

MC100LVELT20

3.3V LVTTTL/LVCMOS to Differential LVPECL Translator

Description

The MC100LVELT20 is a 3.3 V TTL/CMOS to differential PECL translator. Because PECL (Positive ECL) levels are used, only + 3.3 V and ground are required. The small outline SOIC-8 package and the single gate of the MC100LVELT20 makes it ideal for those applications where space, performance, and low power are at a premium.

The 100 Series contains temperature compensation.

Features

- 390 ps Typical Propagation Delay
- Maximum Input Clock Frequency > 0.8 GHz Typical
- Operating Range $V_{CC} = 3.0\text{ V}$ to 3.6 V with $GND = 0\text{ V}$
- PNP TTL Input for Minimal Loading
- Q Output will Default HIGH with Input Open
- Pb-Free Packages are Available



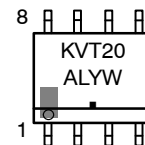
ON Semiconductor®

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MARKING DIAGRAM



SO-8
D SUFFIX
CASE 751



A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week
▪ = Pb-Free Package

*For additional marking information, refer to Application Note AND8002/D.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

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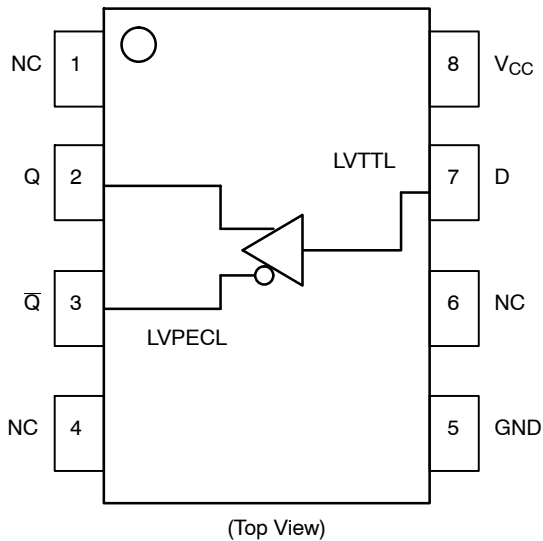


Table 1. PIN DESCRIPTION

Pin	Function
Q, \bar{Q}	Differential PECL Outputs
D	LVTTTL Input
V _{CC}	Positive Supply
GND	Ground
NC	No Connect

Figure 1. 8-Lead Pinout and Logic Diagram

Table 2. ATTRIBUTES

Characteristics		Value	
Internal Input Pulldown Resistor		N/A	
Internal Input Pullup Resistor		N/A	
ESD Protection	Human Body Model	> 1.5 kV	
	Machine Model	> 200 V	
	Charged Device Model	> 2 kV	
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)	Pb Pkg	Level 1	
	SOIC-8	Level 1	
Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in	
Transistor Count	150 Devices		
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test			

1. For additional information, see Application Note AND8003/D.

Table 3. MAXIMUM RATINGS

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V _{CC}	Power Supply	GND = 0 V		6	V
V _I	Input Voltage	GND = 0 V	V _I ≤ V _{CC}	6	V
I _{out}	Output Current	Continuous Surge		50 100	mA mA
T _A	Operating Temperature Range			-40 to +85	°C
T _{stg}	Storage Temperature Range			-65 to +150	°C
θ _{JA}	Thermal Resistance (Junction-to-Ambient)	0 lfpm	SOIC-8	190	°C/W
		500 lfpm	SOIC-8	130	°C/W
θ _{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	SOIC-8	41 to 44	°C/W
T _{sol}	Wave Solder	Pb		265	°C
		Pb-Free		265	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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Table 4. LVTTTL INPUT DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$, $GND = 0\text{ V}$, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$

Symbol	Characteristic	Min	Typ	Max	Unit
I_{IH}	Input HIGH Current ($V_{in} = 2.7\text{ V}$)			20	μA
I_{IHH}	Input HIGH Current MAX ($V_{in} = 6.0\text{ V}$)			100	μA
I_{IL}	Input LOW Current ($V_{in} = 0.5\text{ V}$)			-0.6	mA
V_{IK}	Input Clamp Voltage ($I_{in} = -18\text{ mA}$)			-1.2	V
V_{IH}	Input HIGH Voltage	2.0			V
V_{IL}	Input LOW Voltage			0.8	V

