

## HIGH OUTPUT RS-485 TRANSCEIVERS

### FEATURES

- Minimum Differential Output Voltage of 2.5 V Into a 54-Ω Load
- Open-Circuit, Short-Circuit, and Idle-Bus Failsafe Receiver
- 1/8<sup>th</sup> Unit-Load Option Available (Up to 256 Nodes on the Bus)
- Bus-Pin ESD Protection Exceeds 16 kV HBM
- Driver Output Slew Rate Control Options
- Electrically Compatible With ANSI TIA/EIA-485-A Standard
- Low-Current Standby Mode . . . 1 μA Typical
- Glitch-Free Power-Up and Power-Down Protection for Hot-Plugging Applications
- Pin Compatible With Industry Standard SN75176

### APPLICATIONS

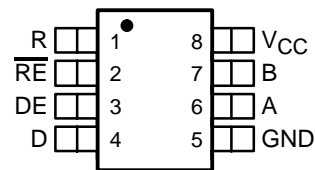
- Data Transmission Over Long or Lossy Lines or Electrically Noisy Environments
- Profibus Line Interface
- Industrial Process Control Networks
- Point-of-Sale (POS) Networks
- Electric Utility Metering
- Building Automation
- Digital Motor Control

### DESCRIPTION

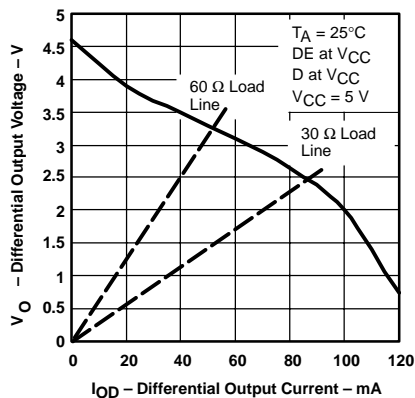
The SN65HVD05, SN75HVD05, SN65HVD06, SN75HVD06, SN65HVD07, and SN75HVD07 combine a 3-state differential line driver and differential line receiver. They are designed for balanced data transmission and interoperate with ANSI TIA/EIA-485-A and ISO 8482E standard-compliant devices. The driver is designed to provide a differential output voltage greater than that required by these standards for increased noise margin. The drivers and receivers have active-high and active-low enables respectively, which can be externally connected together to function as direction control.

The driver differential outputs and receiver differential inputs connect internally to form a differential input/output (I/O) bus port that is designed to offer minimum loading to the bus whenever the driver is disabled or not powered. These devices feature wide positive and negative common-mode voltage ranges, making them suitable for party-line applications.

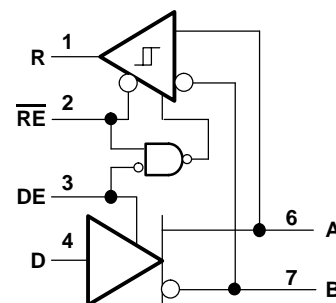
**D OR P PACKAGE**  
**(TOP VIEW)**



**DIFFERENTIAL OUTPUT VOLTAGE**  
**vs**  
**DIFFERENTIAL OUTPUT CURRENT**



**LOGIC DIAGRAM**  
**(POSITIVE LOGIC)**



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.



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)**

SIGNALING RATE	UNIT LOAD	DRIVER OUTPUT SLOPE CONTROL	T <sub>A</sub>	PART NUMBER(2)		MARKED AS	
						PLASTIC DUAL-IN-LINE PACKAGE (PDIP)	SMALL OUTLINE IC (SOIC) PACKAGE
40 Mbps	1/2	No	-40°C to 85°C	SN65HVD05D	SN65HVD05P	65HVD05	VP05
10 Mbps	1/8	Yes		SN65HVD06D	SN65HVD06P	65HVD06	VP06
1 Mbps	1/8	Yes		SN65HVD07D	SN65HVD07P	65HVD07	VP07
40 Mbps	1/2	No	-0°C to 70°C	SN75HVD05D	SN75HVD05P	75HVD05	VN05
10 Mbps	1/8	Yes		SN75HVD06D	SN75HVD06P	75HVD06	VN06
1 Mbps	1/8	Yes		SN75HVD07D	SN75HVD07P	75HVD07	VN07

(1) For the most current specification and package information, refer to our web site at [www.ti.com](http://www.ti.com).

(2) The D package is available taped and reeled. Add an R suffix to the device type (i.e., SN65HVD05DR).

**PACKAGE DISSIPATION RATINGS (SEE FIGURE 12 AND FIGURE 13)**

PACKAGE	T <sub>A</sub> ≤ 25°C POWER RATING	DERATING FACTOR(1) ABOVE T <sub>A</sub> = 25°C	T <sub>A</sub> = 70°C POWER RATING	T <sub>A</sub> = 85°C POWER RATING
D(2)	710 mW	5.7 mW/°C	455 mW	369 mW
D(3)	1282 mW	10.3 mW/°C	821 mW	667 mW
P	1000 mW	8.0 mW/°C	640 mW	520 mW

(1) This is the inverse of the junction-to-ambient thermal resistance when board-mounted and with no air flow.

(2) Tested in accordance with the Low-K thermal metric definitions of EIA/JESD51-3

(3) Tested in accordance with the High-K thermal metric definitions of EIA/JESD51-7

**ABSOLUTE MAXIMUM RATINGS**

over operating free-air temperature range unless otherwise noted(1) (2)

		SN65HVD05, SN65HVD06, SN65HVD07 SN75HVD05, SN75HVD06, SN75HVD07	
Supply voltage range, V <sub>CC</sub>		-0.3 V to 6 V	
Voltage range at A or B		-9 V to 14 V	
Input voltage range at D, DE, R or RE		-0.5 V to V <sub>CC</sub> + 0.5 V	
Voltage input range, transient pulse, A and B, through 100 Ω (see Figure 11)		-50 V to 50 V	
Electrostatic discharge	Human body model(3)	A, B, and GND	16 kV
		All pins	4 kV
	Charged-device model(4)	All pins	1 kV
Continuous total power dissipation		See Dissipation Rating Table	
Storage temperature range, T <sub>stg</sub>		-65°C to 150°C	
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds		260°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, except differential I/O bus voltages, are with respect to network ground terminal.

(3) Tested in accordance with JEDEC Standard 22, Test Method A114-A.

(4) Tested in accordance with JEDEC Standard 22, Test Method C101.

## RECOMMENDED OPERATING CONDITIONS

		MIN	NOM	MAX	UNIT
Supply voltage, $V_{CC}$		4.5		5.5	V
Voltage at any bus terminal (separately or common mode) $V_I$ or $V_{IC}$		-7 <sup>(1)</sup>		12	V
High-level input voltage, $V_{IH}$	D, DE, $\overline{RE}$	2			V
Low-level input voltage, $V_{IL}$	D, DE, $\overline{RE}$			0.8	V
Differential input voltage, $V_{ID}$ (see Figure 7)		-12		12	V
High-level output current, $I_{OH}$	Driver	-100			mA
	Receiver	-8			
Low-level output current, $I_{OL}$	Driver			100	mA
	Receiver			8	
Operating free-air temperature, $T_A$	SN65HVD05	-40		85	°C
	SN65HVD06				
	SN65HVD07				
	SN75HVD05	0		70	°C
	SN75HVD06				
	SN75HVD07				

(1) The algebraic convention, in which the least positive (most negative) limit is designated as minimum is used in this data sheet.

