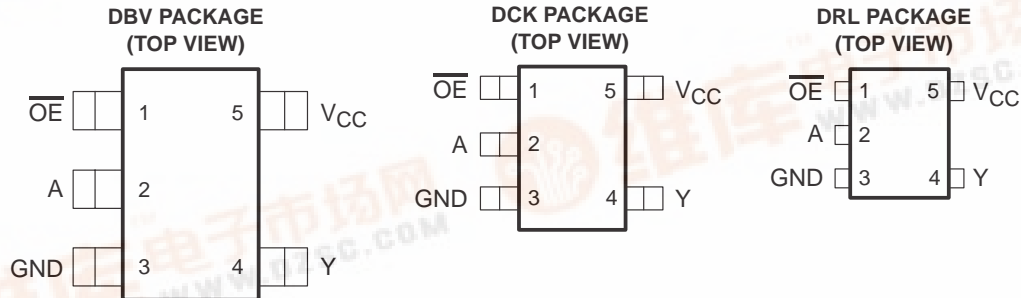


SN74AHC1G125 SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT

SCLS377J – AUGUST 1997 – REVISED JUNE 2005

- Operating Range of 2 V to 5.5 V
- Max t_{pd} of 6 ns at 5 V
- Low Power Consumption, 10- μ A Max I_{CC}
- ± 8 -mA Output Drive at 5 V



See mechanical drawings for dimensions.

description/ordering information

The SN74AHC1G125 is a single bus buffer gate/line driver with 3-state output. The output is disabled when the output-enable (\overline{OE}) input is high. When \overline{OE} is low, true data is passed from the A input to the Y output.

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	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING‡
–40°C to 85°C	SOT (SOT-23) – DBV	Reel of 3000	SN74AHC1G125DBVR	A25_
		Reel of 250	SN74AHC1G125DBVT	A25_
	SOT (SC-70) – DCK	Reel of 3000	SN74AHC1G125DCKR	AM_
		Reel of 250	SN74AHC1G125DCKT	AM_
	SOT (SOT-553) – DRL	Reel of 4000	SN74AHC1G125DRLR	AM_

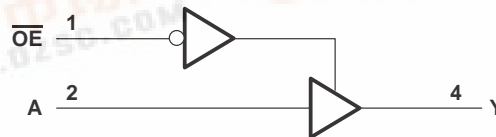
† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

‡ The actual top-side marking has one additional character that designates the assembly/test site.

FUNCTION TABLE

INPUTS		OUTPUT
\overline{OE}	A	Y
L	H	H
L	L	L
H	X	Z

logic diagram (positive logic)



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.

SN74AHC1G125

SINGLE BUS BUFFER GATE

WITH 3-STATE OUTPUT

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

Supply voltage range, V_{CC}	–0.5 V to 7 V
Input voltage range, V_I (see Note 1)	–0.5 V to 7 V
Output voltage range, V_O (see Note 1)	–0.5 V to $V_{CC} + 0.5$ V
Input clamp current, I_{IK} ($V_I < 0$)	–20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	±25 mA
Continuous current through V_{CC} or GND	±50 mA
Package thermal impedance, θ_{JA} (see Note 2):	
DBV package	206°C/W
DCK package	252°C/W
DRL package	142°C/W
Storage temperature range, T_{stg}	–65°C to 150°C

[†] 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.

recommended operating conditions (see Note 3)

