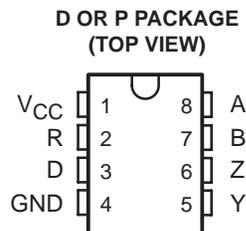


# SN75179A DIFFERENTIAL DRIVER AND RECEIVER PAIR

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



**NOT RECOMMENDED FOR NEW DESIGN**

## description

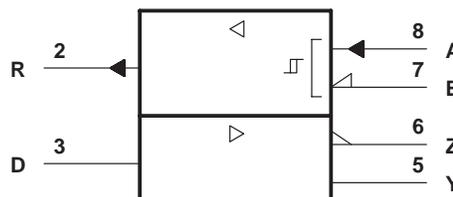
The SN75179A driver and bus receiver circuit is a monolithic integrated device designed for balanced transmission line applications, and meets EIA Standards RS-422A, RS-423A, and CCITT Recommendations V.11 and X.27. It is designed to improve the performance of data communications over long bus lines.

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.

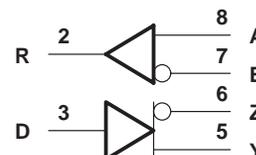
The driver provides thermal shutdown for protection from line fault conditions. Thermal shutdown is designed to occur at a junction temperature of approximately 150°C. The device is designed to drive current loads of up to 60 mA maximum.

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

## logic symbol



## logic diagram



## Function Tables

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

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

**TEXAS  
INSTRUMENTS**

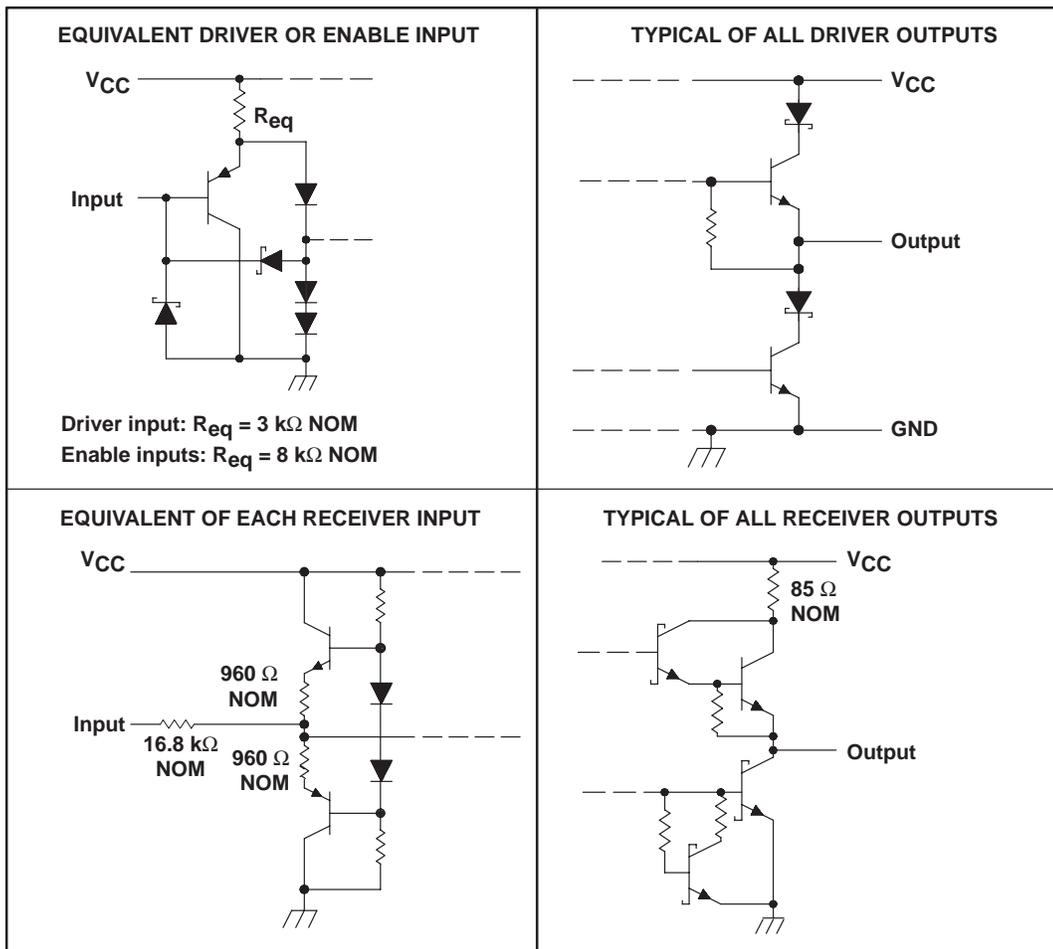
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# SN75179A DIFFERENTIAL DRIVER AND RECEIVER PAIR

