ARIZONA MICROTEK, INC.

AZ10EL31
AZ100EL31

ECL/PECL D Flip-Flop with Set and Reset

FEATURES

- 475ps Propagation Delay
- 2.8GHz Toggle Frequency
- 75kΩ Internal Input Pulldown Resistors
- Direct Replacement for ON Semiconductor MC10EL31 & MC100EL31

PACKAGE AVAILABILITY

PACKAGE	PART NUMBER	MARKING	NOTES
SOIC 8	AZ10EL31D	AZM10EL31	1,2
SOIC 8	AZ100EL31D	AZM100EL31	1,2
TSSOP 8	AZ10EL31T	AZTEL31	1,2
TSSOP 8	AZ100EL31T	AZHEL31	1,2

1 Add R1 at end of part number for 7 inch (1K parts), R2 for 13 inch (2.5K parts) Tape & Reel.
2 Date Code "YWW" on underside of part.

DESCRIPTION

The AZ10/100EL31 is a master-slave D flip-flop with set and reset. The device is functionally equivalent to the E131 device with higher performance capabilities. With propagation delays and output transition times significantly faster than the E131, the EL31 is ideally suited for those applications that require the ultimate in AC performance.

Both set and reset inputs are asynchronous, level triggered signals. Data enters the master section of the flip-flop when the clock is LOW. When the clock transitions from LOW to HIGH, the data in the master section transfers into the slave section and through to the outputs.

NOTE: Specifications in ECL/PECL tables are valid when thermal equilibrium is established.

TRUTH TABLE

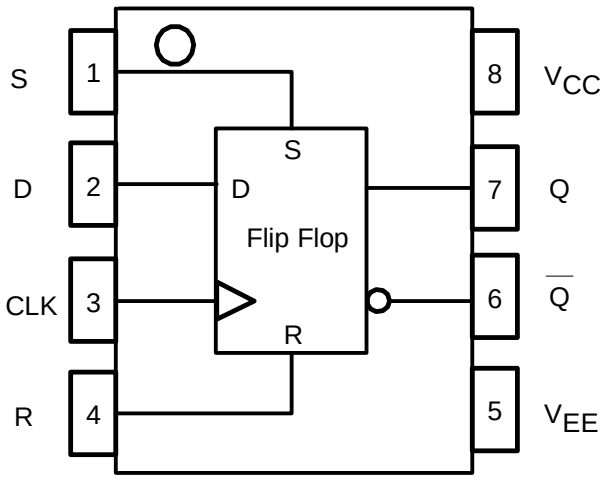
D	S*	R*	CLK	Q	$\bar{Q}$
L	L	L	Z	L	H
H	L	L	Z	H	L
X	H	L	X	H	L
X	L	H	X	L	H
X	H	H	X	Undef	Undef

Z = LOW to HIGH Transition
* Pins will default low when left open

PIN DESCRIPTION

PIN	FUNCTION
S	Set Input
D	Data Input
R	Reset Input
CLK	Clock Input
Q, $\bar{Q}$	Data Outputs
V_{CC}	Positive Supply
V_{EE}	Negative Supply

LOGIC DIAGRAM AND PINOUT ASSIGNMENT



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www.azmicrotek.com

Absolute Maximum Ratings are those values beyond which device life may be impaired.

Symbol	Characteristic	Rating	Unit
V_{CC}	PECL Power Supply (V_{EE} = 0V)	0 to +8.0	Vdc
V_I	PECL Input Voltage (V_{EE} = 0V)	0 to +6.0	Vdc
V_{EE}	ECL Power Supply (V_{CC} = 0V)	-8.0 to 0	Vdc
V_I	ECL Input Voltage (V_{CC} = 0V)	-6.0 to 0	Vdc
I_{OUT}	Output Current --- Continuous --- Surge	50 100	mA
T_A	Operating Temperature Range	-40 to +85	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C

10K ECL DC Characteristics (V_{EE} = -4.75 to -5.5V, V_{CC} = GND)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1]	-1080		-890	-1020		-840	-980		-810	-910		-720	mV
V_{OL}	Output LOW Voltage[1]	-1950		-1650	-1950		-1630	-1950		-1630	-1950		-1595	mV
V_{IH}	Input HIGH Voltage	-1230		-890	-1170		-840	-1130		-810	-1060		-720	mV
V_{IL}	Input LOW Voltage	-1950		-1500	-1950		-1480	-1950		-1480	-1950		-1445	mV
I_{IH}	Input HIGH Current D, CLK S, R			 150 300			 150 300			 150 300			 150 300	µA
I_{IL}	Input LOW Current	0.5			0.5			0.5			0.5			µA
I_{EE}	Power Supply Current		27	32		27	32		27	32		27	32	mA

1. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

10K PECL DC Characteristics (V_{EE} = GND, V_{CC} = +5.0V)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1,2]	3920		4110	3980		4160	4020		4190	4090		4280	mV
V_{OL}	Output LOW Voltage[1,2]	3050		3350	3050		3370	3050		3370	3050		3405	mV
V_{IH}	Input HIGH Voltage[1]	3770		4110	3830		4160	3870		4190	3940		4280	mV
V_{IL}	Input LOW Voltage[1]	3050		3500	3050		3520	3050		3520	3050		3555	mV
I_{IH}	Input HIGH Current D, CLK S, R			 150 300			 150 300			 150 300			 150 300	µA
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current	0.5			0.5			0.5			0.5			µA
I_{EE}	Power Supply Current		27	32		27	32		27	32		27	32	mA

1. For supply voltages other that 5.0V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

100K ECL DC Characteristics (V_{EE} = -4.2V to -5.5V, V_{CC} = GND)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1]	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	-1025	-955	-880	mV
V_{OL}	Output LOW Voltage[1]	-1830	-1695	-1555	-1810	-1705	-1620	-1810	-1705	-1620	-1810	-1705	-1620	mV
V_{IH}	Input HIGH Voltage	-1165		-880	-1165		-880	-1165		-880	-1165		-880	mV
V_{IL}	Input LOW Voltage	-1810		-1475	-1810		-1475	-1810		-1475	-1810		-1475	mV
I_{IH}	Input HIGH Current D, CLK S, R			 150 300			 150 300			 150 300			 150 300	µA
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current	0.5			0.5			0.5			0.5			µA
I_{EE}	Power Supply Current		27	32		27	32		27	32		31	37	mA

1. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

100K PECL DC Characteristics (V_{EE} = GND, V_{CC} = +5.0V)

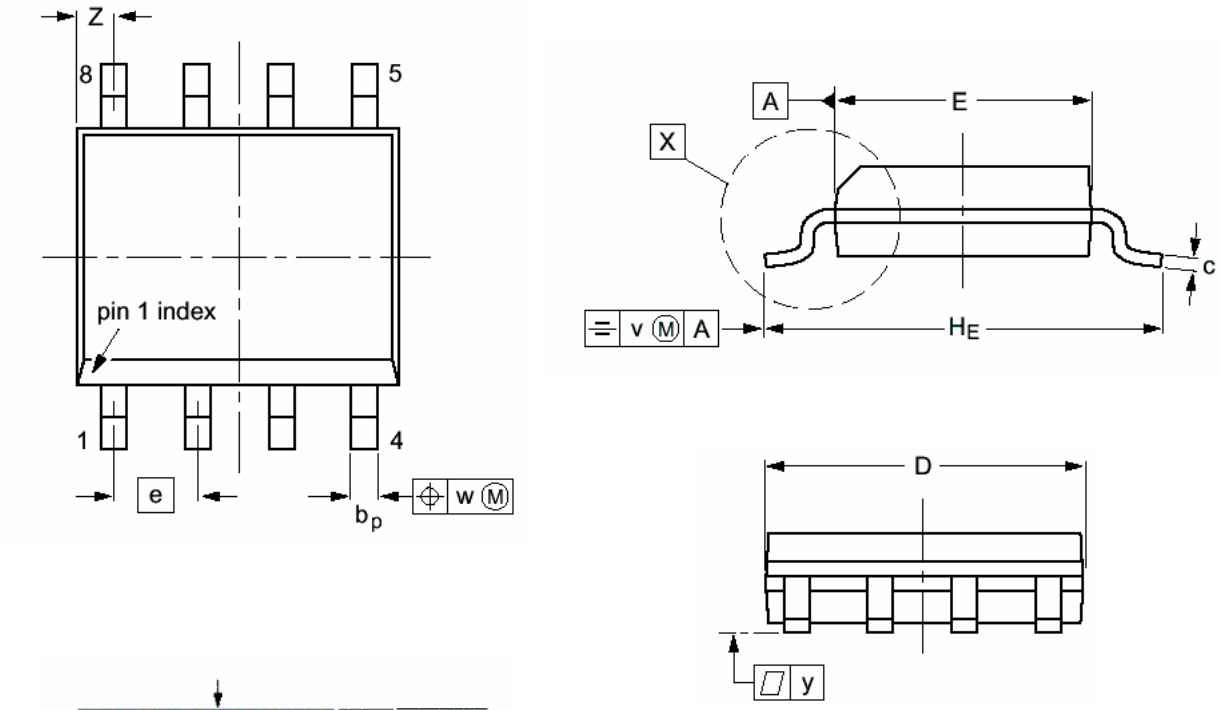
Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1,2]	3915	3995	4120	3975	4045	4120	3975	4045	4120	3975	4045	4120	mV
V_{OL}	Output LOW Voltage[1,2]	3170	3305	3445	3190	3295	3380	3190	3295	3380	3190	3295	3380	mV
V_{IH}	Input HIGH Voltage[1]	3835		4120	3835		4120	3835		4120	3835		4120	mV
V_{IL}	Input LOW Voltage[1]	3190		3525	3190		3525	3190		3525	3190		3525	mV
I_{IH}	Input HIGH Current D, CLK S, R			 150 300			 150 300			 150 300			 150 300	µA
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current	0.5			0.5			0.5			0.5			µA
I_{EE}	Power Supply Current		27	32		27	32		27	32		31	37	mA

