

Single Positive-Edge-Triggered D-Type Flip-Flop

Check for Samples: [SN74LVC1G79](#)

FEATURES

- Available in the Texas Instruments NanoFree™ Package
- Supports 5-V V_{CC} Operation
- Inputs Accept Voltages to 5.5 V
- Supports Down Translation to V_{CC}
- Max t_{pd} of 4 ns at 3.3 V
- Low Power Consumption, 10- μ A Max I_{CC}
- \pm 24-mA Output Drive at 3.3 V
- I_{off} Supports Live Insertion, Partial-Power-Down Mode, and Back-Drive Protection
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

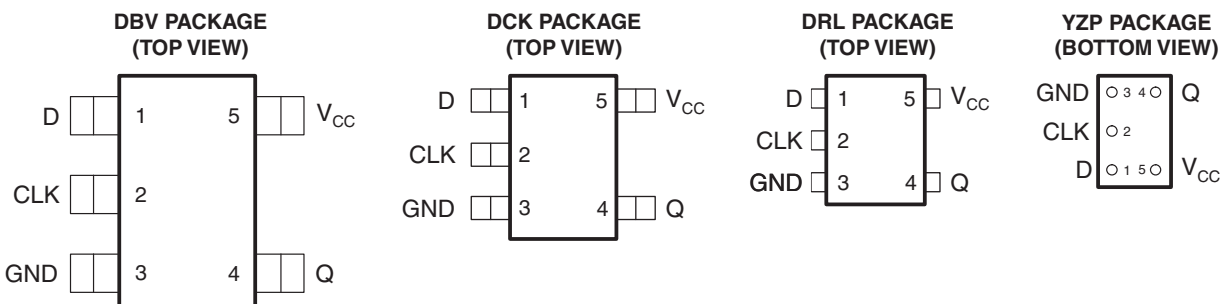
DESCRIPTION

This single positive-edge-triggered D-type flip-flop is designed for 1.65-V to 5.5-V V_{CC} operation.

When data at the data (D) input meets the setup time requirement, the data is transferred to the Q output on the positive-going edge of the clock pulse. Clock triggering occurs at a voltage level and is not directly related to the rise time of the clock pulse. Following the hold-time interval, data at the D input can be changed without affecting the level at the output.

NanoFree™ package technology is a major breakthrough in IC packaging concepts, using the die as the package.

This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.



See mechanical drawings for dimensions.



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.

NanoFree is a trademark of Texas Instruments.

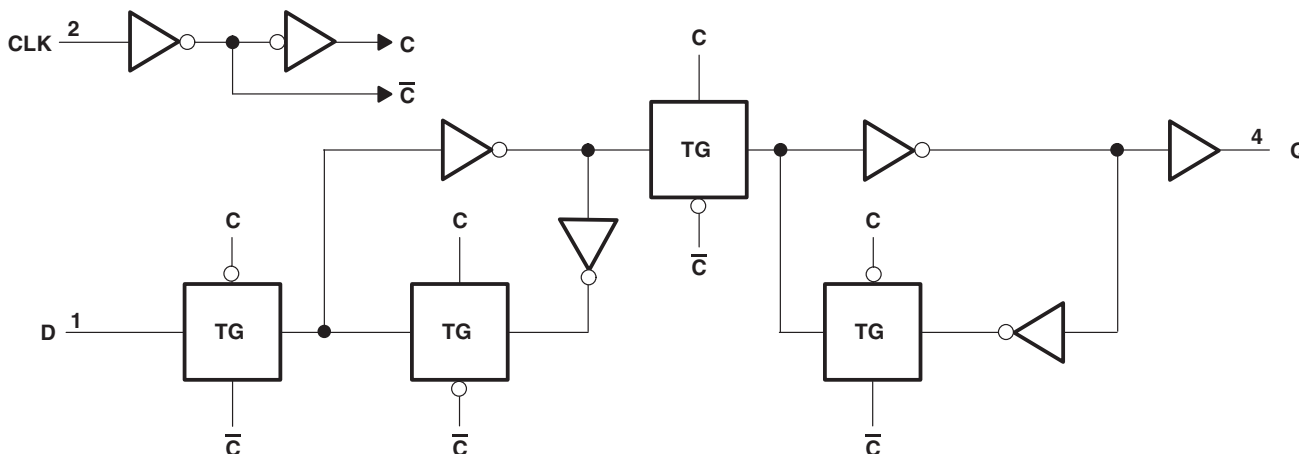


These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Function Table

INPUTS		OUTPUT
CLK	D	Y
↑	H	H
↑	L	L
L	X	Q ₀

Logic Diagram (Positive Logic)



Absolute Maximum Ratings⁽¹⁾

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

		MIN	MAX	UNIT
V _{CC}	Supply voltage range	-0.5	6.5	V
V _I	Input voltage range ⁽²⁾	-0.5	6.5	V
V _O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾	-0.5	6.5	V
V _O	Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾	-0.5	V _{CC} + 0.5	V
I _{IK}	Input clamp current	V _I < 0		-50 mA
I _{OK}	Output clamp current	V _O < 0		-50 mA
I _O	Continuous output current			±50 mA
	Continuous current through V _{CC} or GND			±100 mA
θ _{JA}	Package thermal impedance ⁽⁴⁾	DBV package		206
		DCK package		252
		DRL package		142
		YZP package		132
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 negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The value of V_{CC} is provided in the recommended operating conditions table.
- (4) The package thermal impedance is calculated in accordance with JESD 51-7.

