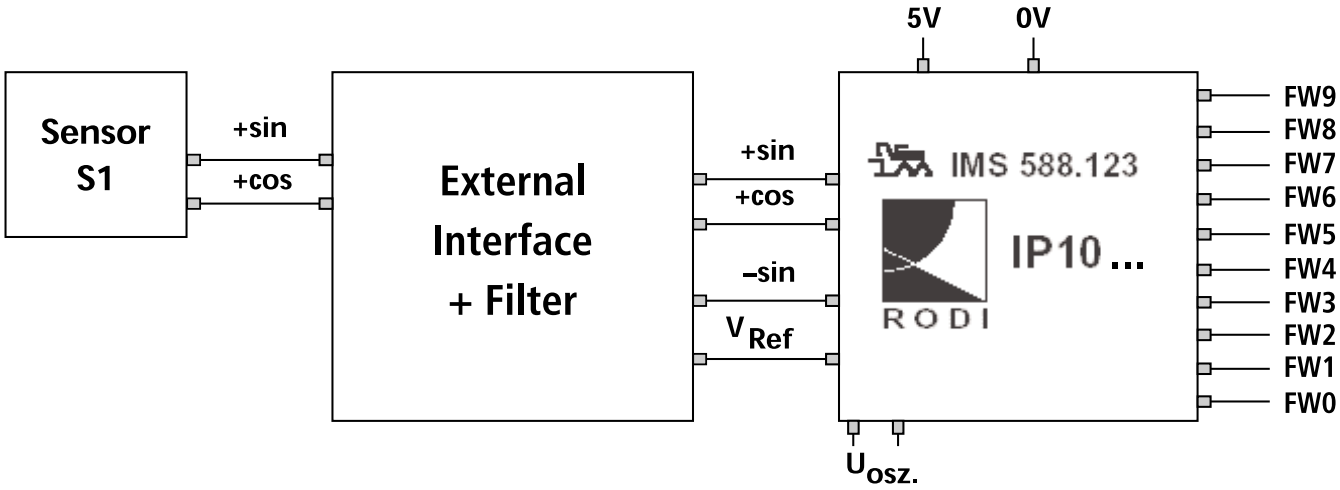
Short Data Sheet ARIMS® - Interpolator IP10, IP10S

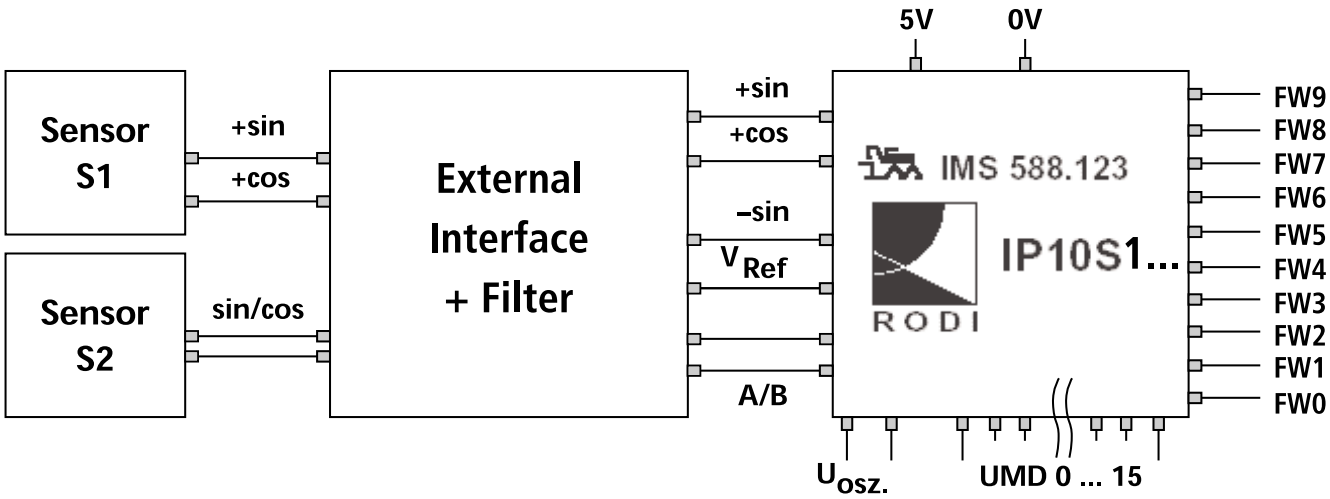
1. Features

Unique real time precision Interpolator (patented) for linear and rotational position measurement

