

Single 3-Input Positive AND-OR Gate

Check for Samples: SN74LVC1G0832

FEATURES

- Available in the Texas Instruments NanoFree™ **Package**
- Supports 5-V V_{CC} Operation
- Inputs Accept Voltages to 5.5 V
- Provides Down Translation to V_{CC}
- Max t_{pd} of 5 ns at 3.3 V
- Low Power Consumption, 10-μA Max I_{CC}
- ±24-mA Output Drive at 3.3 V
- Input Hysteresis Allows Slow Input **Transition and Better Switching Noise** Immunity at the Input $(V_{hvs} = 250 \text{ mV Typ } @ 3.3 \text{ V})$
- Can Be Used in Three Combinations:
 - AND-OR Gate
 - AND Gate
 - OR Gate
- Ioff Supports Live Insertion, Partial-Power-Down Mode, and Back-Drive Protection
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- **ESD Protection Exceeds JESD 22**
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

DESCRIPTION

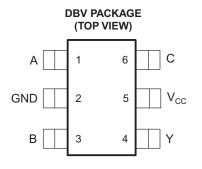
This device is designed for 1.65-V to 5.5-V V_{CC} operation.

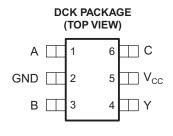
The SN74LVC1G0832 device is a single 3-input positive AND-OR gate. It performs the Boolean function $Y = (A \cdot B) + C$ in positive logic.

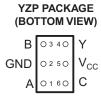
By tying one input to GND or V_{CC} , SN74LVC1G0832 device offers two more functions. When C is tied to GND, this device performs as a 2-input AND gate (Y = A • B). When A is tied to V_{CC}, the device works as a 2-input OR gate (Y = B + C). This device also works as a 2-input OR gate when B is tied to V_{CC} (Y = A + C).

NanoFree™ package technology is a major breakthrough in IC packaging concepts, using the die as the package.

This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.







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. NanoFree is a trademark of Texas Instruments.





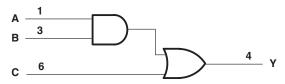
These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Function Table⁽¹⁾

I	NPUTS	OUTPUT	
Α	В	С	Y
Х	Χ	Н	Н
Н	Н	Χ	Н
Х	L	L	L
L	Χ	L	L

(1) X = Valid H or L

Logic Diagram (Positive Logic)



Function Selection Table

LOGIC FUNCTION	FIGURE
2-Input AND Gate	Figure 1
2-Input OR Gate	Figure 2
Y = (A • B) + C	Figure 3

Submit Documentation Feedback



Logic Configurations

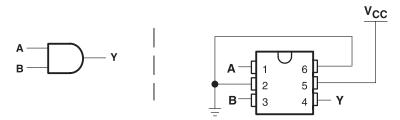


Figure 1. 2-Input AND Gate

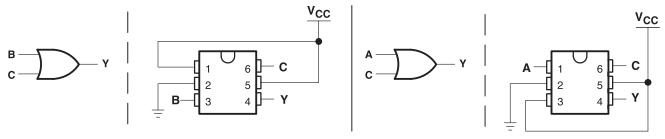


Figure 2. 2-Input OR Gate



Figure 3. Y = (A • B) + C



Absolute Maximum Ratings(1)

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

			MIN	MAX	UNIT
V _{CC}	Supply voltage range		-0.5	6.5	V
VI	Input voltage range ⁽²⁾		-0.5	6.5	V
Vo	Voltage range applied to Y output in the high-impedance or power-off state (2)			6.5	V
Vo	Voltage range applied to any output in the h	-0.5	V _{CC} + 0.5	V	
I _{IK}	Input clamp current	V ₁ < 0		-50	mA
I _{OK}	Output clamp current	V _O < 0		-50	mA
Io	Continuous output current			±50	mA
	Continuous current through V _{CC} or GND			±100	mA
		DBV package		215	
θ_{JA}	Package thermal impedance (4)	DCK package		259	°C/W
		YZP package		123	
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.