Recommended Operating Conditions⁽¹⁾

			MIN	MAX	UNIT
V _{CC}	Supply voltage	Operating	1.65	5.5	V
		Data retention only	1.5		
V _{IH}	High-level input voltage	V _{CC} = 1.65 V to 1.95 V	0.65 × V _{CC}		V
		V _{CC} = 2.3 V to 2.7 V	1.7		
		V _{CC} = 3 V to 3.6 V	2		
		V _{CC} = 4.5 V to 5.5 V	0.7 × V _{CC}		
V _{IL}	Low-level input voltage	V _{CC} = 1.65 V to 1.95 V		0.35 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V		0.7	
		V _{CC} = 3 V to 3.6 V		0.8	
		V _{CC} = 4.5 V to 5.5 V		0.3 × V _{CC}	
V _I	Input voltage		0	5.5	V
V _O	Output voltage		0	V _{CC}	V
I _{OH}	High-level output current	V _{CC} = 1.65 V		–4	mA
		V _{CC} = 2.3 V		–8	
		V _{CC} = 3 V		–16	
		V _{CC} = 4.5 V		–24	
I _{OL}	Low-level output current	V _{CC} = 1.65 V		4	mA
		V _{CC} = 2.3 V		8	
		V _{CC} = 3 V		16	
		V _{CC} = 4.5 V		24	
Δt/Δv	Input transition rise or fall rate	V _{CC} = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V		20	ns/V
		V _{CC} = 3.3 V ± 0.3 V		10	
		V _{CC} = 5 V ± 0.5 V		5	
T _A	Operating free-air temperature		–40	125	°C

(1) 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}	–40°C to 85°C			–40°C to 125°C			UNIT
			MIN	TYP ⁽¹⁾	MAX	MIN	TYP ⁽¹⁾	MAX	
V _{OH}	I _{OH} = –100 μA	1.65 V to 5.5 V	V _{CC} – 0.1			V _{CC} – 0.1			V
	I _{OH} = –4 mA	1.65 V	1.2			1.2			
	I _{OH} = –8 mA	2.3 V	1.9			1.9			
	I _{OH} = –16 mA	3 V	2.4			2.4			
	I _{OH} = –24 mA		2.3			2.3			
	I _{OH} = –32 mA	4.5 V	3.8			3.8			
V _{OL}	I _{OL} = 100 μA	1.65 V to 5.5 V				0.1			V
	I _{OL} = 4 mA	1.65 V				0.45			
	I _{OL} = 8 mA	2.3 V				0.3			
	I _{OL} = 16 mA	3 V				0.4			
	I _{OL} = 24 mA					0.55			
	I _{OL} = 32 mA	4.5 V				0.55			
I _I	All inputs	V _I = 5.5 V or GND	0 to 5.5 V			±10			μA
I _{off}		V _I or V _O = 5.5 V	0			±10			μA
I _{CC}		V _I = 5.5 V or GND, I _O = 0	1.65 V to 5.5 V			10			μA
ΔI _{CC}		One input at V _{CC} – 0.6 V, Other inputs at V _{CC} or GND	3 V to 5.5 V			500			μA
C _i		V _I = V _{CC} or GND	3.3 V			4			pF

(1) All typical values are at V_{CC} = 3.3 V, T_A = 25°C.

Timing Requirements

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

PARAMETER	SN74LVC1G79 –40°C to 85°C								UNIT	
	V _{CC} = 1.8 ± 0.15 V		V _{CC} = 2.5 ± 0.2 V		V _{CC} = 3.3 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V			
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
f _{clock}	Clock frequency		160		160		160		MHz	
t _w	Pulse duration, CLK high or low		2.5		2.5		2.5		ns	
t _{su}	Setup time before CLK↑		Data high	2.2		1.4		1.3		ns
			Data low	2.6		1.4		1.3		
t _h	Hold time, data after CLK↑		0.3		0.4		1		ns	

Timing Requirements

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

PARAMETER	SN74LVC1G79 –40°C to 125°C								UNIT	
	V _{CC} = 1.8 ± 0.15 V		V _{CC} = 2.5 ± 0.2 V		V _{CC} = 3.3 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V			
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
f _{clock}	Clock frequency		160		160		160		MHz	
t _w	Pulse duration, CLK high or low		2.5		2.5		2.5		ns	
t _{su}	Setup time before CLK↑		Data high	2.2		1.4		1.3		ns
			Data low	2.6		1.4		1.3		
t _h	Hold time, data after CLK↑		0.3		0.4		1		ns	

Switching Characteristics

over recommended operating free-air temperature range, $C_L = 15$ pF (unless otherwise noted) (see [Figure 1](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN74LVC1G79 –40°C to 85°C								UNIT
			$V_{CC} = 1.8\text{ V}$ $\pm 0.15\text{ V}$		$V_{CC} = 2.5\text{ V}$ $\pm 0.2\text{ V}$		$V_{CC} = 3.3\text{ V}$ $\pm 0.3\text{ V}$		$V_{CC} = 5\text{ V}$ $\pm 0.5\text{ V}$		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
f_{max}			160		160		160		160		MHz
t_{pd}	CLK	Q	2.5	9.1	1.2	6	1	4	0.8	3.8	ns

Switching Characteristics

over recommended operating free-air temperature range, $C_L = 30$ pF or 50 pF (unless otherwise noted) (see [Figure 2](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN74LVC1G79 –40°C to 85°C								UNIT
			$V_{CC} = 1.8\text{ V}$ $\pm 0.15\text{ V}$		$V_{CC} = 2.5\text{ V}$ $\pm 0.2\text{ V}$		$V_{CC} = 3.3\text{ V}$ $\pm 0.3\text{ V}$		$V_{CC} = 5\text{ V}$ $\pm 0.5\text{ V}$		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
f_{max}			160		160		160		160		MHz
t_{pd}	CLK	Q	3.9	9.9	2	7	1.7	5	1	4.5	ns

Switching Characteristics

over recommended operating free-air temperature range, $C_L = 30$ pF or 50 pF (unless otherwise noted) (see [Figure 2](#))