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

Table 5. 100LVELT PECL OUTPUT DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$, $GND = 0\text{ V}$ (Note 2)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{CC}	Negative Power Supply Current	20	25	30	22	27	32	23	28	33	mA
V_{OH}	Output HIGH Voltage (Note 3)	2155	2280	2405	2155	2280	2405	2155	2280	2405	mV
V_{OL}	Output LOW Voltage (Note 3)	1355	1480	1605	1355	1480	1605	1355	1480	1605	mV

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

- Output parameters vary 1:1 with V_{CC} .
- All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.

Table 6. AC CHARACTERISTICS $V_{CC} = 3.0\text{ V}$ to 3.6 V , $GND = 0\text{ V}$ (Note 4)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{max}	Maximum Input Clock Frequency (Figure 2)	600	800		600	800		600	800		MHz
t_{PLH} , t_{PHL}	Propagation Delay to Output Differential	280	350	430	300	370	450	320	400	490	ps
t_{SKEW}	Device-to-Device Skew (Note 5)			250			250			250	ps
t_{JITTER}	Random Clock Jitter (RMS) (Figure 2)		< 1	< 2		< 1	< 2		< 1	< 2	ps
t_r , t_f	Output Rise/Fall Times (20% – 80%) Q, \bar{Q}	70	100	225	80	120	225	90	140	225	ps

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

- Measured using a LVTTTL source, 50% duty cycle clock source. All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.
- Skew is measured between outputs under identical transitions.

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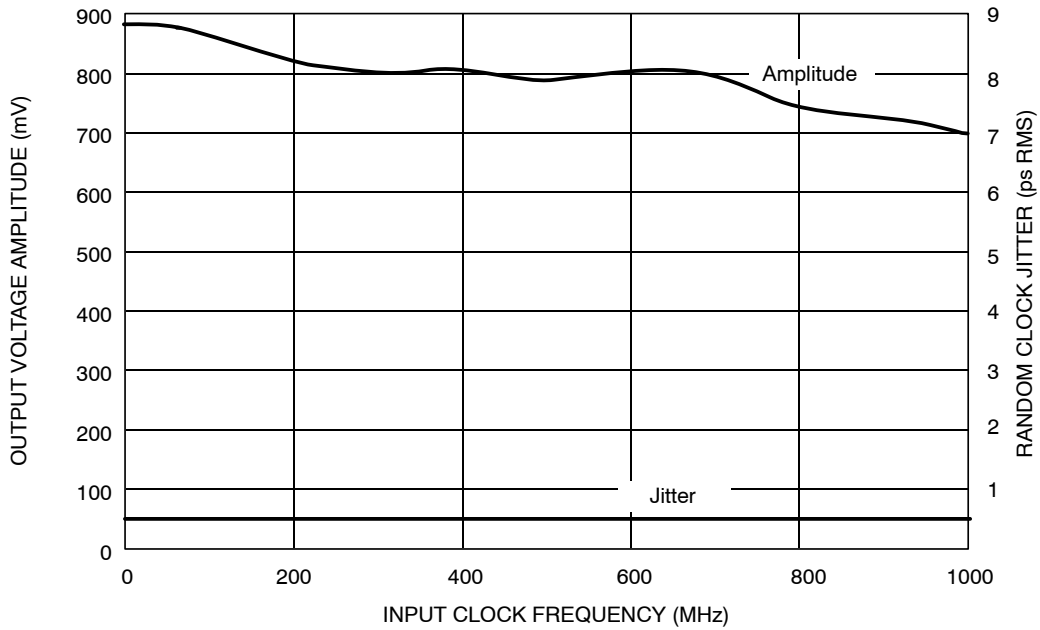


Figure 2. Output Voltage Amplitude (V_{OUTpp})/RMS Jitter vs. Input Clock Frequency at Ambient Temperature

