

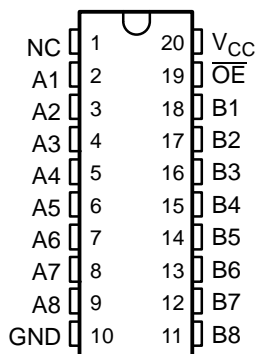
## FEATURES

- High-Bandwidth Data Path (up to 500 MHz <sup>(1)</sup>)
- Equivalent to IDTQS3VH384 Device
- 5-V Tolerant I/Os With Device Powered Up or Powered Down
- Low and Flat ON-State Resistance ( $r_{on}$ ) Characteristics Over Operating Range ( $r_{on} = 4\ \Omega$  Typ)
- Rail-to-Rail Switching on Data I/O Ports
  - 0- to 5-V Switching With 3.3-V  $V_{CC}$
  - 0- to 3.3-V Switching With 2.5-V  $V_{CC}$
- Bidirectional Data Flow With Near-Zero Propagation Delay
- Low Input/Output Capacitance Minimizes Loading and Signal Distortion ( $C_{io(OFF)} = 3.5\text{ pF}$  Typ)
- Fast Switching Frequency ( $f_{OE} = 20\text{ MHz}$  Max)

(1) For additional information regarding the performance characteristics of the CB3Q family, refer to the TI application report, *CBT-C, CB3T, and CB3Q Signal-Switch Families*, literature number SCDA008.

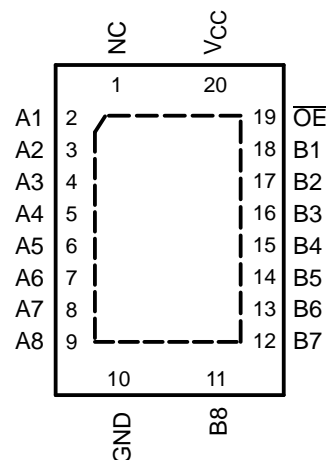
- Data and Control Inputs Provide Undershoot Clamp Diodes
- Low Power Consumption ( $I_{CC} = 1\text{ mA}$  Typical)
- $V_{CC}$  Operating Range From 2.3 V to 3.6 V
- Data I/Os Support 0- to 5-V Signaling Levels (0.8 V, 1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5 V)
- Control Inputs Can Be Driven by TTL or 5-V/3.3-V CMOS Outputs
- $I_{off}$  Supports Partial-Power-Down Mode Operation
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Performance Tested Per JESD 22
  - 2000-V Human-Body Model (A114-B, Class II)
  - 1000-V Charged-Device Model (C101)
- Supports Both Digital and Analog Applications: PCI Interface, Differential Signal Interface, Memory Interleaving, Bus Isolation, Low-Distortion Signal Gating

DBQ, DGV, OR PW PACKAGE  
(TOP VIEW)



NC - No internal connection

RGY PACKAGE  
(TOP VIEW)



NC - No internal connection

## DESCRIPTION/ORDERING INFORMATION

The SN74CB3Q3245 is a high-bandwidth FET bus switch utilizing a charge pump to elevate the gate voltage of the pass transistor, providing a low and flat ON-state resistance ( $r_{on}$ ). The low and flat ON-state resistance allows for minimal propagation delay and supports rail-to-rail switching on the data input/output (I/O) ports. The device also features low data I/O capacitance to minimize capacitive loading and signal distortion on the data bus. Specifically designed to support high-bandwidth applications, the SN74CB3Q3245 provides an optimized interface solution ideally suited for broadband communications, networking, and data-intensive computing systems.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

# SN74CB3Q3245

## 8-BIT FET BUS SWITCH

### 2.5-V/3.3-V LOW-VOLTAGE HIGH-BANDWIDTH BUS SWITCH

SCDS124B–JULY 2003–REVISED MARCH 2005

## DESCRIPTION/ORDERING INFORMATION (CONTINUED)

The SN74CB3Q3245 is organized as an 8-bit bus switch with a single output-enable ( $\overline{OE}$ ) input. When  $\overline{OE}$  is low, the bus switch is ON and the A port is connected to the B port, allowing bidirectional data flow between ports. When  $\overline{OE}$  is high, the bus switch is OFF and a high-impedance state exists between the A and B ports.

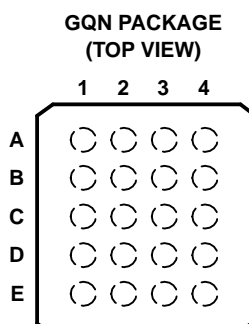
This device is fully specified for partial-power-down applications using  $I_{off}$ . The  $I_{off}$  circuitry prevents damaging current backflow through the device when it is powered down. The device has isolation during power off.

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.

