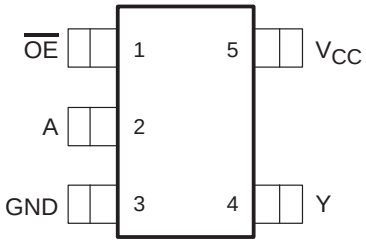
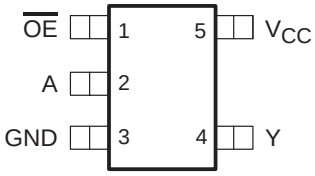
- **Operating Range of 2 V to 5.5 V**
- **Max t_{pd} of 6 ns at 5 V**
- **Low Power Consumption, 10-μA Max I_{CC}**
- **±8-mA Output Drive at 5 V**

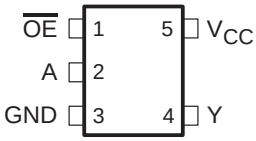
DBV PACKAGE
(TOP VIEW)



DCK PACKAGE
(TOP VIEW)



DRL PACKAGE
(TOP VIEW)



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

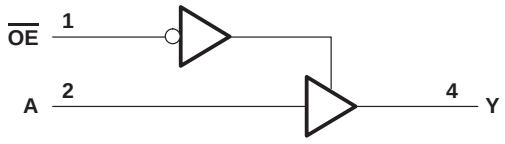
T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING‡
−40°C to 85°C	SOT (SOT-23) − DBV	Reel of 3000	SN74AHC1G125DBVR	A25_
		Reel of 250	SN74AHC1G125DBVT	
	SOT (SC-70) − DCK	Reel of 3000	SN74AHC1G125DCKR	AM_
		Reel of 250	SN74AHC1G125DCKT	
	SOT (SOT-553) − DRL	Reel of 4000	SN74AHC1G125DRLR	AM_

† 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.

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.

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}	$\overline{OE}$	Y	C_L = 15 pF		5.4	8	1	9.5	ns
t_{PZL}					5.4	8	1	9.5	
t_{PHZ}	$\overline{OE}$	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}	$\overline{OE}$	Y	C_L = 50 pF		7.9	11.5	1	13	ns
t_{PZL}					7.9	11.5	1	13	
t_{PHZ}	$\overline{OE}$	Y	C_L = 50 pF		9.5	13.2	1	15	ns
t_{PLZ}					9.5	13.2	1	15	

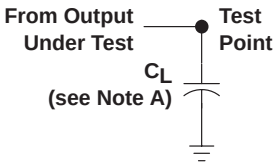
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

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		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 pF		3.6	5.1	1	6	ns
t_{PZL}					3.6	5.1	1	6	
t_{PHZ}	$\overline{OE}$	Y	C_L = 15 pF		4.6	6.8	1	8	ns
t_{PLZ}					4.6	6.8	1	8	
t_{PLH}	A	Y	C_L = 50 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 pF		5.1	7.1	1	8	ns
t_{PZL}					5.1	7.1	1	8	
t_{PHZ}	$\overline{OE}$	Y	C_L = 50 pF		6.1	8.8	1	10	ns
t_{PLZ}					6.1	8.8	1	10	

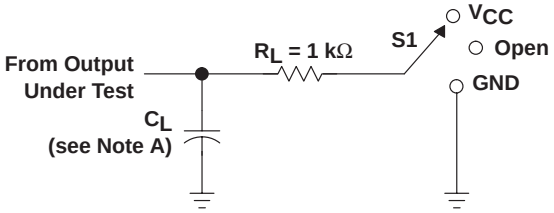
operating characteristics, V_{CC} = 5 V, T_A = 25°C

