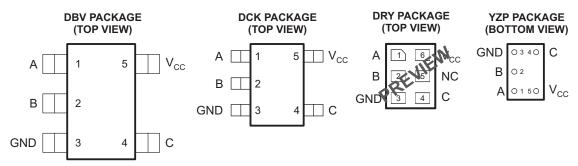


FEATURES

- Available in the Texas Instruments NanoFree™ Package
- Wide V_{CC} Range of 0.8 V to 2.7 V
- Sub-1-V Operable
- Low Power Consumption, 10-µA Max I_{CC}
- High On-Off Output Voltage Ratio
- **High Degree of Linearity**
- High Speed Max 0.2 ns (V_{CC} = 1.8 V, $C_{L} = 15 \text{ pF}$

- Low On-State Impedance Typically 99 Ω $(V_{CC} = 2.3 V)$
- 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)



See mechanical drawings for dimensions. NC- No internal connection

DESCRIPTION/ORDERING INFORMATION

This single analog switch is operational at 0.8-V to 2.7-V V_{CC}, but is designed specifically for 1.65-V to 1.95-V V_{CC} operation.

The SN74AUC1G66 can handle both analog and digital signals. The combined AC and DC signal has to be between V_{CC} and GND for it to be transmitted in either direction.

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

Applications include signal gating, chopping, modulation or demodulation (modem), and signal multiplexing for analog-to-digital and digital-to-analog conversion systems.

	-			
T _A	PACKAGE ⁽¹⁾⁽²⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING ⁽³⁾
	NanoFree™ WCSP (DSBGA) – YZP (Pb-free)	Reel of 3000	SN74AUC1G66YZPR	U6_
–40°C to 85°C	SON – DRY	Reel of 5000	SN74AUC1G66DRYR	PREVIEW
	SOT (SOT-23) – DBV	Reel of 3000	SN74AUC1G66DBVR	U66_
	SOT (SC-70) – DCK	Reel of 3000	SN74AUC1G66DCKR	U6_

ORDERING INFORMATION

Package drawings, thermal data, and symbolization are available at www.ti.com/packaging. (1)

(2)For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.

(3) DBV/DCK/DRY: The actual top-side marking has one additional character that designates the assembly/test site. YZP: The actual top-side marking has three preceding characters to denote year, month, and sequence code, and one following character to designate the assembly/test site.

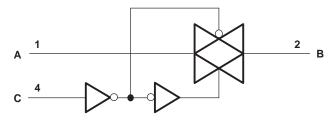


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FUNCTION TABLE

CONTROL INPUT (C)	SWITCH
L	OFF
Н	ON

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	3.6	V
VI	Input voltage range ⁽²⁾		-0.5	3.6	V
V _{I/O}	Switch I/O voltage range ⁽²⁾⁽³⁾		-0.5	V _{CC} + 0.5	V
I _{IK}	Control input clamp current	V _I < 0		-50	mA
I _{IOK}	I/O port diode current	$V_{I/O} < 0 \text{ or } V_{I/O} > V_{CC}$		±50	mA
I _T	On-state switch current	$V_{I/O} = 0$ to V_{CC}		±50	mA
IT	Continuous current through V_{CC} or GND		±100	mA	
		DBV package		206	
0	Package thermal impedance ⁽⁴⁾	DCK package		252 234	
θ_{JA}		DRY package			
		YZP package		123	
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) All voltages are with respect to ground, unless otherwise specified.

(3) The input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.

(4) The package thermal impedance is calculated in accordance with JESD 51-7.

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Recommended Operating Conditions⁽¹⁾

			MIN	MAX	UNIT
V _{CC}	Supply voltage		0.8	2.7	V
		V _{CC} = 0.8 V	V _{CC}		
VIH	High-level input voltage	$V_{CC} = 1.1 \text{ V to } 1.95 \text{ V}$	$0.65 imes V_{CC}$		V
		V_{CC} = 2.3 V to 2.7 V	1.7		
		V _{CC} = 0.8 V		0	
VIL	Low-level input voltage	voltage V _{CC} = 1.1 V to 1.95 V		$0.35 \times V_{CC}$	V
		V_{CC} = 2.3 V to 2.7 V		0.7	
V _{I/O}	I/O port voltage		0	V _{CC}	V
VI	Control input voltage		0	3.6	V
Δt/Δv	Input transition rise or fall rate			20	ns/V
T _A	Operating free-air temperature		-40	85	°C

