

四路低功耗差动接收器

查询样品: [SN55LBC173-HIREL](#)

特性

- 符合 EIA 标准 **RS-422-A**, **RS-423-A**, **RS-485** 和 **CCITT V.11**
- 被设计成支持脉冲时长运行最短 **20ns**
- 针对嘈杂环境中的长距离总线线路上的多点总线传输
- 输入灵敏度: **±200mV**
- 低功耗: **20mA** (最大值)
- 开路故障安全设计

说明

SN55LBC173 是一款具有 3 态输出的单片四路差动线路接收器, 此接收器被设计成符合 EIA 标准 RS-422-A, RS-423-A, RS-485 和 CCITT V.11。这个器件针对数据速率高达且超过每秒 1 千万位的平衡多点总线传输进行了优化。4 个接收器共用 2 个进行或操作的使能输入, 一个在高电平时有效, 一个在低电平时有效。每个接收器在 12V 至 -7V 的共模输入电压范围内特有高输入阻抗、输入滞后以增加抗扰度, 以及 ±200mV 的输入灵敏度。故障安全设计确保了在输入为开路时, 输出始终为高电平。SN55LBC173 使用德州仪器 (TI) 已获专利的 LinBiCMOS™ 技术进行设计, 这个技术提供了低功耗、高开关速度和稳健耐用性。



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.

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English Data Sheet: [SGLS415](#)



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.

ORDERING INFORMATION⁽¹⁾

T _A	PACKAGE	ORDERABLE PART NUMBER	TOP-SIDE MARKING
-55°C to 125°C	KGD	SN55LBC173MKGD1	NA
		SN55LBC173MKGD2	NA

(1) 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.

BARE DIE INFORMATION

DIE THICKNESS	BACKSIDE FINISH	BACKSIDE POTENTIAL	BOND PAD METALLIZATION COMPOSITION	BOND PAD THICKNESS
10.5 mils.	Silicon with backgrind	Floating	AlSi(1%)Cu(0.5%)TiW	1850 nm