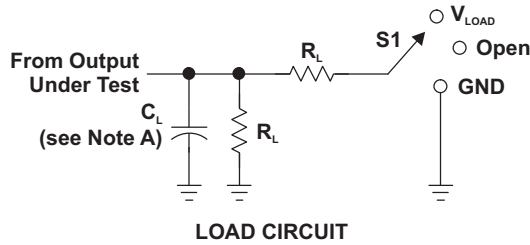
PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN74LVC1G79 –40°C to 125°C								UNIT
			$V_{CC} = 1.8\text{ V}$ $\pm 0.15\text{ V}$		$V_{CC} = 2.5\text{ V}$ $\pm 0.2\text{ V}$		$V_{CC} = 3.3\text{ V}$ $\pm 0.3\text{ V}$		$V_{CC} = 5\text{ V}$ $\pm 0.5\text{ V}$		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
f_{max}			160		160		160		160		MHz
t_{pd}	CLK	Q	3.9	12	2	8.5	1.7	6	1	5	ns

Operating Characteristics

$T_A = 25^\circ\text{C}$

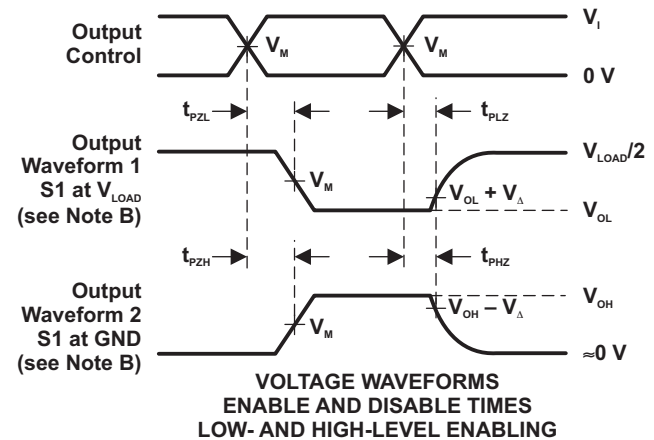
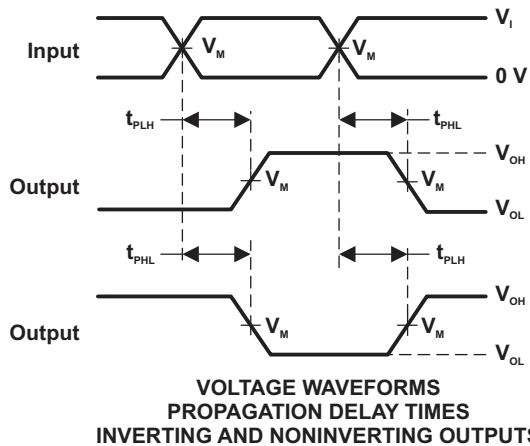
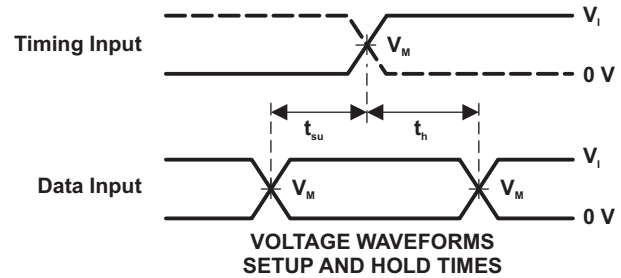
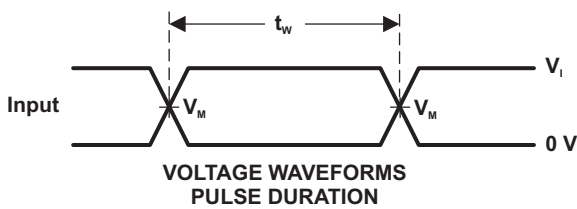
PARAMETER	TEST CONDITIONS	$V_{CC} = 1.8\text{ V}$	$V_{CC} = 2.5\text{ V}$	$V_{CC} = 3.3\text{ V}$	$V_{CC} = 5\text{ V}$	UNIT	
		TYP	TYP	TYP	TYP		
C_{pd}	Power dissipation capacitance	f = 10 MHz	26	26	27	30	pF

Parameter Measurement Information



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

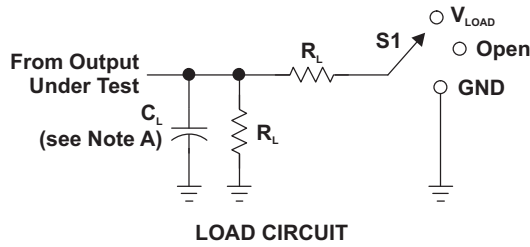
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_i	t_i/t_f					
$1.8\text{ V} \pm 0.15\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	15 pF	1 M Ω	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	15 pF	1 M Ω	0.15 V
$3.3\text{ V} \pm 0.3\text{ V}$	3 V	$\leq 2.5\text{ ns}$	1.5 V	6 V	15 pF	1 M Ω	0.3 V
$5\text{ V} \pm 0.5\text{ V}$	V_{CC}	$\leq 2.5\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	15 pF	1 M Ω	0.3 V



- 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: $PRR \leq 10\text{ MHz}$, $Z_o = 50\ \Omega$.
 - 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.