SLLS123B – D2845, JUNE 1984 – REVISED FEBRUARY 1993

## 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)	$\pm 25$ 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	$T_A \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW
P	1000 mW	8.0 mW/°C	640 mW

# SN75179A DIFFERENTIAL DRIVER AND RECEIVER PAIR

SLLS123B – D2845, JUNE 1984 – REVISED FEBRUARY 1993

## 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, $V_{IC}$		$-7^{\dagger}$	12		V
Differential input voltage, $V_{ID}$		$\pm 12$			V
High-level output current, $I_{OH}$	Driver	-60			mA
	Receiver	-400			$\mu$ A
Low-level output current, $I_{OL}$	Driver	60			mA
	Receiver	8			
Operating free-air temperature, $T_A$		0	70		$^{\circ}$ C

$^{\dagger}$  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 $^{\ddagger}$	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	$R_L = 100 \Omega$ ,	See Figure 13	2	2.7		V
		$R_L = 54 \Omega$ ,	See Figure 13	1.5	2.4		
$\Delta V_{OD} $	Change in magnitude of differential output voltage $^{\S}$					$\pm 0.2$	V
$V_{OC}$	Common-mode output voltage $^{\parallel}$	$R_L = 54 \Omega$ or $100 \Omega$ ,	See Figure 13			3	V
$\Delta V_{OC} $	Change in magnitude of common-mode output voltage $^{\S}$					$\pm 0.2$	V
$I_O$	Output current with power off	$V_{CC} = 0$ ,	$V_O = -7$ V to 12 V			$\pm 100$	$\mu$ A
$I_{IH}$	High-level input current	$V_I = 2.4$ V				20	$\mu$ A
$I_{IL}$	Low-level input current	$V_I = 0.4$ V				-400	$\mu$ A
$I_{OS}$	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

$^{\ddagger}$  All typical values are at  $V_{CC} = 5$  V and  $T_A = 25^{\circ}$ C.

$^{\S}$   $\Delta|V_{OD}|$  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.

$^{\parallel}$  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, $T_A = 25^{\circ}$ C

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



# SN75179A

## DIFFERENTIAL DRIVER AND RECEIVER PAIR

SLLS123B – D2845, JUNE 1984 – REVISED FEBRUARY 1993

### 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	$V_O = 2.7\text{ V}$ , $I_O = -0.4\text{ mA}$			0.2	V
$V_{T-}$	Negative-going threshold voltage	$V_O = 0.5\text{ V}$ , $I_O = 8\text{ mA}$	$-0.2\ddagger$			V
$V_{hys}$	Hysteresis ( $V_{T+} - V_{T-}$ )	See Figure 9		50		mV
$V_{OH}$	High-level output voltage	$V_{ID} = 200\text{ mV}$ , See Figure 2 $I_{OH} = -400\text{ }\mu\text{A}$ ,		2.7		V
$V_{OL}$	Low-level output voltage	$V_{ID} = -200\text{ mV}$ , $I_{OL} = 8\text{ mA}$ , See Figure 2			0.45	V
$I_I$	Line input current	Other input at 0 V, See Note 3		$V_I = 12\text{ V}$	1	mA
				$V_I = -7\text{ V}$	-0.8	
$r_i$	Input resistance		12			k $\Omega$
$I_{OS}$	Short-circuit output current		-15		-85	mA
$I_{CC}$	Supply current ( total package)	No load			50	mA

† All typical values are at  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

‡ 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, $V_{CC} = 5\text{ V}$ , $T_A = 25^\circ\text{C}$

