

DS30BA101 3.125Gbps 差分缓冲器

查询样品: [DS30BA101](#)

特性

- **DC** 的数据速率达到 **3.125Gbps**
- 支持标清 (**SD**) 和高清 (**HD**) 视频分辨率
- 功耗: 典型值为 **165mW**
- 工业温度范围: **-40°C 至 +85°C**

应用范围

- 电缆延长
- 信号缓冲和重复
- 安全和监控

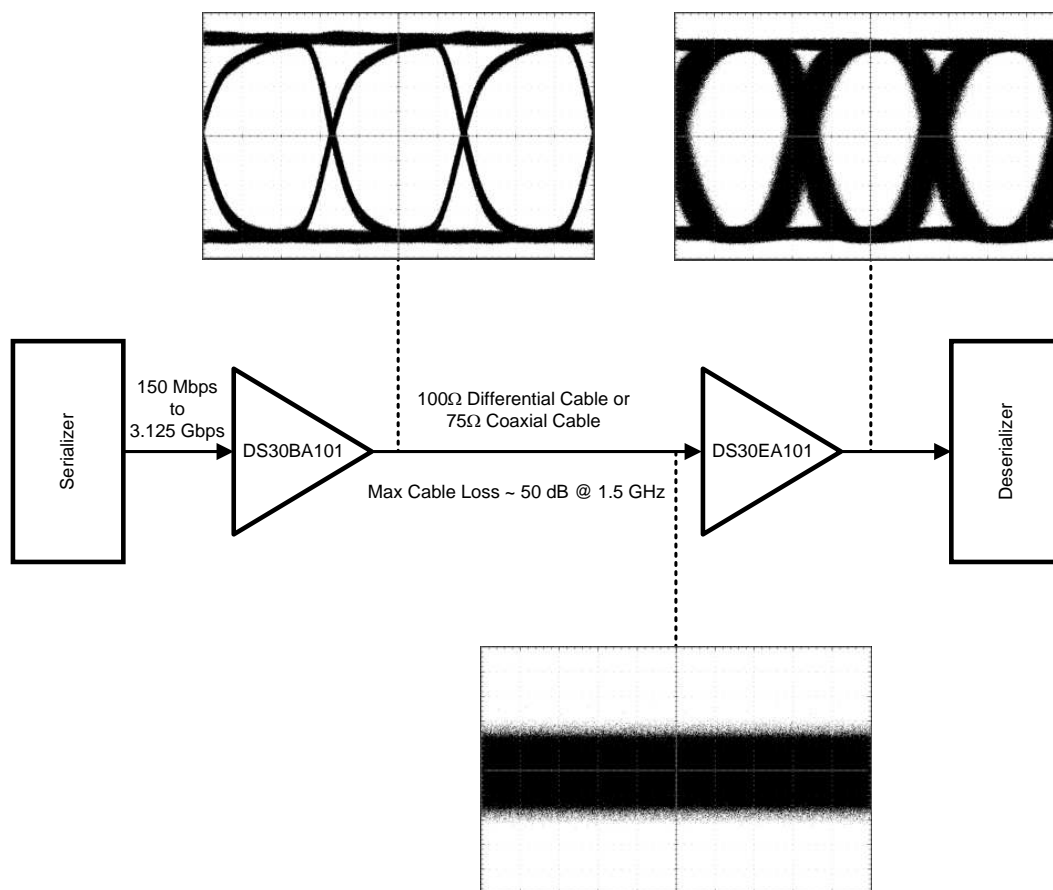
说明

DS30BA101 是一款高速差分缓冲器, 此缓冲器用于电缆驱动、信号缓冲和信号重复应用。它的全差分信号路径确保了出色的信号完整性和抗扰度。DS30BA101 以高达 3.125Gbps 的数据速率驱动差分 and 单端传输线路。

输出电压振幅可由电缆的一个单个外部电阻器调节, 此电缆将应用驱动进入 75Ω 单端和 100Ω 差分模式阻抗。

DS30BA101 由一个单个 3.3V 电源供电, 功耗 165mW (典型值)。它运行在 -40°C 至 +85°C 的全工业温度范围内, 并且采用 4mm x 4mm 16 引脚超薄型四方扁平无引线 (WQFN) 封装。

