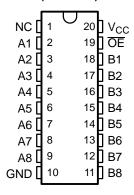
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SCDS034M-JULY 1997-REVISED AUGUST 2005

FEATURES

- Standard '245-Type Pinout
- 5- Ω Switch Connection Between Two Ports
- Rail-to-Rail Switching on Data I/O Ports
- I_{off} Supports Partial-Power-Down Mode Operation

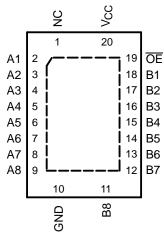
DBQ, DGV, DW, OR PW PACKAGE (TOP VIEW)



NC - No internal connection

- Latch-Up Performance Exceeds 250 mA Per JESD 17
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)





NC - No internal connection

DESCRIPTION/ORDERING INFORMATION

The SN74CBTLV3245A provides eight bits of high-speed bus switching in a standard '245 device pinout. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

The device is organized as one 8-bit switch. When output enable (\overline{OE}) is low, the 8-bit bus switch is on, and port A is connected to port B. When \overline{OE} is high, the switch is open, and the high-impedance state exists between the two ports.

This 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.

ORDERING INFORMATION

T _A	PACKAG	E ⁽¹⁾	ORDERABLE PART NUMBER	TOP-SIDE MARKING	
4000 12 0500	QFN – RGY	Tape and reel	SN74CBTLV3245ARGYR	CL245A	
	SOIC - DW	Tube	SN74CBTLV3245ADW	- CBTLV3245A	
	201C - DW	Tape and reel	SN74CBTLV3245ADWR	CB1LV3245A	
	SSOP (QSOP) – DBQ	Tape and reel	SN74CBTLV3245ADBQR	CBTLV3245A	
–40°C to 85°C	TSSOP - PW	Tape and reel	SN74CBTLV3245APWR	CL245A	
	TVSOP - DGV	Tape and reel	SN74CBTLV3245ADGVR	CL245A	
	VFBGA – GQN	Tape and reel	SN74CBTLV3245AGQNR	CL245A	
	VFBGA – ZQN Tape and reel		SN74CBTLV3245AZQNR	CL245A	

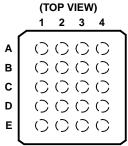
⁽¹⁾ Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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.



GQN OR ZQN PACKAGE



TERMINAL ASSIGNMENTS(1)

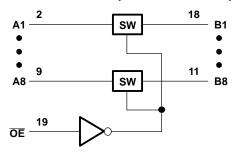
	1	2	3	4
Α	A1	NC	V _{cc}	ŌĒ
В	A3	B2	A2	B1
С	A5	A4	B4	В3
D	A7	B6	A6	B5
Е	GND	A8	B8	B7

(1) NC - No internal connection

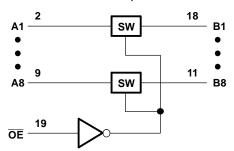
FUNCTION TABLE

INPUT OE	FUNCTION
L	A port = B port
Н	Disconnect

LOGIC DIAGRAM (POSITIVE LOGIC)



SIMPLIFIED SCHEMATIC, EACH FET SWITCH







SCDS034M-JULY 1997-REVISED AUGUST 2005

Absolute Maximum Ratings⁽¹⁾

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

			MIN	MAX	UNIT
V_{CC}	Supply voltage range		-0.5	4.6	V
V_{I}	Input voltage range ⁽²⁾		-0.5	4.6	V
	Continuous channel current			128	mA
I _{IK}	Input clamp current	V _{I/O} < 0		-50	mA
		DBQ package ⁽³⁾		68	
		DGV package ⁽³⁾		92	
θ_{JA}	Package thermal impedance	DW package ⁽³⁾		58	°C/W
		PW package ⁽³⁾		83	
		RGY package ⁽⁴⁾		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) The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
- (3) The package thermal impedance is calculated in accordance with JESD 51-7.
- (4) The package thermal impedance is calculated in accordance with JESD 51-5.

Recommended Operating Conditions⁽¹⁾

			MIN	MAX	UNIT
V _{CC}	Supply voltage		2.3	3.6	V
V	Lligh level control input voltage	V _{CC} = 2.3 V to 2.7 V	1.7		V
V_{IH}	High-level control input voltage	$V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$	2		V
\/	Low lovel control input voltage	V _{CC} = 2.3 V to 2.7 V		0.7	V
V _{IL}	Low-level control input voltage	$V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$		0.8	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.