- Interpolation in full resolution of 10 Bit by clock frequency higher than 20 MHz
- Measurement speed higher than 16 m/sec with 1 µm resolution
- Possible integration of Interpolator with Digital Logic in Gate Array or Asic
- Parallel binary output of 10 Bit (≦50 n sec)
- Optionaly Serial-Output of A/B/R-Quadrature-Signals with Sensor-Frequency up to 10 kHz
- Optional Device for 3 Phase-Brushless-Motor (2, 4 ... pol) commutating (I,II,III) and Quadrature-Signals (A/B/R)

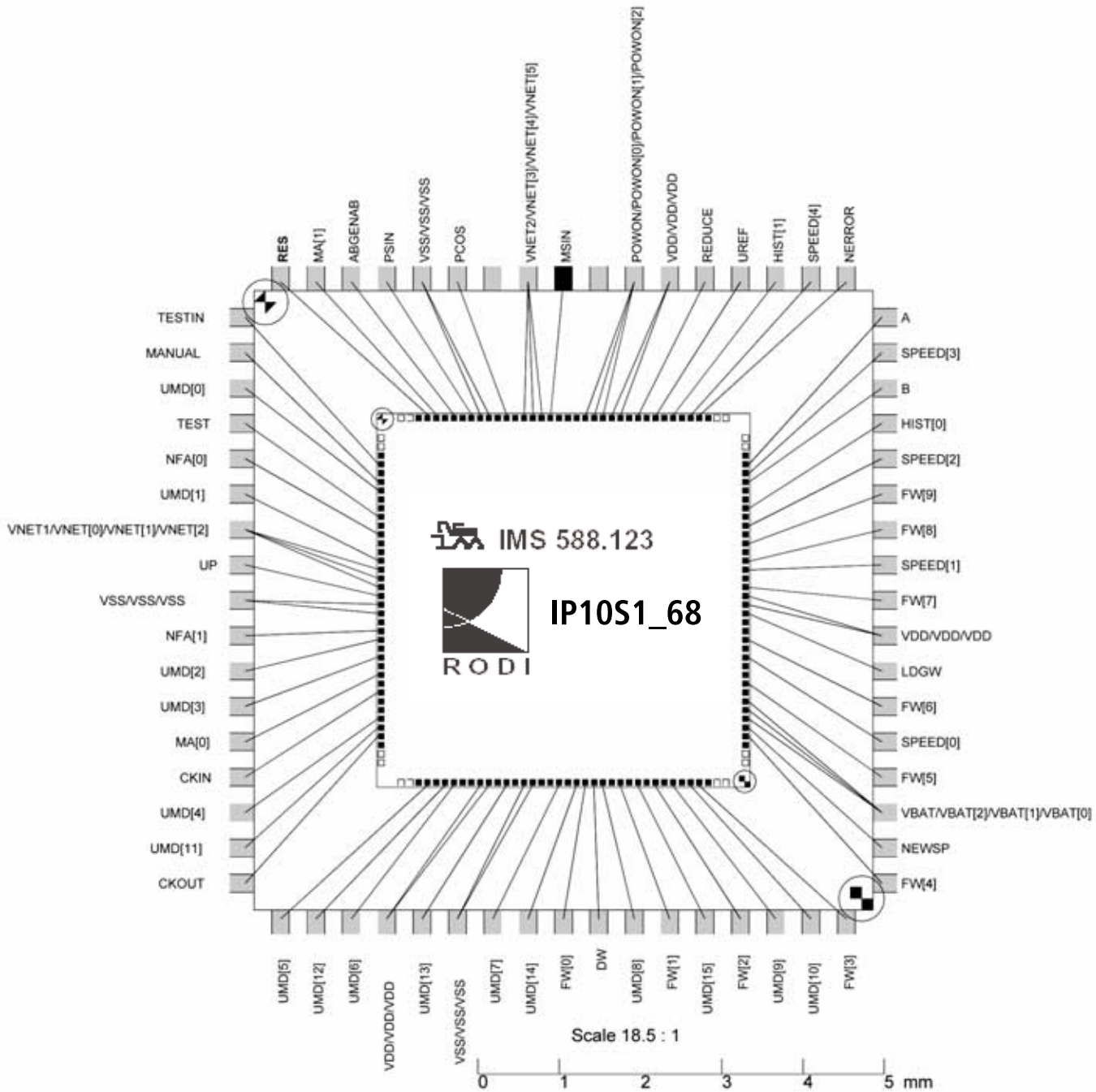
2. Block Diagram





3. PIN Configuration and Bondplan

3.1. IP 10S1_68



Bond wire length:

minimum: 1.6 mm (65 mils)

