

# MC100E336

## 5V ECL 3-Bit Registered Bus Transceiver

The MC100E336 contains three bus transceivers with both transmit and receive registers. The bus outputs (BUS0–BUS2) are specified for driving a 25 Ω bus; the receive outputs (Q0 – Q2) are specified for 50 Ω. The bus outputs feature a normal HIGH level ( $V_{OH}$ ) and a cutoff LOW level – when LOW, the outputs go to –2.0 V and the output emitter-follower is “off”, presenting a high impedance to the bus. The bus outputs also feature edge slow-down capacitors.

The Transmit Enable pins (TEN) control whether current data is held in the transmit register, or new data is loaded from the A/B inputs. A LOW on both of the Bus Enable inputs (BUSEN), when clocked through the register, disables the bus outputs to –2.0 V.

The receiver section clocks bus data into the receive registers, after gating with the Receive Enable (RXEN) input.

All registers are clocked by a positive transition of CLK1 or CLK2 (or both).

Additional leadframe grounding is provided through the Ground pins (GND) which should be connected to 0 V. The GND pins are not electrically connected to the chip.

The 100 Series contains temperature compensation.

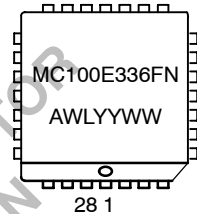
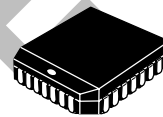
- 25 Ω Cutoff Bus Outputs
- 50 Ω Receiver Outputs
- Transmit and Receive Registers
- 1500 ps Max. Clock to Bus
- 1000 ps Max. Clock to Q
- Bus Outputs Feature Internal Edge Slow-Down Capacitors
- Additional Package Ground Pins
- PECL Mode Operating Range:  $V_{CC} = 4.2\text{ V to } 5.7\text{ V}$  with  $V_{EE} = 0\text{ V}$
- NECL Mode Operating Range:  $V_{CC} = 0\text{ V}$  with  $V_{EE} = -4.2\text{ V to } -5.7\text{ V}$
- Internal Input Pulldown Resistors
- ESD Protection: > 1 KV HBM, > 75 V MM
- Meets or Exceeds JEDEC Spec EIA/JESD78 IC Latchup Test
- Moisture Sensitivity Level 1  
For Additional Information, see Application Note AND8003/D
- Flammability Rating: UL 94 code V-0 @ 1/8",  
Oxygen Index 28 to 34
- Transistor Count = 430 devices



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### MARKING DIAGRAM



PLCC-28  
FN SUFFIX  
CASE 776

A = Assembly Location  
WL = Wafer Lot  
YY = Year  
WW = Work Week

### ORDERING INFORMATION

Device	Package	Shipping
MC100E336FN	PLCC-28	37 Units/Rail
MC100E336FNR2	PLCC-28	500 Units/Reel



# MC100E336

## MAXIMUM RATINGS (Note 1)

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
V <sub>CC</sub>	PECL Mode Power Supply	V <sub>EE</sub> = 0 V		8	V
V <sub>EE</sub>	NECL Mode Power Supply	V <sub>CC</sub> = 0 V		-8	V
V <sub>I</sub>	PECL Mode Input Voltage NECL Mode Input Voltage	V <sub>EE</sub> = 0 V V <sub>CC</sub> = 0 V	V <sub>I</sub> ≤ V <sub>CC</sub> V <sub>I</sub> ≥ V <sub>EE</sub>	6 -6	V V
I <sub>out</sub>	Output Current	Continuous Surge		50 100	mA mA
T <sub>A</sub>	Operating Temperature Range			0 to +85	°C
T <sub>stg</sub>	Storage Temperature Range			-65 to +150	°C
θ <sub>JA</sub>	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	28 PLCC 28 PLCC	63.5 43.5	°C/W °C/W
θ <sub>JC</sub>	Thermal Resistance (Junction-to-Case)	std bd	28 PLCC	22 to 26	°C/W
V <sub>EE</sub>	PECL Operating Range NECL Operating Range			4.2 to 5.7 -5.7 to -4.2	V V
T <sub>sol</sub>	Wave Solder	< 2 to 3 sec @ 248°C		265	°C

1. Maximum Ratings are those values beyond which device damage may occur.

## 100E SERIES PECL DC CHARACTERISTICS V<sub>CCx</sub> = 5.0 V; V<sub>EE</sub> = 0.0 V (Note 2)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I <sub>EE</sub>	Power Supply Current		125	150		125	150		144	173	mA
V <sub>OH</sub>	Output HIGH Voltage (Note 3)	3975	4050	4120	3975	4050	4120	3975	4050	4120	mV
V <sub>OL</sub>	Output LOW Voltage (Note 3)	3190	3295	3380	3190	3255	3380	3190	3260	3380	mV
V <sub>IH</sub>	Input HIGH Voltage	3835	4050	4120	3835	4120	4120	3835	4120	4120	mV
V <sub>IL</sub>	Input LOW Voltage	3190	3300	3525	3190	3525	3525	3190	3525	3525	mV
V <sub>CUT</sub>	Cut-off Output Voltage (Note 3)	2.9		2.97	2.9		2.97	2.9		2.97	V
I <sub>IH</sub>	Input HIGH Current RXEN All Other Inputs			225 150			225 150			225 150	μA
I <sub>IL</sub>	Input LOW Current	0.5	0.3		0.5	0.25		0.5	0.2		μA

NOTE: Devices are designed to meet the DC specifications shown in the above table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lpm is maintained.

