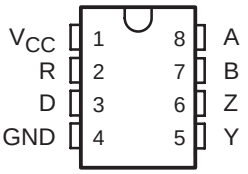
SLLS123B − D2845, JUNE 1984 − REVISED FEBRUARY 1993

- **Meets EIA Standards RS-422A, RS423A, and CCITT Recommendations V.11 and X.27**
- **Bus Voltage Range . . . −7 V to 12 V**
- **Positive and Negative Current Limiting**
- **Driver Output Capability . . . 60 mA Max**
- **Driver Thermal Shutdown Protection**
- **Receiver Input Impedance . . . 12 kΩ Min**
- **Receiver Input Sensitivity . . . ±200 mV**
- **Receiver Input Hysteresis . . . 50 mV Typ**
- **Operates From Single 5-V Supply**
- **Low Power Requirements**

D OR P PACKAGE
(TOP VIEW)



NOT RECOMMENDED FOR NEW DESIGN

description

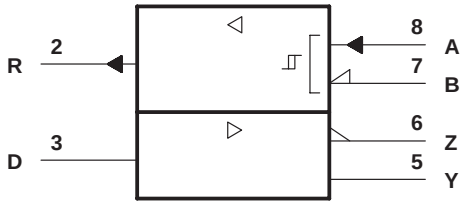
The SN75179A driver and bus receiver circuit is a monolithic integrated device designed for balanced transmission line applications, and meets EIA Standards RS-422A, RS-423A, and CCITT Recommendations V.11 and X.27. It is designed to improve the performance of data communications over long bus lines.

The SN75179A features positive- and negative-current limiting for the driver and receiver. The receiver features high input impedance, input hysteresis for increased noise immunity, and input sensitivity of ±200 mV over a common-mode input voltage range of −12 V to 12 V.

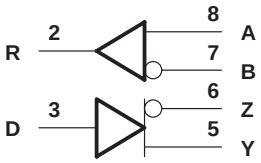
The driver provides thermal shutdown for protection from line fault conditions. Thermal shutdown is designed to occur at a junction temperature of approximately 150°C. The device is designed to drive current loads of up to 60 mA maximum.

The SN75179A is characterized for operation from 0°C to 70°C.