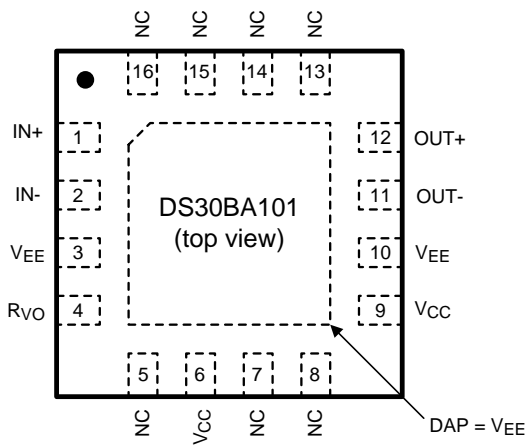
典型应用



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连接图



外露裸片连接垫是用于这个器件的一个负电端子。它应该被连接至负电源电压。

图 1. 16 引脚 WQFN 封装
请见封装编号 RUM0016A

引脚说明

引脚	名称	I/O, 类型	说明
1	IN+	I, CML	非反相输入。
2	IN-	I, CML	反相输入。
3	VEE	接地	负电源（接地）。
4	RVO	I, 模拟	输出电压电平控制。在这个引脚与 V _{CC} 之间连接一个电阻器以设定输出电压。
5	NC	不可用	否 连接。内部未连接。
6	V _{CC}	电源	正电源 (+3.3V)。
7	NC	不可用	否 连接。内部未连接。
8	NC	不可用	否 连接。内部未连接。
9	V _{CC}	电源	正电源 (+3.3V)。
10	VEE	接地	负电源（接地）。
11	OUT-	O, 数据	反相输出。
12	OUT+	O, 数据	非反相输出。
13	NC	不可用	否 连接。内部未连接。
14	NC	不可用	否 连接。内部未连接。
15	NC	不可用	否 连接。内部未连接。
16	NC	不可用	否 连接。内部未连接。
DAP	VEE	接地	将外露 DAP 连接至负电源（接地）。



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Absolute Maximum Ratings⁽¹⁾

Supply Voltage:	3.6V
Input Voltage (all inputs)	-0.3V to $V_{CC}+0.3V$
Output Current	28 mA
Storage Temperature Range	-65°C to +150°C
Junction Temperature	+125°C
Package Thermal Resistance θ_{JA} 16-pin WQFN θ_{JC} 16-pin WQFN	+58°C/W +21°C/W
ESD Rating (HBM)	$\geq \pm 4.5$ kV
ESD Rating (MM)	$\geq \pm 250V$
ESD Rating (CDM)	$\geq \pm 2$ kV

- (1) "Absolute Maximum Ratings" indicate limits beyond which damage to the device may occur, including inoperability and degradation of device reliability and/or performance. Functional operation of the device and/or non-degradation at the Absolute Maximum Ratings or other conditions beyond those indicated in the Recommended Operating Conditions is not implied. The Recommended Operating Conditions indicate conditions at which the device is functional and the device should not be operated beyond such conditions.

Recommended Operating Conditions

Supply Voltage (V_{CC}):	3.3V $\pm 5\%$
Operating Free Air Temperature (T_A)	-40°C to +85°C

DC Electrical Characteristics

Over recommended supply voltage and operating temperature ranges, unless otherwise specified. ⁽¹⁾ ⁽²⁾

Parameter		Test Conditions	Reference	Min	Typ	Max	Units
V_{ICM}	Input Common Mode Voltage		IN+, IN-	$1.1 + V_{ID}/2$		$V_{CC} - V_{ID}/2$	V
V_{ID}	Input Voltage Swing	Differential		100		2200	mV _{P-P}
V_{OCM}	Output Common Mode Voltage		OUT+, OUT-		$V_{CC} - V_{OUT}$		V
V_{OUT}	Output Voltage	Single-ended, 75Ω load, $R_{VO} = 750\Omega$			800		mV _{P-P}
		Single-ended, 50Ω load, $R_{VO} = 953\Omega$			400		mV _{P-P}
I_{CC}	Supply Current				50	59	mA

- (1) The Electrical Characteristics tables list ensured specifications under the listed Recommended Operating Conditions except as otherwise modified or specified by the Electrical Characteristics Conditions and/or Notes. Typical specifications are estimations only and are not ensured.
- (2) Typical values represent most likely parametric norms at $V_{CC} = +3.3V$, $T_A = +25^\circ C$, and at the Recommended Operating Conditions at the time of product characterization and are not ensured.