2. Input and output parameters vary 1:1 with V<sub>CC</sub>. V<sub>EE</sub> can vary +0.46 V / -0.8 V.

3. Outputs are terminated through a 50 Ω resistor to V<sub>CC</sub> - 2.10 V.

## 100E SERIES NECL DC CHARACTERISTICS V<sub>CCx</sub> = 0.0 V; V<sub>EE</sub> = -5.0 V (Note 4)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I <sub>EE</sub>	Power Supply Current		125	150		125	150		144	173	mA
V <sub>OH</sub>	Output HIGH Voltage (Note 5)	-1025	-950	-880	-1025	-950	-880	-1025	-950	-880	mV
V <sub>OL</sub>	Output LOW Voltage (Note 5)	-1810	-1705	-1620	-1810	-1745	-1620	-1810	-1740	-1620	mV
V <sub>IH</sub>	Input HIGH Voltage	-1165	-950	-880	-1165	-880	-880	-1165	-880	-880	mV
V <sub>IL</sub>	Input LOW Voltage	-1810	-1700	-1475	-1810	-1475	-1475	-1810	-1475	-1475	mV
V <sub>CUT</sub>	Cut-off Output Voltage (Note 3)	2.9		2.97	2.9		2.97	2.9		2.97	V
I <sub>IH</sub>	Input HIGH Current RXEN All Other Inputs			225 150			225 1502			225 150	μA
I <sub>IL</sub>	Input LOW Current	0.5	0.3		0.5	0.25		0.5	0.2		μA

NOTE: Devices are designed to meet the DC specifications shown in the above table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lpm is maintained.

4. Input and output parameters vary 1:1 with V<sub>CC</sub>. V<sub>EE</sub> can vary +0.46 V / -0.8 V.

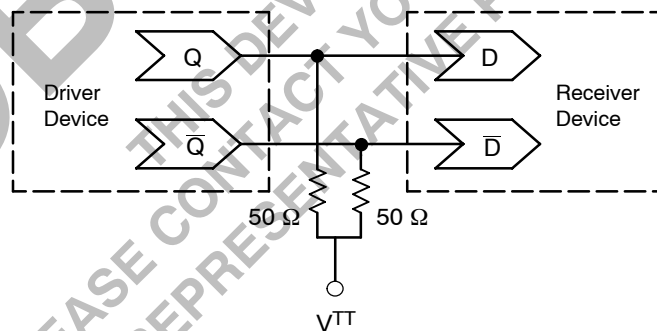
5. Outputs are terminated through a 50 Ω resistor to V<sub>CC</sub> - 2.10 V.

# MC100E336

**AC CHARACTERISTICS**  $V_{CCx} = 5.0\text{ V}$ ;  $V_{EE} = 0.0\text{ V}$  or  $V_{CCx} = 0.0\text{ V}$ ;  $V_{EE} = -5.0\text{ V}$  (Note 6)

Symbol	Characteristic	0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$f_{MAX}$	Maximum Toggle Frequency		TBD			TBD			TBD		GHz
$t_{PLH}$ $t_{PHL}$	Propagation Delay to Output Clk to Q Clk to $\overline{BUS}$	500 825	700 1250	100 1800	500 825	700 1250	1000 1800	500 825	700 1250	1000 1800	ps
$t_s$	Setup Time $\overline{BUS}$ , $\overline{RXEN}$ BUSEN A, B Data TEN	150 100 300 450	-150 -200 -50 150		150 100 300 450	-150 -200 -50 150		150 100 300 450	-150 -200 -50 150		ps
$t_h$	Hold Time $\overline{BUS}$ , $\overline{RXEN}$ BUSEN A, B Data TEN	450 500 350 200	150 200 50 -150		450 500 350 200	150 200 50 -150		450 500 350 200	150 200 50 -150		ps
$t_{PW}$	Minimum Pulse Width Clk	400			400			400			ps
$t_{JITTER}$	Cycle-to-Cycle Jitter		TBD			TBD			TBD		ps
$t_r$ $t_f$	Rise/Fall Times 20 - 80% ( $Q_n$ ) 20 - 80% ( $\overline{BUS}_n$ Rise) 20 - 80% ( $\overline{BUS}_n$ Fall)	300 500 300	450 800 500	700 1000 800	300 500 300	450 800 500	700 1000 800	300 500 300	450 800 500	700 1000 800	ps

6. 100 Series:  $V_{EE}$  can vary +0.46 V / -0.8 V.



$$V_{TT} = V_{CC} - 2.10\text{ V}$$

**Typical Termination for Output Driver and Device Evaluation**  
(See Application Note AND8020 – Termination of ECL Logic Devices.)

