SNx4ACT241 3 ステート出力、オクタル・バッファ / ドライバ

1 特長

- 4.5V～5.5V の V_{CC} で動作
- 5.5V までの入力電圧に対応
- 最大 t_{pd} 8.5ns (5V 時)
- 入力は TTL 互換です

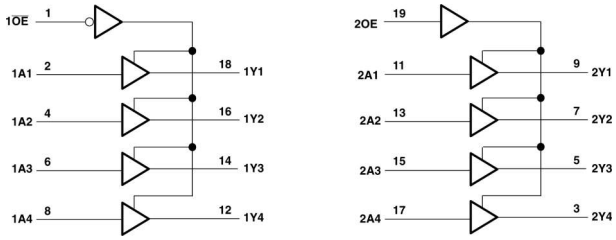
2 概要

これらのオクタル バッファ / ライン ドライバは、3 ステート メモリ アドレス ドライバ、クロック ドライバ、バス用レシーバ / トランスミッタの性能と密度を向上することに特化して設計されています。

製品情報

部品番号	パッケージ (1)	パッケージ サイズ(2)	本体サイズ (3)
SNx4ACT241	N (PDIP、20)	24.33mm × 9.4mm	24.33mm × 6.35mm
	DW (SOIC、20)	12.8mm × 10.3mm	12.8mm × 7.5mm
	NS (SOP、20)	12.6mm × 7.8mm	12.6mm × 5.3mm
	DB (SSOP、20)	7.2mm × 7.8mm	7.2mm × 5.3mm
	PW (TSSOP、20)	6.5mm × 6.4mm	6.5mm × 4.4mm

(1) 詳細については、セクション 10 を参照してください。
(2) パッケージ サイズ (長さ × 幅) は公称値であり、該当する場合はピンも含まれます。
(3) 本体サイズ (長さ×幅) は公称値であり、ピンは含まれません。



論理図 (正論理)

このリソースの元の言語は英語です。翻訳は概要を便宜的に提供するもので、自動化ツール (機械翻訳) を使用していることがあり、TI では翻訳の正確性および妥当性につきましては一切保証いたしません。実際の設計などの前には、ti.com で必ず最新の英語版をご参照くださいますようお願いいたします。

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3 Pin Configuration and Functions

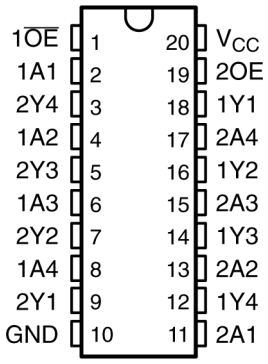


図 3-1. SN54ACT241 J or W Package SN74ACT241 DB, DW, N, NS, or PW Package (Top View)

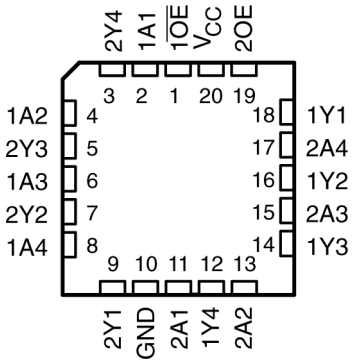


図 3-2. SN54ACT241 FK Package (Top View)

表 3-1. Pin Functions

NAME[1]	PIN	TYPE	DESCRIPTION
1OE	1	I	Output enable 1
1A1	2	I	1A1 input
2Y4	3	O	2Y4 output
1A2	4	I	1A2 input
2Y3	5	O	2Y3 output
1A3	6	I	1A3 input
2Y2	7	O	2Y2 output
1A4	8	I	1A4 input
2Y1	9	O	2Y1 output
GND	10	—	Ground pin
2A1	11	I	2A1 input
1Y4	12	O	1Y4 output
2A2	13	I	2A2 input
1Y3	14	O	1Y3 output
2A3	15	I	2A3 input
1Y2	16	O	1Y2 output
2A4	17	I	2A4 input
1Y1	18	O	1Y1 output
2OE	19	I	Output enable 2
VCC	20	—	Power pin

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4 Specifications

4.1 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
V_I (2)	Input voltage range		-0.5	V_{CC}+0.5	V
V_O (2)	Output voltage range		-0.5	V_{CC}+0.5	V
I_{IK}	Input clamp current	(V_I < 0 or V_I > V_{CC})		±20	mA
I_{OK}	Output clamp current	(V_O < 0 or V_O > V_{CC})		±20	mA
I_O	Continuous output current	(V_O = 0 or V_{CC})		±50	mA
	Continuous current through V_{CC} or GND			±200	mA
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.

4.2 Recommended Operating Conditions

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

		SN54ACT241		SN74ACT241		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V_{IH}	High-level input voltage	2		2		V
V_{IL}	Low-level input voltage		0.8		0.8	V
V_I	Input voltage	0	V_{CC}	0	V_{CC}	V
V_O	Output voltage	0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current		-24		-24	mA
I_{OL}	Low-level output current		24		24	mA
Δt/Δv	Input transition rise or fall rate		8		8	ns/V
T_A	Operating free-air temperature	–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.

4.3 Thermal Information

THERMAL METRIC(1)		DB (SSOP)	DW (SOIC)	N (PDIP)	NS (SOP)	PW (TSSOP)	UNIT
		20 PINS					
$R_{\theta JA}$	Junction-to-ambient thermal resistance(2)	70	58	69	60	126.2	°C/W

(1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report, SPRA953.
(2) The package thermal impedance is calculated in accordance with JESD 51-7.

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4.4 Electrical Characteristics

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

PARAMETER	TEST CONDITIONS		V_{CC}	T_A= 25°C			SN54ACT241		SN74ACT241		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	I_{OH} = –50 µA		4.5 V	4.4	4.49		4.4		4.4		V
			5.5 V	5.4	5.49		5.4		5.4		
	I_{OH} = –24 mA		4.5 V	3.86			3.7		3.76		
			5.5 V	4.86			4.7		4.76		
	I_{OH} = –50 mA(1)		5.5 V				3.85				
	I_{OH} = –75 mA(1)		5.5 V						3.85		
V_{OL}	I_{OL} = 50 µA		4.5 V		0.001	0.1		0.1		0.1	V
			5.5 V		0.001	0.1		0.1		0.1	
	I_{OL} = 24 mA		4.5 V			0.36		0.5		0.44	
			5.5 V			0.36		0.5		0.44	
	I_{OL} = 50 mA(1)		5.5 V					1.65			
	I_{OL} = 75 mA(1)		5.5 V							1.65	
I_{OZ}	V_O = V_{CC} or GND		5.5 V			±0.25		±5		±2.5	µA
I_I	V_I = V_{CC} or GND		5.5 V			±0.1		±1		±1	µA
I_{CC}	V_I = V_{CC} or GND,	I_O = 0	5.5 V			4		80		40	µA
ΔI_{CC} (2)	One input at 3.4 V, Other inputs at GND or V_{CC}		5.5 V		0.6			1.6		1.5	mA
C_i	V_I = V_{CC} or GND		5 V		2.5						pF
C_o	V_I = V_{CC} or GND		5 V		8						pF

(1) Not more than one output should be tested at a time, and the duration of the test should not exceed 2 ms.
(2) 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}.

4.5 Switching Characteristics

over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Load Circuit and Voltage Waveforms)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			SN54ACT241		SN74ACT241		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1.5	6	8.5	1	9.5	1.5	9.5	ns
t_{PHL}			1.5	5.5	7.5	1	9	1.5	8.5	
t_{PZH}	$\overline{OE}$ or OE	Y	1.5	7	8.5	1	10	1	9.5	ns
t_{PZL}			2	7	9.5	1	11.5	1.5	10.5	
t_{PHZ}	$\overline{OE}$ or OE	Y	2	8	9.5	1	11	2	10.5	ns
t_{PLZ}			2.5	6.5	10	1	11.5	2	10.5	

