MC10ELT21, MC100ELT21

5V Differential PECL to TTL Translator

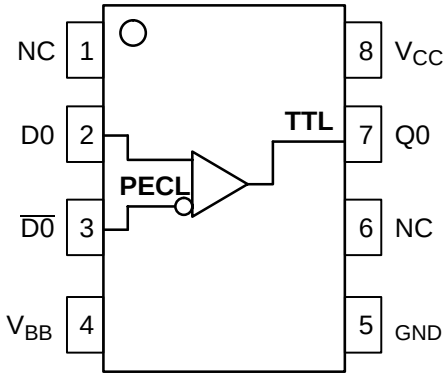
The MC10ELT/100ELT21 is a differential PECL to TTL translator. Because PECL (Positive ECL) levels are used, only +5 V and ground are required. The small outline 8-lead package and the single gate of the ELT21 makes it ideal for those applications where space, performance and low power are at a premium.

The V_{BB} pin, an internally generated voltage supply, is available to this device only. For single-ended input conditions, the unused differential input is connected to V_{BB} as a switching reference voltage. V_{BB} may also rebias AC coupled inputs. When used, decouple V_{BB} and V_{CC} via a 0.01 μF capacitor and limit current sourcing or sinking to 0.5 mA. When not used, V_{BB} should be left open.

The 100 Series contains temperature compensation.

- 3.5 ns Typical Propagation Delay
- 24 mA TTL Output
- Flow Through Pinouts
- ESD Protection: >2 KV HBM
- Operating Range: V_{CC}= 4.75 V to 5.25 V with GND= 0 V
- Q Output Will Default High with Inputs Left Open or < 1.3 V
- Internal Input Pulldown Resistors
- 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 = 81 devices

LOGIC DIAGRAM AND PINOUT ASSIGNMENT



PIN DESCRIPTION

PIN	FUNCTION
Q0	TTL Output
D0, $\overline{D0}$	PECL Differential Inputs
V_{BB}	Reference Voltage Output
V_{CC}	Positive Supply
GND	Ground
NC	No Connect

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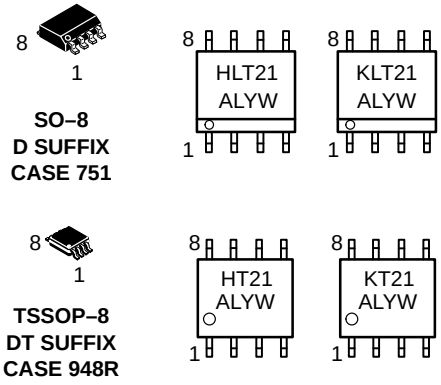
MARKING DIAGRAMS*



SO–8
D SUFFIX
CASE 751

TSSOP–8
DT SUFFIX
CASE 948R

H = MC10
K = MC100
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week

*For additional information, see Application Note AND8002/D

ORDERING INFORMATION

Device	Package	Shipping
MC10ELT21D	SO–8	98 Units/Rail
MC10ELT21DR2	SO–8	2500 Tape & Reel
MC100ELT21D	SO–8	98 Units/Rail
MC100ELT21DR2	SO–8	2500 Tape & Reel
MC10ELT21DT	TSSOP–8	98 Units/Rail
MC10ELT21DTR2	TSSOP–8	2500 Tape & Reel
MC100ELT21DT	TSSOP–8	98 Units/Rail
MC100ELT21DTR2	TSSOP–8	2500 Tape & Reel

MAXIMUM RATINGS (Note 1.)

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
V_{CC}	PECL Power Supply	GND = 0 V		7	V
V_{IN}	PECL Input Voltage	GND = 0 V	$V_I \leq V_{CC}$	0 to 6	V
I_{BB}	V_{BB} Sink/Source			± 0.5	mA
TA	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 500 LFPM	8 SOIC 8 SOIC	190 130	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction to Case)	std bd	8 SOIC	41 to 44	°C/W
θ_{JA}	Thermal Resistance (Junction to Ambient)	0 LFPM 500 LFPM	8 TSSOP 8 TSSOP	185 140	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction to Case)	std bd	8 TSSOP	41 to 44 ± 5%	°C/W
T_{sol}	Wave Solder	<2 to 3 sec @ 248°C		265	°C

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

10ELT SERIES PECL INPUT DC CHARACTERISTICS V_{CC}= 5.0 V; GND= 0.0 V (Note 1.)

