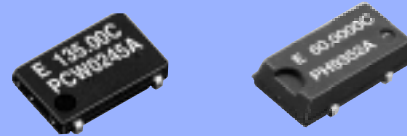


CRYSTAL OSCILLATOR

SPXO

SG-645 / SG-636 series

- Frequency range : 2.21675 MHz to 135 MHz
- Supply voltage : 2.5 V / 3.3 V / 5.0 V
- Function : Output enable(OE) Standby(\overline{ST})
- Thickness : SG-645:1.5 mm Max.
SG-636:2.7 mm Max.



Actual size

SG-645 series



SG-636 series



Specifications (characteristics)

Item	Symbol	Specifications				Remarks
		SG-636 PTF	SG-636 PH	SG-636 PCE SG-636 SCE	SG-636 PDE	
Output frequency range	f_0	2.21675 MHz to 41.000 MHz	41.001 MHz to 70.000 MHz	2.21675 MHz to 40.000 MHz	2.21675 MHz to 40.000 MHz	
Supply voltage	V_{CC}	5.0 V \pm 0.5 V		3.3 V \pm 0.3 V	2.5 V \pm 0.25 V	
Temperature range	Storage temperature T_{stg}	-55 °C to +100 °C				Store as bare product after unpacking
	Operating temperature T_{use}	-20 °C to +70 °C				
Frequency tolerance	$F_{tol(osc)}$	C: $\pm 100 \times 10^{-6}$				-20 °C to +70 °C
Current consumption	I_{CC}	17 mA Max.	35 mA Max.	9 mA Max.	5 mA Max.	No load condition
Output disable current	I_{dis}	10 mA Max.	20 mA Max.	5 mA Max.	3 mA Max.	OE=GND
Stand-by current	I_{std}	—		2 μ A Max.	—	\overline{ST} =GND(SCE)
Symmetry	SYM	40 % to 60 %		45 % to 55 %		CMOS load:50 % V_{CC} level
		45 % to 55 %		—		TTL load: 1.4 V level
High output voltage	V_{OH}	V_{CC} -0.4 V Min.				I_{OH} =-8 mA(PTF)/-4 mA(PH,SCE,PCE), /-3.2 mA(PDE)
Low output voltage	V_{OL}	0.4 V Max.				I_{OL} =16 mA(PTF)/4mA(PH,SCE,PCE) /3.2 mA(PDE)
Output load condition (TTL)	L_{TTL}	10 TTL Max.	—			$L_{CMOS} \leq 15$ pF
Output load condition (CMOS)	L_{CMOS}	50 pF Max.	20 pF Max.(≤ 55 MHz) 15 pF Max.(> 55 MHz)	30 pF Max.	15 pF Max.	
Output enable / disable input voltage	V_{IH}	2.0 V Min.		80 % V_{CC} Min.		OE Terminal, \overline{ST} Terminal (SCE)
	V_{IL}	0.8 V Max.		20 % V_{CC} Max.		
Output rise and fall time	t_r / t_f	7 ns Max.	5 ns Max.			CMOS load:20 % V_{CC} to 80 % V_{CC} level TTL load:0.4 V to 2.4 V level
		5 ns Max.	—			
Oscillation start up time	t_{osc}	4 ms Max.	10 ms Max.	4 ms Max.		Time at minimum supply voltage to be 0 s
Frequency aging	F_{aging}	$\pm 5 \times 10^{-6}$ / year Max.				+25 °C, V_{CC} =5.0 V/3.3 V/2.5 V, First year

Specifications (characteristics)