## ORDERING INFORMATION

$T_A$	PACKAGE <sup>(1)</sup>		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	QFN – RGY	Tape and reel	SN74CB3Q3245RGYR	BU245
	SSOP (QSOP) – DBQ	Tape and reel	SN74CB3Q3245DBQR	CB3Q3245
	TSSOP – PW	Tube	SN74CB3Q3245PW	BU245
		Tape and reel	SN74CB3Q3245PWR	
	TVSOP – DGV	Tape and reel	SN74CB3Q3245DGVR	BU245
	VFBGA – GQN	Tape and reel	SN74CB3Q3245GQNR	BU245

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



## TERMINAL ASSIGNMENTS<sup>(1)</sup>

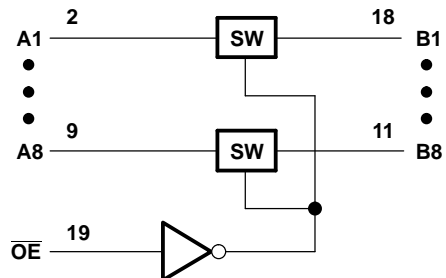
	1	2	3	4
<b>A</b>	A1	NC	$V_{CC}$	$\overline{OE}$
<b>B</b>	A3	B2	A2	B1
<b>C</b>	A5	A4	B4	B3
<b>D</b>	A7	B6	A6	B5
<b>E</b>	GND	A8	B8	B7

(1) NC - No internal connection

## FUNCTION TABLE

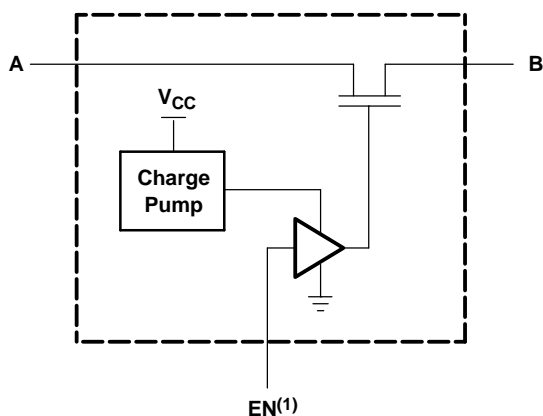
INPUT $\overline{OE}$	INPUT/OUTPUT A	FUNCTION
L	B	A port = B port
H	Z	Disconnect

### LOGIC DIAGRAM (POSITIVE LOGIC)



Pin numbers shown are for the DBQ, DGV, PW, and RGY packages.

### SIMPLIFIED SCHEMATIC, EACH FET SWITCH (SW)



(1) EN is the internal enable signal applied to the switch.

**SN74CB3Q3245**  
**8-BIT FET BUS SWITCH**  
**2.5-V/3.3-V LOW-VOLTAGE HIGH-BANDWIDTH BUS SWITCH**

SCDS124B—JULY 2003—REVISED MARCH 2005

## Absolute Maximum Ratings<sup>(1)</sup>

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

		MIN	MAX	UNIT
$V_{CC}$	Supply voltage range	−0.5	4.6	V
$V_{IN}$	Control input voltage range <sup>(2) (3)</sup>	−0.5	7	V
$V_{I/O}$	Switch I/O voltage range <sup>(2) (3) (4)</sup>	−0.5	7	V
$I_{IK}$	Control input clamp current	$V_{IN} < 0$		−50 mA
$I_{I/O}$	I/O port clamp current	$V_{I/O} < 0$		−50 mA
$I_{IO}$	ON-state switch current <sup>(5)</sup>	±64		mA
	Continuous current through $V_{CC}$ or GND	±100		mA
$\theta_{JA}$	Package thermal impedance	DBQ package <sup>(6)</sup>		68 °C/W
		DGV package <sup>(6)</sup>		92
		GQN package <sup>(6)</sup>		78
		PW package <sup>(6)</sup>		83
		RGY package <sup>(7)</sup>		37
$T_{stg}$	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) All voltages are with respect to ground, unless otherwise specified.
- (3) The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- (4)  $V_I$  and  $V_O$  are used to denote specific conditions for  $V_{I/O}$ .
- (5)  $I_I$  and  $I_O$  are used to denote specific conditions for  $I_{I/O}$ .
- (6) The package thermal impedance is calculated in accordance with JESD 51-7.
- (7) The package thermal impedance is calculated in accordance with JESD 51-5.

## Recommended Operating Conditions<sup>(1)</sup>

		MIN	MAX	UNIT
$V_{CC}$	Supply voltage	2.3	3.6	V
$V_{IH}$	High-level control input voltage	$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.7	5.5 V
		$V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$	2	5.5
$V_{IL}$	Low-level control input voltage	$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	0	0.7 V
		$V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$	0	0.8
$V_{I/O}$	Data input/output voltage	0	5.5	V
$T_A$	Operating free-air temperature	−40	85	°C

- (1) All unused control 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<sup>(1)</sup>

