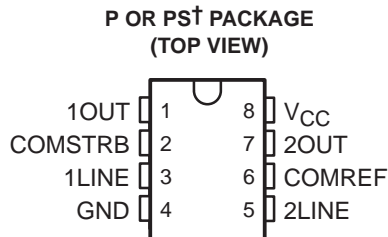


- Single 5-V Supply
- $\pm 100$ -mV Sensitivity
- For Application as:
  - Single-Ended Line Receiver
  - Gated Oscillator
  - Level Comparator
- Adjustable Reference Voltage
- TTL Outputs
- TTL-Compatible Strobe
- Designed for Party-Line (Data-Bus) Applications
- Common Reference-Voltage Pin
- Common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



† 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  $\mu$ A), the device is suited ideally for party-line (data-bus) systems.

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

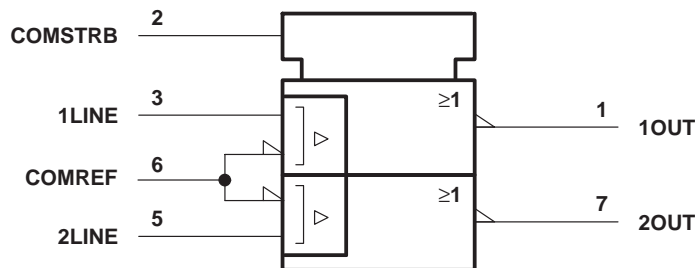
The SN75140 is characterized for operation from 0°C to 70°C.

**FUNCTION TABLE  
(each receiver)**

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



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.

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**

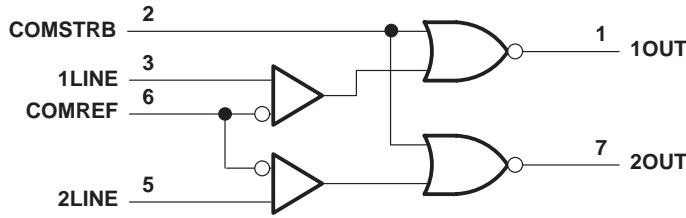
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1998, Texas Instruments Incorporated

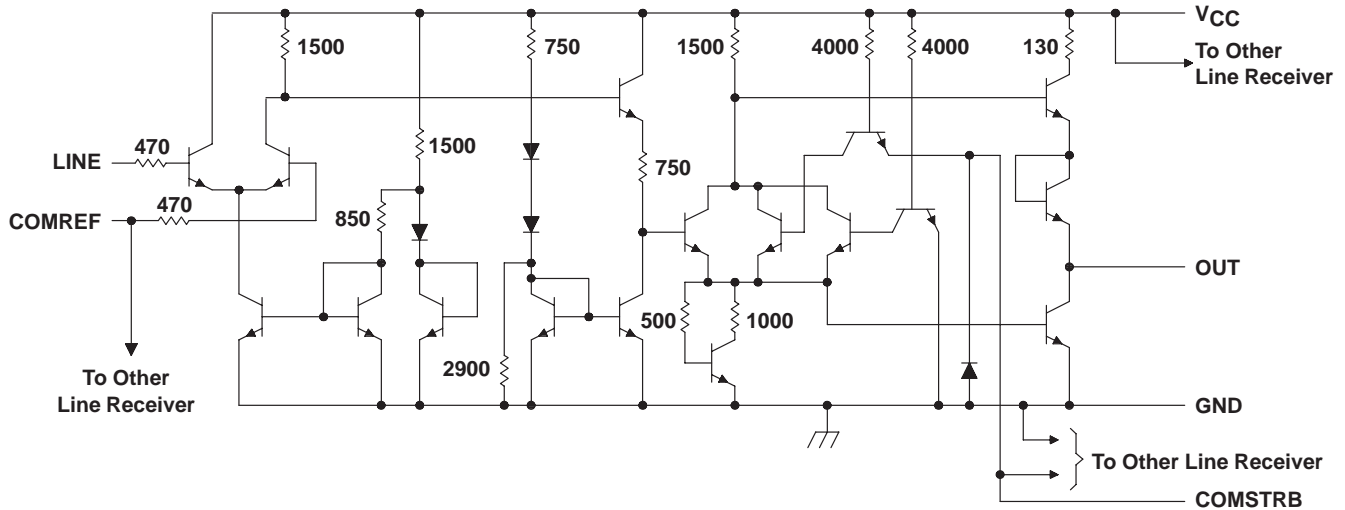
# SN75140 DUAL LINE RECEIVER

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 $V_{ref}$	$\pm 5$ 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



