MC10ELT25, MC100ELT25

-5V Differential ECL to TTL Translator

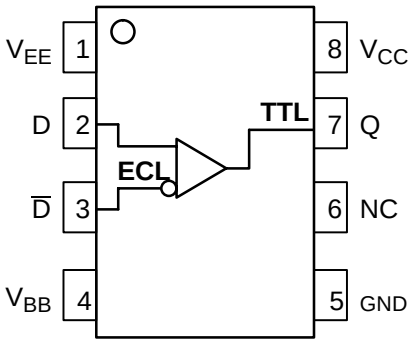
The MC10ELT/100ELT25 is a differential ECL to TTL translator. Because ECL levels are used, a +5 V, -5.2 V (or -4.5 V) and ground are required. The small outline 8-lead package and the single gate of the ELT25 makes it ideal for those applications where space, performance and low power are at a premium.

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.

- 2.6 ns Typical Propagation Delay
- 100 MHz F_{MAX} CLK
- 24 mA TTL Outputs
- Flow Through Pinouts
- ESD Protection: >1 KV HBM, > 400 V MM
- Operating Range: V_{CC}= 4.5 V to 5.5 V with GND= 0 V; V_{EE}= –4.2 V to –5.7 V with GND= 0 V
- Internal Input Pulldown Resistors
- Q Output will default HIGH with inputs open or < 1.3 V
- 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 = 38 devices

LOGIC DIAGRAM AND PINOUT ASSIGNMENT



PIN DESCRIPTION

PIN	FUNCTION
D, $\overline{D}$	ECL Differential Inputs
Q	TTL Output
V_{BB}	Reference Voltage Output
V_{CC}	Positive Supply
V_{EE}	Negative Supply
GND	Ground
NC	No Connect

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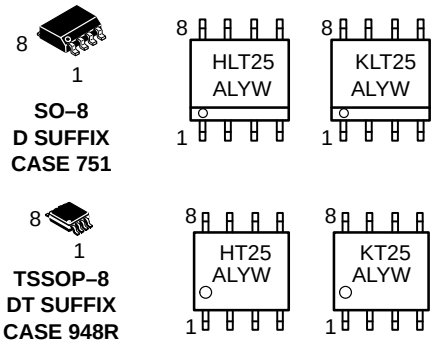
MARKING DIAGRAMS*



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
MC10ELT25D	SO–8	98 Units/Rail
MC10ELT25DR2	SO–8	2500 Tape & Reel
MC100ELT25D	SO–8	98 Units/Rail
MC100ELT25DR2	SO–8	2500 Tape & Reel
MC10ELT25DT	TSSOP–8	98 Units/Rail
MC10ELT25DTR2	TSSOP–8	2500 Tape & Reel
MC100ELT25DT	TSSOP–8	98 Units/Rail
MC100ELT25DTR2	TSSOP–8	2500 Tape & Reel

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MAXIMUM RATINGS (Note 1.)

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
V_{CC}	Positive Power Supply	GND = 0 V	V_{EE} = –5.0 V	7	V
V_{EE}	Negative Power Supply	GND = 0 V	V_{CC} = +5.0 V	–8	V
V_{IN}	Input Voltage	GND = 0 V		0 to V_{EE}	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 NECL DC CHARACTERISTICS V_{CC}= 5.0 V; V_{EE}= –5.0 V; GND= 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)	–1230		–890	–1130		–810	–1060		–720	mV
V_{IL}	Input LOW Voltage (Single Ended)	–1950		–1500	–1950		–1480	–1950		–1445	mV
V_{BB}	Output Voltage Reference	–1.43		–1.30	–1.35		–1.25	–1.31		–1.19	V
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 2.)	–2.8		0.0	–2.8		0.0	–2.8		0.0	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 GND. V_{EE} can vary +0.06 V / –0.5 V.
2. V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with GND.

100ELT SERIES NECL DC CHARACTERISTICS V_{CC}= 5.0 V; V_{EE}= –5.0 V; GND= 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)	–1165		–880	–1165		–880	–1165		–880	mV
V_{IL}	Input LOW Voltage (Single Ended)	–1810		–1475	–1810		–1475	–1810		–1475	mV
V_{BB}	Output Voltage Reference	–1.38		–1.26	–1.38		–1.26	–1.38		–1.26	V
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 2.)	–2.8		0.0	–2.8		0.0	–2.8		0.0	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 GND. V_{EE} can vary +0.8 V / –0.5 V.
2. V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with GND.

TTL OUTPUT DC CHARACTERISTICS V_{CC} = 4.5 V to 5.5 V; T_A = –40°C to +85°C

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
V_{OH}	Output HIGH Voltage	I_{OH} = –3.0 mA	2.4			V
V_{OL}	Output LOW Voltage	I_{OL} = 24 mA			0.5	V
I_{CCH}	Power Supply Current			11	16	mA
I_{CCL}	Power Supply Current			13	18	mA
I_{EE}	Negative Power Supply Current			15	21	mA
I_{OS}	Output Short Circuit Current		–150		–60	mA

AC CHARACTERISTICS V_{CC}= 5.0 V; V_{EE}= –5.0 V; GND= 0 V (Note 1.)