Item	Symbol	Specifications			Remarks
		SG-636 PTG	SG-636 PHG	SG-636 PCG SG-636 SCG	
Output frequency range	f_0	2.21675 MHz to 33.000 MHz *1			
Supply voltage	V_{CC}	4.5 V to 5.5 V		2.7 V to 3.6 V	
Temperature range	Storage temperature T_{stg}	-55 °C to +100 °C			Store as bare product after unpacking
	Operating temperature T_{use}	-20 °C to +70 °C			
Frequency tolerance	$F_{tol(osc)}$	B: $\pm 50 \times 10^{-6}$ C: $\pm 100 \times 10^{-6}$			-20 °C to +70 °C
Current consumption	I_{CC}	25 mA Max.		12 mA Max.	No load condition
Output disable current	I_{dis}	20 mA Max.		10 mA Max.	OE=GND (PTG,PHG,PCG)
Stand-by current	I_{std}	—		50 μ A Max.	\overline{ST} =GND (SCG)
Symmetry	SYM	40 % to 60 %		45 % to 55 %	50 % V_{CC} level, L_{CMOS} =25 pF
		2.4 V Min.		—	V_{CC} -0.4 V Min.
High output voltage	V_{OH}	—		V_{CC} -0.4 V Min.	I_{OH} =-16 mA
Low output voltage	V_{OL}	—		0.4 V Max.	I_{OL} =8 mA
		0.4 V Max.		—	I_{OL} =16 mA
Output load condition	L_{CMOS}	25 pF Max.			
Output enable / disable input voltage	V_{IH}	2.0 V Min.		70 % V_{CC} Min.	OE Terminal, \overline{ST} Terminal
	V_{IL}	0.8 V Max.		20 % V_{CC} Max.	
Output rise and fall time	t_r / t_f	—		3.4 ns Max.	20 % V_{CC} to 80 % V_{CC} level, $L_{CMOS} \leq 25$ pF TTL load:0.4 V to 2.4 V level, $L_{CMOS} \leq 25$ pF
		2.4 ns Max.		—	
Oscillation start up time	t_{osc}	12 ms Max.			$t=0$ at 90 % V_{CC}
Frequency aging	F_{aging}	$\pm 5 \times 10^{-6}$ / year Max.			+25 °C, V_{CC} =5.0 V/ 3.3 V, First year

*1 4.1250 MHz < f_0 < 4.4336 MHz, 8.2500 MHz < f_0 < 8.8672 MHz, 16.500 MHz < f_0 < 17.7344 MHz : Unavailable

Specifications (characteristics)

Item	Symbol	Specifications			Remarks	
		SG-636 PTW / STW SG-645 PTW / STW	SG-636 PHW / SHW SG-645 PHW / SHW	SG-636 PCW / SCW SG-645 PCW / SCW		
Output frequency range	f_0	32.001 MHz to 135.000 MHz				
Supply voltage	V_{cc}	5.0 V \pm 0.5 V		3.3 V \pm 0.3 V		
Temperature range	Storage temperature	SG-636P**:-55 °C to +100 °C / SG-645P**:-55 °C to +125 °C			Store as bare product after unpacking	
	Operating temperature	-20 °C to +70 °C				
Frequency tolerance	$F_{tol}(osc)$	B: $\pm 50 \times 10^{-6}$ C: $\pm 100 \times 10^{-6}$		M: $\pm 50 \times 10^{-6}$	SG-645PCW / SCW Only	
						-20 °C to +70 °C *1
Current consumption	I_{cc}	45 mA Max.		28 mA Max.	No load condition(Max. frequency range)	
Output disable current	I_{dis}	30 mA Max.		16 mA Max.	OE=GND (PTW,PHW,PCW)	
Stand-by current	I_{std}	50 μ A Max.			\overline{ST} =GND (STW,SHW,SCW)	
Symmetry	SYM	—		40 % to 60 %	50 % V_{cc} level, L_{CMOS} =Max.	
		40 % to 60 %		—	1.4 V level, L_{CMOS} =Max.	
High output voltage	V_{OH}	V_{cc} -0.4 V Min.			I_{OH} =-16 mA(PTW , STW , PHW , SHW) /-8 mA(PCW , SCW)	
Low output voltage	V_{OL}	0.4 V Max.			I_{OL} = 16 mA(PTW , STW , PHW , SHW) / 8 mA(PCW , SCW)	
Output load condition (TTL)	L_{TTL}	5 TTL Max.	—	—	$f_0 \leq 90$ MHz, Max.Supply voltage.	
Output load condition (CMOS)	L_{CMOS}	15 pF Max.			Max.frequency, Max.Supply voltage.	
Output enable / disable input voltage	V_{IH}	2.0 V Min.		70 % V_{cc} Min.	OE Terminal , \overline{ST} Terminal	
	V_{IL}	0.8 V Max.		20 % V_{cc} Max.		
Output rise and fall time	t_r / t_f	—			4 ns Max.	20 % V_{cc} to 80 % V_{cc} level, $L_{CMOS} \leq$ Max.
		4 ns Max.		—	—	0.4 V to 2.4 V level
Oscillation start up time	t_{osc}	10 ms Max.			Time at minimum supply voltage to be 0 s	
Frequency aging	F_{aging}	$\pm 5 \times 10^{-6}$ / year Max.			+25 °C, V_{cc} =5.0 V / 3.3 V, First year	