		MIN	MAX	UNIT
V_{CC}	Supply voltage	2	5.5	V
V_{IH}	High-level input voltage	$V_{CC} = 2$ V	1.5	V
		$V_{CC} = 3$ V	2.1	
		$V_{CC} = 5.5$ V	3.85	
V_{IL}	Low-level input voltage	$V_{CC} = 2$ V	0.5	V
		$V_{CC} = 3$ V	0.9	
		$V_{CC} = 5.5$ V	1.65	
V_I	Input voltage	0	5.5	V
V_O	Output voltage	0	V_{CC}	V
I_{OH}	High-level output current	$V_{CC} = 2$ V	–50	µA
		$V_{CC} = 3.3$ V ± 0.3 V	–4	mA
		$V_{CC} = 5$ V ± 0.5 V	–8	
I_{OL}	Low-level output current	$V_{CC} = 2$ V	50	µA
		$V_{CC} = 3.3$ V ± 0.3 V	4	mA
		$V_{CC} = 5$ V ± 0.5 V	8	
$\Delta t/\Delta v$	Input transition rise or fall rate	$V_{CC} = 3.3$ V ± 0.3 V	100	ns/V
		$V_{CC} = 5$ V ± 0.5 V	20	
T_A	Operating free-air temperature	–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.

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SINGLE BUS BUFFER GATE
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electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
V _{OH}	I _{OH} = -50 µA	2 V	1.9	2		1.9		V
		3 V	2.9	3		2.9		
		4.5 V	4.4	4.5		4.4		
	I _{OH} = -4 mA	3 V	2.58			2.48		
	I _{OH} = -8 mA	4.5 V	3.94			3.8		
V _{OL}	I _{OL} = 50 µA	2 V			0.1		0.1	V
		3 V			0.1		0.1	
		4.5 V			0.1		0.1	
	I _{OL} = 4 mA	3 V			0.36		0.44	
	I _{OL} = 8 mA	4.5 V			0.36		0.44	
I _I	V _I = 5.5 V or GND	0 V to 5.5 V			±0.1		±1	µA
I _{OZ}	V _I = V _{CC} or GND	5.5 V			±0.25		±2.5	µA
I _{CC}	V _I = V _{CC} or GND, I _O = 0	5.5 V			1		10	µA
C _i	V _I = V _{CC} or GND	5 V		4	10		10	pF
C _o	V _O = V _{CC} or GND	5 V		10				pF

switching characteristics over recommended operating free-air temperature range,
V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	T _A = 25°C			MIN	MAX	UNIT
				MIN	TYP	MAX			
t _{PLH}	A	Y	C _L = 15 pF		5.6	8	1	9.5	ns
t _{PHL}					5.6	8	1	9.5	
t _{PZH}	$\overline{\text{OE}}$	Y	C _L = 15 pF		5.4	8	1	9.5	ns
t _{PZL}					5.4	8	1	9.5	
t _{PHZ}	$\overline{\text{OE}}$	Y	C _L = 15 pF		7	9.7	1	11.5	ns
t _{PLZ}					7	9.7	1	11.5	
t _{PLH}	A	Y	C _L = 50 pF		8.1	11.5	1	13	ns
t _{PHL}					8.1	11.5	1	13	
t _{PZH}	$\overline{\text{OE}}$	Y	C _L = 50 pF		7.9	11.5	1	13	ns
t _{PZL}					7.9	11.5	1	13	
t _{PHZ}	$\overline{\text{OE}}$	Y	C _L = 50 pF		9.5	13.2	1	15	ns
t _{PLZ}					9.5	13.2	1	15	

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SINGLE BUS BUFFER GATE

WITH 3-STATE OUTPUT

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switching characteristics over recommended operating free-air temperature range,
 $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
				MIN	TYP	MAX			
t_{PLH}	A	Y	$C_L = 15\text{ pF}$		3.8	5.5	1	6.5	ns
t_{PHL}					3.8	5.5	1	6.5	
t_{PZH}	\overline{OE}	Y	$C_L = 15\text{ pF}$		3.6	5.1	1	6	ns
t_{PZL}					3.6	5.1	1	6	
t_{PHZ}	\overline{OE}	Y	$C_L = 15\text{ pF}$		4.6	6.8	1	8	ns
t_{PLZ}					4.6	6.8	1	8	
t_{PLH}	A	Y	$C_L = 50\text{ pF}$		5.3	7.5	1	8.5	ns
t_{PHL}					5.3	7.5	1	8.5	
t_{PZH}	\overline{OE}	Y	$C_L = 50\text{ pF}$		5.1	7.1	1	8	ns
t_{PZL}					5.1	7.1	1	8	
t_{PHZ}	\overline{OE}	Y	$C_L = 50\text{ pF}$		6.1	8.8	1	10	ns
t_{PLZ}					6.1	8.8	1	10	