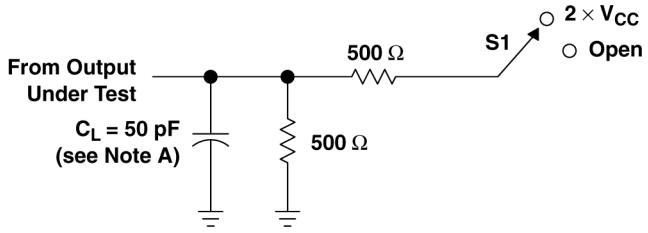
4.6 Operating Characteristics

V_{CC} = 5 V, T_A = 25°C

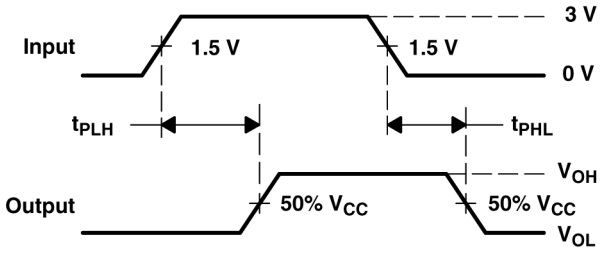
PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance per buffer/driver	C_L = 50 pF,	f = 1 MHz	45	pF

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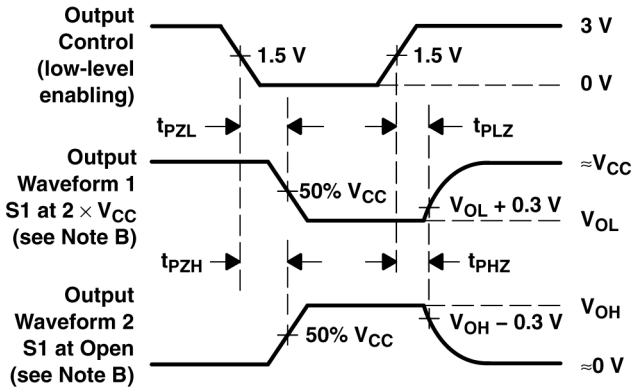
5 Parameter Measurement Information



LOAD CIRCUIT



VOLTAGE WAVEFORMS



VOLTAGE WAVEFORMS

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 ≤ 1 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.
D. The outputs are measured one at a time with one input transition per measurement.

図 5-1. Load Circuit and Voltage Waveforms

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	2 × V_{CC}
t_{PHZ}/t_{PZH}	Open

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6 Detailed Description

6.1 Overview

The ’ACT241 devices are organized as two 4-bit buffers/drivers with separate complementary output-enable (1$\overline{OE}$ and 2OE) inputs. When 1$\overline{OE}$ is low or 2OE is high, the device passes noninverted data from the A inputs to the Y outputs. When 1$\overline{OE}$ is high or 2OE is low, the outputs are in the high-impedance state

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

6.2 Functional Block Diagram

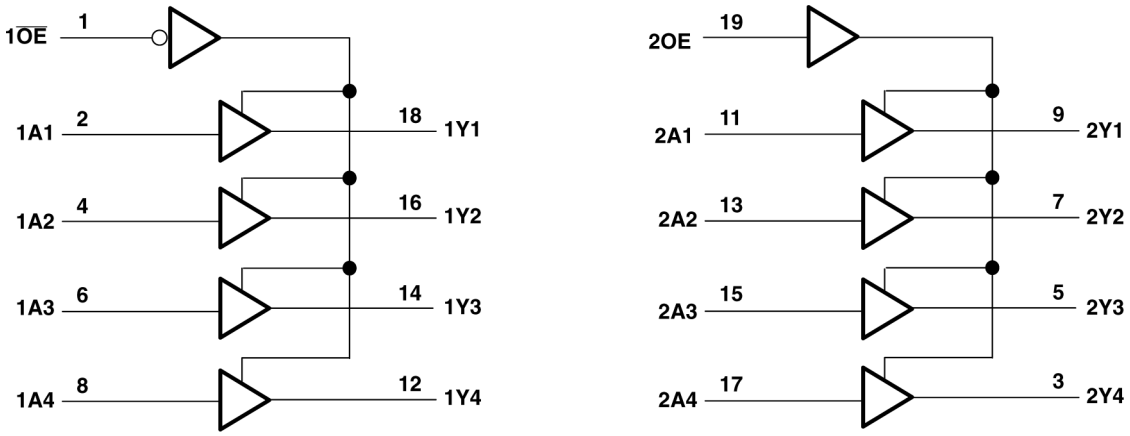


図 6-1. Logic Diagram (Positive Logic)

6.3 Device Functional Modes

Function Tables

INPUTS		OUTPUT
1$\overline{OE}$	1A	1Y
L	H	H
L	L	L
H	X	Z

INPUTS		OUTPUT
2OE	2A	2Y
H	H	H
H	L	L
L	X	Z

7 Application and Implementation

注

以下のアプリケーション情報は、TI の製品仕様に含まれるものではなく、TI ではその正確性または完全性を保証いたしません。個々の目的に対する製品の適合性については、お客様の責任で判断していただくことになります。お客様は自身の設計実装を検証しテストすることで、システムの機能を確認する必要があります。

7.1 Power Supply Recommendations

The power supply can be any voltage between the min and max supply voltage rating located in *セクション 4.2*.

Each V_{CC} terminal should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, TI recommends 0.1 µF and if there are multiple V_{CC} terminals, then TI recommends .01 µF or .022 µF for each power terminal. It is okay to parallel multiple bypass capacitors to reject different frequencies of noise. A 0.1 µF and 1 µF are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results.

7.2 Layout

7.2.1 Layout Guidelines

When using multiple bit logic devices inputs should not ever float.

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 input pins should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. Specified below are the rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that should be applied to any particular unused input depends on the function of the device. Generally they will be tied to GND or V_{CC} whichever make more sense or is more convenient. It is generally okay to float outputs unless the part is a transceiver. If the transceiver has an output enable pin it will disable the outputs section of the part when asserted. This does not disable the input section of the IOs so they cannot float when disabled.

7.2.1.1 Layout Example

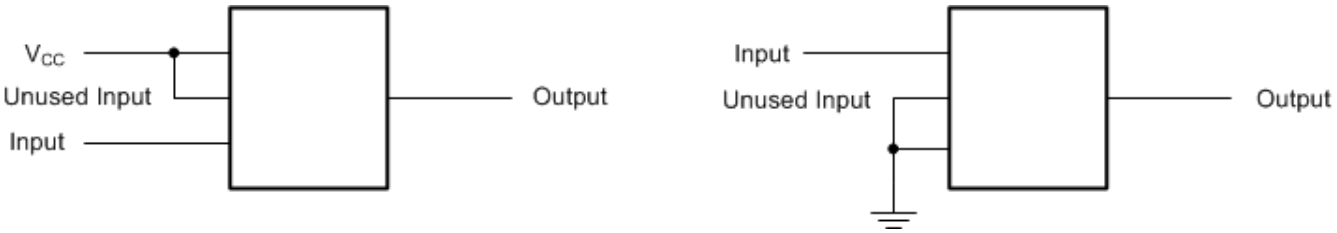


図 7-1. Layout Recommendation

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8 Device and Documentation Support

8.1 Documentation Support

8.1.1 Related Documentation

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

表 8-1. Related Links

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
SN54ACT241	Click here	Click here	Click here	Click here	Click here
SN74ACT241	Click here	Click here	Click here	Click here	Click here

8.2 ドキュメントの更新通知を受け取る方法

ドキュメントの更新についての通知を受け取るには、www.tij.co.jp のデバイス製品フォルダを開いてください。[通知] をクリックして登録すると、変更されたすべての製品情報に関するダイジェストを毎週受け取ることができます。 変更の詳細については、改訂されたドキュメントに含まれている改訂履歴をご覧ください。

8.3 サポート・リソース

テキサス・インスツルメンツ E2E™ サポート・フォーラムは、エンジニアが検証済みの回答と設計に関するヒントをエキスパートから迅速かつ直接得ることができる場所です。既存の回答を検索したり、独自の質問をしたりすることで、設計で必要な支援を迅速に得ることができます。

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8.4 Trademarks

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8.5 静電気放電に関する注意事項



この IC は、ESD によって破損する可能性があります。テキサス・インスツルメンツは、IC を取り扱う際には常に適切な注意を払うことを推奨します。正しい取り扱いおよび設置手順に従わない場合、デバイスを破損するおそれがあります。

ESD による破損は、わずかな性能低下からデバイスの完全な故障まで多岐にわたります。精密な IC の場合、パラメータがわずかに変化するだけで公表されている仕様から外れる可能性があるため、破損が発生しやすくなっています。

8.6 用語集

テキサス・インスツルメンツ用語集　　この用語集には、用語や略語の一覧および定義が記載されています。

9 Revision History

Changes from Revision D (May 2023) to Revision E (March 2024) — **Page**

- 「アプリケーションと実装」セクション、「デバイスおよびドキュメントのサポート」セクション、「製品情報」表のパッケージサイズ、「メカニカル、パッケージ、および注文情報」セクションを追加 1
- Updated RθJA value: PW = 83 to 126.2, all values in °C/W 4

Changes from Revision C (October 2002) to Revision D (May 2023) — **Page**

- 「パッケージ情報」表、「ピンの機能」表、「熱に関する情報」表を追加 1

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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.