logic symbol



logic diagram



Function Tables

DRIVER

INPUT D	OUTPUTS Y	OUTPUTS Z
H	H	L
L	L	H

RECEIVER

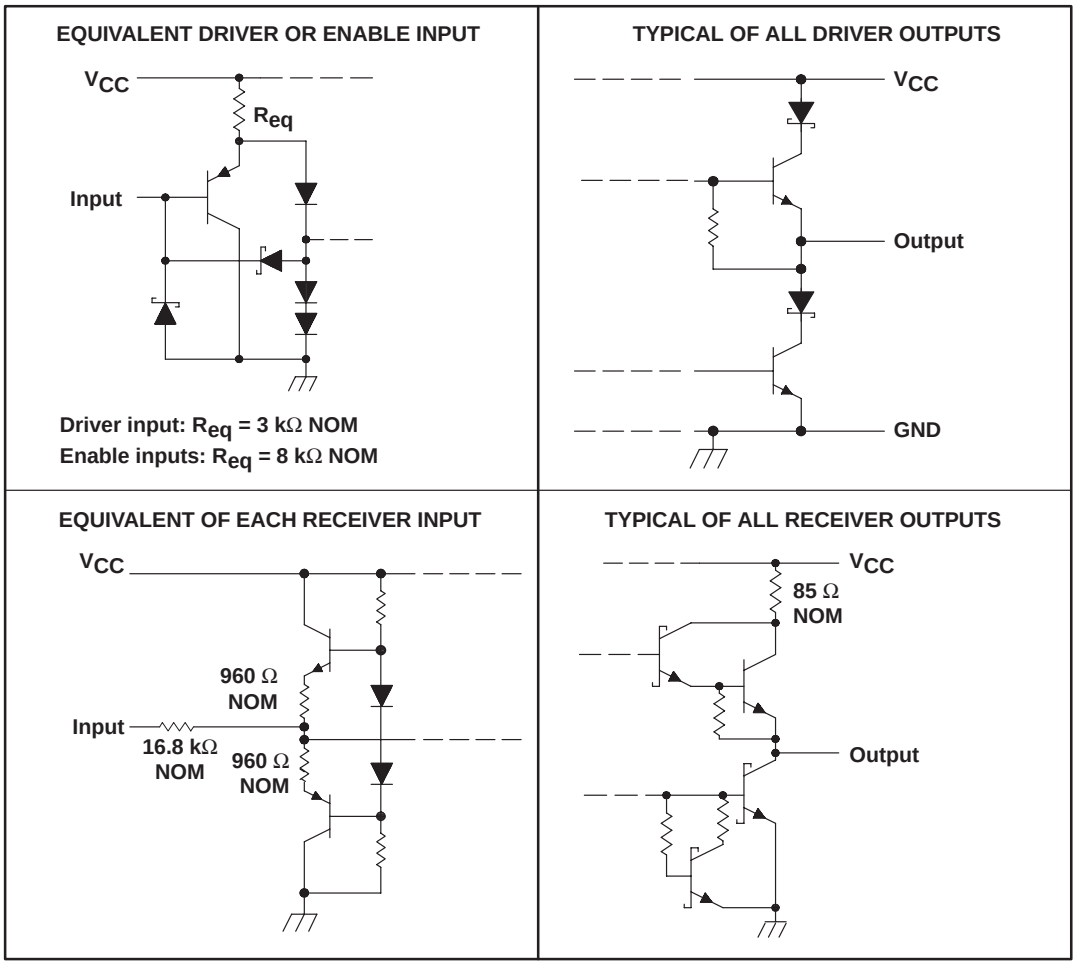
DIFFERENTIAL INPUTS A − B	OUTPUT R
$V_{ID} \geq 0.2$ V	H
$-0.2\text{ V} < V_{ID} < 0.2\text{ V}$	?
$V_{ID} \leq -0.2$ V	L

H = high level, L = low level, ? = indeterminate

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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schematics of inputs and outputs



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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Voltage range at any bus terminal . . . . . −10 V to 15 V
Differential input voltage (see Note 2) . . . . . ±25 V
Continuous total dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range . . . . . 0°C to 70°C

NOTES: 1. All voltage values, except differential input voltage, are with respect to network ground terminal.
2. Differential-input voltage is measured at the noninverting input with respect to the corresponding inverting input.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW
P	1000 mW	8.0 mW/°C	640 mW

recommended operating conditions

		MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}		4.5	5	5.25	V
High-level input voltage, V_{IH}	Driver	2			V
Low-level input voltage, V_{IL}	Driver			0.8	V
Common-mode input voltage, V_{IC}		−7†		12	V
Differential input voltage, V_{ID}				±12	V
High-level output current, I_{OH}	Driver			−60	mA
	Receiver			−400	µA
Low-level output current, I_{OL}	Driver			60	mA
	Receiver			8	
Operating free-air temperature, T_A		0		70	°C

† The algebraic convention, where the less-positive (more-negative) limit is designated minimum, is used in this data sheet for common-mode input voltage and threshold voltage.

