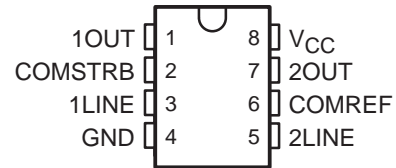


- Single 5-V Supply
- $\pm 100\text{-mV}$ Sensitivity
- For Application as:
 - Single-Ended Line Receiver
 - Gated Oscillator
 - Level Comparator
- Adjustable Reference Voltage
- TTL Outputs
- TTL-Compatible Strobe
- Designed for Party-Line (Data-Bus) Applications
- Common Reference-Voltage Pin
- Common Strobe

P OR PS† PACKAGE
(TOP VIEW)



† The PS package is only available left-ended taped and reeled (order SN75140 PSR).

description

This device consists of a dual single-ended line receiver with TTL-compatible strobes and outputs. The reference voltage (switching threshold) is applied externally and can be adjusted from 1.5 V to 3.5 V, making it possible to optimize noise immunity for a given system design. Due to the low input current (less than 100 μA), the device is suited ideally for party-line (data-bus) systems.

The SN75140 has a common reference-voltage pin and a common strobe.

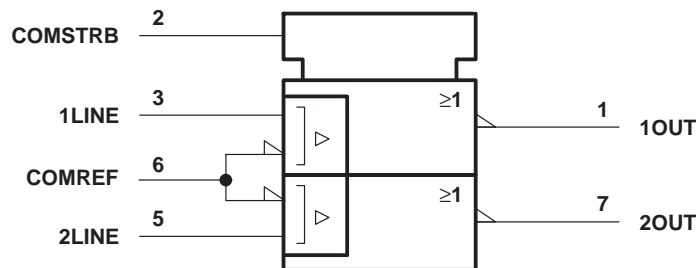
The SN75140 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE
(each receiver)

LINE INPUT	STROBE	OUTPUT
$\leq V_{\text{ref}} - 100\text{ mV}$	L	H
$\geq V_{\text{ref}} + 100\text{ mV}$	X	L
X	H	L

H = high level, L = low level, X = irrelevant

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.



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**TEXAS
INSTRUMENTS**

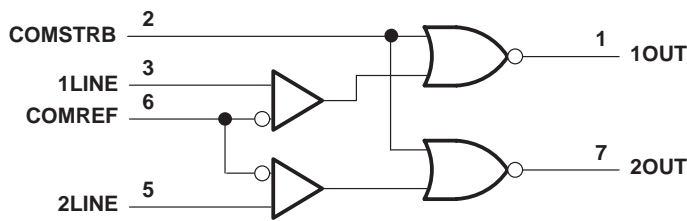
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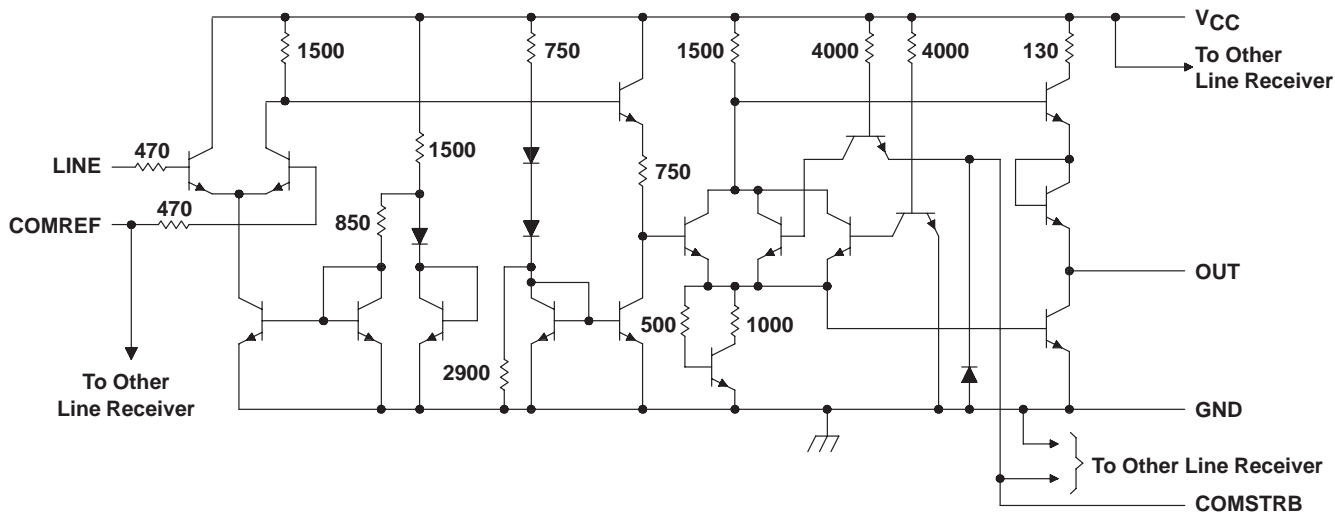
SN75140
DUAL LINE RECEIVER