AC Electrical Characteristics

Over recommended supply voltage and operating temperature ranges, unless otherwise specified. ⁽¹⁾ ⁽²⁾

Parameter		Test Conditions	Reference	Min	Typ	Max	Units
DR_{IN}	Input Data Rate		IN+, IN-			3125	Mbps
t_{TLH}	Transition Time Low to High	20% - 80% ⁽³⁾	OUT+, OUT-		90	130	ps
t_{THL}	Transition Time High to Low				90	130	ps

- (1) The Electrical Characteristics tables list ensured specifications under the listed Recommended Operating Conditions except as otherwise modified or specified by the Electrical Characteristics Conditions and/or Notes. Typical specifications are estimations only and are not ensured.
- (2) Typical values represent most likely parametric norms at $V_{CC} = +3.3V$, $T_A = +25^\circ C$, and at the Recommended Operating Conditions at the time of product characterization and are not ensured.
- (3) Specification is ensured by characterization and is not tested in production.

DEVICE OPERATION

INPUT INTERFACING

The DS30BA101 accepts either differential or single-ended input. DC-coupled inputs must be kept within the specified common-mode range.

OUTPUT INTERFACING

The DS30BA101 uses current mode outputs. Single-ended output levels are 800 mV_{P-P} into 75Ω AC-coupled coaxial cable with an R_{VO} resistor of 750Ω, or 400 mV_{P-P} (800 mV_{P-P} differential) into 100Ω differential cable with an R_{VO} resistor of 953Ω. The output voltage level is controlled by the value of the R_{VO} resistor connected between the R_{VO} pin and V_{CC}.

The R_{VO} resistor should be placed as close as possible to the R_{VO} pin. In addition, the copper in the plane layers below the R_{VO} network should be removed to minimize parasitic capacitance.

Figure 2 and Figure 3 show the typical configurations for differential output and single-ended output, respectively. For single-ended output, the unused output must be properly terminated as shown.

APPLICATION INFORMATION

CABLE EXTENDER APPLICATION

The DS30BA101 together with the DS30EA101 form a cable extender chipset optimized for extending serial data streams from serializer/deserializer (SerDes) pairs and FPGAs over 100Ω differential cables and 75Ω coaxial cables. Setting the correct DS30BA101 output amplitude and proper cable termination are essential for optimal operation. Figure 2 shows the recommended chipset configuration for 100Ω differential cable and Figure 3 shows the recommended chipset configuration for 75Ω coaxial cable.