 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 COND	TIONS	V _{cc}	MIN TYP ⁽¹⁾	MAX	UNIT
		$V_{I} = V_{CC}$ or GND,	$I_{S} = 4 \text{ mA}$	1.65 V	10	20	
r _{on}	On-state switch resistance	$V_{C} = V_{IH}$ (see Figure 1)	$I_S = 8 \text{ mA}$	2.3 V	9	15	Ω
		$V_I = V_{CC}$ to GND,	$I_{\rm S} = 4 \rm mA$	1.65 V	32	80	_
r _{on(p)}	Peak on resistance	$V_{C} = V_{IH}$ (see Figure 1)	$I_S = 8 \text{ mA}$	2.3 V	15	20	Ω
I _{S(off)}	Off-state switch leakage current	$V_I = V_{CC}$ and $V_O = GNI$ $V_I = GND$ and $V_O = V_{CI}$ $V_C = V_{IL}$ (see Figure 2)	С,	2.7 V		±1 ±0.1 ⁽¹⁾	μA
I _{S(on)}	On-state switch leakage current	$V_1 = V_{CC}$ or GND, $V_C =$ (see Figure 3)	V _{IH} , V _O = Open	2.7 V		±1 ±0.1 ⁽¹⁾	μA
I _I	Control input current	$V_{I} = V_{CC}$ or GND		0 to 2.7 V		±5	μA
I _{CC}	Supply current	$V_I = V_{CC}$ or GND,	I _O = 0	0.8 V to 2.7 V		10	μA
C _{ic}	Control input capacitance			2.5 V	2		pF
C _{io(off)}	Switch input/output capacitance			2.5 V	3.5		pF
C _{io(on)}	Switch input/output capacitance			2.5 V	7		рF

(1) All typical values are at $T_A = 25^{\circ}C$.

Switching Characteristics

over recommended operating free-air temperature range, $C_L = 15 \text{ pF}$ (unless otherwise noted) (see Figure 4)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 0.8 V	V _{CC} = ± 0.		V _{CC} = 1.5 V ± 0.1 V		V _{CC} = 1.8 V ± 0.15 V			V _{CC} = 2.5 V ± 0.2 V		UNIT
		(001201)	TYP	MIN	MAX	MIN	MAX	MIN	TYP	MAX	MIN	MAX	
t _{pd} ⁽¹⁾	A or B	B or A	0.9		0.3		0.2			0.2		0.1	ns
t _{en}	С	A or B	4.1	0.5	2.6	0.5	1.7	0.5	0.8	1.1	0.5	1	ns
t _{dis}	С	A or B	5	0.7	3.6	0.5	2.6	0.5	1.7	2.9	0.5	2.2	ns

(1) The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).

SN74AUC1G66 SINGLE BILATERAL ANALOG SWITCH

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Switching Characteristics

over recommended operating free-air temperature range, $C_L = 30 \text{ pF}$ (unless otherwise noted) (see Figure 4)

PARAMETER	FROM (INPUT)	TO (OUTPUT)		_c = 1.8 0.15 V		V _{CC} = ± 0.	UNIT	
		(001F01)	MIN	TYP	MAX	MIN	MAX	
t _{pd} ⁽¹⁾	A or B	B or A			0.3		0.3	ns
t _{en}	С	A or B	0.5	1.4	2.3	0.8	1.4	ns
t _{dis}	С	A or B	0.5	1.7	2.9	0.5	1.5	ns

(1) The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).



