

SN74CBTLV3253 Low-Voltage Dual 1-of-4 FET Multiplexer/Demultiplexer

1 Features

- Functionally Equivalent to QS3253
- 5Ω Switch Connection Between Two Ports
- Rail-to-Rail Switching on Data I/O Ports
- I_{off} Supports Partial-Power-Down Mode Operation
- Latch-Up Performance Exceeds 100mA Per JESD 78, Class II

2 Applications

- [Datacenter and enterprise computing](#)
- [Broadband fixed line access](#)
- [Building automation](#)
- [Wired networking](#)
- [Motor drives](#)
- Video Broadcasting: IP-Based Multi-Format Transcoders
- Video Communications Systems

3 Description

The SN74CBTLV3253 device is a dual 1-of-4 high-speed FET multiplexer and demultiplexer. The low ON-state resistance of the switch allows connections to be made with minimal propagation delay.

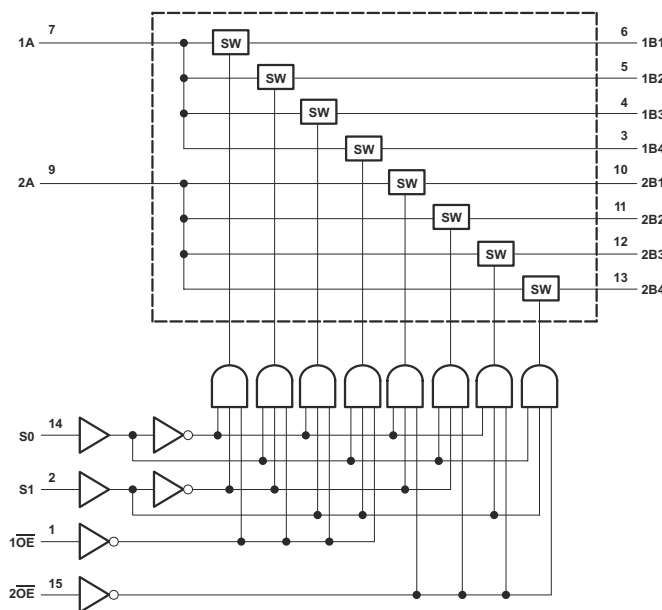
The select (S0, S1) inputs control the data flow. The FET multiplexers/demultiplexers are disabled when the associated output-enable ($\overline{OE}$) input is high.

The SN74CBTLV3253 device is fully specified for partial-power-down applications using I_{off} . The I_{off} feature ensures that damaging current cannot backflow through the device when it is powered down. The device has isolation during power off.

Package Information

PART NUMBER	PACKAGE ⁽¹⁾	PACKAGE SIZE
SN74CBTLV3253D	SOIC (16)	9.90mm × 3.90mm
SN74CBTLV3253DBQ	SSOP (16)	4.90mm × 3.90mm
SN74CBTLV3253DGV	TVSOP (16)	3.60mm × 4.40mm
SN74CBTLV3253RGY	VQFN (16)	4.00mm × 3.50mm
SN74CBTLV3253PW	TSSOP (16)	5.00mm × 4.40mm
SN74CBTLV3253DYY	SOT (16)	4.20mm × 2.00mm
SN74CBTLV3253BQB	WQFN (16)	3.50mm × 2.50mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.



Logic Diagram (Positive Logic)



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4 Pin Configuration and Functions

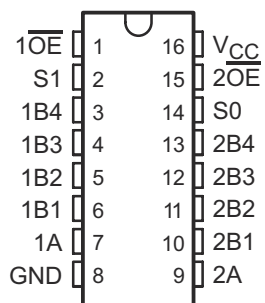


Figure 4-1. D, DBQ, DGV, PW or DYY Package 16-Pin SOIC, SSOP, TVSOP, TSSOP or SOT Top View

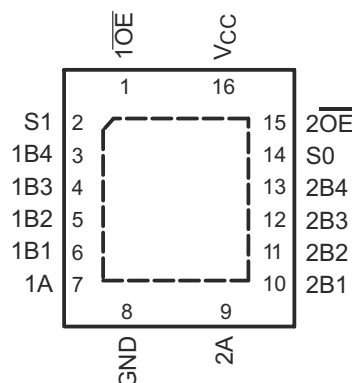


Figure 4-2. RGY or BQB Package 16-Pin VQFN Top View

Table 4-1. Pin Functions

PIN		Type	DESCRIPTION
NAME	NO.		
1 $\overline{OE}$	1	I	Output Enable 1 Active-Low
S1	2	I	Select Pin 1
1B4	3	I/O	Channel 1 I/O 4
1B3	4	I/O	Channel 1 I/O 3
1B2	5	I/O	Channel 1 I/O 2
1B1	6	I/O	Channel 1 I/O 1
1A	7	I/O	Channel 1 common
GND	8	—	Ground
2A	9	I/O	Channel 2 common
2B1	10	I/O	Channel 2 I/O 1
2B2	11	I/O	Channel 2 I/O 2
2B3	12	I/O	Channel 2 I/O 3
2B4	13	I/O	Channel 2 I/O 4
S0	14	I	Select Pin 0
2 $\overline{OE}$	15	I	Output Enable 2 Active-Low
V _{CC}	16	—	Power

5 Specifications

5.1 Absolute Maximum Ratings

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

			MIN	MAX	UNIT
V _{CC}	Supply voltage		−0.5	4.6	V
V _{IN}	Control input voltage ⁽²⁾		−0.5	4.6	V
V _{I/O}	Switch I/O voltage ⁽²⁾		−0.5	4.6	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
	Continuous current through V _{CC} or GND			±128	mA
T _J	Junction temperature			150	°C
T _{stg}	Storage temperature		−65	150	°C

(1) Operation outside the Absolute Maximum Ratings may cause permanent device damage. Absolute Maximum Ratings do not imply functional operation of the device at these or any other conditions beyond those listed under Recommended Operating Conditions. If used outside the Recommended Operating Conditions but within the Absolute Maximum Ratings, the device may not be fully functional, and this may affect device reliability, functionality, performance, and shorten the device lifetime.

(2) The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

5.2 ESD Ratings

			VALUE	UNIT
V _{ESD}	Electrostatic discharge	Human Body Model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins ⁽¹⁾	+2000	V
		Charged-Device Model (CDM), per JEDEC specification JESD22-C101, all pins ⁽²⁾	+1000	V

(1) JEDEC document JEP155 states that 500V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250V CDM allows safe manufacturing with a standard ESD control process.

5.3 Recommended Operating Conditions

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

			MIN	MAX	UNIT
V _{CC}	Supply voltage		2.3	3.6	V
V _{IH}	High-level control input voltage	V _{CC} = 2.3V to 2.7V	1.7		V
		V _{CC} = 2.7V to 3.6V	2		
V _{IL}	Low-level control input voltage	V _{CC} = 2.3V to 2.7V		0.7	V
		V _{CC} = 2.7V to 3.6V		0.8	
T _A	Operating free-air temperature	PKG = RGY, DBQ, D, PW, DGV	−40	85	°C
T _A	Operating free-air temperature	PKG = BQB, DYY	−40	125	°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 [Implications of Slow or Floating CMOS Inputs](#) application note.

5.4 Thermal Information

THERMAL METRIC ⁽¹⁾	SN74CBTLV3253							UNIT
	D (SOIC)	DBQ (SSOP)	DGV (TVSO P)	PW (TSSOP)	RGY (VQFN)	DYY (SOT)	BQB (WQFN)	
	16 PINS	16 PINS	16 PINS	16 PINS	16 PINS	16 PINS	16 PINS	
$R_{\theta JA}$ Junction-to-ambient thermal resistance	102.5	116.6	123.1	129.1	78.4	129.9	88.1	°C/W
$R_{\theta JC(top)}$ Junction-to-case (top) thermal resistance	65.4	70	48.7	67	52.5	78.4	58.3	°C/W
$R_{\theta JB}$ Junction-to-board thermal resistance	65.2	75	54.9	87.1	21.74	73.3	17.0	°C/W
ψ_{JT} Junction-to-top characterization parameter	25.5	17	5.2	14.5	52.5	17.2	58.3	°C/W
ψ_{JB} Junction-to-board characterization parameter	64.6	74.1	54.3	86.3	76.6	72.4	85.1	°C/W
$R_{\theta JC(bot)}$ Junction-to-case (bottom) thermal resistance	n/a	n/a	n/a	n/a	37.3	n/a	37.5	°C/W

(1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC Package Thermal Metrics](#) application note.