DRIVER SECTION

electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP‡	MAX	UNIT
V_{IK}	Input clamp voltage	I_I = −18 mA				−1.5	V
V_{OH}	High-level output voltage	V_{IH} = 2 V, I_{OH} = −33 mA	V_{IL} = 0.8 V,		3.7		V
V_{OL}	Low-level output voltage	V_{IH} = 2 V, I_{OH} = 33 mA	V_{IL} = 0.8 V,		1.1		V
$\|V_{OD1}\|$	Differential output voltage	I_O = 0				2 V_{OD2}	V
$\|V_{OD2}\|$	Differential output voltage	R_L = 100 Ω,	See Figure 13	2	2.7		V
		R_L = 54 Ω,	See Figure 13	1.5	2.4		
$\Delta\|V_{OD}\|$	Change in magnitude of differential output voltage§	R_L = 54 Ω or 100 Ω,	See FIgure 13			±0.2	V
V_{OC}	Common-mode output voltage¶					3	V
$\Delta\|V_{OC}\|$	Change in magnitude of common-mode output voltage§					±0.2	V
I_O	Output current with power off	V_{CC} = 0,	V_O = −7 V to 12 V			±100	µA
I_{IH}	High-level input current	V_I = 2.4 V				20	µA
I_{IL}	Low-level input current	V_I = 0.4 V				−400	µA
I_{OS}	Short-circuit output current	V_O = −7 V				−250	mA
		V_O = V_{CC}				250	
		V_O = 12 V				500	
I_{CC}	Supply current (total package)	No load				50	mA

‡ All typical values are at V_{CC} = 5 V and T_A = 25°C.

§ $\Delta|V_{OD}|$ and $\Delta|V_{OC}|$ are the changes in magnitude of V_{OD} and V_{OC}, respectively, that occur when the input is changed from a high level to a low level.

¶ In EIA Standard RS-422A, V_{OC}, which is the average of the two output voltages with respect to ground, is called output offset voltage, V_{OS}.

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

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{dD}	Differential-output delay time	R_L = 60 Ω, See Figure 3		40	60	ns
t_{tD}	Differential-output transition time			65	95	ns

RECEIVER SECTION

electrical characteristics over recommended ranges of common-mode input voltage, supply voltage, and operating free-air temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{T+}	Positive-going threshold voltage	V_O = 2.7 V,	I_O = −0.4 mA			0.2	V
V_{T-}	Negative-going threshold voltage	V_O = 0.5 V,	I_O = 8 mA	−0.2‡			V
V_{hys}	Hysteresis ($V_{T+} - V_{T-}$)	See Figure 9			50		mV
V_{OH}	High-level output voltage	V_{ID} = 200 mV, See Figure 2	I_{OH} = −400 µA,	2.7			V
V_{OL}	Low-level output voltage	V_{ID} = −200 mV,	I_{OL} = 8 mA, See Figure 2			0.45	V
I_I	Line input current	Other input at 0 V, See Note 3	V_I = 12 V			1	mA
			V_I = −7 V			−0.8	
r_i	Input resistance			12			kΩ
I_{OS}	Short-circuit output current			−15		−85	mA
I_{CC}	Supply current (total package)	No load				50	mA

† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ The algebraic convention, where the less-positive (more-negative) limit is designated minimum, is used in this data sheet for common-mode input voltage and threshold voltage levels only.
NOTE 3: Refer to EIA Standard RS-422A for exact conditions.

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

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	V_{ID} = −1.5 V to 1.5 V, C_L = 15 pF, See Figure 5		26	35	ns
t_{PHL}	Propagation delay time, high-to-low-level output			27	35	ns