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

## PARAMETER MEASUREMENT INFORMATION

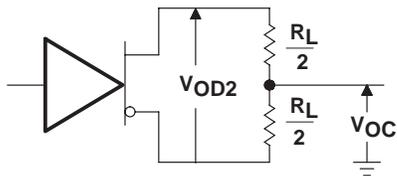


Figure 1. Driver  $V_{OD}$  and  $V_{OC}$

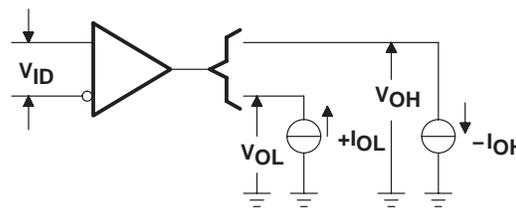


Figure 2. Receiver  $V_{OH}$  and  $V_{OL}$

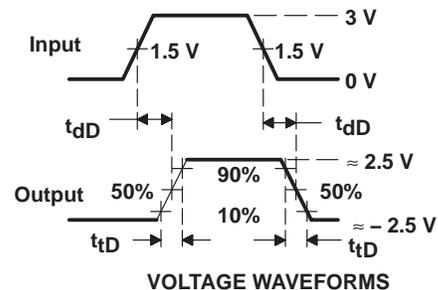
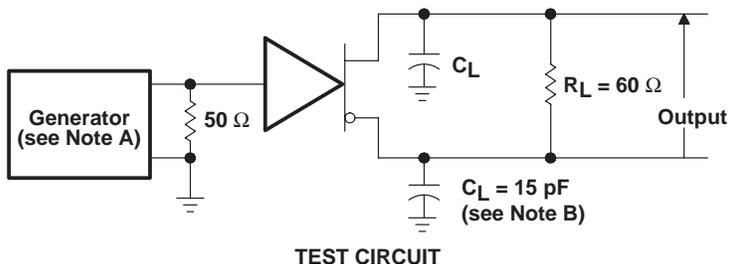


Figure 3. Driver Differential-Output Delay and Transition Times

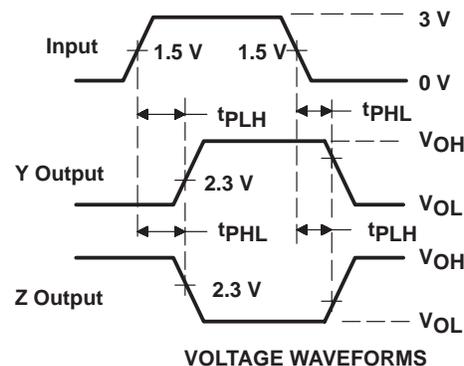
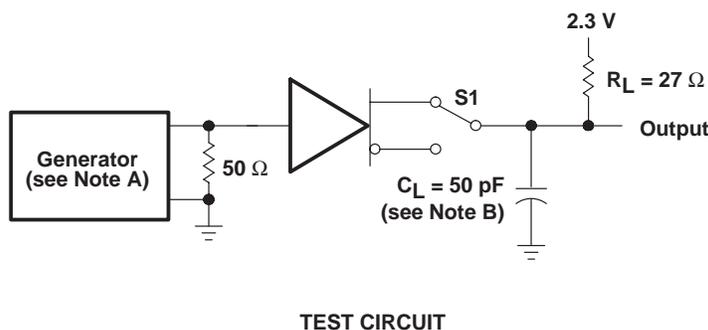


Figure 4. Driver Test Circuit and Voltage Waveforms

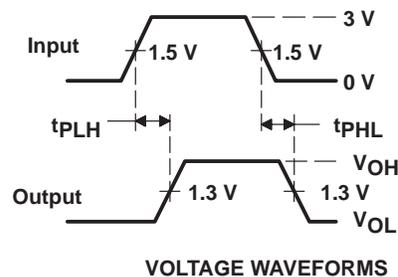
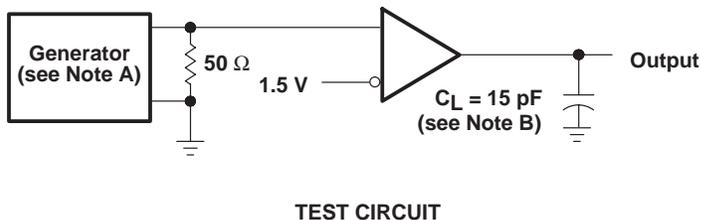