5.5 Electrical Characteristics - D, DBQ, DGV, PW and RGY only

over recommended operating free-air temperature range -40 to 85°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP ⁽¹⁾	MAX	UNIT
V_{IK}		$V_{CC} = 3V$,	$I_I = -18mA$			-1.2	V
I_I		$V_{CC} = 3.6V$,	$V_I = V_{CC}$ or GND			±1	µA
I_{off}		$V_{CC} = 0$,	V_I or $V_O = 0$ to 3.6V			15	µA
I_{CC}		$V_{CC} = 3.6V$,	$I_O = 0$,			10	µA
ΔI_{CC} ⁽²⁾	Control inputs	$V_{CC} = 3.6V$,	One input at 3V,			300	µA
C_i	Control inputs	$V_I = 3V$ or 0				3	pF
$C_{io(OFF)}$	A port	$V_O = 3V$ or 0,	$\overline{OE} = V_{CC}$			20.5	pF
	B port					5.5	
r_{on} ⁽³⁾	$V_{CC} = 2.3V$, TYP at $V_{CC} = 2.5V$	$V_I = 0$	$I_I = 64mA$			5	8
			$I_I = 24mA$			5	8
		$V_I = 1.7V$,	$I_I = 15mA$			27	40
	$V_{CC} = 3V$	$V_I = 0$	$I_I = 64mA$			5	7
			$I_I = 24mA$			5	7
		$V_I = 2.4V$,	$I_I = 15mA$			10	15

(1) All typical values are at $V_{CC} = 3.3V$ (unless otherwise noted), $T_A = 25^\circ C$.

(2) This is the increase in supply current for each input that is at the specified voltage level, rather than V_{CC} or GND.

(3) Measured by the voltage drop between the A and the 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.

5.6 Electrical Characteristics - DYY and BQB Package only

over recommended operating free-air temperature range -40 to 125°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP ⁽¹⁾	MAX	UNIT
V_{IK}		$V_{CC} = 3V$,	$I_I = -18mA$			-1.2	V
I_I		$V_{CC} = 3.6V$,	$V_I = V_{CC}$ or GND			±1	μA
I_{off}		$V_{CC} = 0$,	V_I or $V_O = 0$ to 3.6V			20	μA
I_{CC}		$V_{CC} = 3.6V$,	$I_O = 0$,			10	μA
ΔI_{CC} ⁽²⁾	Control inputs	$V_{CC} = 3.6V$,	One input at 3V,			300	μA
			Other inputs at V_{CC} or GND				
C_i	Control inputs	$V_I = 3V$ or 0			3		pF
$C_{io(OFF)}$	A port	$V_O = 3V$ or 0,	$\overline{OE} = V_{CC}$		20.5		pF
	B port				5.5		
r_{on} ⁽³⁾		$V_{CC} = 2.3V$, TYP at $V_{CC} = 2.5V$	$V_I = 0$	$I_I = 64mA$	5	10	Ω
				$I_I = 24mA$	5	10	
			$V_I = 1.7V$,	$I_I = 15mA$	27	40	
		$V_{CC} = 3V$	$V_I = 0$	$I_I = 64mA$	5	9	
				$I_I = 24mA$	5	9	
			$V_I = 2.4V$,	$I_I = 15mA$	10	20	

(1) All typical values are at $V_{CC} = 3.3V$ (unless otherwise noted), $T_A = 25^\circ C$.

(2) This is the increase in supply current for each input that is at the specified voltage level, rather than V_{CC} or GND.

(3) Measured by the voltage drop between the A and the 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.

5.7 Switching Characteristics - D, DBQ, DGV, PW and RGY only

over recommended operating free-air temperature range -40 to 85°C (unless otherwise noted) (see Figure 6-1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 2.5V$ $\pm 0.2V$		$V_{CC} = 3.3V$ $\pm 0.3V$		UNIT
			MIN	MAX	MIN	MAX	
t_{pd}	A or B ⁽¹⁾	B or A		0.15		0.25	ns
	S	A or B	1	6.8	1	5.5	
t_{en}	S	A or B	1	4.3	1	4	ns
t_{dis}	S	A or B	1	5.1	1	5.5	ns
t_{en}	$\overline{OE}$	A or B	1	5	1	4.8	ns
t_{dis}	$\overline{OE}$	A or B	1	5.5	1	5.4	ns

(1) 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).

5.8 Switching Characteristics - DYY and BQB Package only

over recommended operating free-air temperature range -40 to 125°C (unless otherwise noted) (see [Figure 6-1](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 3.3V \pm 0.3V$		UNIT
			MIN	MAX	MIN	MAX	
t_{pd}	A or B ⁽¹⁾	B or A		3.1		1.7	ns
	S	A or B	1	6.8	1	5.5	
t_{en}	S	A or B	1	6.8	1	6.8	ns
t_{dis}	S	A or B	1	7	1	7	ns
t_{en}	$\overline{OE}$	A or B	1	6.5	1	6	ns
t_{dis}	$\overline{OE}$	A or B	1	6.5	1	6	ns

5.9 Typical Characteristics

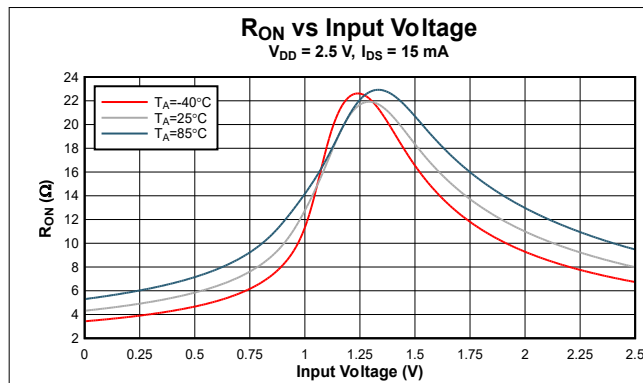


Figure 5-1. $V_{DD} = 2.5V$, $I_{DS} = 15mA$

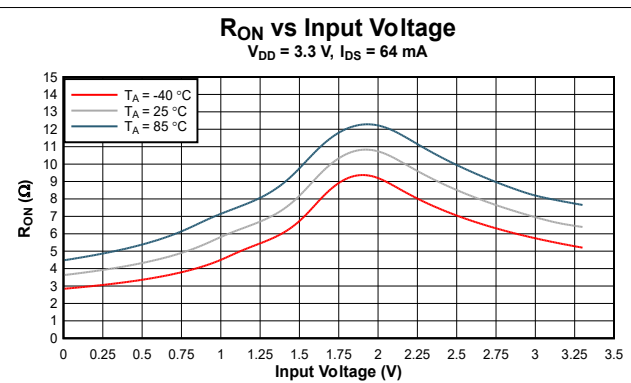


Figure 5-2. $V_{DD} = 3.3V$, $I_{DS} = 64mA$

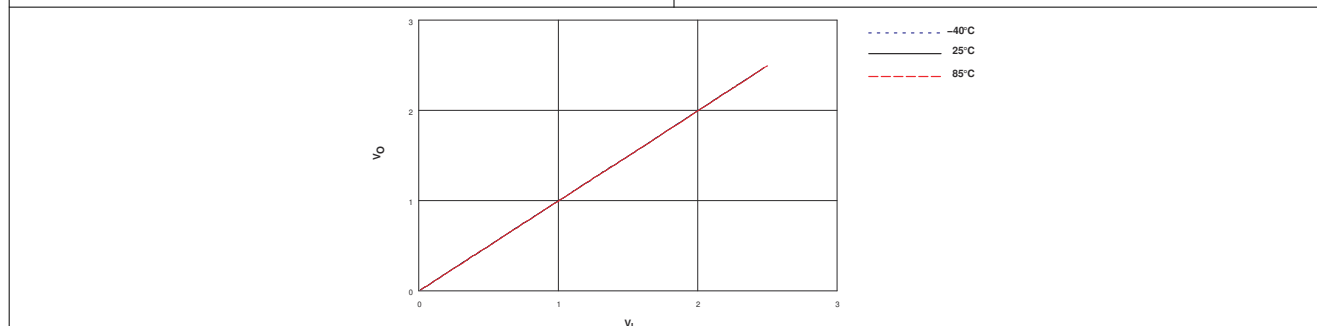
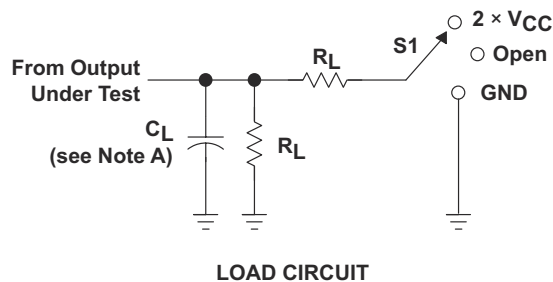


