## 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

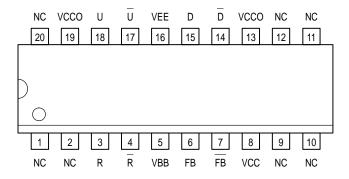


Figure 1. 20-Lead Pinout (Top View)

### MC100LVEL40



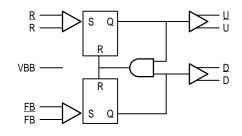


Figure 2. Logic Diagram

#### 3.3V ECL DC CHARACTERISTICS ( $T_A = -40^{\circ}\text{C}$ to $85^{\circ}\text{C}$ ; $V_{EE} = -3.0\text{V}$ to -3.8V; $V_{CC} = \text{GND}$ )

		–40°C			0			
Symbol	Parameter	Min	Тур	Max	Min	Тур	Max	Unit
Voн	Output HIGH Voltage	-1085	-1005	-880	-1025	-955	-880	V
VOL	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
կլ	Input LOW Current	0.5			0.5			μΑ
IEE	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.



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

		-40°C			0°C			25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Unit									
VOH	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 <sub>OL</sub>	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 <sub>IH</sub>	Input HIGH Voltage1.	2.135		2.420	2.135		2.420	2.135		2.420	2.135		2.420	V
V <sub>IL</sub>	Input LOW Voltage <sup>1</sup> .	1.490		1.825	1.490		1.825	1.490		1.825	1.490		1.825	V
V <sub>BB</sub>	Output Reference Voltage <sup>1</sup> ·	1.92		2.04	1.92		2.04	1.92		2.04	1.92		2.04	V
VCC	Power Supply Voltage	3.0		3.8	3.0		3.8	3.0		3.8	3.0		3.8	V
ΙΗ	Input HIGH Current			150			150			150			150	μΑ
I <sub>IL</sub>	Input R, FB LOW Current Others	-300 0.5			-300 0.5			-300 0.5			-300 0.5			μА
IEE	Power Supply Current		45			45			45			45		mA

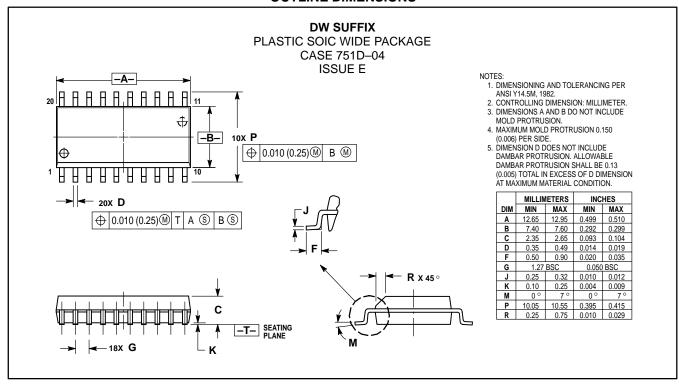
<sup>1.</sup> These values are for  $V_{CC}$  = 3.3V. Level Specifications will vary 1:1 with  $V_{CC}$ .

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

Symbol	Parameter	Min	Тур	Max	Unit
f <sub>max</sub>	Maximum Toggle Frequency		250		MHz
<sup>t</sup> PLH <sup>,</sup> <sup>t</sup> PHL	Propagation Delay R to R to FB to FB to	J D	1100 450 450 1100		ps
t <sub>r</sub> /t <sub>f</sub>	Output Rise/Fall Time		350		ps

MOTOROLA 4–2

#### **OUTLINE DIMENSIONS**



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