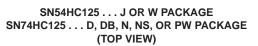
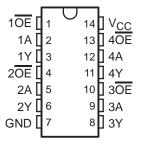
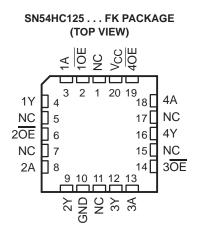
SCLS104D - MARCH 1984 - REVISED AUGUST 2003

- Wide Operating Voltage Range of 2 V to 6 V
- High-Current 3-State Outputs Interface Directly With System Bus or Can Drive Up To 15 LSTTL Loads
- Low Power Consumption, 80-µA Max ICC





- Typical t<sub>pd</sub> = 11 ns
- ±6-mA Output Drive at 5 V
- Low Input Current of 1 μA Max



NC - No internal connection

#### description/ordering information

These quadruple bus buffer gates feature independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable ( $\overline{OE}$ ) input is high.

To ensure the high-impedance state during power up or power down,  $\overline{OE}$  should be tied to V<sub>CC</sub> through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

TA	PACKA	GE†	ORDERABLE PART NUMBER	TOP-SIDE MARKING							
	PDIP – N	Tube of 25	SN74HC125N	SN74HC125N							
		Tube of 50	SN74HC125D								
	SOIC – D	Reel of 2500	SN74HC125DR	HC125							
-40°C to 85°C SOP - NS		Reel of 250	SN74HC125DT								
	SOP – NS	Reel of 2000	SN74HC125NSR	HC125							
	SSOP – DB	Reel of 2000	SN74HC125DBR	HC125							
		Reel of 2000	SN74HC125PWR	110405							
	TSSOP – PW	Reel of 250	SN74HC125PWT	HC125							
CDIP – J		Tube of 25	SNJ54HC125J	SNJ54HC125J							
–55°C to 125°C	CFP – W	Tube of 150	SNJ54HC125W	SNJ54HC125W							
	LCCC – FK	Tube of 55	SNJ54HC125FK	SNJ54HC125FK							

#### **ORDERING INFORMATION**

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.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

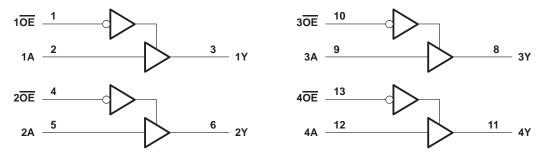


Copyright © 2003, Texas Instruments Incorporated On products compliant to MIL-PRF-3853s, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

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FUNCTION TABLE (each buffer)											
INPUTS OUTPUT											
OE	Α	Y									
L	Н	Н									
L	L	L									
Н	Х	Z									

### logic diagram (positive logic)



Pin numbers shown are for the D, DB, J, N, NS, PW, and W packages.

#### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>

N N	Note 1)	±20 mA ±20 mA ±35 mA ±70 mA 86°C/W 96°C/W 80°C/W 76°C/W
Storage temperature range, T <sub>stg</sub>		

<sup>+</sup> 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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. The package thermal impedance is calculated in accordance with JESD 51-7.



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### recommended operating conditions (see Note 3)

			SN	154HC12	25	SN	174HC12	25	
			MIN	NOM	MAX	MIN	NOM	MAX	UNIT
VCC	Supply voltage		2	5	6	2	5	6	V
		$V_{CC} = 2 V$	1.5			1.5			
VIH	High-level input voltage	$V_{CC} = 4.5 V$	3.15			3.15			V
		$V_{CC} = 6 V$	4.2			4.2			
		$V_{CC} = 2 V$			0.5			0.5	
VIL	Low-level input voltage	$V_{CC} = 4.5 V$			1.35			1.35	V
		ACC = 6 A			1.8			1.8	
VI	Input voltage		0		VCC	0		VCC	V
VO	Output voltage		0		VCC	0		VCC	V
		$V_{CC} = 2 V$			1000			1000	
$\Delta t / \Delta v$	Input transition rise/fall time	V <sub>CC</sub> = 4.5 V			500			500	ns
		V <sub>CC</sub> = 6 V			400			400	
TA	Operating free-air temperature	÷	-55		125	-40		85	°C

NOTE 3: All unused inputs of the device must be held at V<sub>CC</sub> 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)