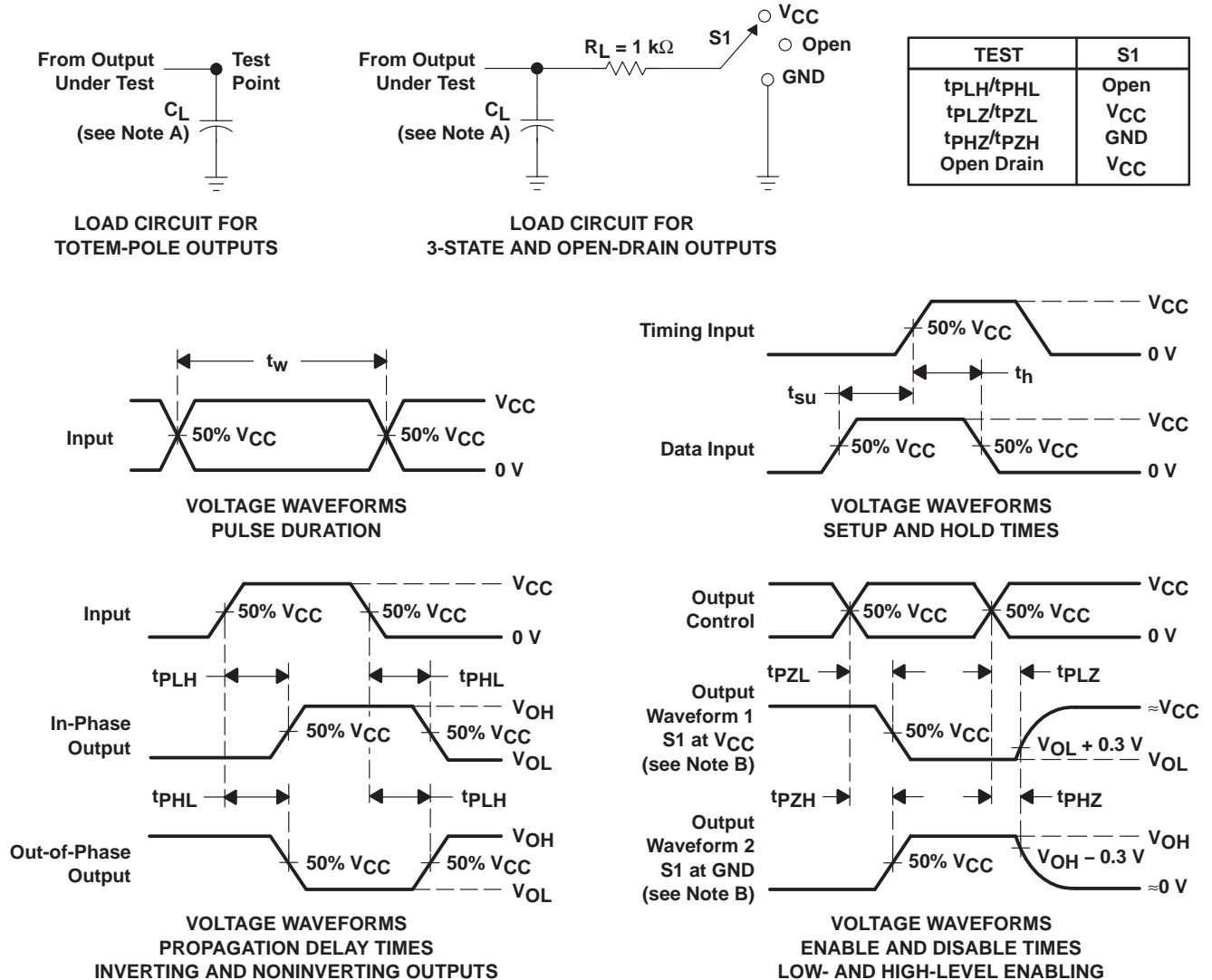
operating characteristics, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance	No load, $f = 1\text{ MHz}$	14	pF