Submit Documentation Feedback

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

⁽³⁾ The value of V_{CC} is provided in the recommended operating conditions table.

⁽⁴⁾ The package thermal impedance is calculated in accordance with JESD 51-7.



Recommended Operating Conditions⁽¹⁾

			MIN	MAX	UNIT	
.,	Complement	Operating	1.65	5.5		
V _{CC}	Supply voltage	Data retention only	1.5		V	
		V _{CC} = 1.65 V to 1.95 V	0.65 × V _{CC}	5.5		
.,	LPak Java Parast valtaria	V_{CC} = 2.3 V to 2.7 V		5.5	V	
V_{IH}	High-level input voltage	V _{CC} = 3 V to 3.6 V	2	5.5	V	
		V _{CC} = 4.5 V to 5.5 V	0.7 × V _{CC}	5.5		
		V _{CC} = 1.65 V to 1.95 V	0	$0.35 \times V_{CC}$		
\ /	Low lovel input veltage	V _{CC} = 2.3 V to 2.7 V	0		V	
V_{IL}	Low-level input voltage	V _{CC} = 3 V to 3.6 V	0		V	
		V _{CC} = 4.5 V to 5.5 V	0			
Vo	Output voltage		0	V_{CC}	V	
		V _{CC} = 1.65 V		-4		
		V _{CC} = 2.3 V		-8		
I_{OH}	High-level output current	V _{CC} = 3 V		-16	mA	
		VCC = 3 V		-24		
		V _{CC} = 4.5 V		-32		
		V _{CC} = 1.65 V		4		
		V _{CC} = 2.3 V		8		
I_{OL}	Low-level output current	V _{CC} = 3 V		16	mA	
		VCC = 3 V		24		
		V _{CC} = 4.5 V		32		
		$V_{CC} = 1.8 \text{ V} \pm 0.15 \text{ V}, 2.5 \text{ V} \pm 0.2 \text{ V}$		20		
Δt/Δv	Input transition rise or fall rate	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		10	ns/V	
		$V_{CC} = 5 V \pm 0.5 V$		5		
T _A	Operating free-air temperature		-40	125	°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.



Electrical Characteristics

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

D.4.		TEOT 00	NOTIONS		-40°0	C to 85°C		–40°C	to 125°C		
PAI	RAMETER	IESI CO	NDITIONS	V _{cc}	MIN	TYP ⁽¹⁾	MAX	MIN	TYP ⁽¹⁾	MAX	UNIT
		$I_{OH} = -100 \ \mu A$		1.65 V to 5.5 V	V _{CC} - 0.1			V _{CC} - 0.1			
		$I_{OH} = -4 \text{ mA}$		1.65 V	1.2			1.2			
M	$I_{OH} = -8 \text{ mA}$	$V_{I} = 5.5 \text{ V or}$	2.3 V	1.9			1.9			V	
V _{OH}		$I_{OH} = -16 \text{ mA}$	GND	3 V	2.4			2.4			V
		$I_{OH} = -24 \text{ mA}$		3 V	2.3			2.3			
		$I_{OH} = -32 \text{ mA}$		4.5 V	3.8			3.8			
		I _{OL} = 100 μA		1.65 V to 5.5 V			0.1			0.1	
	I _{OL} = 4 mA	I _{OL} = 4 mA	V _I = 5.5 V or GND	1.65 V			0.45			0.45	
.,		$I_{OL} = 8 \text{ mA}$		2.3 V			0.3			0.3	V
V_{OL}		I _{OL} = 16 mA		3 V			0.4			0.4	V
		$I_{OL} = 24 \text{ mA}$					0.55			0.55	;
		I _{OL} = 32 mA		4.5 V			0.55			0.6	
I _I	A, B, or C inputs	V _I = 5.5 V or GN	ID	0 to 5.5 V			±5			±5	μA
I _{off}		V_I or $V_O = 5.5 \text{ V}$		0			±10			±10	μA
Icc		V _I = 5.5 V or GN	ID, I _O = 0	1.65 V to 5.5 V			10			10	μA
ΔI _{CC}		One input at V _{Ct} Other inputs at V		3 V to 5.5 V			500			500	μA
Ci		V _I = V _{CC} or GNE)	3.3 V		7					pF

⁽¹⁾ All typical values are at V_{CC} = 3.3 V, T_A = 25°C.



