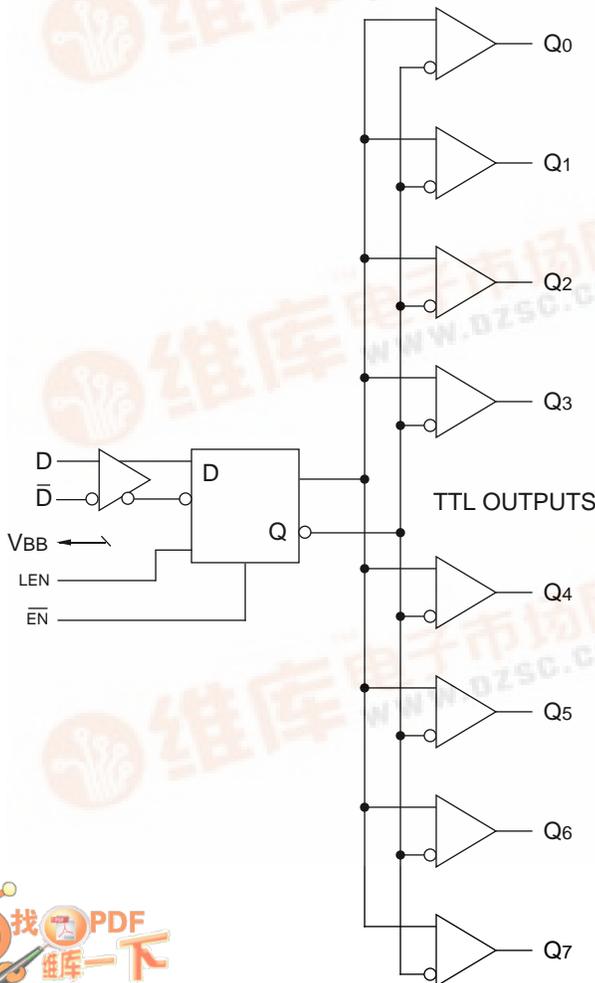# MICREL
The Infinite Bandwidth Company™

DUAL SUPPLY
OCTAL ECL-TO-TTL

ClockWorks™
SY100HA643

FEATURES

- ■ ECL/TTL version of popular ECLinPS™ E111
- ■ 400ps within device skew
- ■ 800ps part-to-part skew
- ■ Latch
- ■ Differential internal design
- ■ V_{BB} output
- ■ Dual supply
- ■ Reset/Enable
- ■ Multiple TTL and ECL power/ground pins
- ■ Fully compatible with Motorola MC100H643
- ■ Higher performance than H643 versions
- ■ Industrial temperature availability
- ■ Available in 28-pin PLCC package

BLOCK DIAGRAM

DESCRIPTION

The SY100HA643 is an enhanced dual supply, low skew translating 1:8 clock driver. Devices in the Micrel-Synergy H600 translators series utilize the 28-lead PLCC for optimal power pinning, signal flow through and electrical performance. The dual-supply HA643 is similar to the H641, which is a single-supply 1:9 version of the same function, with higher performance than the H643 versions.

The device features a 48mA TTL output stage, with AC performance specified into a 20pF load capacitance. A Latch is provided on-chip. When LEN is LOW (or left open, in which case it is pulled LOW by the internal pulldowns) the latch is transparent. A HIGH on the enable pin ($\overline{EN}$) forces all outputs LOW.

The 100HA643 is compatible with 100K ECL logic levels.