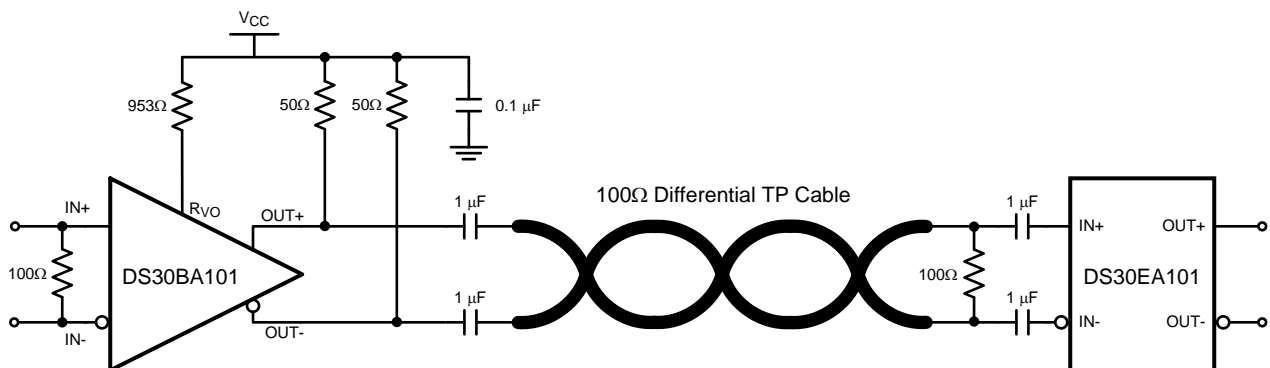


Figure 2. Cable Extender Chipset Application Circuit for 100Ω Differential Cable

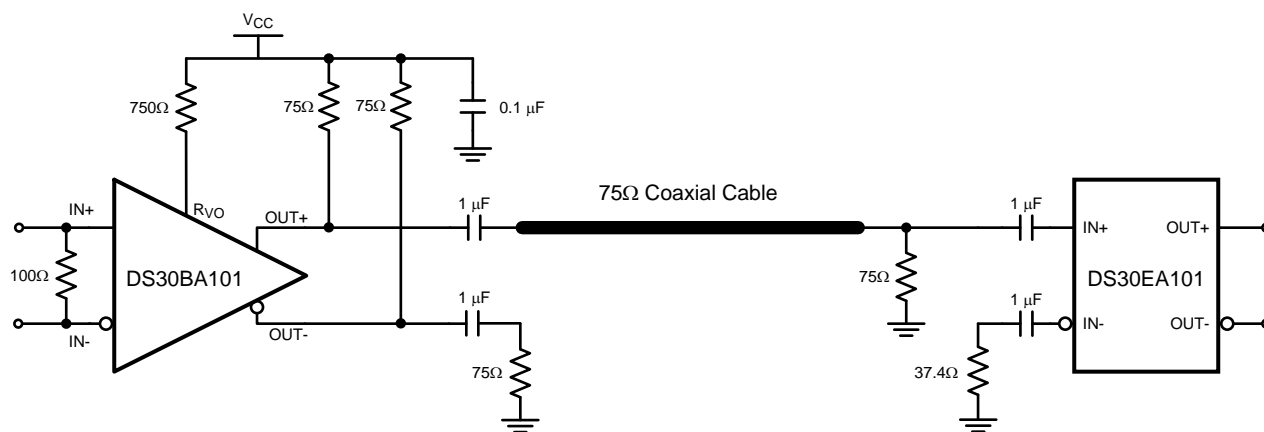


Figure 3. Cable Extender Chipset Application Circuit for 75Ω Coaxial Cable

REVISION HISTORY

Changes from Original (April 2013) to Revision A	Page
• Changed layout of National Data Sheet to TI format	5

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)
DS30BA101SQ/NOPB	Active	Production	WQFN (RUM) 16	1000 SMALL T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	30BA101
DS30BA101SQ/NOPB.A	Active	Production	WQFN (RUM) 16	1000 SMALL T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	30BA101
DS30BA101SQE/NOPB	Active	Production	WQFN (RUM) 16	250 SMALL T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	30BA101
DS30BA101SQE/NOPB.A	Active	Production	WQFN (RUM) 16	250 SMALL T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	30BA101
DS30BA101SQE/NOPB.B	Active	Production	WQFN (RUM) 16	250 SMALL T&R	-	Call TI	Call TI	-40 to 85	
DS30BA101SQX/NOPB	Active	Production	WQFN (RUM) 16	4500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	30BA101
DS30BA101SQX/NOPB.A	Active	Production	WQFN (RUM) 16	4500 LARGE T&R	Yes	SN	Level-3-260C-168 HR	-40 to 85	30BA101
DS30BA101SQX/NOPB.B	Active	Production	WQFN (RUM) 16	4500 LARGE T&R	-	Call TI	Call TI	-40 to 85	

(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.

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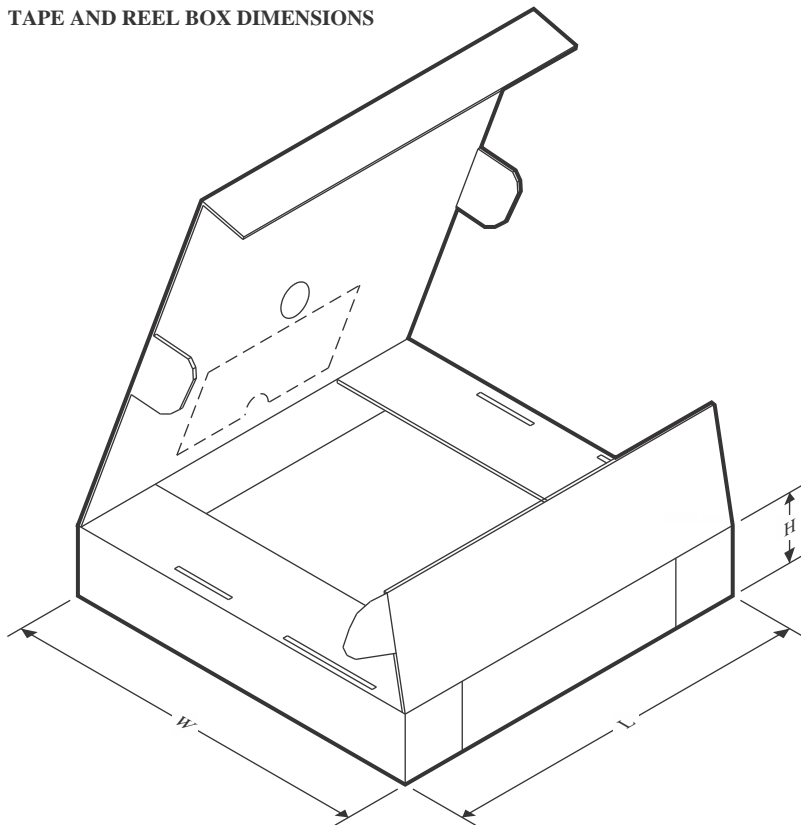
TAPE AND REEL INFORMATION