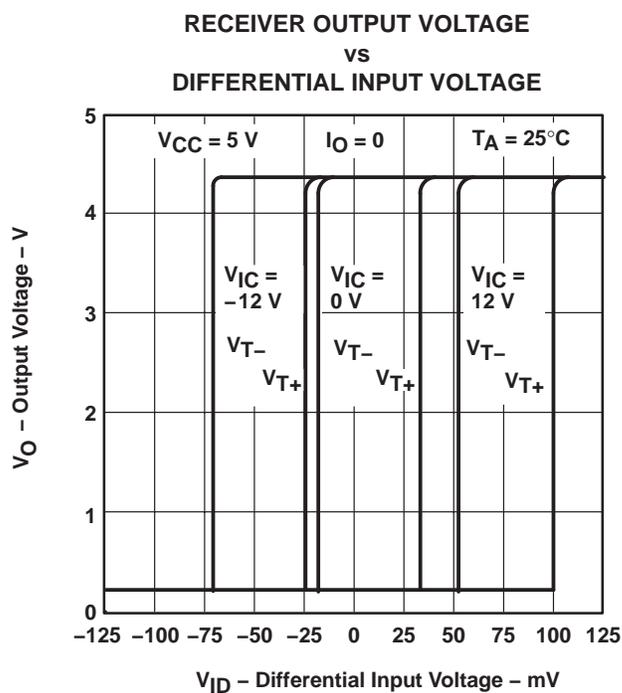
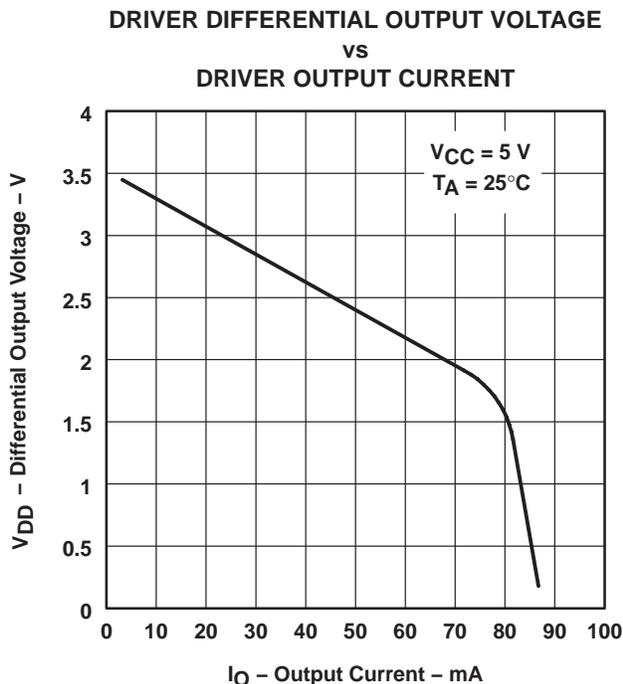
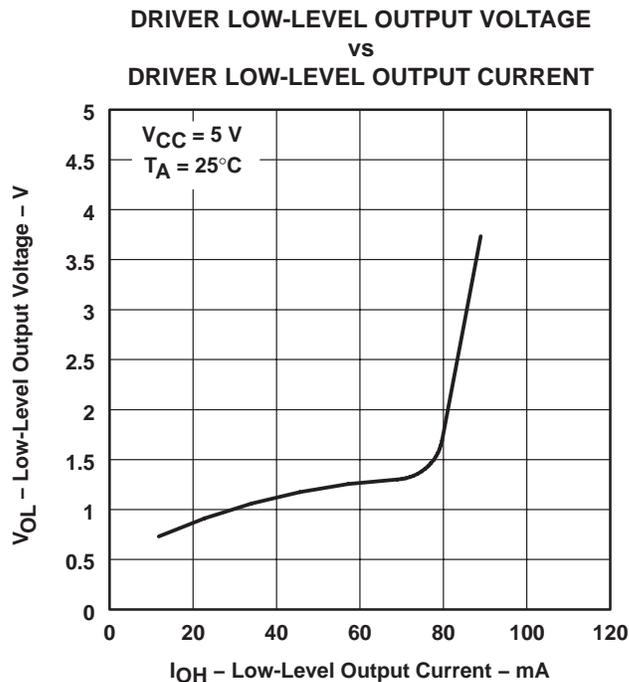
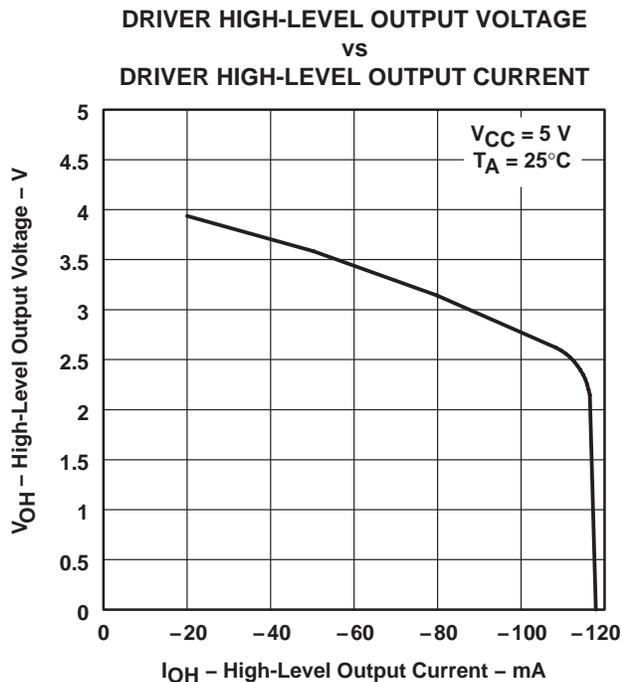
Figure 5. Receiver Test Circuit and Voltage Waveforms