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

**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  $3.5\text{ V}$  (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	Strobe	$V_{I(S)} = 5.5\text{ V}$			1	mA	
		COMSTRB				2		
$I_{IH}$	High-level input current	Strobe	$V_{I(S)} = 2.4\text{ V}$			40	$\mu\text{A}$	
		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	$V_{I(S)} = 0.4\text{ V}$			-1.6	mA	
		COMSTRB				-3.2		
		LINE	$V_{I(L)} = 0$ , $V_{ref} = 1.5\text{ V}$			-10	$\mu\text{A}$	
		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.

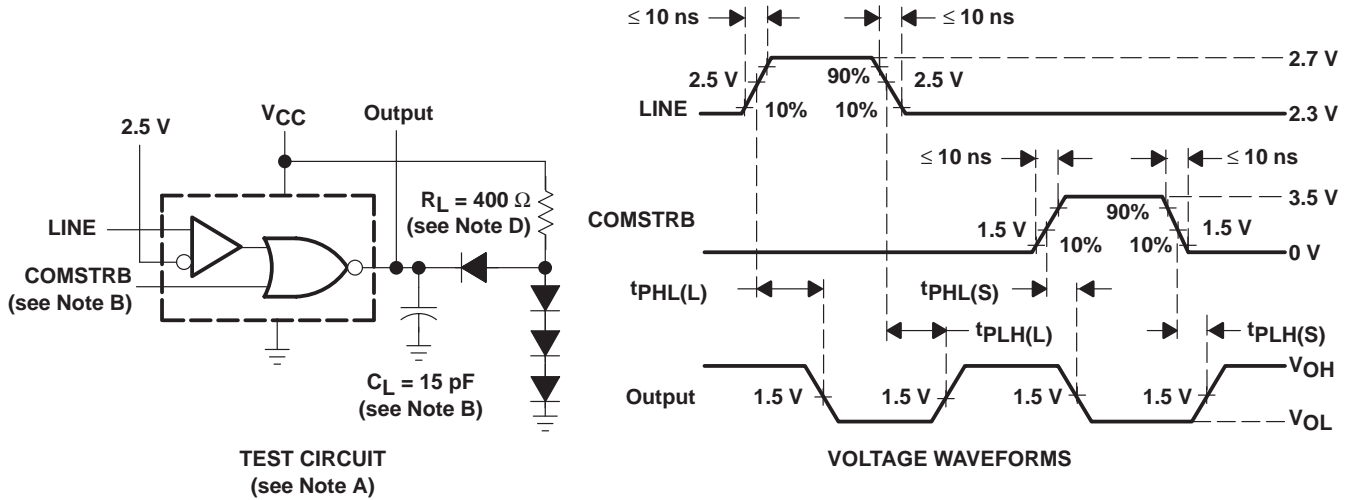
**switching characteristics,  $V_{CC} = 5\text{ V}$ ,  $V_{ref} = 2.5\text{ V}$ ,  $T_A = 25^\circ\text{C}$**

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:  $PRR \leq 1 \text{ MHz}$ , duty cycle  $\leq 50\%$ ,  $Z_O = 50 \Omega$ .  
 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