*All dimensions are nominal

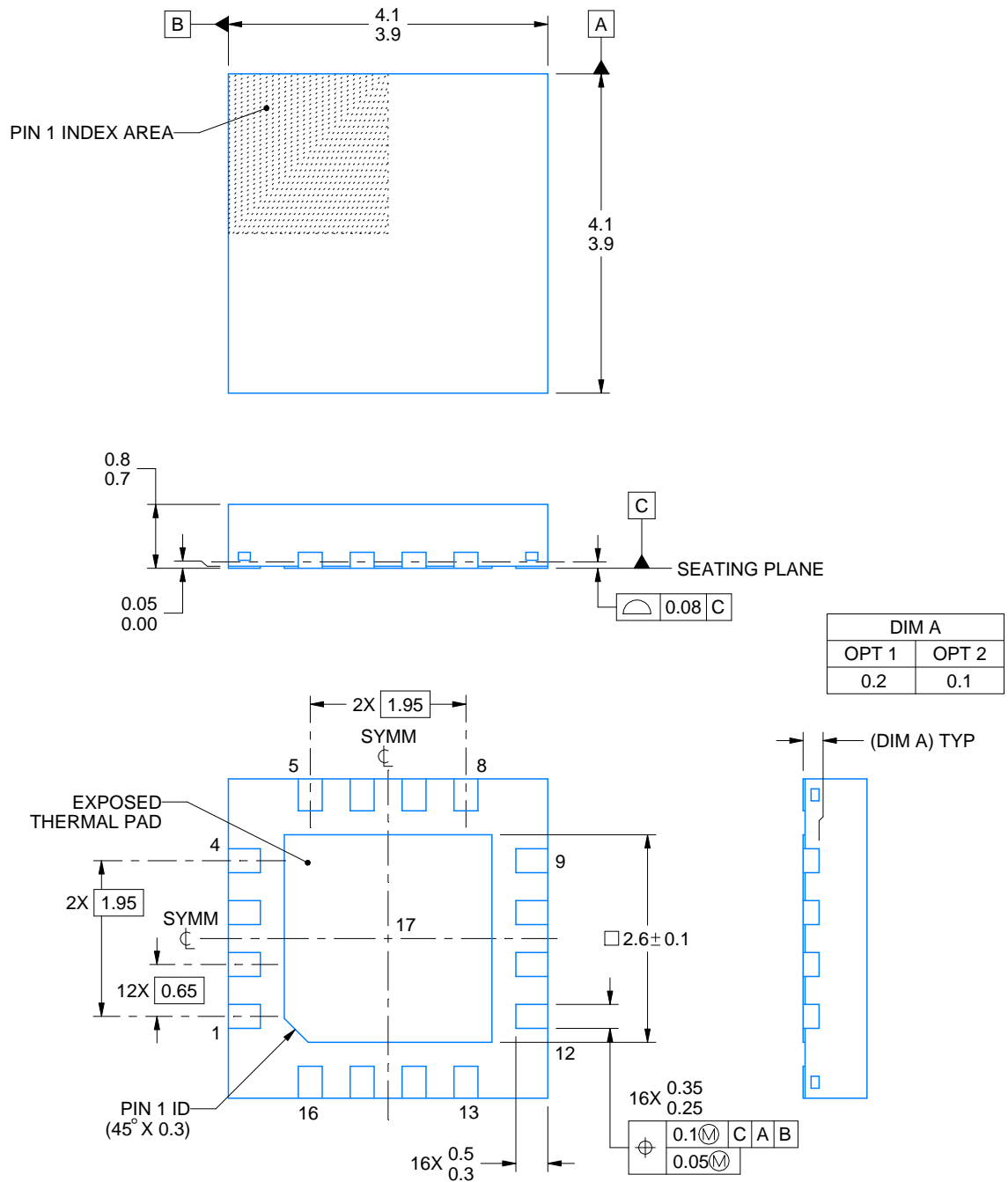
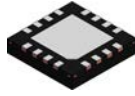
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
DS30BA101SQ/NOPB	WQFN	RUM	16	1000	177.8	12.4	4.3	4.3	1.3	8.0	12.0	Q1
DS30BA101SQE/NOPB	WQFN	RUM	16	250	177.8	12.4	4.3	4.3	1.3	8.0	12.0	Q1
DS30BA101SQX/NOPB	WQFN	RUM	16	4500	330.0	12.4	4.3	4.3	1.3	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
DS30BA101SQ/NOPB	WQFN	RUM	16	1000	208.0	191.0	35.0
DS30BA101SQE/NOPB	WQFN	RUM	16	250	208.0	191.0	35.0
DS30BA101SQX/NOPB	WQFN	RUM	16	4500	356.0	356.0	36.0