NOTES: A. The input pulse is supplied by a generator having the following characteristics: PRR = 1 MHz, 50% duty cycle,  $t_r \leq 6$  ns,  $t_f \leq 6$  ns,  $Z_0 = 50 \Omega$ .  
 B.  $C_L$  includes probe and jig capacitance.

# SN75179A DIFFERENTIAL DRIVER AND RECEIVER PAIR

SLLS123B – D2845, JUNE 1984 – REVISED FEBRUARY 1993

## TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS

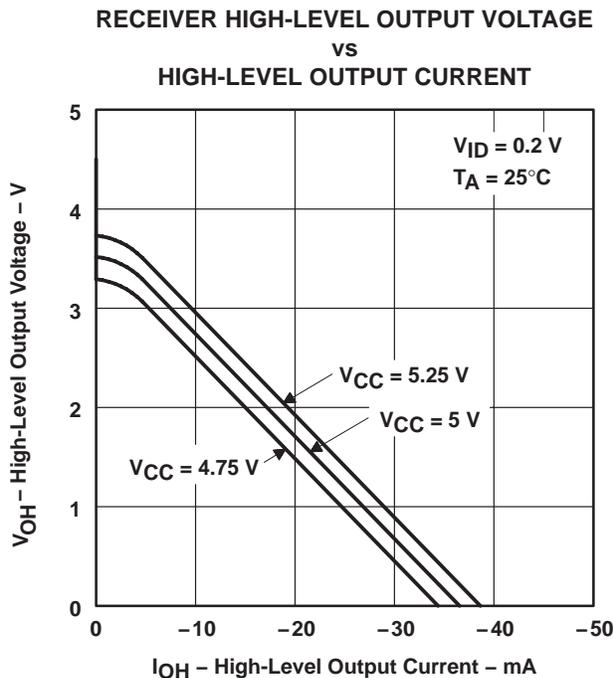