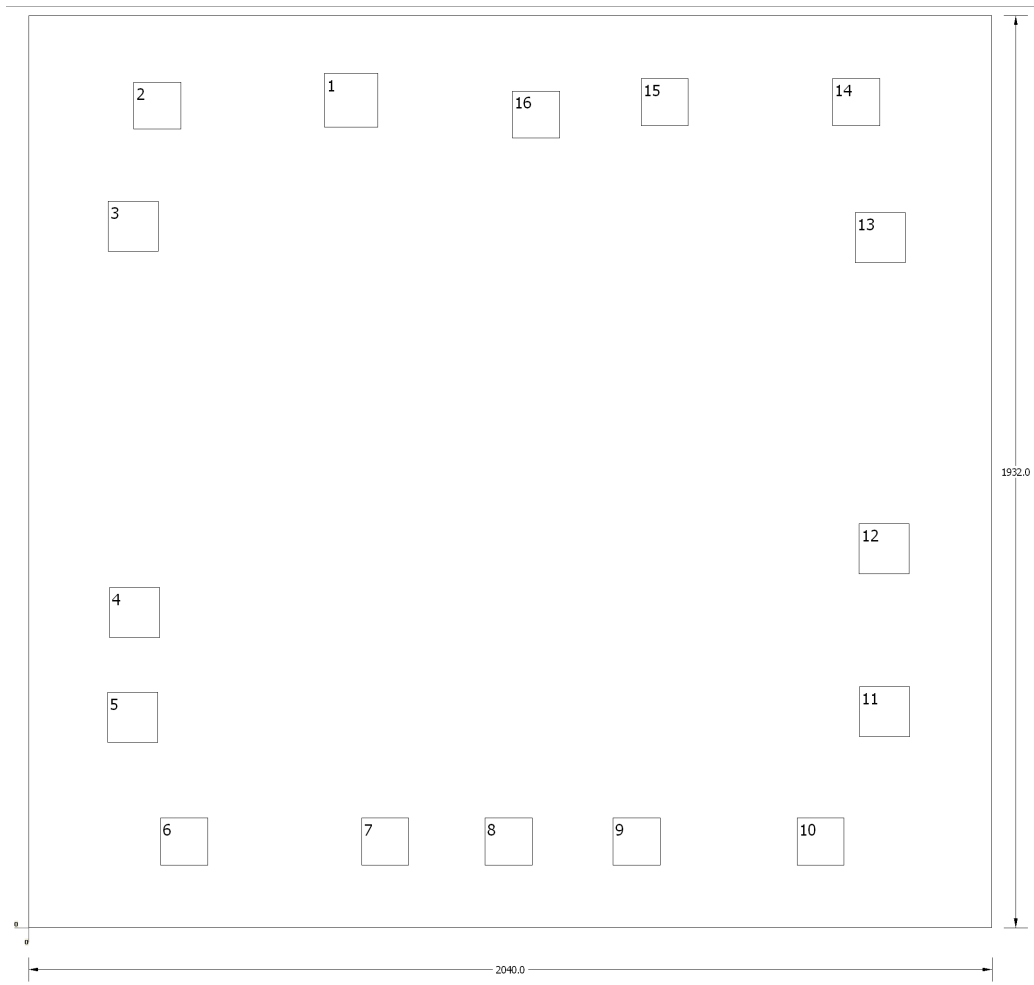


Table 1. Bond Pad Coordinates in Microns

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
1B	1	626.5	1695	740.5	1809.5
1A	2	222.5	1690.7	323	1791.3
1Y	3	167.9	1432.1	274.8	1539
G	4	171.4	614.1	278.3	721
2Y	5	166.6	392.1	273.5	499
2A	6	279.2	132	379.7	232.6
2B	7	704.8	132	805.3	232.6
GND	8	966.2	132	1066.7	232.6
3B	9	1237.2	132	1337.7	232.6
3A	10	1626.7	132	1727.2	232.6
3Y	11	1758.7	403.7	1865.6	510.6
\bar{G}	12	1758.5	749	1865.4	855.9
4Y	13	1750.1	1408.4	1857	1515.3
4A	14	1702.2	1698.4	1802.7	1799
4B	15	1296.7	1698.4	1397.2	1799
VCC	16	1024.2	1671.9	1124.7	1772.5

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

over operating free-air temperature range unless otherwise noted

	Value	UNIT
V _{CC} Supply voltage range ⁽²⁾	–0.3 to 7	V
V _I Input voltage range, (A or B inputs)	±25	V
V _{ID} Differential input voltage ⁽³⁾	±25	V
Data and control voltage range	–0.3 to 7	V
T _A Operating free-air temperature range	–55 to 125	°C
T _{stg} Storage temperature range	–65 to 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 voltage values are with respect to network ground terminal.
- (3) Differential input voltage is measured at the noninverting input with respect to the corresponding inverting input.

RECOMMENDED OPERATING CONDITIONS

	MIN	TYP	MAX	UNIT
V _{CC} Supply voltage	4.75	5	5.25	V
V _{IC} Common-mode input voltage	–7		12	
V _{IH} High-level input voltage	2			
V _{IL} Low-level input voltage			0.8	
V _{ID} Differential input voltage	–6		6	
I _{OH} High-level output current			–8	mA
I _{OL} Low-level output current			16	mA
T _A Operating free-air temperature	–55		125	°C

ELECTRICAL CHARACTERISTICS

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

PARAMETER		TEST CONDITIONS	MIN	TYP ⁽¹⁾	MAX	UNIT	
V _{IT+}	Positive-going input threshold voltage	I _O = -8 mA			0.2	V	
V _{IT-}	Negative-going input threshold voltage	I _O = 8 mA	-0.2			V	
V _{hys}	Hysteresis voltage (V _{IT+} - V _{IT-})			45		mV	
V _{IK}	Enable input clamp voltage	I _I = -18 mA	-0.9		-1.5	V	
V _{OH}	High-level output voltage	V _{ID} = -200 mV, I _{OH} = -8 mA	3.5	4.5		V	
V _{OL}	Low-level output voltage	V _{ID} = -200 mV, I _{OL} = 8 mA		0.3	0.5	V	
		V _{ID} = -200 mV, I _{OL} = 8 mA, T _A = 125°			0.7		
I _{OZ}	High-impedance-state output current	V _O = 0 V to V _{CC}			±20	μA	
I _I	Bus input current	A or B inputs	Other inputs at 0 V	V _{IH} = 12 V, V _{CC} = 5 V	0.7	1.15	mA
				V _{IH} = 12 V, V _{CC} = 0 V	0.8	1.15	
				V _{IH} = -7 V, V _{CC} = 5 V	-0.5	-0.9	
				V _{IH} = -7 V, V _{CC} = 0 V	-0.4	-0.9	
I _{IH}	High-level input current	V _{IH} = 5 V			±20	μA	
I _{IL}	Low-level input current	V _{IL} = 0 V			-20	μA	
I _{OS}	Short-circuit output current	V _O = 0			-80	-120	mA
I _{CC}	Supply current	Outputs enabled, I _O = 0, V _{ID} = 5 V		11	20	mA	
		Outputs disabled		0.9	1.4		