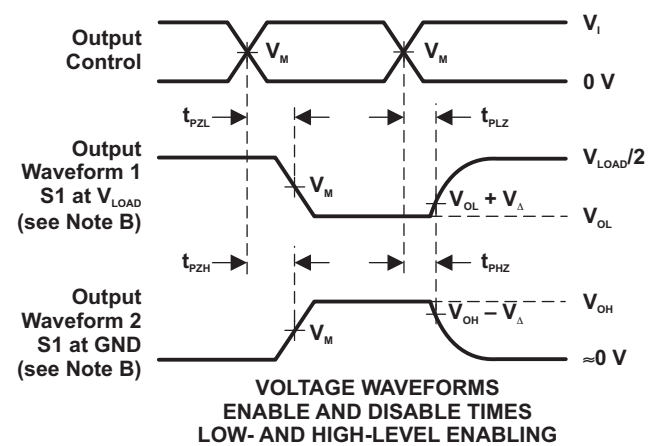
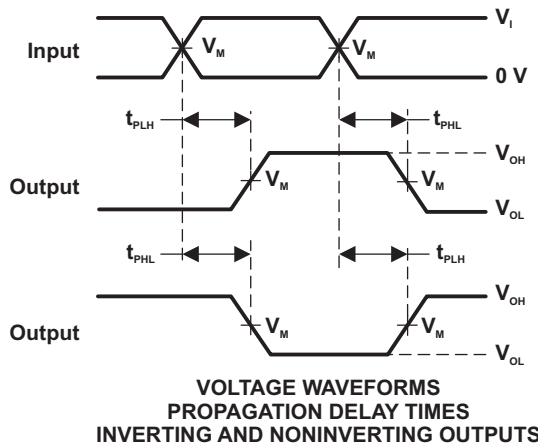
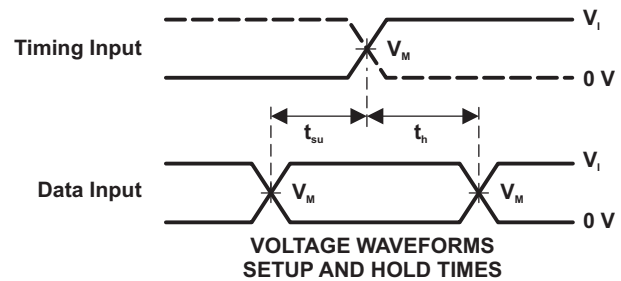
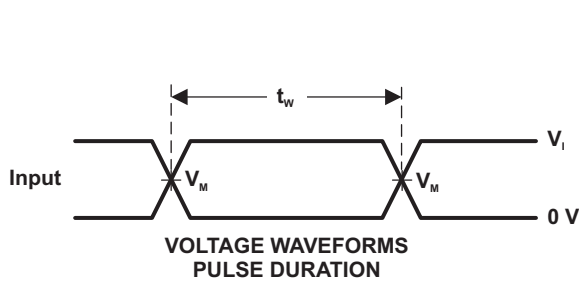
Figure 1. Load Circuit and Voltage Waveforms

Parameter Measurement Information (continued)



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

V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_i	t_r/t_f					
$1.8\text{ V} \pm 0.15\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	1 k Ω	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	500 Ω	0.15 V
$3.3\text{ V} \pm 0.3\text{ V}$	3 V	$\leq 2.5\text{ ns}$	1.5 V	6 V	50 pF	500 Ω	0.3 V
$5\text{ V} \pm 0.5\text{ V}$	V_{CC}	$\leq 2.5\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	50 pF	500 Ω	0.3 V



- 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 $\leq 10\text{ MHz}$, $Z_o = 50\ \Omega$.
 - 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 2. Load Circuit and Voltage Waveforms

REVISION HISTORY

Changes from Revision S (November 2007) to Revision T	Page
• Updated document to new TI data sheet format.	1
• Updated Features.	1
• Removed Ordering Information table.	1
• Added ESD warning.	2
• Updated operating temperature range.	3

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SN74LVC1G79DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(C795 ~ C79F ~ C79R)	Samples
SN74LVC1G79DBVT	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(C795 ~ C79F ~ C79R)	Samples
SN74LVC1G79DBVTG4	ACTIVE	SOT-23	DBV	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	C79F	Samples
SN74LVC1G79DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(CR5 ~ CRF ~ CRR)	Samples
SN74LVC1G79DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(CR5 ~ CRF ~ CRR)	Samples
SN74LVC1G79DCKRG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(CR5 ~ CRF ~ CRR)	Samples
SN74LVC1G79DCKT	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(CR5 ~ CRF ~ CRR)	Samples
SN74LVC1G79DCKTG4	ACTIVE	SC70	DCK	5	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(CR5 ~ CRF ~ CRR)	Samples
SN74LVC1G79DRLR	ACTIVE	SOT	DRL	5	4000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	(CR7 ~ CRR)	Samples
SN74LVC1G79YZPR	ACTIVE	DSBGA	YZP	5	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	(CR2 ~ CR7 ~ CRN)	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) 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 SN74LVC1G79 :

- Enhanced Product: [SN74LVC1G79-EP](#)

NOTE: Qualified Version Definitions:

- Enhanced Product - Supports Defense, Aerospace and Medical Applications

TAPE AND REEL INFORMATION

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
SN74LVC1G79DBVR	SOT-23	DBV	5	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74LVC1G79DBVT	SOT-23	DBV	5	250	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74LVC1G79DBVT	SOT-23	DBV	5	250	178.0	9.0	3.3	3.2	1.4	4.0	8.0	Q3
SN74LVC1G79DBVTG4	SOT-23	DBV	5	250	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
SN74LVC1G79DCKR	SC70	DCK	5	3000	180.0	8.4	2.47	2.3	1.25	4.0	8.0	Q3
SN74LVC1G79DCKR	SC70	DCK	5	3000	178.0	9.0	2.4	2.5	1.2	4.0	8.0	Q3
SN74LVC1G79DCKT	SC70	DCK	5	250	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3
SN74LVC1G79DRLR	SOT	DRL	5	4000	180.0	8.4	1.98	1.78	0.69	4.0	8.0	Q3
SN74LVC1G79DRLR	SOT	DRL	5	4000	180.0	9.5	1.78	1.78	0.69	4.0	8.0	Q3
SN74LVC1G79YZPR	DSBGA	YZP	5	3000	178.0	9.2	1.02	1.52	0.63	4.0	8.0	Q1