SN74CBTLV3245A LOW-VOLTAGE OCTAL FET BUS SWITCH

SCDS034M-JULY 1997-REVISED AUGUST 2005



Electrical Characteristics

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

PA	RAMETER		TEST CONDITIO	NS	MIN TYP(1)	MAX	UNIT
.,	Control inputs	V 2.V	I 40 A			-1.2	V
V _{IK}	Data inputs	$V_{CC} = 3 V$,	$I_1 = -18 \text{ mA}$			-0.8	V
I		V _{CC} = 3.6 V,	$V_I = V_{CC}$ or GND			±60	μΑ
I _{off}		$V_{CC} = 0$,	V_I or $V_O = 0$ to 3.6 V			40	μΑ
I_{CC}		$V_{CC} = 3.6 \text{ V},$	$I_{O} = 0$,	$V_I = V_{CC}$ or GND		20	μΑ
$\Delta I_{CC}^{(2)}$	Control inputs	$V_{CC} = 3.6 \text{ V},$	One input at 3 V,	Other inputs at V _{CC} or GND		300	μΑ
Ci	Control inputs	V _I = 3 V or 0			4		pF
C _{io(OFF)}		$V_{O} = 3 \text{ V or } 0,$	OE = V _{CC}		9		pF
			V _I = 0	I _O = 64 mA	5	8	
		$V_{CC} = 2.3 \text{ V},$ TYP at $V_{CC} = 2.5 \text{ V}$	v ₁ = 0	I _O = 24 mA	5	8	
r _{on} (3)			$V_1 = 1.7 V$,	I _O = 15 mA	27	40	Ω
'on ''			V = 0	$I_O = 64 \text{ mA}$	5	7	22
		V _{CC} = 3 V	$V_I = 0$	I _O = 24 mA	5	7	
			$V_1 = 2.4 V,$	I _O = 15 mA	10	15	

All typical values are at V_{CC} = 3.3 V (unless otherwise noted), T_A = 25°C. This is the increase in supply current for each input that is at the specified voltage level, rather than V_{CC} or GND.

Switching Characteristics

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

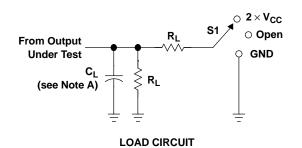
PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 2 ± 0.2	2.5 V 2 V	V _{CC} = 3 ± 0.3		UNIT
	(INFOT)	(001F01)	MIN	MAX	MIN	MAX	
t _{pd} ⁽¹⁾	A or B	B or A		0.15		0.25	ns
t _{en}	<u>OE</u>	A or B	1	6	1	4.7	ns
t _{dis}	ŌĒ	A or B	1	6.1	1	6.4	ns

(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).

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.

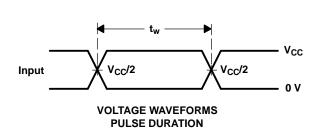


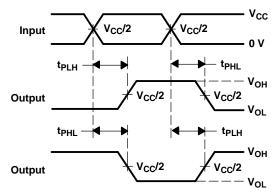
PARAMETER MEASUREMENT INFORMATION



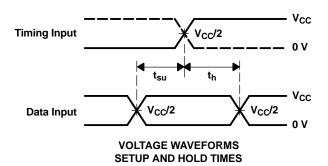
TEST	S1
t _{PLH} /t _{PHL}	Open
t _{PLZ} /t _{PZL}	2×V _{CC}
t _{PHZ} /t _{PZH}	GND

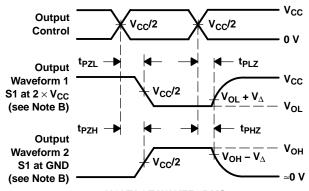
v _{cc}	CL	R _L	$\mathbf{V}_{\!\Delta}$
2.5 V ±0.2 V	30 pF	500 Ω	0.15 V
3.3 V \pm 0.3 V	50 pF	500 Ω	0.3 V











VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES LOW- AND HIGH-LEVEL ENABLING

- 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_O = 50 Ω , $t_f \leq$ 2 ns.
 - 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 1. Load Circuit and Voltage Waveforms