Figure 5-3. V_O vs V_I , $V_{CC} = 2.5V$

6 Parameter Measurement Information



TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$
t_{PHZ}/t_{PZH}	GND

V_{CC}	C_L	R_L	V_{Δ}
$2.5 \text{ V} \pm 0.2 \text{ V}$	30 pF	500 Ω	0.15 V
$3.3 \text{ V} \pm 0.3 \text{ V}$	50 pF	500 Ω	0.3 V

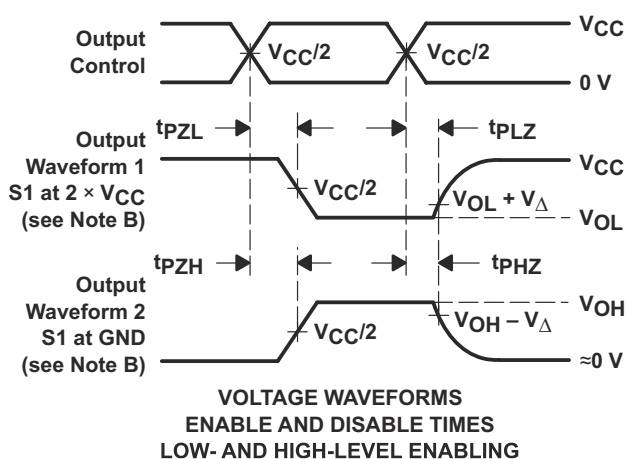
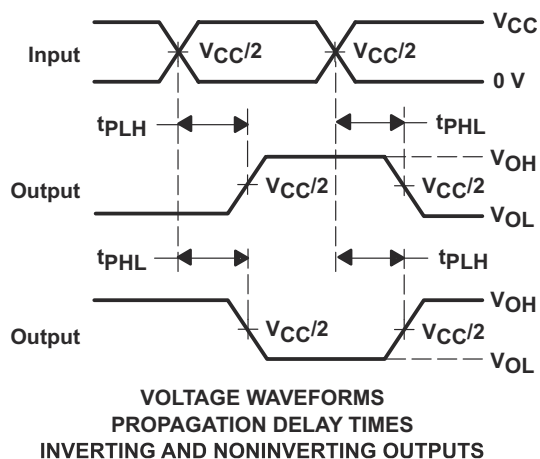
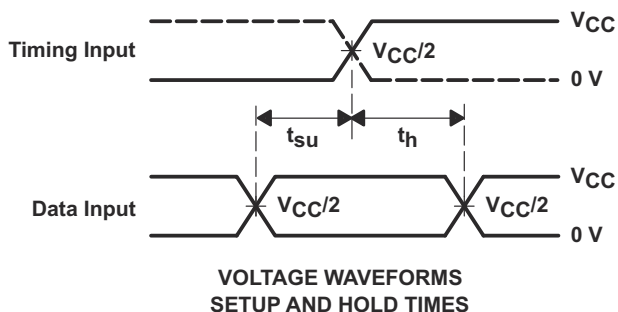
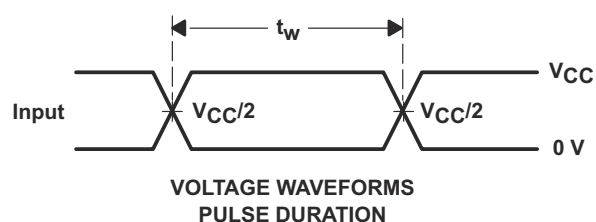


Figure 6-1. Test Circuit and Voltage Waveforms

7 Detailed Description

7.1 Overview

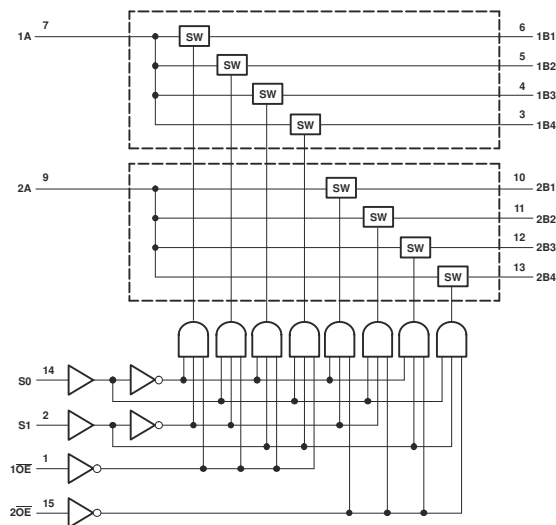
The SN74CBTLV3253 device is a dual 1-of-4 high-speed FET multiplexer/demultiplexer. The low ON-state resistance of the switch allows connections to be made with minimal propagation delay.

The select (S0, S1) inputs control the data flow. The FET multiplexers and demultiplexers are disabled when the associated output-enable ($\overline{OE}$) input is high.

The SN74CBTLV3253 device is fully specified for partial-power-down applications using I_{off} . The I_{off} feature ensures that damaging current will not 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.

7.2 Functional Block Diagram



7.3 Feature Description

The SN74CBTLV3253 device is functionally equivalent to the QS3253 and has a 5Ω switch connection between two ports. The device also has rail-to-rail switching on data I/O ports as well as I_{off} supporting partial-power-down mode operation.

7.4 Device Functional Modes

Table 7-1 lists the functional modes of the SN74CBTLV3253.

**Table 7-1. Function Table
(Each Multiplexer/Demultiplexer)**

INPUTS			FUNCTION
$\overline{OE}$	S1	S0	
L	L	L	A port = B1 port
L	L	H	A port = B2 port
L	H	L	A port = B3 port
L	H	H	A port = B4 port
H	X	X	Disconnect

8 Application and Implementation

Note

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

8.1 Application Information

The SN74CBTLV3253 can be used to multiplex and demultiplex up to 2 channels simultaneously in a 4:1 configuration. The application shown here is a 2-bit bus being multiplexed between two devices. the $\overline{OE}$ and S pins are used to control the chip from the bus controller. This is a very generic example, and could apply to many situations.

8.2 Typical Application

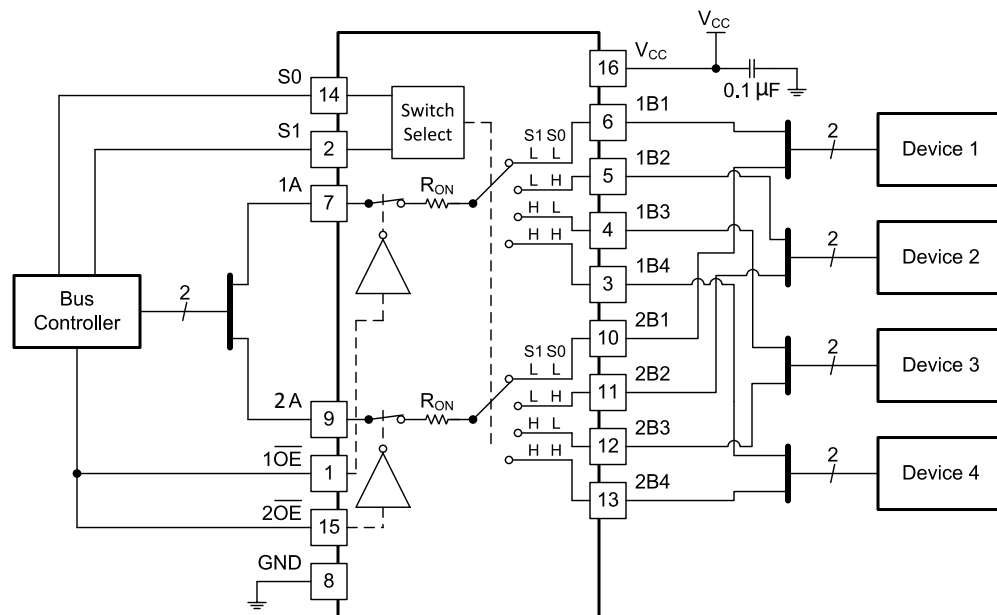


Figure 8-1. Typical Application of the SN74CBTLV3253

8.2.1 Design Requirements

The 0.1μF capacitor should be placed as close as possible to the device.

8.2.2 Detailed Design Procedure

- Recommended Input Conditions:
 - For specified high and low levels, see V_{IH} and V_{IL} in [Section 5.3](#).
 - Inputs and outputs are overvoltage tolerant allowing them to go as high as 4.6V at any valid V_{CC} .
- Recommended Output Conditions:
 - Load currents must not exceed $\pm 128\text{mA}$ per channel.
- Frequency Selection Criterion:
 - Added trace resistance/capacitance can reduce maximum frequency capability; use layout practices as directed in [Section 10](#).