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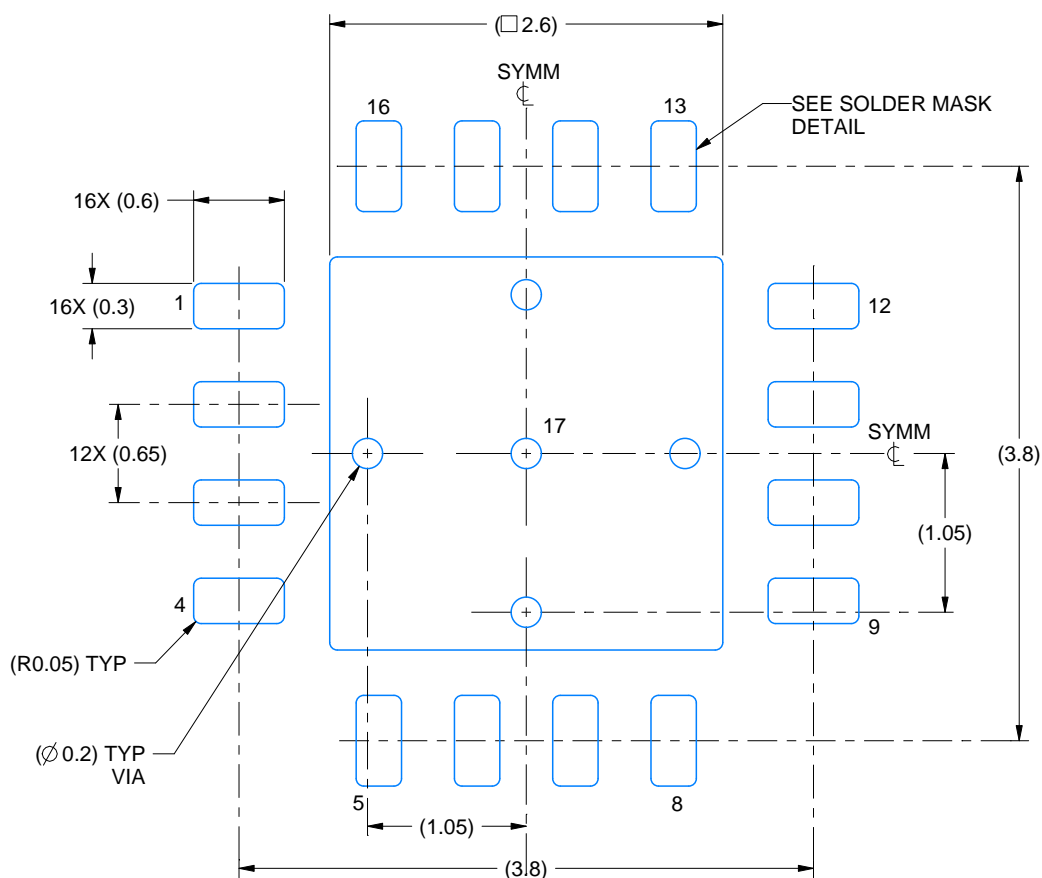
NOTES:

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. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