SN74AHC1G125 SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT

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PARAMETER MEASUREMENT INFORMATION



- 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: $PRR \leq 1\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r \leq 3\text{ ns}$, $t_f \leq 3\text{ ns}$.
- D. The outputs are measured one at a time with one input transition per measurement.
- E. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
74AHC1G125DBVRE4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AHC1G125DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AHC1G125DBVTE4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AHC1G125DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AHC1G125DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AHC1G125DCKRG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AHC1G125DCKTE4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AHC1G125DCKTG4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AHC1G125DRLRG4	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHC1G125DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHC1G125DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHC1G125DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHC1G125DCKT	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHC1G125DRLR	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

⁽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⁾ 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)

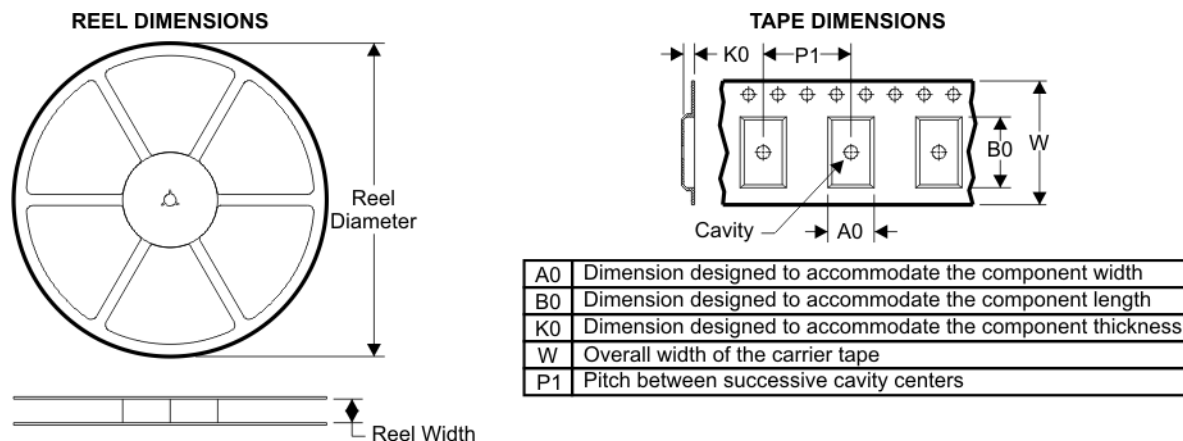
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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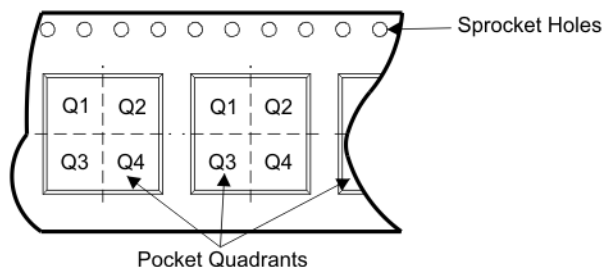
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TAPE AND REEL BOX INFORMATION

