SCLS309D - JANUARY 1996 - REVISED SEPTEMBER 2003

- Wide Operating Voltage Range of 2 V to 6 V
- High-Current 3-State Outputs Drive Bus Lines, Buffer Memory Address Registers, or Drive Up To 15 LSTTL Loads
- True Outputs
- Low Power Consumption, 80-μA Max I_{CC}
- Typical t_{pd} = 10 ns
- ±6-mA Output Drive at 5 V
- Low Input Current of 1 μA Max

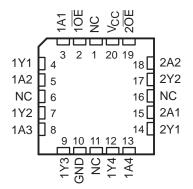
description/ordering information

These hex buffers and line drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. The 'HC367 devices are organized as dual 4-line and 2-line buffers/drivers with active-low output-enable ($1\overline{OE}$ and $2\overline{OE}$) inputs. When \overline{OE} is low, the device passes noninverted data from the A inputs to the Y outputs. When \overline{OE} is high, the outputs are in the high-impedance state.

SN54HC367 J OR W PACKAGE
SN74HC367 D, N, NS, OR PW PACKAGE
(TOP VIEW)

	(101	VIL VV)	
10E 1A1 1Y1 1A2 1Y2 1A3 1Y3 GND	[6 [7	13 12 11] V _{CC}] 2OE] 2A2] 2Y2] 2A1] 2Y1] 1A4] 1Y4

SN54HC367 . . . FK PACKAGE (TOP VIEW)



NC - No internal connection

TA	PACKA	3E†	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – N	Tube of 25	SN74HC367N	SN74HC367N
		Tube of 40	SN74HC367D	
	SOIC – D	Reel of 2500	SN74HC367DR	HC367
4000 / 0500		Reel of 250	SN74HC367DT	
–40°C to 85°C	SOP – NS	Reel of 2000	SN74HC367NSR	HC367
		Tube of 90	SN74HC367PW	
	TSSOP – PW	Reel of 2000	SN74HC367PWR	HC367
		Reel of 250	SN74HC367PWT	
	CDIP – J	Tube of 25	SNJ54HC367J	SNJ54HC367J
–55°C to 125°C	CFP – W	Tube of 150	SNJ54HC367W	SNJ54HC367W
	LCCC – FK	Tube of 55	SNJ54HC367FK	SNJ54HC367FK

ORDERING INFORMATION

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



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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.

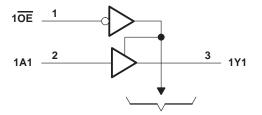


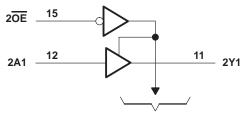
Copyright i 2003, Texas Instruments Incorporated On products compliant to MIL-PRF-3853, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

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

logic diagram (positive logic)





To Three Other Channels

To One Other Channel

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

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V_{CC} $-0.5 V \text{ to } 7 V_{I}$ Input clamp current, I_{IK} ($V_I < 0 \text{ or } V_I > V_{CC}$) (see Note 1) $\pm 20 \text{ mA}$ Output clamp current, I_{OK} ($V_O < 0 \text{ or } V_O > V_{CC}$) (see Note 1) $\pm 20 \text{ mA}$ Continuous output current, I_O ($V_O = 0 \text{ to } V_{CC}$) $\pm 35 \text{ mA}$ Continuous current through V_{CC} or GND $\pm 70 \text{ mA}$	A A A
Package thermal impedance, θ_{JA} (see Note 2): D package	
N package	Ν
NS package	Ν
PW package	Ν
Storage temperature range, T _{stg} –65°C to 150°C	С

[†] 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)

			SI	154HC36	67	SN	174HC36	67	
			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		$V_{CC} = 4.5 V$	3.15			3.15			V
		$V_{CC} = 6 V$	4.2			4.2			
VIL	Low-level input voltage	$V_{CC} = 2 V$			0.5			0.5	
		$V_{CC} = 4.5 V$			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	
Δt/Δv	Input transition rise/fall time	$V_{CC} = 4.5 V$			500			500	ns
		V _{CC} = 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_{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)

	7507.00			Т	A = 25°C	;	SN54H	IC367	SN74H	C367	
PARAMETER	TEST CO	ONDITIONS	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
			2 V	1.9	1.998		1.9		1.9		
		I _{OH} = -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 _{OH} = -7.8 mA	6 V	5.48	5.8		5.2		5.34		
			2 V		0.002	0.1		0.1		0.1	
	$V_{I} = V_{IH} \text{ or } V_{IL}$	I _{OL} = 20 μA	4.5 V		0.001	0.1		0.1		0.1	
V _{OL}			6 V		0.001	0.1		0.1		0.1	V
		IOL = 6 mA	4.5 V		0.17	0.26		0.4		0.33	
		I _{OL} = 7.8 mA	6 V		0.15	0.26		0.4		0.33	
lı	VI = ACC or 0		6 V		±0.1	±100		±1000		±1000	nA
IOZ	VO = 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	IC367	SN74H	IC367	
PARAMETER	(INPUT)	(OUTPUT)	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
			2 V		50	95		145		120	20
^t pd	А	Y	4.5 V		12	19		29		24	ns
			6 V		10	16		25		20	
			2 V		100	190		285		238	
ten	OE	Y	4.5 V		26	38		57		48	ns
			6 V		21	32		48		41	
			2 V		50	175		265		240	
^t dis	OE	Y	4.5 V		21	35		53		48	ns
			6 V		19	30		45		41	
			2 V		28	60		90		75	
t		Any	4.5 V		8	12		18		15	ns
			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	;	SN54HC367		SN74HC367		
PARAMETER	(INPUT)	(OUTPUT)	Vcc	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
t _{pd} A			2 V		70	120		180		150	
	А	Y	4.5 V		17	24		36		30	ns
			6 V		14	20		31		25	
			2 V		140	230		345		285	
ten	OE	Y	4.5 V		30	46		69		57	ns
			6 V		28	39		59		48	
			2 V		45	210		315		265	
tt		Any	4.5 V		17	42		63		53	ns
			6 V		13	36		53		45	