8.2.3 Application Curve

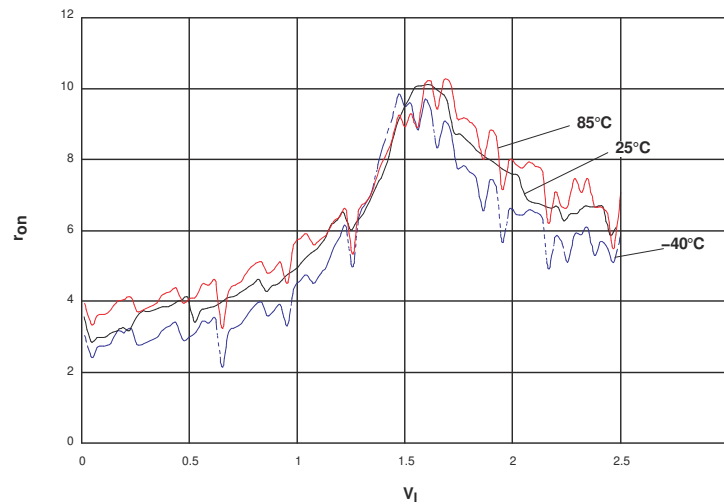


Figure 8-2. r_{on} vs V_I , $V_{CC} = 2.5V$

9 Power Supply Recommendations

The power supply can be any voltage between the minimum and maximum supply voltage rating listed in the [Section 5.3](#) table.

Each V_{CC} terminal should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, a 0.1μF bypass capacitor is recommended. If multiple pins are labeled V_{CC} , then a 0.01μF or 0.022μF capacitor is recommended for each V_{CC} because the V_{CC} pins are tied together internally. For devices with dual-supply pins operating at different voltages, for example V_{CC} and V_{DD} , a 0.1μF bypass capacitor is recommended for each supply pin. To reject different frequencies of noise, use multiple bypass capacitors in parallel. Capacitors with values of 0.1μF and 1μF are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results.

10 Layout

10.1 Layout Guidelines

Reflections and matching are closely related to the loop antenna theory but are different enough to be discussed separately from the theory. When a PCB trace turns a corner at a 90° angle, a reflection can occur. A reflection occurs primarily because of the change of width of the trace. At the apex of the turn, the trace width increases to 1.414 times the width. This increase upsets the transmission-line characteristics, especially the distributed capacitance and self-inductance of the trace which results in the reflection. Not all PCB traces can be straight and therefore some traces must turn corners. [Figure 10-1](#) shows progressively better techniques of rounding corners. Only the last example (BEST) maintains constant trace width and minimizes reflections.

10.2 Layout Example

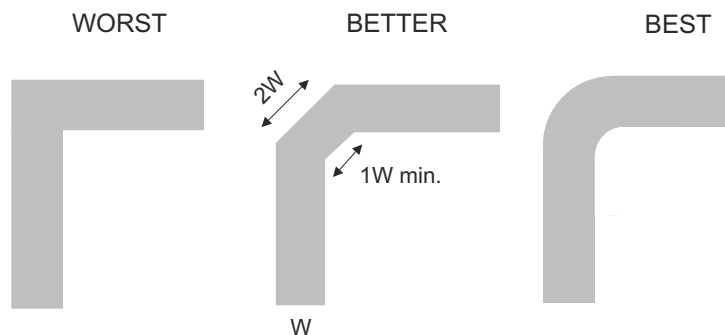


Figure 10-1. Trace Example

11 Device and Documentation Support

11.1 Documentation Support

11.1.1 Related Documentation

- Texas Instruments, [Implications of Slow or Floating CMOS Inputs](#)

11.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](#). Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

11.3 Trademarks

All trademarks are the property of their respective owners.

11.4 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

11.5 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

12 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision J (January 2018) to Revision K (July 2026)	Page
• Added New Packages with 125°C capability	4
• Updated Thermal ratings.....	5
• Added Electrical Specification section for new package.....	6
• Added Switching Specification section for new package	7
• Added Typical Curves	7

Changes from Revision I (February 2014) to Revision J (January 2018)	Page
• Changed the <i>Thermal Information</i> table.....	5

Changes from Revision H (February 2014) to Revision I (September 2015)	Page
• Added <i>Applications</i> section, <i>Device Information</i> table, <i>Pin Configuration and Functions</i> section, <i>ESD Ratings</i> table, <i>Feature Description</i> section, <i>Device Functional Modes</i> , <i>Application and Implementation</i> section, <i>Power Supply Recommendations</i> section, <i>Layout</i> section, <i>Device and Documentation Support</i> section, and <i>Mechanical, Packaging, and Orderable Information</i> section	1

Changes from Revision G (February 2014) to Revision H (February 2014)	Page
• Updated data sheet – no specific changes	1

Changes from Revision F (July 2012) to Revision G (February 2014)	Page
• Deleted <i>Ordering Information</i> table.....	1

13 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.

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)
74CBTLV3253DGVRG4	Active	Production	TVSOP (DGV) 16	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL253
74CBTLV3253DGVRG4.B	Active	Production	TVSOP (DGV) 16	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL253
74CBTLV3253RGYRG4	Active	Production	VQFN (RGY) 16	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL253
74CBTLV3253RGYRG4.A	Active	Production	VQFN (RGY) 16	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL253
74CBTLV3253RGYRG4.B	Active	Production	VQFN (RGY) 16	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL253
SN74CBTLV3253D	Obsolete	Production	SOIC (D) 16	-	-	Call TI	Call TI	-40 to 85	CBTLV3253
SN74CBTLV3253DBQR	Active	Production	SSOP (DBQ) 16	2500 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL253
SN74CBTLV3253DBQR.A	Active	Production	SSOP (DBQ) 16	2500 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL253
SN74CBTLV3253DBQR.B	Active	Production	SSOP (DBQ) 16	2500 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL253
SN74CBTLV3253DGVR	Active	Production	TVSOP (DGV) 16	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL253
SN74CBTLV3253DGVR.B	Active	Production	TVSOP (DGV) 16	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL253
SN74CBTLV3253DR	Active	Production	SOIC (D) 16	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBTLV3253
SN74CBTLV3253DR.A	Active	Production	SOIC (D) 16	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBTLV3253
SN74CBTLV3253DR.B	Active	Production	SOIC (D) 16	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBTLV3253
SN74CBTLV3253PW	Obsolete	Production	TSSOP (PW) 16	-	-	Call TI	Call TI	-40 to 85	CL253
SN74CBTLV3253PWR	Active	Production	TSSOP (PW) 16	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL253
SN74CBTLV3253PWR.A	Active	Production	TSSOP (PW) 16	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL253
SN74CBTLV3253PWR.B	Active	Production	TSSOP (PW) 16	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL253
SN74CBTLV3253RGYR	Active	Production	VQFN (RGY) 16	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL253
SN74CBTLV3253RGYR.A	Active	Production	VQFN (RGY) 16	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL253
SN74CBTLV3253RGYR.B	Active	Production	VQFN (RGY) 16	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL253

⁽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.

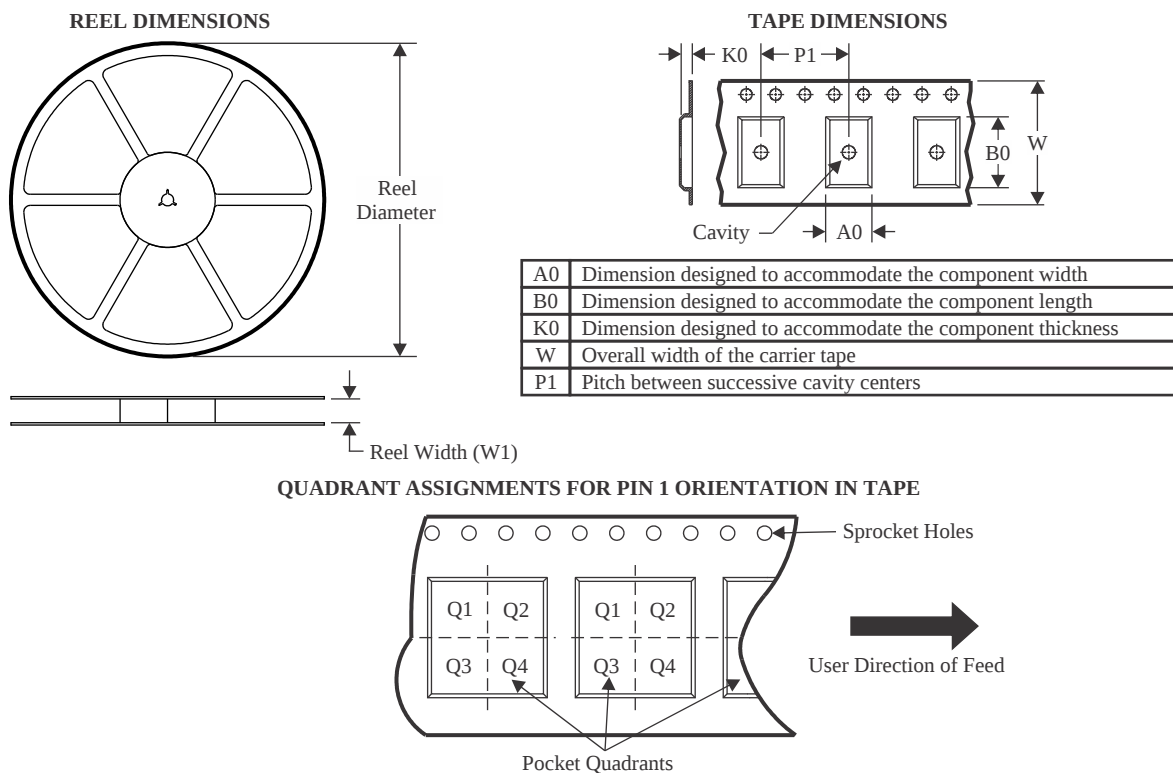
(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

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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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.