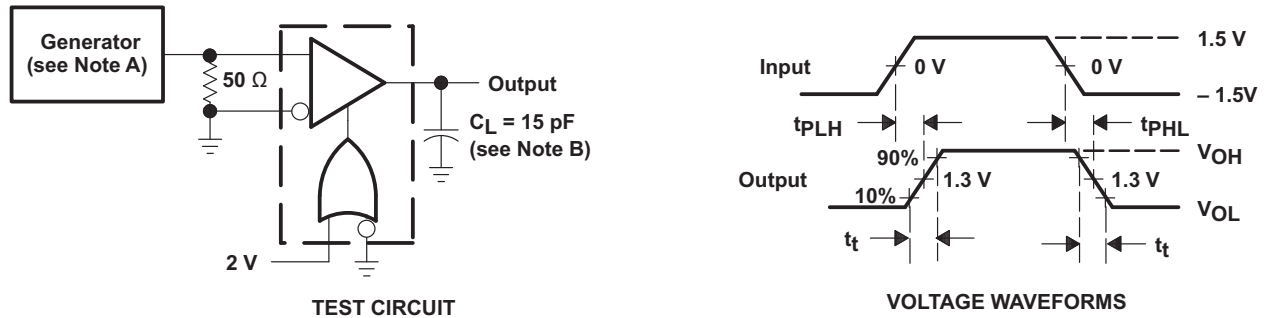
(1) All typical values are at 25°C and with a 5 V supply.

SWITCHING CHARACTERISTICS

V_{CC} = 5 V, C_L = 15 pF, over operating free-air temperature range (unless otherwise noted)

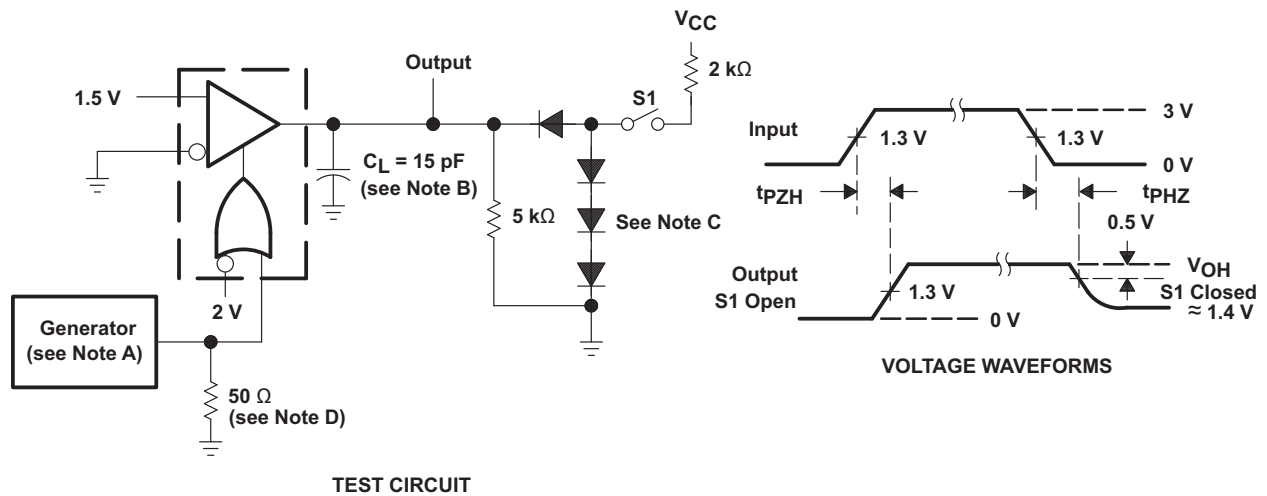
PARAMETER		TEST CONDITIONS	T _A	MIN	TYP	MAX	UNIT
t _{PHL}	Propagation delay time, high-to-low-level output	V _{ID} = -1.5 V to 1.5 V, See Figure 1	25°C	11	22	30	ns
			-55°C to 125°C	11		35	
t _{PLH}	Propagation delay time, low-to-high-level output	V _{ID} = -1.5 V to 1.5 V, See Figure 1	25°C	11	22	35	ns
			-55°C to 125°C	11		35	
t _{PZH}	Output enable time to high level	See Figure 2	25°C		17	40	ns
			-55°C to 125°C			45	
t _{PZL}	Output enable time to low level	See Figure 3	25°C		18	30	ns
			-55°C to 125°C			35	
t _{PHZ}	Output disable time from high level	See Figure 2	25°C		30	40	ns
			-55°C to 125°C			55	
t _{PLZ}	Output disable time from low level	See Figure 3	25°C		25	40	ns
			-55°C to 125°C			45	
t _{sk(p)}	Pulse skew (t _{PHL} - t _{PLH})	See Figure 1	25°C		0.5	6	ns
			-55°C to 125°C			7	
t _t	Transition time	See Figure 1	25°C		5	10	ns
			-55°C to 125°C			16	