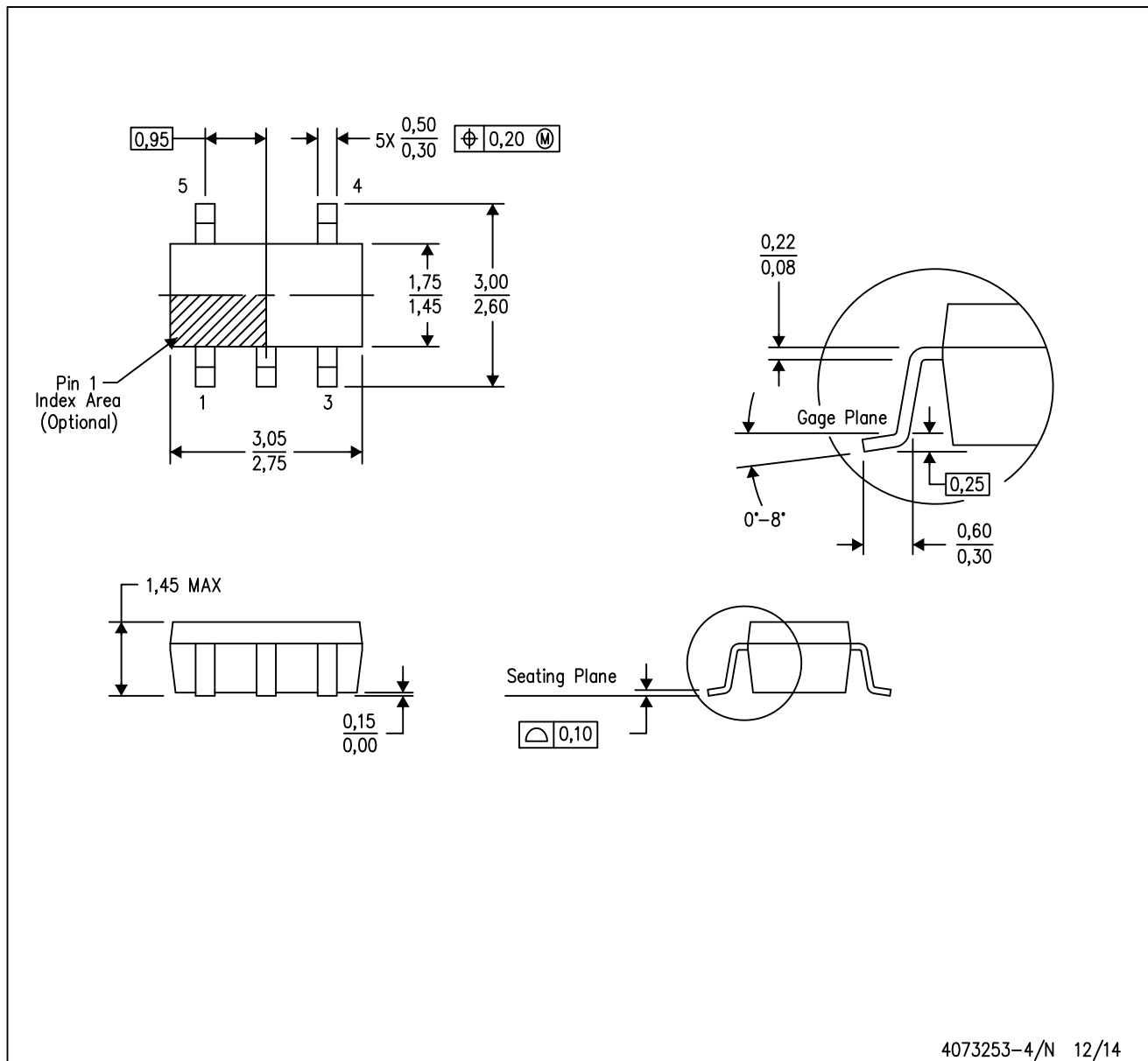
TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC1G79DBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
SN74LVC1G79DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74LVC1G79DBVT	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74LVC1G79DBVTG4	SOT-23	DBV	5	250	180.0	180.0	18.0
SN74LVC1G79DCKR	SC70	DCK	5	3000	202.0	201.0	28.0
SN74LVC1G79DCKR	SC70	DCK	5	3000	180.0	180.0	18.0
SN74LVC1G79DCKT	SC70	DCK	5	250	180.0	180.0	18.0
SN74LVC1G79DRLR	SOT	DRL	5	4000	202.0	201.0	28.0
SN74LVC1G79DRLR	SOT	DRL	5	4000	184.0	184.0	19.0
SN74LVC1G79YZPR	DSBGA	YZP	5	3000	220.0	220.0	35.0

DBV (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-178 Variation AA.

DBV (R-PDSO-G5)