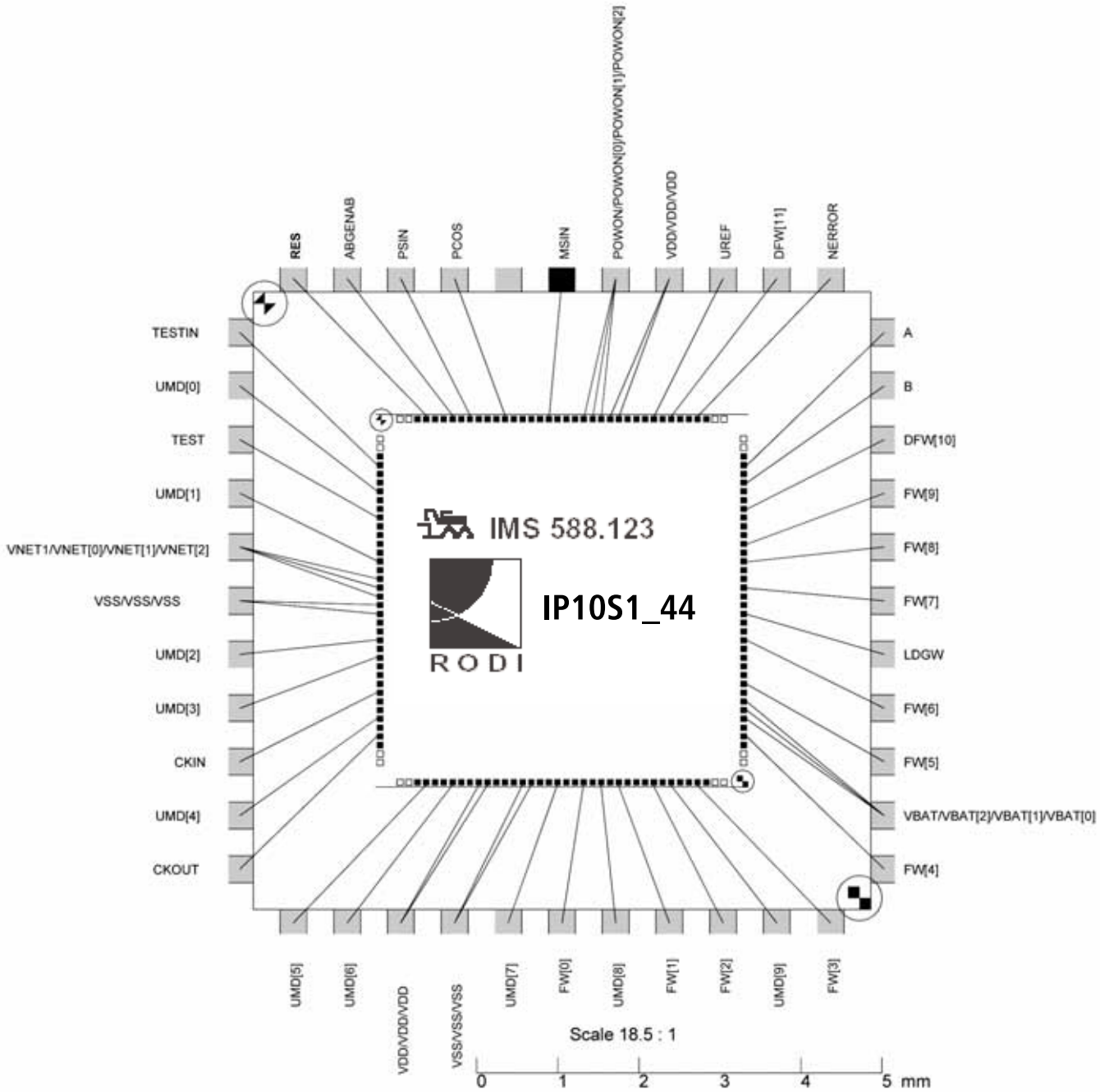
maximum: 2.4 mm (96 mils)

Chip step size:

4800 x 4800 μm^2 (188.98 x 188.98 sq.mils)

