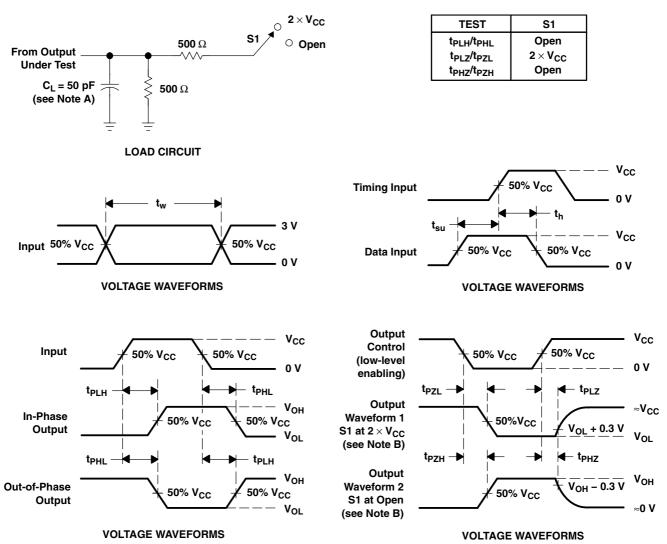
DADAMETED	то	то	T _A = 25°C			SN54AC574		SN74AC574		UNIT
PARAMETER	(INPUT)	(OUTPUT)	MIN	ТҮР	MAX	MIN	MAX	MIN	MAX	UNIT
f _{max}			95	153		85		85		MHz
t _{PLH}	0.17	0	2	6	9.5	1.5	11.5	2	11	
t _{PHL}	CLK	Q	2	5.5	8.5	1.5	10.5	2	9.5	ns
t _{PZH}		0	2	5	8.5	1.5	9.5	2	9	
t _{PZL}	ŌĒ	Q	2	5	8	1.5	9.5	1.5	9	ns
t _{PHZ}		Q	2	6	9.5	1.5	11.5	1.5	10.5	200
t _{PLZ}	ŌĒ	Q Q	1	4.5	7.5	1.5	9	1	8.5	ns

operating characteristics, V_{CC} = 5 V, T_A = 25°C

	PARAMETER	TEST CO	ТҮР	UNIT	
C _{pd}	Power dissipation capacitance	C _L = 50 pF,	f = 1 MHz	40	pF



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PARAMETER MEASUREMENT INFORMATION

NOTES: A. C_L includes probe and jig capacitance.

- B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
- C. All input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, Z_Q = 50 Ω , t_f \leq 2.5 ns. t_f \leq 2.5 ns.
- D. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms





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
5962-9677301Q2A	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 9677301Q2A SNJ54AC 574FK	Samples
5962-9677301QRA	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-9677301QR A SNJ54AC574J	Samples
5962-9677301QSA	ACTIVE	CFP	W	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-9677301QS A SNJ54AC574W	Samples
SN74AC574DBR	ACTIVE	SSOP	DB	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC574	Samples
SN74AC574DWR	ACTIVE	SOIC	DW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC574	Samples
SN74AC574N	ACTIVE	PDIP	N	20	20	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	SN74AC574N	Samples
SN74AC574PWR	ACTIVE	TSSOP	PW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC574	Samples
SN74AC574PWRG4	ACTIVE	TSSOP	PW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC574	Samples
SNJ54AC574FK	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 9677301Q2A SNJ54AC 574FK	Samples
SNJ54AC574J	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-9677301QR A SNJ54AC574J	Samples
SNJ54AC574W	ACTIVE	CFP	W	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-9677301QS A SNJ54AC574W	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.



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PACKAGE OPTION ADDENDUM

⁽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 (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 SN54AC574, SN74AC574 :

Catalog : SN74AC574

Military : SN54AC574

NOTE: Qualified Version Definitions:

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



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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
SN74AC574DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74AC574DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
SN74AC574PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1



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PACKAGE MATERIALS INFORMATION

12-May-2023



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AC574DBR	SSOP	DB	20	2000	356.0	356.0	35.0
SN74AC574DWR	SOIC	DW	20	2000	367.0	367.0	45.0
SN74AC574PWR	TSSOP	PW	20	2000	356.0	356.0	35.0

TEXAS INSTRUMENTS

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12-May-2023

TUBE



- B - Alignment groove width

*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	Τ (μm)	B (mm)
5962-9677301Q2A	FK	LCCC	20	1	506.98	12.06	2030	NA
5962-9677301QSA	W	CFP	20	1	506.98	26.16	6220	NA
SN74AC574N	N	PDIP	20	20	506	13.97	11230	4.32
SNJ54AC574FK	FK	LCCC	20	1	506.98	12.06	2030	NA
SNJ54AC574W	W	CFP	20	1	506.98	26.16	6220	NA

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



- NOTES: A. All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice. В.
 - 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 GDFP2-F20



PW0020A



PACKAGE OUTLINE

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



NOTES:

- 1. All linear dimensions are in millimeters. Any 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 0.25 mm per side.
- 5. Reference JEDEC registration MO-153.



PW0020A

EXAMPLE BOARD LAYOUT

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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.



PW0020A

EXAMPLE STENCIL DESIGN

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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.



LAND PATTERN DATA



NOTES: Α. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
 C. Publication IPC-7351 is recommended for alternate design.
- 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.



DB0020A



PACKAGE OUTLINE

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



NOTES:

- 1. All linear dimensions are in millimeters. Any 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 0.25 mm per side.
- 5. Reference JEDEC registration MO-150.



DB0020A

EXAMPLE BOARD LAYOUT

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



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.



DB0020A

EXAMPLE STENCIL DESIGN

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



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.



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.





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.



DW0020A



PACKAGE OUTLINE

SOIC - 2.65 mm max height

SOIC



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.



DW0020A

EXAMPLE BOARD LAYOUT

SOIC - 2.65 mm max height

SOIC



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.



DW0020A

EXAMPLE STENCIL DESIGN

SOIC - 2.65 mm max height

SOIC



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



NOTES: 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.

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