

# LVHSTL TO CMOS CLOCK DIVIDER

# ICS558-02

## Description

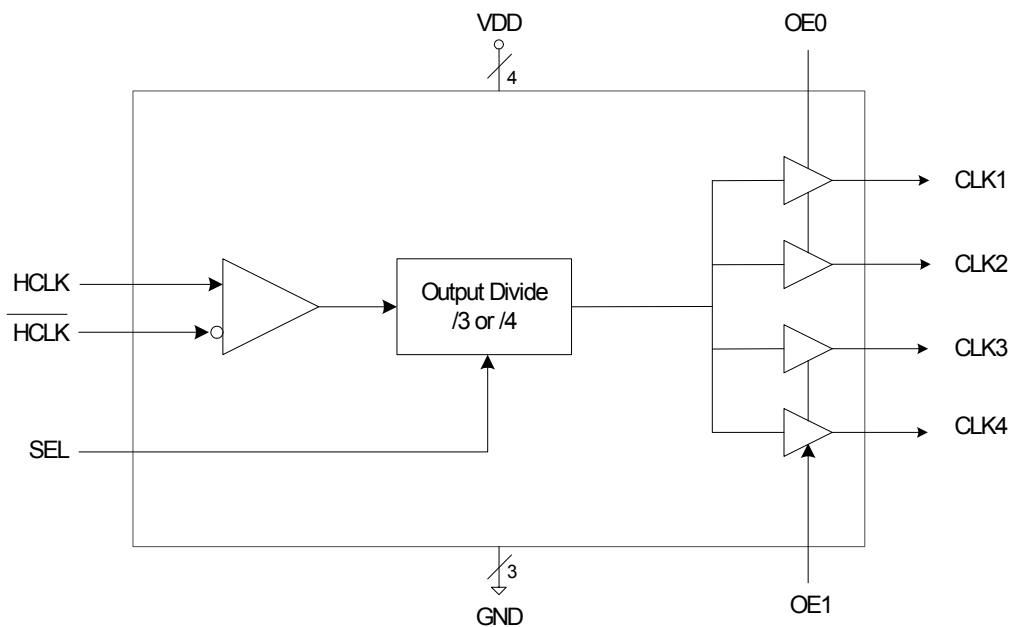
The ICS558-02 accepts a high-speed LVHSTL input and provides four CMOS low skew outputs from a selectable internal divider (divide by 3, divide by 4). The four outputs are split into two banks of two outputs. Each bank has a separate output enable to tri-state the output buffers.

The ICS558-02 is a member of the ICS Clock Blocks™ family of clock generation, synchronization, and distribution devices.

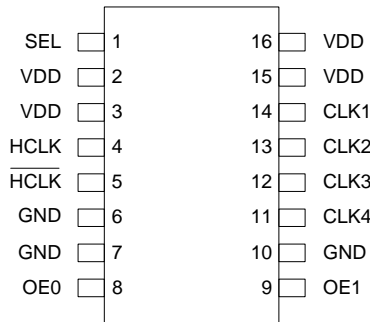
## Features

- 16-pin TSSOP package
- LVHSTL inputs
- Accepts up to 250 MHz input frequency
- Four low skew (<250 ps) outputs
- Selectable internal divider of 3 or 4
- Operating voltage of 3.3 V

## Block Diagram



## Pin Assignment



16 Pin 173 Mil (0.65mm) TSSOP

## Tri-State Table

OE1	OE0	CLK 1, CLK 2	CLK 3, CLK 4
0	0	Tri-state	Tri-state
0	1	Clock ON	Tri-state
1	0	Tri-state	Clock ON
1	1	Clock ON	Clock ON

## Output Divide Selection

SEL	Output Divide
0	/3
1	/4

## Pin Descriptions

Pin Number	Pin Name	Pin Type	Pin Description
1	SEL	Input	Select pin for output divider. See table above. Internal pull-up to VDD.
2	VDD	Power	Connect to +3.3 V.
3	VDD	Power	Connect to +3.3 V.
4	HCLK	Input	Differential LVHSTL input (true input).
5	HCLK	Input	Differential LVHSTL input (complimentary input).
6	GND	Power	Connect to ground.
7	GND	Power	Connect to ground.
8	OE0	Input	Output enable for CLK1 and CLK2. See table above. Internal pull-up to VDD.
9	OE1	Input	Output enable for CLK3 and CLK4. See table above. Internal pull-up to VDD.
10	GND	Power	Connect to ground.
11	CLK4	Output	Low skew clock output.
12	CLK3	Output	Low skew clock output.
13	CLK2	Output	Low skew clock output.
14	CLK1	Output	Low skew clock output.
15	VDD	Power	Connect to +3.3 V.
16	VDD	Power	Connect to +3.3 V.

## Absolute Maximum Ratings

Stresses above the ratings listed below can cause permanent damage to the ICS558-02. These ratings, which are standard values for ICS commercially rated parts, are stress ratings only. Functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods can affect product reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.