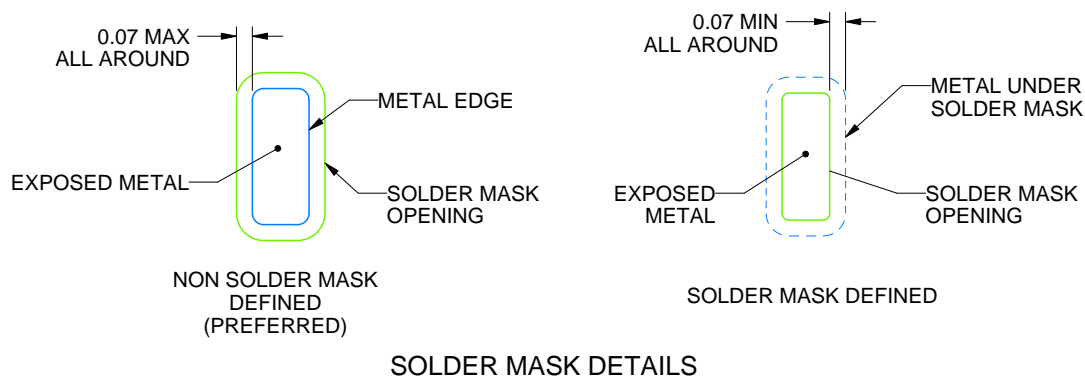
RUM0016A

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 20X



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NOTES: (continued)

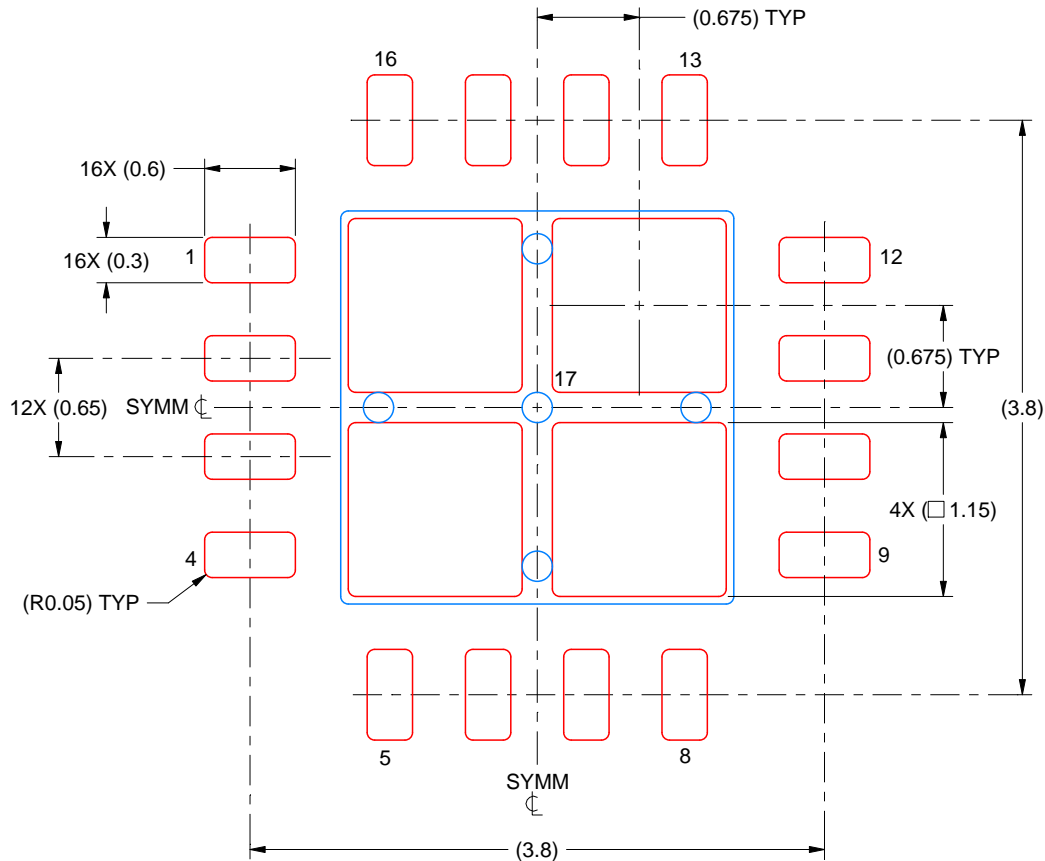
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

EXAMPLE STENCIL DESIGN

RUM0016A

WQFN - 0.8 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.125 MM THICK STENCIL
SCALE: 20X

EXPOSED PAD 17
78% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE

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NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

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