Switching Characteristics

over recommended operating free-air temperature range, C_L = 15 pF (unless otherwise noted) (see Figure 4)

			SN74LVC1G0832 -40°C to 85°C								
PARAMETER	FROM (INPUT)	TO (OUTPUT)			v = 2.5 V V _{CC} = 3.3 V 0.2 V ± 0.3 V			V _{CC} = 5 V ± 0.5 V		UNIT	
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A, B, or C	Υ	3.7	14	2.4	7	1.7	5	1.2	3.4	ns

Switching Characteristics

over recommended operating free-air temperature range, C_L = 30 pF or 50 pF (unless otherwise noted) (see Figure 5)

	, ,	37.2	SN74LVC1G0832 -40°C to 85°C								-
PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = ± 0.1		V _{CC} = ± 0.2		V _{CC} = ± 0.		V _{CC} = ± 0.5		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A, B, or C	Υ	2.5	17.5	1.8	7.6	1.8	5.9	1.3	4	ns

Switching Characteristics

over recommended operating free-air temperature range, $C_L = 30 \text{ pF}$ or 50 pF (unless otherwise noted) (see Figure 5)

				SN74LVC1G0832 −40°C to 125°C							
PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 1.8 V ± 0.15 V		V _{CC} = 2.5 V ± 0.2 V		V _{CC} = 3.3 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A, B, or C	Υ	2.5	17.5	1.8	7.6	1.8	5.9	1.3	4.5	ns

Operating Characteristics

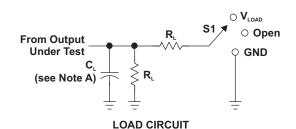
 $T_A = 25$ °C

	PARAMETER	TEST	V _{CC} = 1.8 V	$V_{CC} = 2.5 V$	$V_{CC} = 3.3 \text{ V}$	$V_{CC} = 5 V$	UNIT	
PARAMETER		CONDITIONS	TYP	TYP	TYP	TYP	UNII	
C_{pd}	Power dissipation capacitance	f = 10 MHz	15	15	16	18	pF	

Copyright © 2004-2013, Texas Instruments Incorporated Submit Documentation Feedback

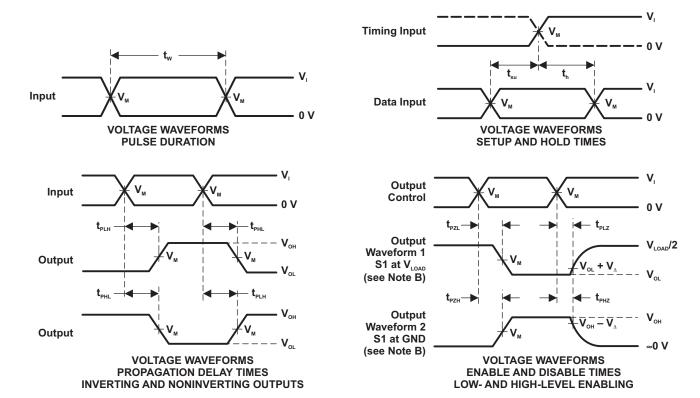


Parameter Measurement Information



TEST	S1
t _{PLH} /t _{PHL}	Open
t_{PLZ}/t_{PZL}	V _{LOAD}
t _{PHZ} /t _{PZH}	GND

.,	INI	PUTS		v v		-	.,
V _{cc}	V,	t,/t,	V _M	V _{LOAD}	C ^r	R _⊾	V _A
1.8 V ± 0.15 V	V _{cc}	≤2 ns	V _{cc} /2	2 × V _{cc}	15 pF	1 M Ω	0.15 V
2.5 V ± 0.2 V	V _{cc}	≤2 ns	V _{cc} /2	2 × V _{cc}	15 pF	1 M Ω	0.15 V
3.3 V ± 0.3 V	3 V	≤2.5 ns	1.5 V	6 V	15 pF	1 M Ω	0.3 V
5 V ± 0.5 V	V _{cc}	≤2.5 ns	V _{cc} /2	2 × V _{cc}	15 pF	1 M Ω	0.3 V



NOTES: A. C_L includes probe and jig capacitance.