PARAMETER MEASUREMENT INFORMATION



- A. The input pulse is supplied by a generator having the following characteristics: PRR = 1 MHz, duty cycle \leq 50%, $t_r \leq 6$ ns, $t_f \leq 6$ ns, $Z_O = 50 \Omega$.
- B. C_L includes probe and jig capacitance.

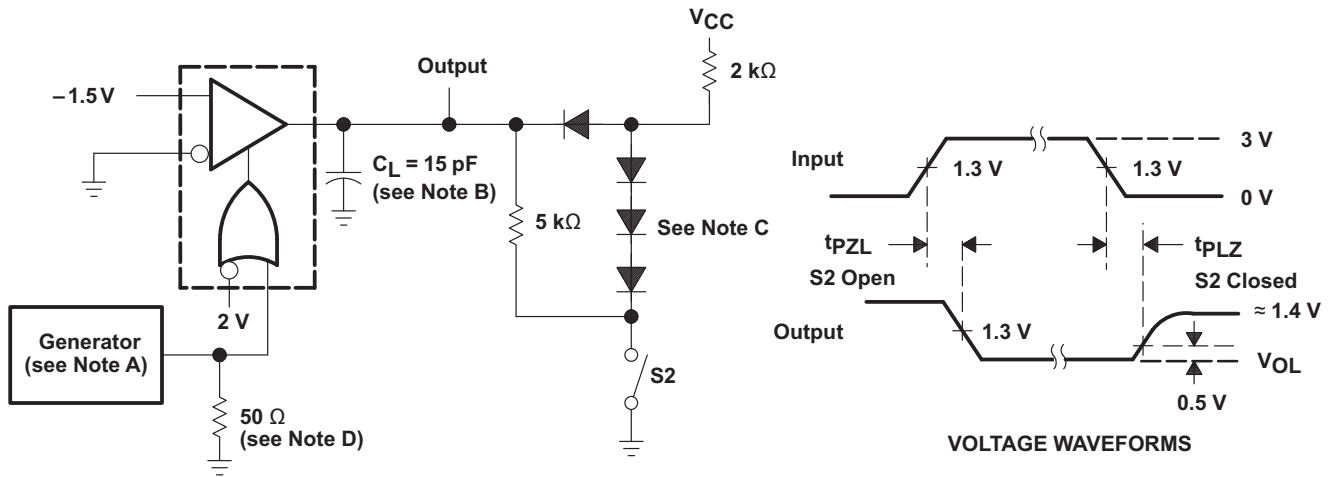
Figure 1. t_{pd} and t_t Test Circuit and Voltage Waveforms



- A. The input pulse is supplied by a generator having the following characteristics: PRR = 1 MHz, duty cycle \leq 50%, $t_r \leq 6$ ns, $t_f \leq 6$ ns, $Z_O = 50 \Omega$.
- B. C_L includes probe and jig capacitance.
- C. All diodes are 1N916 or equivalent.
- D. To test the active-low enable \overline{G} , ground G and apply an inverted input waveform to \overline{G} .