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

PARAMETER		TEST CONDITIONS		MIN	TYP <sup>(2)</sup>	MAX	UNIT
$V_{IK}$		$V_{CC} = 3.6\text{ V}$ ,	$I_I = -18\text{ mA}$			-1.8	V
$I_{IN}$	Control inputs	$V_{CC} = 3.6\text{ V}$ ,	$V_{IN} = 0\text{ to }5.5\text{ V}$			$\pm 1$	$\mu\text{A}$
$I_{OZ}^{(3)}$		$V_{CC} = 3.6\text{ V}$ ,	$V_O = 0\text{ to }5.5\text{ V}$ , $V_I = 0$ , Switch OFF, $V_{IN} = V_{CC}\text{ or GND}$			$\pm 1$	$\mu\text{A}$
$I_{off}$		$V_{CC} = 0$ ,	$V_O = 0\text{ to }5.5\text{ V}$ , $V_I = 0$			1	$\mu\text{A}$
$I_{CC}$		$V_{CC} = 3.6\text{ V}$ ,	$I_{IO} = 0$ , Switch ON or OFF, $V_{IN} = V_{CC}\text{ or GND}$		1	2	mA
$\Delta I_{CC}^{(4)}$	Control inputs	$V_{CC} = 3.6\text{ V}$ ,	One input at 3 V, Other inputs at $V_{CC}\text{ or GND}$			30	$\mu\text{A}$
$I_{CCD}^{(5)}$	Per control input	$V_{CC} = 3.6\text{ V}$ ,	A and B ports open, Control input switching at 50% duty cycle		0.30	0.35	mA/ MHz
$C_{in}$	Control inputs	$V_{CC} = 3.3\text{ V}$ ,	$V_{IN} = 5.5\text{ V}$ , 3.3 V, or 0		2.5	3.5	pF
$C_{io(OFF)}$		$V_{CC} = 3.3\text{ V}$ ,	Switch OFF, $V_{IN} = V_{CC}\text{ or GND}$ , $V_{IO} = 5.5\text{ V}$ , 3.3 V, or 0		3.5	5	pF
$C_{io(ON)}$		$V_{CC} = 3.3\text{ V}$ ,	Switch ON, $V_{IN} = V_{CC}\text{ or GND}$ , $V_{IO} = 5.5\text{ V}$ , 3.3 V, or 0		9	11	pF
$r_{on}^{(6)}$		$V_{CC} = 2.3\text{ V}$ , TYP at $V_{CC} = 2.5\text{ V}$	$V_I = 0$ , $I_O = 30\text{ mA}$		4	8	$\Omega$
			$V_I = 1.7\text{ V}$ , $I_O = -15\text{ mA}$		4.5	9	
		$V_{CC} = 3\text{ V}$	$V_I = 0$ , $I_O = 30\text{ mA}$		4	6	
			$V_I = 2.4\text{ V}$ , $I_O = -15\text{ mA}$		4	8	

- (1)  $V_{IN}$  and  $I_{IN}$  refer to control inputs.  $V_I$ ,  $V_O$ ,  $I_I$ , and  $I_O$  refer to data pins.
- (2) All typical values are at  $V_{CC} = 3.3\text{ V}$  (unless otherwise noted),  $T_A = 25^\circ\text{C}$ .
- (3) For I/O ports, the parameter  $I_{OZ}$  includes the input leakage current.
- (4) This is the increase in supply current for each input that is at the specified TTL voltage level, rather than  $V_{CC}$  or GND.
- (5) This parameter specifies the dynamic power-supply current associated with the operating frequency of a single control input (see Figure 2).
- (6) Measured by the voltage drop between the A and B terminals at the indicated current through the switch. ON-state resistance is determined by the lower of the voltages of the two (A or B) terminals.

## Switching Characteristics

over recommended operating free-air temperature range (unless otherwise noted) (see Figure 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 2.5\text{ V}$ $\pm 0.2\text{ V}$		$V_{CC} = 3.3\text{ V}$ $\pm 0.3\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	
$f_{OE}^{(1)}$	$\overline{OE}$	A or B		10		20	MHz
$t_{pd}^{(2)}$	A or B	B or A		0.12		0.20	ns
$t_{en}$	$\overline{OE}$	A or B	1.5	7.5	1.5	6.5	ns
$t_{dis}$	$\overline{OE}$	A or B	1	6.5	1	6.5	ns

- (1) Maximum switching frequency for control input ( $V_O > V_{CC}$ ,  $V_I = 5\text{ V}$ ,  $R_L \geq 1\text{ M}\Omega$ ,  $C_L = 0$ )
- (2) The propagation delay is the calculated RC time constant of the typical ON-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).