**Resource Reference of Application Notes**

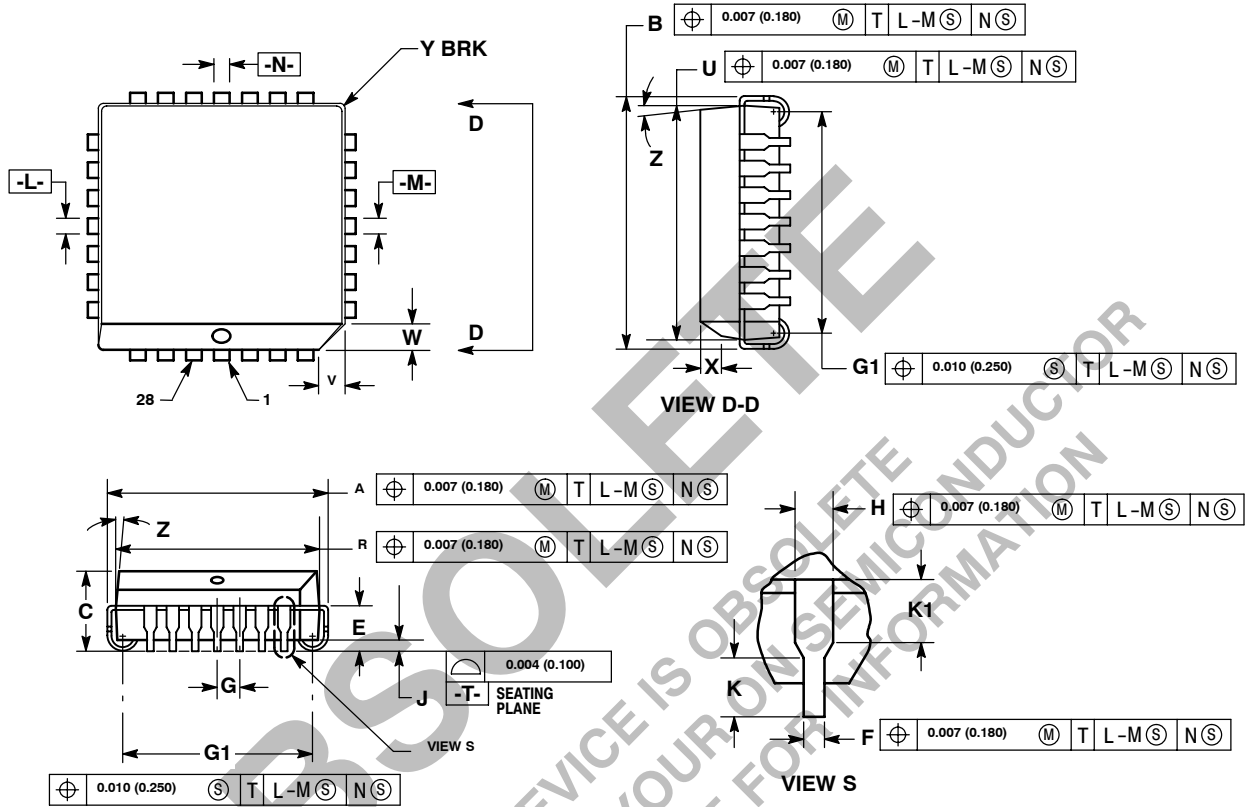
- AN1404** – ECLinPS Circuit Performance at Non-Standard  $V_{IH}$  Levels
- AN1405** – ECL Clock Distribution Techniques
- AN1406** – Designing with PECL (ECL at +5.0 V)
- AN1503** – ECLinPS I/O SPICE Modeling Kit
- AN1504** – Metastability and the ECLinPS Family
- AN1568** – Interfacing Between LVDS and ECL
- AN1596** – ECLinPS Lite Translator ELT Family SPICE I/O Model Kit
- AN1650** – Using Wire-OR Ties in ECLinPS Designs
- AN1672** – The ECL Translator Guide
- AND8001** – Odd Number Counters Design
- AND8002** – Marking and Date Codes
- AND8020** – Termination of ECL Logic Devices

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# MC100E336

## PACKAGE DIMENSIONS

PLCC-28  
FN SUFFIX  
PLASTIC PLCC PACKAGE  
CASE 776-02  
ISSUE E



**NOTES:**

- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIM G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIM R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
- DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.485	0.495	12.32	12.57
B	0.485	0.495	12.32	12.57
C	0.165	0.180	4.20	4.57
E	0.090	0.110	2.29	2.79
F	0.013	0.019	0.33	0.48
G	0.050 BSC		1.27 BSC	
H	0.026	0.032	0.66	0.81
J	0.020	—	0.51	—
K	0.025	—	0.64	—
R	0.450	0.456	11.43	11.58
U	0.450	0.456	11.43	11.58
V	0.042	0.048	1.07	1.21
W	0.042	0.048	1.07	1.21
X	0.042	0.056	1.07	1.42
Y	—	0.020	—	0.50
Z	2°	10°	2°	10°
G1	0.410	0.430	10.42	10.92
K1	0.040	—	1.02	—

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