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

PARAMETER MEASUREMENT INFORMATION

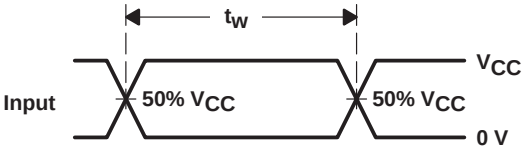


LOAD CIRCUIT FOR
TOTEM-POLE OUTPUTS

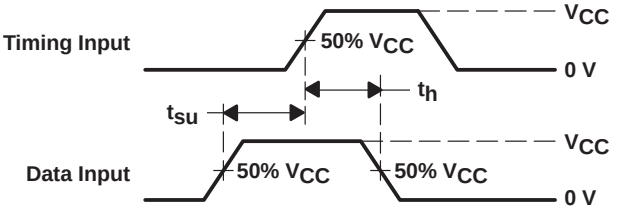


LOAD CIRCUIT FOR
3-STATE AND OPEN-DRAIN OUTPUTS

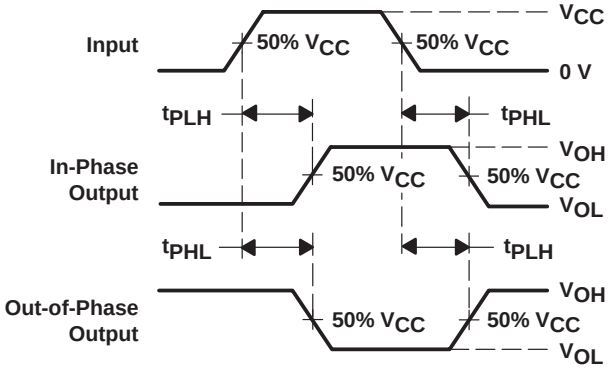
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{CC}
t_{PHZ}/t_{PZH}	GND
Open Drain	V_{CC}



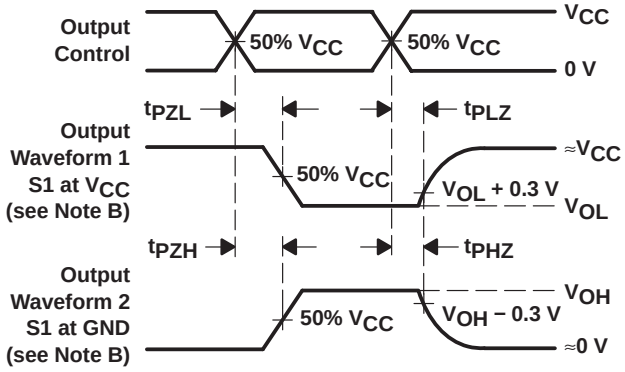
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS



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 ≤ 1 MHz, Z_O = 50 Ω, t_r ≤ 3 ns, t_f ≤ 3 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)	Op Temp (°C)	Top-Side Markings (4)	Samples
74AHC1G125DBVRE4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(A253 ~ A25G ~ A25J ~ A25L ~ A25S)	Samples
74AHC1G125DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(A253 ~ A25G ~ A25J ~ A25L ~ A25S)	Samples
74AHC1G125DBVTE4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(A253 ~ A25G ~ A25L ~ A25S)	Samples
74AHC1G125DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(A253 ~ A25G ~ A25L ~ A25S)	Samples
74AHC1G125DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(AM3 ~ AMG ~ AMJ ~ AML ~ AMS)	Samples
74AHC1G125DCKRG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(AM3 ~ AMG ~ AMJ ~ AML ~ AMS)	Samples
74AHC1G125DCKTE4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(AM3 ~ AMG ~ AML ~ AMS)	Samples
74AHC1G125DCKTG4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(AM3 ~ AMG ~ AML ~ AMS)	Samples
74AHC1G125DRLRG4	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AMS	Samples
SN74AHC1G125DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(A253 ~ A25G ~ A25J ~ A25L ~ A25S)	Samples
SN74AHC1G125DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(A253 ~ A25G ~ A25L ~ A25S)	Samples
SN74AHC1G125DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(AM3 ~ AMG ~ AMJ ~ AML ~ AMS)	Samples
SN74AHC1G125DCKT	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	(AM3 ~ AMG ~ AML ~ AMS)	Samples
SN74AHC1G125DRLR	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AMS	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.

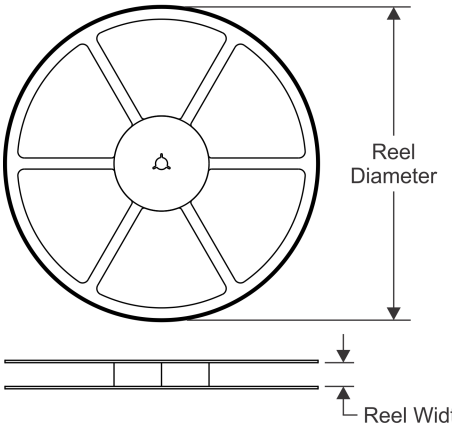
(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been 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.