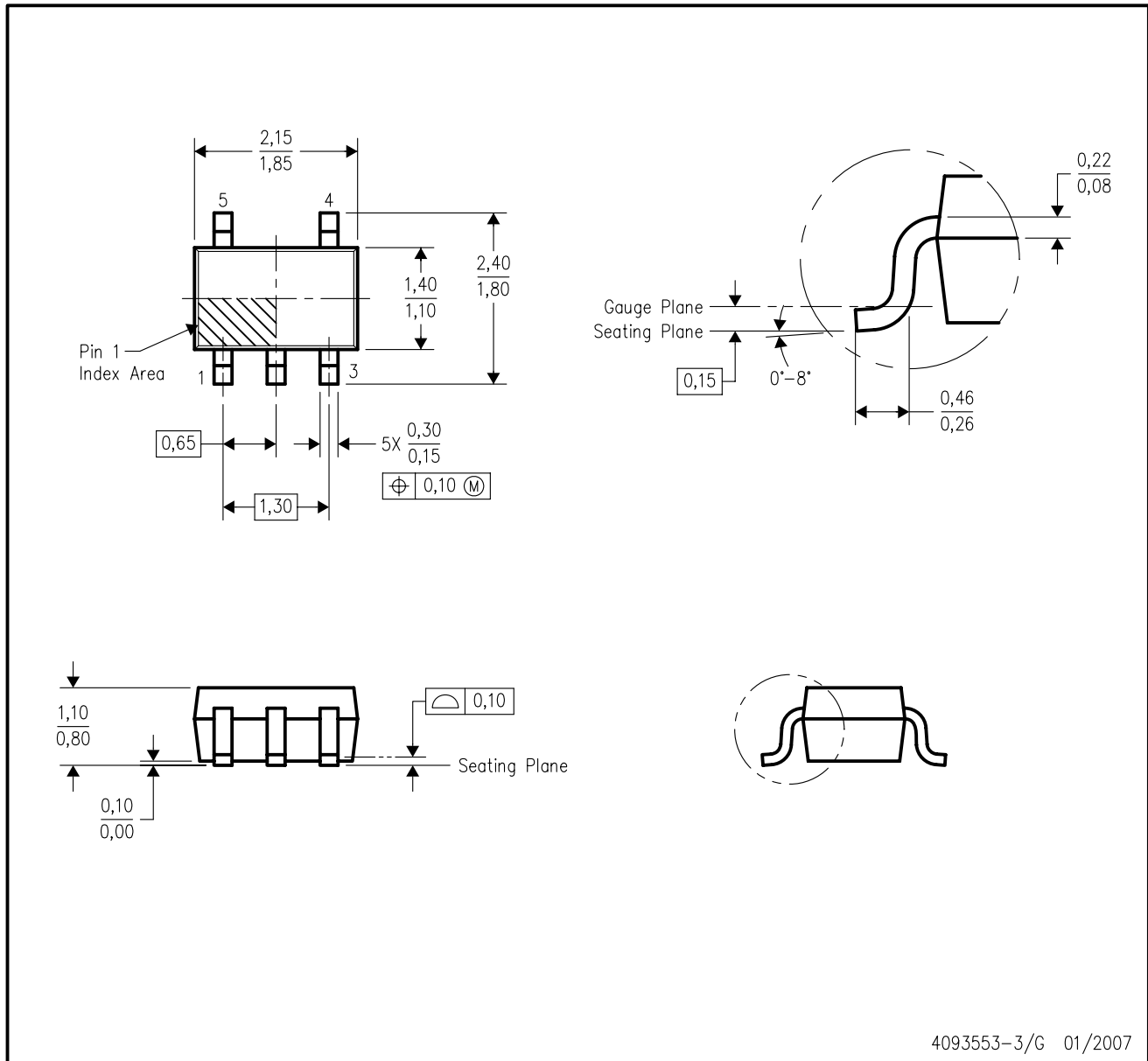
PLASTIC SMALL OUTLINE



- 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)