PARAMETER MEASUREMENT INFORMATION

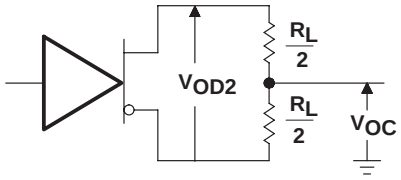


Figure 1. Driver V_{OD} and V_{OC}

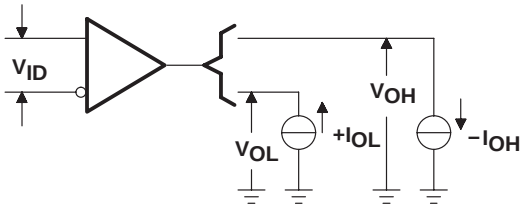


Figure 2. Receiver V_{OH} and V_{OL}

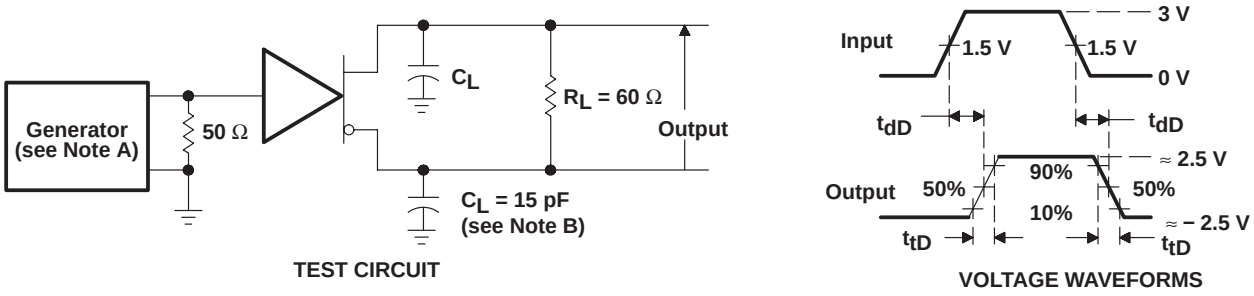


Figure 3. Driver Differential-Output Delay and Transition Times

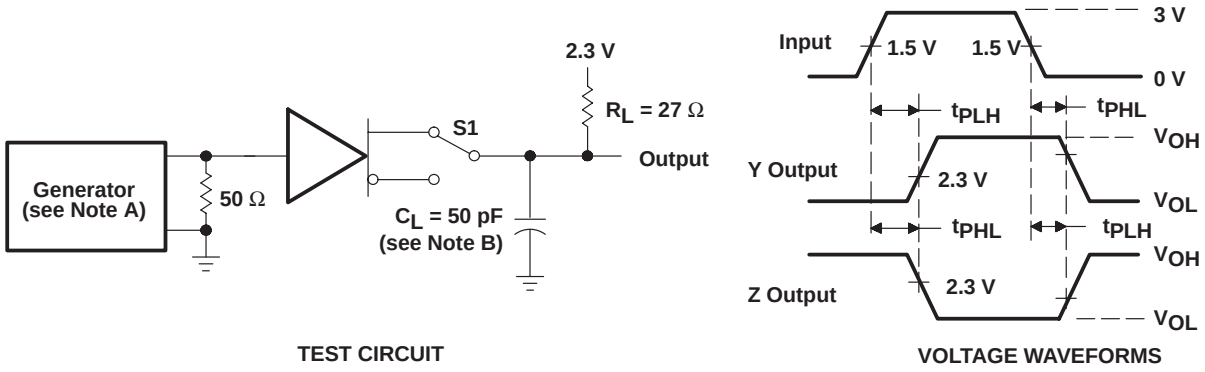


Figure 4. Driver Test Circuit and Voltage Waveforms

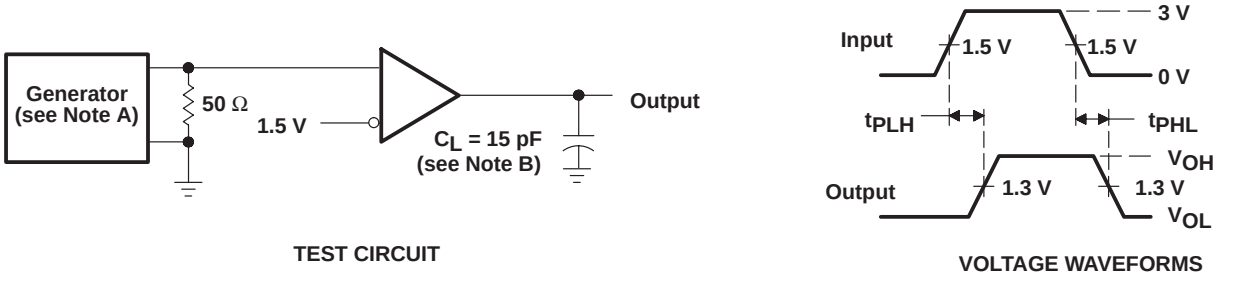


