



CRYSTAL OSCILLATOR (SPXO)

OUTPUT : CMOS, TTL

SG-645 / SG-636 series

- Frequency range : 2.21675 MHz to 135 MHz
- Supply voltage : 2.5 V Typ. / 3.3 V Typ. / 5.0 V Typ.
- Function : Output enable(OE) or Standby(\overline{ST})
- External dimensions : 7.1 × 5.1 × 1.5 mm (t: Max.)...SG-645
10.5 × 5.8 × 2.7 mm (t: Max.)...SG-636



Product Number (please contact us)

SG-645 : Q33645xx2xxxx00

SG-636 : Q33636xx2xxxx00



Actual size

SG-645 series



SG-636 series



Specifications (characteristics)

Item	Symbol	Specifications			Conditions / Remarks
		SG-636 PTF	SG-636 PCE SG-636 SCE	SG-636 PDE	
Output frequency range	f_o	2.21675 MHz to 41.000 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	
Storage temperature	T_{stg}	-55 °C to +100 °C			Storage as single product.
Operating temperature	T_{use}	-20 °C to +70 °C			
Frequency tolerance	f_{tol}	C: \pm 100 × 10 ⁻⁶			-20 °C to +70 °C
Current consumption	I_{cc}	17 mA Max.	9 mA Max.	5 mA Max.	No load condition
Disable current	I_{dis}	10 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
Output voltage	V_{OH}	V_{cc} -0.4 V Min.			I_{OH} =-8 mA(PTF) / -4 mA(SCE,PCE) / -3.2 mA(PDE)
	V_{OL}	0.4 V Max.			I_{OL} =16 mA(PTF) / 4 mA(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.	30 pF Max.	15 pF Max.	
Input voltage	V_{IH}	2.0 V Min.			OE Terminal or \overline{ST} Terminal (SCE)
	V_{IL}	0.8 V Max.			
Rise time / Fall time	t_r / t_f	7 ns Max.		5 ns Max.	CMOS load:20 % V_{cc} to 80 % V_{cc} level
		5 ns Max.		—	TTL load:0.4 V to 2.4 V level
Start-up time	t_{str}	4 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			Conditions / Remarks
		SG-636 PTG	SG-636 PHG	SG-636 PCG SG-636 SCG	
Output frequency range	f_o	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	
Storage temperature	T_{stg}	-55 °C to +100 °C			Storage as single product.
Operating temperature	T_{use}	-20 °C to +70 °C			
Frequency tolerance	f_{tol}	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
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.		—	1.4 V level, L_{CMOS} =25 pF
Output voltage	V_{OH}	—		V_{cc} -0.4 V Min.	I_{OH} =-8 mA
	V_{OL}	—		0.4 V Max.	I_{OH} =-16 mA
Output load condition	L_{CMOS}	0.4 V Max.		—	I_{OL} =8 mA
		25 pF Max.		—	I_{OL} =16 mA
Input voltage	V_{IH}	2.0 V Min.		70 % V_{cc} Min.	OE Terminal or \overline{ST} Terminal
	V_{IL}	0.8 V Max.		20 % V_{cc} Max.	
Rise time / Fall time	t_r / t_f	—		3.4 ns Max.	20 % V_{cc} to 80 % V_{cc} level, $L_{CMOS} \leq 25$ pF
		2.4 ns Max.		—	TTL load:0.4 V to 2.4 V level, $L_{CMOS} \leq 25$ pF
Start-up time	t_{str}	12 ms Max.		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_o < 4.4336 MHz, 8.2500 MHz < f_o < 8.8672 MHz, 16.500 MHz < f_o < 17.7344 MHz : Unavailable

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Specifications (characteristics)

Item	Symbol	Specifications			Conditions / 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 ± 0.5 V		3.3 V ± 0.3 V	
Storage temperature	T_{stg}	SG-636***: -55 °C to +100 °C / SG-645***: -55 °C to +125 °C			Storage as single product.
Operating temperature	T_{use}	-20 °C to +70 °C			
Frequency tolerance	f_{tol}	B: $\pm 50 \times 10^{-6}$ C ² : $\pm 100 \times 10^{-6}$		M: $\pm 100 \times 10^{-6}$	SG-645PCW / SCW Only -20 °C to +70 °C -40 °C to +85 °C : SG-645PCW / SCW Only
Current consumption	I_{cc}	45 mA Max.		28 mA Max.	No load condition (Max. frequency range)
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 %		40 % to 60 %	50 % V_{cc} level, L_CMOS=Max. 1.4 V level, L_CMOS=Max.
Output voltage	V_{OH}	$V_{cc}-0.4$ V Min.			$I_{OH}=-16$ mA (PTW , STW , PHW , SHW) / -8 mA (PCW , SCW)
	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.
Input voltage	V_{IH}	2.0 V Min.		70 % V_{cc} Min.	OE Terminal or \overline{ST} Terminal
	V_{IL}	0.8 V Max.		20 % V_{cc} Max.	
Rise time / 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
Start-up time	t_{str}	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

