

## 针对音频应用的 2 X 2 交叉点开关

查询样品: [TS3A26746E](#)

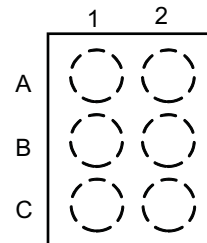
### 特性

- 针对接地 (GND) 开关的超低  $R_{\text{导通}}$  (典型值  $80\text{m}\Omega$ )
- 针对麦克风 (MIC) 开关的  $R_{\text{导通}}$  小于  $10\Omega$
- 3.0V 至 3.6V V+ 运行
- 控制输入符合 1.8 V 逻辑要求
- 6 焊锡凸点, 0.5mm 焊球间距芯片级 (CSP) 封 (1.45mm x 0.95mm x 0.5mm)
- 锁断性能超过 100mA (符合 JESD 78, II 类规范的要求)
- 静电放电 (ESD) 性能测试符合 JESD 22 标准
  - 2000V 人体模型 (A114-B, II 类)
  - 500V 充电器件模型 (C101)
- ESD 性能 (SLEEVE, RING2)
  - $\pm 8\text{kV}$  接触放电 (IEC 61000-4-2)

### 应用范围

- 手机
- 掌上电脑 (PDA)
- 便携式仪表
- 数码相机
- 便携式导航器件

引脚分配



### 说明

TS3A26746E 是一款  $2 \times 2$  交叉点开关, 此开关被用来在耳机连接器上交替接地及 MIC 连接。接地开关具有不足  $0.1\Omega$  的超低  $R_{\text{导通}}$  以大大降低其上的电压压降, 从而可防止耳机接地基准电压意外升高。该开关状态可通过 SEL 输入进行控制。当 SEL 为高电平时, GND 被连接至 RING2, 而 MIC 被连接至 SLEEVE。当 SEL 为低时, GND 被连接至 SLEEVE, 而 MIC 则被连接至 RING2。SEL 输入上的内部 100k 上拉电阻器可设定开关的缺省状态。