PACKAGE: CLCC68

3.2. IP 10S1_44

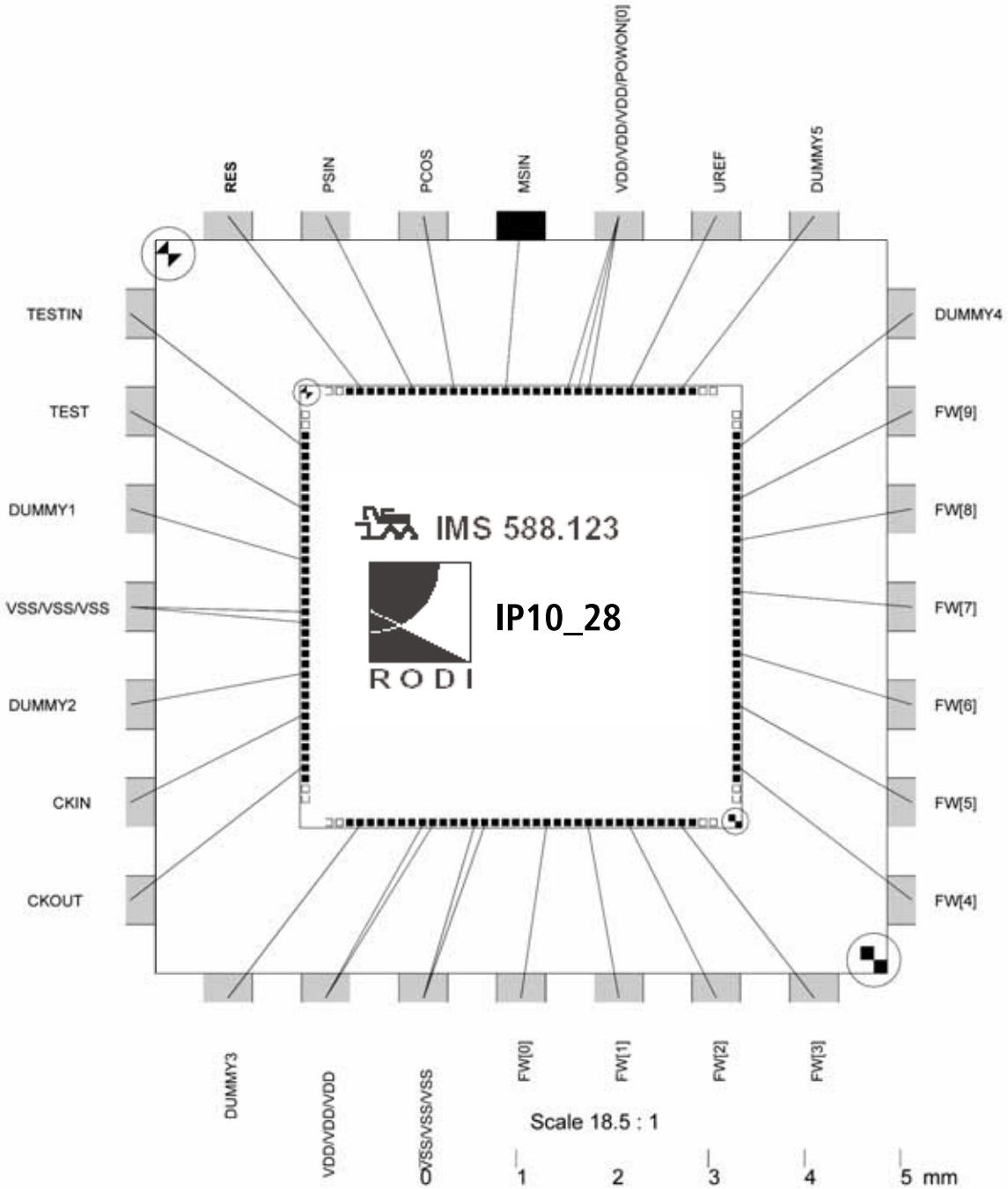


Bond wire length:
minimum: 1.7 mm (67 mils)
maximum: 2.4 mm (93 mils)

Chip step size:
4800 x 4800 μm^2 (188.98 x 188.98 sq.mils)

PACKAGE: CLCC44

3.3. IP 10_28



Bond wire length:
minimum: 1.8 mm (70 mils)
maximum: 2.3 mm (89 mils)

Chip step size:
4800 x 4800 μm^2 (188.98 x 188.98 sq.mils)