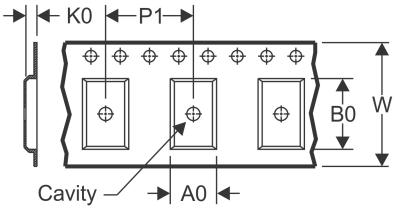
(4) Multiple Top-Side Markings will be inside parentheses. Only one Top-Side Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Top-Side Marking for that device.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

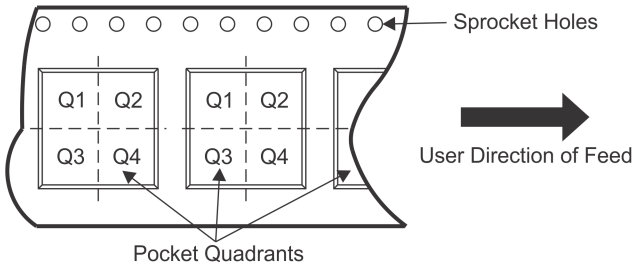


TAPE DIMENSIONS



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

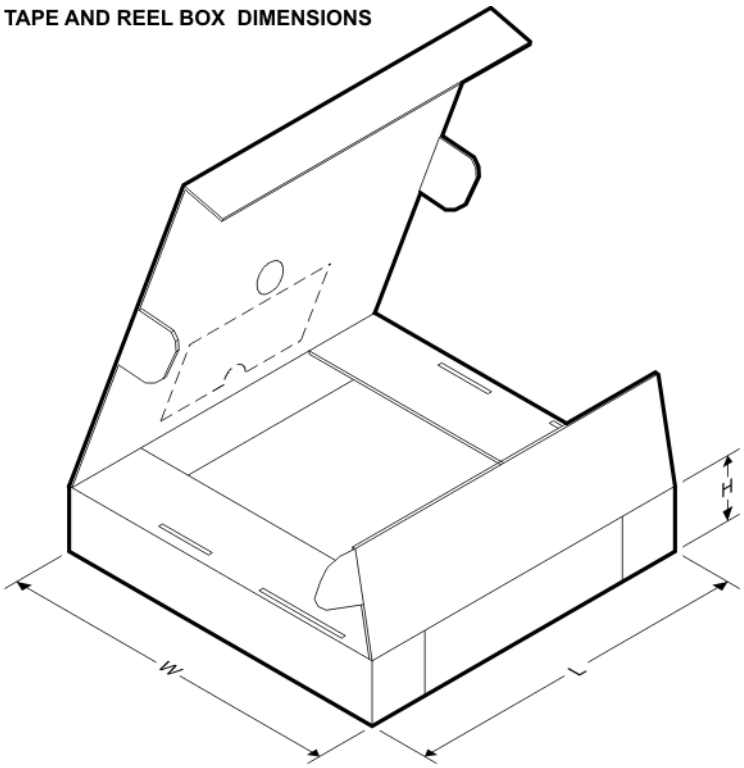
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74AHC1G125DBVR	SOT-23	DBV	5	3000	180.0	9.2	3.17	3.23	1.37	4.0	8.0	Q3
SN74AHC1G125DBVR	SOT-23	DBV	5	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHC1G125DBVR	SOT-23	DBV	5	3000	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74AHC1G125DBVR	SOT-23	DBV	5	3000	180.0	8.4	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHC1G125DBVT	SOT-23	DBV	5	250	180.0	8.4	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHC1G125DBVT	SOT-23	DBV	5	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74AHC1G125DBVT	SOT-23	DBV	5	250	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74AHC1G125DCKR	SC70	DCK	5	3000	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74AHC1G125DCKR	SC70	DCK	5	3000	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3
SN74AHC1G125DCKR	SC70	DCK	5	3000	180.0	9.2	2.3	2.55	1.2	4.0	8.0	Q3
SN74AHC1G125DCKT	SC70	DCK	5	250	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74AHC1G125DCKT	SC70	DCK	5	250	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3
SN74AHC1G125DCKT	SC70	DCK	5	250	180.0	9.2	2.3	2.55	1.2	4.0	8.0	Q3
SN74AHC1G125DRLR	SOT	DRL	5	4000	180.0	8.4	1.98	1.78	0.69	4.0	8.0	Q3