Analog Switch Characteristics

T _A = 25°C	
-----------------------	--

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	V _{cc}	ТҮР	UNIT
				0.8 V	60	
			$C_{L} = 50 \text{ pF}, R_{L} = 600 \Omega,$	1.1 V	60	
			f _{in} = sine wave	1.4 V	80	
			(see Figure 5)	1.65 V	120	
Frequency response ⁽¹⁾	A or B	B or A		2.3 V	170	MHz
(switch ON)	AUD	BUIA		0.8 V	>500	
			$C_{L} = 5 \text{ pF}, R_{L} = 50 \Omega,$	1.1 V	>500	
			f _{in} = sine wave	1.4 V	>500	
			(see Figure 5)	1.65 V	>500	
				2.3 V	>500	
				0.8 V	9	
			$C_{L} = 50 \text{ pF}, R_{L} = 600 \Omega,$	1.1 V	14	
Crosstalk (control input to signal output)	С	A or B	f _{in} = 1 MHz (square wave)	1.4 V	15	mV
			(see Figure 6)	1.65 V	16	
				2.3 V	20	
				0.8 V	-60	dB
		B or A	$C_{L} = 50 \text{ pF}, R_{L} = 600 \Omega,$	1.1 V	-60	
			f _{in} = 1 MHz (sine wave)	1.4 V	-60	
			(see Figure 7)	1.65 V	-60	
Feedthrough attenuation ⁽²⁾				2.3 V	-60	
(switch OFF)	A or B			0.8 V	-55	
			$C_{L} = 5 \text{ pF}, R_{L} = 50 \Omega,$	1.1 V	-55	
			f _{in} = 1 MHz (sine wave)	1.4 V	-55	
			(see Figure 7)	1.65 V	-55	
				2.3 V	-55	
				0.8 V	7.5	
			C _L = 50 pF, R _L = 10 kΩ,	1.1 V	0.16	
	A or B	B or A	f _{in} = 1 kHz (sine wave)	1.4 V	0.04	
			(see Figure 8)	1.65 V	0.03	
				2.3 V	0.02	0/
Sine-wave distortion				0.8 V	4.2	%
			C _L = 50 pF, R _L = 10 kΩ,	1.1 V	0.2	
	A or B	B or A	f _{in} = 10 kHz (sine wave)	1.4 V	0.03	
			(see Figure 8)	1.65 V	0.02	
				2.3 V	0.02	

 $\begin{array}{ll} \mbox{(1)} & \mbox{Adjust} \ f_{in} \ \mbox{voltage to obtain 0 dBm at output. Increase} \ f_{in} \ \mbox{frequency until dB meter reads} \ -3 \ \mbox{dB.} \\ \mbox{(2)} & \mbox{Adjust} \ f_{in} \ \mbox{voltage to obtain 0 dBm at input.} \end{array}$

Operating Characteristics

 $T_A = 25^{\circ}C$

	PARAMETER	TEST CONDITIONS	V _{CC} = 0.8 V TYP	V _{CC} = 1.2 V TYP	V _{CC} = 1.5 V TYP	V _{CC} = 1.8 V TYP	V _{CC} = 2.5 V TYP	UNIT
C_{pd}	Power dissipation capacitance	f = 10 MHz	3	3	3	3	3	pF

SN74AUC1G66 SINGLE BILATERAL ANALOG SWITCH SCES386K-MARCH 2002-REVISED OCTOBER 2007

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PARAMETER MEASUREMENT INFORMATION

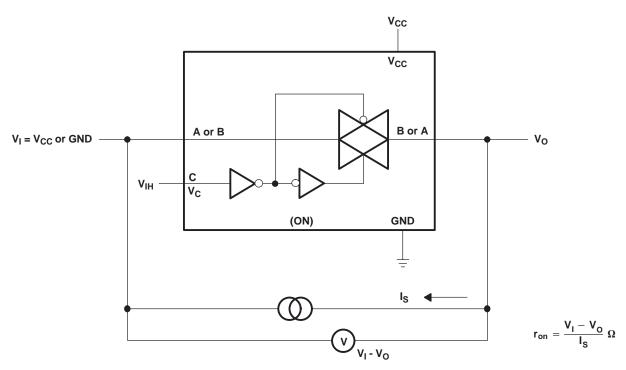


Figure 1. On-State Resistance Test Circuit

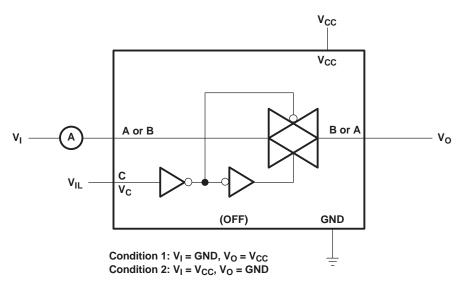


Figure 2. Off-State Switch Leakage-Current Test Circuit



PARAMETER MEASUREMENT INFORMATION (Continued)