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
74CBTLV3253DGVRG4	TVSOP	DGV	16	2000	330.0	12.4	6.8	4.0	1.6	8.0	12.0	Q1
74CBTLV3253RGYRG4	VQFN	RGY	16	3000	330.0	12.4	3.8	4.3	1.5	8.0	12.0	Q1
SN74CBTLV3253DBQR	SSOP	DBQ	16	2500	330.0	12.5	6.4	5.2	2.1	8.0	12.0	Q1
SN74CBTLV3253DGVR	TVSOP	DGV	16	2000	330.0	12.4	6.8	4.0	1.6	8.0	12.0	Q1
SN74CBTLV3253DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74CBTLV3253PWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74CBTLV3253RGYR	VQFN	RGY	16	3000	330.0	12.4	3.8	4.3	1.5	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS

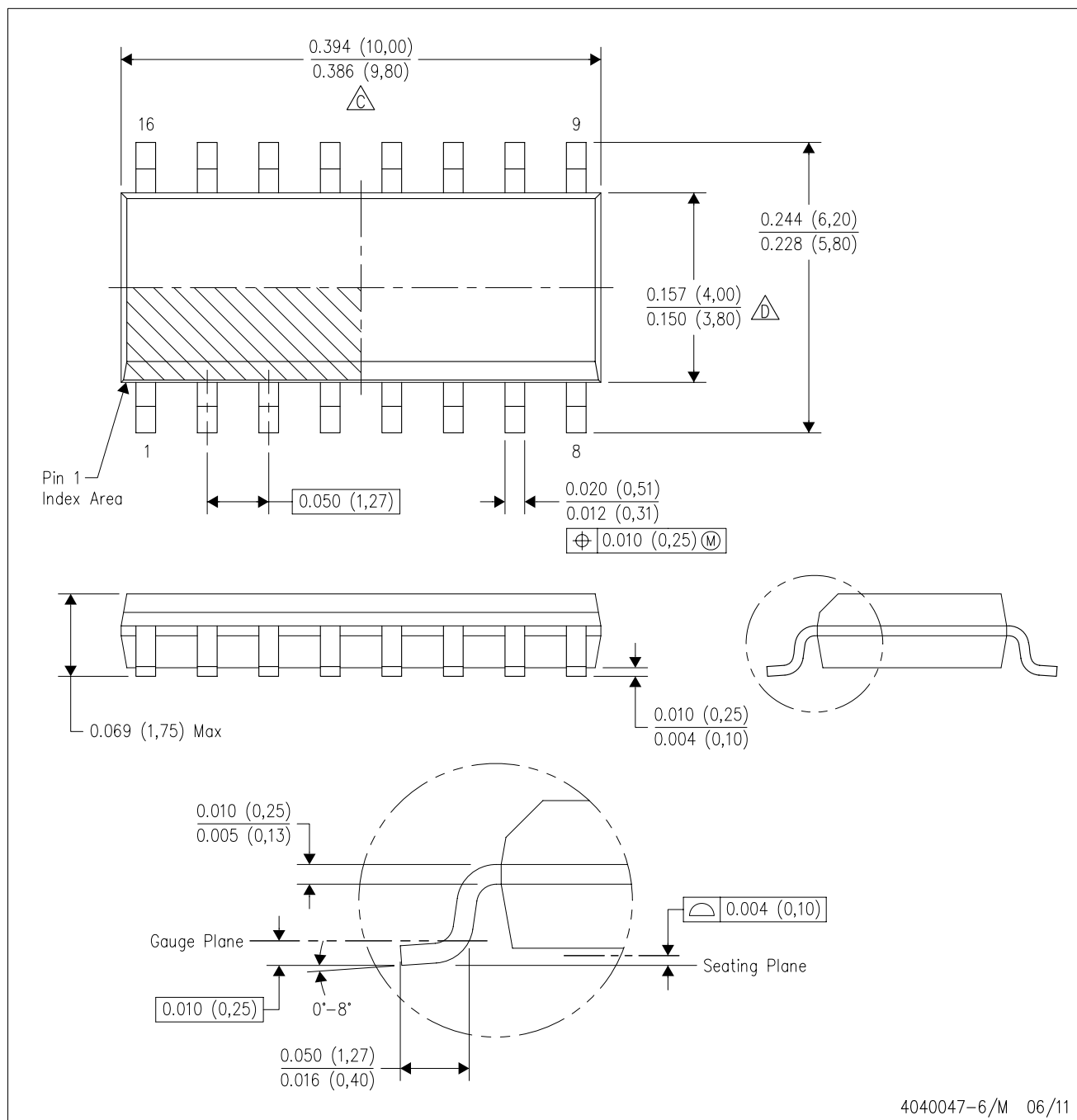


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
74CBTLV3253DGVRG4	TVSOP	DGV	16	2000	353.0	353.0	32.0
74CBTLV3253RGYRG4	VQFN	RGY	16	3000	353.0	353.0	32.0
SN74CBTLV3253DBQR	SSOP	DBQ	16	2500	353.0	353.0	32.0
SN74CBTLV3253DGVR	TVSOP	DGV	16	2000	353.0	353.0	32.0
SN74CBTLV3253DR	SOIC	D	16	2500	353.0	353.0	32.0
SN74CBTLV3253PWR	TSSOP	PW	16	2000	353.0	353.0	32.0
SN74CBTLV3253RGYR	VQFN	RGY	16	3000	353.0	353.0	32.0

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



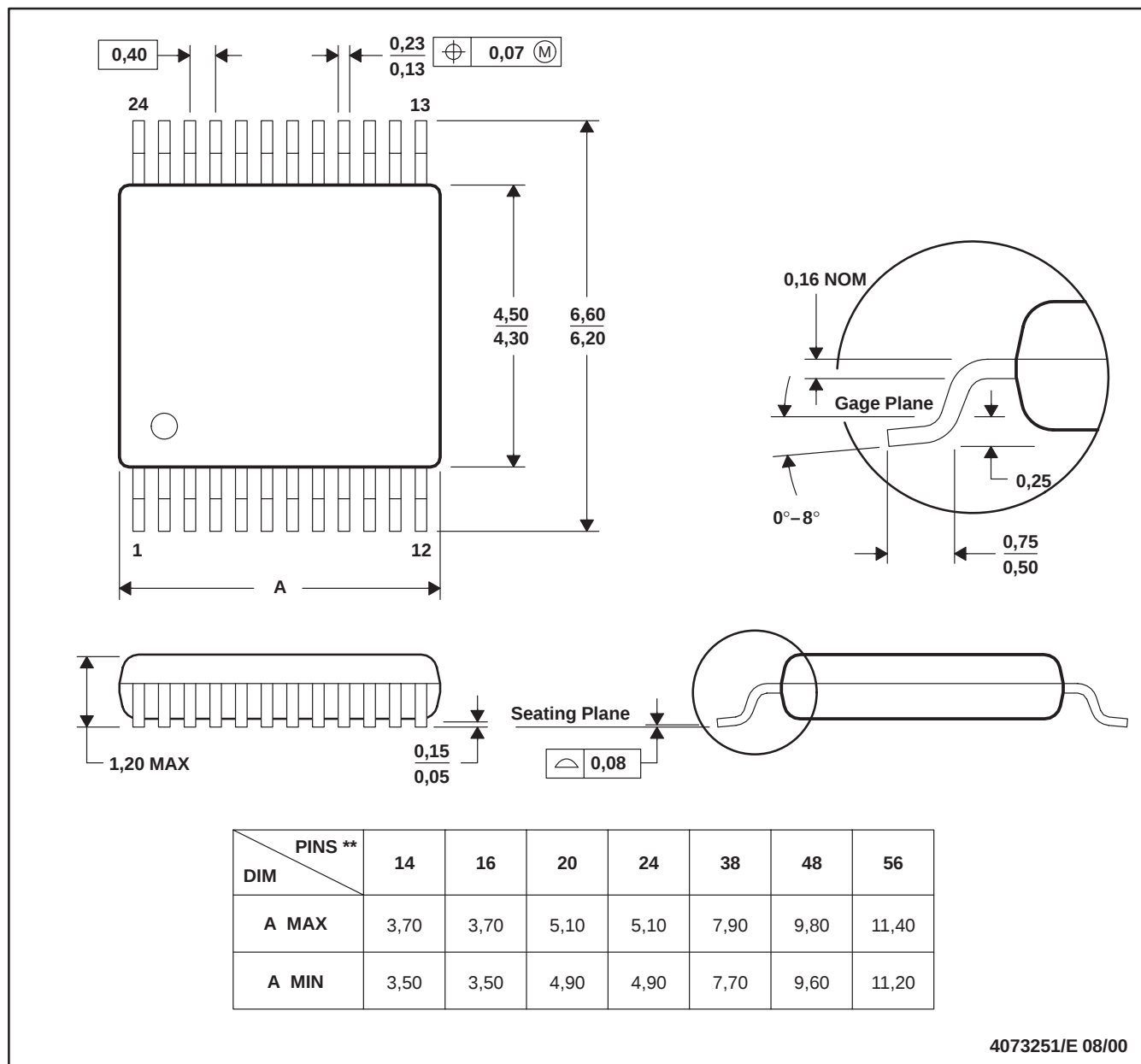
NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AC.