Figure 2. t_{pHZ} and t_{pZH} Test Circuit and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION (continued)



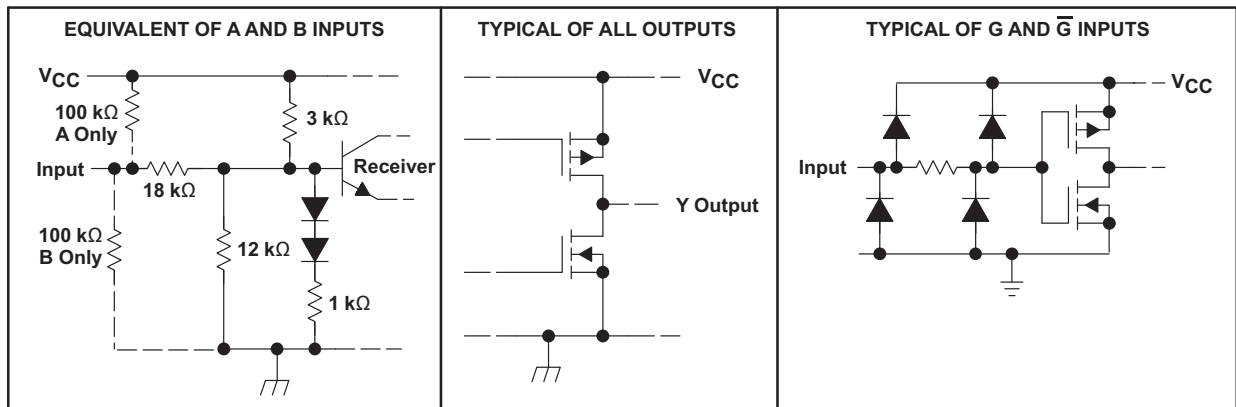
TEST CIRCUIT

- A. The input pulse is supplied by a generator having the following characteristics: PRR = 1 MHz, duty cycle ≤ 50%, t_r ≤ 6 ns, t_f ≤ 6 ns, Z_O = 50 Ω.
- B. C_L includes probe and jig capacitance.
- C. All diodes are 1N916 or equivalent.
- D. To test the active-low enable \overline{G} , ground G and apply an inverted input waveform to \overline{G} .

Figure 3. t_{pZL} and t_{pLZ} Test Circuit and Voltage Waveforms

DEVICE INFORMATION

EQUIVALENT INPUT AND OUTPUT SCHEMATIC DIAGRAMS



FUNCTION TABLE (EACH RECIEVER)

DIFFERENTIAL INPUTS	ENABLES		OUTPUT
	G	\bar{G}	
A - B			Y
$V_{ID} \geq 0.2 V$	H	X	H
	X	L	H
$-0.2 < V_{ID} < 0.2 V$	H	X	?
	X	L	?
$V_{ID} \leq -0.2 V$	H	X	L
	X	L	L
X	L	H	Z
Open circuit	H	X	H
	X	L	H

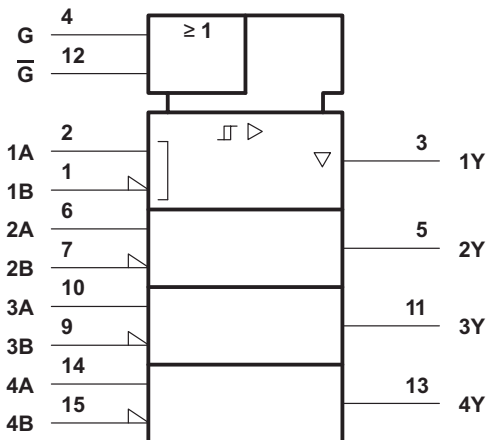


Figure 4. Logic Symbol

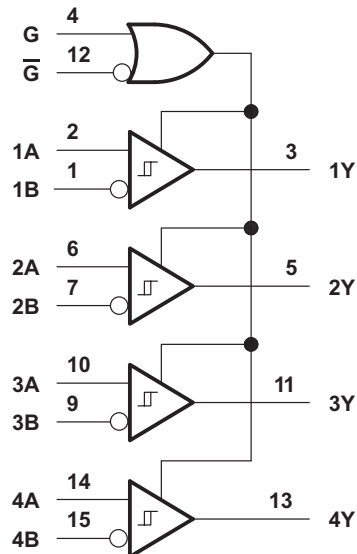


Figure 5. Logic Diagram (Positive Logic)