SLLS080C – JANUARY 1977 – REVISED APRIL 1998

logic diagram (positive logic)



schematic (each receiver)



NOTE: Resistor values shown are nominal and in ohms.

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

Supply voltage, V_{CC} (see Note 1)	7 V
Reference input voltage, V_{ref}	5.5 V
Line input voltage range with respect to GND	-2 V to 5.5 V
Line input voltage with respect to V_{ref}	± 5 V
Strobe input voltage	5.5 V
Continuous total power dissipation	See Dissipation Rating Table
Storage temperature range, T_{stg}	-65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

[†] 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.

NOTE 1: Unless otherwise specified, voltage values are with respect to network ground terminal.

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
P	1000 mW	8.0 mW/°C	640 mW
PS	450 mW	3.6 mW/°C	288 mW

recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.5	5	5.5	V
Reference input voltage, V_{ref}	1.5		3.5	V
High-level line input voltage, $V_{IH(L)}$	$V_{ref}+0.1$		$V_{CC}-1$	V
Low-level line input voltage, $V_{IL(L)}$	0		$V_{ref}-0.1$	V
High-level strobe input voltage, $V_{IH(S)}$	2		5.5	V
Low-level strobe input voltage, $V_{IL(S)}$	0		0.8	V
Operating free-air temperature range, T_A	0		70	°C

electrical characteristics over recommended operating free-air temperature range, $V_{CC} = 5\text{ V} \pm 10\%$, $V_{ref} = 1.5\text{ V}$ to 3.5 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V_{IK}	Strobe input clamp voltage	$I_I(S) = -12\text{ mA}$			-1.5	V
V_{OH}	High-level output voltage	$V_{IL(L)} = V_{ref} - 100\text{ mV}$, $V_{IL(S)} = 0.8\text{ V}$, $I_{OH} = -400\text{ }\mu\text{A}$	2.4			V
V_{OL}	Low-level output voltage	$V_{IH(L)} = V_{ref} + 100\text{ mV}$, $V_{IL(S)} = 0.8\text{ V}$, $I_{OL} = 16\text{ mA}$			0.4	V
		$V_{IL(L)} = V_{ref} - 100\text{ mV}$, $V_{IH(S)} = 2\text{ V}$, $I_{OL} = 16\text{ mA}$			0.4	
$I_I(S)$	Strobe input current at maximum input voltage	$V_I(S) = 5.5\text{ V}$			1	mA
	COMSTRB				2	
I_{IH}	High-level input current	Strobe			40	μA
		COMSTRB			80	
		LINE	$V_{I(L)} = 3.5\text{ V}$, $V_{ref} = 1.5\text{ V}$	35	100	
		Reference	$V_{I(L)} = 0$, $V_{ref} = 3.5\text{ V}$	35	100	
		COMREF		70	200	
I_{IL}	Low-level input current	Strobe			-1.6	mA
		COMSTRB	$V_I(S) = 0.4\text{ V}$		-3.2	
		LINE	$V_{I(L)} = 0$, $V_{ref} = 1.5\text{ V}$		-10	μA
		Reference	$V_{I(L)} = 1.5\text{ V}$, $V_{ref} = 0$		-10	
		COMREF			-20	
I_{OS}	Short-circuit output current‡	$V_{CC} = 5.5\text{ V}$	-18		-55	mA
I_{CCH}	Supply current, output high	$V_I(S) = 0$, $V_{I(L)} = V_{ref} - 100\text{ mV}$		18	30	mA
I_{CCL}	Supply current, output low	$V_I(S) = 0$, $V_{I(L)} = V_{ref} + 100\text{ mV}$		20	35	mA