## DRIVER ELECTRICAL CHARACTERISTICS

over operating free-air temperature range unless otherwise noted<sup>(1)</sup>

PARAMETER		TEST CONDITIONS		MIN	TYP <sup>(1)</sup>	MAX	UNIT
$V_{IK}$	Input clamp voltage	$I_I = -18$ mA		-1.5			V
$ V_{OD} $	Differential output voltage	No Load				$V_{CC}$	V
		$R_L = 54 \Omega$ , See Figure 1		2.5			
		$V_{test} = -7$ V to 12 V, See Figure 2		2.2			
$\Delta V_{OD} $	Change in magnitude of differential output voltage	See Figure 1 and Figure 2		-0.2		0.2	V
$V_{OC(SS)}$	Steady-state common-mode output voltage	See Figure 3		2.2		3.3	V
$\Delta V_{OC(SS)}$	Change in steady-state common-mode output voltage	See Figure 3		-0.1		0.1	V
$V_{OC(PP)}$	Peak-to-peak common-mode output voltage	HVD05	See Figure 3		600		mV
		HVD06		500			
		HVD07		900			
$I_{OZ}$	High-impedance output current	See receiver input currents					
$I_I$	Input current	D		-100		0	$\mu$ A
		DE		0		100	
$I_{OS}$	Short-circuit output current	$-7$ V $\leq V_O \leq 12$ V		-250		250	mA
$C_{(diff)}$	Differential output capacitance	$V_{ID} = 0.4 \sin(4E6\pi t) + 0.5$ V, DE at 0 V			16		pF
$I_{CC}$	Supply current	$\overline{RE}$ at $V_{CC}$ , D & DE at $V_{CC}$ , No load	Receiver disabled and driver enabled		9	15	mA
		$\overline{RE}$ at $V_{CC}$ , D at $V_{CC}$ DE at 0 V, No load	Receiver disabled and driver disabled (standby)		1	5	$\mu$ A
		$\overline{RE}$ at 0 V, D & DE at $V_{CC}$ , No load	Receiver enabled and driver enabled		9	15	mA

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

**DRIVER SWITCHING CHARACTERISTICS NIL**

over operating free-air temperature range unless otherwise noted

PARAMETER		TEST CONDITIONS	MIN	TYP(1)	MAX	UNIT	
t <sub>PLH</sub>	Propagation delay time, low-to-high-level output	HVD05		6.5	11	ns	
		HVD06		27	40		
		HVD07		250	400		
t <sub>PHL</sub>	Propagation delay time, high-to-low-level output	HVD05		6.5	11	ns	
		HVD06		27	40		
		HVD07		250	400		
t <sub>r</sub>	Differential output signal rise time	HVD05	R <sub>L</sub> = 54 Ω, C <sub>L</sub> = 50 pF, See Figure 4	2.7	3.6	6	ns
		HVD06		18	28	55	
		HVD07		150	300	450	
t <sub>f</sub>	Differential output signal fall time	HVD05	R <sub>L</sub> = 54 Ω, C <sub>L</sub> = 50 pF, See Figure 4	2.7	3.6	6	ns
		HVD06		18	28	55	
		HVD07		150	300	450	
t <sub>sk(p)</sub>	Pulse skew ( t <sub>PHL</sub> – t <sub>PLH</sub>  )	HVD05			2	ns	
		HVD06			2.5		
		HVD07			10		
t <sub>sk(pp)</sub> (2)	Part-to-part skew	HVD05			3.5	ns	
		HVD06			14		
		HVD07			100		
t <sub>PZH1</sub>	Propagation delay time, high-impedance-to-high-level output	HVD05	R <sub>E</sub> at 0 V, R <sub>L</sub> = 110 Ω, See Figure 5			25	ns
		HVD06				45	
		HVD07				250	
t <sub>PHZ</sub>	Propagation delay time, high-level-to-high-impedance output	HVD05	R <sub>E</sub> at 0 V, R <sub>L</sub> = 110 Ω, See Figure 5			25	ns
		HVD06				60	
		HVD07				250	
t <sub>PZL1</sub>	Propagation delay time, high-impedance-to-low-level output	HVD05	R <sub>E</sub> at 0 V, R <sub>L</sub> = 110 Ω, See Figure 6			15	ns
		HVD06				45	
		HVD07				200	
t <sub>PLZ</sub>	Propagation delay time, low-level-to-high-impedance output	HVD05	R <sub>E</sub> at 0 V, R <sub>L</sub> = 110 Ω, See Figure 6			14	ns
		HVD06				90	
		HVD07				550	
t <sub>PZH2</sub>	Propagation delay time, standby-to-high-level output		R <sub>L</sub> = 110 Ω, R <sub>E</sub> at 3 V, See Figure 5			6	μs
t <sub>PZL2</sub>	Propagation delay time, standby-to-low-level output		R <sub>L</sub> = 110 Ω, R <sub>E</sub> at 3 V, See Figure 6			6	μs

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

(2) t<sub>sk(pp)</sub> is the magnitude of the difference in propagation delay times between any specified terminals of two devices when both devices operate with the same supply voltages, at the same temperature, and have identical packages and test circuits.

## RECEIVER ELECTRICAL CHARACTERISTICS

over operating free-air temperature range unless otherwise noted

PARAMETER		TEST CONDITIONS		MIN	TYP <sup>(1)</sup>	MAX	UNIT
V <sub>IT+</sub>	Positive-going input threshold voltage	I <sub>O</sub> = -8 mA				-0.01	V
V <sub>IT-</sub>	Negative-going input threshold voltage	I <sub>O</sub> = 8 mA		-0.2			V
V <sub>hys</sub>	Hysteresis voltage (V <sub>IT+</sub> - V <sub>IT-</sub> )				35		mV
V <sub>IK</sub>	Enable-input clamp voltage	I <sub>I</sub> = -18 mA		-1.5			V
V <sub>OH</sub>	High-level output voltage	V <sub>ID</sub> = 200 mV, I <sub>OH</sub> = -8 mA,	See Figure 7	4			V
V <sub>OL</sub>	Low-level output voltage	V <sub>ID</sub> = -200 mV, I <sub>OL</sub> = 8 mA,	See Figure 7			0.4	V
I <sub>OZ</sub>	High-impedance-state output current	V <sub>O</sub> = 0 or V <sub>CC</sub>	$\overline{RE}$ at V <sub>CC</sub>	-1		1	μA
I <sub>I</sub>	Bus input current	HVD05	Other input at 0 V	V <sub>A</sub> or V <sub>B</sub> = 12 V	0.23	0.5	mA
				V <sub>A</sub> or V <sub>B</sub> = 12 V, V <sub>CC</sub> = 0 V	0.3	0.5	
				V <sub>A</sub> or V <sub>B</sub> = -7 V	-0.4	-0.13	
				V <sub>A</sub> or V <sub>B</sub> = -7 V, V <sub>CC</sub> = 0 V	-0.4	-0.15	
		HVD06, HVD07	Other input at 0 V	V <sub>A</sub> or V <sub>B</sub> = 12 V	0.06	0.1	mA
				V <sub>A</sub> or V <sub>B</sub> = 12 V, V <sub>CC</sub> = 0 V	0.08	0.13	
				V <sub>A</sub> or V <sub>B</sub> = -7 V	-0.1	-0.05	
				V <sub>A</sub> or V <sub>B</sub> = -7 V, V <sub>CC</sub> = 0 V	-0.05	-0.03	
I <sub>IH</sub>	High-level input current, $\overline{RE}$	V <sub>IH</sub> = 2 V		-60	-26.4		μA
I <sub>IL</sub>	Low-level input current, $\overline{RE}$	V <sub>IL</sub> = 0.8 V		-60	-27.4		μA
C <sub>(diff)</sub>	Differential input capacitance	V <sub>I</sub> = 0.4 sin(4E6πt) + 0.5 V, DE at 0 V			16		pF
I <sub>CC</sub>	Supply current	RE at 0 V, D & DE at 0 V, No load	Receiver enabled and driver disabled	5	10		mA
		RE at V <sub>CC</sub> , DE at 0 V, D at V <sub>CC</sub> , No load	Receiver disabled and driver disabled (standby)	1	5		μA
		RE at 0 V, D & DE at V <sub>CC</sub> , No load	Receiver enabled and driver enabled	9	15		mA