DGV (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

24 PINS SHOWN



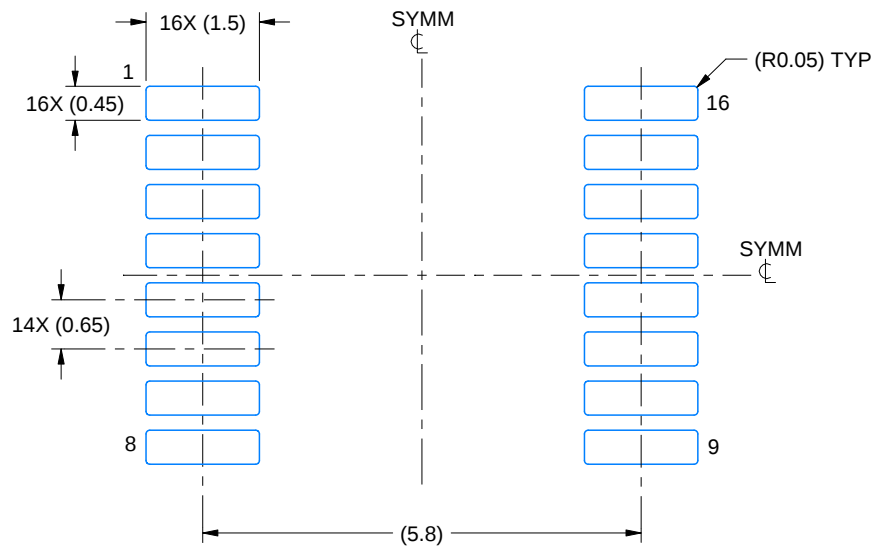
- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.
 D. Falls within JEDEC: 24/48 Pins – MO-153
 14/16/20/56 Pins – MO-194

EXAMPLE BOARD LAYOUT

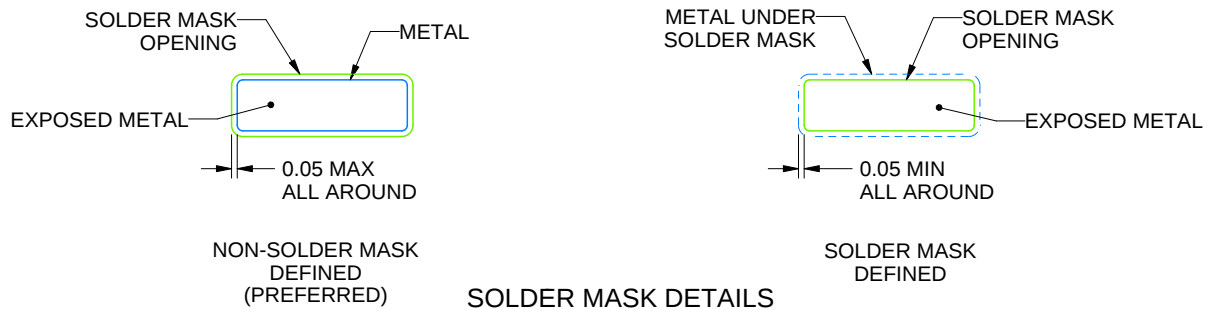
PW0016A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



4220204/B 12/2023

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

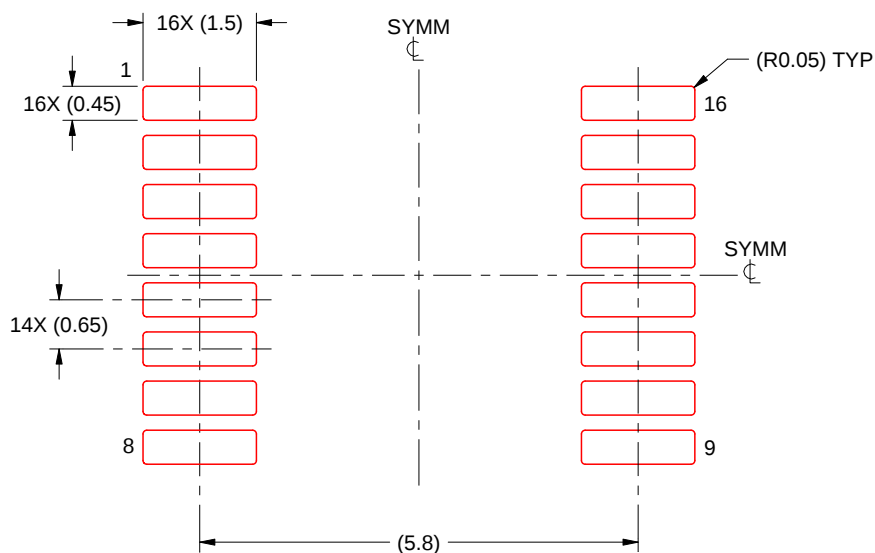
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

PW0016A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

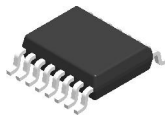


SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

4220204/B 12/2023

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.