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

‡ Only one output should be shorted at a time.

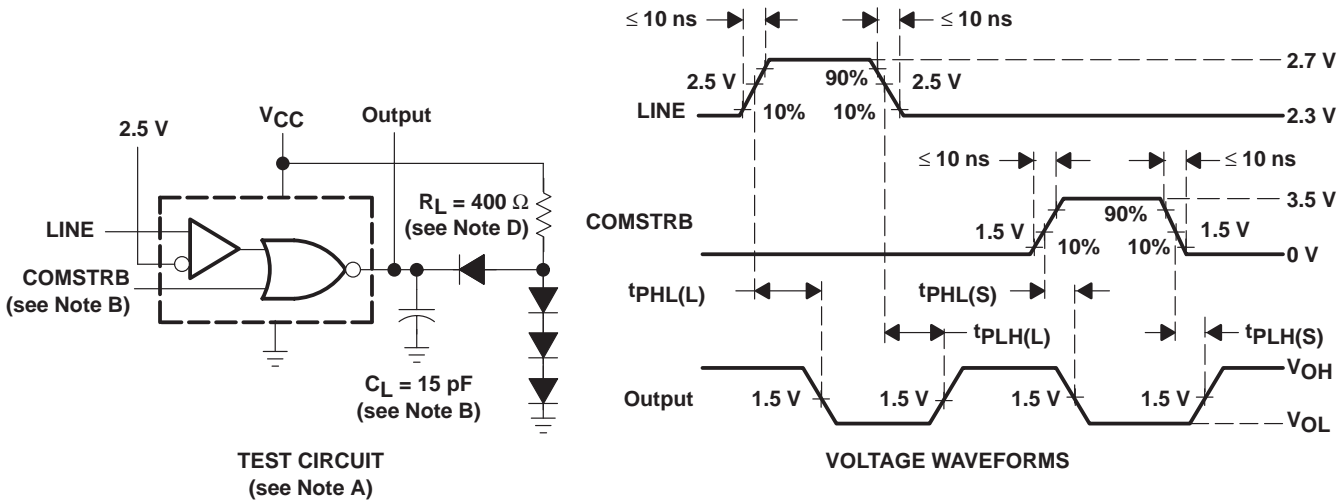
switching characteristics, $V_{CC} = 5\text{ V}$, $V_{ref} = 2.5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH(L)}$	Propagation delay time, low- to high-level output from LINE	$C_L = 15\text{ pF}$, $R_L = 400\text{ k}\Omega$, See Figure 1		22	35	ns
$t_{PHL(L)}$	Propagation delay time, high- to low-level output from LINE	$C_L = 15\text{ pF}$, $R_L = 400\text{ k}\Omega$, See Figure 1		22	30	ns
$t_{PLH(S)}$	Propagation delay time, low- to high-level output from COMSTRB	$C_L = 15\text{ pF}$, $R_L = 400\text{ k}\Omega$, See Figure 1		12	22	ns
$t_{PHL(S)}$	Propagation delay time, high- to low-level output from COMSTRB	$C_L = 15\text{ pF}$, $R_L = 400\text{ k}\Omega$, See Figure 1		8	15	ns

SN75140
DUAL LINE RECEIVER

SLLS080C – JANUARY 1977 – REVISED APRIL 1998

PARAMETER MEASUREMENT INFORMATION



- NOTES: A. Input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, duty cycle ≤ 50%, Z_O = 50 Ω.
B. Unused strobes are to be grounded.
C. C_L includes probe and jig capacitance.
D. All diodes are 1N3064.