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PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
5962-89847012A	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-89847012A SNJ54ACT 241FK
5962-8984701RA	Active	Production	CDIP (J) | 20	20 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8984701RA SNJ54ACT241J
5962-8984701SA	Active	Production	CFP (W) | 20	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8984701SA SNJ54ACT241W
SN74ACT241DBR	Last Time Buy	Production	SSOP (DB) | 20	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AD241
SN74ACT241DBR.A	Last Time Buy	Production	SSOP (DB) | 20	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AD241
SN74ACT241DW	Obsolete	Production	SOIC (DW) | 20	-	-	Call TI	Call TI	-40 to 85	ACT241
SN74ACT241DWR	Active	Production	SOIC (DW) | 20	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ACT241
SN74ACT241DWR.A	Active	Production	SOIC (DW) | 20	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ACT241
SN74ACT241N	Active	Production	PDIP (N) | 20	20 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74ACT241N
SN74ACT241N.A	Active	Production	PDIP (N) | 20	20 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74ACT241N
SN74ACT241NSR	Active	Production	SOP (NS) | 20	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ACT241
SN74ACT241NSR.A	Active	Production	SOP (NS) | 20	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ACT241
SN74ACT241PW	Obsolete	Production	TSSOP (PW) | 20	-	-	Call TI	Call TI	-40 to 85	AD241
SN74ACT241PWR	Active	Production	TSSOP (PW) | 20	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AD241
SN74ACT241PWR.A	Active	Production	TSSOP (PW) | 20	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AD241
SNJ54ACT241FK	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-89847012A SNJ54ACT 241FK
SNJ54ACT241FK.A	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-89847012A SNJ54ACT 241FK
SNJ54ACT241J	Active	Production	CDIP (J) | 20	20 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8984701RA SNJ54ACT241J

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SNJ54ACT241J.A	Active	Production	CDIP (J) | 20	20 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8984701RA SNJ54ACT241J
SNJ54ACT241W	Active	Production	CFP (W) | 20	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8984701SA SNJ54ACT241W
SNJ54ACT241W.A	Active	Production	CFP (W) | 20	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8984701SA SNJ54ACT241W

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts 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.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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 SN54ACT241, SN74ACT241 :

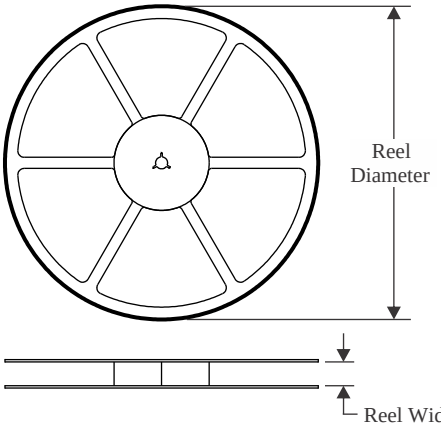
- Catalog : SN74ACT241
- Military : SN54ACT241

NOTE: Qualified Version Definitions:

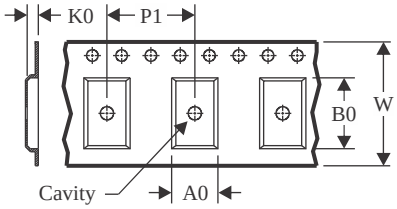
- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

TAPE AND REEL INFORMATION

REEL DIMENSIONS

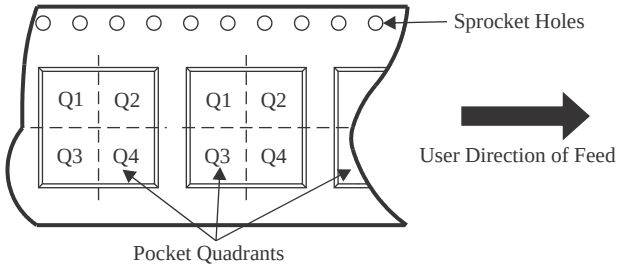


TAPE DIMENSIONS



A0	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

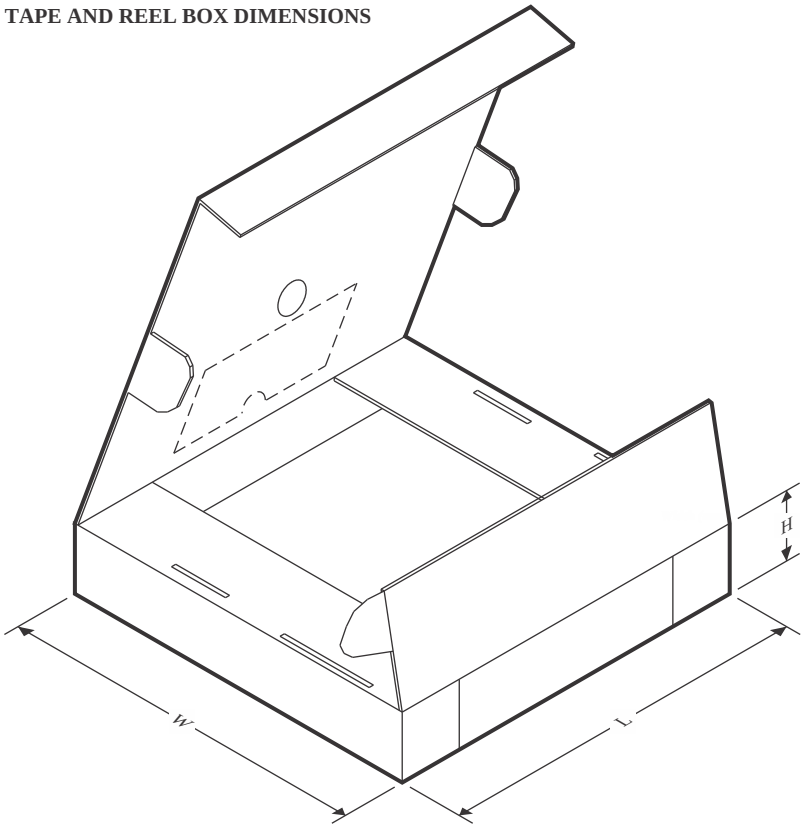
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

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
SN74ACT241DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74ACT241DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
SN74ACT241NSR	SOP	NS	20	2000	330.0	24.4	8.4	13.0	2.5	12.0	24.0	Q1
SN74ACT241PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1

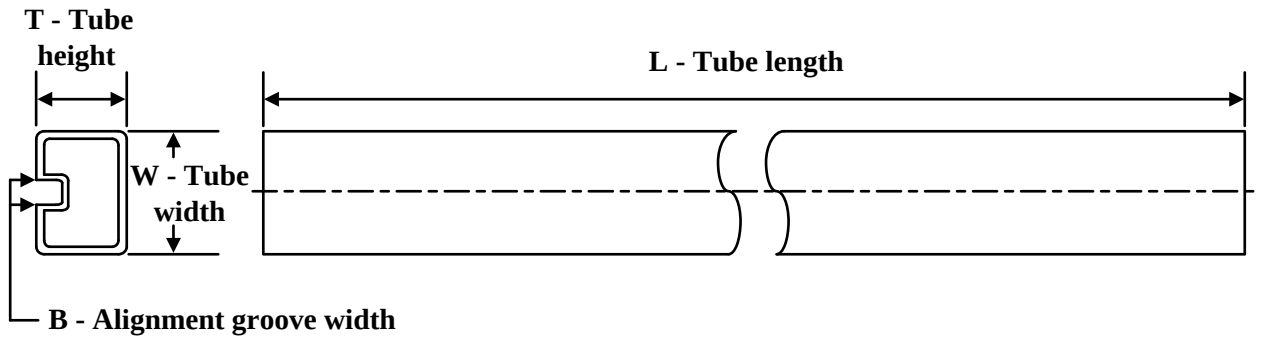
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74ACT241DBR	SSOP	DB	20	2000	353.0	353.0	32.0
SN74ACT241DWR	SOIC	DW	20	2000	356.0	356.0	45.0
SN74ACT241NSR	SOP	NS	20	2000	356.0	356.0	45.0
SN74ACT241PWR	TSSOP	PW	20	2000	353.0	353.0	32.0