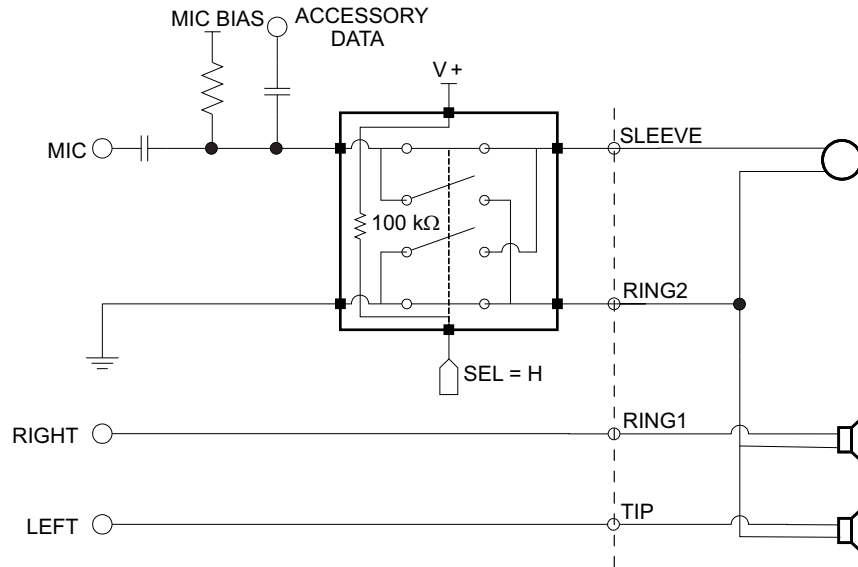


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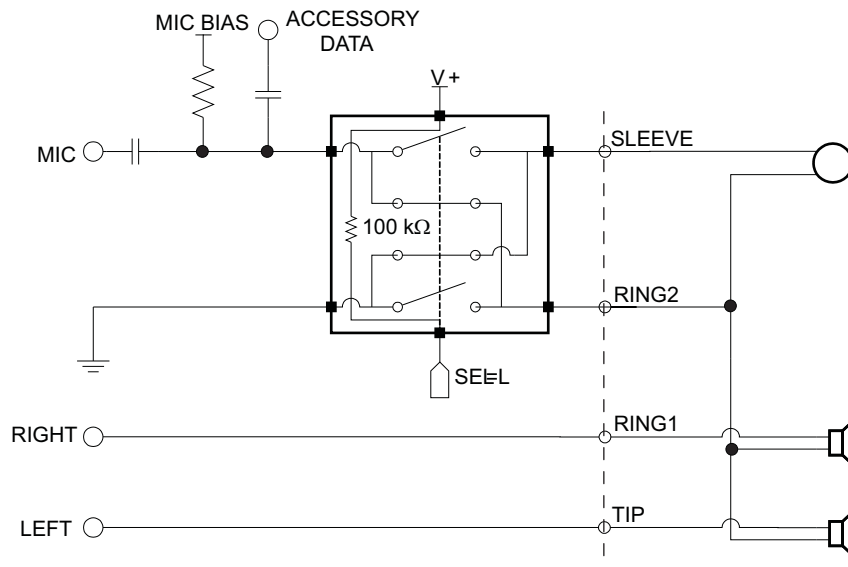


These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

**TYPICAL APPLICATION BLOCK DIAGRAM**

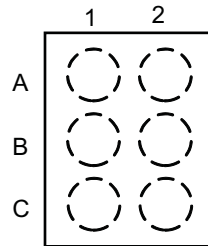


**Figure 1. Standard Headphone Configuration (SEL=H)**



**Figure 2. Alternate Headphone Configuration (SEL=L)**

**PINOUT**



**TERMINAL ASSIGNMENTS**

	1	2
<b>A</b>	SEL	V+
<b>B</b>	MIC	SLEEVE
<b>C</b>	GND	RING2

**PIN FUNCTIONS**

BALL #	PIN		DESCRIPTION
	NAME	TYPE	
A1	SEL	Input	Control Input
A2	V+	Power	Supply Voltage
B1	MIC	I/O	MIC
B2	SLEEVE	I/O	Sleeve Connection on Headphone Jack
C1	GND	Ground	Ground
C2	RING2	I/O	2 <sup>nd</sup> Ring Connection on Headphone Jack

**Table 1. FUNCTION TABLE**

SEL	MIC to SLEEVE, GND to RING2	MIC to RING2, GND to SLEEVE
L	OFF	ON
H	ON	OFF

**TS3A26746E**

ZHCS135C – FEBRUARY 2011 – REVISED MAY 2013

[www.ti.com.cn](http://www.ti.com.cn)
**ABSOLUTE MAXIMUM RATINGS<sup>(1)(2)</sup>**

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

			MIN	MAX	UNIT
V <sub>+</sub>	Supply voltage range <sup>(3)</sup>		-0.3	4.0	V
V <sub>MIC</sub> V <sub>SLEEVE</sub> V <sub>RING2</sub>	Analog voltage range <sup>(3)</sup>		-0.3	4.0	V
I <sub>K</sub>	Analog port diode current	V <sub>MIC</sub> , V <sub>SLEEVE</sub> , V <sub>RING2</sub> < 0 V	-50		mA
V <sub>I</sub>	Digital input voltage range		-0.3	4.0	V
I <sub>IK</sub>	Digital input clamp current <sup>(3)</sup>	V <sub>I</sub> < 0 V	-50		mA
I <sub>+</sub>	Continuous current through V <sub>+</sub>			100	mA
I <sub>GND</sub>	Continuous current through GND		-100		mA
θ <sub>JA</sub>	Package thermal impedance <sup>(4)</sup>	YZP package		102	°C/W
T <sub>stg</sub>	Storage temperature range		-65	150	°C

- (1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.
- (2) The algebraic convention, whereby the most negative value is a minimum and the most positive value is a maximum.
- (3) All voltages are with respect to ground, unless otherwise specified.
- (4) The package thermal impedance is calculated in accordance with JESD 51-7.