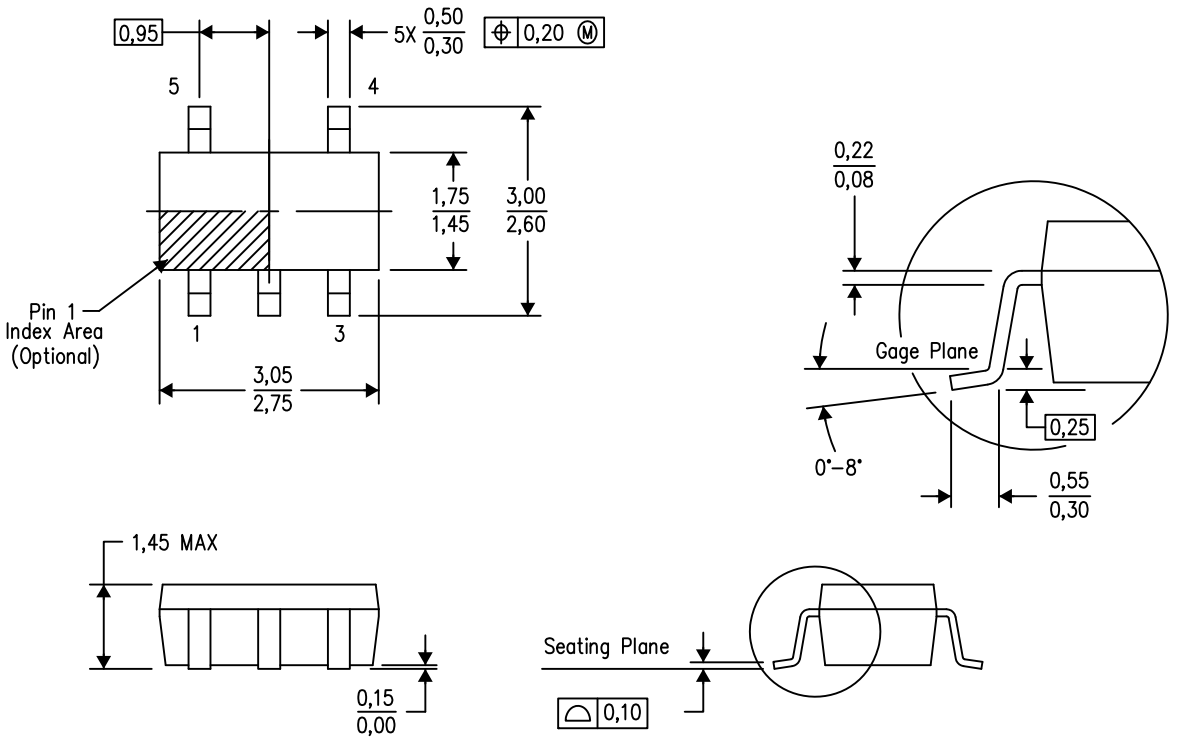
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AHC1G125DBVR	SOT-23	DBV	5	3000	205.0	200.0	33.0
SN74AHC1G125DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74AHC1G125DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74AHC1G125DBVR	SOT-23	DBV	5	3000	202.0	201.0	28.0
SN74AHC1G125DBVT	SOT-23	DBV	5	250	202.0	201.0	28.0
SN74AHC1G125DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74AHC1G125DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74AHC1G125DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74AHC1G125DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74AHC1G125DCKR	SC70	DCK	5	3000	205.0	200.0	33.0
SN74AHC1G125DCKT	SC70	DCK	5	250	180.0	180.0	18.0
SN74AHC1G125DCKT	SC70	DCK	5	250	180.0	180.0	18.0
SN74AHC1G125DCKT	SC70	DCK	5	250	205.0	200.0	33.0
SN74AHC1G125DRLR	SOT	DRL	5	4000	202.0	201.0	28.0