PIN CONFIGURATION
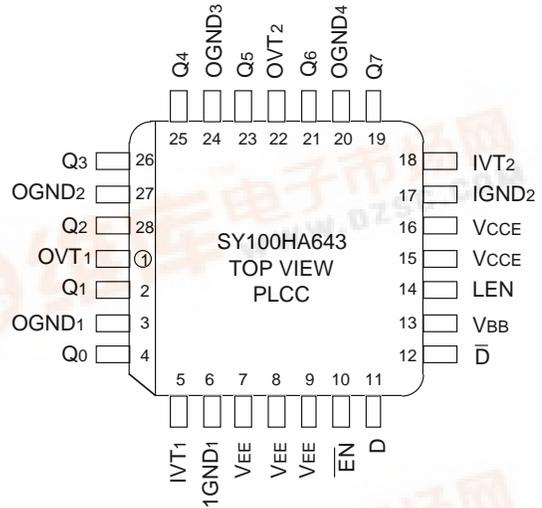
PIN NAMES

Pin	Function
OGND	TTL Output Ground (0V)
OVTTTL	Output V_{CC} (+5.0V)
IGND	Internal TTL GND (0V)
IVT	Internal TTL V_{CC} (+5.0V)
V_{EE}	ECL V_{EE} (-5.2/-4.5V)
VCCE	ECL Ground (0V)
D, $\overline{D}$	Signal Input (ECL)
V_{BB}	V_{BB} Reference Output
Q0 - Q7	Signal Outputs (TTL)
$\overline{EN}$	Enable Input (ECL)
LEN	Latch Enable Input (ECL)

TRUTH TABLE

D	LEN	$\overline{\text{EN}}$	Q
L	L	L	L
H	L	L	H
X	X	H	L

DC CHARACTERISTICS

IVT = OVT = 5.0V ±5%; V_{EE} = –4.2V to –5.5V; V_{CCE} = GND

Symbol	Parameter		T_A = –40°C		T_A = 0°C		T_A = +25°C		T_A = +85°C		Unit	Condition
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
I_{EE}	Power Supply	ECL	—	58	—	58	—	58	—	58	mA	V_{EE} Pins
I_{CCL}		TTL	—	83	—	83	—	83	—	83	mA	Total all OVT
I_{CCH}			—	73	—	73	—	73	—	73	mA	and IVT pins
V_{OH}	TTL Output HIGH		2.5	—	2.5	—	2.5	—	2.5	—	V	I_{OH} = –3.0mA
	Voltage		2.0	—	2.0	—	2.0	—	2.0	—		I_{OH} = –15mA
V_{OL}	TTL Output LOW Voltage		—	0.5	—	0.5	—	0.5	—	0.5	V	I_{OL} = 48mA
I_{OS}	TTL Output Short Circuit Current		–80	–200	–80	–200	–80	–200	–80	–200	mA	V_{OUT} = 0V
I_{IH}	ECL Input HIGH Current		—	225	—	225	—	175	—	175	µA	
I_{IL}	ECL Input LOW Current		0.5	—	0.5	—	0.5	—	0.5	—	µA	
V_{IH}	ECL Input HIGH Voltage		—	—	–1165	–880	–1165	–880	–1165	–880	mV	
V_{IL}	ECL Input LOW Voltage		—	—	–1810	–1475	–1810	–1475	–1810	–1475	mV	
V_{BB}	ECL Output Reference Voltage		–1380	–1260	–1380	–1260	–1380	–1260	–1380	–1260	mV	