TUBE



*All dimensions are nominal

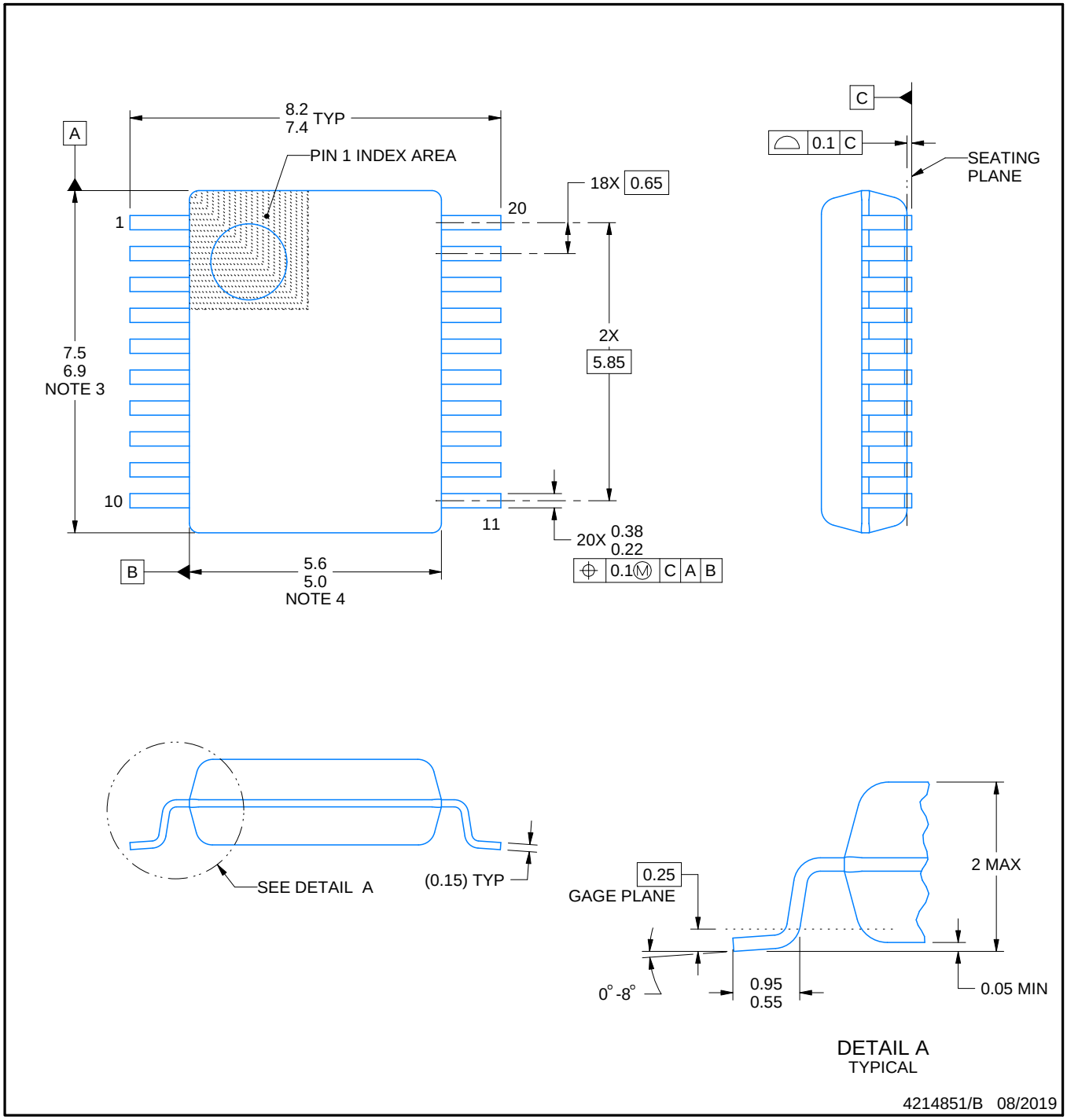
Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
5962-89847012A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-8984701SA	W	CFP	20	25	506.98	26.16	6220	NA
SN74ACT241N	N	PDIP	20	20	506	13.97	11230	4.32
SN74ACT241N.A	N	PDIP	20	20	506	13.97	11230	4.32
SNJ54ACT241FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54ACT241FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54ACT241W	W	CFP	20	25	506.98	26.16	6220	NA
SNJ54ACT241W.A	W	CFP	20	25	506.98	26.16	6220	NA

PACKAGE OUTLINE

DB0020A

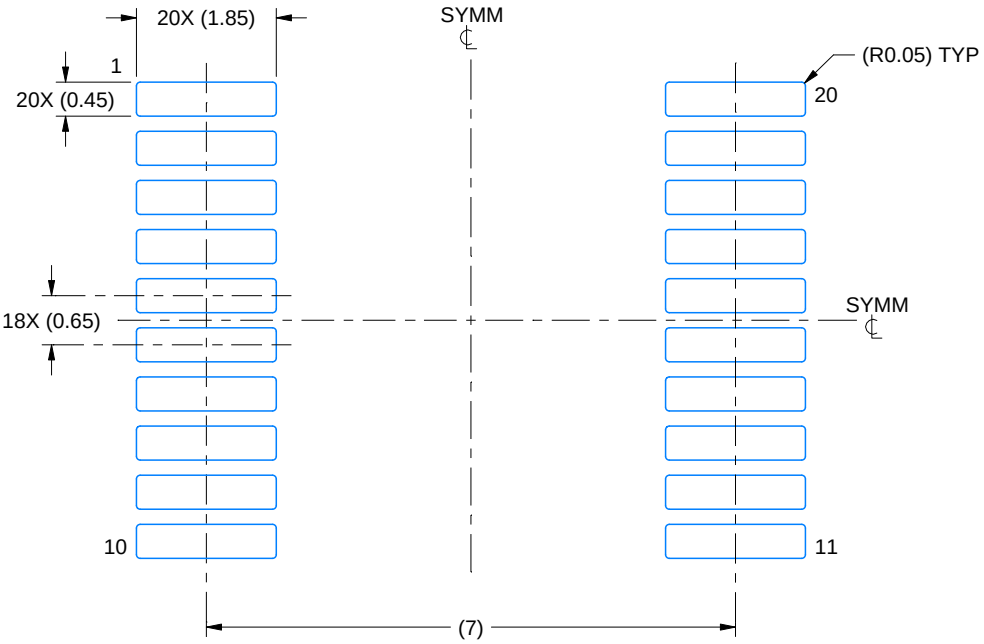
SSOP - 2 mm max height

SMALL OUTLINE PACKAGE

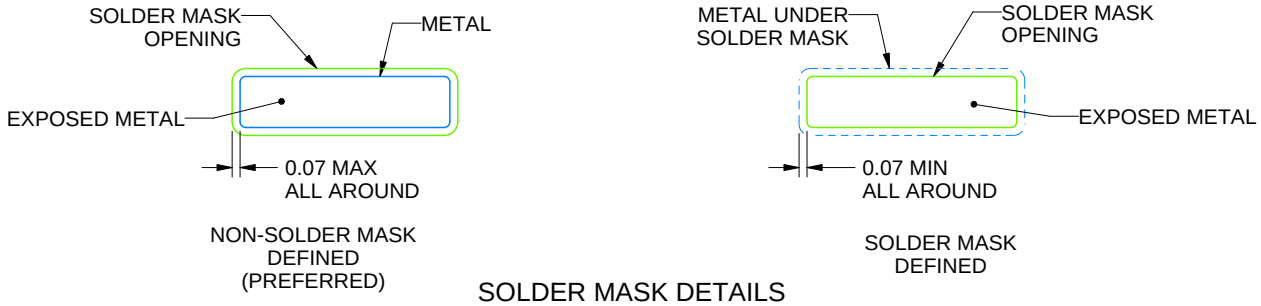


NOTES:

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.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



SOLDER MASK DETAILS

4214851/B 08/2019

NOTES: (continued)