		–40°C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
V_{IH}	Input HIGH Voltage (Single Ended)	3770		4110	3870		4190	3930		4265	mV
V_{IL}	Input LOW Voltage (Single Ended)	3050		3500	3050		3520	3050		3555	mV
V_{BB}	Output Voltage Reference	3.57		3.7	3.65		3.75	3.69		3.81	V
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 2.)	2.2		5.0	2.2		5.0	2.2		5.0	V
I_{IH}	Input HIGH Current			150			150			150	µA
I_{IL}	Input LOW Current	0.5			0.5			0.3			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 lfpm is maintained.

1. Input parameters vary 1:1 with V_{CC}. V_{CC} can vary ± 0.25 V.
2. V_{IHCMR} min varies 1:1 with GND, V_{IHCMR} max varies 1:1 with V_{CC}.

100ELT SERIES PECL INPUT DC CHARACTERISTICS V_{CC}= 5.0 V; GND= 0.0 V (Note 1.)

		–40°C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
V_{IH}	Input HIGH Voltage (Single Ended)	3835		4120	3835		4120	3835		4120	mV
V_{IL}	Input LOW Voltage (Single Ended)	3190		3525	3190		3525	3190		3525	mV
V_{BB}	Output Voltage Reference	3.62		3.74	3.62		3.74	3.62		3.745	V
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 2.)	2.2		5.0	2.2		5.0	2.2		5.0	V
I_{IH}	Input HIGH Current			150			150			150	µA
I_{IL}	Input LOW Current	0.5			0.5			0.5			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 lfpm is maintained.

1. Input parameters vary 1:1 with V_{CC}. V_{CC} can vary ± 0.25 V.
2. V_{IHCMR} min varies 1:1 with GND, V_{IHCMR} max varies 1:1 with V_{CC}.

TTL OUTPUT DC CHARACTERISTICS V_{CC}= 4.75 V to 5.25 V; T_A= –40°C to 85°C)

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
V_{OH}	Output HIGH Voltage	I_{OH} = –3.0mA	2.4		(Note 1.)	V
V_{OL}	Output LOW Voltage	I_{OL} = 24mA			0.5	V
I_{CCH}	Power Supply Current			20	29	mA
I_{CCL}	Power Supply Current			22	32	mA
I_{OS}	Output Short Circuit Current		–150		–60	mA

1. Max level is V_{CC}–0.7 by design.

AC CHARACTERISTICS V_{CC}= 4.75 V to 5.25 V; GND= 0.0 V

Symbol	Characteristic	–40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{max}	Maximum Toggle Frequency		TBD			100			TBD		MHz
t_{JITTER}	Cycle–to–Cycle Jitter		TBD			TBD			TBD		ps
t_{PLH}	Propagation Delay @ 1.5 V C_L = 20pF	2.0		5.5	2.0		5.5	2.0		5.5	ns
t_{PHL}	Propagation Delay @ 1.5 V C_L = 20pF	2.0		5.5	2.0		5.5	2.0		5.5	ns
V_{PP}	Input Swing (Note 1.)	200		1000	200		1000	200		1000	mV
t_r/t_f	Output Rise/Fall Time (10–90%) C_L = 20pF					750					ps