OUTPUT VOLTAGE  
vs  
LINE INPUT VOLTAGE

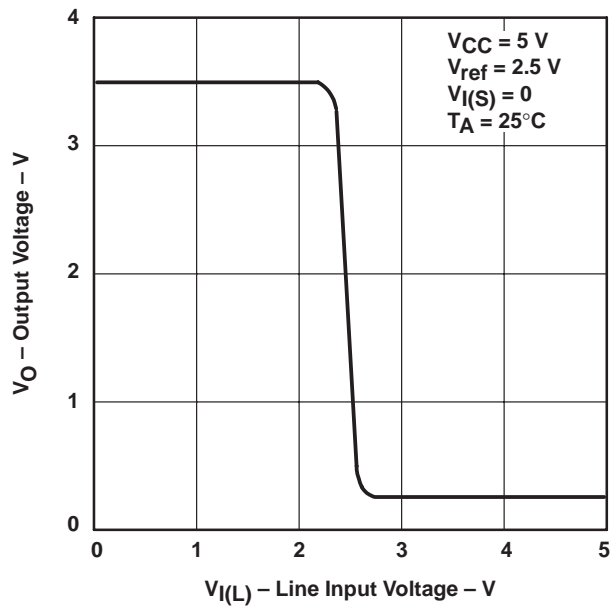


Figure 2

## APPLICATION INFORMATION

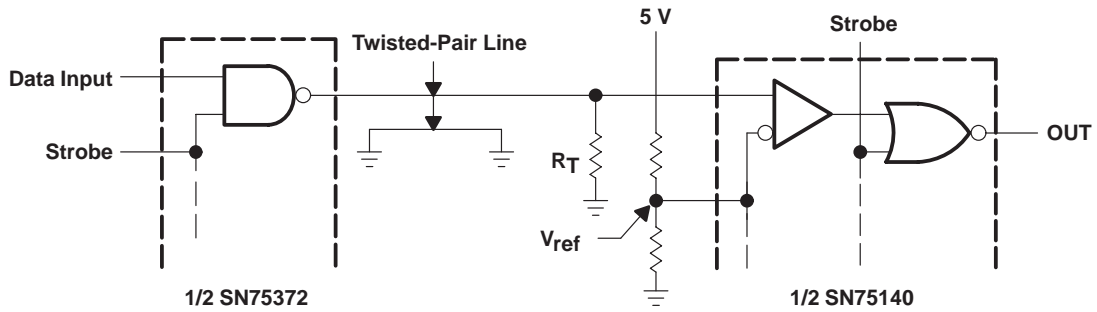
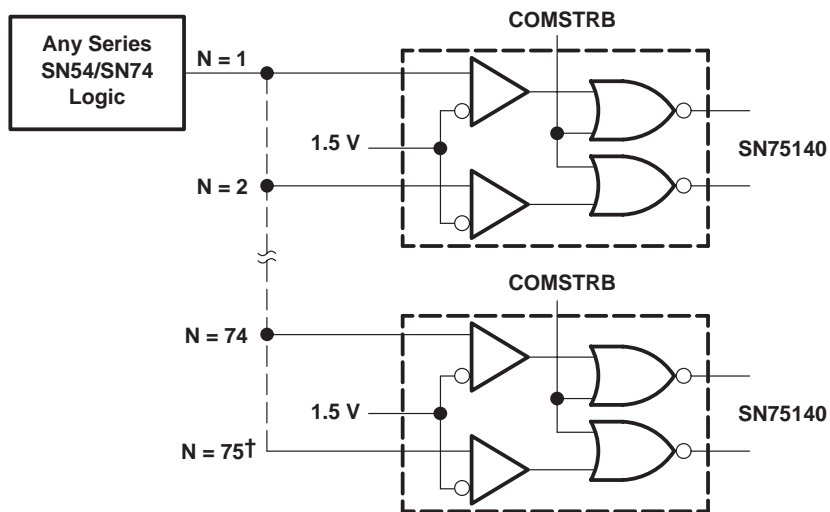


Figure 3. Line Receiver



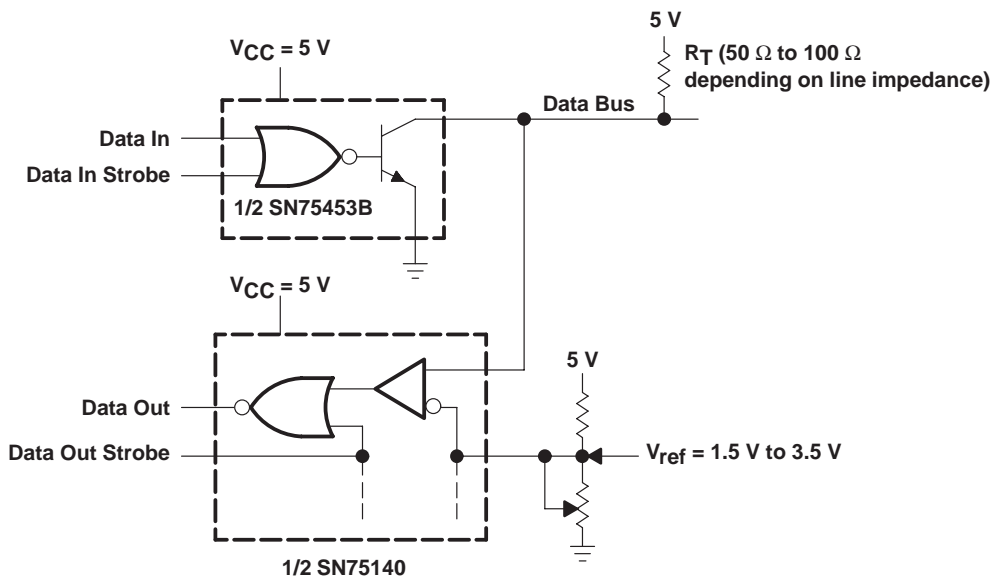
† Although most series SN54/SN74 circuits have a >2.4-V output at 400  $\mu$ A, they typically are capable of maintaining a >2.4-V output level under a load of 7.5 mA.

