

**FEATURES**

- ECL/TTL version of popular ECLinPS™ E111
- 400ps within device skew
- 800ps part-to-part skew
- Latch
- Differential internal design
- V<sub>BB</sub> output
- Dual supply
- Reset/Enable
- Multiple TTL and ECL power/ground pins
- Choice of ECL compatibility: MECL 10H (10Hxxx) or 100K (100Hxxx)
- Fully compatible with Motorola MC10H643/100H43
- Higher performance than H643 versions
- Industrial temperature availability

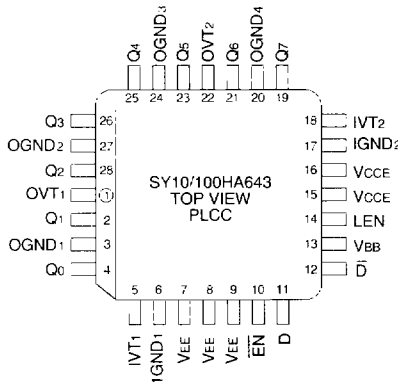
**DESCRIPTION**

The SY10/100HA643 are enhanced dual supply, low skew translating 1:8 clock drivers. Devices in the 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.

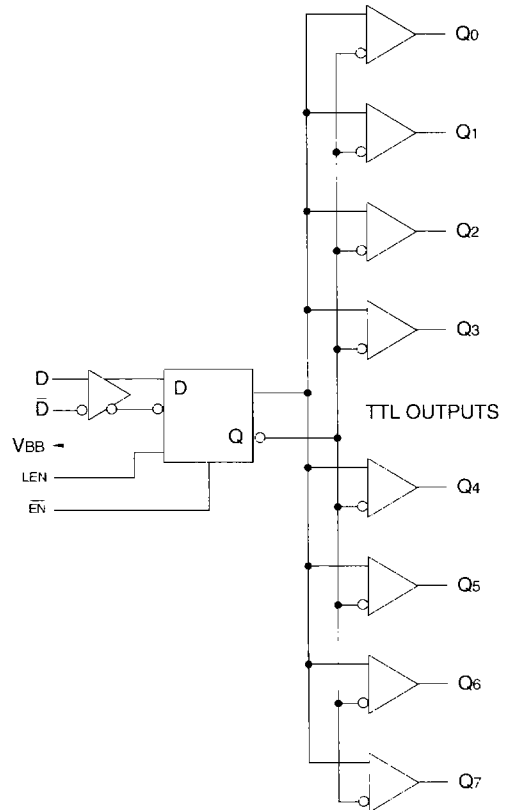
The device features a 48mA TTL output stage, with AC performance specified into a 20pF load capacitance. A Latch is provided on-chip. When LEN is LOW (or left open, in which case it is pulled LOW by the internal pulldowns) the latch is transparent. A HIGH on the enable pin (EN) forces all outputs LOW.

The 10HA version is compatible with 10K ECL logic levels. The 100HA version is compatible with 100K levels.

**PIN CONFIGURATION**



**BLOCK DIAGRAM**



**PIN NAMES**

Pin	Function
OGND	TTL Output Ground (0V)
OVT	TTL Output Vcc (+5.0V)
IGND	Internal TTL GND (0V)
IVT	Internal TTL Vcc (+5.0V)
VEE	ECL VEE (-5.2/-4.5V)
VCC1	ECL Ground (0V)
D, D-bar	Signal Input (ECL)
VBB	VBB Reference Output
Q0 - Q7	Signal Outputs (TTL)
EN	Enable Input (ECL)
LEN	Latch Enable Input (ECL)

**TRUTH TABLE**

D	LEN	EN	Q
L	L	L	L
H	L	L	H
X	X	H	Q <sub>0</sub>
X	X	H	L

**TTL DC CHARACTERISTICS**

IVT = OVT = 5.0V ±5%

Symbol	Parameter	TA = -40°C		TA = 0°C		TA = +25°C		TA = +85°C		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
V <sub>OH</sub>	Output HIGH Voltage	2.5	—	2.5	—	2.5	—	2.5	—	V	I <sub>OH</sub> = -3.0mA I <sub>OH</sub> = -15mA
V <sub>OL</sub>	Output LOW Voltage	—	0.5	—	0.5	—	0.5	—	0.5	V	I <sub>OL</sub> = 48mA
I <sub>OS</sub>	Output Short Circuit Current	-80	-200	-80	-200	-80	-200	-80	-200	mA	V <sub>OUT</sub> = 0V