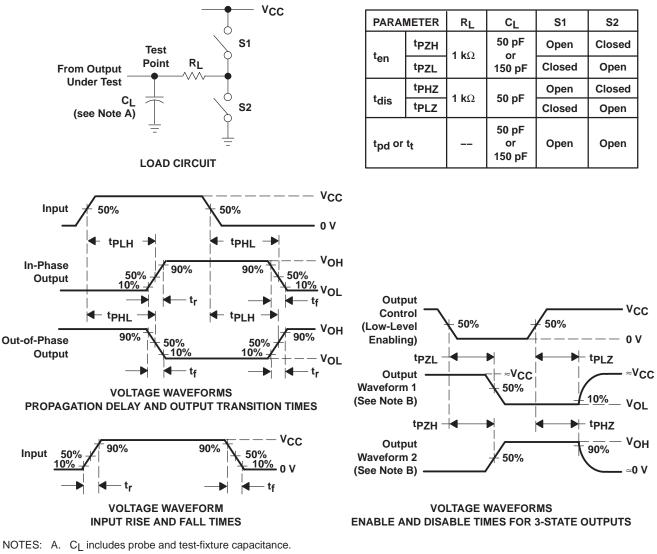
operating characteristics, $T_A = 25^{\circ}C$

		PARAMETER	TEST CONDITIONS	TYP	UNIT
Γ	C _{pd}	Power dissipation capacitance per buffer/driver	No load	35	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_Q = 50 Ω , t_f = 6 ns, t_f = 6 ns.
- D. The outputs are measured one at a time with one input transition per measurement.
- E. tPLH and tPHL are the same as tpd.
- F. tpLz and tpHz are the same as tdis.
- G. tpzL and tpzH are the same as ten.

Figure 1. Load Circuit and Voltage Waveforms





31-May-2014

PACKAGING INFORMATION

Orderable Device	Status	Package Type		Pins		Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
85002012A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	85002012A SNJ54HC 367FK	Samples
8500201EA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	8500201EA SNJ54HC367J	Samples
JM38510/65708BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	JM38510/ 65708BEA	Samples
JM38510/65708BFA	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	JM38510/ 65708BFA	Samples
M38510/65708BEA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	JM38510/ 65708BEA	Samples
M38510/65708BFA	ACTIVE	CFP	W	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	JM38510/ 65708BFA	Samples
SN54HC367J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	SN54HC367J	Samples
SN74HC367D	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367DE4	ACTIVE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367DG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367DR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367DRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367DRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367DT	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367DTE4	ACTIVE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367DTG4	ACTIVE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	SN74HC367N	Samples



PACKAGE OPTION ADDENDUM

31-May-2014

Orderable Device	Status	Package Type	•	Pins	•	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
SN74HC367NE4	ACTIVE	PDIP	Ν	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367NSR	ACTIVE	SO	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367NSRE4	ACTIVE	SO	NS	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367NSRG4	ACTIVE	SO	NS	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367PW	ACTIVE	TSSOP	PW	16	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367PWE4	ACTIVE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367PWG4	ACTIVE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367PWR	ACTIVE	TSSOP	PW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367PWRE4	ACTIVE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367PWRG4	ACTIVE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367PWT	ACTIVE	TSSOP	PW	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC367	Samples
SN74HC367PWTE4	ACTIVE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC367PWTG4	ACTIVE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85		Samples
SNJ54HC367FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	85002012A SNJ54HC 367FK	Samples
SNJ54HC367J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	8500201EA SNJ54HC367J	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.



PACKAGE OPTION ADDENDUM

31-May-2014

(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)

⁽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/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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OTHER QUALIFIED VERSIONS OF SN54HC367, SN74HC367 :

Catalog: SN74HC367

• Military: SN54HC367

NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Military QML certified for Military and Defense Applications

PACKAGE MATERIALS INFORMATION

www.ti.com

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

*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
SN74HC367DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74HC367NSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74HC367PWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74HC367PWT	TSSOP	PW	16	250	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1

TEXAS INSTRUMENTS

www.ti.com

PACKAGE MATERIALS INFORMATION

14-Jul-2012



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HC367DR	SOIC	D	16	2500	333.2	345.9	28.6
SN74HC367NSR	SO	NS	16	2000	367.0	367.0	38.0
SN74HC367PWR	TSSOP	PW	16	2000	367.0	367.0	35.0
SN74HC367PWT	TSSOP	PW	16	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.

W (R-GDFP-F16)

CERAMIC DUAL FLATPACK



- 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 ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only.
 - E. Falls within MIL STD 1835 GDFP2-F16



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-G16)

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 AC.



4211283-4/E 08/12

D (R-PDSO-G16) PLASTIC SMALL OUTLINE Stencil Openings (Note D) Example Board Layout (Note C) –16x0,55 -14x1,27 -14x1,27 16x1,50 5,40 5.40 Example Non Soldermask Defined Pad Example Pad Geometry (See Note C) 0,60 .55 Example 1. Solder Mask Opening (See Note E) -0,07 All Around

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-G16)

PLASTIC SMALL OUTLINE



NOTES:

A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994. β . 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 0,15 each side.

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

E. Falls within JEDEC MO-153



PW (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- 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.



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