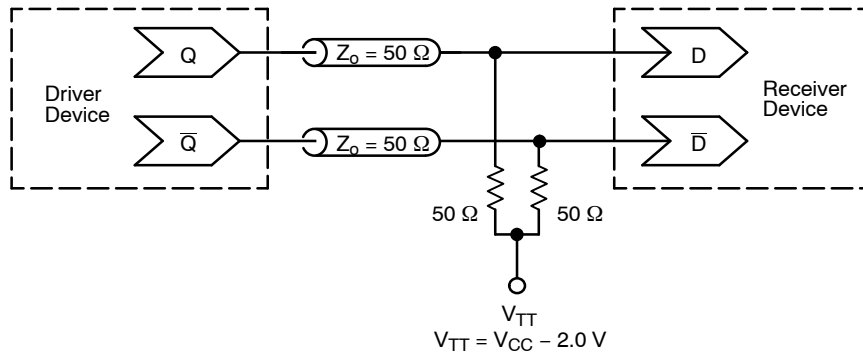


Figure 3. Typical Termination for Output Driver and Device Evaluation (See Application Note AND8020/D – Termination of ECL Logic Devices.)

ORDERING INFORMATION

Device	Package	Shipping [†]
MC100LVELT20D	SOIC-8	98 Units / Rail
MC100LVELT20DG	SOIC-8 (Pb-Free)	98 Units / Rail
MC100LVELT20DR2	SOIC-8	2500 / Tape & Reel
MC100LVELT20DR2G	SOIC-8 (Pb-Free)	2500 / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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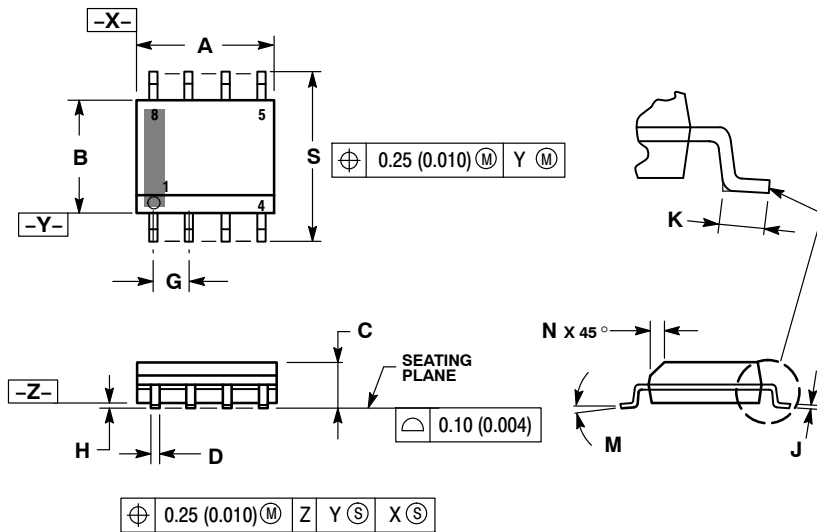
Resource Reference of Application Notes

- AN1405/D** – ECL Clock Distribution Techniques
- AN1406/D** – Designing with PECL (ECL at +5.0 V)
- AN1503/D** – ECLinPS™ I/O SPiCE Modeling Kit
- AN1504/D** – Metastability and the ECLinPS Family
- AN1568/D** – Interfacing Between LVDS and ECL
- AN1672/D** – The ECL Translator Guide
- AND8001/D** – Odd Number Counters Design
- AND8002/D** – Marking and Date Codes
- AND8020/D** – Termination of ECL Logic Devices
- AND8066/D** – Interfacing with ECLinPS
- AND8090/D** – AC Characteristics of ECL Devices

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PACKAGE DIMENSIONS

SOIC-8 NB
CASE 751-07
ISSUE AJ

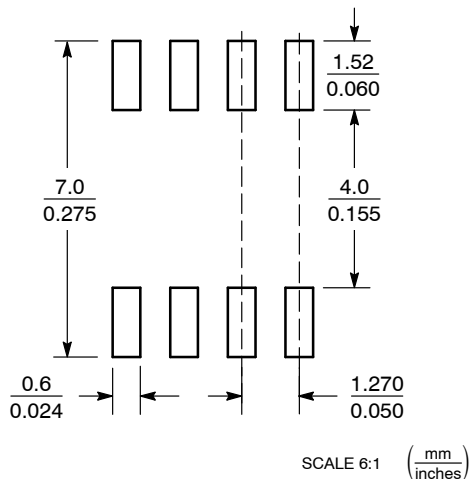


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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