**ELECTRICAL CHARACTERISTICS FOR 3.3 V SUPPLY<sup>(1)</sup>**

 V<sub>+</sub> = 3 V to 3.6 V, T<sub>A</sub> = -40°C to 85°C (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T <sub>A</sub>	V <sub>+</sub>	MIN	TYP	MAX	UNIT
<b>MIC SWITCH</b>							
V <sub>MIC</sub> , V <sub>SLEEVE</sub> , V <sub>RING2</sub>	Analog signal range			0		V+	V
r <sub>on</sub>	ON-state resistance	0 ≤ V <sub>SLEEVE</sub> or V <sub>RING2</sub> ≤ V <sub>+</sub> , I <sub>MIC</sub> = -32 mA	Switch ON	25°C	3 V	5 8	Ω
				Full		10	
r <sub>on(flat)</sub>	ON-state resistance flatness	0 ≤ V <sub>SLEEVE</sub> or V <sub>RING2</sub> ≤ V <sub>+</sub> , I <sub>MIC</sub> = -32 mA	Switch ON	25°C	3 V	1 2.3	Ω
				Full		2.5	
I <sub>SLEEVE(OFF)</sub> , I <sub>RING2(OFF)</sub>	SLEEVE, RING2 OFF leakage current	V <sub>SLEEVE</sub> or V <sub>RING2</sub> = 1 V, V <sub>MIC</sub> = 3 V, or V <sub>SLEEVE</sub> or V <sub>RING2</sub> = 3 V, V <sub>MIC</sub> = 1 V	Switch OFF	25°C	3.6 V	-0.5 0.05 0.5	μA
			Full			-2 2	
I <sub>MIC(OFF)</sub>	MIC OFF leakage current	V <sub>SLEEVE</sub> or V <sub>RING2</sub> = 3 V, V <sub>MIC</sub> = 1 V, or V <sub>SLEEVE</sub> or V <sub>RING2</sub> = 1 V, V <sub>MIC</sub> = 3 V	Switch OFF	25°C	3.6 V	-1 0.1 1	μA
			Full			-2 2	
I <sub>SLEEVE(ON)</sub> , I <sub>RING2(ON)</sub>	SLEEVE, RING2 ON leakage current	V <sub>SLEEVE</sub> or V <sub>RING2</sub> = 1 V, V <sub>MIC</sub> = Open, or V <sub>SLEEVE</sub> or V <sub>RING2</sub> = 3 V, V <sub>MIC</sub> = Open	Switch ON	25°C	3.6 V	-2 0.5 2	μA
			Full			-2 2	
I <sub>MIC(ON)</sub>	MIC ON leakage current	V <sub>SLEEVE</sub> or V <sub>RING2</sub> = Open V, V <sub>MIC</sub> = 1 V, or V <sub>SLEEVE</sub> or V <sub>RING2</sub> = Open, V <sub>MIC</sub> = 3 V	Switch ON	25°C	3.6 V	-2 0.5 2	μA
			Full			-2 2	
<b>GND SWITCH</b>							
r <sub>on</sub>	ON-state resistance	I <sub>SLEEVE</sub> or I <sub>RING2</sub> = +32 mA, V <sub>GND</sub> = 0 V, I <sub>GND</sub> = -32 mA	Switch ON	25°C	3 V	0.08 0.09	Ω
			Full			0.11	
I <sub>SLEEVE(OFF)</sub> , I <sub>RING2(OFF)</sub>	SLEEVE, RING2 OFF leakage current	V <sub>SLEEVE</sub> or V <sub>RING2</sub> = 3V and V <sub>GND</sub> = 0 V	Switch OFF	25°C	3.6 V	-0.5 0.05 0.5	μA
				Full			
I <sub>SLEEVE(PWROFF)</sub> , I <sub>RING2(PWROFF)</sub>	SLEEVE, RING2 OFF leakage current	V <sub>SLEEVE</sub> or V <sub>RING2</sub> = 0 to 3.6 V and V <sub>GND</sub> = 0 V	Switch OFF	25°C	0 V	-1 0.5 1	μA
				Full			

- (1) The algebraic convention, whereby the most negative value is a minimum and the most positive value is a maximum