AC CHARACTERISTICS

IVT = OVT = 5.0V ±5%; V_{EE} = −4.2V to −5.5V ; V_{CCE} = GND

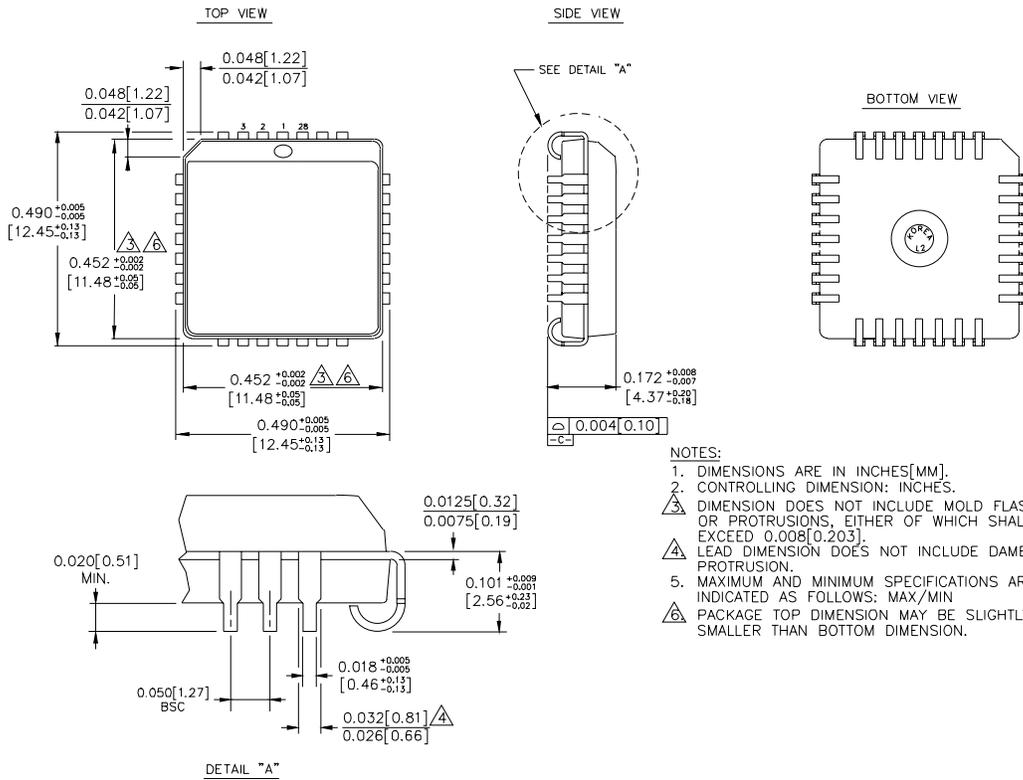| Symbol	Parameter	TA = −40°C		TA = 0°C		TA = +25°C		TA = +85°C		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
I_{IH}	Propagation Delay to Output D $\overline{LEN}$ $\overline{EN}$	2.3	3.1	2.3	3.1	2.3	3.1	2.3	3.1	ns	C_L = 20pF
t_{skew}	Within-Device Skew(1)	—	0.4	—	0.4	—	0.4	—	0.4	ns	
t_{PW}	Pulse Width Out(2) HIGH or LOW @ FOUT = 100MHz	4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5	ns	C_L = 20pF
t_S	Setup Time D	0.75	—	0.75	—	0.75	—	0.75	—	ns	
t_H	Hold Time D	0.75	—	0.75	—	0.75	—	0.75	—	ns	
t_{RR}	Recovery Time $\overline{LEN}$ $\overline{EN}$	1.25 1.25	— —	1.25 1.25	— —	1.25 1.25	— —	1.25 1.25	— —	ns ns	
t_{PW}	Minimum Pulse $\overline{LEN}$ Width $\overline{EN}$	1.5 1.5	— —	1.5 1.5	— —	1.5 1.5	— —	1.5 1.5	— —	ns ns	
t_r t_f	Rise / Fall times 0.8V — 2.0V	—	1.5	—	1.5	—	1.5	—	1.5	ns	C_L = 20pF
f_{MAX}	Max. Input Frequency(3,4)	160	—	160	—	160	—	160	—	MHz	C_L = 20pF

NOTES:

1. Within-Device skew defined as identical transitions on similar paths through a device.

2. Pulse width is defined relative to 1.5V measurement points on the output waveform.

3. Frequency at which output levels will meet a 0.8V to 2.0V minimum swing.

4. The f_{MAX} value is specified as the minimum guaranteed maximum frequency. Actual operational maximum frequency may be greater.

PRODUCT ORDERING CODE

Ordering Code	Package Type	Operating Range	Ordering Code	Package Type	Operating Range
SY100HA643JC	J28-1	Commercial	SY100HA643JI	J28-1	Industrial
SY100HA643JCTR	J28-1	Commercial	SY100HA643JITR	J28-1	Industrial

28 LEAD PLCC (J28-1)

TOP VIEW

SIDE VIEW

BOTTOM VIEW

0.048[1.22]
0.042[1.07]

0.048[1.22]
0.042[1.07]

SEE DETAIL "A"

3 2 1 28

0.490 +0.005 −0.005
[12.45 +0.13 −0.13]

0.452 +0.002 −0.002
[11.48 +0.05 −0.05]

0.452 +0.002 −0.002
[11.48 +0.05 −0.05]

0.490 +0.005 −0.005
[12.45 +0.13 −0.13]

0.172 +0.008 −0.007
[4.37 +0.20 −0.18]

0.004[0.10]

KOREA

NOTES:
1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.008[0.203].
4. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
5. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX/MIN
6. PACKAGE TOP DIMENSION MAY BE SLIGHTLY SMALLER THAN BOTTOM DIMENSION.

0.0125[0.32]
0.0075[0.19]

0.020[0.51]
MIN.

0.101 +0.009 −0.001
[2.56 +0.23 −0.02]

0.018 +0.005 −0.005
[0.46 +0.13 −0.13]

0.050[1.27]
BSC

0.032[0.81]
0.026[0.66]

DETAIL "A"

Rev. 03