Figure 1. Test Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

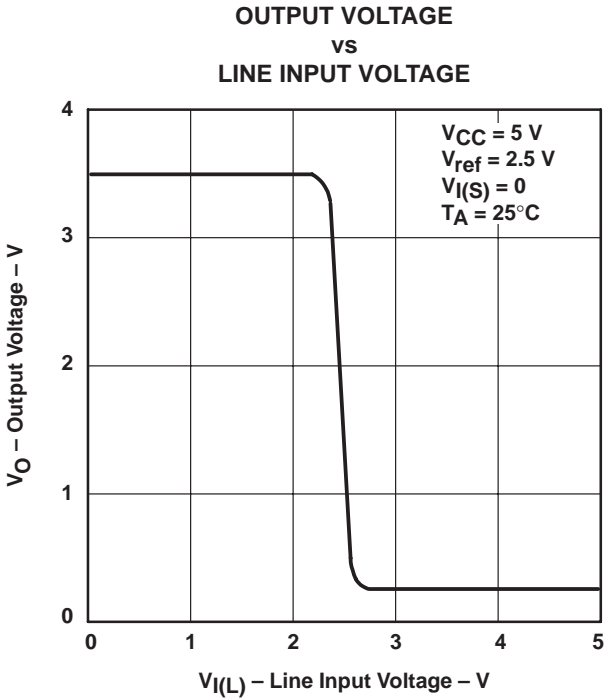


Figure 2

APPLICATION INFORMATION

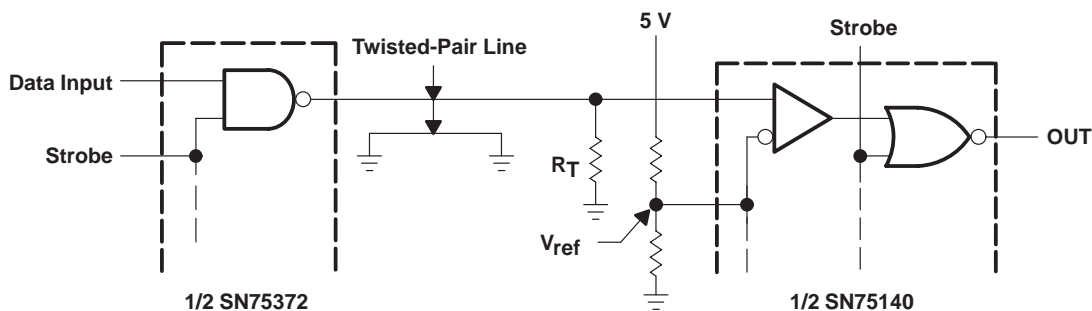
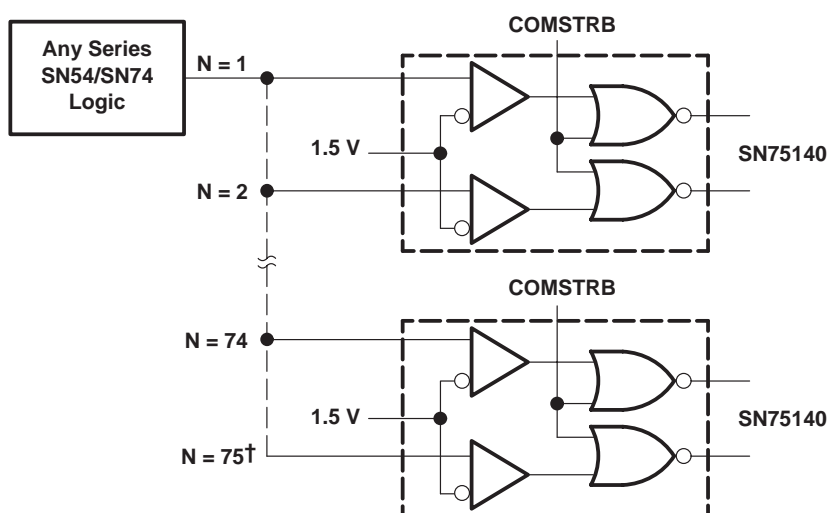