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

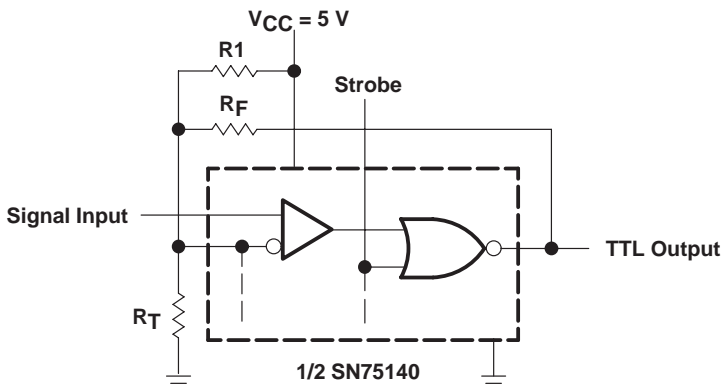
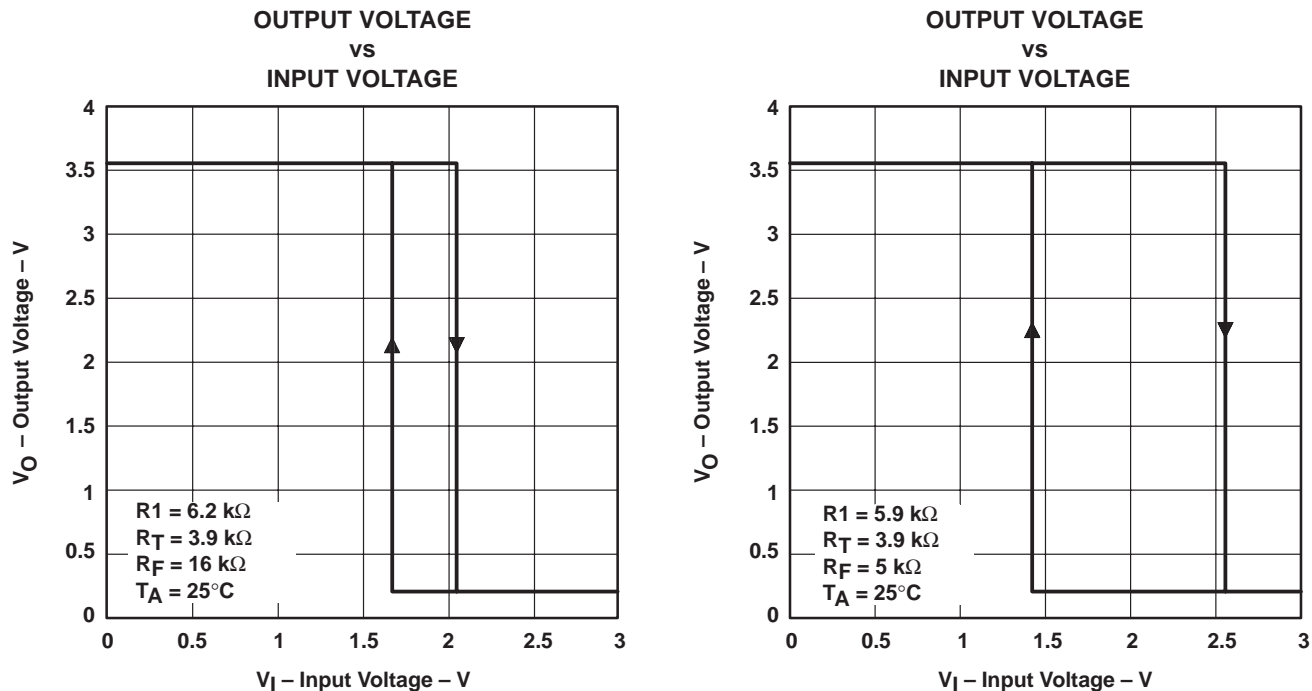


