

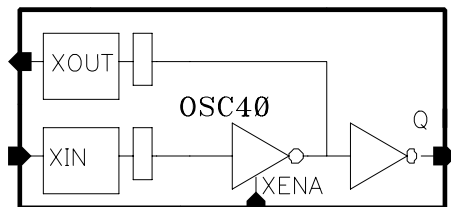
## Process

C35 (0.35 $\mu$ m)

## Key Features

- Small Area 0.070 mm<sup>2</sup>
- Size x = 210  $\mu$ m, y = 335  $\mu$ m
- Supply Voltage 3.0 to 3.6V
- T<sub>junction</sub> -40 to 125°C
- Power Down Mode
- Internal capacitors
- Pad limited layout

## Symbol



## Description

OSC40 is a quartz crystal oscillator for a frequency range from 20 MHz to 40 MHz. ESD Protection (typ. 200 Ohm) and Load Capacitors (typ. 3pF) are included in the cell.

When using a quartz crystal, connect it to the pins XIN and XOUT.

OSC40 may also be driven by a signal at XIN without using a quartz crystal.

For loads > 1pF an additional driver at Q is needed!

## Pinlist

Pin	Description	Type
Q	Oscillator Output	Digital
XIN	Crystal Terminal In	Digital
XOUT	Crystal Terminal Out	Digital
XENA	Enable Not	Digital

**TECHNICAL DATA FOR 3.3V SUPPLY**(T<sub>junction</sub> = -40 to 125°C, VDDA=+3.0V to +3.6V, unless otherwise specified)**POWER REQUIREMENTS**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VDD	Pos. Digital Supply Voltage		3.0	3.3	3.6	V
VSS	Neg. Digital Supply Voltage		0	0	0	V
IDD	Supply Current Digital	40MHz		600	750	μA
Pdiss_tot	Total Power Consumption	40MHz		2	2.7	mW

**DC PARAMETERS**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Gm	Small Signal Trans Conductance		1.55	2.88	5	mS
Rds	Small Signal Output Resistance		3.3	8.52	21.9	kOhm

**TRANSIENT PARAMETERS**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
TR	Rise Time	unloaded	0.57	0.8	1.4	ns
KTR	Rise Scaling Factor		0.7	1.2	2.1	ns/pF
TF	Fall Time	unloaded	0.55	0.7	1.1	ns
KTF	Fall Scaling Factor		0.6	1.0	1.6	ns/pF

**TRUTH TABLE**

Inputs		Outputs	
XENA	XIN	XOUT	Q
High	X	X	Low
Low	Crystal	Crystal	Oscillating
Low	Low	Floating	Low
Low	High	Floating	High

**Gm results for typ. XTAL Data****HC49 XTAL DATA @ max Rds=21.9kOhm, R(ESD Protection)=200Ohm**

Frequency	Clod**	ESR	C0	CXTAL	Gm min	Gm opt	Gm max
[MHz]	[pF]	[Ohm]	[pF]	[fF]	$\mu\text{S}$	$\mu\text{S}$	$\mu\text{S}$
20	8.2+3*	50	7	1	1820	5970	28800
32	8.2+3*	50	4	0.7	4840	13000	51000
40	4.7+3*	50	4	0.5	4150	12300	27200

**HC49 XTAL DATA @ max Rds=21.9kOhm, R(ESD Protection)=200Ohm**

Frequency	Clod**	ESR	C0	CXTAL	Gm min	Gm opt	Gm max
[MHz]	[pF]	[Ohm]	[pF]	[fF]	$\mu\text{S}$	$\mu\text{S}$	$\mu\text{S}$
20	3*	50	7	1	495	1000	2300
32	3*	50	4	0.7	585	1800	7000
40	3*	50	4	0.5	991	2350	6200

**HC49 XTAL DATA @ max Rds=21.9kOhm, R(ESD Protection)=200Ohm**

Frequency	Clod**	ESR	C0	CXTAL	Gm min	Gm opt	Gm max
[MHz]	[pF]	[Ohm]	[pF]	[fF]	$\mu\text{S}$	$\mu\text{S}$	$\mu\text{S}$
40	3*	20	4	0.5	510	2350	18700

\* internal

\*\* Clod at XIN and XOUT

**Important Notes**

For proper working of the oscillator: Gm min (XTAL) must be at least 3 times lower (margin during start up) than Gm min (oscillator).

In order to verify the correct behavior of the oscillator, transient simulation (real equivalent circuit diagram of XTAL + oscillator) has to be done.

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