Figure 5. Receiver Test Circuit and Voltage Waveforms

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

TYPICAL CHARACTERISTICS

DRIVER HIGH-LEVEL OUTPUT VOLTAGE vs DRIVER HIGH-LEVEL OUTPUT CURRENT

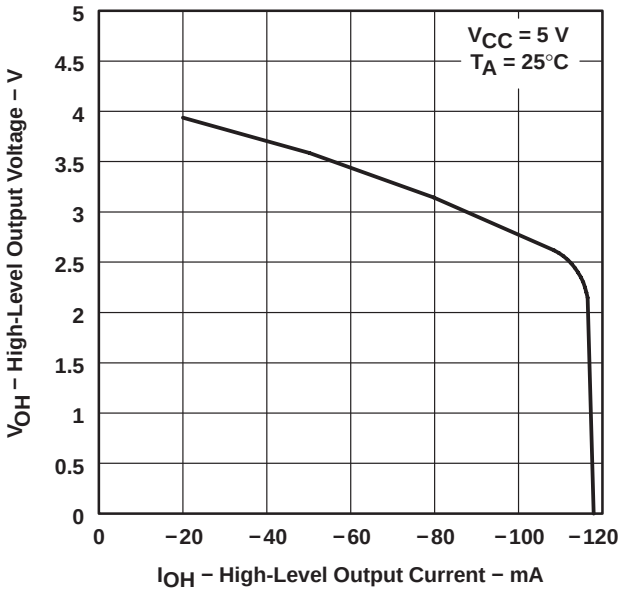


Figure 6

DRIVER LOW-LEVEL OUTPUT VOLTAGE vs DRIVER LOW-LEVEL OUTPUT CURRENT

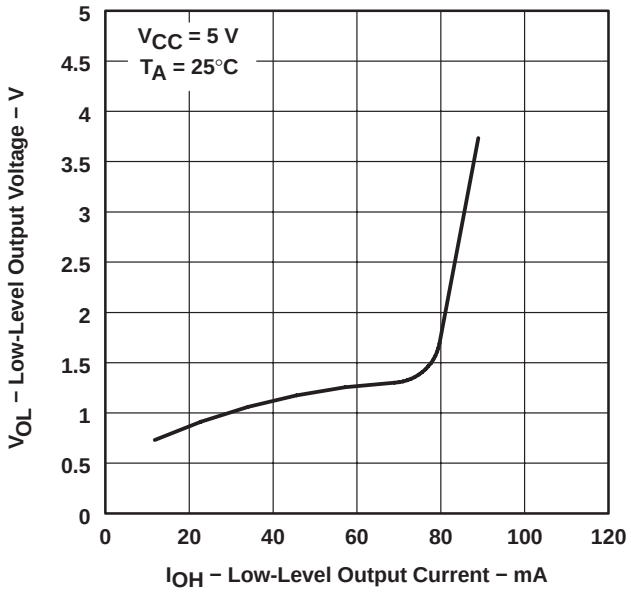


Figure 7

DRIVER DIFFERENTIAL OUTPUT VOLTAGE vs DRIVER OUTPUT CURRENT