Figure 3. Line Receiver



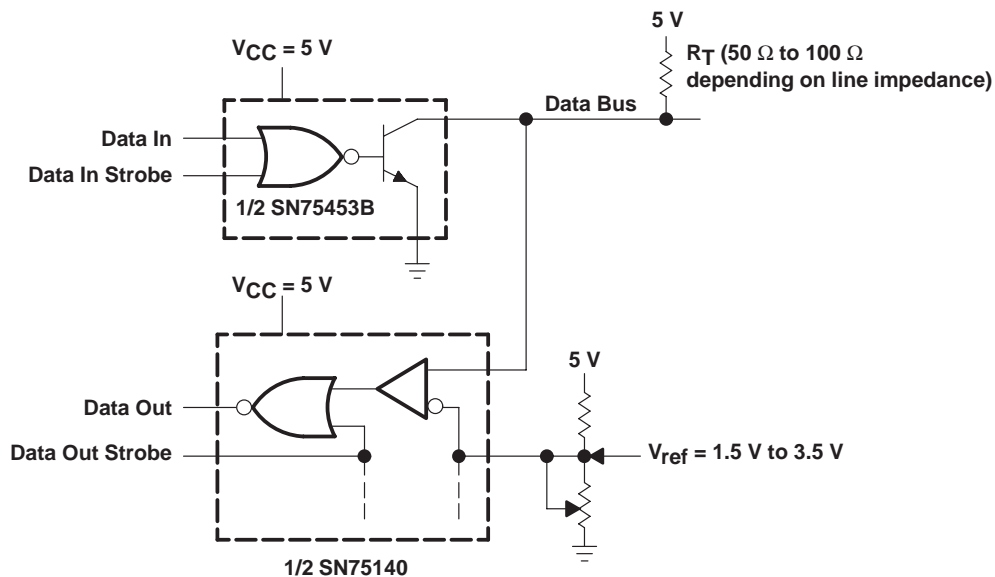
[†] Although most series SN54/SN74 circuits have a >2.4-V output at 400 μ A, they typically are capable of maintaining a >2.4-V output level under a load of 7.5 mA.

Figure 4. High Fanout From Standard TTL Gate

SN75140 DUAL LINE RECEIVER

SLLS080C – JANUARY 1977 – REVISED APRIL 1998

APPLICATION INFORMATION



NOTE A: Using this arrangement, as many as 100 transceivers can be connected to a single data bus. The adjustable reference-voltage feature allows the noise margin to be optimized for a given system. The complete dual bus transceiver (SN75453B driver and SN75140 receiver) can be assembled in approximately the same space required by a single 16-pin package and only one power supply is required (5 V). Data in and data out are TTL compatible.