**10H ECL DC CHARACTERISTICS**

 IVT = OVT = 5.0V ±5%; V<sub>EE</sub> = -4.75V to -5.5V (10H Version)

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 <sub>IH</sub>	Input HIGH Current	—	—	—	225	—	175	—	175	μA	
I <sub>IL</sub>	Input LOW Current	—	—	0.5	—	0.5	—	0.5	—	μA	
V <sub>IH</sub>	Input HIGH Voltage	—	—	-1170	-840	-1130	-810	-1070	-735	mV	
V <sub>IL</sub>	Input LOW Voltage	—	—	-1950	-1480	-1950	-1480	-1950	-1450	mV	
V <sub>BB</sub>	Output Reference Voltage	—	—	-1380	-1270	-1350	-1250	-1310	-1190	mV	

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**100H ECL DC CHARACTERISTICS**

 IVT = OVT = 5.0V ±5%; V<sub>EE</sub> = -4.2V to -5.5V (100H Version)

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 <sub>IH</sub>	Input HIGH Current	—	225	—	225	—	175	—	175	μA	
I <sub>IL</sub>	Input LOW Current	0.5	—	0.5	—	0.5	—	0.5	—		
V <sub>IH</sub>	Input HIGH Voltage	—	—	-1165	-880	-1165	-880	-1165	-880	mV	
V <sub>IL</sub>	Input LOW Voltage	—	—	-1810	-1475	-1810	-1475	-1810	-1475		
V <sub>BB</sub>	Output Reference Voltage	-1380	-1260	-1380	-1260	-1380	-1260	-1380	-1260	mV	

## DC CHARACTERISTICS

IVT = OVT = 5.0V ±5%; VEE = -4.75V to -5.5V (10H Version); VEE = -4.2V to -5.5V (100H Version)

Symbol	Parameter		TA = -40°C		TA = 0°C		TA = +25°C		TA = +85°C		Unit	Condition
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
IEE	Power Supply	ECL	—	58	—	58	—	58	—	58	mA	VEE Pins
ICCL		TTL	—	83	—	83	—	83	—	83	mA	Total all OVT
ICCH			—	73	—	73	—	73	—	73	mA	and IVT pins

## AC CHARACTERISTICS

IVT = OVT = 5.0V ±5%; VEE = -4.75V to -5.5V (10H Version); -4.2V to -5.5V (100H Version); VCC = 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.		
t <sub>ih</sub>	Propagation Delay to Output D LEN EN		2.3	3.1	2.3	3.1	2.3	3.1	2.3	3.1	ns	CL = 20pF
t <sub>skew</sub>	Within-Device Skew <sup>(1)</sup>		—	0.4	—	0.4	—	0.4	—	0.4	ns	
t <sub>pw</sub>	Pulse Width Out <sup>(2)</sup> HIGH or LOW @ FOUT = 100MHz		4.5	5.5	4.5	5.5	4.5	5.5	4.5	5.5	ns	CL = 20pF
t <sub>s</sub>	Setup Time	D	0.75	—	0.75	—	0.75	—	0.75	—	ns	
t <sub>h</sub>	Hold Time	D	0.75	—	0.75	—	0.75	—	0.75	—	ns	
t <sub>rr</sub>	Recovery Time	LEN EN	1.25 1.25	— —	1.25 1.25	— —	1.25 1.25	— —	1.25 1.25	— —	ns ns	
t <sub>pw</sub>	Minimum Pulse Width	LEN EN	1.5 1.5	— —	1.5 1.5	— —	1.5 1.5	— —	1.5 1.5	— —	ns ns	
t <sub>r</sub> t <sub>f</sub>	Rise / Fall times 0.8V — 2.0V		—	1.5	—	1.5	—	1.5	—	1.5	ns	CL = 20pF
f <sub>max</sub>	Max. Input Frequency <sup>(3,4)</sup>		160	—	160	—	160	—	160	—	MHz	CL = 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<sub>max</sub> 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
SY10HA643JC	J28-1	Commercial
SY10HA643JCTR	J28-1	Commercial
SY100HA643JC	J28-1	Commercial
SY100HA643JCTR	J28-1	Commercial
SY10HA643JI	J28-1	Industrial
SY10HA643JITR	J28-1	Industrial
SY100HA643JI	J28-1	Industrial
SY100HA643JITR	J28-1	Industrial