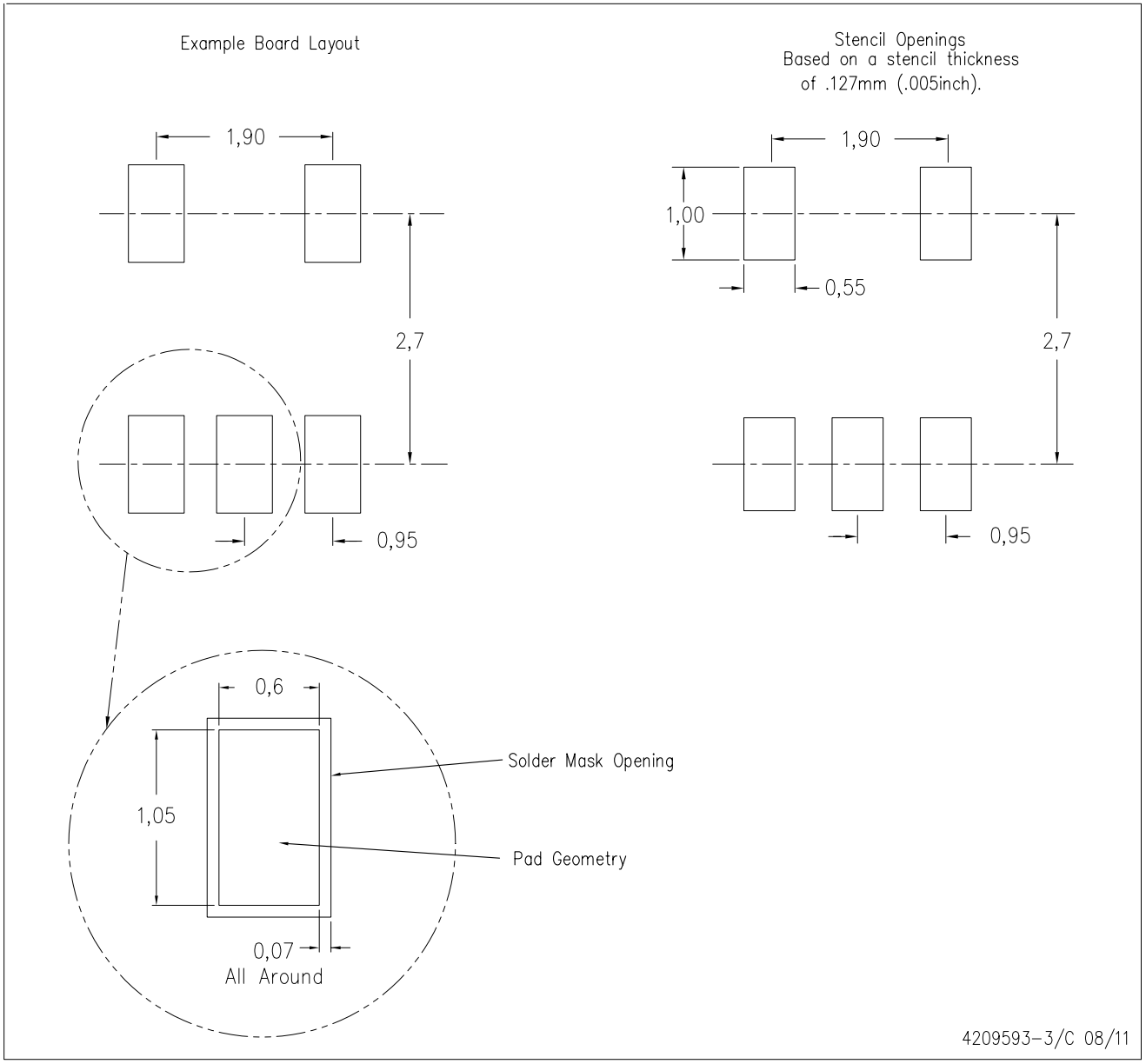
DBV (R–PDSO–G5) PLASTIC SMALL–OUTLINE PACKAGE