**ELECTRICAL CHARACTERISTICS FOR 3.3 V SUPPLY<sup>(1)</sup> (continued)**
 $V_+ = 3\text{ V to }3.6\text{ V}$ ,  $T_A = -40^\circ\text{C to }85^\circ\text{C}$  (unless otherwise noted)

PARAMETER		TEST CONDITIONS	$T_A$	$V_+$	MIN	TYP	MAX	UNIT
<b>DIGITAL CONTROL INPUTS (SEL)</b>								
$V_{IH}$	Input logic high		Full	3.6 V	1.2		3.6	V
$V_{IL}$	Input logic low		Full	3.6 V	0		0.4	V
$I_{IH}$	Input logic high leakage current	$V_I = V_+$	25°C	3.6 V	-1	0.05	1	$\mu\text{A}$
			Full		-2		2	
$I_{IL}$	Input logic low leakage current	$V_I = 0\text{ V}$	25°C	3.6 V	-38	-36	-34	$\mu\text{A}$
			Full		-45		-30	
<b>DYNAMIC</b>								
$t_{ON}$	Turn-on time	$V_{MIC} = V_+$ , $R_L = 50\ \Omega$	$C_L = 35\ \text{pF}$	25°C	3.3 V		150 200	ns
				Full	3 V to 3.6 V		250	
$t_{OFF}$	Turn-off time	$V_{MIC} = V_+$ , $R_L = 50\ \Omega$	$C_L = 35\ \text{pF}$	25°C	3.3 V		5 10	ns
				Full	3 V to 3.6 V		15	
$t_{BBM}$	Break-before-make time	$V_{MIC} = V_+$	25°C	3.3 V		70	330	ns
			Full	3 V to 3.6 V			330	
$C_{MIC}$	MIC capacitance	SEL=High	25°C	3.3 V		100	140	$\text{pF}$
		SEL=Low	25°C	3.3 V		100	140	
$C_{SLEEVE}$	SLEEVE / RING2 capacitance	SEL=High	25°C	3.3 V		100	140	$\text{pF}$
		SEL=Low	25°C	3.3 V		100	140	
$C_I$	Digital input capacitance	$V_I = V_+$ or 0 V	25°C	3.3 V		4.0		$\text{pF}$
THD	Total harmonic distortion	$R_L = 1\text{ k}\ \Omega$ , $V = 30\text{ mVPP}$	f = 20 Hz to 20 kHz 25°C	3.3 V		0.01%		
<b>SUPPLY</b>								
$V_+$	Power Supply Voltage				3.0	3.3	3.6	V
$I_+$	Positive supply current	$V_I = V_+$	25°C	3.6 V		0.01	1	$\mu\text{A}$
			Full				5	
		$V_I = 0\text{ V}$	25°C			40	41	$\mu\text{A}$
			Full				50	