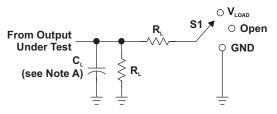
- B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
- C. All input pulses are supplied by generators having the following characteristics: PRR \leq 10 MHz, Z_{\circ} = 50 Ω .
- D. The outputs are measured one at a time, with one transition per measurement.
- E. $t_{\mbox{\tiny PLZ}}$ and $t_{\mbox{\tiny PHZ}}$ are the same as $t_{\mbox{\tiny dis}}.$
- F. t_{PZL} and t_{PZH} are the same as t_{en} .
- G. t_{PLH} and t_{PHL} are the same as t_{pd} .
- H. All parameters and waveforms are not applicable to all devices.

Figure 4. Load Circuit and Voltage Waveforms

Submit Documentation Feedback



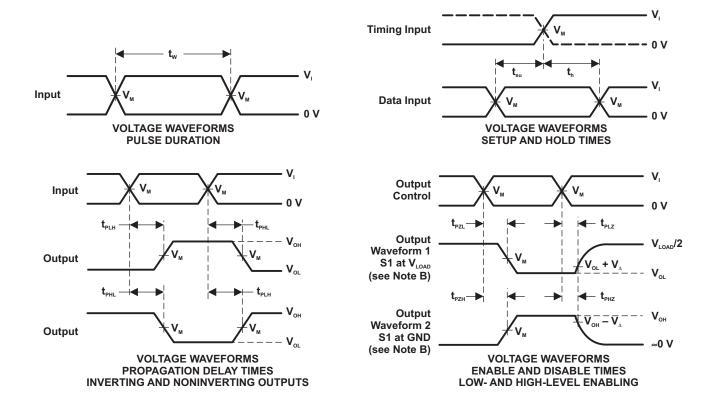
Parameter Measurement Information (continued)



TEST	S1
t _{PLH} /t _{PHL}	Open
$\mathbf{t}_{\scriptscriptstyle{\mathrm{PLZ}}}/\mathbf{t}_{\scriptscriptstyle{\mathrm{PZL}}}$	\mathbf{V}_{LOAD}
t _{PHZ} /t _{PZH}	GND

LOAD CIRCUIT

.,	INI	PUTS	V	V			.,
V _{cc}	V,	t,/t,	V _M	V _{LOAD}	C _L	R _⊾	V _A
1.8 V ± 0.15 V	V _{cc}	≤2 ns	V _{cc} /2	2 × V _{cc}	30 pF	1 k Ω	0.15 V
2.5 V ± 0.2 V	V _{cc}	≤2 ns	V _{cc} /2	2 × V _{cc}	30 pF	500 Ω	0.15 V
$3.3 \text{ V} \pm 0.3 \text{ V}$	3 V	≤2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V
5 V ± 0.5 V	V _{cc}	≤2.5 ns	V _{cc} /2	2 × V _{cc}	50 pF	500 Ω	0.3 V



NOTES: 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 \leq 10 MHz, Z_0 = 50 Ω .
- D. The outputs are measured one at a time, with one transition per measurement.
- E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
- F. t_{PZL} and t_{PZH} are the same as t_{en} .
- G. t_{PLH} and t_{PHL} are the same as t_{pd} .
- H. All parameters and waveforms are not applicable to all devices.