TYPICAL CHARACTERISTICS

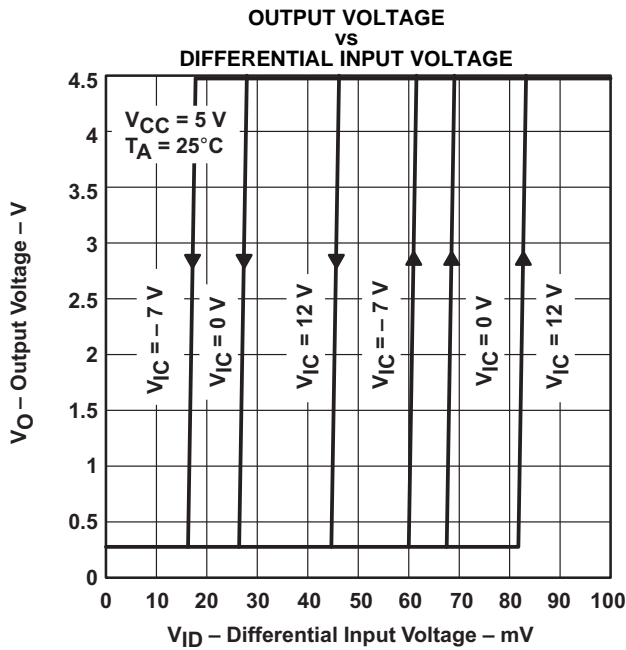


Figure 6.

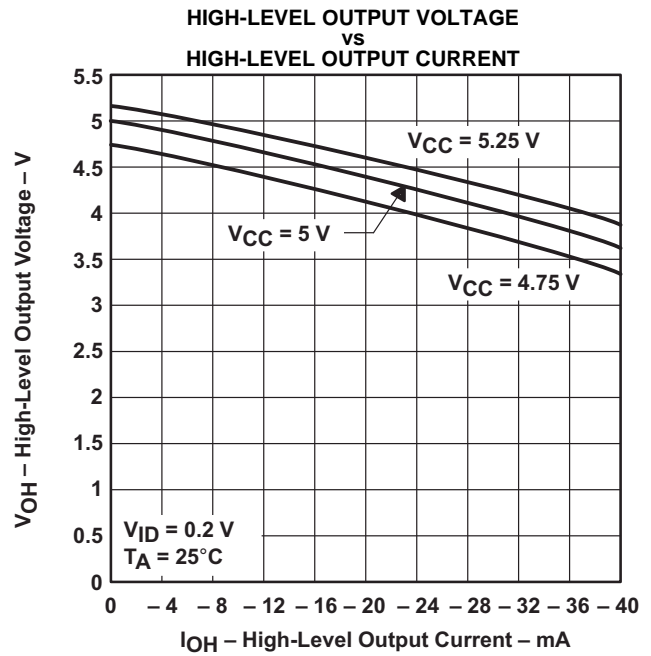


Figure 7.

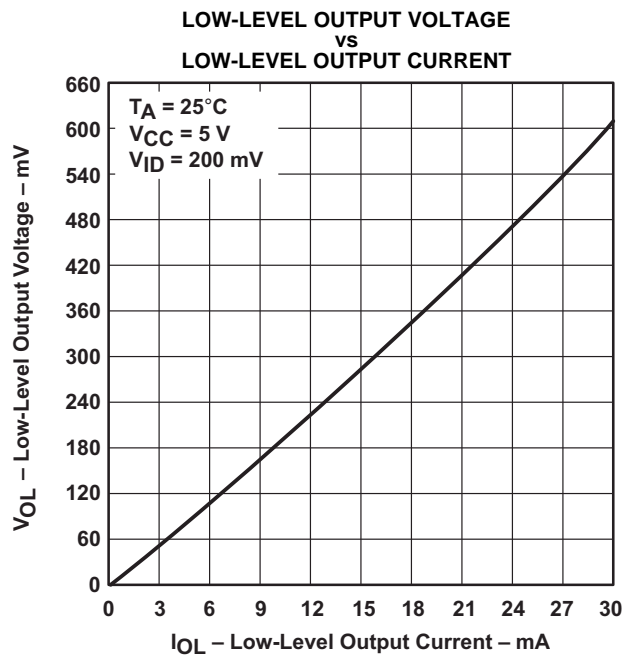


Figure 8.