Item	Rating
Supply Voltage	4.6 V
All Inputs and Outputs	-0.5 V to VDD+0.5 V
Ambient Operating Temperature	0 to +70 °C
Storage Temperature	-65 to +150 °C
Junction Temperature	125 °C
Soldering Temperature	260 °C

## Recommended Operation Conditions

Parameter	Min.	Typ.	Max.	Units
Ambient Operating Temperature	0		+70	°C
Power Supply Voltage (measured in respect to GND)	+3.15	+3.3	+3.5	V

## DC Electrical Characteristics

VDD=3.3 V ±5%, Ambient temperature 0 to +70°C, unless stated otherwise stated.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Operating Voltage	VDD		3.135	3.3	3.465	V
Operating Supply Current	IDD	No load, 100 MHz		60		mA
Input High Voltage	V <sub>IH</sub>	OE pins	VDD-0.5		VDD	V
Input Low Voltage	V <sub>IL</sub>	OE pins			0.5	V
Input High Voltage	V <sub>IH</sub>	HCLK	V <sub>x</sub> + 0.1		1.2	V
Input Low Voltage	V <sub>IL</sub>	HCLK	-0.3		V <sub>x</sub> - 0.1	V
Peak to Peak Input Voltage		HCLK	0.3		1.0	V
HCLK Input Leakage Current	I <sub>IL</sub>		-20		20	µA
Input Common Mode Voltage	V <sub>x</sub>	Input Common Mode	0.68		0.90	V
Output High Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -14.5 mA	2.4			V
Output Low Voltage	V <sub>OL</sub>	I <sub>OL</sub> = 9.4 mA			0.4	V
Nominal Output Impedance	Z <sub>O</sub>			20		W
Internal Pull-up Resistor	R <sub>PU</sub>			250		kΩ
Input Capacitance	C <sub>IN</sub>			7		pF

## AC Electrical Characteristics

VDD = 3.3 V  $\pm$ 5%, Ambient Temperature 0 to +70°C, unless stated otherwise stated.

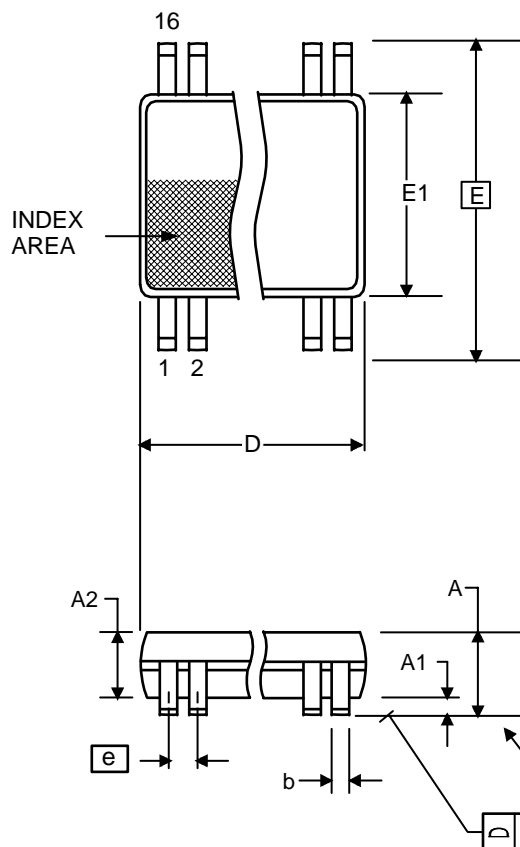
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input Frequency			0		250	MHz
Output Rise Time	$t_{OR}$	0.4 to 2.4 V, $C_L=30$ pF	0.5	1.1	2.0	ns
Output Fall Time	$t_{OF}$	2.4 to 0.4 V, $C_L=30$ pF	0.5	1.0	2.0	ns
Skew (between any two output clocks)		30 pF load		0	250	ps
Propagation Delay				9	12	ns
Output Clock Duty Cycle		at VDD/2, $C_L=30$ pF	45	50	55	%

## Thermal Characteristics (16-pin TSSOP)

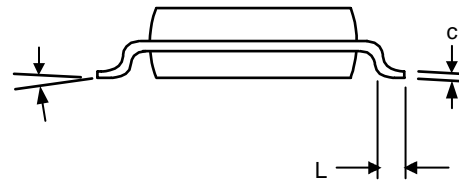
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Thermal Resistance Junction to Ambient	$\theta_{JA}$	Still air		78		°C/W
	$\theta_{JA}$	1 m/s air flow		70		°C/W
	$\theta_{JA}$	3 m/s air flow		68		°C/W
Thermal Resistance Junction to Case	$\theta_{JC}$			37		°C/W

## Package Outline and Package Dimensions (16-pin TSSOP, 4.40 mm Body, 0.65 mm Pitch)

Package dimensions are kept current with JEDEC Publication No. 95, MO-153



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	--	1.20	--	0.047
A1	0.05	0.15	0.002	0.006
A2	0.80	1.05	0.032	0.041
b	0.19	0.30	0.007	0.012
C	0.09	0.20	0.0035	0.008
D	4.90	5.1	0.193	0.201
E	6.40 BASIC		0.252 BASIC	
E1	4.30	4.50	0.169	0.177
e	0.65 Basic		0.0256 Basic	
L	0.45	0.75	0.018	0.030
a	0°	8°	0°	8°
aaa	--	0.10	--	0.004



## Ordering Information

Part / Order Number	Marking (both)	Shipping packaging	Package	Temperature
558G-02	ICS558G-02	Tubes	16-pin TSSOP	0 to 70° C
558G-02T	ICS558G-02	Tape and Reel	16-pin TSSOP	0 to 70° C

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