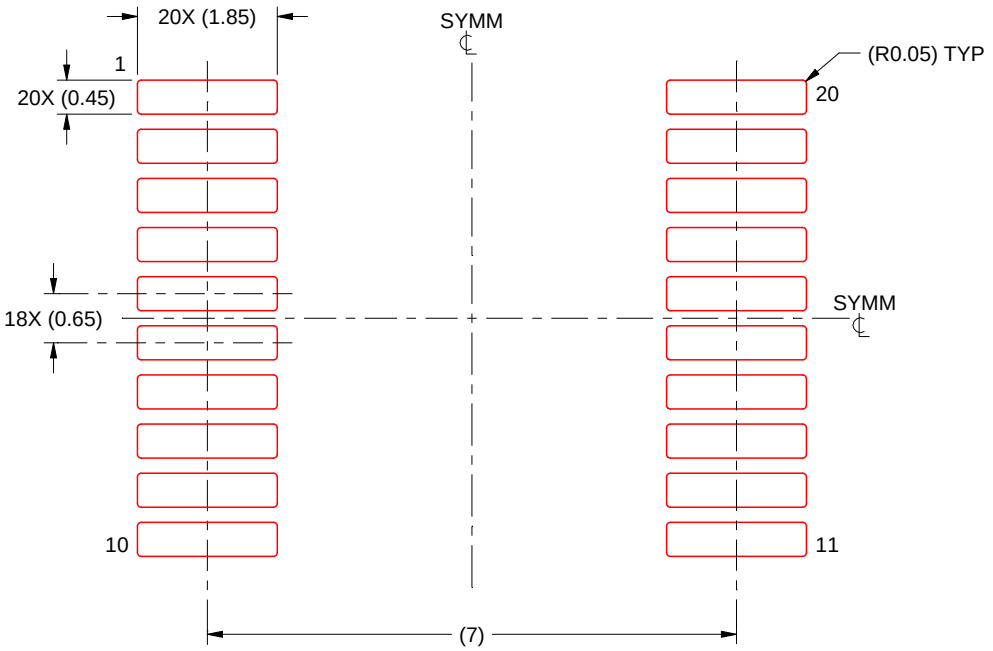
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

4214851/B 08/2019

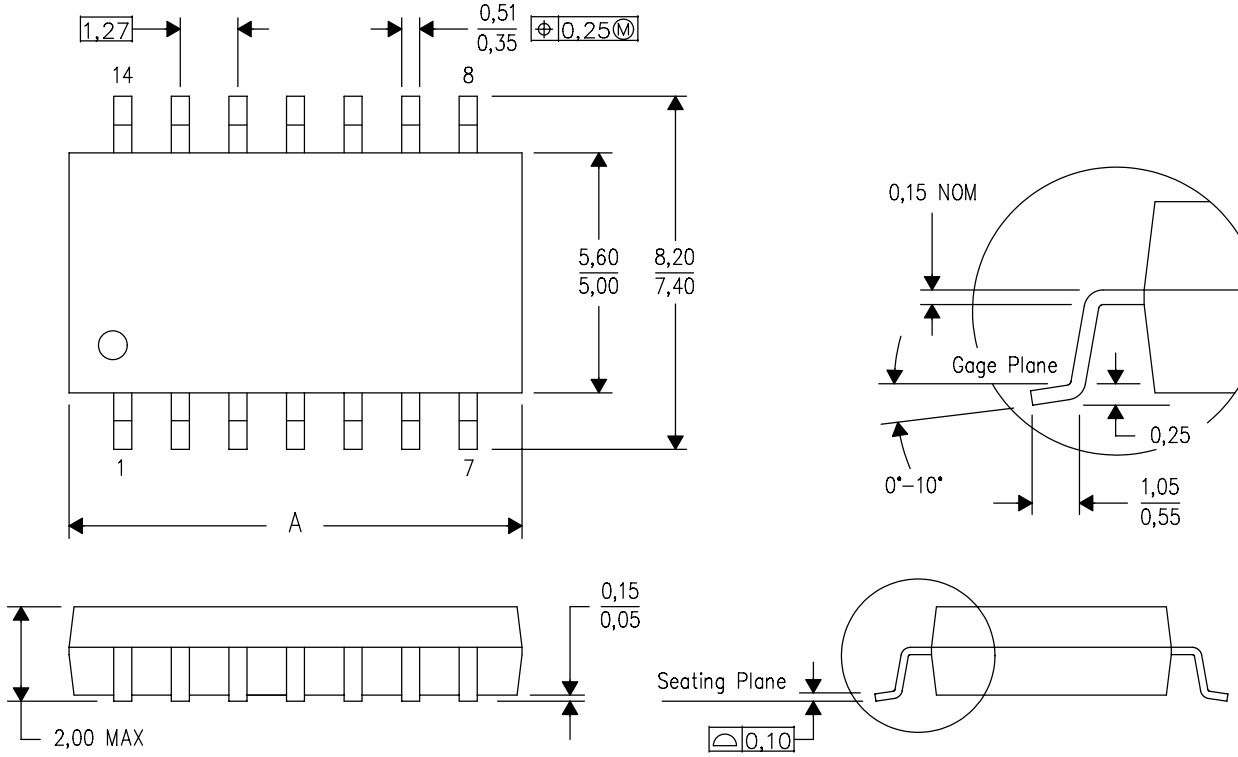
NOTES: (continued)

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.

MECHANICAL DATA

NS (R-PDSO-G)** **PLASTIC SMALL-OUTLINE PACKAGE**

14-PINS SHOWN



DIM \ PINS **	14	16	20	24
A MAX	10,50	10,50	12,90	15,30
A MIN	9,90	9,90	12,30	14,70

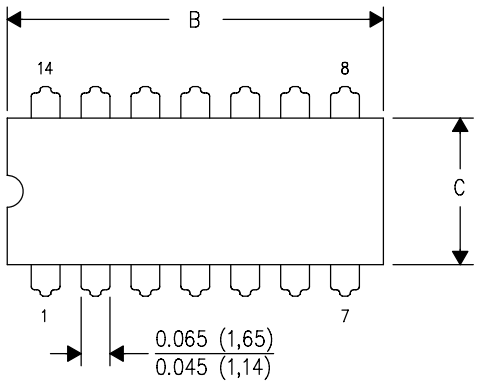
4040062/C 03/03

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.

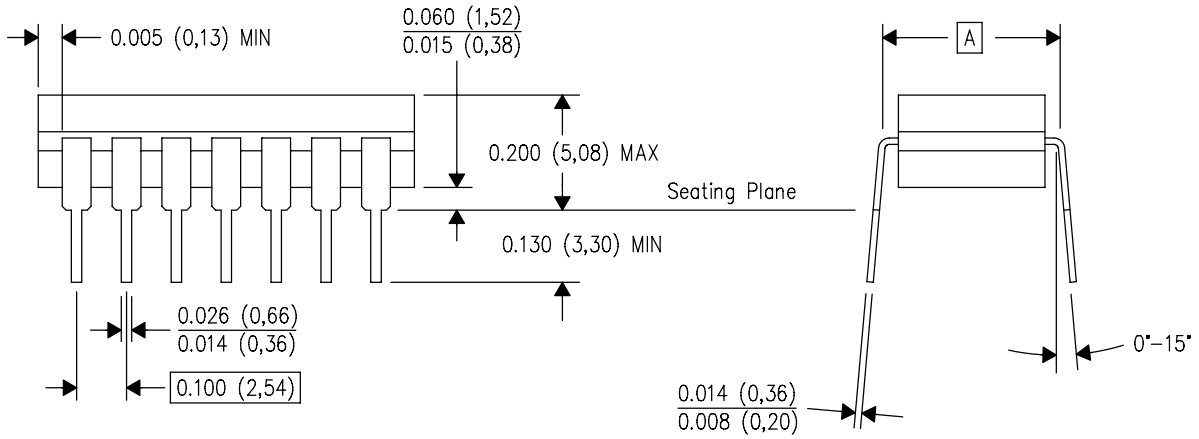
J (R–GDIP–T**)

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:
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.