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

## RECEIVER SWITCHING CHARACTERISTICS

over operating free-air temperature range unless otherwise noted

PARAMETER		TEST CONDITIONS	MIN	TYP(1)	MAX	UNIT
t <sub>PLH</sub>	Propagation delay time, low-to-high-level output 1/2 UL	HVD05		14.6	25	ns
t <sub>PHL</sub>	Propagation delay time, high-to-low-level output 1/2 UL	HVD05		14.6	25	ns
t <sub>PLH</sub>	Propagation delay time, low-to-high-level output 1/8 UL	HVD06		55	70	ns
		HVD07		55	70	
t <sub>PHL</sub>	Propagation delay time, high-to-low-level output 1/8 UL	HVD06	V <sub>ID</sub> = -1.5 V to 1.5 V, C <sub>L</sub> = 15 pF, See Figure 8	55	70	ns
		HVD07		55	70	
t <sub>sk(p)</sub>	Pulse skew ( t <sub>PHL</sub> - t <sub>PLH</sub>  )	HVD05			2	ns
		HVD06			4.5	
		HVD07			4.5	
t <sub>sk(pp)</sub> <sup>(2)</sup>	Part-to-part skew	HVD05			6.5	ns
		HVD06			14	
		HVD07			14	
t <sub>r</sub>	Output signal rise time	C <sub>L</sub> = 15 pF, See Figure 8		2	3	ns
t <sub>f</sub>	Output signal fall time			2	3	
t <sub>PZH1</sub>	Output enable time to high level	C <sub>L</sub> = 15 pF, DE at 3 V, See Figure 9			10	ns
t <sub>PZL1</sub>	Output enable time to low level				10	
t <sub>PHZ</sub>	Output disable time from high level				15	
t <sub>PLZ</sub>	Output disable time from low level				15	
t <sub>PZH2</sub>	Propagation delay time, standby-to-high-level output	C <sub>L</sub> = 15 pF, DE at 0, See Figure 10			6	μs
t <sub>PZL2</sub>	Propagation delay time, standby-to-low-level output				6	

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

(2) t<sub>sk(pp)</sub> is the magnitude of the difference in propagation delay times between any specified terminals of two devices when both devices operate with the same supply voltages, at the same temperature, and have identical packages and test circuits.

PARAMETER MEASUREMENT INFORMATION

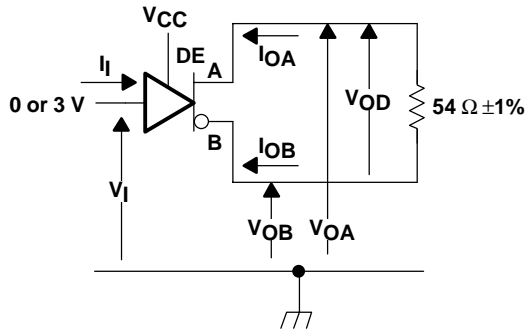


Figure 1. Driver  $V_{OD}$  Test Circuit and Voltage and Current Definitions

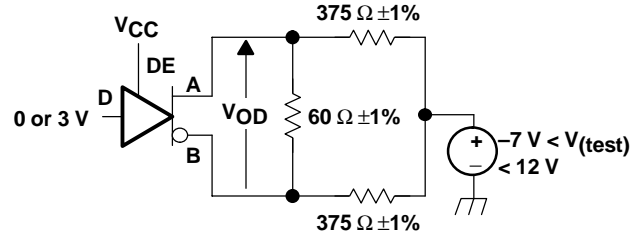
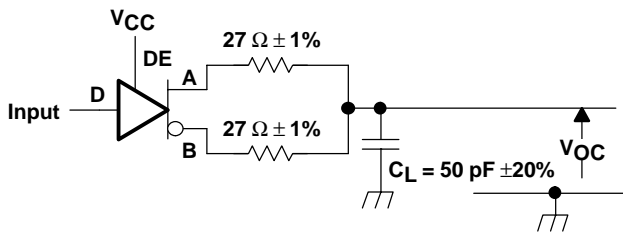


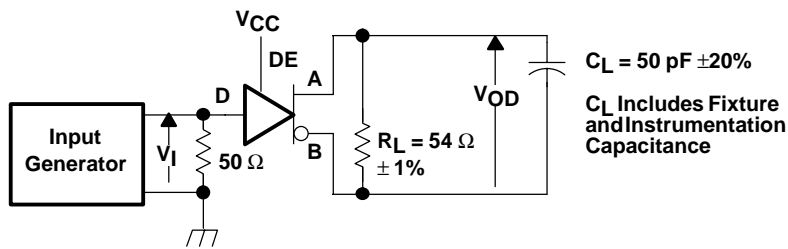
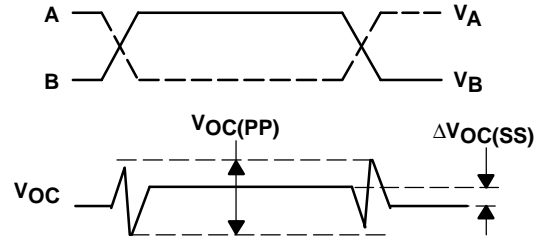
Figure 2. Driver  $V_{OD}$  With Common-Mode Loading Test Circuit



$C_L$  Includes Fixture and Instrumentation Capacitance

Input: PRR = 500 kHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$

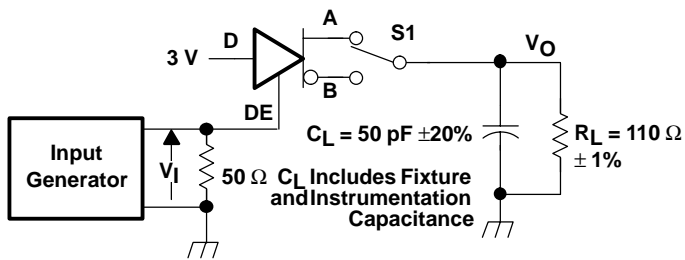
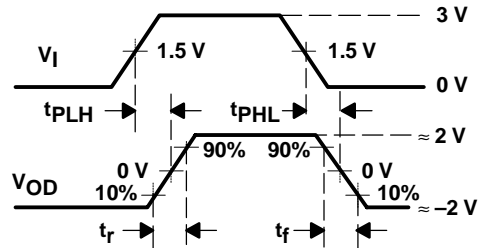
Figure 3. Test Circuit and Definitions for the Driver Common-Mode Output Voltage



$C_L = 50 \text{ pF} \pm 20\%$   
 $C_L$  Includes Fixture and Instrumentation Capacitance

Generator: PRR = 500 kHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$

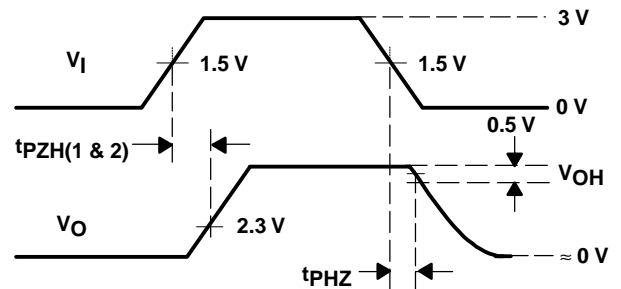
Figure 4. Driver Switching Test Circuit and Voltage Waveforms

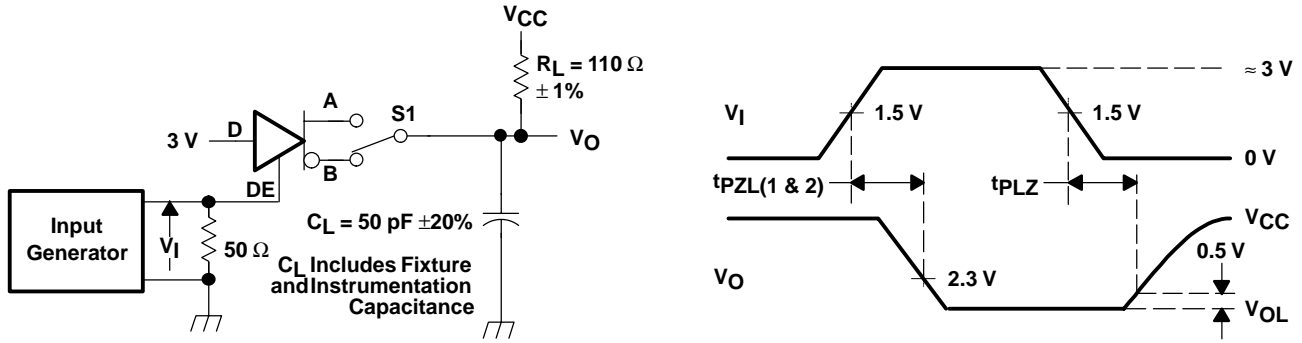


$C_L = 50 \text{ pF} \pm 20\%$   
 $C_L$  Includes Fixture and Instrumentation Capacitance