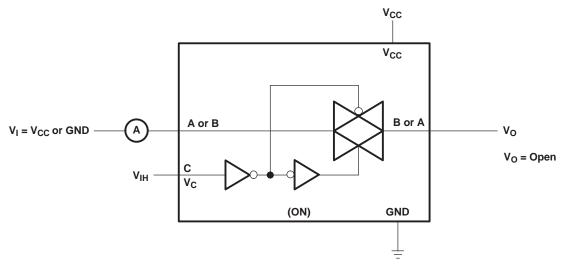
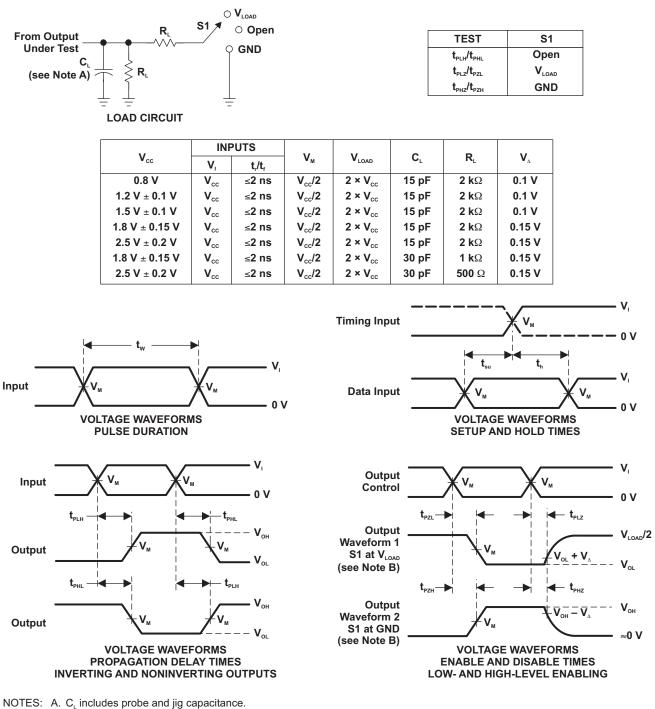


Figure 3. On-State Leakage-Current Test Circuit



PARAMETER MEASUREMENT INFORMATION (Continued)



- - 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 MHz, Z_o = 50 Ω , Slew rate \geq 1 V/ns.
 - D. The outputs are measured one at a time, with one transition per measurement.
 - E. t_{PLZ} and \dot{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_{od} .

Figure 4. Load Circuit and Voltage Waveforms





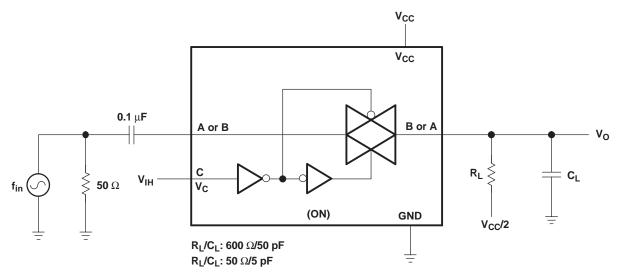


Figure 5. Frequency Response (Switch ON)