1. V_{PP}(min) is the minimum input swing for which AC parameters are guaranteed. The device has a DC gain of ≈40.

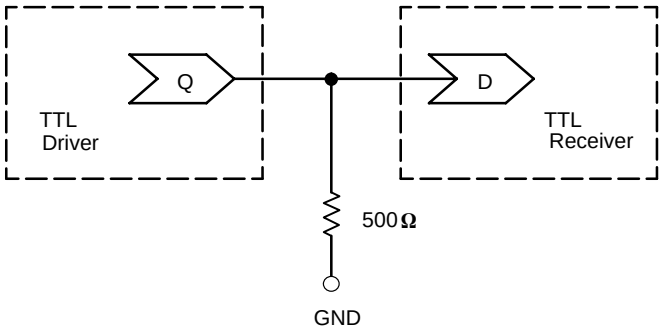


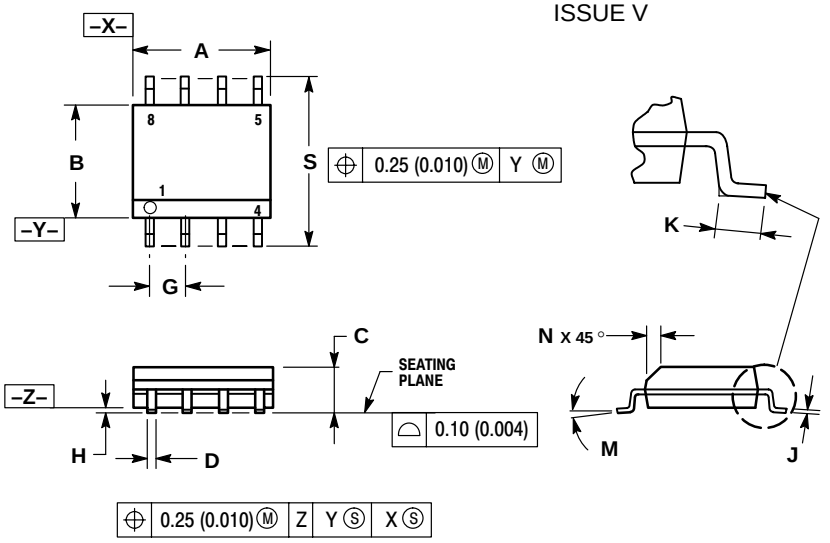
Figure 1. TTL Output Termination

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
AN1560	–	Low Voltage ECLinPS SPICE Modeling Kit
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

PACKAGE DIMENSIONS

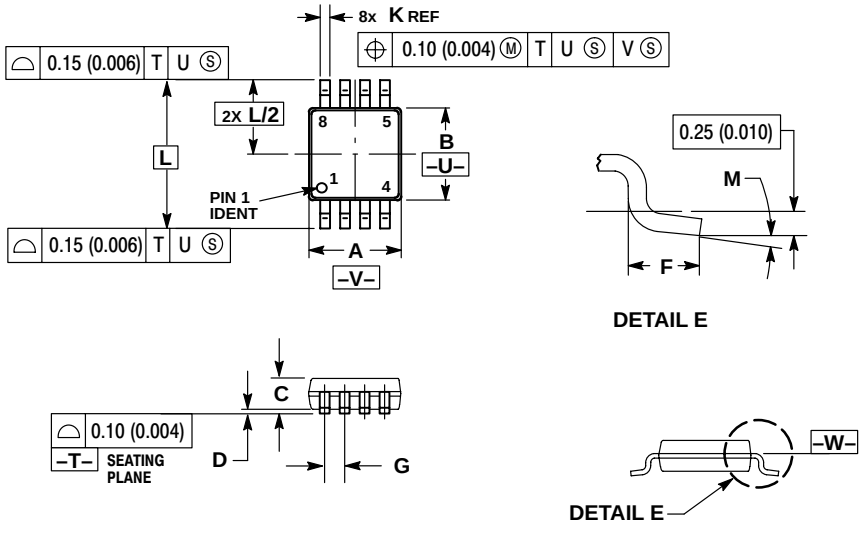
SO–8
D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751–07
ISSUE V



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.

	MILLIMETERS		INCHES	
DIM	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

TSSOP–8
DT SUFFIX
PLASTIC TSSOP PACKAGE
CASE 948R–02
ISSUE A



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH. PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
6. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE –W–.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	0.80	1.10	0.031	0.043
D	0.05	0.15	0.002	0.006
F	0.40	0.70	0.016	0.028
G	0.65 BSC		0.026 BSC	
K	0.25	0.40	0.010	0.016
L	4.90 BSC		0.193 BSC	
M	0°	6 °	0°	6 °

Notes

Notes

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