PACKAGE: CLCC28

4. PIN Description

Signal name	Pin	Type	Applied signal	Function
PCOS	1	input	analog	analog voltage from sensor
PSIN	2	input	analog	analog voltage from sensor
POWON	3	power	5V	supply voltage mains (mandatory)
UP	4	output		counting upwards
DW	5	output		counting downwards
NABGL	7	Input	active Low	(re-)start offset calibration
TESTIN	8	input	active High	for test purposes
RES	9	input	active High	RESET
HIST(1:0)	10-11	input		hysteresis (0 to 3)
REDUCE	12	input	active High	maximum resolution after change direction
MANUAL	13	input	active High	use manual resolution
VNET1	14	power	5V	supply voltage mains
NFA(1:0)	16,17	input		resolution in manual mode (0 to 3)
MA(1:0)	18,19	output		actual resolution (auto Mode)
SPEED(4:0)	20-24	output		actual speed in angle units
NEWSP	25	output		speed is updated
UMD(15:0)	26-43	bidir		rotation count
FW(9:0)	44-53	output		angular value
TEST	54	input	active High	for test purposes
VNET2	56	power	5V	supply voltage mains
CKIN	57	input	clock	clock input
CKOUT	58	output		inverting clock output
A	59	input	active High	digital A/B sensor input
B	60	input	active High	digital A/B sensor input
NERROR	61	output		ERROR during rotation count
LDGW	62	input	active High	load rotation count
VBAT	64	power		supply voltage battery
UREF	65	input	2.5 V	reference voltage for sensor
MSIN	68	input	analog	analog voltage from sensor
VDDint	6, 34, 66	power	C vs. VSS / 5V	internal supply voltage
VSS	15, 35, 55	power	0V	common ground

5. Elecrical Characterisitcs

5.1. Absolut Maximum Ratings

Parameter	Symbol	Limit values		Unit
		min.	max.	
Supply voltage	V_{DD}	- 0.3	+ 7.0	V
Input voltage	V_I	- 0.3	V_{DD}+0.3	V
Output voltage	V_O	- 0.3	V_{DD}+0.3	V
Input clamp current	I_{IK}	- 20	+ 20	mA
Output clamp current	I_{OK}	- 20	+ 20	mA
Junction temperature [1)]	T_J	- 40	+ 150	°C
Storage temperature	T_{STG}	- 65	+ 150	°C

1) *During operation*

5.2. Operating Conditions

Parameter (Condition)	Symbol	Limit values		Unit
		min.	max.	
DC supply voltage(V_{SS} = 0V)	V_{DD}	4.75	5.5	V
DC supply voltage Batterie (V_{SS} = 0V)	V_{DD}	2.75	5.5	V
Input voltage	V_I	0	V_{DD}	V
Output voltage	V_O	0	V_{DD}	V
Input transition time	t_r, t_f	0	10	ns
Junction temperature [1)]	T_J	0	100	°C

1) *The corresponding ambient temperature (T_A) results from power dissipation and packaging specification.*

5.3. Electrical Signal

- Digital Signals

Parameter (Condition)	Symbol	Limit values min.	Limit values max.	Unit
Static current consumption $V_I = V_{DD}$ or V_{SS}	I_{DDS}	-	5	mA
Input leakage current	I_{IL}, I_{IH}	-	10000	nA/pad
Input current				
Input low (pullup)	I_{IPL}	50	200	µA
Input high (pulldown)	I_{IPH}	50	200	µA
Input low voltage CMOS Input	V_{ILC}	-	1.0	V
Input high voltage CMOS Input	V_{IHC}	4.0	-	V
Output low voltage	V_{OL}			
4mA drive option (I_{OL} = 4mA)[2)]		-	0.4	V
12mA drive option (I_{OL} = 12mA)		-	0.4	V
Output high voltage	V_{OH}			
4mA drive option (I_{OH} = 4mA)[2)]		V_{DD} - 0.5	-	V
12mA drive option (I_{OH}=12mA)		V_{DD} - 0.5	-	V

[2)] *Maximum output frequency 20 MHz, due to tester limitations*

- Analog Inputs

$U_{Ref\ INT.}$ = 2.5 V ± 0.1 V ; Reference Voltage for Interpolator

$U_{Ref\ SENSOR}$ (= $U_{Ref\ INT.}$) ; Reference Voltage for Sensor

$U_{SIN/COS}$ = $U_{Ref} + U_0 \sin(\omega t) + U_{Roff}$; $U_{Roff} = U_{Ref\ INT.} - U_{Ref\ SENSOR}$

with U_0 = 1,5 to 2.0 V (0,5 ... 2V) ; U_0 = Amplitude of SIN/COS-Sensor Signal

and $|U_{Roff}| \leq 1.5$ mV Difference of $U_{Ref\ INT}$ to $U_{Ref\ SENSOR}$

$\omega/2\Pi \leq 10$ kHz Sensor Signal Frequency

6. Ordering Information for Customer

- Delivery of first 10 Samples
- Higher Volume takes about 9 weeks after ordering

7. Price/Initial Cost

- For more information please contact

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