Figure 10

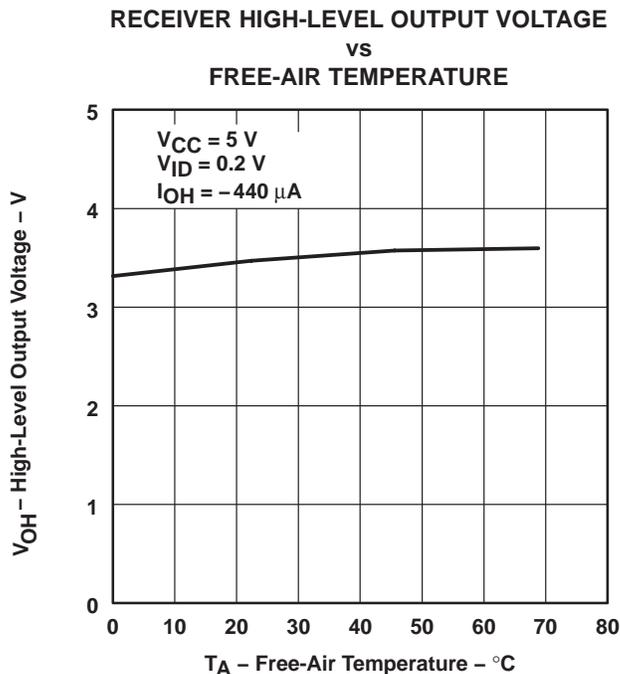


Figure 11

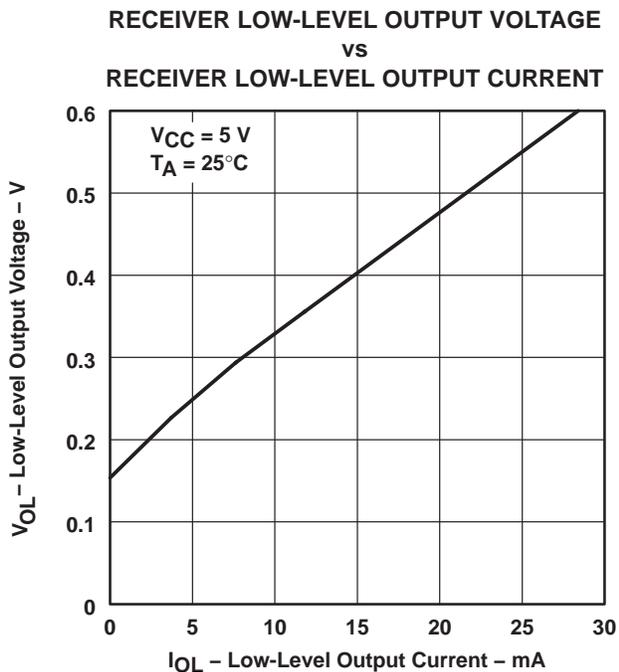


Figure 12

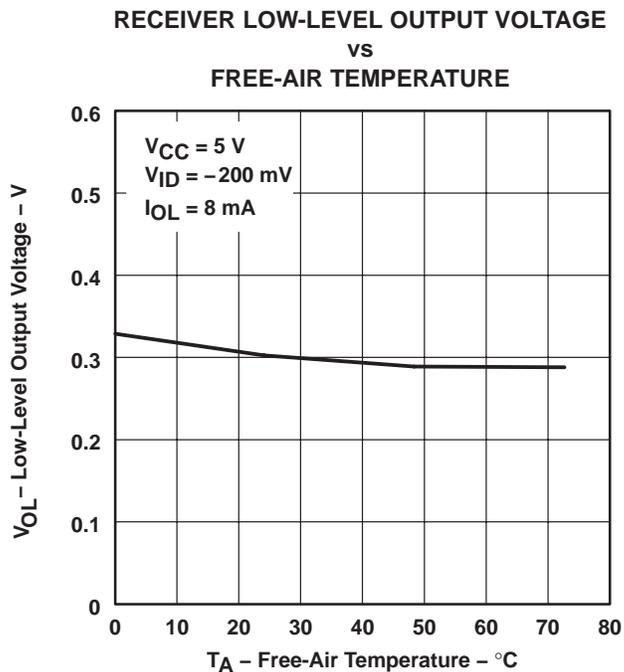


Figure 13

**PACKAGING INFORMATION**

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

<sup>(1)</sup> 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.

<sup>(2)</sup> 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.