### OPERATIONAL CHARACTERISTICS

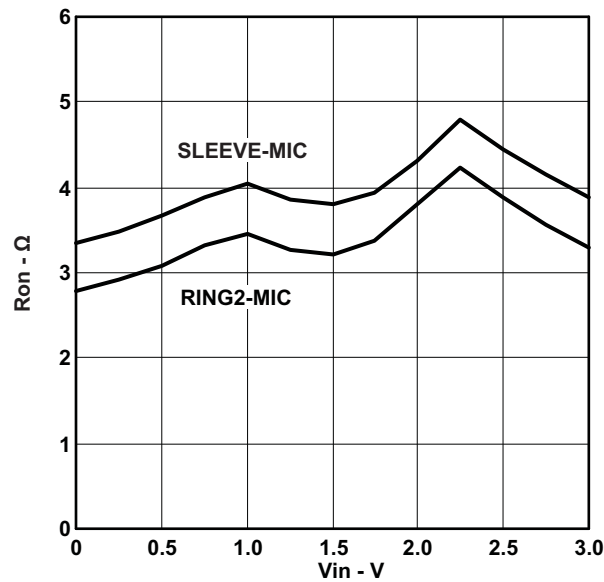
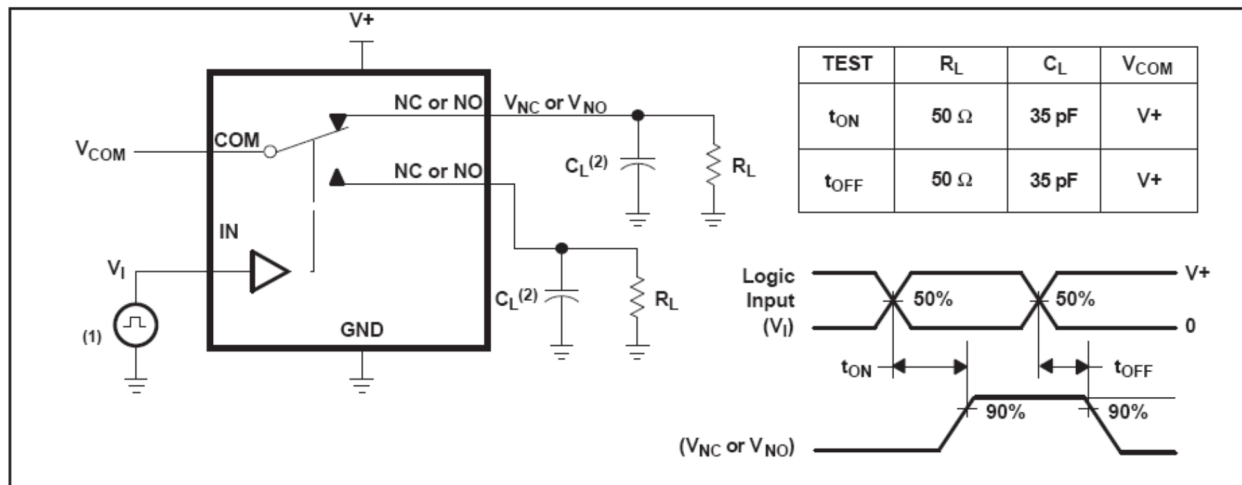


Figure 3.  $R_{ON}$  vs  $V_{IN}$  (MIC Switch)

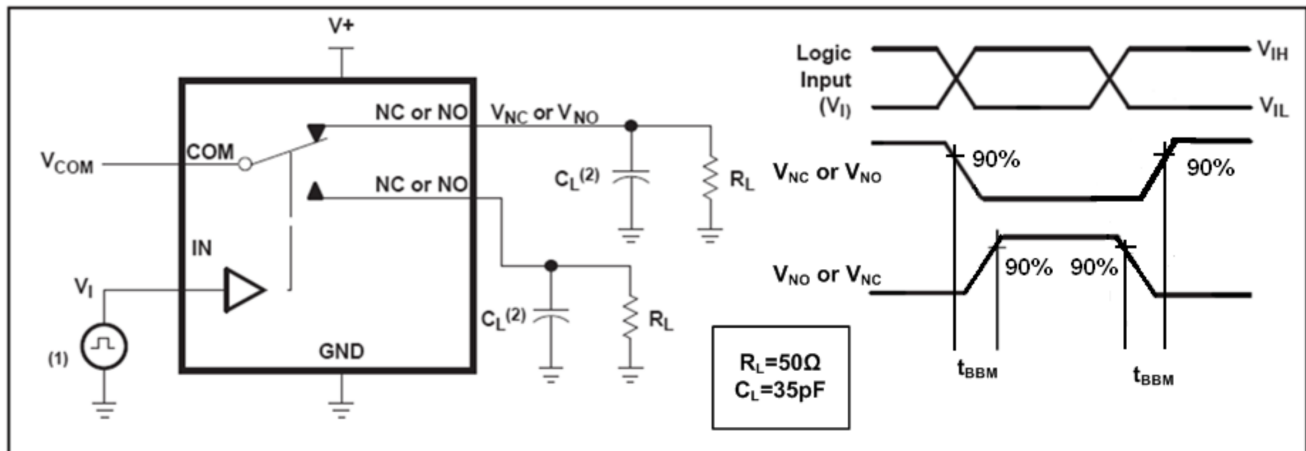
### PARAMETER MEASUREMENT INFORMATION



- All input pulses are supplied by generators having the following characteristics: PRR  $\leq$  10 MHz,  $Z_O = 50 \Omega$ ,  $t_r < 5$  ns,  $t_f < 5$  ns.
- $C_L$  includes probe and jig capacitance.