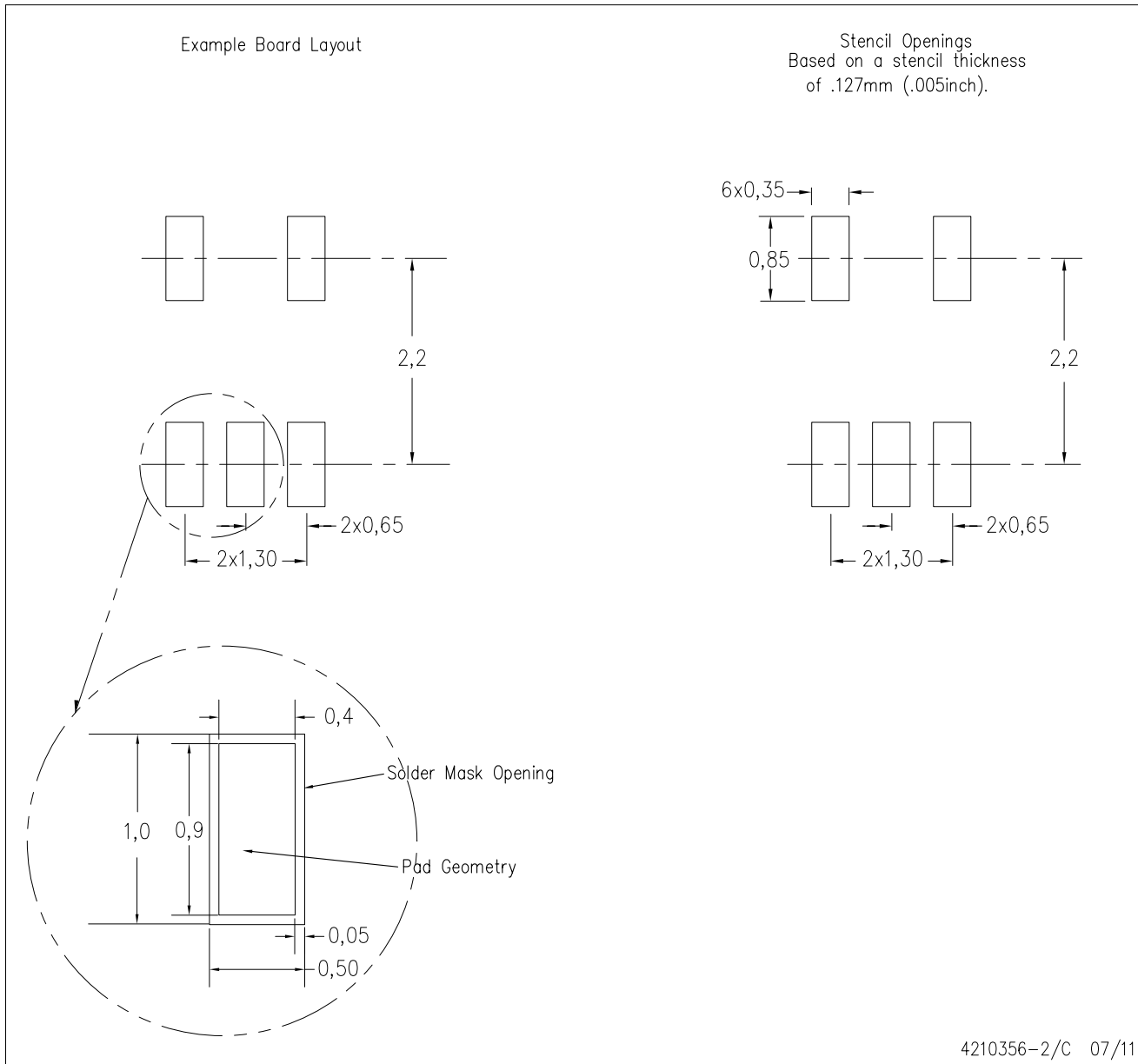
PLASTIC SMALL-OUTLINE PACKAGE



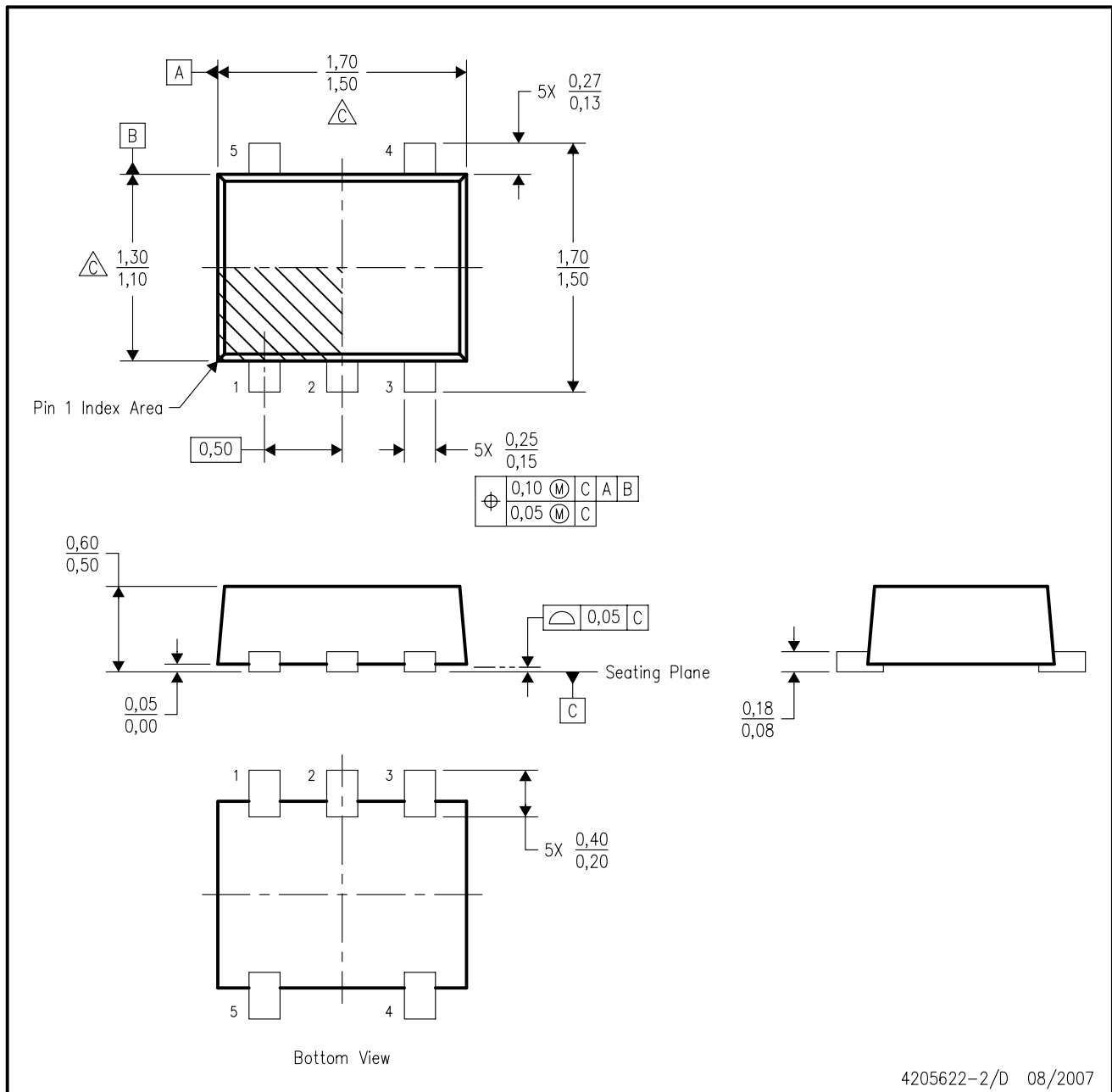
- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
 - D. Falls within JEDEC MO-203 variation AA.

DCK (R-PDSO-G5)