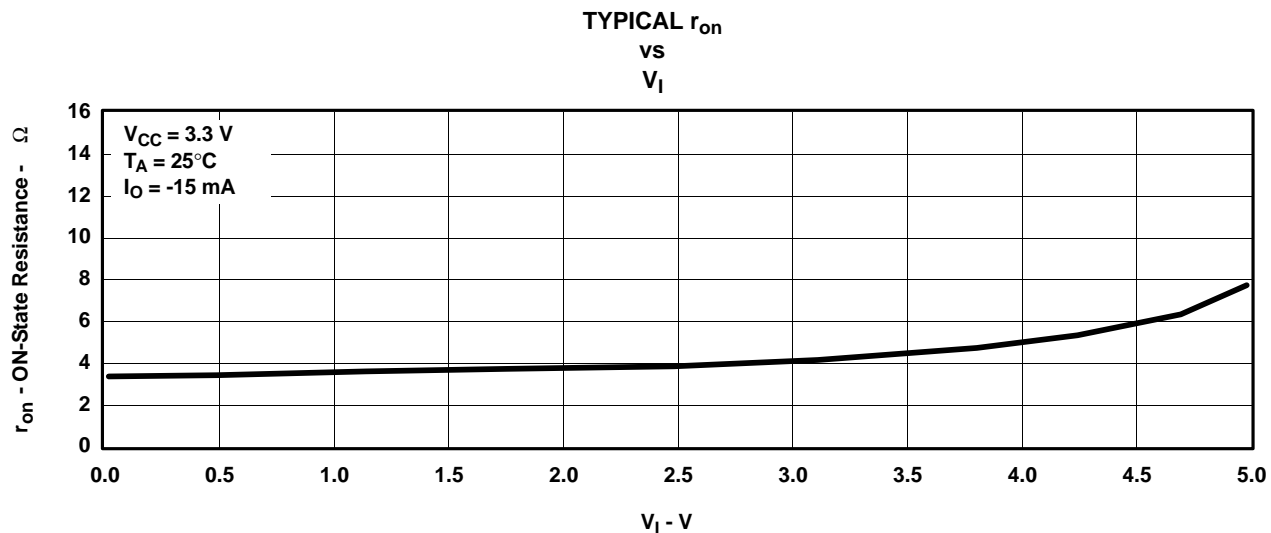


Figure 1. Typical  $r_{on}$  vs  $V_I$

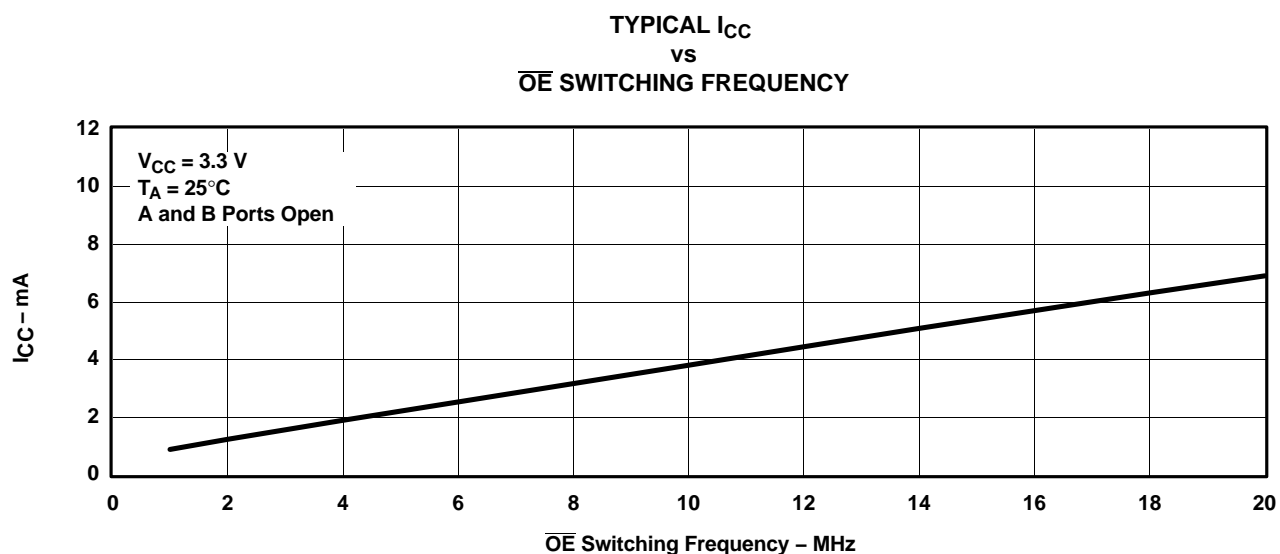
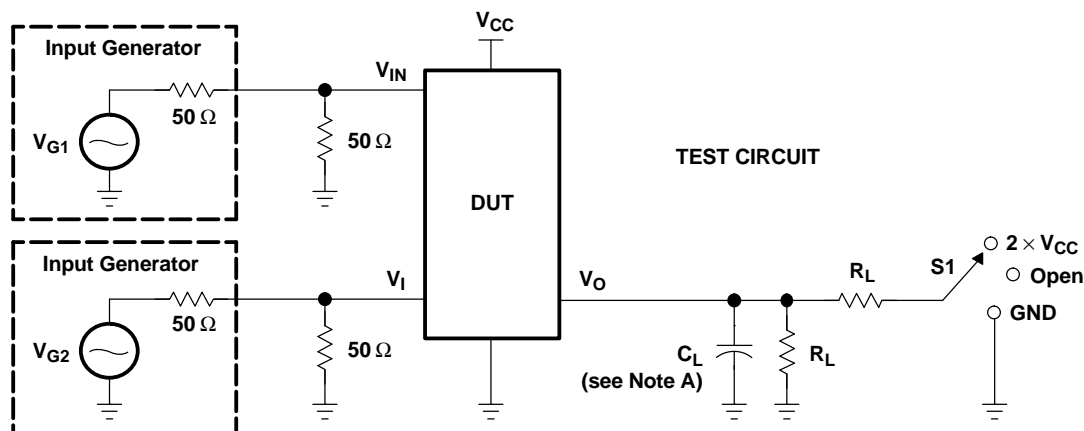
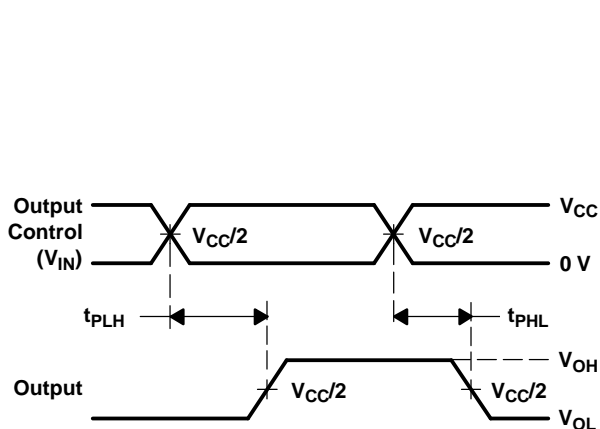