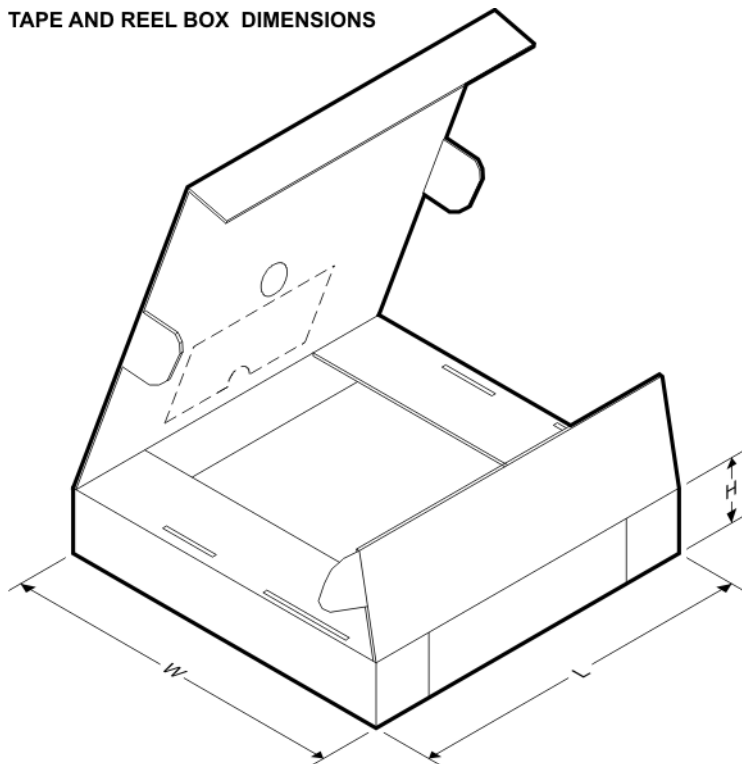


QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



Device	Package	Pins	Site	Reel Diameter (mm)	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AHC1G125DBVR	DBV	5	SITE 34	180	9	3.23	3.17	1.37	4	8	Q3
SN74AHC1G125DBVR	DBV	5	SITE 45	0	0	3.23	3.17	1.37	4	8	Q3
SN74AHC1G125DBVT	DBV	5	SITE 34	180	9	3.23	3.17	1.37	4	8	Q3
SN74AHC1G125DBVT	DBV	5	SITE 45	330	16	10.6	15.8	4.9	16	24	Q3
SN74AHC1G125DCKR	DCK	5	SITE 34	180	9	2.24	2.34	1.22	4	8	Q3
SN74AHC1G125DCKR	DCK	5	SITE 45	0	0	2.4	2.5	1.2	4	8	Q3
SN74AHC1G125DCKT	DCK	5	SITE 34	180	9	2.24	2.34	1.22	4	8	Q3
SN74AHC1G125DCKT	DCK	5	SITE 45	0	0	2.4	2.5	1.2	4	8	Q3
SN74AHC1G125DRLR	DRL	5	SITE 35	180	9	1.78	1.78	0.69	4	8	Q3