*2 SG-636 series "C" tolerance : 40 MHz < f_0 \leq 135 MHz

Product Name **SG-645 P T W 135.000000MHz B**
 (Standard form) ① ②③ ④ ⑤
 ① Model ② Function (P: Output enable, S: Standby)
 ③ Supply voltage ④ Frequency
 ⑤ Frequency tolerance

③ Supply voltage	
D	2.5 V Typ.
C	3.3 V Typ.
T,H	5.0 V Typ.

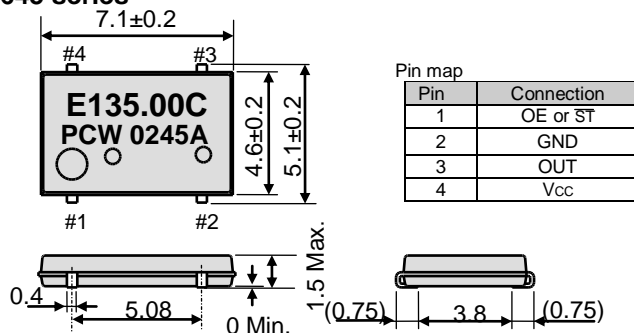
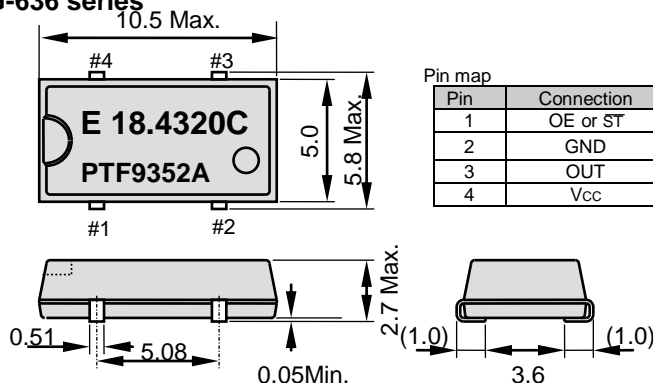
⑤ Frequency tolerance	
B	$\pm 50 \times 10^{-6}$ / -20 to +70 °C
C	$\pm 100 \times 10^{-6}$ / -20 to +70 °C
M	$\pm 100 \times 10^{-6}$ / -40 to +85 °C

External dimensions

(Unit:mm)

Footprint (Recommended)

(Unit:mm)

● SG-645 series

● SG-636 series


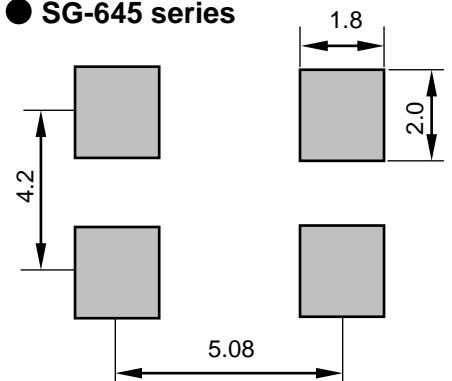
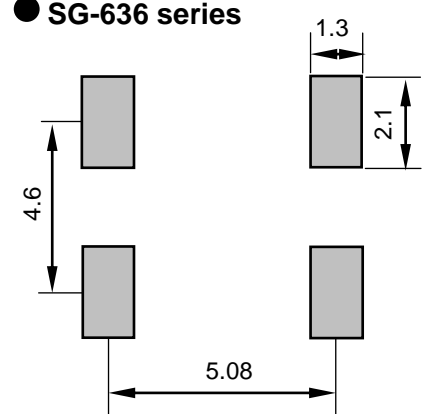
The metal case inside of the molding compound may be exposed on the top or bottom of this product. This purely cosmetic and does not have any effect on quality, reliability or electrical specs.

Note.

OE pin (PTF,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.

● SG-645 series

● SG-636 series


To maintain stable operation, provide a 0.01 μ F to 0.1 μ F by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between V_{cc} - GND).