1. For supply voltages other that 5.0V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

AC Characteristics (V_{EE} =10E(-4.75V to -5.5V), 100E(-4.2V to -5.5V); V_{CC} =GND or V_{EE} =GND; V_{CC} =10E(+4.75V to +5.5V), 100E(+4.2V to +5.5V))

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{MAX}	Maximum Toggle Frequency	2.0	2.5		2.2	2.8		2.2	2.8		2.2	2.8		GHz
t_{PLH} / t_{PHL}	Propagation Delay to Output CLK S,R	315 295	465 455	630 630	365 345	465 455	580 580	375 355	475 465	590 590	430 400	530 510	645 645	ps
t_S t_H	Setup Time Hold Time	150 250	0 100		150 250	0 100		150 250	0 100		150 250	0 100		ps
t_{RR}	Set/Reset Recovery	400	200		400	200		400	200		400	200		ps
t_{PW}	Minimum Pulse Width CLK, Set, Reset	400			400			400			400			ps
t_r / t_f	Output Rise/Fall Times Q (20% - 80%)	100		350	100		350	100		350	100		350	ps

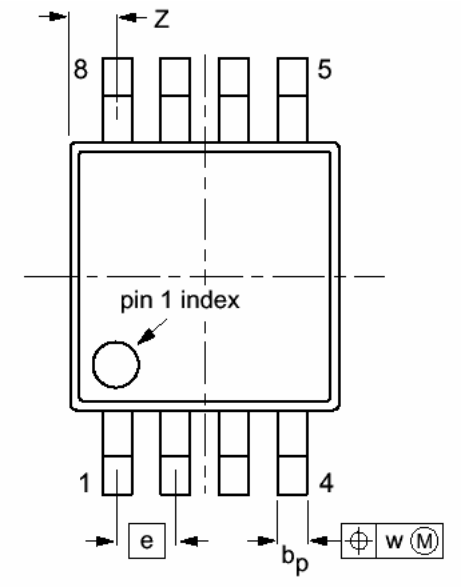
PACKAGE DIAGRAM
SOIC 8

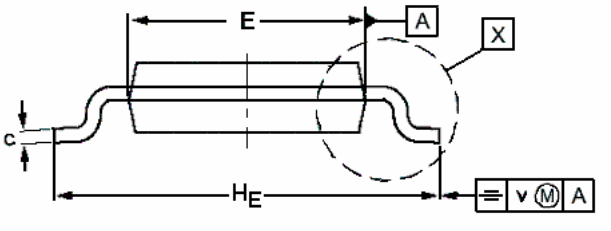


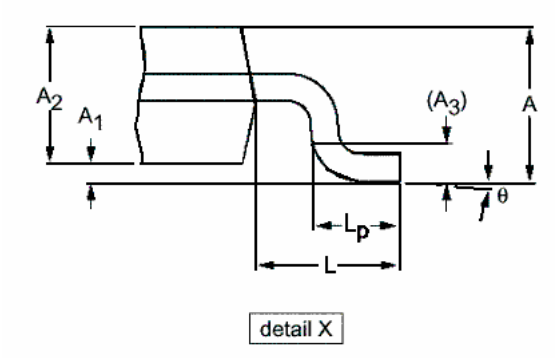
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A		1.75		0.069
A_1	0.10	0.25	0.004	0.010
A_2	1.25	1.45	0.049	0.057
A_3	0.25		0.01	
b_p	0.36	0.49	0.014	0.019
c	0.19	0.25	0.0075	0.0100
D	4.8	5.0	0.19	0.20
E	3.8	4.0	0.15	0.16
e	1.27		0.050	
H_E	5.80	6.20	0.228	0.244
L	1.05		0.041	
L_p	0.40	1.00	0.016	0.039
Q	0.60	0.70	0.024	0.028
v	0.25		0.01	
w	0.25		0.01	
y	0.10		0.004	
Z	0.30	0.70	0.012	0.028
θ	0^O	8^O	0^O	8^O

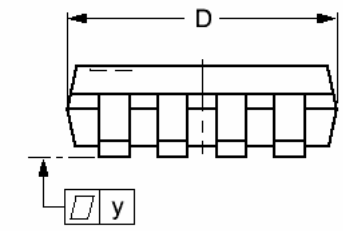
NOTES:
1. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
2. MAXIMUM MOLD PROTRUSION FOR D IS 0.15mm.
3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

PACKAGE DIAGRAM
TSSOP 8









NOTES:
1. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
2. MAXIMUM MOLD PROTRUSION FOR D IS 0.15mm.
3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

DIM	MILLIMETERS	
	MIN	MAX
A		1.10
A_1	0.05	0.15
A_2	0.80	0.95
A_3	0.25	
b_p	0.25	0.45
c	0.15	0.28
D	2.90	3.10
E	2.90	3.10
e	0.65	
H_E	4.70	5.10
L	0.94	
L_p	0.40	0.70
v	0.10	
w	0.10	
y	0.10	
Z	0.35	0.70
θ	0^O	6^O

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