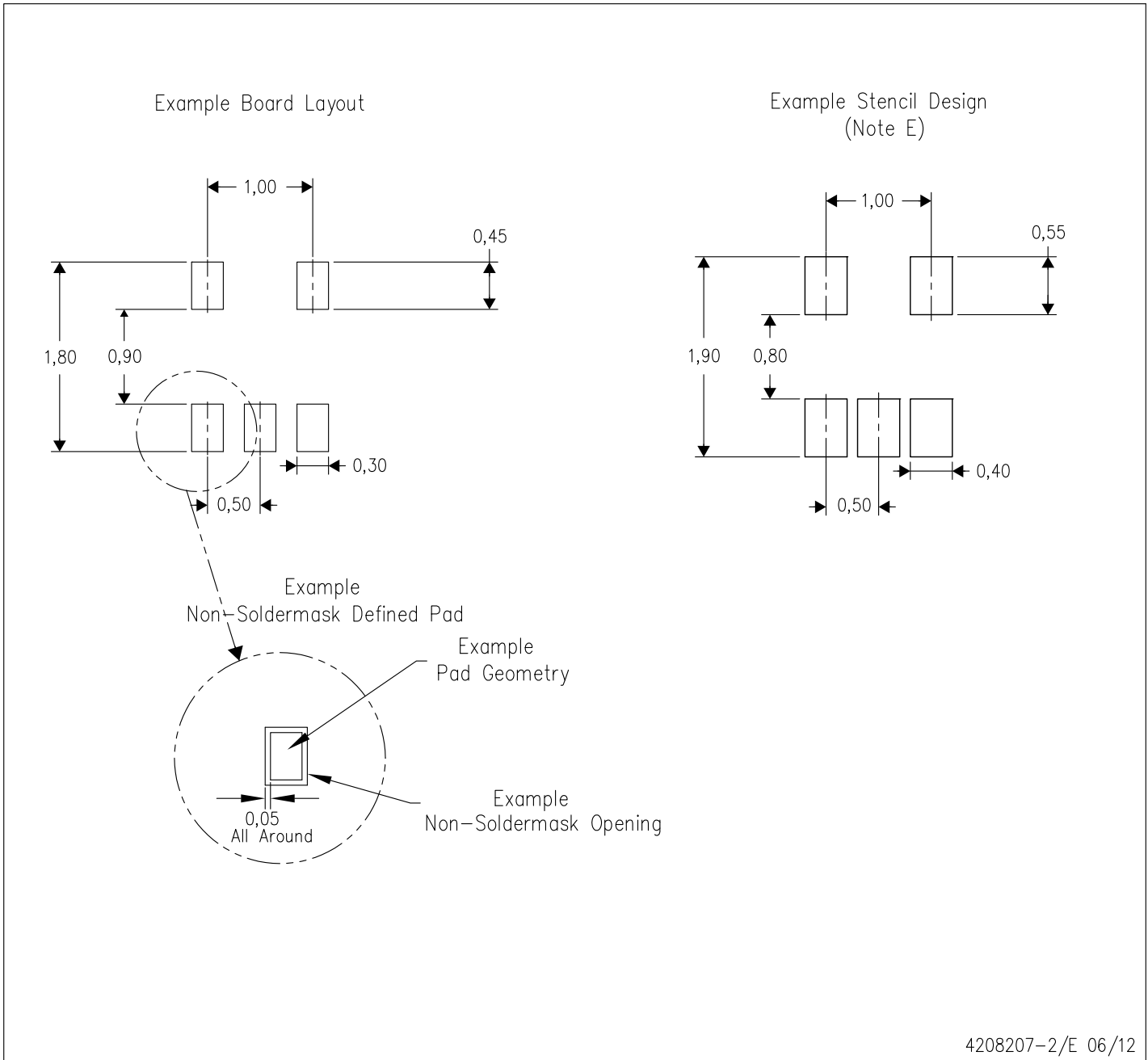
PLASTIC SMALL OUTLINE



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



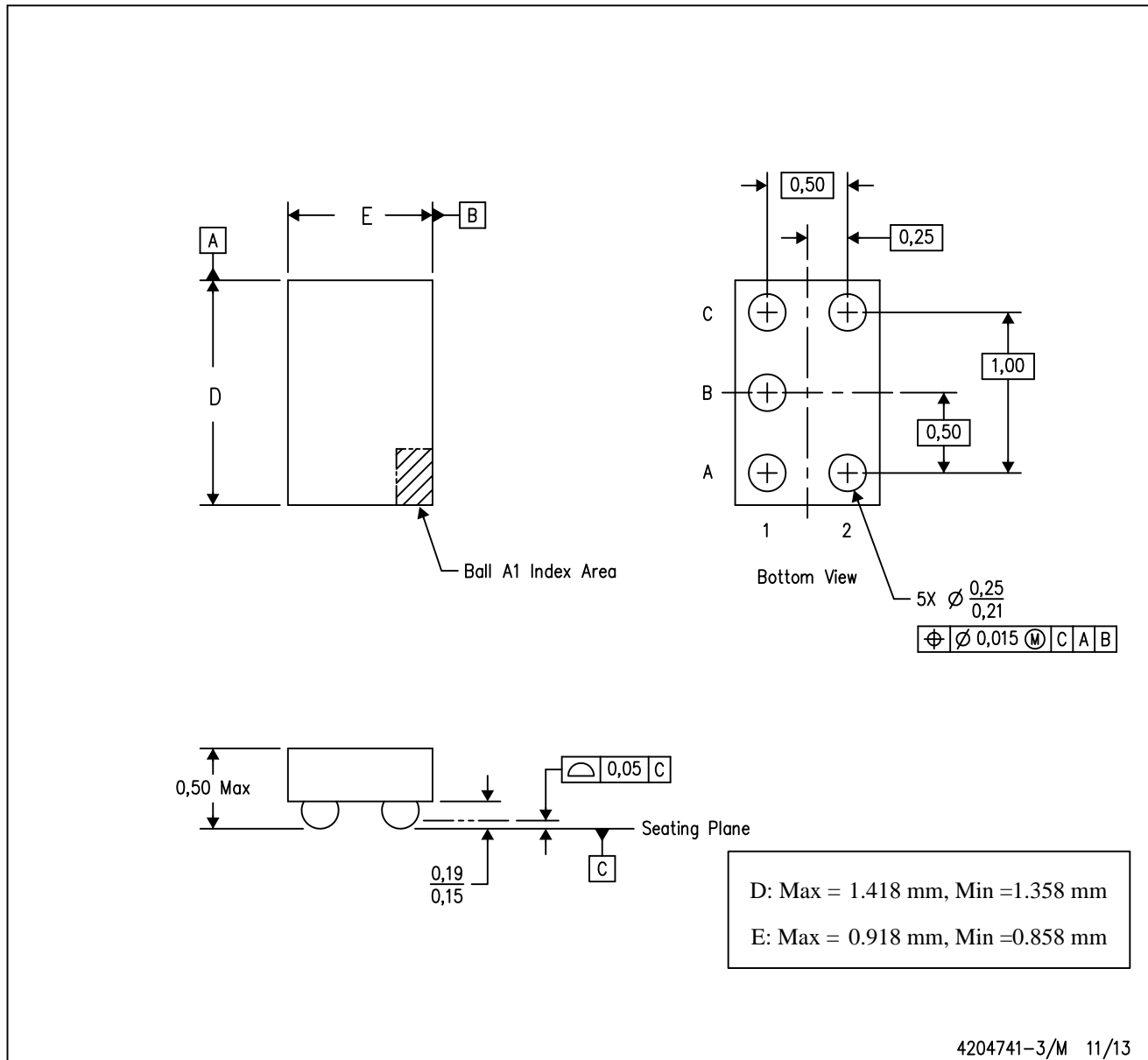
- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash, interlead flash, protrusions, or gate burrs. Mold flash, interlead flash, protrusions, or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



- 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.

YZP (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



- 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. NanoFree™ package configuration.

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