Figure 6. Schmitt Trigger

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

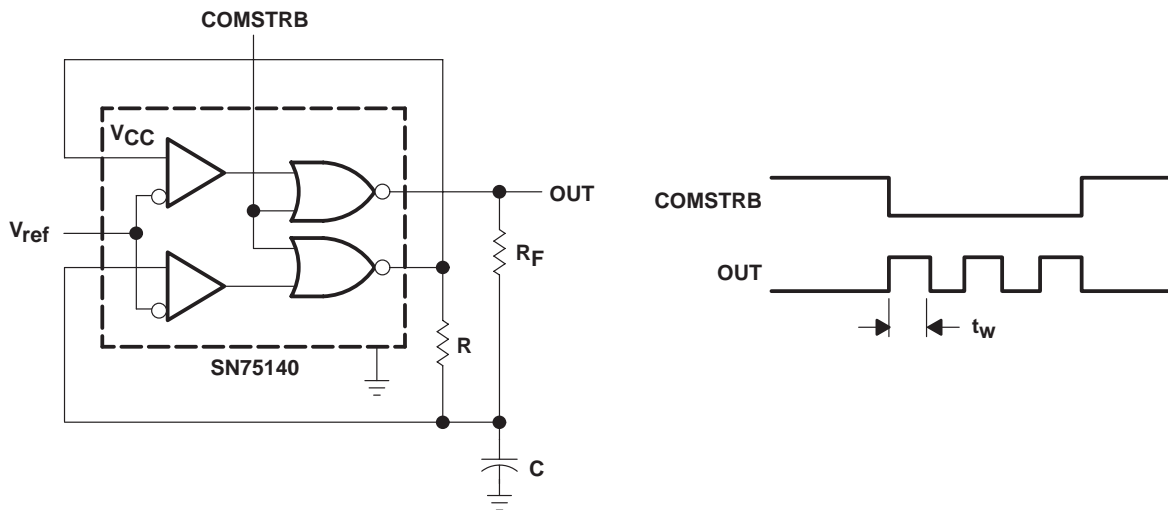


Figure 8. Gated Oscillator

APPLICATION INFORMATION

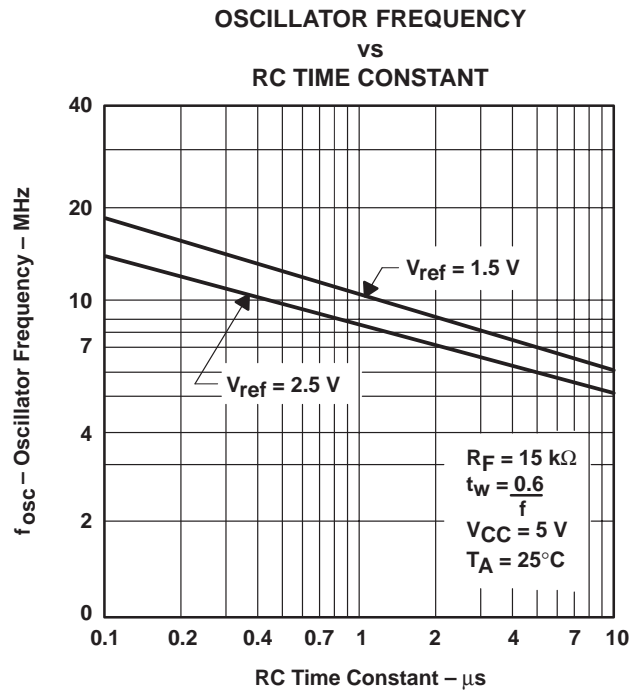


Figure 9



## IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.