TAPE AND REEL BOX DIMENSIONS

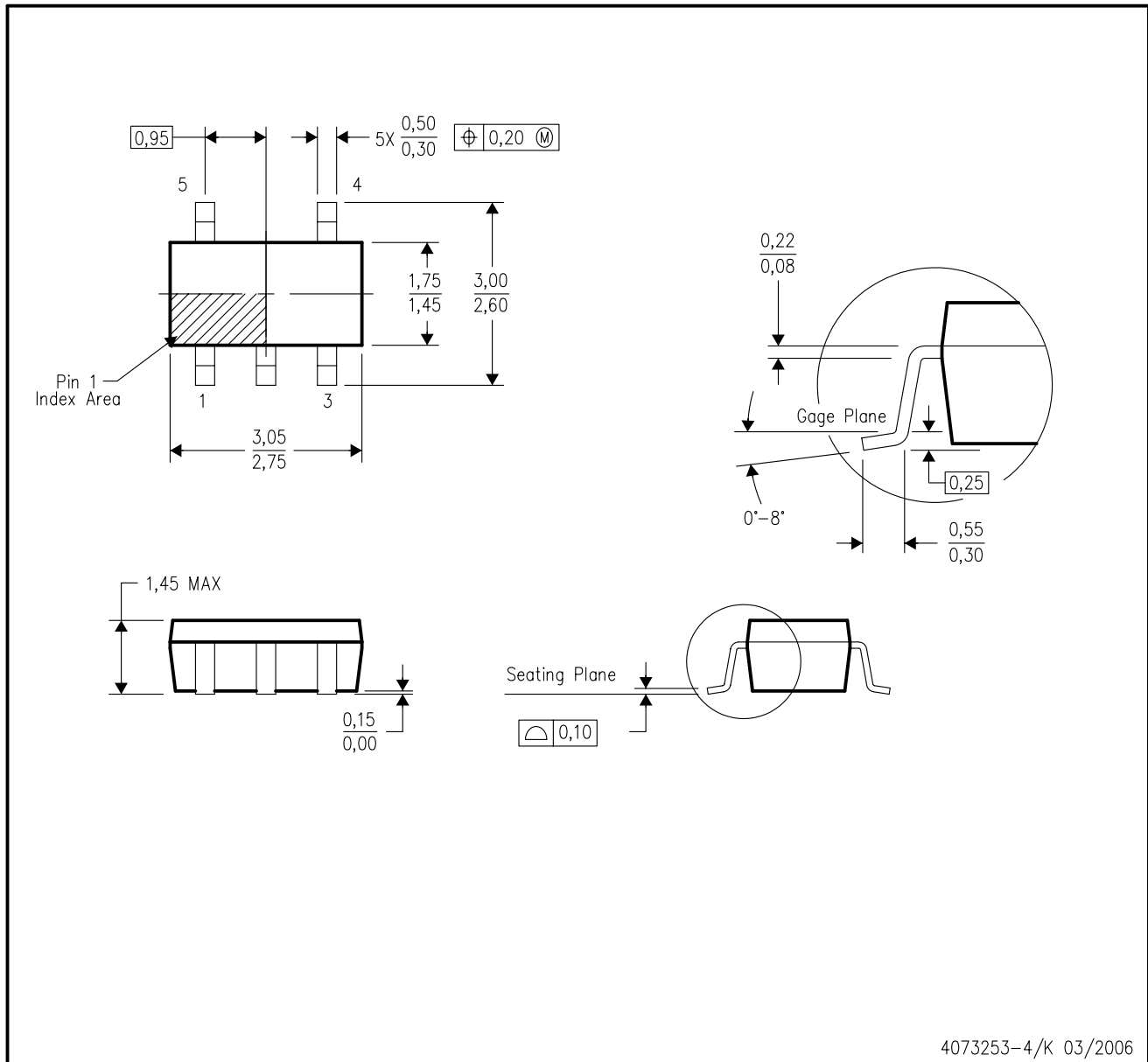


Device	Package	Pins	Site	Length (mm)	Width (mm)	Height (mm)
SN74AHC1G125DBVR	DBV	5	SITE 34	205.0	200.0	33.0
SN74AHC1G125DBVR	DBV	5	SITE 45	0.0	185.0	220.0
SN74AHC1G125DBVT	DBV	5	SITE 34	201.0	192.0	26.0
SN74AHC1G125DBVT	DBV	5	SITE 45	0.0	0.0	0.0
SN74AHC1G125DCKR	DCK	5	SITE 34	205.0	200.0	33.0
SN74AHC1G125DCKR	DCK	5	SITE 45	0.0	185.0	220.0
SN74AHC1G125DCKT	DCK	5	SITE 34	201.0	192.0	26.0
SN74AHC1G125DCKT	DCK	5	SITE 45	0.0	185.0	220.0
SN74AHC1G125DRLR	DRL	5	SITE 35	202.0	201.0	28.0