Figure 5. Dual Bus Transceiver

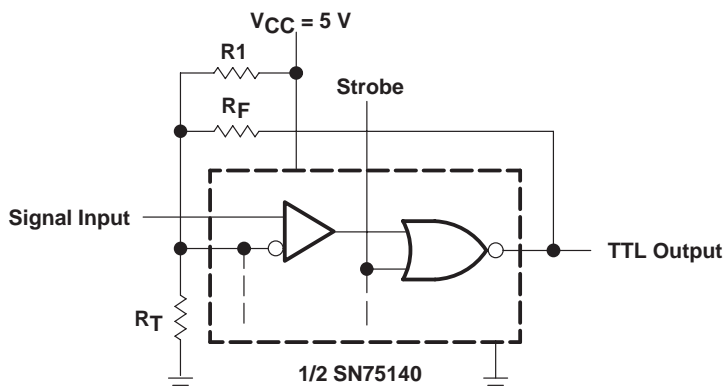
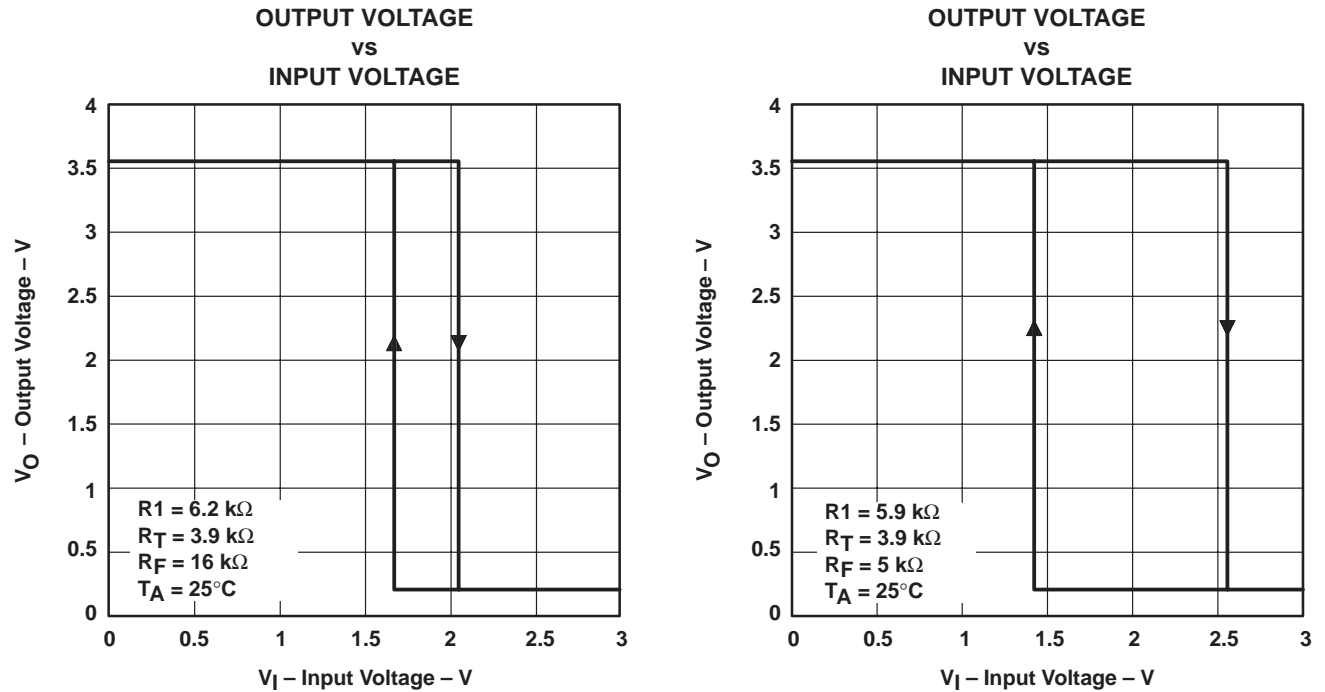


Figure 6. Schmitt Trigger

APPLICATION INFORMATION



NOTE A: Slowly changing input levels from data lines, optical detectors, and other types of transducers can be converted to standard TTL signals with this Schmitt-trigger circuit. R_1 , R_F , and R_T can be adjusted for the desired hysteresis and trigger levels.