Figure 5. Load Circuit and Voltage Waveforms



REVISION HISTORY

CI	hanges from Revision C (January 2007) to Revision D	Page
•	Updated document to new TI data sheet format.	1
•	Updated Features.	1
•	Added ESD warning.	2
•	Updated operating temperature range.	5





10-Dec-2020

PACKAGING INFORMATION

Orderable Device	Status	Package Type	_	Pins	_		Lead finish/ Ball material	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
SN74LVC1G0832DBVR	ACTIVE	SOT-23	DBV	6	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	CDCR	Samples
SN74LVC1G0832DBVT	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	CDCR	Samples
SN74LVC1G0832DCKR	ACTIVE	SC70	DCK	6	3000	RoHS & Green	NIPDAU SN	Level-1-260C-UNLIM	-40 to 125	(DCJ, DCR)	Samples
SN74LVC1G0832DCKT	ACTIVE	SC70	DCK	6	250	RoHS & Green	NIPDAU SN	Level-1-260C-UNLIM	-40 to 125	(DCJ, DCR)	Samples
SN74LVC1G0832YZPR	ACTIVE	DSBGA	YZP	6	3000	RoHS & Green	SNAGCU	Level-1-260C-UNLIM	-40 to 85	DCN	Samples

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) RoHS: TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (CI) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

- (3) MSL, Peak Temp. The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.
- (4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.
- (5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.
- (6) Lead finish/Ball material Orderable Devices 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.



PACKAGE OPTION ADDENDUM

10-Dec-2020

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.

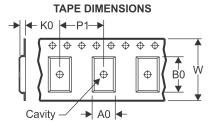
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

PACKAGE MATERIALS INFORMATION

www.ti.com 18-Jan-2020

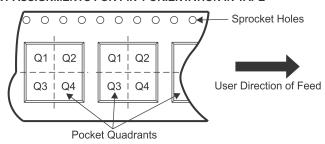
TAPE AND REEL INFORMATION





A0	Dimension designed to accommodate the component width
	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		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC1G0832DBVR	SOT-23	DBV	6	3000	180.0	8.4	3.23	3.17	1.37	4.0	8.0	Q3
SN74LVC1G0832DBVT	SOT-23	DBV	6	250	180.0	8.4	3.23	3.17	1.37	4.0	8.0	Q3
SN74LVC1G0832DCKR	SC70	DCK	6	3000	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3
SN74LVC1G0832DCKR	SC70	DCK	6	3000	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74LVC1G0832DCKT	SC70	DCK	6	250	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74LVC1G0832DCKT	SC70	DCK	6	250	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3
SN74LVC1G0832YZPR	DSBGA	YZP	6	3000	178.0	9.2	1.02	1.52	0.63	4.0	8.0	Q1

www.ti.com 18-Jan-2020



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC1G0832DBVR	SOT-23	DBV	6	3000	202.0	201.0	28.0
SN74LVC1G0832DBVT	SOT-23	DBV	6	250	202.0	201.0	28.0
SN74LVC1G0832DCKR	SC70	DCK	6	3000	202.0	201.0	28.0
SN74LVC1G0832DCKR	SC70	DCK	6	3000	180.0	180.0	18.0
SN74LVC1G0832DCKT	SC70	DCK	6	250	180.0	180.0	18.0
SN74LVC1G0832DCKT	SC70	DCK	6	250	202.0	201.0	28.0
SN74LVC1G0832YZPR	DSBGA	YZP	6	3000	220.0	220.0	35.0

DCK (R-PDSO-G6)

PLASTIC SMALL-OUTLINE PACKAGE



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. Mold flash and protrusion shall not exceed 0.15 per side.
- D. Falls within JEDEC MO-203 variation AB.



DCK (R-PDSO-G6)

PLASTIC SMALL OUTLINE



NOTES:

- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. 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. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.





SMALL OUTLINE TRANSISTOR



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. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.25 per side.

- 4. Leads 1,2,3 may be wider than leads 4,5,6 for package orientation. 5. Refernce JEDEC MO-178.



SMALL OUTLINE TRANSISTOR



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.



SMALL OUTLINE TRANSISTOR



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.





DIE SIZE BALL GRID ARRAY



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.



DIE SIZE BALL GRID ARRAY



NOTES: (continued)

4. 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).



DIE SIZE BALL GRID ARRAY



NOTES: (continued)

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



IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to TI's Terms of Sale or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265 Copyright © 2022, Texas Instruments Incorporated