

# Product Preview

## Phase-Frequency Detector

The MC100LVEL40 is a phase/frequency detector intended for phase-locked loop applications which require a minimum amount of phase and frequency difference at lock. The device is a basic three state phase detector with differential inputs and outputs. The device is designed to work from either a 3.3V or 5.0V power supply.

When the reference (R) and the feedback (FB) inputs are unequal in frequency and/or phase the differential up (U) and down (D) outputs will provide pulse streams which when subtracted and integrated provide an error voltage for control of a VCO.

- 250MHz Typical Bandwidth
- Small Outline 20-Lead SOIC Packaging
- >2000V ESD Protection

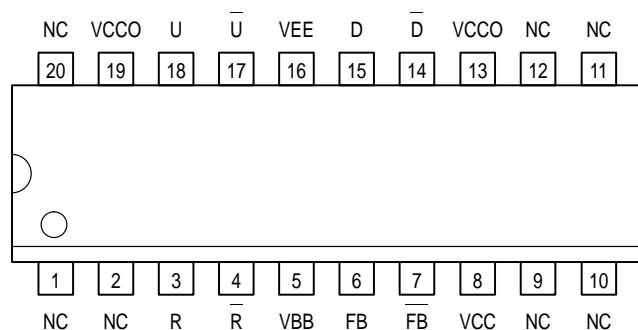
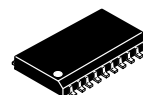


Figure 1. 20-Lead Pinout (Top View)

# MC100LVEL40



**DW SUFFIX**  
20-LEAD PLASTIC SOIC WIDE PACKAGE  
CASE 751D-04

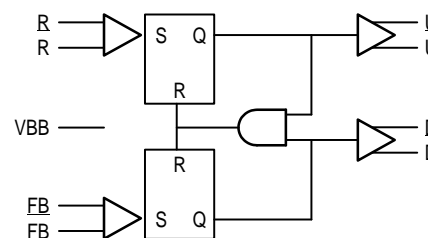


Figure 2. Logic Diagram

### 3.3V ECL DC CHARACTERISTICS (T<sub>A</sub> = -40°C to 85°C; V<sub>EE</sub> = -3.0V to -3.8V; V<sub>CC</sub> = GND)

Symbol	Parameter	-40°C			0°C to +85°C			Unit
		Min	Typ	Max	Min	Typ	Max	
V <sub>OH</sub>	Output HIGH Voltage	-1085	-1005	-880	-1025	-955	-880	V
V <sub>OL</sub>	Output LOW Voltage	-1830	-1695	-1555	-1810	-1705	-1620	V
V <sub>IH</sub>	Input HIGH Voltage	-1165		-880	-1165		-880	V
V <sub>IL</sub>	Input LOW Voltage	-1810		-1475	-1810		-1475	V
I <sub>IL</sub>	Input LOW Current	0.5			0.5			μA
I <sub>EE</sub>	Power Supply Current		45			45		mA

This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice.



# MC100LVEL40

## PECL DC CHARACTERISTICS ( $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ ; $V_{CC} = V_{CC}(\text{min})$ to $V_{CC}(\text{max})$ ; $V_{EE} = \text{GND}$ )

Symbol	Characteristic	$-40^{\circ}\text{C}$			$0^{\circ}\text{C}$			$25^{\circ}\text{C}$			$85^{\circ}\text{C}$			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$V_{OH}$	Output HIGH Voltage <sup>1</sup> .	2.215	2.295	2.420	2.275	2.345	2.420	2.275	2.345	2.420	2.275	2.345	2.420	V
$V_{OL}$	Output LOW Voltage <sup>1</sup> .	1.470	1.605	1.745	1.490	1.595	1.680	1.490	1.595	1.680	1.490	1.595	1.680	V
$V_{IH}$	Input HIGH Voltage <sup>1</sup> .	2.135		2.420	2.135		2.420	2.135		2.420	2.135		2.420	V
$V_{IL}$	Input LOW Voltage <sup>1</sup> .	1.490		1.825	1.490		1.825	1.490		1.825	1.490		1.825	V
$V_{BB}$	Output Reference Voltage <sup>1</sup> .	1.92		2.04	1.92		2.04	1.92		2.04	1.92		2.04	V
$V_{CC}$	Power Supply Voltage	3.0		3.8	3.0		3.8	3.0		3.8	3.0		3.8	V
$I_{IH}$	Input HIGH Current			150			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current													$\mu\text{A}$
$I_{EE}$	Power Supply Current		45			45			45			45		mA

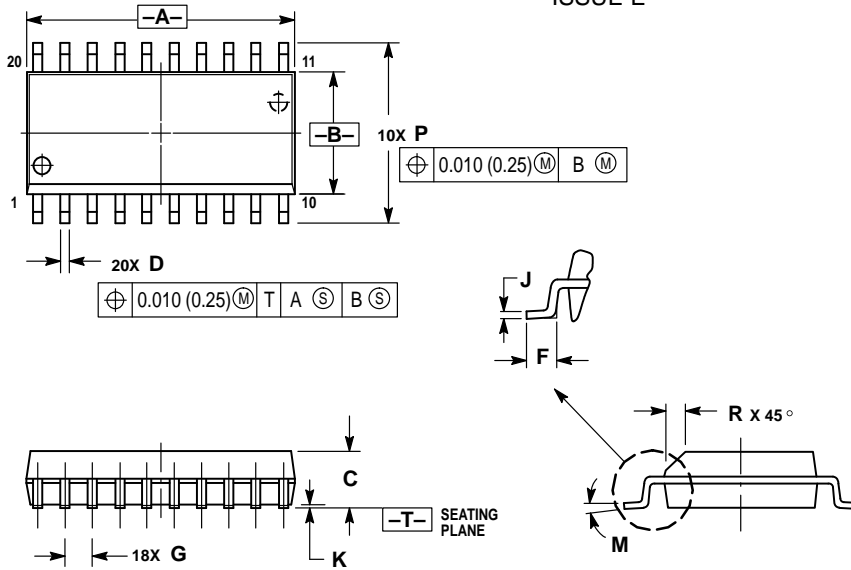
1. These values are for  $V_{CC} = 3.3\text{V}$ . Level Specifications will vary 1:1 with  $V_{CC}$ .

## AC Characteristics ( $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ )

Symbol	Parameter	Min	Typ	Max	Unit
$f_{\text{max}}$	Maximum Toggle Frequency		250		MHz
$t_{\text{PLH}}$ , $t_{\text{PHL}}$	Propagation Delay R to D R to U FB to D FB to U		1100 450 450 1100		ps
$t_r/t_f$	Output Rise/Fall Time		350		ps

OUTLINE DIMENSIONS

DW SUFFIX  
PLASTIC SOIC WIDE PACKAGE  
CASE 751D-04  
ISSUE E



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETER.
  3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
  4. MAXIMUM MOLD PROTRUSION 0.150 (0.006) PER SIDE.
  5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.65	12.95	0.499	0.510
B	7.40	7.60	0.292	0.299
C	2.35	2.65	0.093	0.104
D	0.35	0.49	0.014	0.019
F	0.50	0.90	0.020	0.035
G	1.27 BSC		0.050 BSC	
J	0.25	0.32	0.010	0.012
K	0.10	0.25	0.004	0.009
M	0° - 7°		0° - 7°	
P	10.05	10.55	0.395	0.415
R	0.25	0.75	0.010	0.029

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