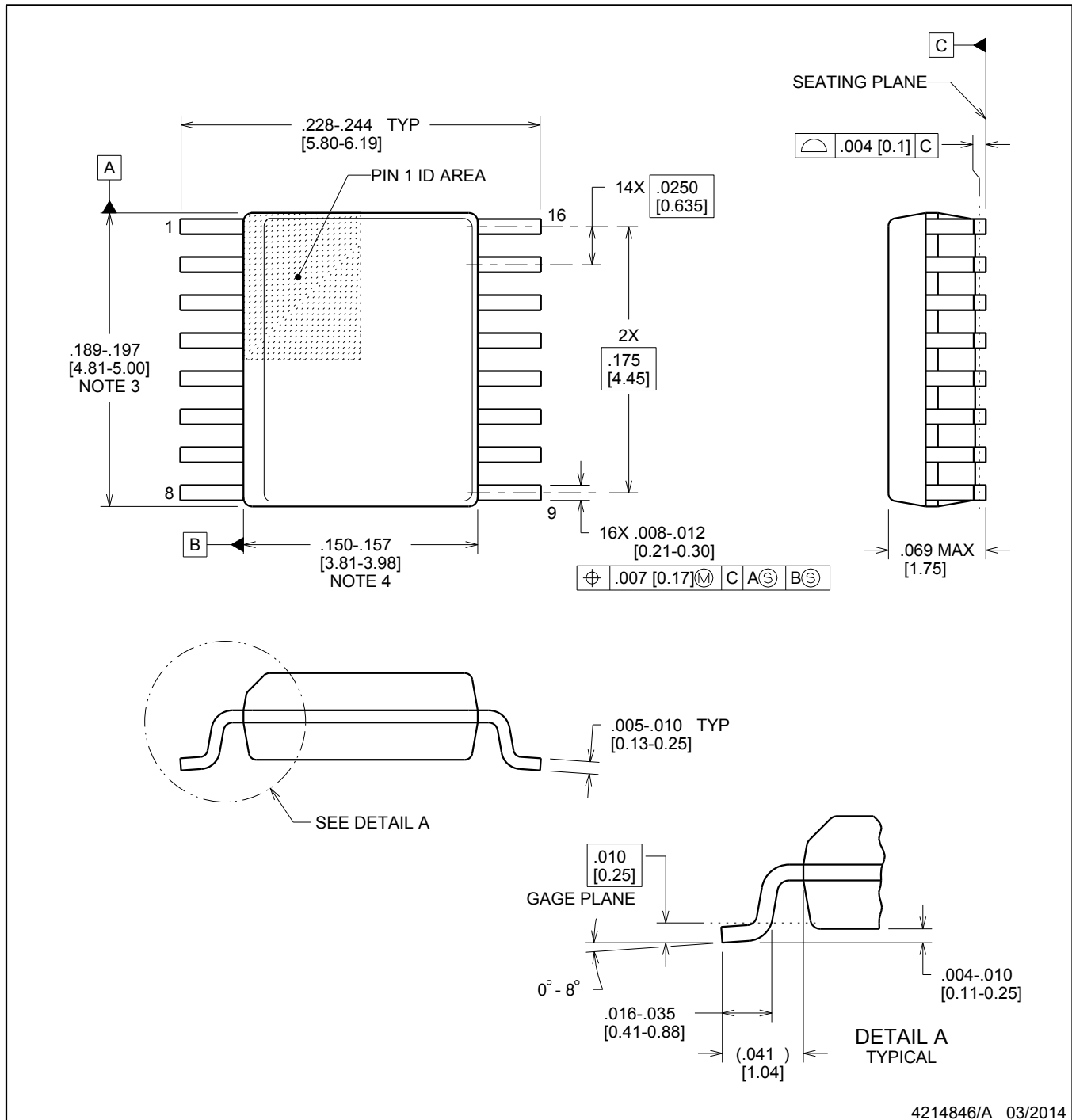


DBQ0016A

PACKAGE OUTLINE

SSOP - 1.75 mm max height

SHRINK SMALL-OUTLINE PACKAGE



4214846/A 03/2014

NOTES:

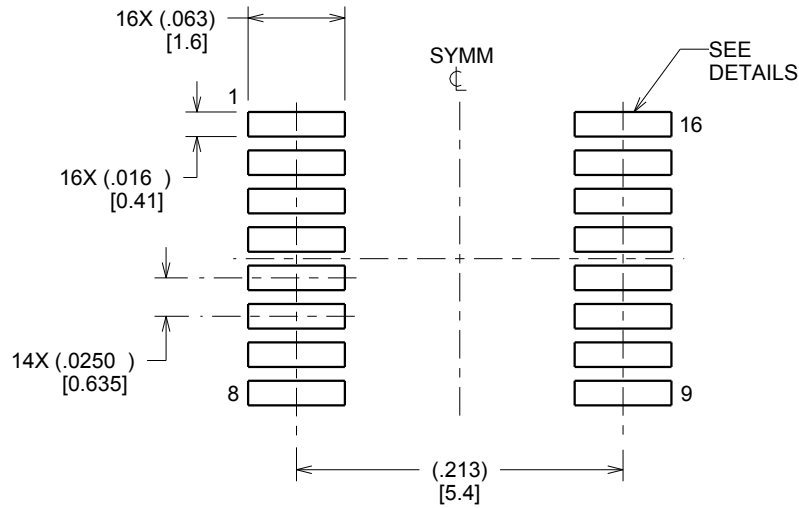
- Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
- This drawing is subject to change without notice.
- This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 inch, per side.
- This dimension does not include interlead flash.
- Reference JEDEC registration MO-137, variation AB.

EXAMPLE BOARD LAYOUT

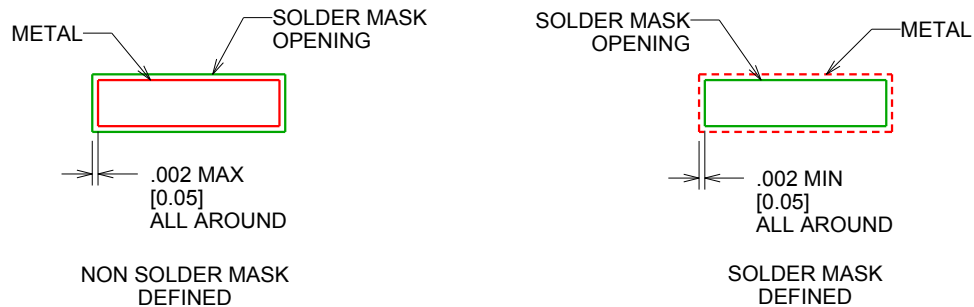
DBQ0016A

SSOP - 1.75 mm max height

SHRINK SMALL-OUTLINE PACKAGE



LAND PATTERN EXAMPLE
SCALE:8X



SOLDER MASK DETAILS

4214846/A 03/2014

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

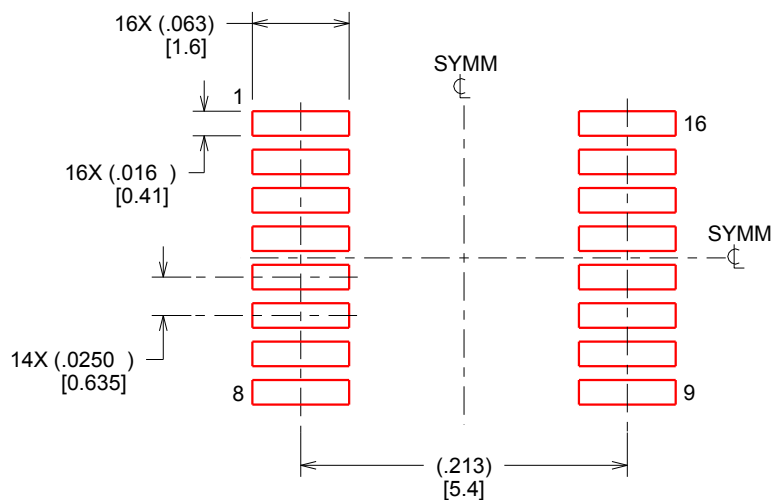
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DBQ0016A