		–40°C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
f_{max}	Maximum Toggle Frequency		100			100			100		MHz
t_{PLH}	Propagation Delay @ 1.5 V C_L = 20 pF	1.7		3.6	1.7		3.6	1.7		3.6	ns
t_{PHL}	Propagation Delay @ 1.5 V C_L = 20 pF	2.6		4.1	2.6		4.1	2.6		4.1	ns
t_{JITTER}	Cycle–to–Cycle Jitter		TBD			TBD			TBD		ps
t_r t_f	Output Rise/Fall Times QTTL 10% – 90%					1.9 2.3					ns
V_{PP}	Input Swing (Note 2.)	200		1000	200		1000	200		1000	mV

1. V_{CC} can vary ± 0.25 V.
   V_{EE} can vary +0.06 V / –0.5 V for 10ELT; V_{EE} can vary +0.8 V / –0.5 V for 100ELT.
2. V_{PP}(min) is the minimum input swing for which AC parameters are guaranteed. The device has a DC gain of ≈40.

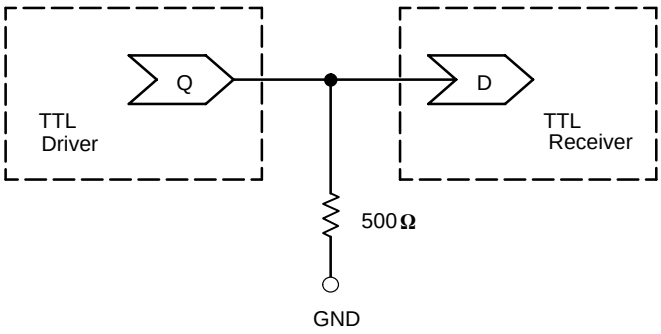


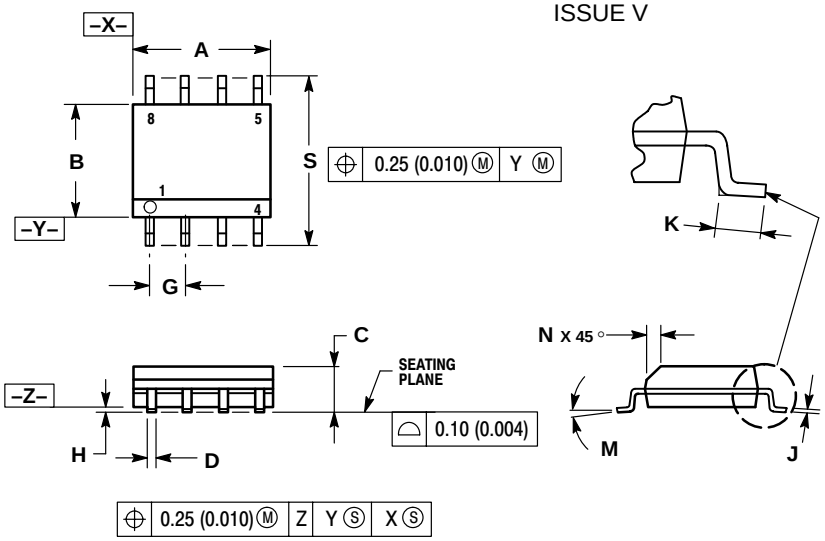
Figure 1. TTL Output Termination

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

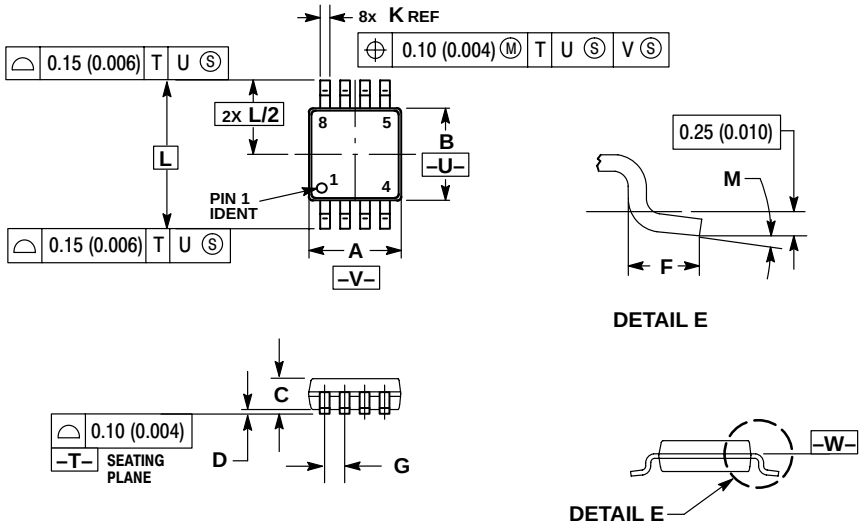


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) 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

PACKAGE DIMENSIONS

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

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