Figure 2. Typical  $I_{CC}$  vs  $\overline{OE}$  Switching Frequency

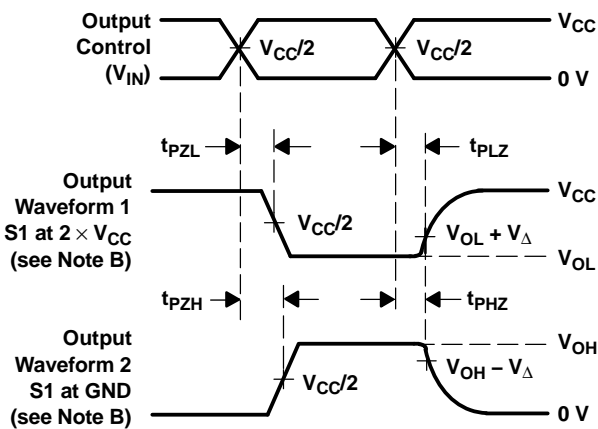
## PARAMETER MEASUREMENT INFORMATION



TEST	V <sub>CC</sub>	S1	R <sub>L</sub>	V <sub>I</sub>	C <sub>L</sub>	V <sub>Δ</sub>
t <sub>pd(s)</sub>	2.5 V ± 0.2 V	Open	500 Ω	V <sub>CC</sub> or GND	30 pF	
	3.3 V ± 0.3 V	Open	500 Ω	V <sub>CC</sub> or GND	50 pF	
t <sub>PLZ</sub> /t <sub>PZL</sub>	2.5 V ± 0.2 V	2 × V <sub>CC</sub>	500 Ω	GND	30 pF	0.15 V
	3.3 V ± 0.3 V	2 × V <sub>CC</sub>	500 Ω	GND	50 pF	0.3 V
t <sub>PHZ</sub> /t <sub>PZH</sub>	2.5 V ± 0.2 V	GND	500 Ω	V <sub>CC</sub>	30 pF	0.15 V
	3.3 V ± 0.3 V	GND	500 Ω	V <sub>CC</sub>	50 pF	0.3 V



VOLTAGE WAVEFORMS  
PROPAGATION DELAY TIMES (t<sub>pd(s)</sub>)



VOLTAGE WAVEFORMS  
ENABLE AND DISABLE TIMES

- NOTES:
- C<sub>L</sub> includes probe and jig capacitance.
  - 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.
  - All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z<sub>O</sub> = 50 Ω, t<sub>r</sub> ≤ 2.5 ns, t<sub>f</sub> ≤ 2.5 ns.
  - The outputs are measured one at a time, with one transition per measurement.
  - t<sub>PLZ</sub> and t<sub>PZH</sub> are the same as t<sub>dis</sub>.
  - t<sub>PZL</sub> and t<sub>PZH</sub> are the same as t<sub>en</sub>.
  - t<sub>PLH</sub> and t<sub>PHL</sub> are the same as t<sub>pd(s)</sub>. The t<sub>pd</sub> propagation delay is the calculated RC time constant of the typical ON-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).
  - All parameters and waveforms are not applicable to all devices.

Figure 3. Test Circuit and Voltage Waveforms

## 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="#">SN74CB3Q3245DBQR</a>	Active	Production	SSOP (DBQ)   20	2500   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CB3Q3245
SN74CB3Q3245DBQR.B	Active	Production	SSOP (DBQ)   20	2500   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CB3Q3245
<a href="#">SN74CB3Q3245DGVR</a>	Active	Production	TVSOP (DGV)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BU245
SN74CB3Q3245DGVR.B	Active	Production	TVSOP (DGV)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BU245
SN74CB3Q3245DGVRG4	Active	Production	TVSOP (DGV)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BU245
SN74CB3Q3245DGVRG4.B	Active	Production	TVSOP (DGV)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BU245
<a href="#">SN74CB3Q3245PW</a>	Obsolete	Production	TSSOP (PW)   20	-	-	Call TI	Call TI	-40 to 85	BU245
<a href="#">SN74CB3Q3245PWR</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BU245
SN74CB3Q3245PWR.B	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	BU245
<a href="#">SN74CB3Q3245RGYR</a>	Active	Production	VQFN (RGY)   20	3000   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	BU245
SN74CB3Q3245RGYR.B	Active	Production	VQFN (RGY)   20	3000   LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	BU245

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **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.

<sup>(3)</sup> **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

<sup>(4)</sup> **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.

<sup>(5)</sup> **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.

<sup>(6)</sup> **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
SN74CB3Q3245DBQR	SSOP	DBQ	20	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74CB3Q3245DGVR	TVSOP	DGV	20	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74CB3Q3245DGVRG4	TVSOP	DGV	20	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74CB3Q3245PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1
SN74CB3Q3245RGYR	VQFN	RGY	20	3000	330.0	12.4	3.71	4.71	1.1	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)
SN74CB3Q3245DBQR	SSOP	DBQ	20	2500	353.0	353.0	32.0
SN74CB3Q3245DGVR	TVSOP	DGV	20	2000	353.0	353.0	32.0
SN74CB3Q3245DGVRG4	TVSOP	DGV	20	2000	353.0	353.0	32.0
SN74CB3Q3245PWR	TSSOP	PW	20	2000	353.0	353.0	32.0
SN74CB3Q3245RGYR	VQFN	RGY	20	3000	353.0	353.0	32.0



## PACKAGE OUTLINE

## TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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.

# EXAMPLE BOARD LAYOUT

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



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.