GENERIC PACKAGE VIEW

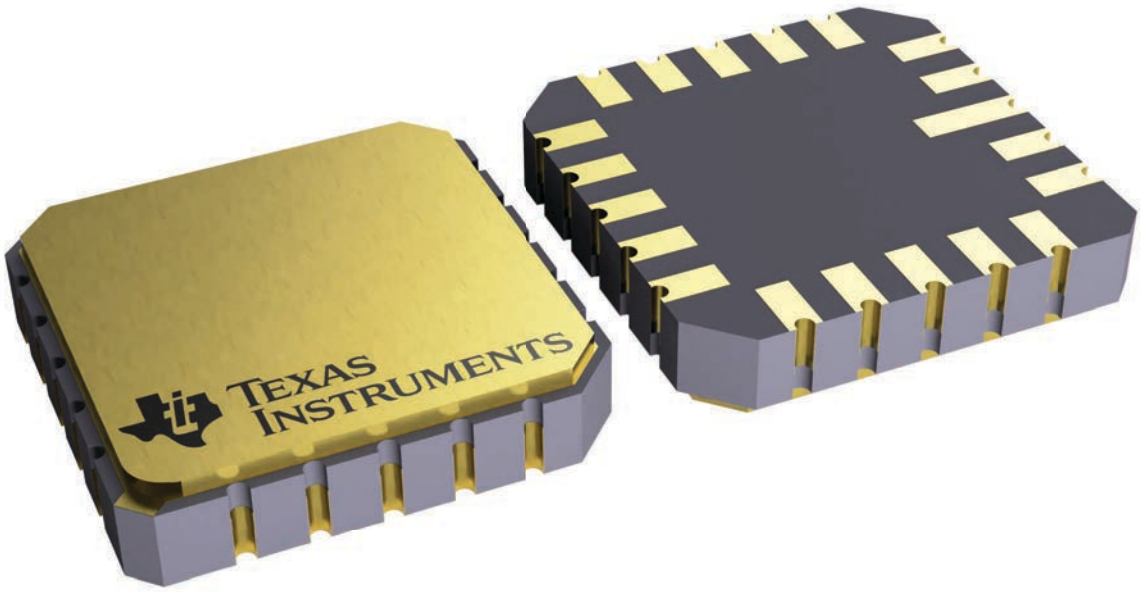
FK 20

LCCC - 2.03 mm max height

8.89 x 8.89, 1.27 mm pitch

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.

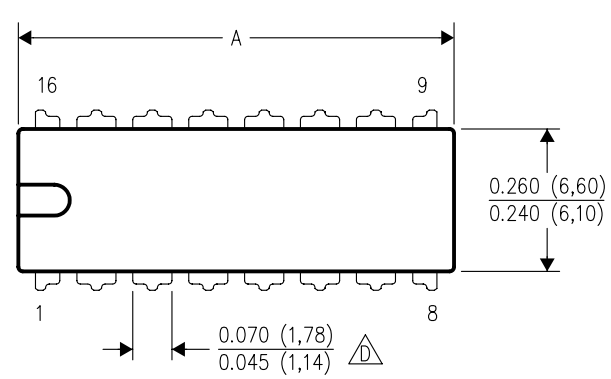


4229370VA\

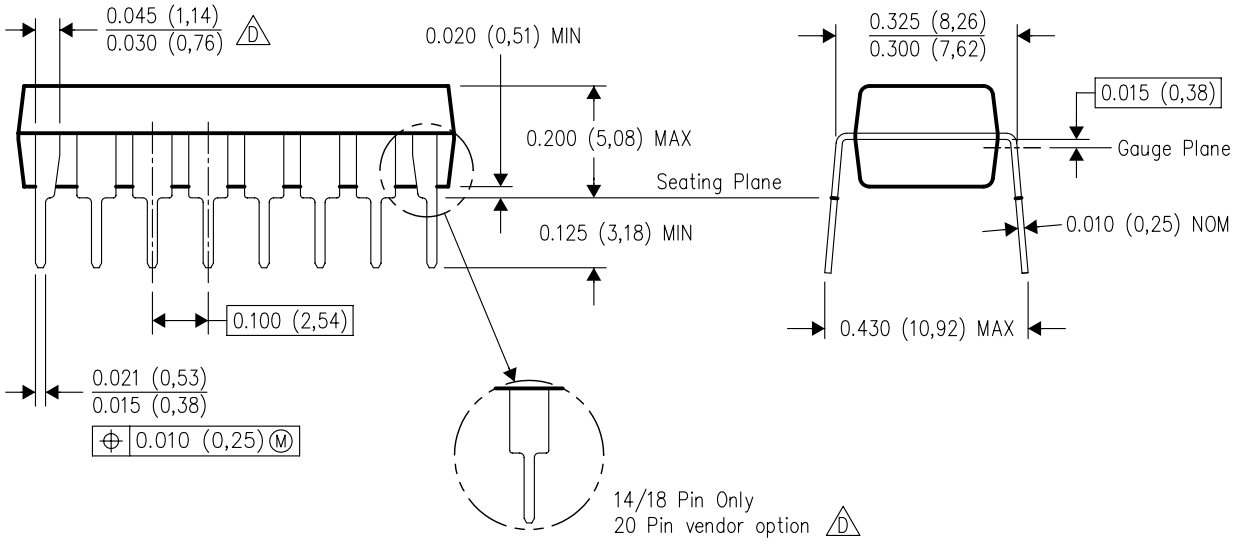
N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN

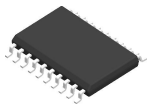


DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS–001 VARIATION (C)	AA	BB	AC	AD



