GENERAL PRODUCT SPECIFICATION

OSCILLATORS - PROGRAMMABLE

EUROQUARTZ

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SPG SERIES

8 pin Dual-in-Line
PROGRAMMABLE OSCILLATORS

- 57 frequencies programmable from one device
- Low current consumption
- Readily mounted 16 pin DIP

General Specification

Frequency range:	0.00027Hz to 1.0MHz
Supply Voltage (Vdd-GND):	±-0.3V to -7.0V max.
Operating Voltage:	5.0V±0.5V
Temperature Range	
Operating:	-10° to +70°C
Storage:	-55° to +125°C
Soldering Conditions:	Under 260°C within 10s.
Supply current:	2mA max.
Frequency/Temperature:	-10°/-120ppm
Ageing:	±5ppm/year max.

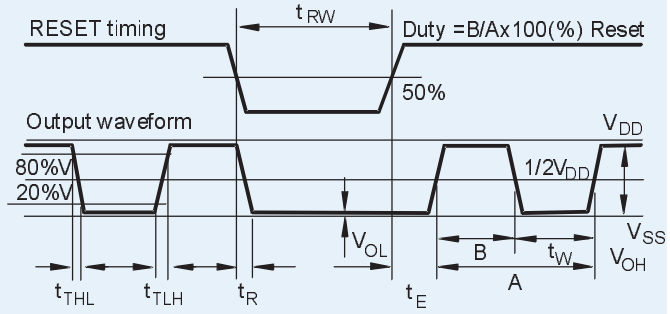
Electrical Specification

Item	Symb.	min.	typ.	max.	Unit
L.input voltage:	V_{IL}	0		0.8	V
H.input voltage:	V_{IH}	V_{DD}-10		V_{DD}	V
L. input current (Reset):	I_{RL}	-30		-5	µA
				(Reset = V_{SS})	
H.input current (Reset):	I_{RH}			0.5	µA
				(Reset = V_{DD})	
L.i/p current (exc.Reset):	I_{IL}	-0.5			µA
H.i/p current (exc.Reset):	I_{IH}	5		30	µA
L.output voltage:	V_{OL}			0.4	V
				(I_{OL} = 1.6mA)	
H.output voltage:	V_{OH}	V_{DD}-10			V
				(I_{OH} = -40µA)	
L.output current:	I_{OL}	1.6			µA
				(V_{OL} = 0.4V)	
H.output current:	I_{OH}			-40	µA
				(V_{OH}=V_{DD}-1.0V)	
Output rise time:	t_{TLH}		30	60	µs
Output fall time:	t_{THL}		25	50	µs
Duty:		40		60	%
				(Except 1/3 and 1/5)	
Min. reset pulse width:	t_{RW}	1.0			µs
Reset delay time:	t_R			1.0	µs
Reset release sync. error:	t_E	t_w-1/2*		t_w**	µs
Ext. signal i/p frequency:	F_{IN}			1M	Hz
				(8640N only)	
Ext signal i/p pulse width:	t_{IN}	0.5			µs
				(8640N only)	
Osc. start-up time:	t_{OSC}		0.2	1***	s.

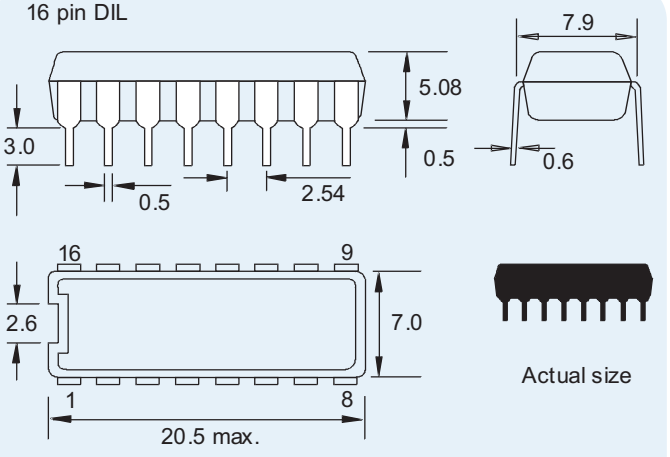
* to = oscillation source cycle, ** tw = ½ cycle of preset frequency
*** for more than 1ms until V_{DD} = 0~+4.5V. Time at 4.5V is to be zero

Part numbers for undivided fundamental frequencies with tolerances and supply current

Type number	Fundamental Frequency (kHz)	Freq. Tol. (ppm)	Freq./ Voltage (ppm)	Current max. (mA)
SPG 8650E	32.768	±50	±10	0.5
SPG 8650A	60.0	±50	±10	0.5
SPG 8650C	96.0	±50	±10	0.5
SPG 8650B	100.0	±50	±10	0.5
SPG 8650D	153.60	±50	±10	0.5
SPG 8640AN	600.0	±100	±20	1.0
SPG 8640CN	768.0	±100	±20	1.5
SPG 8640BN	1000.0	±100	±10	2.0