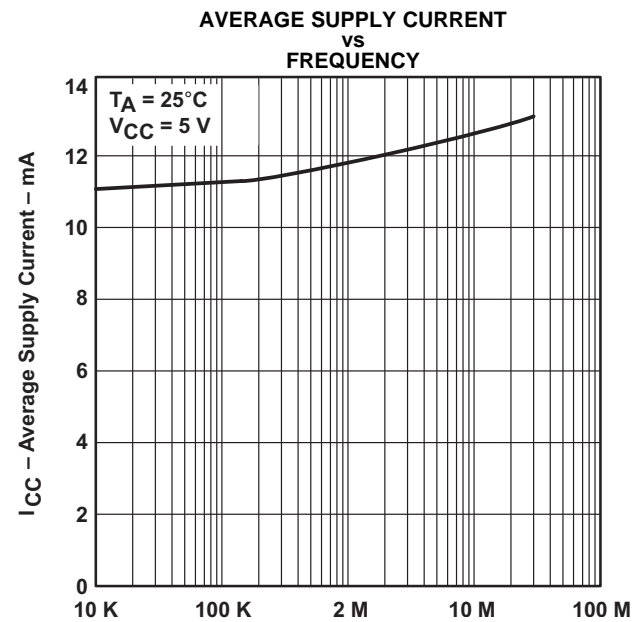
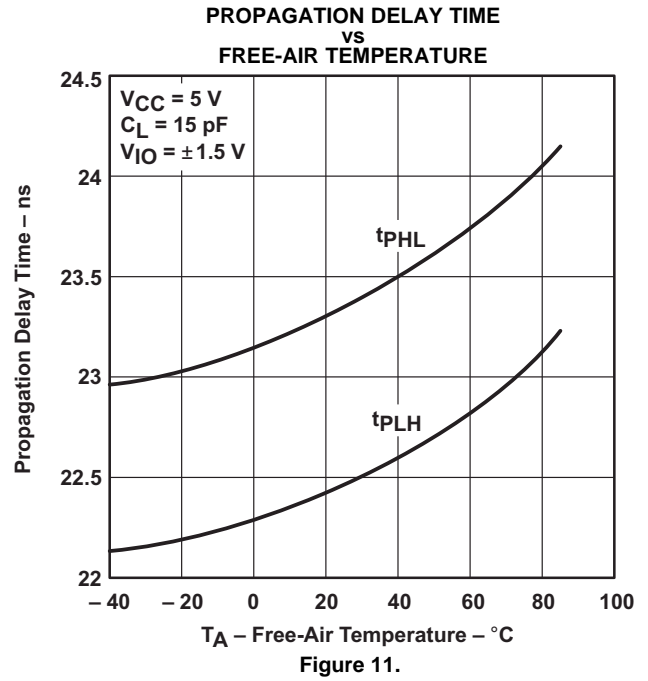
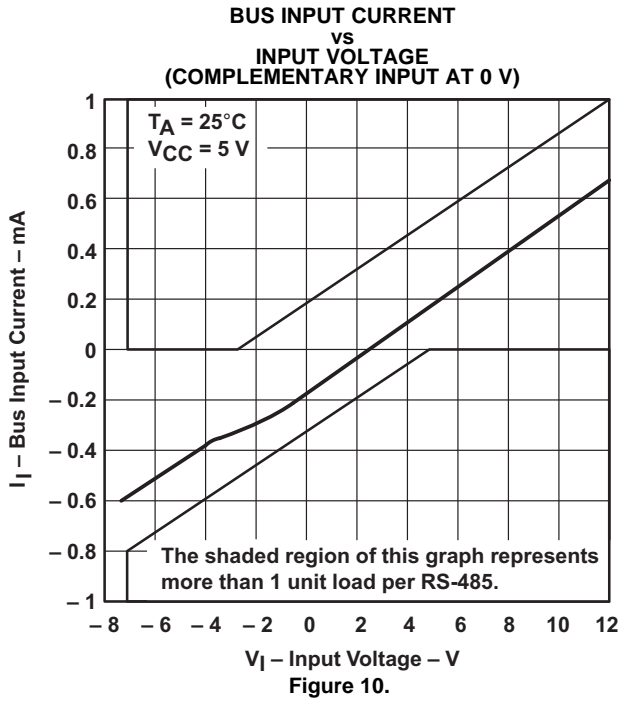


Figure 9.

TYPICAL CHARACTERISTICS (continued)



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
SN55LBC173MKGD1	ACTIVE	XCEPT	KGD	0	100	TBD	Call TI	N / A for Pkg Type	-55 to 125		Samples
SN55LBC173MKGD2	ACTIVE	XCEPT	KGD	0	10	TBD	Call TI	Call TI	-55 to 125		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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