4073253–4/L 08/2013

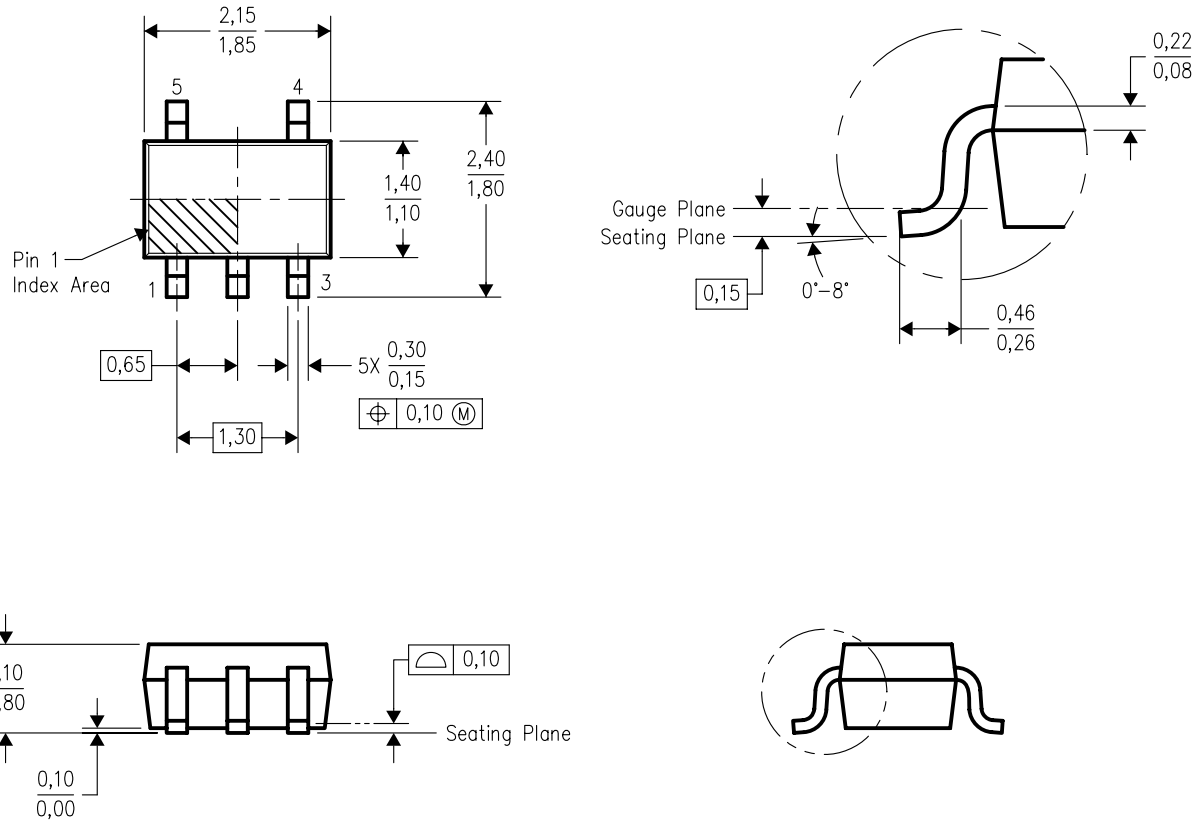
NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
D. Falls within JEDEC MO–178 Variation AA.

DBV (R–PDSO–G5) 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.

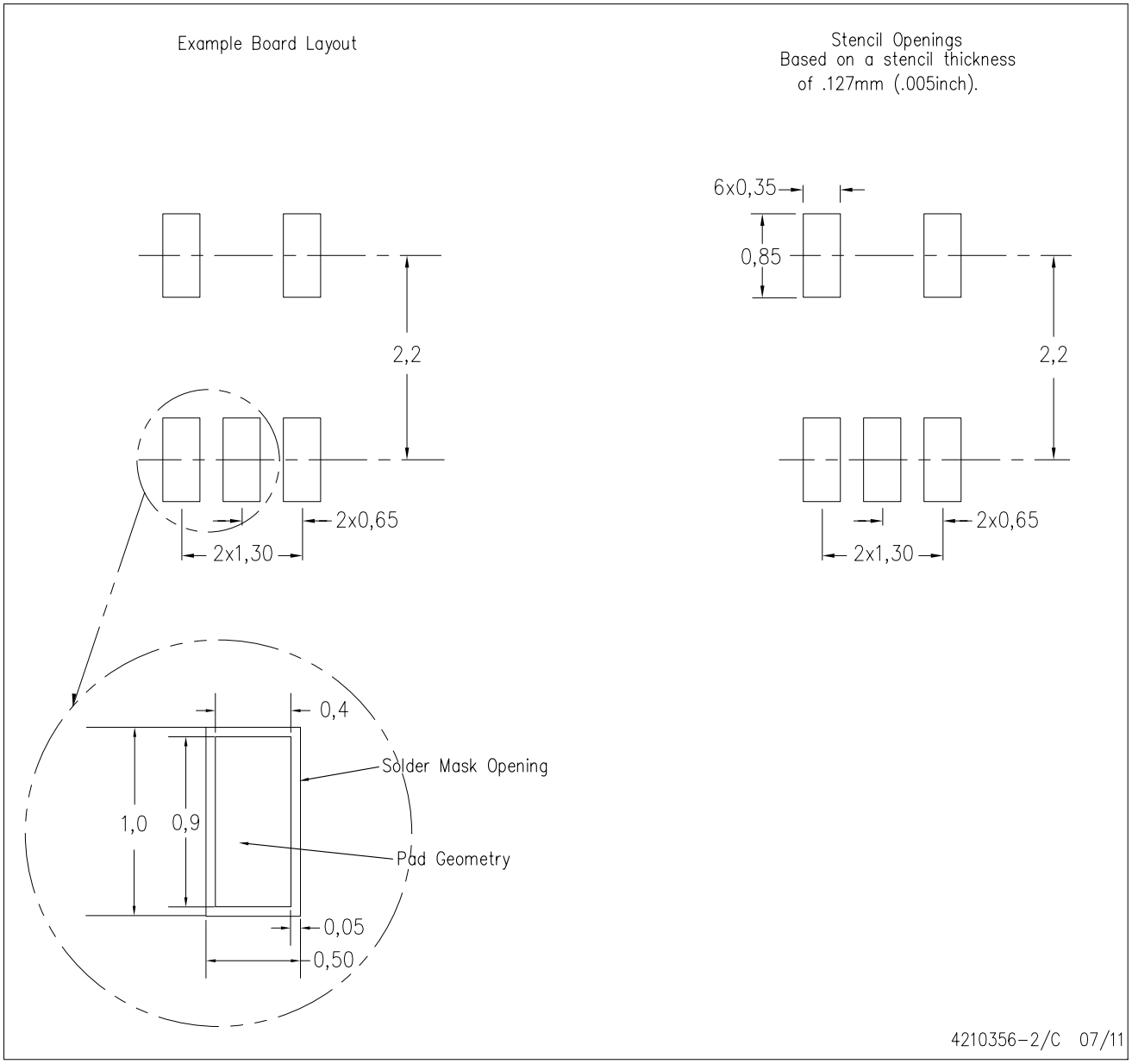
DCK (R–PDSO–G5) PLASTIC SMALL–OUTLINE PACKAGE