## EXAMPLE STENCIL DESIGN

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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

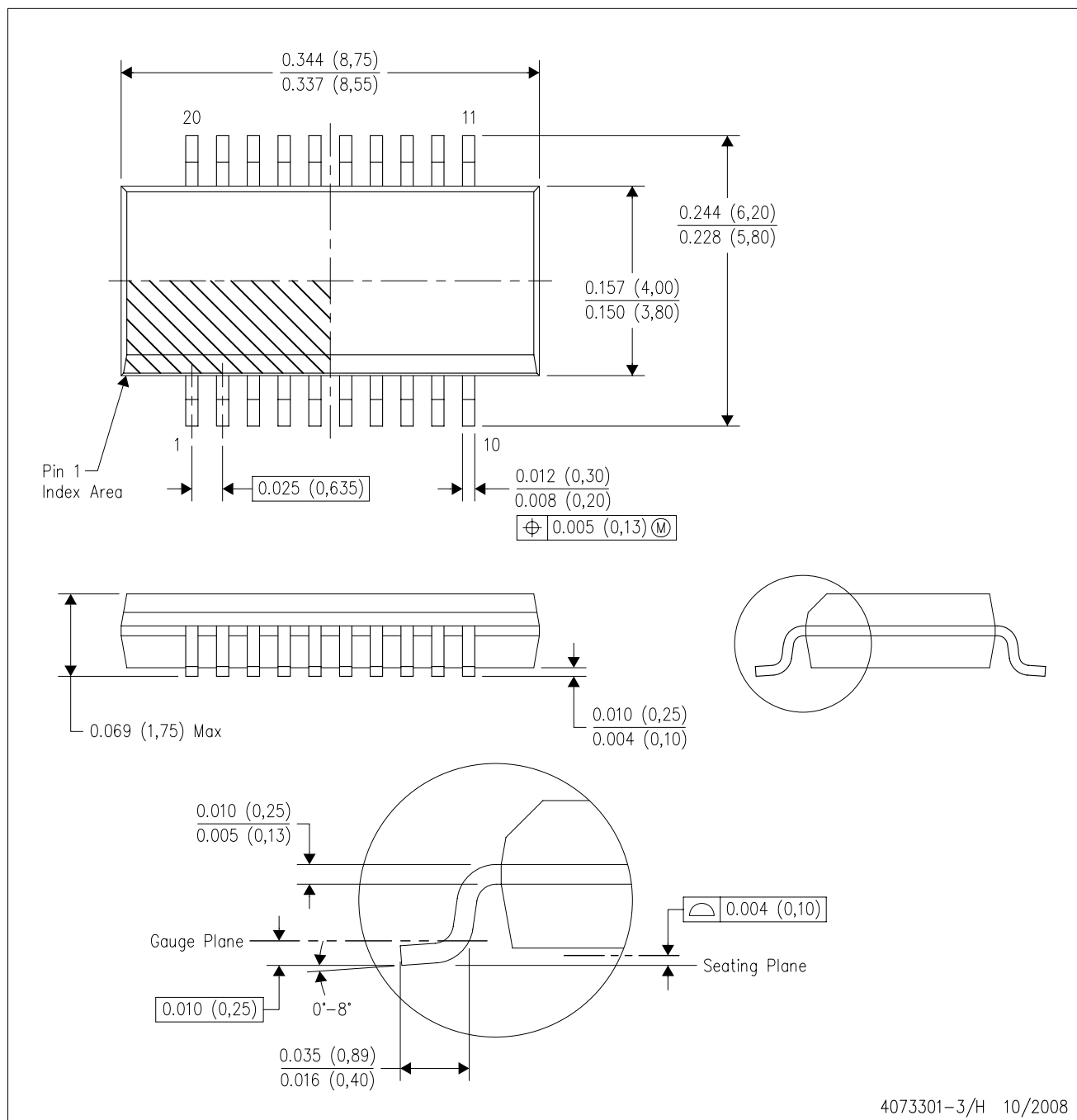
4220206/A 02/2017

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.

DBQ (R-PDSO-G20)

PLASTIC SMALL-OUTLINE PACKAGE



4073301-3/H 10/2008

- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15) per side.
  - Falls within JEDEC MO-137 variation AD.

## DGV (R-PDSO-G\*\*)

## PLASTIC SMALL-OUTLINE

24 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 per side.  
 D. Falls within JEDEC: 24/48 Pins – MO-153  
 14/16/20/56 Pins – MO-194