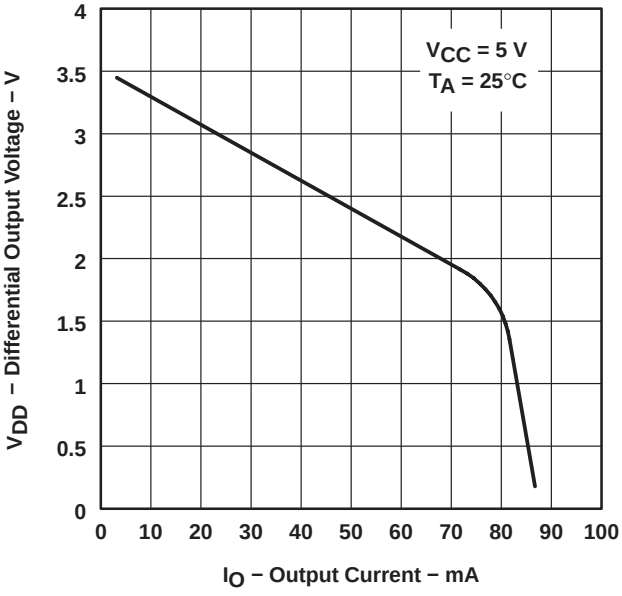


Figure 8

RECEIVER OUTPUT VOLTAGE vs DIFFERENTIAL INPUT VOLTAGE

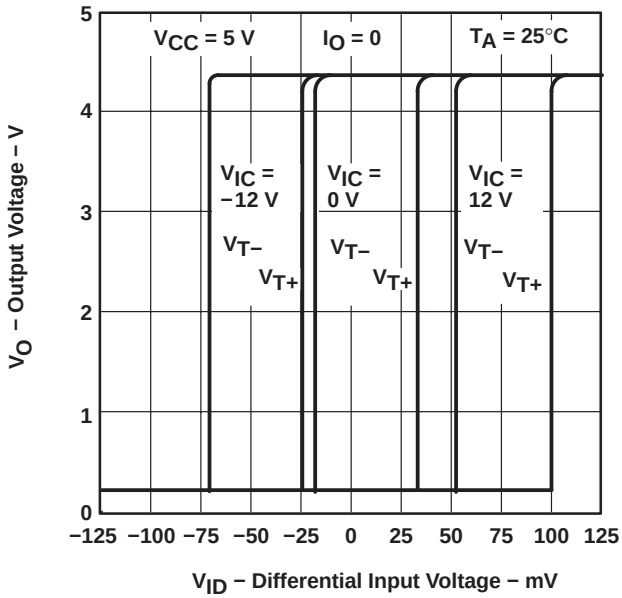


Figure 9

TYPICAL CHARACTERISTICS

RECEIVER HIGH-LEVEL OUTPUT VOLTAGE vs HIGH-LEVEL OUTPUT CURRENT

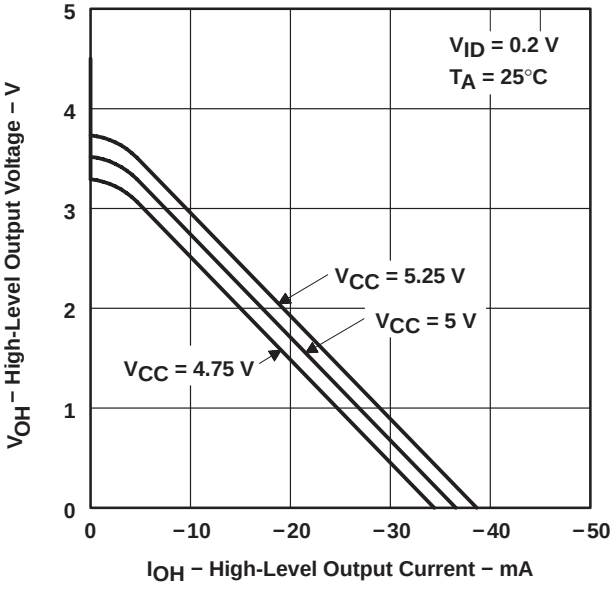


Figure 10

RECEIVER HIGH-LEVEL OUTPUT VOLTAGE vs FREE-AIR TEMPERATURE

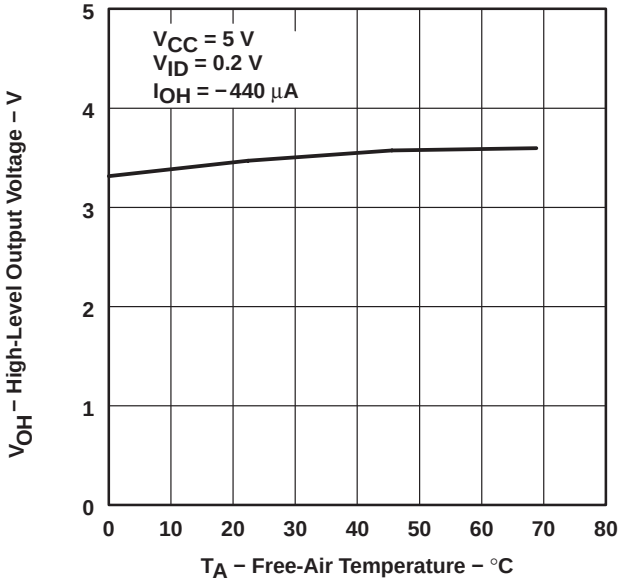


Figure 11

