

# Hex inverter

54F04

## ORDERING INFORMATION

DESCRIPTION	ORDER CODE	PACKAGE DESIGNATOR*
14-Pin Ceramic DIP	54F04/BCA	GDIP1-T14
14-Pin Ceramic Flat Pack	54F04/BDA	GDFP1-F14
20-Pin Ceramic LLCC	54F04/B2A	CQCC2-N20

\* MIL-STD 1835 or Appendix A of 1995 Military Data Handbook

## ABSOLUTE MAXIMUM RATINGS

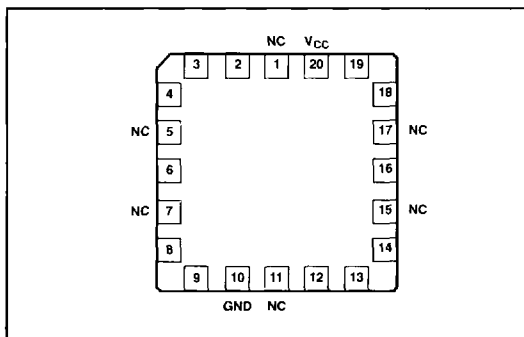
(Operation beyond the limits set forth in this table may impair the useful life of the device. Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER	RATING	UNIT
$V_{CC}$	Supply voltage range	-0.5 to +7.0	V
$V_I$	Input voltage range	-0.5 to +7.0	V
$I_I$	Input current range	-30 to +5	mA
$V_O$	Voltage applied to output in High output state range	-0.5 to + $V_{CC}$	V
$I_O$	Current applied to output in Low output state	40	mA
$T_{STG}$	Storage temperature range	-65 to +150	°C

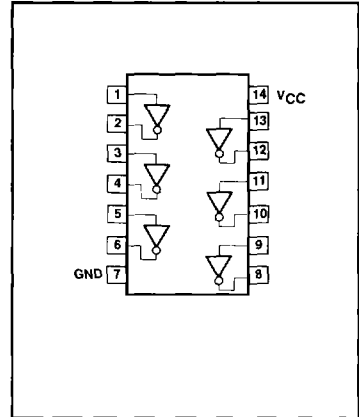
## RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5.0	5.5	V
$V_{IH}$	High-level input voltage	2.0			V
$V_{IL}$	Low-level input voltage			0.8	V
$I_{IK}$	Input clamp current			-18	mA
$I_{OH}$	High-level output current			-1	mA
$I_{OL}$	Low-level output current			20	mA
$T_A$	Operating free-air temperature range	-55		+125	°C

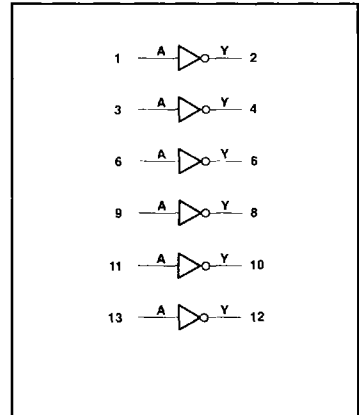
## LLCC LEAD CONFIGURATION



## PIN CONFIGURATION



## LOGIC SYMBOL



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## INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	54F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
A	Inputs	1.0/1.0	20 $\mu$ A/0.6mA
$\bar{Y}$	Outputs	50/33	1.0mA/20mA

NOTE: One (1.0) FAST Unit Load (U.L.) is defined as: 20 $\mu$ A in the High state and 0.6mA in the Low state.

## FUNCTION TABLE

INPUT	OUTPUT
A	$\bar{Y}$
L H	H L

H = High voltage level  
L = Low voltage level

## DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS <sup>1</sup>	LIMITS			UNIT	
			MIN	TYP <sup>2</sup>	MAX		
$V_{OH}$	High-level output voltage	$V_{CC} = \text{Min}$ , $V_{IL} = \text{Max}$ , $I_{OH} = \text{Max}$ , $V_{IH} = \text{Min}$	2.5			V	
$V_{OL}$	Low-level output voltage	$V_{CC} = \text{Min}$ , $V_{IL} = \text{Max}$ , $I_{OL} = \text{Max}$ , $V_{IH} = \text{Min}$		0.35	0.50	V	
$V_{IK}$	Input clamp voltage	$V_{CC} = \text{Min}$ , $I_I = I_{IK}$		-0.73	-1.2	V	
$I_{IH2}$	Input current at maximum input voltage	$V_{CC} = \text{Max}$ , $V_I = 7.0\text{V}$			100	$\mu$ A	
$I_{IH1}$	High-level input current	$V_{CC} = \text{Max}$ , $V_I = 2.7\text{V}$		1	20	$\mu$ A	
$I_{IL}$	Low-level input current	$V_{CC} = \text{Max}$ , $V_I = 0.5\text{V}$		-0.4	-0.6	mA	
$I_{OS}$	Short-circuit output current <sup>3</sup>	$V_{CC} = \text{Max}$ , $V_O = 0.0\text{V}$	-60	-85	-150	mA	
$I_{CC}$	Supply current (total)	$V_{CC} = \text{Max}$	$V_I = \text{GND}$		2.8	4.2	mA
				$V_I \geq 4.0\text{V}$		10.2	15.3

## AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS					UNIT
			$T_A = +25^\circ\text{C}$ , $V_{CC} = +5.0\text{V}$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			$T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$ $V_{CC} = +5.0\text{V} \pm 10\%$ $C_L = 50\text{pF}$ , $R_L = 500\Omega$		
			MIN	TYP	MAX	MIN	MAX	
$t_{PLH}$ $t_{PHL}$	Propagation delay A to $\bar{Y}$	Waveform 1	2.4 1.5	3.7 3.2	5.0 4.3	1.5 1.1	7.0 6.5	ns ns

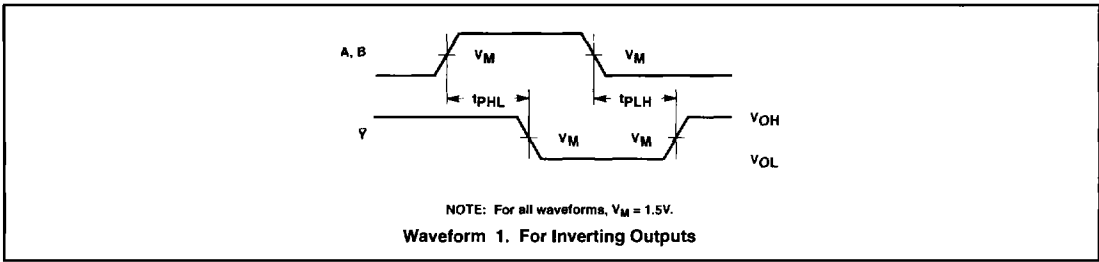
## NOTES:

- For conditions shown as Min or Max, use the appropriate value specified under recommended operating conditions for the applicable type and function table for operating mode.
- All typical values are at  $V_{CC} = 5\text{V}$ ,  $T_A = 25^\circ\text{C}$ .
- Not more than one output should be shorted at a time. For testing  $I_{OS}$ , the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests,  $I_{OS}$  tests should be performed last.

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## AC WAVEFORM



## TEST CIRCUIT AND WAVEFORM