RESET Timing



Outline and Dimensions

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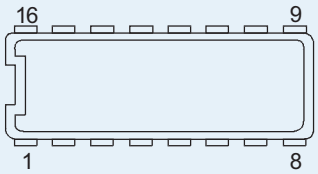
Terminal Connections



Connections

1	n/c	16	Vdd
2	CTL 3	15	n/c
3	CTL 2	14	RESET
4	CTL 1	13	n/c (CSEL)
5	CTL 6	12	n/c (EXC)
6	CTL 5	11	FOUT
7	CTL 4	10	TEST
8	GND	9	OUT

( ) = 8640N only
n/c = Do not connect externally

For 8640 $\overline{O}$
11 n/c
12 CLOCK
13 ENABLE

Terminal connection details

CTL 1 - 6 Programmable dividing ratio. (Pull-down resistor incorp..)

OUT Output frequency preset by CTL 1~ 6.(Refer to the setting procedure of output freq.)

FOUT Constant output of the oscillator source frequency. (Built-in quartz crystal).

RESET Stops output at RESET = 'L'. (Pull-up resistor incorporated.)

TEST Used for testing the input terminal. When CTL 4 is H, output will be 1000 times larger than the preset value at TEST = 'H'. (Pull-down resistor incorp.)

EXC (8640N only) Serves as input terminal when using an external clock by changing to the built-in osc. Effective when CSEL is H.

CSEL (8640N only) When this terminal is made H, the external clock is selected. (Pull-down resistor incorp.)

Unused terminals

RESET When unused connect to Vdd.
TEST When unused connect to GND.
CSEL When unused connect to GND.
CTL 1 ~ 6 When unused connect to GND.

Terminals (8650 O)
CLOCK Clock input (max. 1MHz)
ENABLE Connect to Vdd.)

Divider Output Setting

CTL 1	CTL 2	CTL 3	Division Ratio	CTL 4	CTL 5	CTL 6	Division Ratio
0	0	0	1/1	0	0	0	1/1(1/1)
0	0	1	1/10	0	0	1	1/10(1/2)
0	1	0	1/2	0	1	0	$1/10^2(1/2^2)$
0	1	1	1/3	0	1	1	$1/10^3(1/2^3)$
1	0	0	1/4	1	0	0	$1/10^4(1/2^4)$
1	0	1	1/5	1	0	1	$1/10^5(1/2^5)$
1	1	0	1/6	1	1	0	$1/10^6(1/2^6)$
1	1	1	1/7	1	1	1	$1/10^7(1/2^7)$

Combining the division ratios produces the total division ratio

Output Frequency Settings

8640AN

Set Terminal		CTL4	0	0	0	0	1	1	1	1
		CTL5	0	0	1	1	0	0	1	1
CTL1	CTL2	CTL6 / CTL3	0	1	0	1	0	1	0	1
0	0	0	600k	60k	6k	600	60	6	0.6	0.06
0	0	1	60k	6k	600	60	6	0.6	0.06	0.006
0	1	0	300k	30k	3k	300	30	3	0.3	0.03
0	1	1	200k	20k	2k	200	20	2	0.2	0.02
1	0	0	150k	15k	1.5k	150	15	1.5	0.15	0.015
1	0	1	120k	12k	1.2k	120	12	1.2	0.12	0.012
1	1	0	100k	10k	1k	100	10	1	0.1	0.01
1	1	1	50k	5k	500	50	5	0.5	0.05	0.005

8640BN

Set Terminal		CTL4	0	0	0	0	1	1	1	1
		CTL5	0	0	1	1	0	0	1	1
CTL1	CTL2	CTL6 / CTL3	0	1	0	1	0	1	0	1
0	0	0	1M	100k	10k	1k	100	10	1	1/10
0	0	1	100k	10k	1k	100	10	1	1/10	1/100
0	1	0	500k	50k	5k	500	50	5	1/2	1/20
0	1	1	333.3k	33.3k	3.3k	333.3	33.3	33.3	1/3	1/30
1	0	0	250k	25k	2.5k	250	25	2.5	1/4	1/40
1	0	1	200k	20k	2k	200	20	2	1/5	1/50
1	1	0	166.6k	16.6k	1.6k	166.6	16.6	1.6	1/6	1/60
1	1	1	83.3k	8.3k	833.3	83.3	8.3	0.83	1/12	1/120