RECEIVER LOW-LEVEL OUTPUT VOLTAGE vs RECEIVER LOW-LEVEL OUTPUT CURRENT

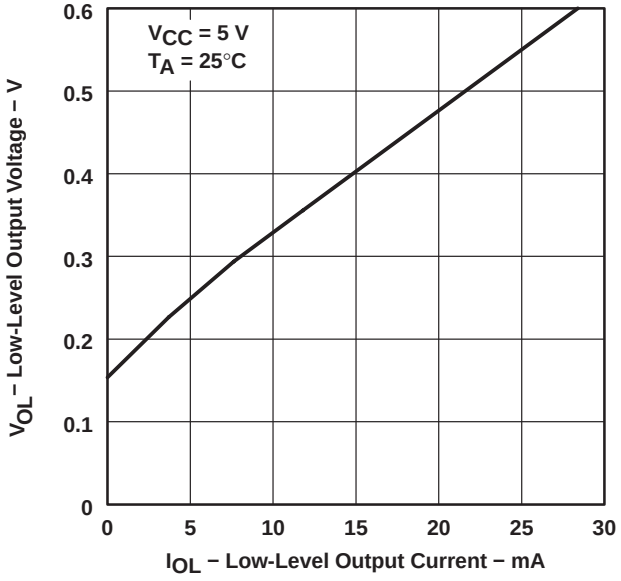


Figure 12

RECEIVER LOW-LEVEL OUTPUT VOLTAGE vs FREE-AIR TEMPERATURE

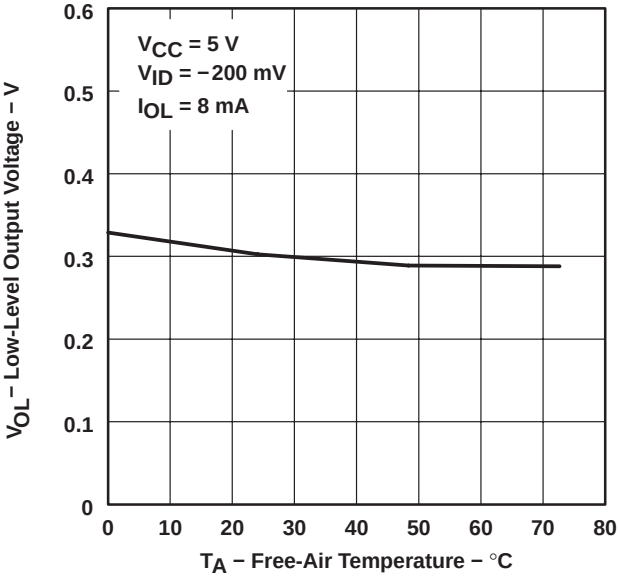


Figure 13

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/ Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
SN75179AP	OBSOLETE	PDIP	P	8		TBD	Call TI	Call TI	Samples Not Available

(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.