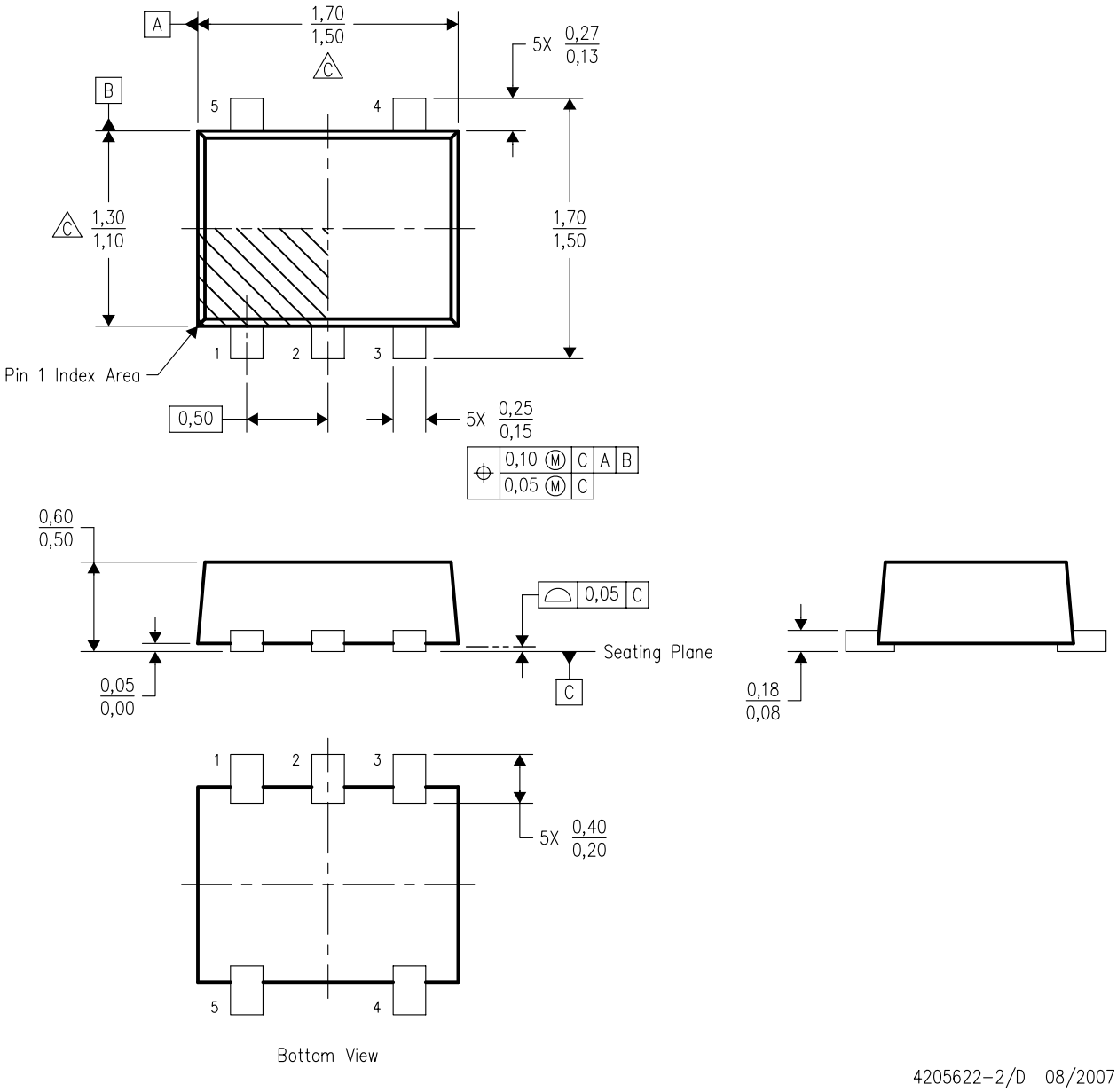
4093553–3/G 01/2007

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.

DCK (R–PDSO–G5) PLASTIC SMALL OUTLINE



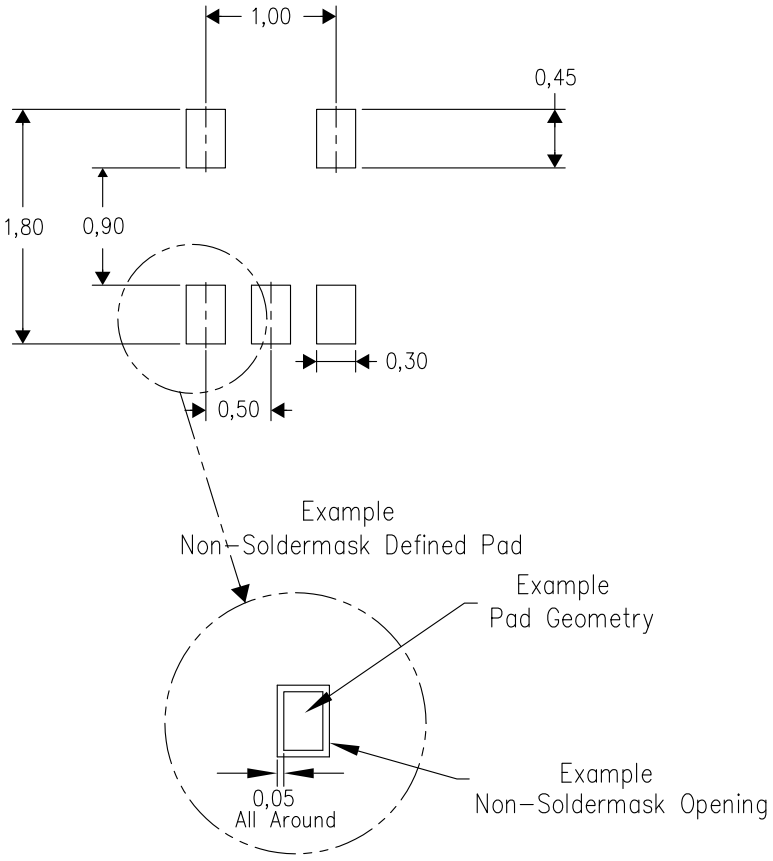
NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
D. Publication IPC–7351 is recommended for alternate designs.
E. Laser cutting 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.



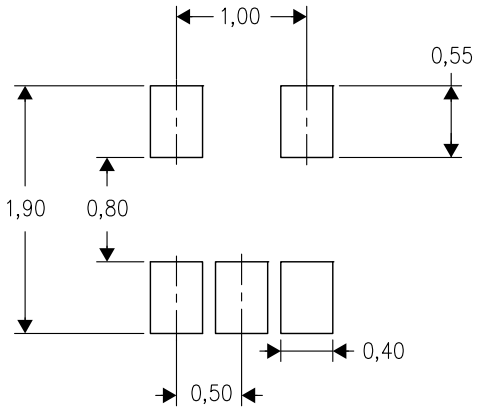
NOTES:
A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash, interlead flash, protrusions, or gate burrs. Mold flash, interlead flash, protrusions, or gate burrs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

DRL (R–PDSO–N5) PLASTIC SMALL OUTLINE

Example Board Layout



Example Stencil Design
(Note E)



4208207–2/E 06/12

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. Customers should contact their board fabrication site for minimum solder mask web tolerances between signal pads.
E. Maximum stencil thickness 0,127 mm (5 mils). All linear dimensions are in millimeters.
F. 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 stencil design considerations.
G. Side aperture dimensions over–print land for acceptable area ratio > 0.66. Customer may reduce side aperture dimensions if stencil manufacturing process allows for sufficient release at smaller opening.

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