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**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)

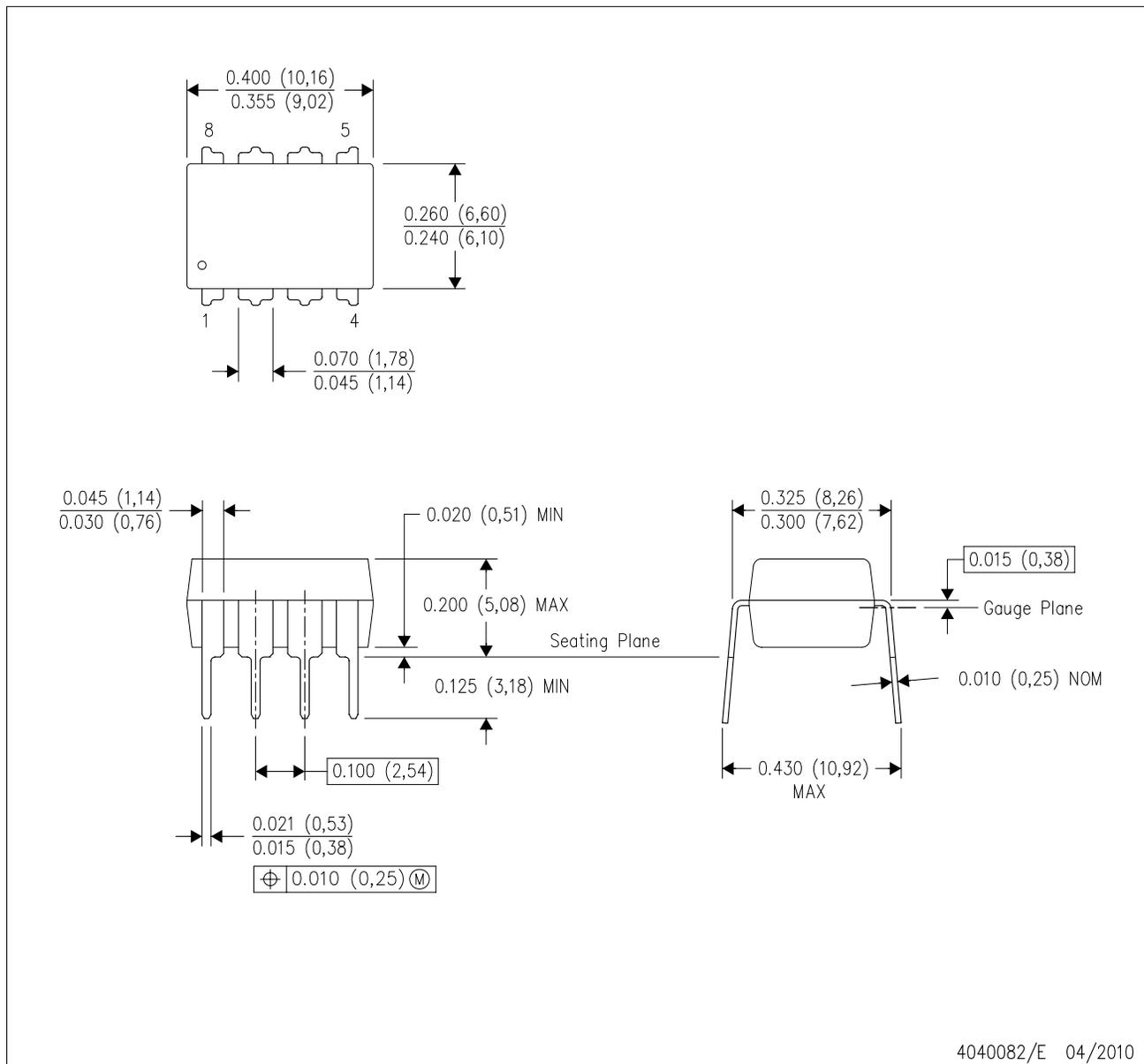
<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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PLASTIC DUAL-IN-LINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Falls within JEDEC MS-001 variation BA.

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DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>	Computers and Peripherals	<a href="http://www.ti.com/computers">www.ti.com/computers</a>
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