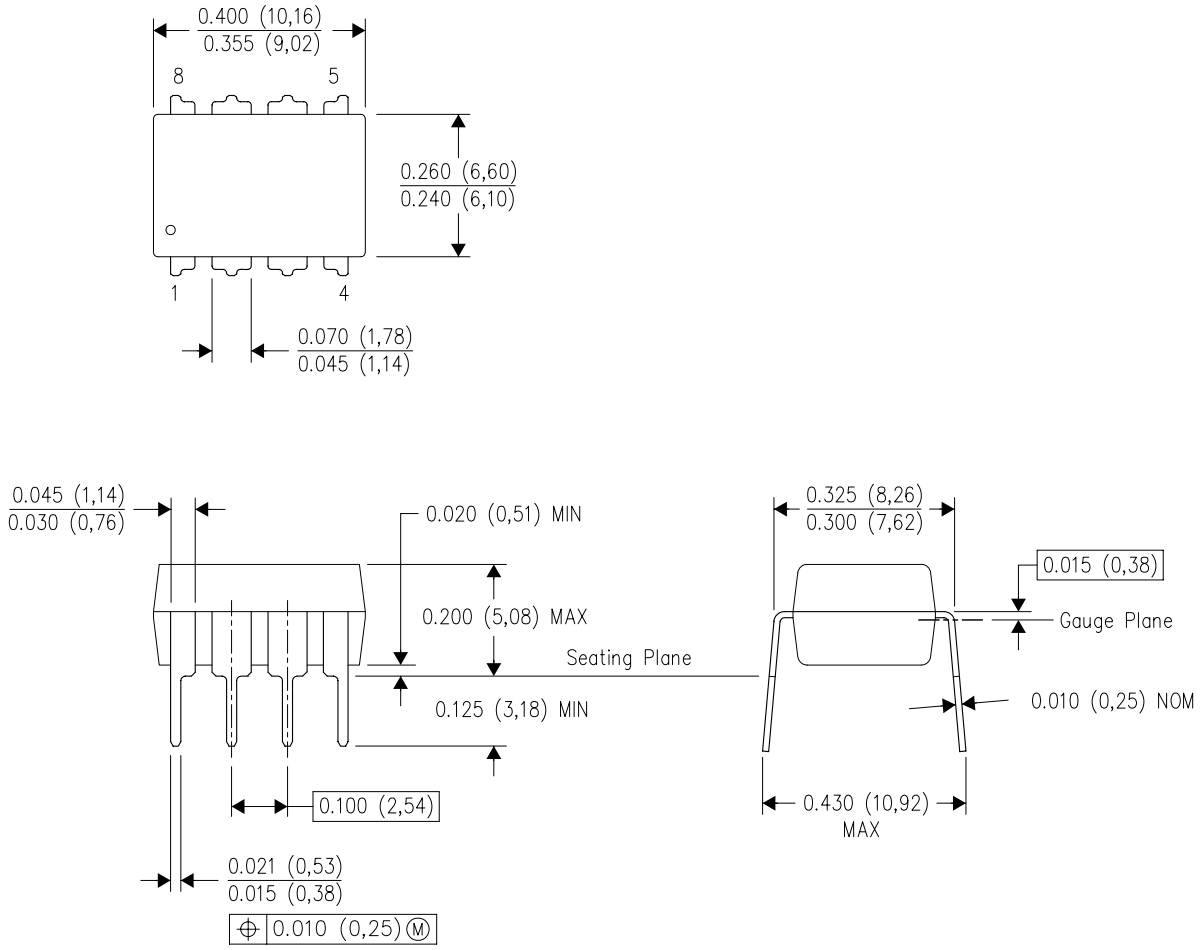
(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been 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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NOTES:
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B. This drawing is subject to change without notice.
C. Falls within JEDEC MS–001 variation BA.

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