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PACKAGING INFORMATION

Orderable part number	Status	Material type	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material	MSL rating/ Peak reflow	Op temp (°C)	Part marking (6)
74CBTLV3245ADGVRG4	Active	Production	TVSOP (DGV) 20	2000 LARGE T&R	Yes	(4) NIPDAU	(5) Level-1-260C-UNLIM	-40 to 85	CL245A
74CBTLV3245ADGVRG4.B	Active	Production	TVSOP (DGV) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL245A
74CBTLV3245ADWG4	Active	Production	SOIC (DW) 20	25 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBTLV3245A
74CBTLV3245APWRG4	Active	Production	TSSOP (PW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL245A
74CBTLV3245APWRG4.B	Active	Production	TSSOP (PW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL245A
74CBTLV3245ARGYRG4	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL245A
74CBTLV3245ARGYRG4.A	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL245A
74CBTLV3245ARGYRG4.B	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL245A
SN74CBTLV3245ADBQR	Active	Production	SSOP (DBQ) 20	2500 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CBTLV3245A
SN74CBTLV3245ADBQR.A	Active	Production	SSOP (DBQ) 20	2500 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CBTLV3245A
SN74CBTLV3245ADBQR.B	Active	Production	SSOP (DBQ) 20	2500 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CBTLV3245A
SN74CBTLV3245ADGVR	Active	Production	TVSOP (DGV) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL245A
SN74CBTLV3245ADGVR.B	Active	Production	TVSOP (DGV) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL245A
SN74CBTLV3245ADW	Active	Production	SOIC (DW) 20	25 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBTLV3245A
SN74CBTLV3245ADW.B	Active	Production	SOIC (DW) 20	25 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBTLV3245A
SN74CBTLV3245ADWE4	Active	Production	SOIC (DW) 20	25 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBTLV3245A
SN74CBTLV3245ADWR	Active	Production	SOIC (DW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBTLV3245A
SN74CBTLV3245ADWR.B	Active	Production	SOIC (DW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CBTLV3245A
SN74CBTLV3245APW	Obsolete	Production	TSSOP (PW) 20	-	-	Call TI	Call TI	-40 to 85	CL245A
SN74CBTLV3245APWR	Active	Production	TSSOP (PW) 20	2000 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 85	CL245A
SN74CBTLV3245APWR.A	Active	Production	TSSOP (PW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL245A
SN74CBTLV3245APWR.B	Active	Production	TSSOP (PW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	CL245A
SN74CBTLV3245ARGYR	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL245A
SN74CBTLV3245ARGYR.A	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL245A
SN74CBTLV3245ARGYR.B	Active	Production	VQFN (RGY) 20	3000 LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-40 to 85	CL245A

⁽¹⁾ Status: For more details on status, see our product life cycle.



PACKAGE OPTION ADDENDUM

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- (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





	Dimension designed to accommodate the component width
В0	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	Package	Pins	SPQ	Reel	Reel	A0	В0	K0	P1	W	Pin1
	Туре	Drawing			Diameter (mm)	Width W1 (mm)	(mm)	(mm)	(mm)	(mm)	(mm)	Quadrant
74CBTLV3245ADGVRG4	TVSOP	DGV	20	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
74CBTLV3245APWRG4	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1
74CBTLV3245ARGYRG4	VQFN	RGY	20	3000	330.0	12.4	3.71	4.71	1.1	8.0	12.0	Q1
SN74CBTLV3245ADBQR	SSOP	DBQ	20	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74CBTLV3245ADGVR	TVSOP	DGV	20	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74CBTLV3245ADWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
SN74CBTLV3245APWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	8.0	16.0	Q1
SN74CBTLV3245ARGYR	VQFN	RGY	20	3000	330.0	12.4	3.71	4.71	1.1	8.0	12.0	Q1



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*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ Length (mm)		Width (mm)	Height (mm)					
74CBTLV3245ADGVRG4	TVSOP	DGV	20	2000	353.0	353.0	32.0					
74CBTLV3245APWRG4	TSSOP	PW	20	2000	353.0 353.0		32.0					
74CBTLV3245ARGYRG4	VQFN	RGY	20	3000	353.0	353.0	32.0					
SN74CBTLV3245ADBQR	SSOP	DBQ	20	2500	353.0	353.0	32.0					
SN74CBTLV3245ADGVR	TVSOP	DGV	20	2000	353.0	353.0	32.0					
SN74CBTLV3245ADWR	SOIC	DW	20	2000	356.0	356.0	45.0					
SN74CBTLV3245APWR	TSSOP	PW	20	2000	353.0	353.0	32.0					
SN74CBTLV3245ARGYR	VQFN	RGY	20	3000	353.0	353.0	32.0					

PACKAGE MATERIALS INFORMATION

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TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
74CBTLV3245ADWG4	DW	SOIC	20	25	507	12.83	5080	6.6
SN74CBTLV3245ADW	DW	SOIC	20	25	507	12.83	5080	6.6
SN74CBTLV3245ADW.B	DW	SOIC	20	25	507	12.83	5080	6.6
SN74CBTLV3245ADWE4	DW	SOIC	20	25	507	12.83	5080	6.6

DGV (R-PDSO-G**)

24 PINS SHOWN

PLASTIC SMALL-OUTLINE



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



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.





PLASTIC QUAD FLATPACK - NO LEAD



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.



PLASTIC QUAD FLATPACK - NO LEAD



NOTES: (continued)

- 4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
- 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.



PLASTIC QUAD FLATPACK - NO LEAD



NOTES: (continued)

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





SOIC



NOTES:

- 1. All linear dimensions are in millimeters. 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 0.43 mm per side.
- 5. Reference JEDEC registration MS-013.



SOIC



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.



SOIC



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.





SMALL OUTLINE PACKAGE



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. 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.



SMALL OUTLINE PACKAGE



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 PACKAGE



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



NOTES:

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



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