Figure 7. Examples of Transfer Characteristics

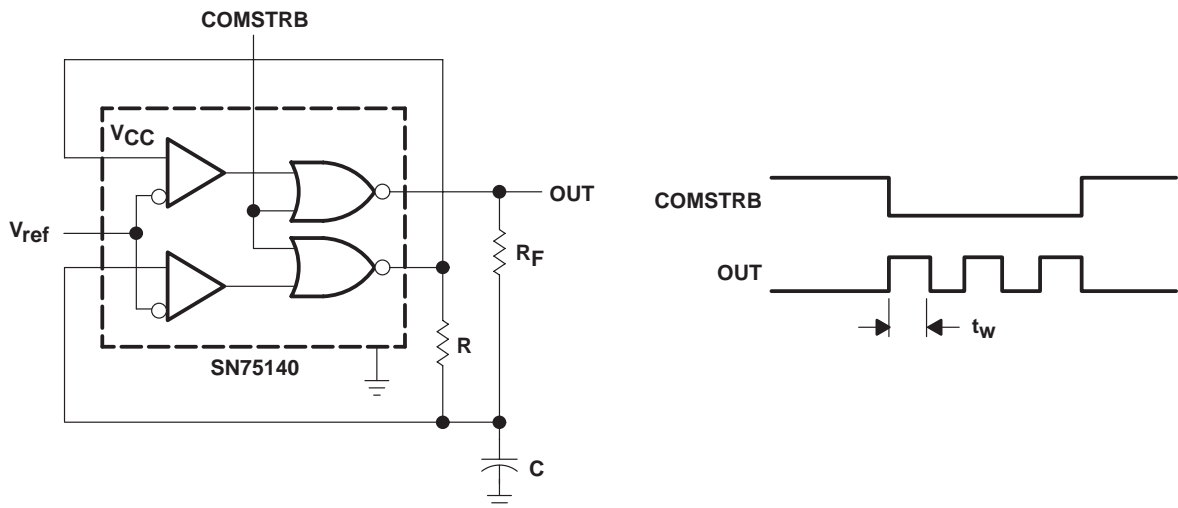


Figure 8. Gated Oscillator

SN75140
DUAL LINE RECEIVER

SLLS080C – JANUARY 1977 – REVISED APRIL 1998

APPLICATION INFORMATION

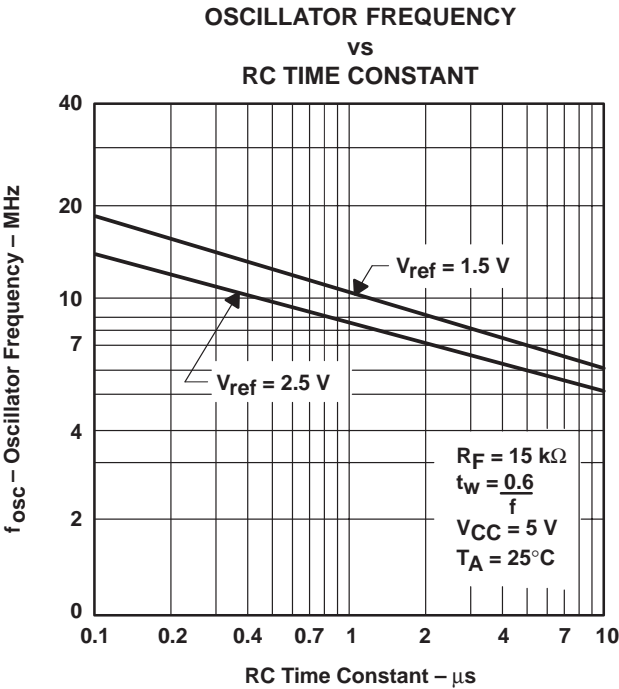


Figure 9

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN75140P	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN75140P
SN75140P.A	Active	Production	PDIP (P) 8	50 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN75140P
SN75140PSR	Active	Production	SO (PS) 8	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	A140
SN75140PSR.A	Active	Production	SO (PS) 8	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	A140

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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TAPE AND REEL INFORMATION



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN75140PSR	SO	PS	8	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN75140PSR	SO	PS	8	2000	353.0	353.0	32.0

TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
SN75140P	P	PDIP	8	50	506	13.97	11230	4.32
SN75140P.A	P	PDIP	8	50	506	13.97	11230	4.32

P (R-PDIP-T8)

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.

MECHANICAL DATA

PS (R-PDSO-G8)

PLASTIC SMALL-OUTLINE PACKAGE



4040063/C 03/03

- 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, not to exceed 0,15.

PS (R-PDSO-G8)

PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Publication IPC-7351 is recommended for alternate designs.
 - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
 - Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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