*1 SG-636 series "C" tolerance : 40 MHz< f_0 <135 MHz

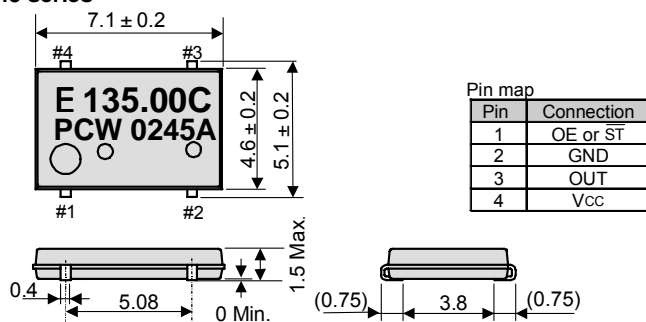
External dimensions

(Unit:mm)

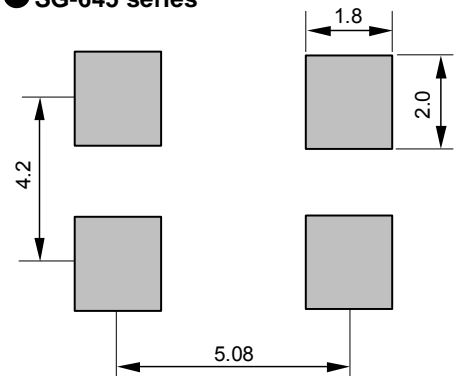
Footprint (Recommended)

(Unit:mm)

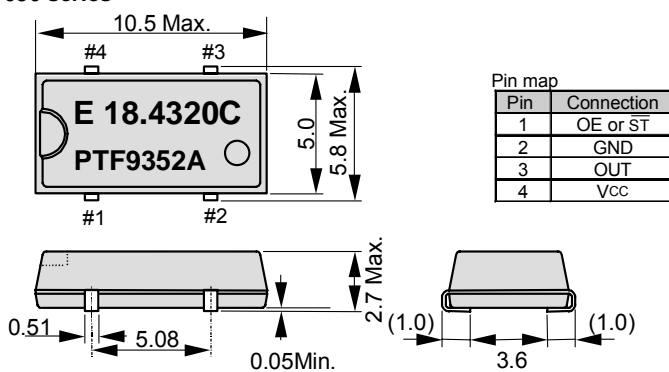
● SG-645 series



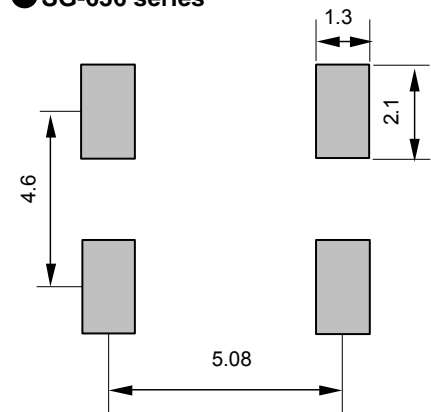
● SG-645 series



● SG-636 series



● SG-636 series



Metal may be exposed on the top or bottom of this product. This will not affect any quality, reliability or electrical spec.

Note.

OE pin (PTF,PH,PCE,PDE,PTW,PHW,PCW,PTG,PHG,PCG)

OE pin = "H" or "open" : Specified frequency output.

OE pin = "L" : Output is high impedance.

\overline{ST} pin (STW, SHW, SCW,SCG)

\overline{ST} pin = "H" or "open" : Specified frequency output.

\overline{ST} pin = "L" : Output is low level (weak pull - down),oscillation stops.

\overline{ST} pin (SCE)

\overline{ST} pin = "H" or "open" : Specified frequency output.

\overline{ST} pin = "L" : Output is low level ,oscillation stops.