Figure 4. Turn-On ( $t_{ON}$ ) and Turn-Off Time ( $t_{OFF}$ )

PARAMETER MEASUREMENT INFORMATION (continued)



- A.  $C_L$  includes probe and jig capacitance.
- B. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10$  MHz,  $Z_O = 50 \Omega$ ,  $t_r < 5$  ns,  $t_f < 5$  ns.

Figure 5. Break-Before-Make Time ( $t_{BBM}$ )

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**REVISION HISTORY**

<b>Changes from Revision B (November 2011) to Revision C</b>	<b>Page</b>
• 用整个文档替换 1 页预览。 .....	<b>1</b>

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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)
<a href="#">TS3A26746EYZPR</a>	Active	Production	DSBGA (YZP)   6	3000   LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 85	7N
TS3A26746EYZPR.B	Active	Production	DSBGA (YZP)   6	3000   LARGE T&R	Yes	SNAGCU	Level-1-260C-UNLIM	-40 to 85	7N

(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**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

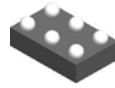
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TS3A26746EYZPR	DSBGA	YZP	6	3000	180.0	8.4	1.02	1.52	0.63	4.0	8.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TS3A26746EYZPR	DSBGA	YZP	6	3000	182.0	182.0	20.0

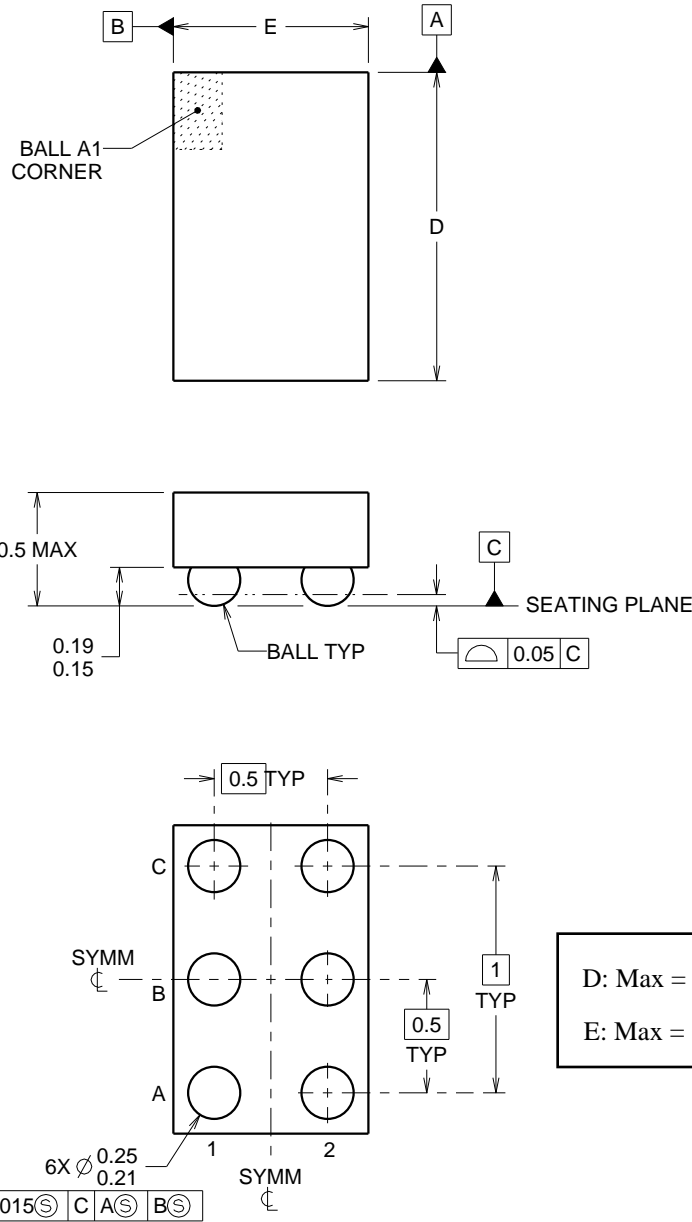
YZP0006



PACKAGE OUTLINE

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



D: Max = 1.418 mm, Min = 1.358 mm  
 E: Max = 0.917 mm, Min = 0.857 mm

4219524/A 06/2014

NOTES:

NanoFree Is a trademark of Texas Instruments.