				Т	A = 25°C	;	SN54H	IC125	SN74H	C125	
PARAMETER	TEST CO	ONDITIONS	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
			2 V	1.9	1.998		1.9		1.9		
		l <sub>OH</sub> = -20 μA	4.5 V	4.4	4.499		4.4		4.4		
VOH	$V_I = V_{IH} \text{ or } V_{IL}$	-	6 V	5.9	5.999		5.9		5.9		V
		$I_{OH} = -6 \text{ mA}$	4.5 V	3.98	4.3		3.7		3.84		
		I <sub>OH</sub> = -7.8 mA	6 V	5.48	5.8		5.2		5.34		
			2 V		0.002	0.1		0.1		0.1	
		l <sub>OL</sub> = 20 μA	4.5 V		0.001	0.1		0.1		0.1	
V <sub>OL</sub>	$V_I = V_{IH} \text{ or } V_{IL}$		6 V		0.001	0.1		0.1		0.1	V
		$I_{OL} = 6 \text{ mA}$	4.5 V		0.17	0.26		0.4		0.33	
		I <sub>OL</sub> = 7.8 mA	6 V		0.15	0.26		0.4		0.33	
lı	$V_{I} = V_{CC} \text{ or } 0$		6 V		±0.1	±100		±1000		±1000	nA
IOZ	AO = ACC  or  0		6 V		±0.01	±0.5		±10		±5	μΑ
ICC	$V_I = V_{CC} \text{ or } 0,$	IO = 0	6 V			8		160		80	μΑ
Ci			2 V to 6 V		3	10		10		10	pF



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# switching characteristics over recommended operating free-air temperature range, $C_L = 50 \text{ pF}$ (unless otherwise noted) (see Figure 1)

	FROM	то		Τį	λ = 25°C	;	SN54H	IC125	SN74H	IC125																			
PARAMETER	(INPUT)	(OUTPUT)	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT																		
			2 V		48	120		150		150																			
<sup>t</sup> pd	А	Y	4.5 V		14	24		36		30	ns																		
			6 V		11	20		25		26																			
			2 V		53	120		180		150																			
ten	OE	Y	4.5 V		14	24		36		30	ns																		
			6 V		11	20		31		26																			
			2 V		30	120		180		150																			
<sup>t</sup> dis	OE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	4.5 V		15	24		36		30	ns							
			6 V		14	20		31		26																			
		Any	2 V		28	60		90		75																			
tt			Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	4.5 V		8	12		18		15
			6 V		6	10		15		13																			

# switching characteristics over recommended operating free-air temperature range, $C_L = 150 \text{ pF}$ (unless otherwise noted) (see Figure 1)

	FROM	то		Т	ן = 25°C	;	SN54H	C125	SN74H	IC125																				
PARAMETER	(INPUT)	(OUTPUT)	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT																			
			2 V		67	150		225		190																				
<sup>t</sup> pd	А	Y	4.5 V		19	30		45		38	ns																			
,			6 V		15	25		39		32																				
			2 V		100	135		200		170																				
ten	OE	Y	4.5 V		20	27		40		34	ns																			
			6 V		17	23		34		29																				
			2 V		45	210		315		265																				
tt		Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	4.5 V		17	42		63		53	ns
			6 V		13	36		53		45																				

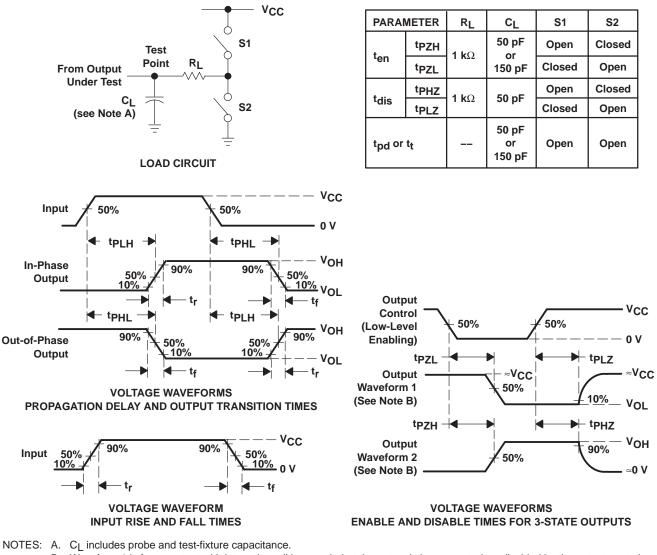
## operating characteristics, $T_A = 25^{\circ}C$

	PARAMETER	TEST CONDITIONS	TYP	UNIT
Cp	d Power dissipation capacitance per gate	No load	45	pF



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#### PARAMETER MEASUREMENT INFORMATION



- 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. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR  $\leq$  1 MHz, Z<sub>Q</sub> = 50  $\Omega$ , t<sub>f</sub> = 6 ns, t<sub>f</sub> = 6 ns.
- D. The outputs are measured one at a time with one input transition per measurement.
- E. tpLz and tpHz are the same as tdis.
- F.  $t_{P7I}$  and  $t_{P7H}$  are the same as  $t_{en}$ .
- G.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .

#### Figure 1. Load Circuit and Voltage Waveforms





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5-Sep-2011

#### **PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/ Ball Finish	MSL Peak Temp <sup>(3)</sup>	Samples (Requires Login)
5962-87721012A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Call TI	
5962-8772101CA	ACTIVE	CDIP	J	14	1	TBD	Call TI	Call TI	
SN54HC125J	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	
SN74HC125D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DBLE	OBSOLETE	SSOP	DB	14		TBD	Call TI	Call TI	
SN74HC125DBR	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DBRE4	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DBRG4	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DT	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DTE4	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125DTG4	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125N	ACTIVE	PDIP	Ν	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74HC125N3	OBSOLETE	PDIP	Ν	14		TBD	Call TI	Call TI	
SN74HC125NE4	ACTIVE	PDIP	Ν	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
SN74HC125NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	



5-Sep-2011

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/ Ball Finish	MSL Peak Temp <sup>(3)</sup>	Samples (Requires Login)
SN74HC125NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125NSRG4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125PWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125PWRE4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125PWRG4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125PWT	ACTIVE	TSSOP	PW	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125PWTE4	ACTIVE	TSSOP	PW	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SN74HC125PWTG4	ACTIVE	TSSOP	PW	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
SNJ54HC125FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	
SNJ54HC125J	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	

<sup>(1)</sup> 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) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.



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5-Sep-2011

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#### OTHER QUALIFIED VERSIONS OF SN54HC125, SN74HC125 :

• Catalog: SN74HC125

- Automotive: SN74HC125-Q1, SN74HC125-Q1
- Military: SN54HC125

NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Automotive Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Military QML certified for Military and Defense Applications

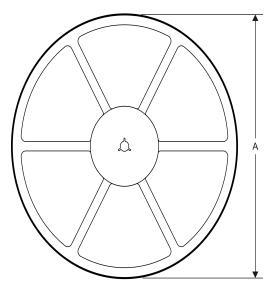
# PACKAGE MATERIALS INFORMATION

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### TAPE AND REEL INFORMATION

#### REEL DIMENSIONS

Texas Instruments





TAPE AND REEL INFORMATION

#### TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	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

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
SN74HC125DBR	SSOP	DB	14	2000	330.0	16.4	8.2	6.6	2.5	12.0	16.0	Q1
SN74HC125DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HC125DRG4	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HC125DT	SOIC	D	14	250	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HC125NSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74HC125PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74HC125PWT	TSSOP	PW	14	250	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1

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# PACKAGE MATERIALS INFORMATION

14-Jul-2012



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HC125DBR	SSOP	DB	14	2000	367.0	367.0	38.0
SN74HC125DR	SOIC	D	14	2500	367.0	367.0	38.0
SN74HC125DRG4	SOIC	D	14	2500	367.0	367.0	38.0
SN74HC125DT	SOIC	D	14	250	367.0	367.0	38.0
SN74HC125NSR	SO	NS	14	2000	367.0	367.0	38.0
SN74HC125PWR	TSSOP	PW	14	2000	367.0	367.0	35.0
SN74HC125PWT	TSSOP	PW	14	250	367.0	367.0	35.0

J (R-GDIP-T\*\*) 14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



NOTES: A. All linear dimensions are in inches (millimeters).

- B. This drawing is subject to change without notice.
- C. This package is hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
- E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

LEADLESS CERAMIC CHIP CARRIER

FK (S-CQCC-N\*\*) 28 TERMINAL SHOWN



NOTES: A. All linear dimensions are in inches (millimeters).

B. This drawing is subject to change without notice.

- C. This package can be hermetically sealed with a metal lid.
- D. Falls within JEDEC MS-004



# N (R-PDIP-T\*\*)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



NOTES:

- A. All linear dimensions are in inches (millimeters).B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- $\triangle$  The 20 pin end lead shoulder width is a vendor option, either half or full width.



D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters).

- B. This drawing is subject to change without notice.
- 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.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AB.





NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. 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 other stencil recommendations.
  E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE



A. An integration of the information o

Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.

Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.

E. Falls within JEDEC MO-153





NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. 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 other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



## MECHANICAL DATA

#### PLASTIC SMALL-OUTLINE PACKAGE

#### 0,51 0,35 ⊕0,25⊛ 1,27 8 14 0,15 NOM 5,60 8,20 5,00 7,40 $\bigcirc$ Gage Plane ₽ 0,25 7 1 1,05 0,55 0°-10° Δ 0,15 0,05 Seating Plane — 2,00 MAX 0,10PINS \*\* 14 16 20 24 DIM 10,50 10,50 12,90 15,30 A MAX A MIN 9,90 9,90 12,30 14,70 4040062/C 03/03

NOTES: A. All linear dimensions are in millimeters.

NS (R-PDSO-G\*\*)

**14-PINS SHOWN** 

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



# **MECHANICAL DATA**

MSSO002E - JANUARY 1995 - REVISED DECEMBER 2001

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

PLASTIC SMALL-OUTLINE

28 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.
- D. Falls within JEDEC MO-150



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