Generator: PRR = 100 kHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$

Figure 5. Driver High-Level Enable and Disable Time Test Circuit and Voltage Waveforms





Generator: PRR = 100 kHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$

Figure 6. Driver Low-Level Output Enable and Disable Time Test Circuit and Voltage Waveforms

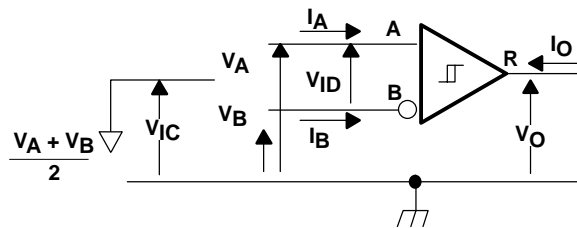
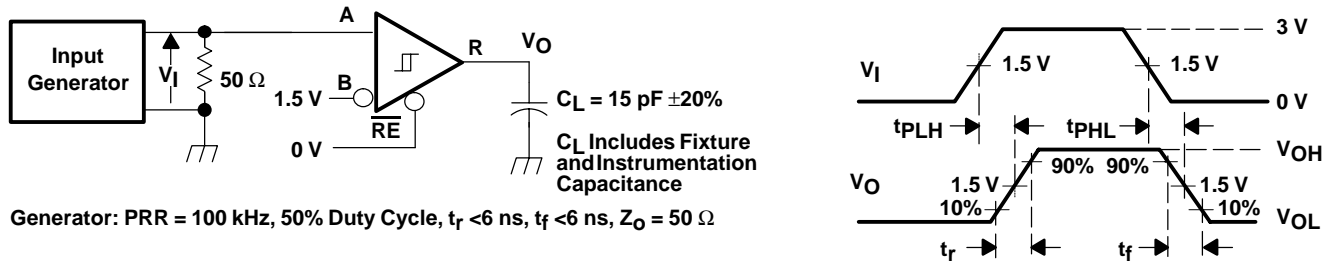


Figure 7. Receiver Voltage and Current Definitions



Generator: PRR = 100 kHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$

Figure 8. Receiver Switching Test Circuit and Voltage Waveforms

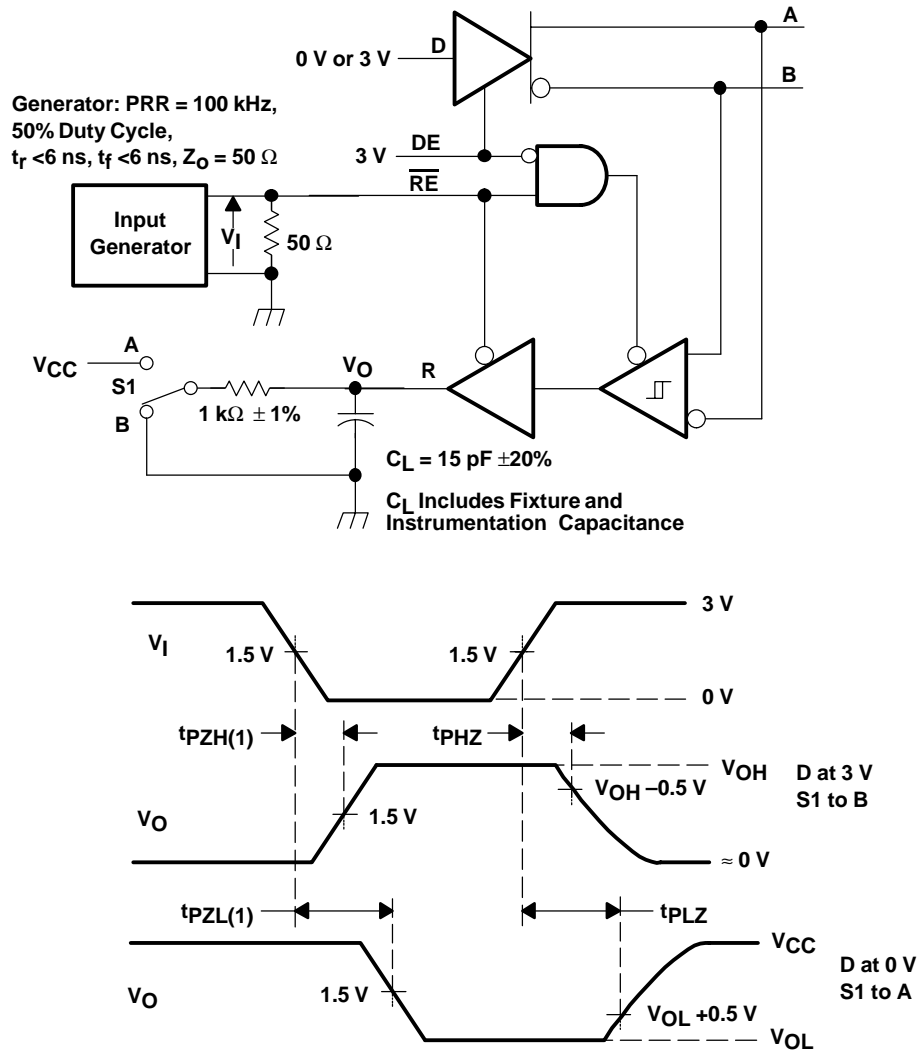


Figure 9. Receiver Enable and Disable Time Test Circuit and Voltage Waveforms With Drivers Enabled

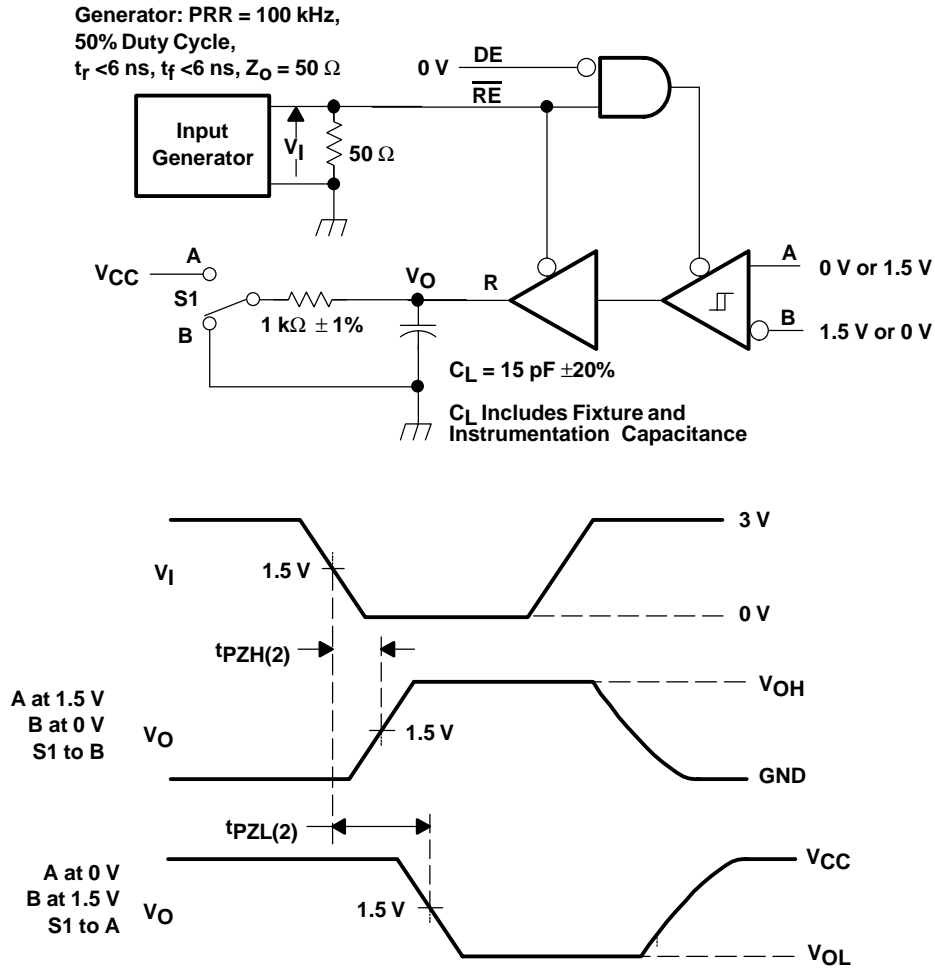
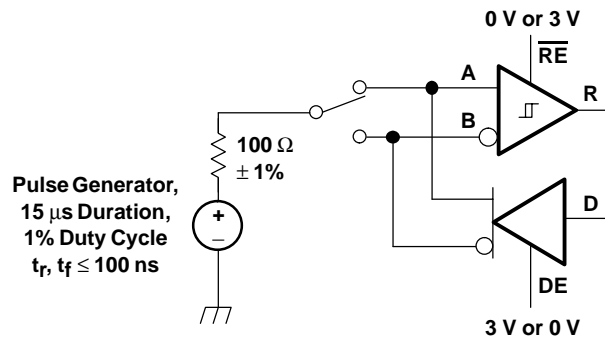