## GENERIC PACKAGE VIEW

**RGY 20**

**VQFN - 1 mm max height**

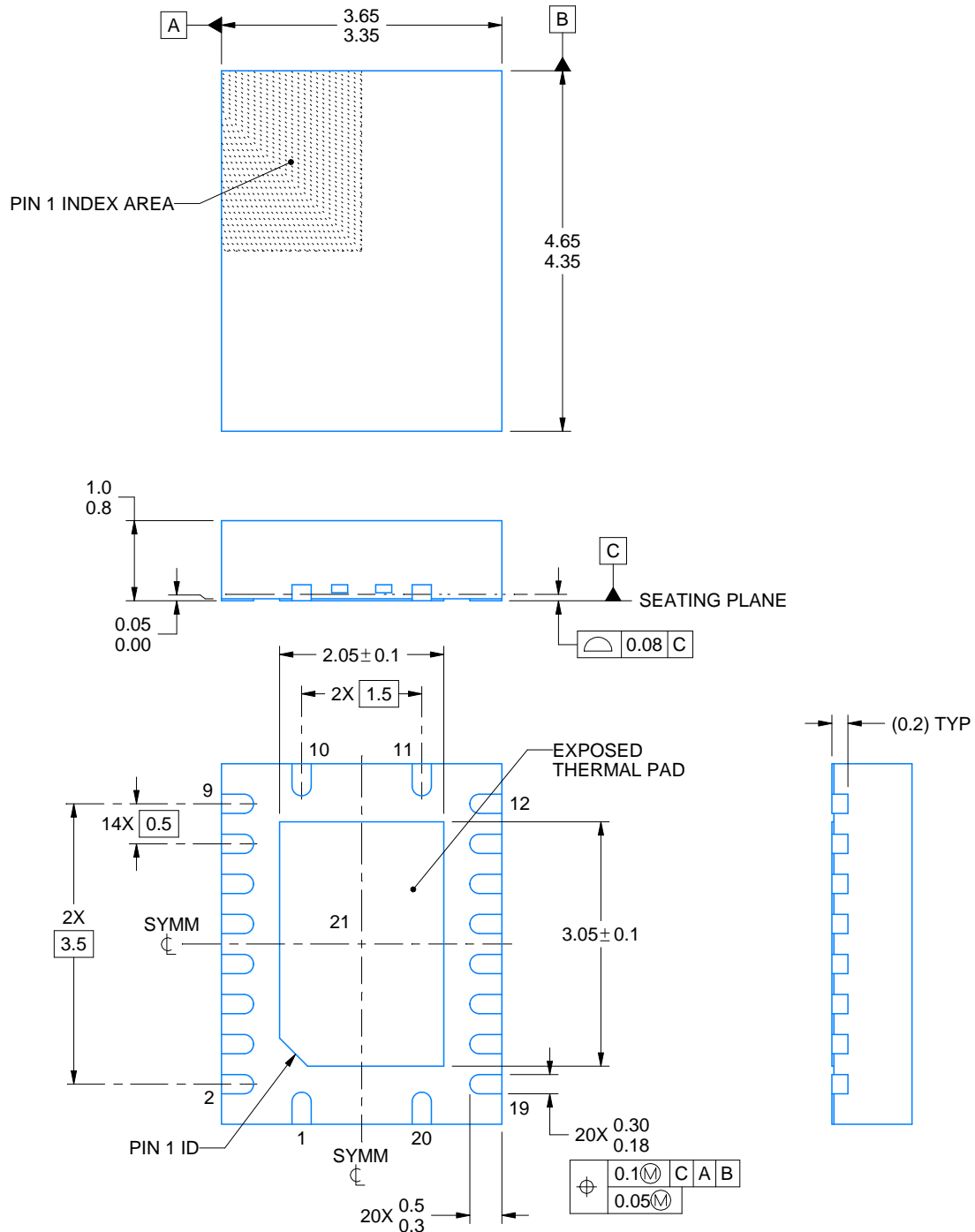
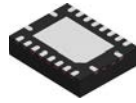
3.5 x 4.5, 0.5 mm pitch

PLASTIC QUAD FGLATPACK - NO LEAD

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



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NOTES:

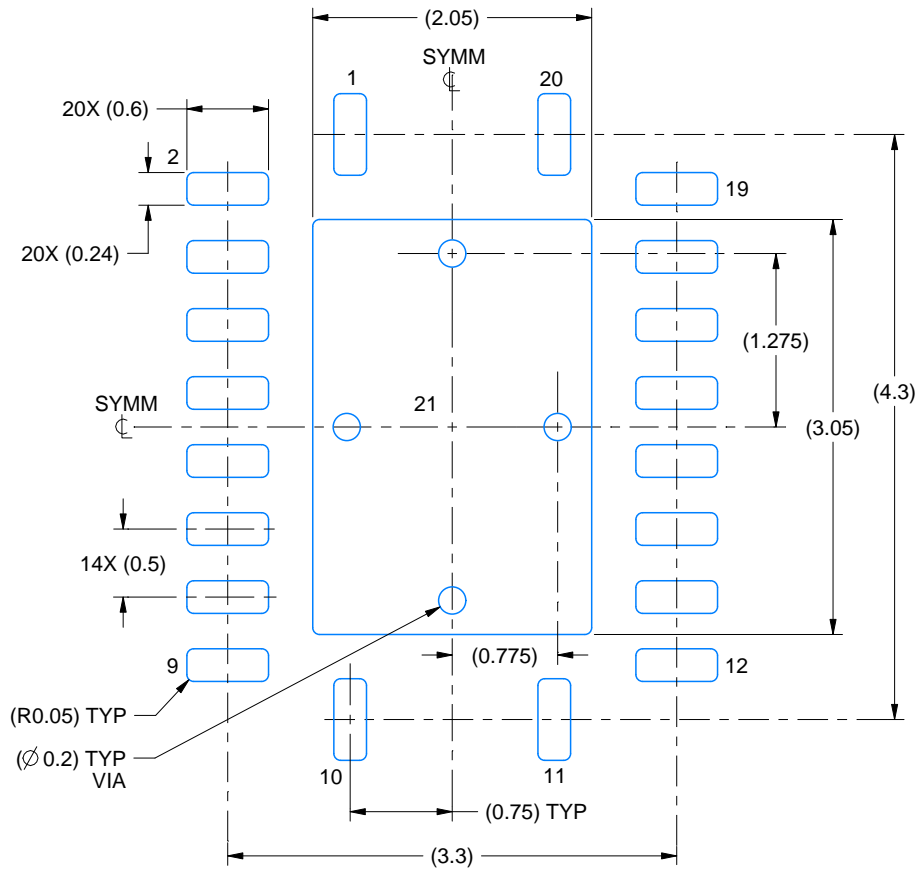
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