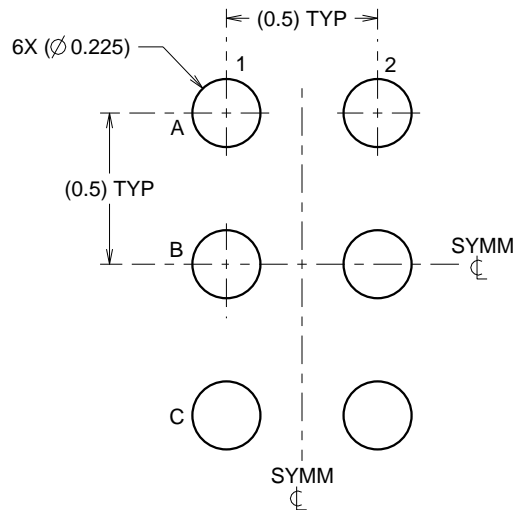
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. NanoFree™ package configuration.

# EXAMPLE BOARD LAYOUT

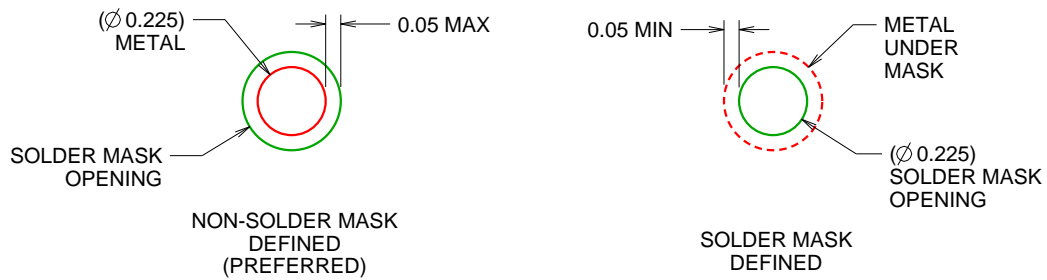
YZP0006

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE  
SCALE:40X



SOLDER MASK DETAILS  
NOT TO SCALE

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NOTES: (continued)

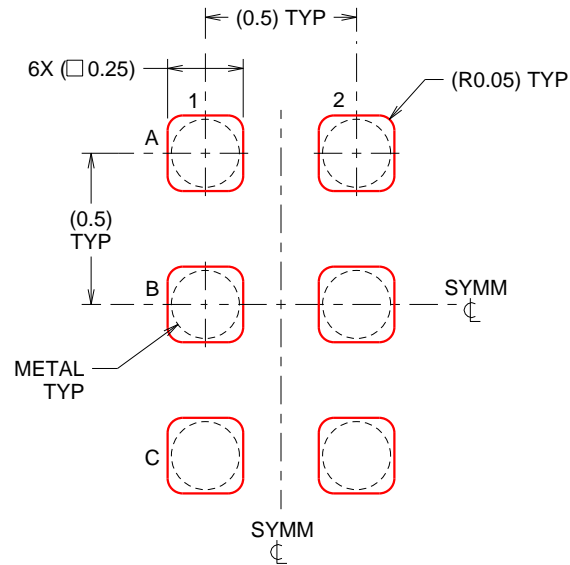
- Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For more information, see Texas Instruments literature number SBVA017 ([www.ti.com/lit/sbva017](http://www.ti.com/lit/sbva017)).

# EXAMPLE STENCIL DESIGN

YZP0006

DSBGA - 0.5 mm max height

DIE SIZE BALL GRID ARRAY



SOLDER PASTE EXAMPLE  
BASED ON 0.1 mm THICK STENCIL  
SCALE:40X

4219524/A 06/2014

NOTES: (continued)

5. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release.

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最后更新日期：2025 年 10 月