Figure 10. Receiver Enable Time From Standby (Driver Disabled)



NOTE: This test is conducted to test survivability only. Data stability at the R output is not specified.

Figure 11. Test Circuit, Transient Over Voltage Test

**FUNCTION TABLES**

**DRIVER**

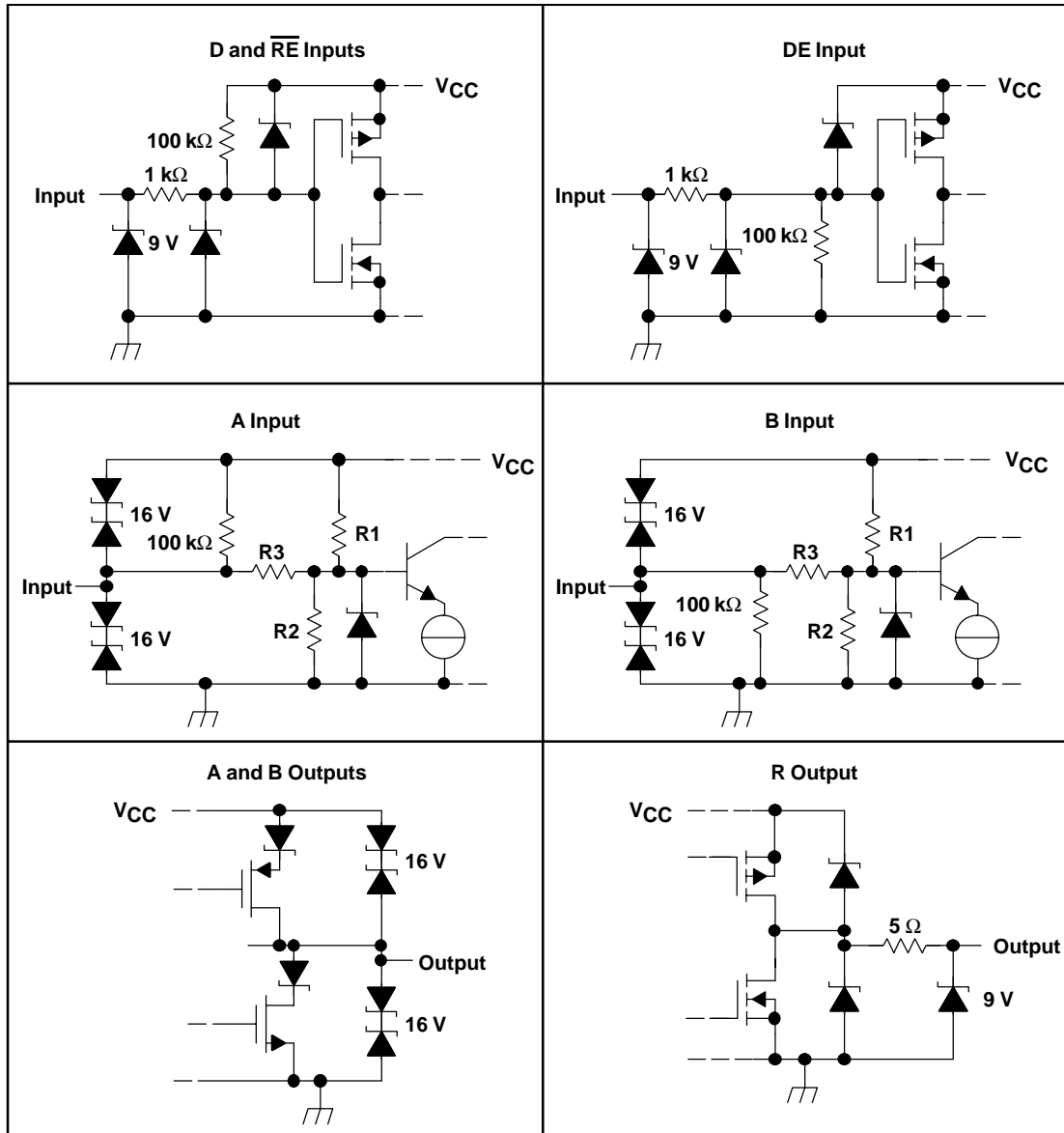
INPUT	ENABLE	OUTPUTS	
	DE	A	B
H	H	H	L
L	H	L	H
X	L	Z	Z
Open	H	H	L
X	Open	Z	Z

**RECEIVER**

DIFFERENTIAL INPUTS	ENABLE	OUTPUT
$V_{ID} = V_A - V_B$	$\overline{RE}$	R
$V_{ID} \leq -0.2\text{ V}$	L	L
$-0.2\text{ V} < V_{ID} < -0.01\text{ V}$	L	?
$-0.01\text{ V} \leq V_{ID}$	L	H
X	H	Z
Open Circuit	L	H
Short Circuit	L	H
X	Open	Z

H = high level; L = low level; Z = high impedance; X = irrelevant; ? = indeterminate