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Output Frequency Settings

8650A

Set Terminal		CTL4	0	0	0	0	1	1	1	1
		CTL5	0	0	1	1	0	0	1	1
CTL1	CTL2	CTL3 \ CTL6	0	1	0	1	0	1	0	1
0	0	0	60k	6k	600	60	6	0.6	0.06	0.006
0	0	1	6k	600	60	6	0.6	0.06	0.006	0.0006
0	1	0	30k	3k	300	30	3	0.3	0.03	0.003
0	1	1	20k	2k	200	20	2	0.2	0.02	0.002
1	0	0	15k	1.5k	150	15	1.5	0.15	0.015	0.0015
1	0	1	12k	1.2k	120	12	1.2	0.12	0.012	0.0012
1	1	0	10k	1k	100	10	1	0.1	0.01	0.001
1	1	1	5k	500	50	5	0.5	0.05	0.005	0.0005

8650B

Set Terminal		CTL4	0	0	0	0	1	1	1	1
		CTL5	0	0	1	1	0	0	1	1
CTL1	CTL2	CTL3 \ CTL6	0	1	0	1	0	1	0	1
0	0	0	100k	10k	1k	100	10	1	1/10	1/100
0	0	1	10k	1k	100	10	1	1/10	1/100	1/1000
0	1	0	50k	5k	500	50	5	1/2	1/20	1/200
0	1	1	33.3k	3.3k	333.3	33.3	3.33	1/3	1/30	1/300
1	0	0	25k	2.5k	250	25	2.5	1/4	1/40	1/400
1	0	1	20k	2k	200	20	2	1/5	1/50	1/500
1	1	0	16.6k	1.6k	166.6	16.6	1.6	1/6	1/60	1/600
1	1	1	8.3k	833.3	83.3	8.3	0.83	1/12	1/120	1/1200

8650E

Set Terminal		CTL4	0	0	0	0	1	1	1	1
		CTL5	0	0	1	1	0	0	1	1
CTL1	CTL2	CTL3 \ CTL6	0	1	0	1	0	1	0	1
0	0	0	32768	3276.8	327.68	32.768	3.276	0.3276	0.03276	0.00327
0	0	1	3276.8	327.68	32.768	3.276	0.327	0.0327	0.00327	0.00032
0	1	0	16384	1638.4	163.84	16.384	1.638	0.1638	0.01638	0.00163
0	1	1	10922.6	1092.26	109.22	10.922	1.092	0.1092	0.01092	0.00109
1	0	0	8192	819.2	81.92	8.192	0.819	0.0819	0.00819	0.00081
1	0	1	6553.6	655.36	65.536	6.553	0.655	0.0655	0.00655	0.00065
1	1	0	5461.3	546.13	54.613	5.416	0.546	0.0546	0.00546	0.00054
1	1	1	2730.6	273.06	27.306	2.730	0.273	0.0273	0.00273	0.00027

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Output Frequency Settings

Baud Rate Generators

8640CN

CTL1	CTL2	CTL3	CTL4	CTL5	CTL6	Output Frequency (kHz)	Baud Rate Output Example (fo/16)
0	0	0	0	0	0	768	48000 bits/sec
1	0	1	0	0	0	153.6	9600 bits/sec
0	0	1	0	0	0	76.8	4800 bits/sec
0	1	0	0	0	1	38.4	2400 bits/sec
1	0	0	0	0	1	19.2	1200 bits/sec

8650C

CTL1	CTL2	CTL3	CTL4	CTL5	CTL6	Output Frequency (kHz)	Baud Rate Output Example (fo/16)
0	0	0	0	0	0	96.0	8000 bits/sec
1	0	1	0	0	0	19.2	1200 bits/sec
0	0	1	0	0	0	9.6	600 bits/sec
0	1	0	0	0	1	4.8	300 bits/sec
0	1	1	0	0	1	3.2	200 bits/sec
1	0	0	0	0	1	2.4	150 bits/sec
1	1	0	0	0	1	1.6	100 bits/sec
1	1	1	0	0	1	0.8	50 bits/sec

8650D

CTL1	CTL2	CTL3	CTL4	CTL5	CTL6	Output Frequency (kHz)	Baud Rate Output Example (fo/16)
0	0	0	0	0	0	153.6	9600 bits/sec
0	0	0	0	0	1	76.8	4800 bits/sec
0	0	0	0	1	0	38.4	2400 bits/sec
0	0	0	0	1	1	19.2	1200 bits/sec
0	0	0	1	0	0	9.6	600 bits/sec
0	0	0	1	0	1	4.8	300 bits/sec
0	1	1	1	0	0	3.2	200 bits/sec
0	0	0	1	1	0	2.4	150 bits/sec
1	1	0	1	0	0	1.6	100 bits/sec
0	0	0	1	1	1	1.2	75 bits/sec
1	1	1	1	0	0	0.8	50 bits/sec