MECHANICAL DATA

DBV (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE

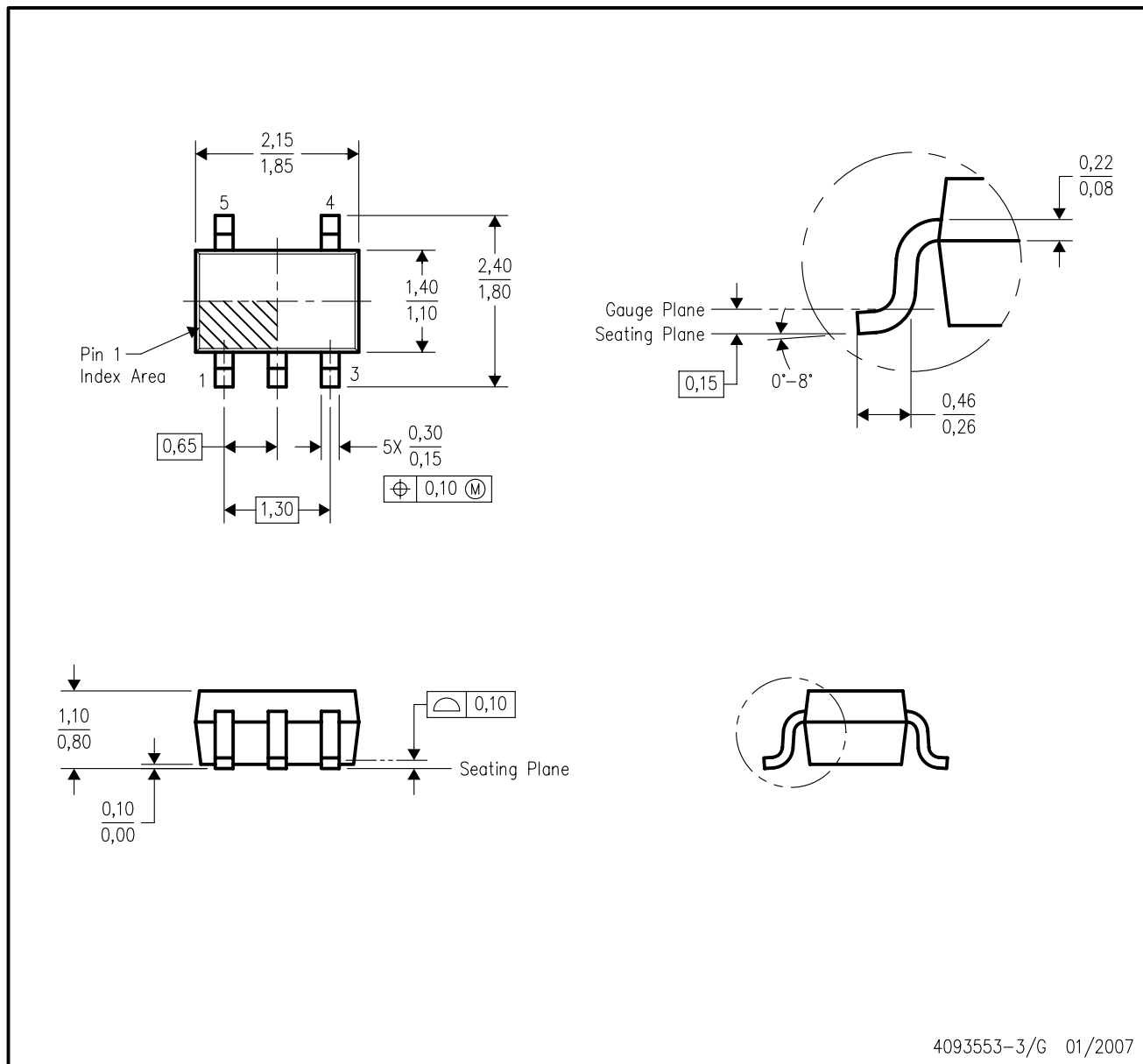


- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
 - Falls within JEDEC MO-178 Variation AA.