EQUIVALENT INPUT AND OUTPUT SCHEMATIC DIAGRAMS



	R1/R2	R3
SN65HVD05	9 kΩ	45 kΩ
SN65HVD06	36 kΩ	180 kΩ
SN65HVD07	36 kΩ	180 kΩ

**TYPICAL CHARACTERISTICS**

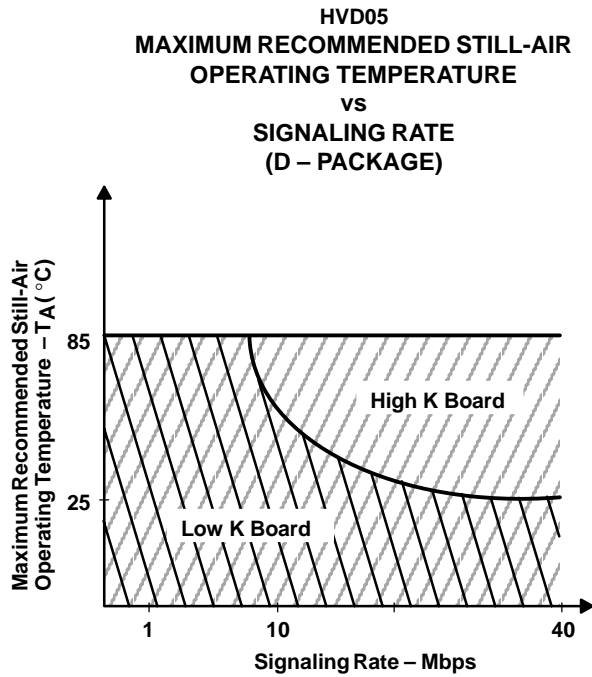


Figure 12

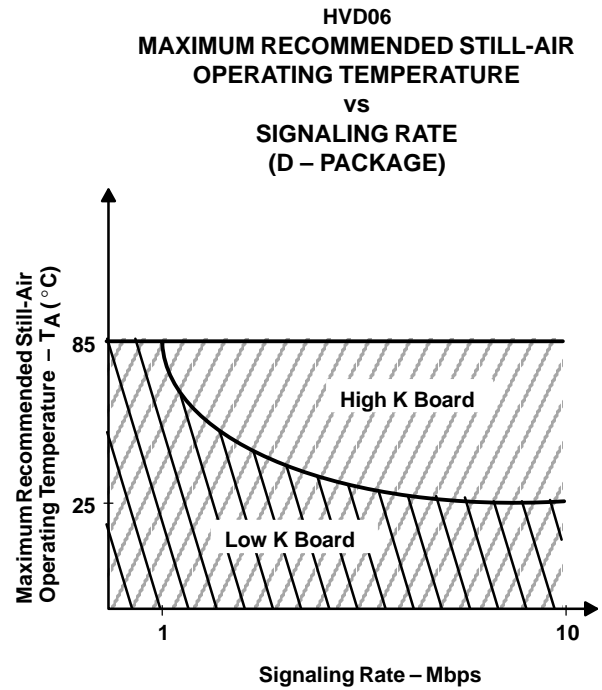


Figure 13

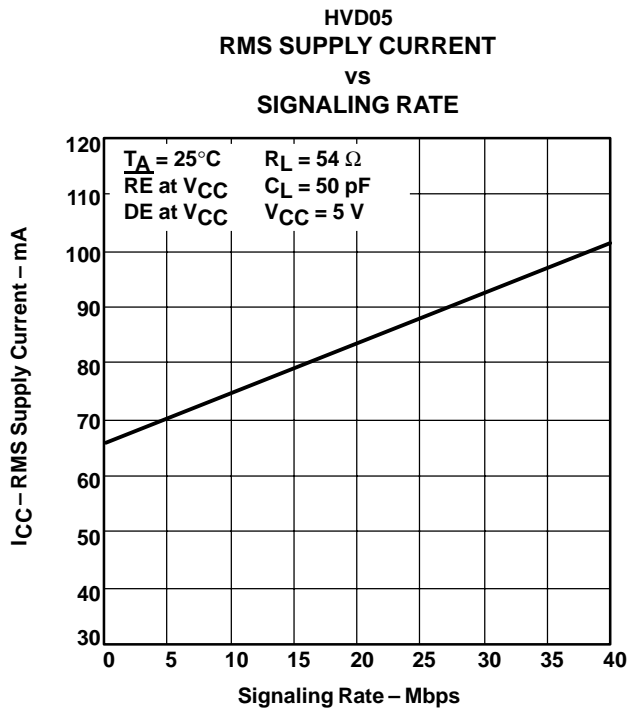


Figure 14

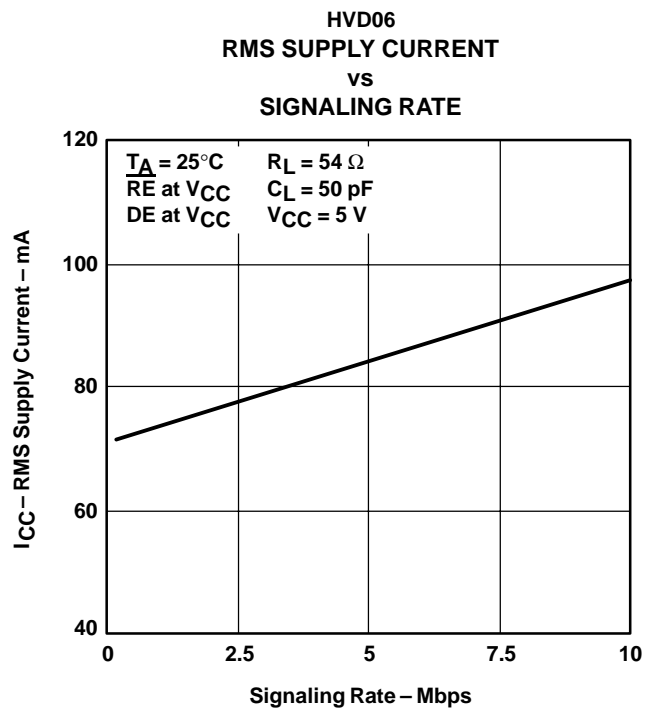


Figure 15

HVD07  
 RMS SUPPLY CURRENT  
 vs  
 SIGNALING RATE

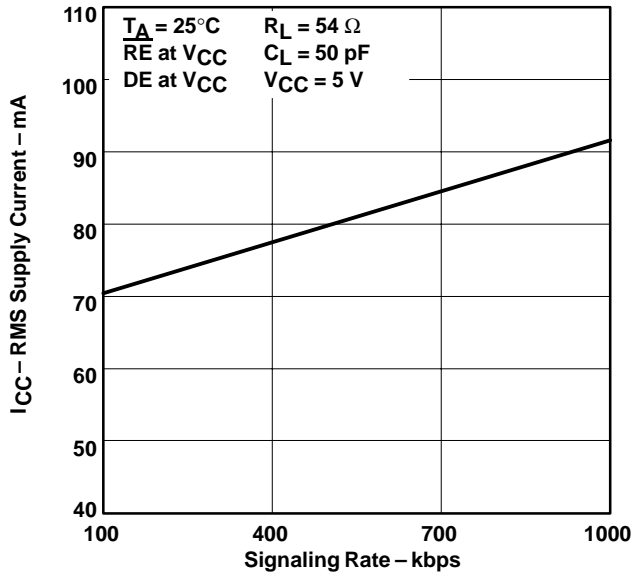


Figure 16

BUS INPUT CURRENT  
 vs  
 BUS INPUT VOLTAGE

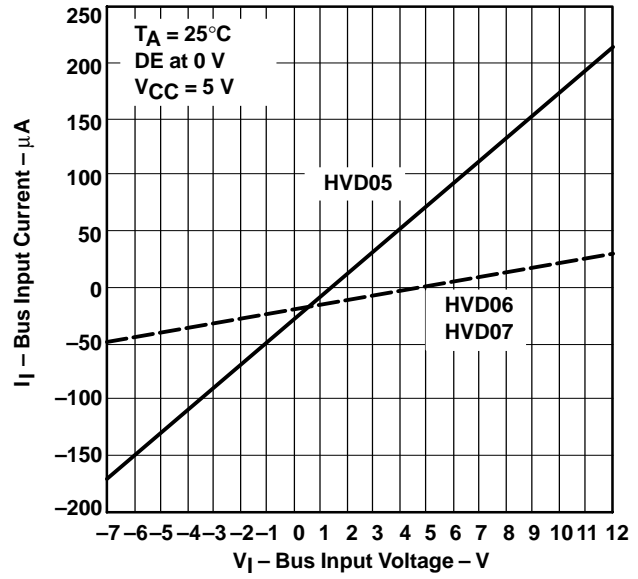


Figure 17

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

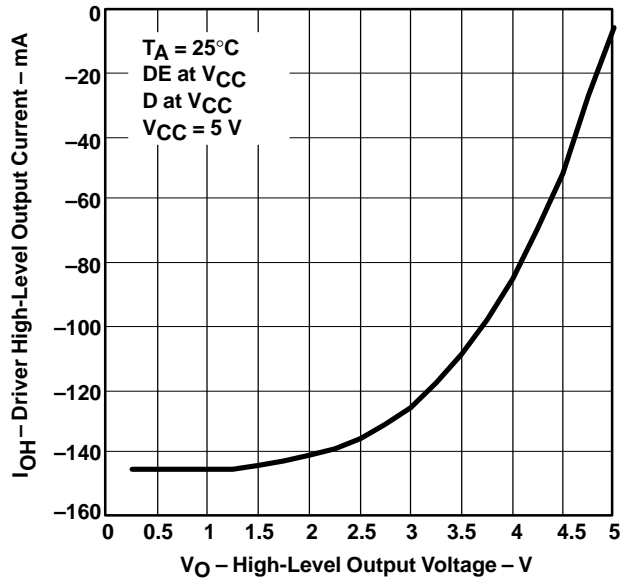


Figure 18

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

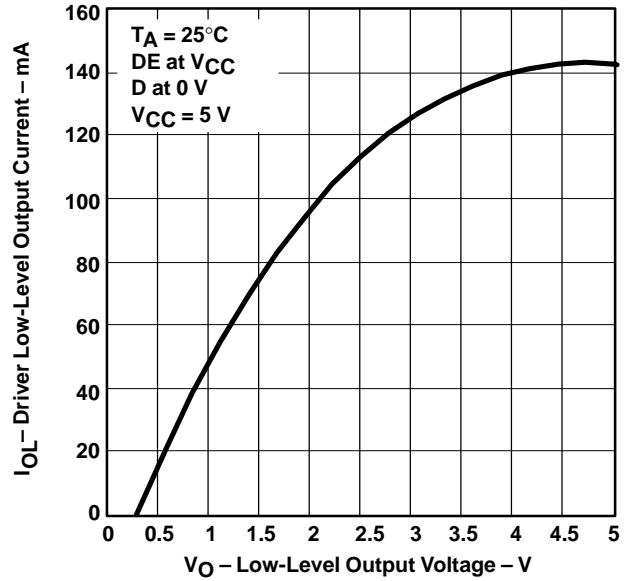


Figure 19

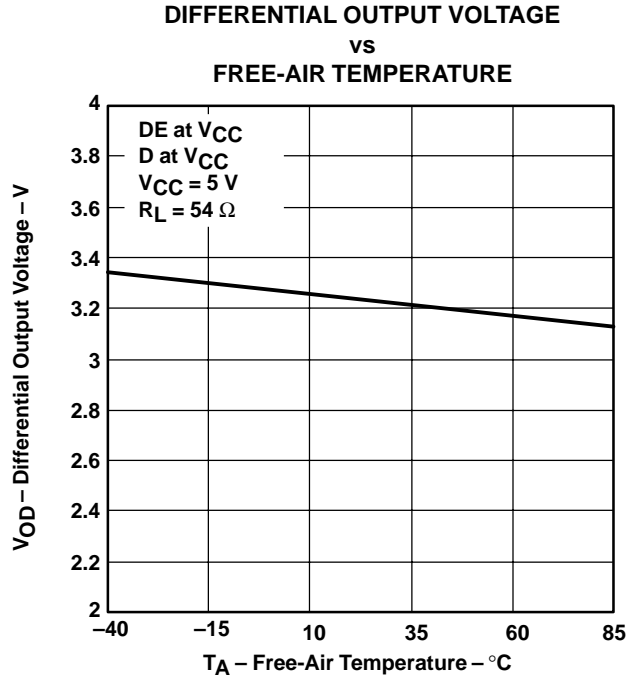


Figure 20

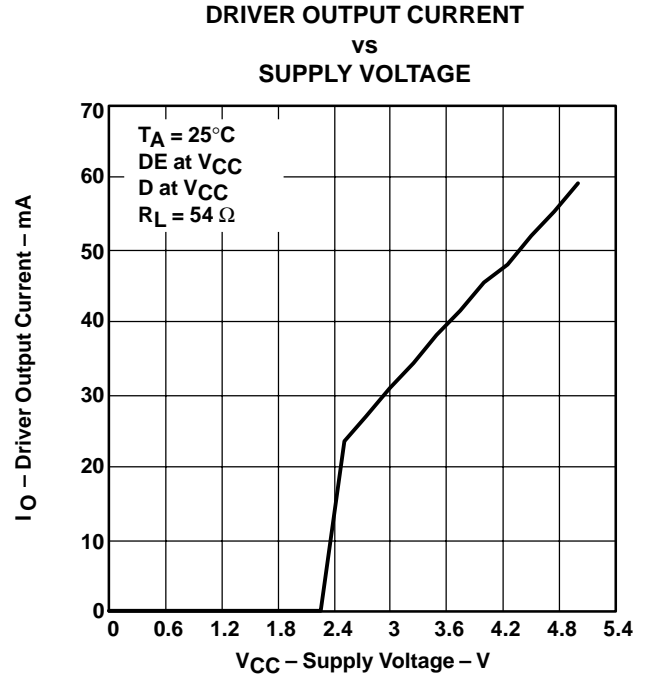


Figure 21

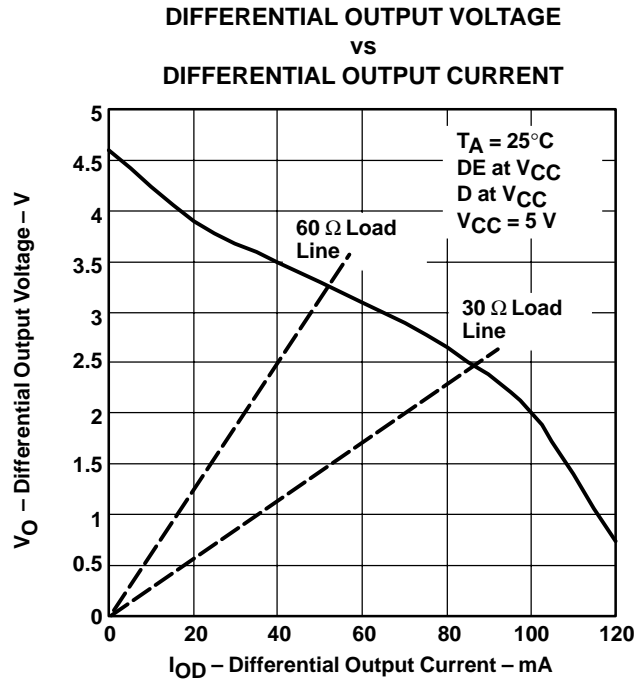
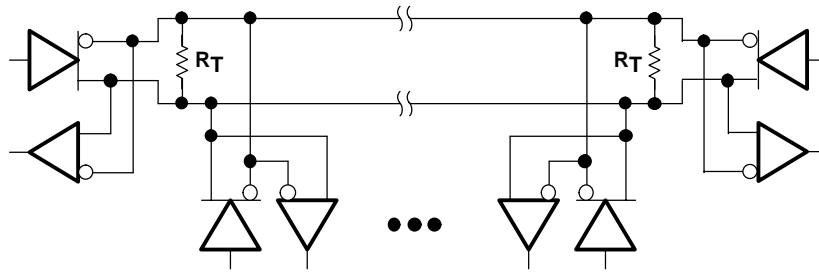


Figure 22

APPLICATION INFORMATION



Device	Number of Devices on Bus
HVD05	64
HVD06	256
HVD07	256

NOTE: The line should be terminated at both ends with its characteristic impedance ( $R_T = Z_0$ ). Stub lengths off the main line should be kept as short as possible.

Figure 23. Typical Application Circuit

**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>
SN65HVD05D	ACTIVE	SOIC	D	8	75	None	CU NIPDAU	Level-1-220C-UNLIM