4040049/E 12/2002

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

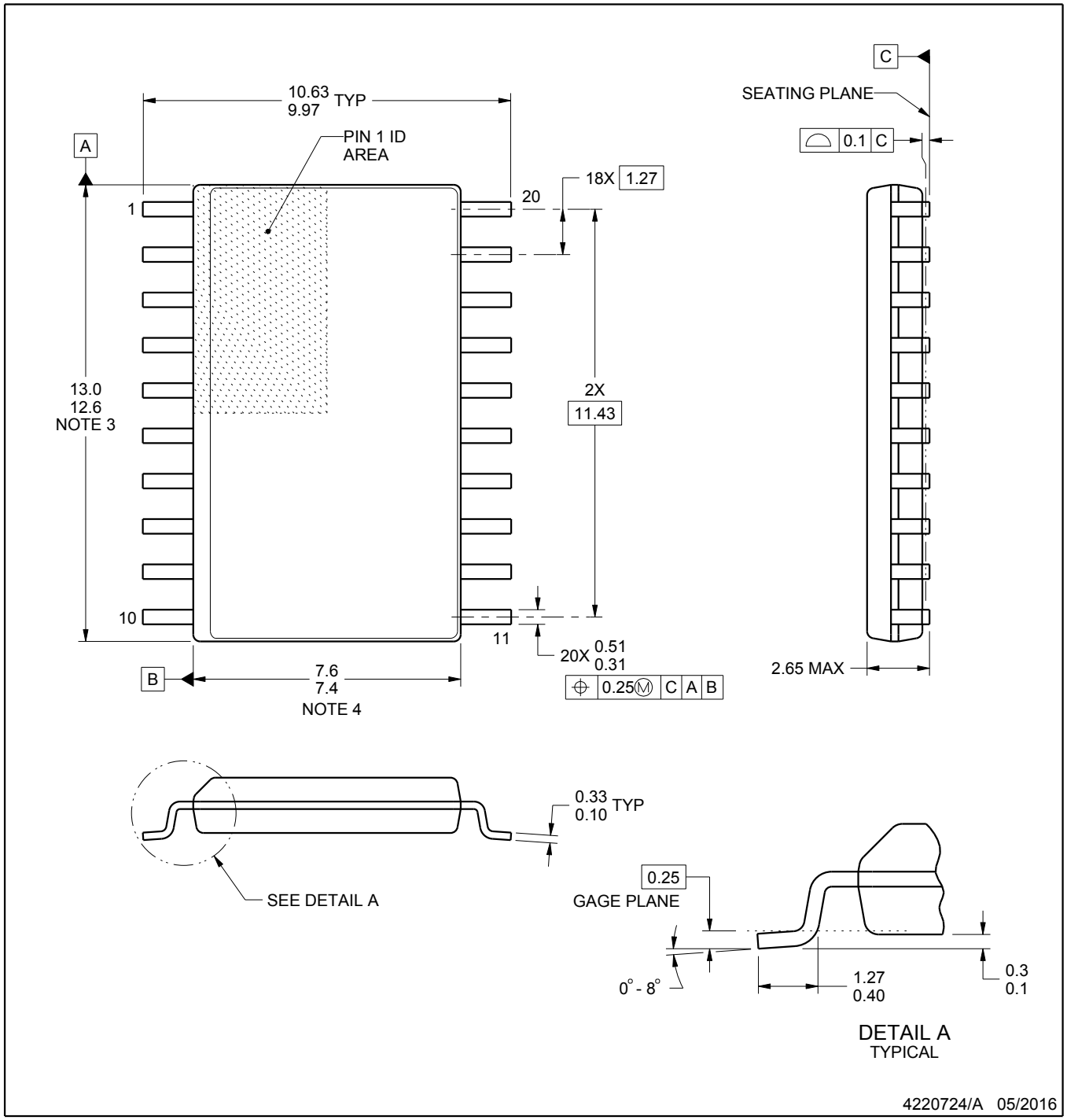


PACKAGE OUTLINE

DW0020A

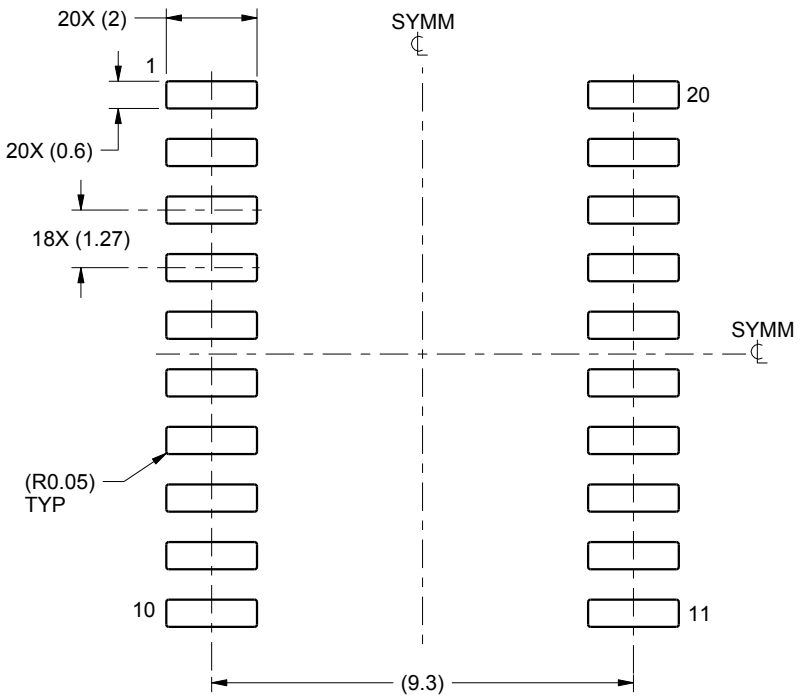
SOIC - 2.65 mm max height

SOIC

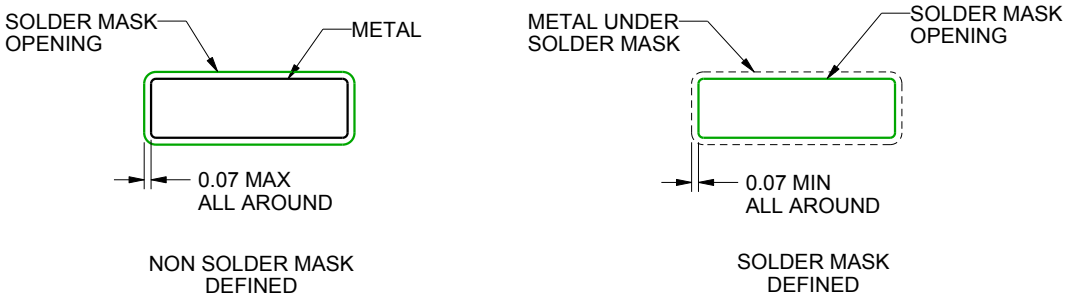


NOTES:

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.



LAND PATTERN EXAMPLE
SCALE:6X

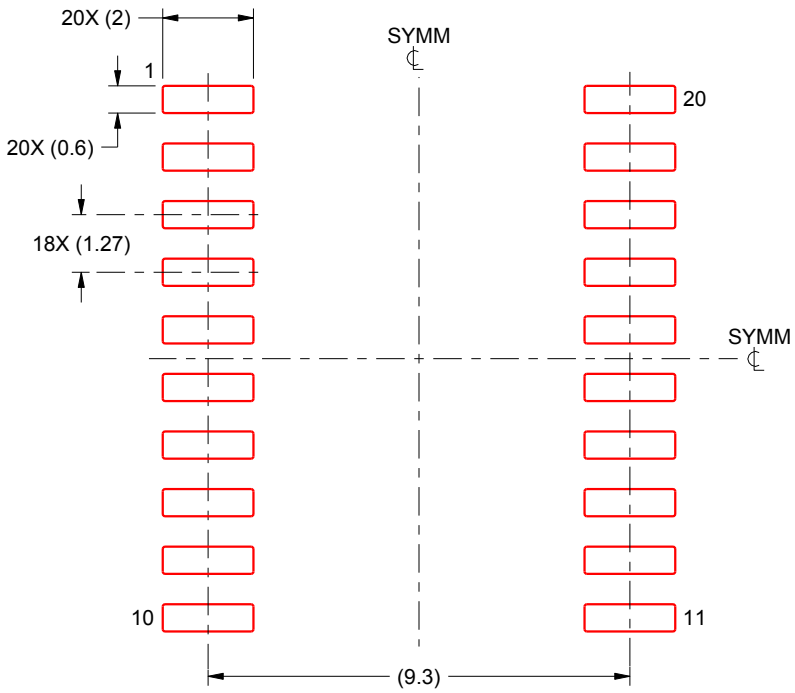


SOLDER MASK DETAILS

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.



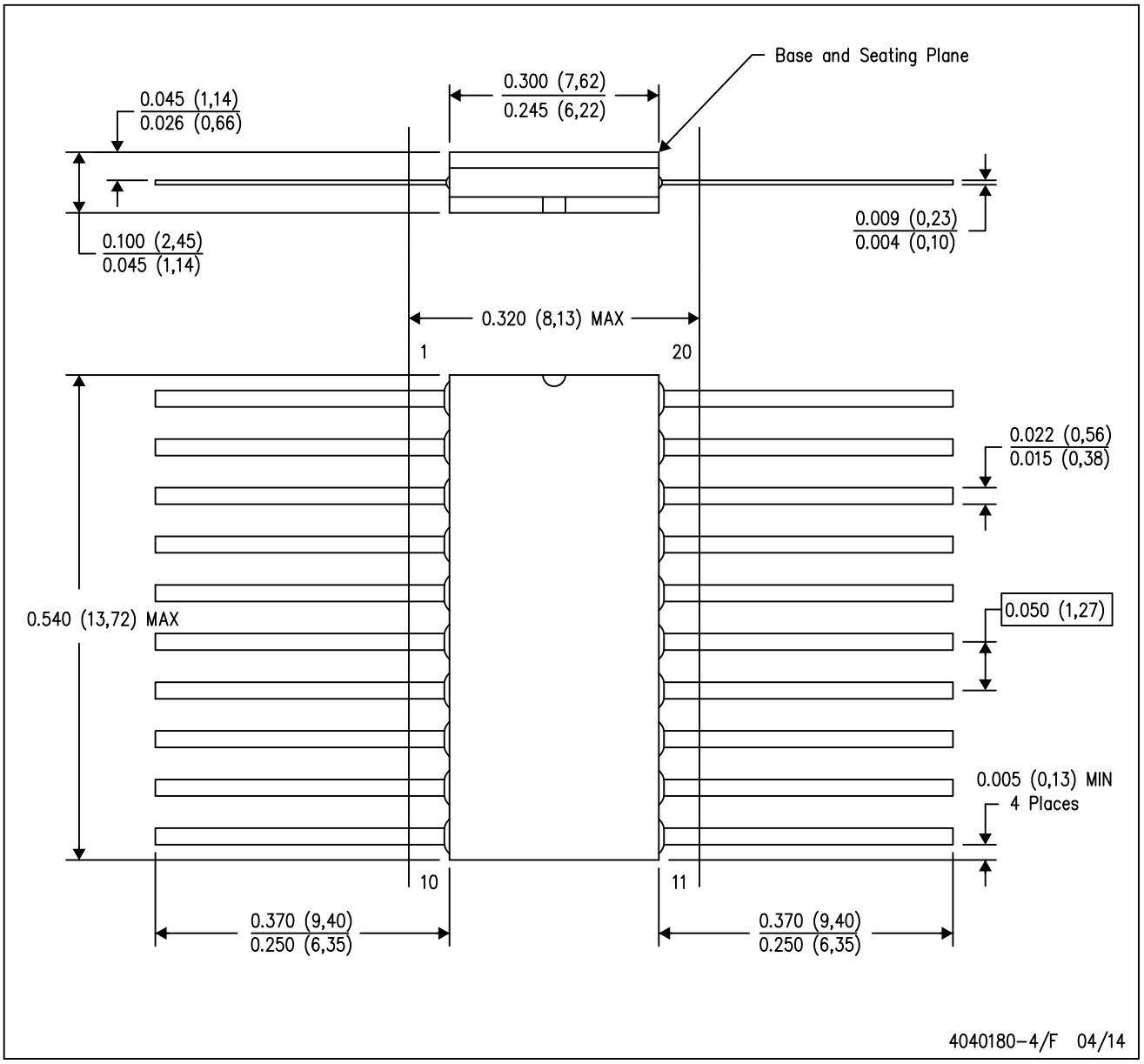
SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

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.