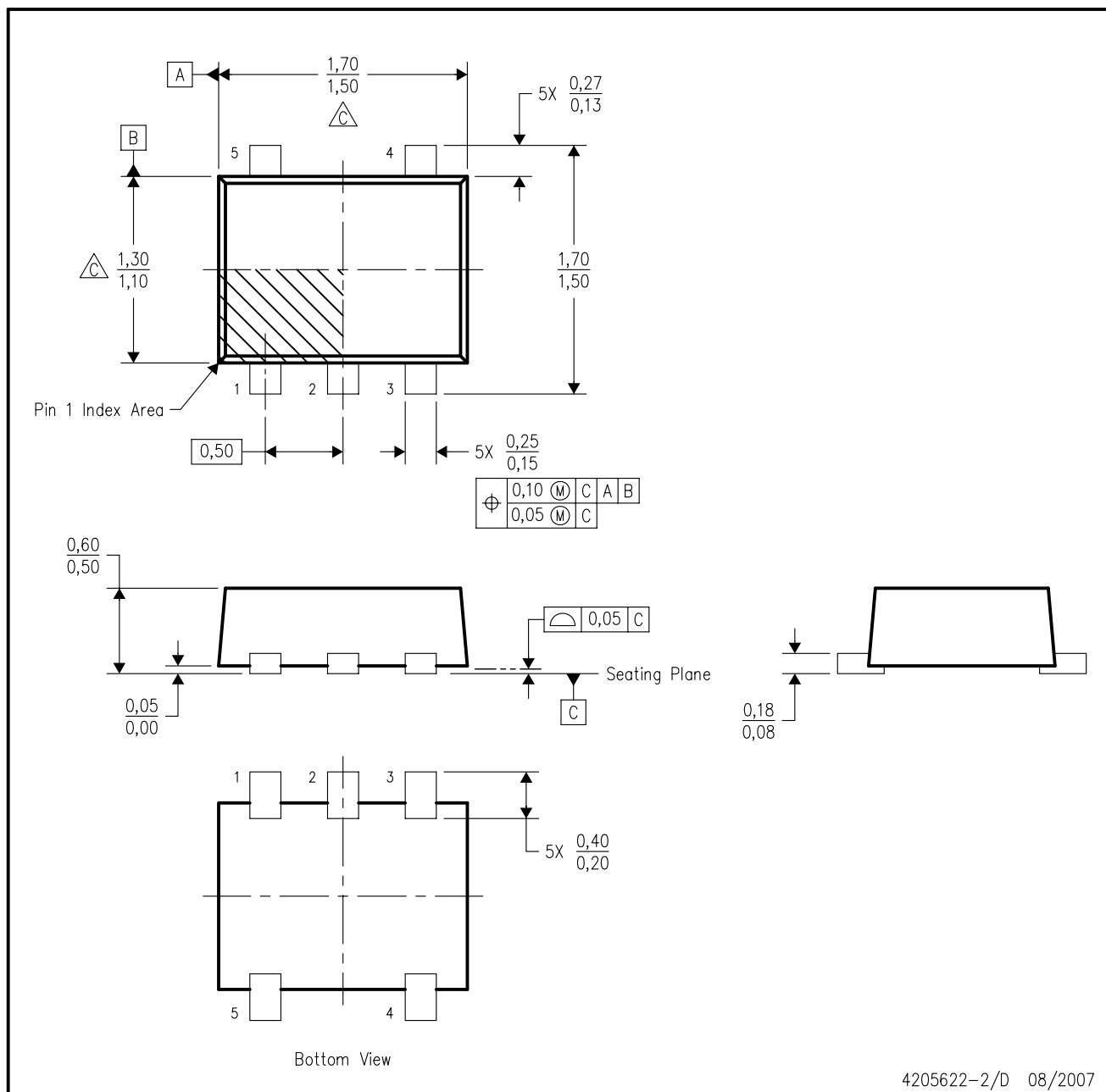
MECHANICAL DATA

DCK (R-PDSO-G5)

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 AA.



4205622-2/D 08/2007

NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash, interlead flash, protrusions, or gate burrs. Mold flash, interlead flash, protrusions, or gate burrs shall not exceed 0,15 per end or side.
 D. JEDEC package registration is pending.

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