SN65HVD05DR	ACTIVE	SOIC	D	8	2500	None	CU NIPDAU	Level-1-220C-UNLIM
SN65HVD05P	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN65HVD06D	ACTIVE	SOIC	D	8	75	None	CU NIPDAU	Level-1-220C-UNLIM
SN65HVD06DR	ACTIVE	SOIC	D	8	2500	None	CU NIPDAU	Level-1-220C-UNLIM
SN65HVD06P	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN65HVD07D	ACTIVE	SOIC	D	8	75	None	CU NIPDAU	Level-1-220C-UNLIM
SN65HVD07DR	ACTIVE	SOIC	D	8	2500	None	CU NIPDAU	Level-1-220C-UNLIM
SN65HVD07P	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN75HVD05D	ACTIVE	SOIC	D	8	75	None	CU NIPDAU	Level-1-220C-UNLIM
SN75HVD05DR	ACTIVE	SOIC	D	8	2500	None	CU NIPDAU	Level-1-220C-UNLIM
SN75HVD05P	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN75HVD06D	ACTIVE	SOIC	D	8	75	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1YEAR/ Level-1-220C-UNLIM
SN75HVD06DR	ACTIVE	SOIC	D	8	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1YEAR/ Level-1-220C-UNLIM
SN75HVD06P	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN75HVD07D	ACTIVE	SOIC	D	8	75	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1YEAR/ Level-1-220C-UNLIM
SN75HVD07DR	ACTIVE	SOIC	D	8	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1YEAR/ Level-1-220C-UNLIM
SN75HVD07P	ACTIVE	PDIP	P	8	50	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC

<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 - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**None:** Not yet available Lead (Pb-Free).