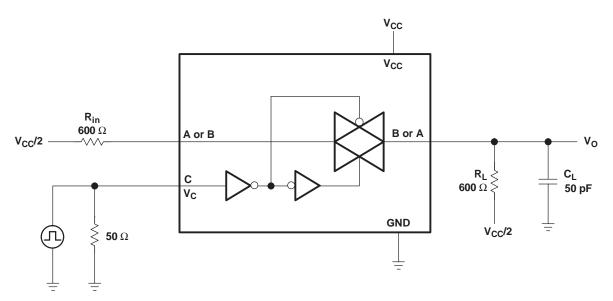
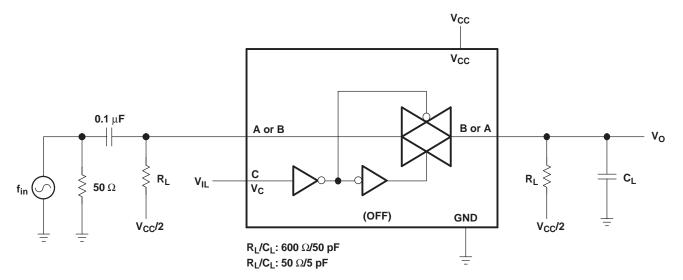
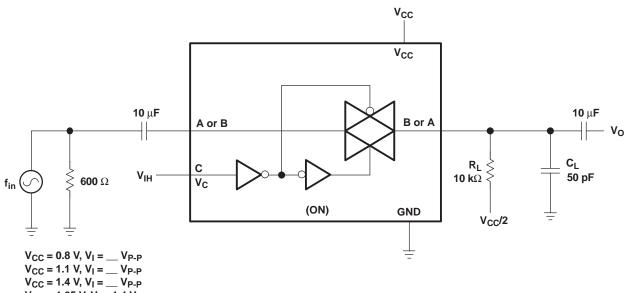


Figure 6. Crosstalk (Control Input – Switch Output)

PARAMETER MEASUREMENT INFORMATION (Continued)







 $V_{CC} = 1.65 \text{ V}, V_I = 1.4 \text{ V}_{P-P}$ $V_{CC} = 2.3 \text{ V}, V_I = 2.5 \text{ V}_{P-P}$

Figure 8. Sine-Wave Distortion

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PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN74AUC1G66DBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G66DBVRE4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G66DBVRG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G66DCKR	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G66DCKRE4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G66DCKRG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AUC1G66YZPR	ACTIVE	WCSP	YZP	5	3000	Green (RoHS & no Sb/Br)	SNAGCU	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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TAPE AND REEL INFORMATION





QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*A	Il dimensions are nominal												
	Device		Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
	SN74AUC1G66DBVR	SOT-23	DBV	5	3000	180.0	9.2	3.23	3.17	1.37	4.0	8.0	Q3
	SN74AUC1G66DCKR	SC70	DCK	5	3000	180.0	9.2	2.24	2.34	1.22	4.0	8.0	Q3



PACKAGE MATERIALS INFORMATION

11-Mar-2008



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AUC1G66DBVR	SOT-23	DBV	5	3000	202.0	201.0	28.0
SN74AUC1G66DCKR	SC70	DCK	5	3000	202.0	201.0	28.0

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.



DCK (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE

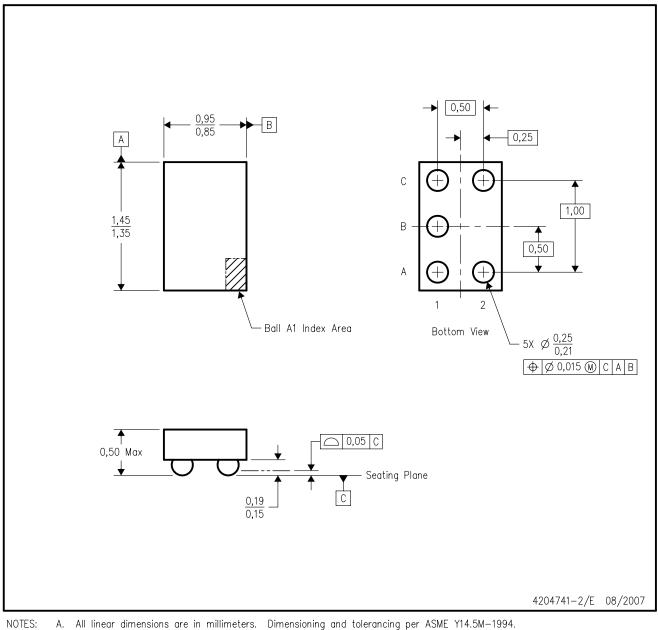


- NOTES: A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
 - D. Falls within JEDEC MO-203 variation AA.



YZP (R-XBGA-N5)

DIE-SIZE BALL GRID ARRAY



- B. This drawing is subject to change without notice.
- C. NanoFree™ package configuration.
- D. This package is lead-free. Refer to the 5 YEP package (drawing 4204725) for tin-lead (SnPb).

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