# EXAMPLE BOARD LAYOUT

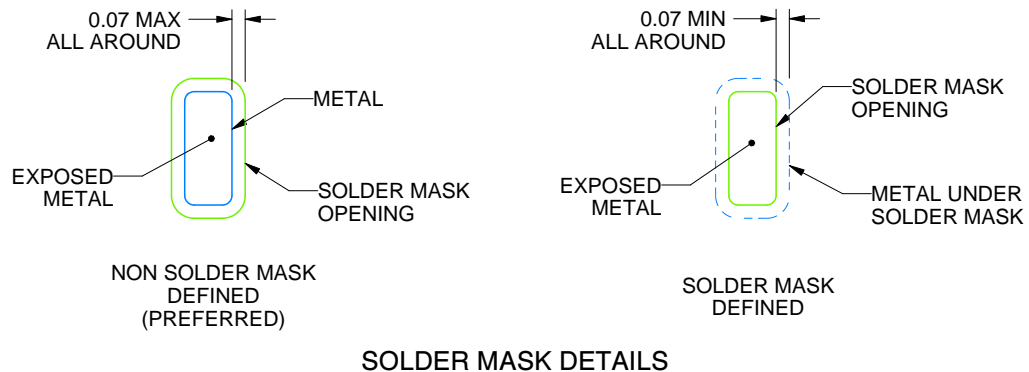
RGY0020A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:18X



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NOTES: (continued)

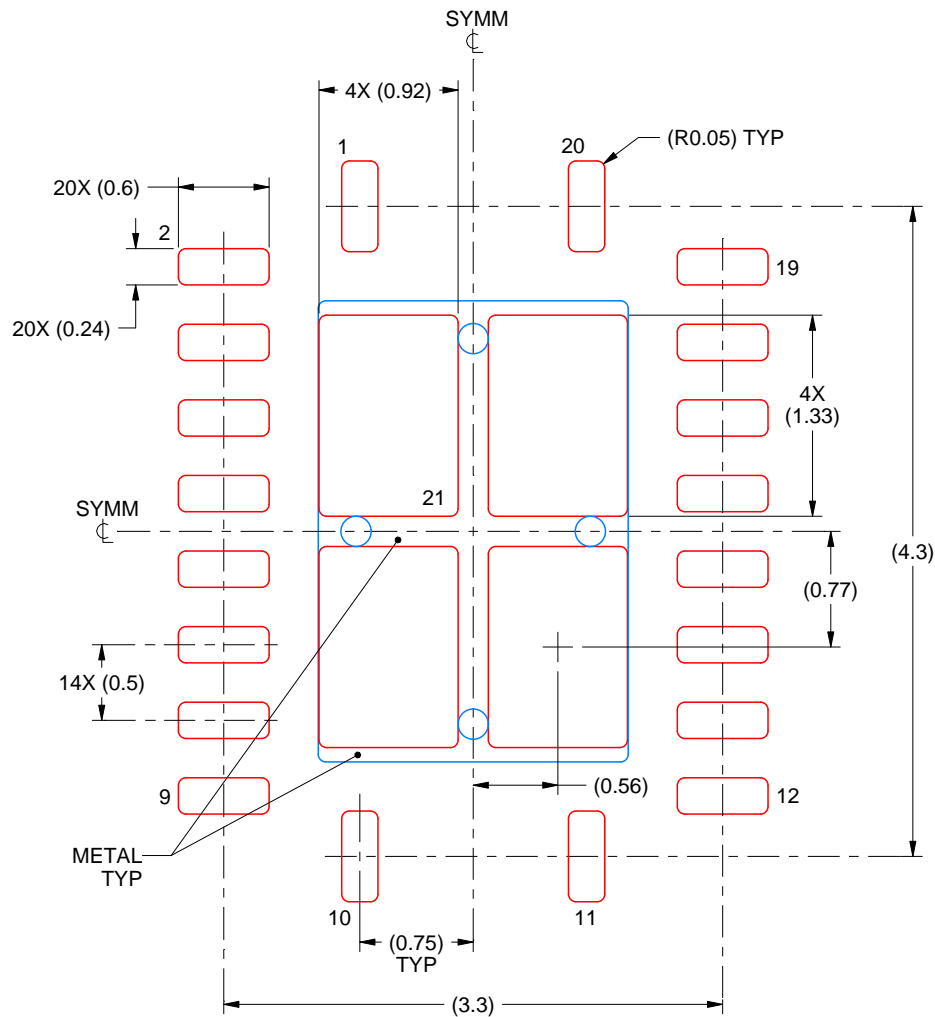
- This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/slua271](http://www.ti.com/lit/slua271)).
- Vias are optional depending on application, refer to device data sheet. If any vias are implemented,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

# EXAMPLE STENCIL DESIGN

RGY0020A

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



**SOLDER PASTE EXAMPLE**  
 BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD 21  
 78% PRINTED SOLDER COVERAGE BY AREA UNDER PACKAGE  
 SCALE:20X

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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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