**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.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

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

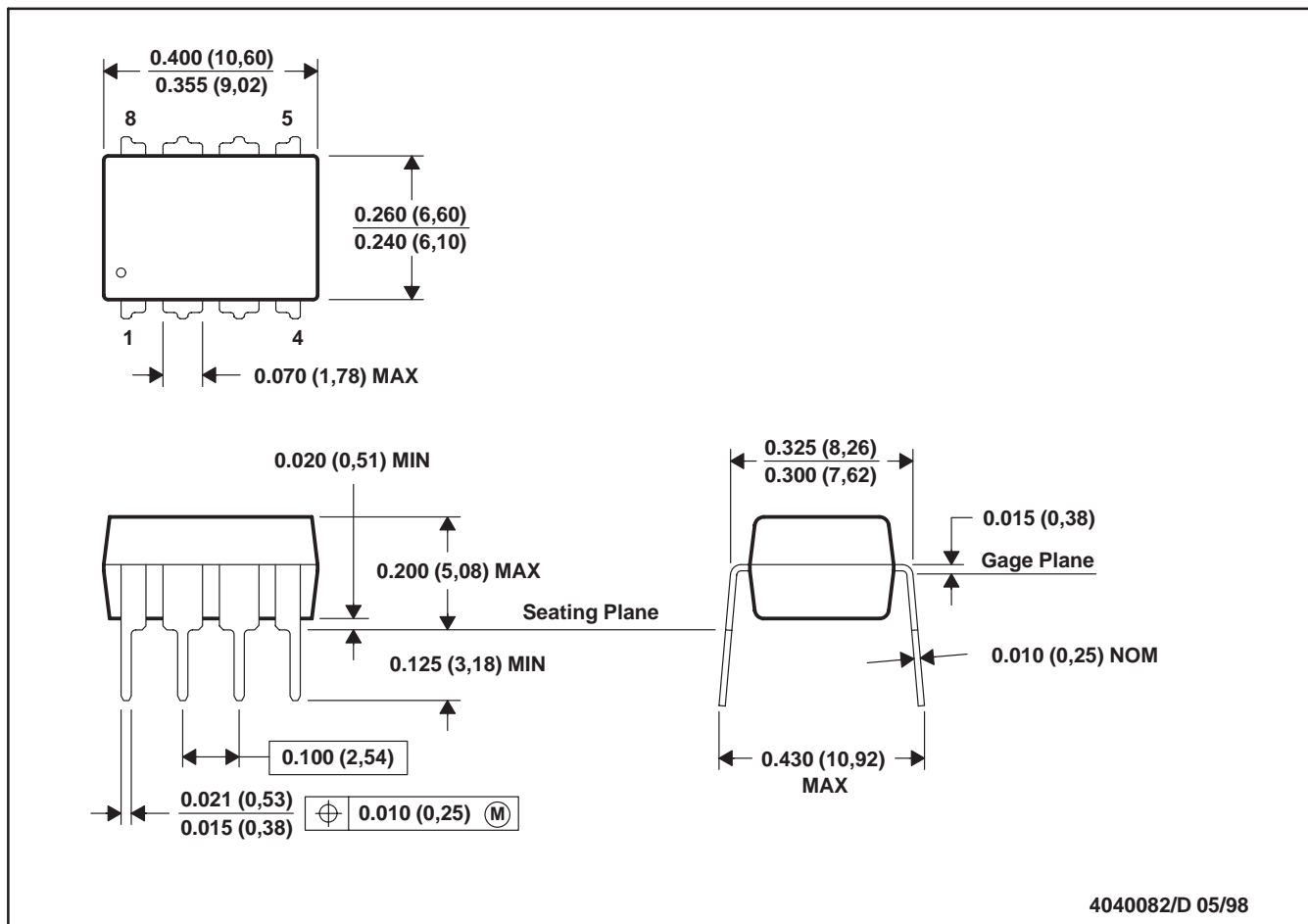
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P (R-PDIP-T8)

PLASTIC DUAL-IN-LINE

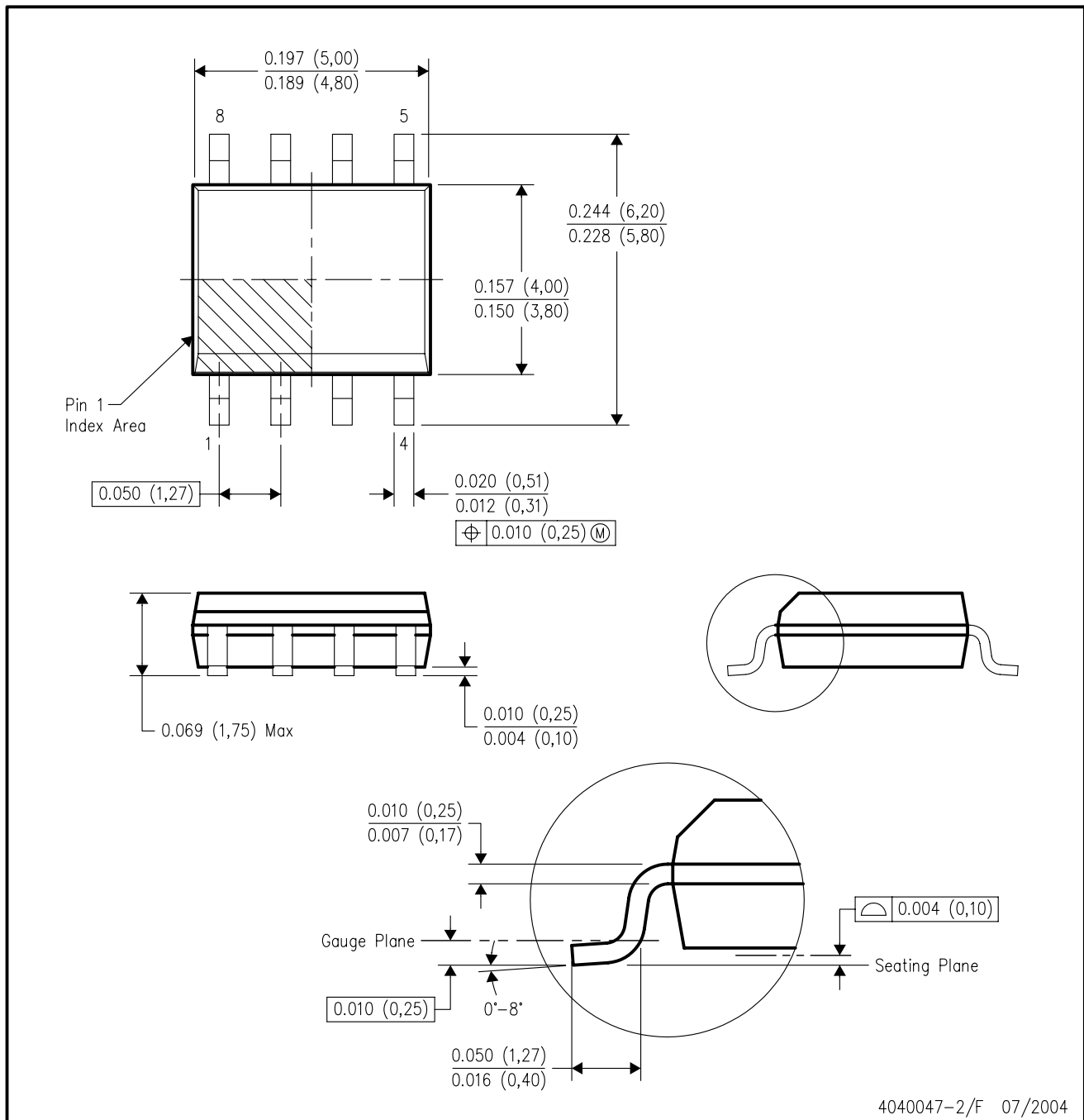


- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Falls within JEDEC MS-001

For the latest package information, go to [http://www.ti.com/sc/docs/package/pkg\\_info.htm](http://www.ti.com/sc/docs/package/pkg_info.htm)

D (R-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - D. Falls within JEDEC MS-012 variation AA.

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