SSOP - 1.75 mm max height

SHRINK SMALL-OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON .005 INCH [0.127 MM] THICK STENCIL
SCALE:8X

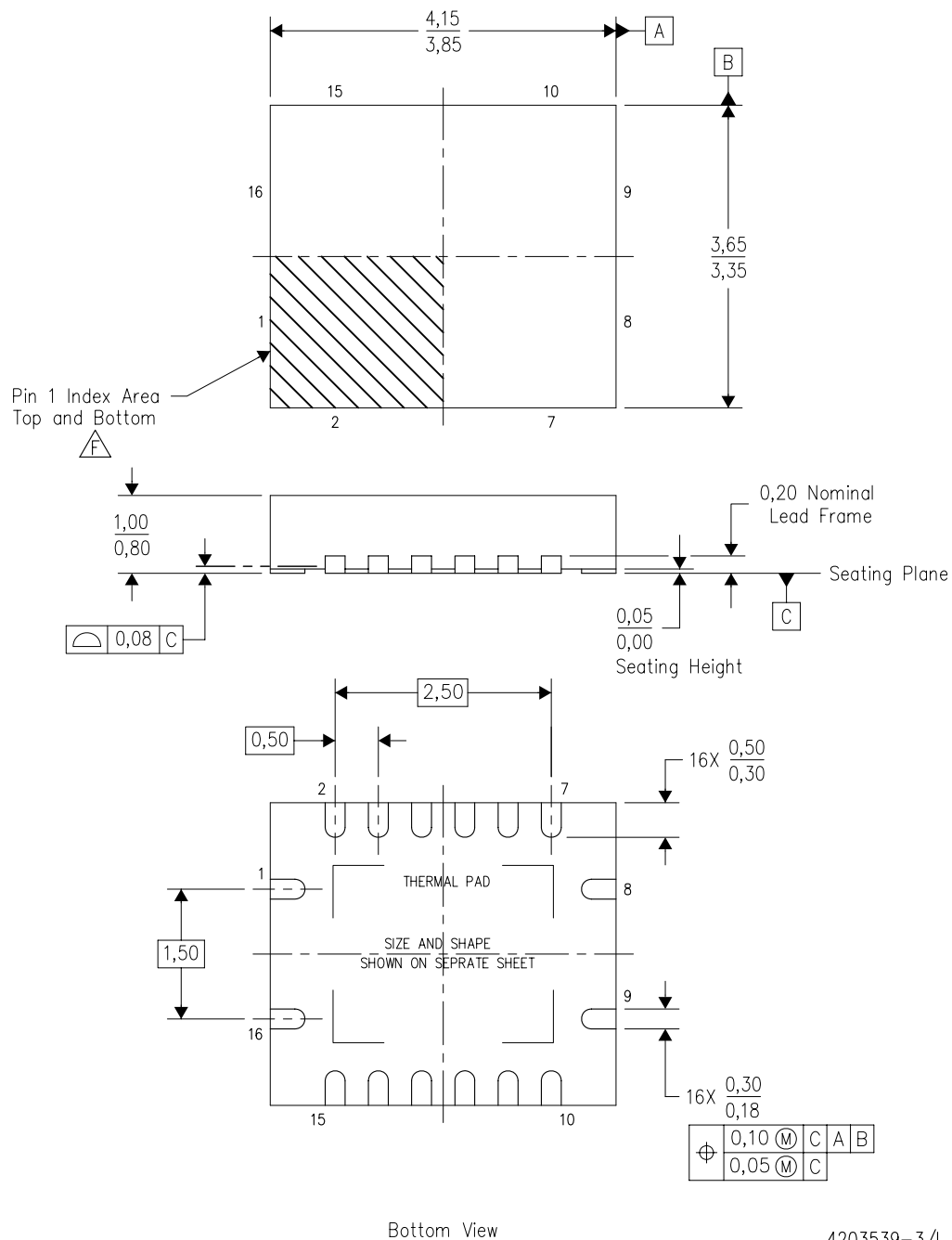
4214846/A 03/2014

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.

RGY (R-PVQFN-N16)

PLASTIC QUAD FLATPACK NO-LEAD



4203539-3/I 06/2011

- NOTES:
- All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
 - This drawing is subject to change without notice.
 - QFN (Quad Flatpack No-Lead) package configuration.
 - The package thermal pad must be soldered to the board for thermal and mechanical performance.
 - See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
- F** Pin 1 identifiers are located on both top and bottom of the package and within the zone indicated. The Pin 1 identifiers are either a molded, marked, or metal feature.
- Package complies to JEDEC MO-241 variation BA.

RGY (R-PVQFN-N16)

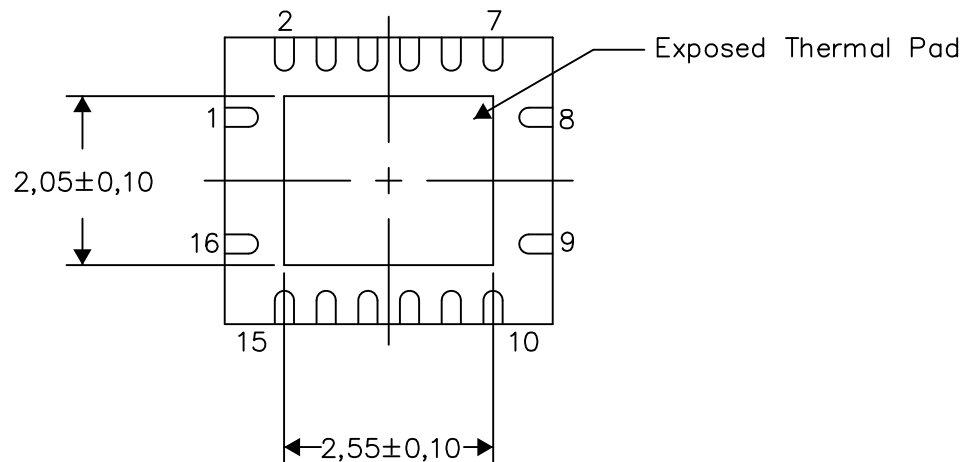
PLASTIC QUAD FLATPACK NO-LEAD

THERMAL INFORMATION

This package incorporates an exposed thermal pad that is designed to be attached directly to an external heatsink. The thermal pad must be soldered directly to the printed circuit board (PCB). After soldering, the PCB can be used as a heatsink. In addition, through the use of thermal vias, the thermal pad can be attached directly to the appropriate copper plane shown in the electrical schematic for the device, or alternatively, can be attached to a special heatsink structure designed into the PCB. This design optimizes the heat transfer from the integrated circuit (IC).

For information on the Quad Flatpack No-Lead (QFN) package and its advantages, refer to Application Report, QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271. This document is available at www.ti.com.

The exposed thermal pad dimensions for this package are shown in the following illustration.



Bottom View

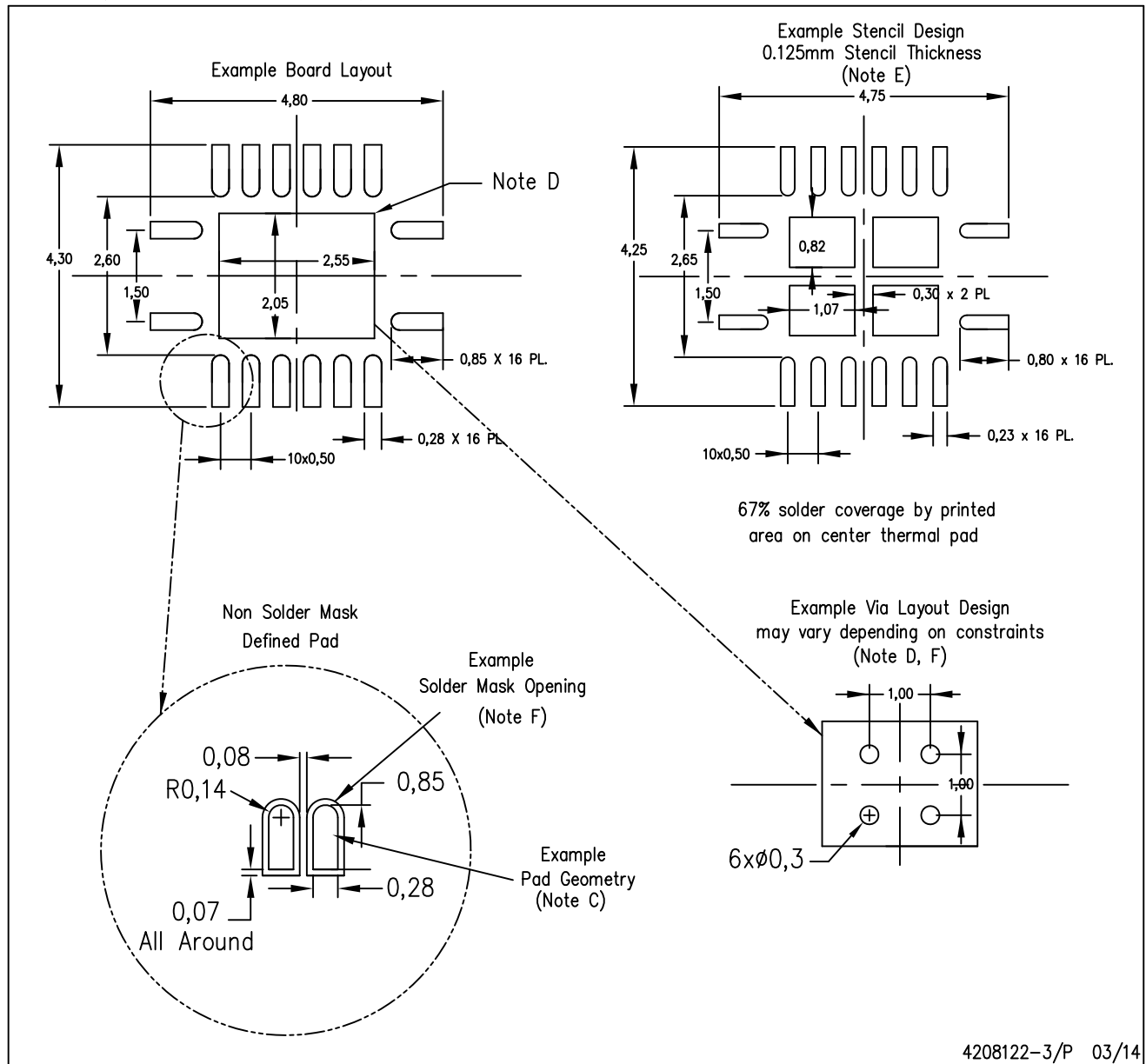
Exposed Thermal Pad Dimensions

4206353-3/P 03/14

NOTE: All linear dimensions are in millimeters

RGY (R-PVQFN-N16)

PLASTIC QUAD FLATPACK NO-LEAD



- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Publication IPC-7351 is recommended for alternate designs.
 - This package is designed to be soldered to a thermal pad on the board. Refer to Application Note, Quad Flat-Pack QFN/SON PCB Attachment, Texas Instruments Literature No. SLUA271, and also the Product Data Sheets for specific thermal information, via requirements, and recommended board layout. These documents are available at www.ti.com <<http://www.ti.com>>.
 - 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 stencil design considerations.
 - Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.

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Last updated 10/2025