W (R–GDFP–F20) CERAMIC DUAL FLATPACK



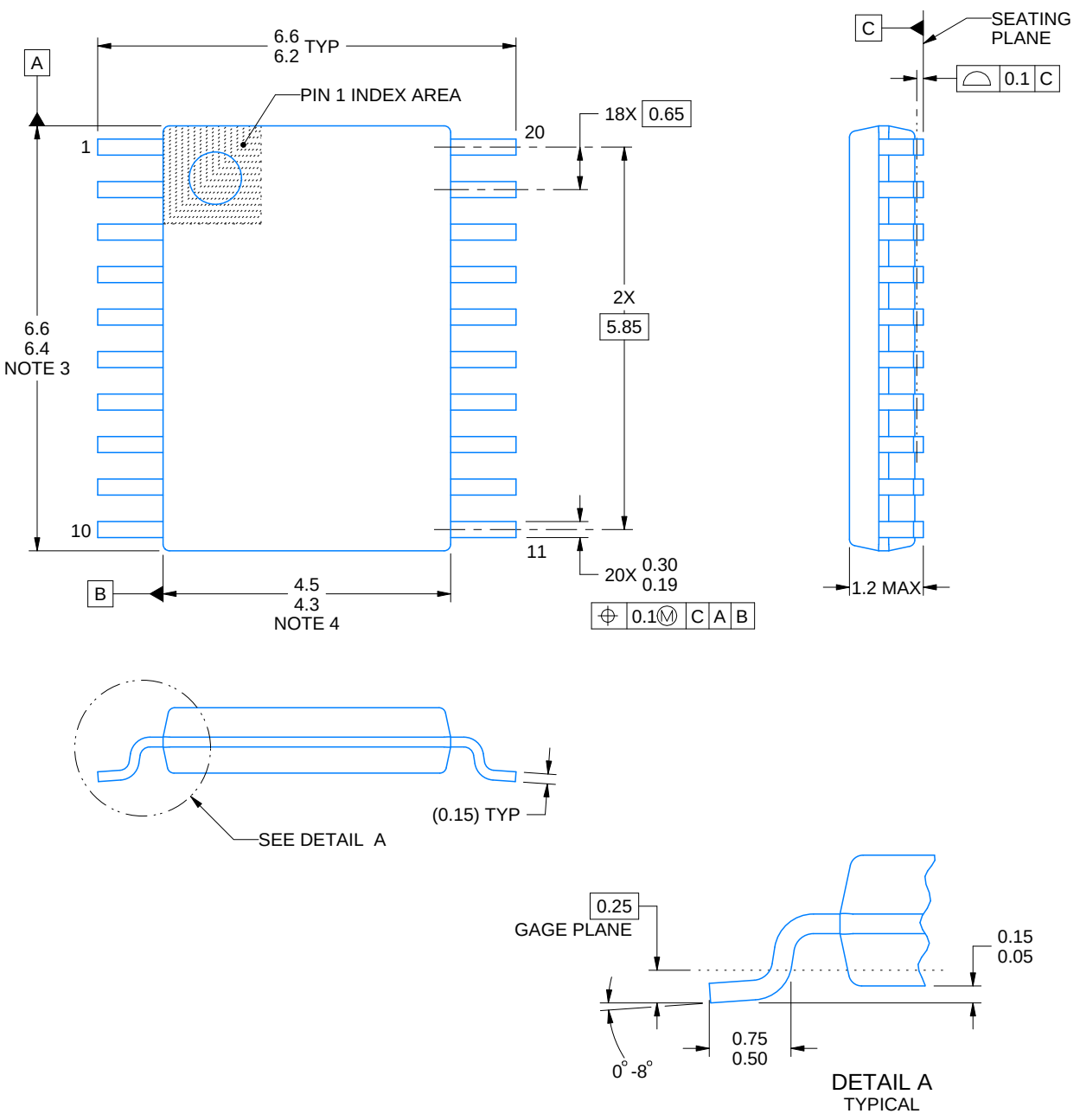
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within Mil–Std 1835 GDFP2–F20

PACKAGE OUTLINE

PW0020A

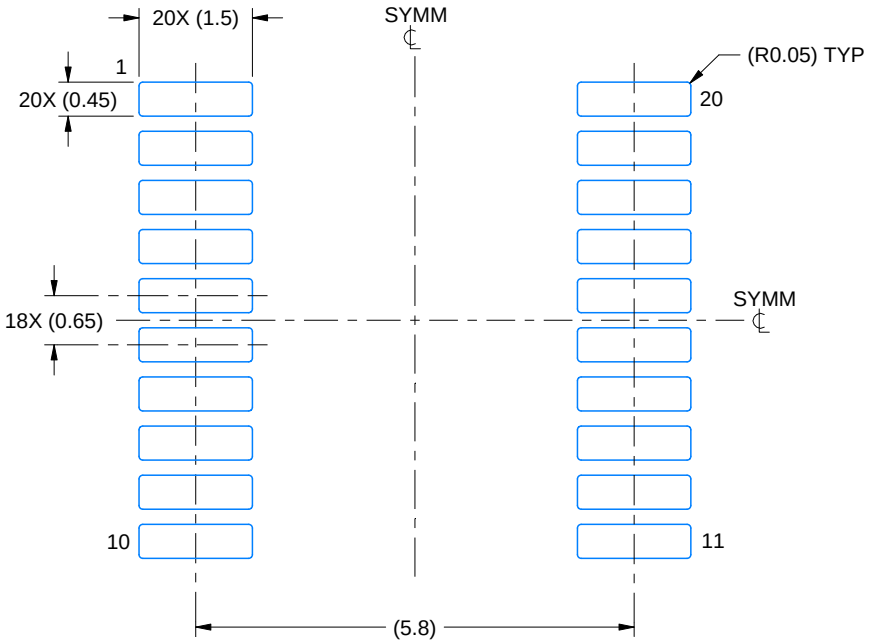
TSSOP - 1.2 mm max height

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.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

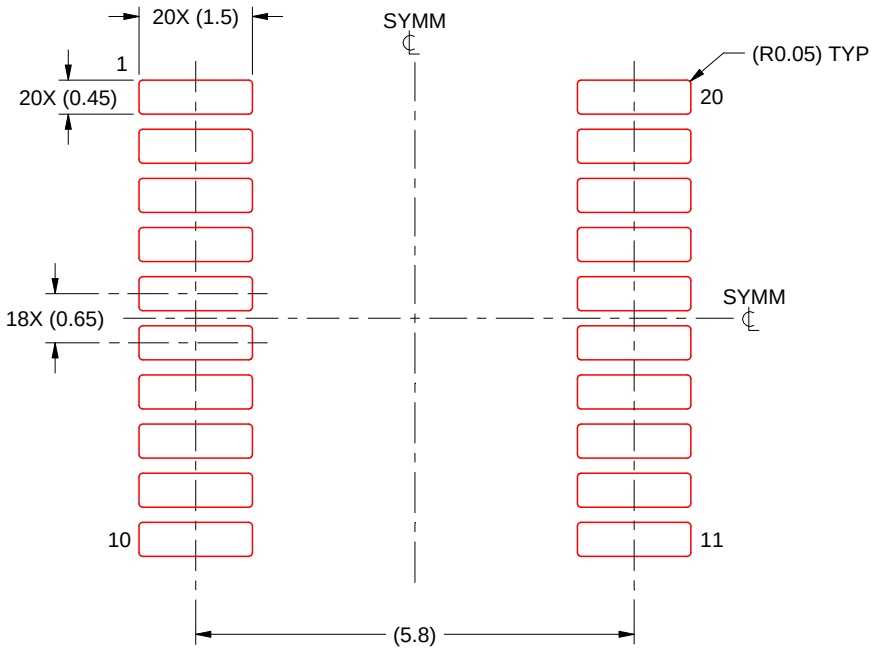


SOLDER MASK DETAILS

4220206/A 02/2017

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.



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

4220206/A 02/2017

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.

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最終更新日：2025 年 10 月