

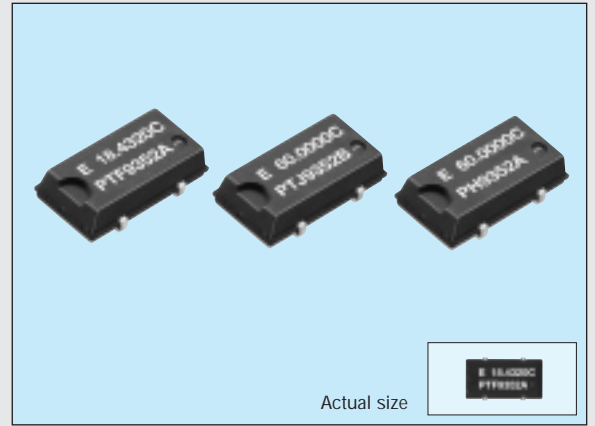
SMALL SOJ HIGH-FREQUENCY CRYSTAL OSCILLATOR

SG-636 series

Products number

Q33636xxxxxx00

- A small SMD that enables high-density mounting.
- A general-purpose device with builtin heat-resisting cylindrical AT-cut crystal and allowing almost the same temperature condition for soldering as SMD IC.
- Low current consumption by output enable function(OE) or standby function(ST).



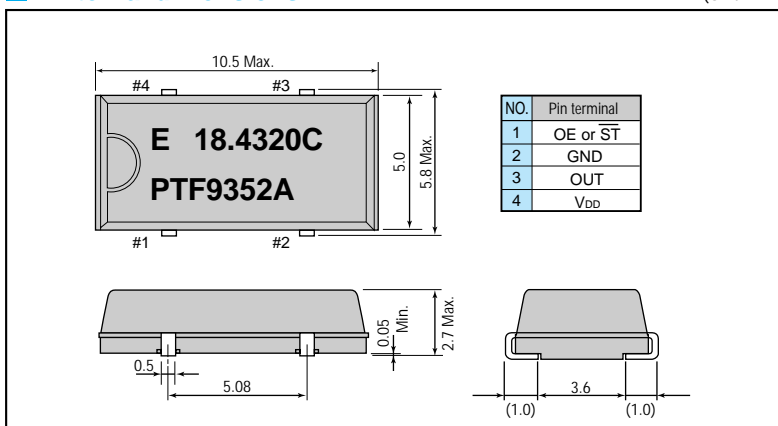
Specifications (characteristics)

Item	Symbol	SG-636PTF	SG-636PH	SG-636SCE/PCE	SG-636PDE	Remarks
		Specifications				
Output frequency range	f_0	2.21675 MHz to 41.0000 MHz	41.0001 MHz to 70.0000 MHz	2.21675 MHz to 41.0000 MHz		
Power source voltage	Max. supply voltage	V_{DD-GND}	-0.5 V to +7.0 V	-0.5 V to +7.0 V		
	Operating voltage	V_{DD}	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			Stored as bare product after unpacking
	Operating temperature	T_{OPR}	-20 °C to +70 °C			
Frequency stability	$\Delta f/f_0$	C: $\pm 100 \times 10^{-6}$				
Current consumption	I_{OP}	17 mA Max.	35 mA Max.	9 mA Max.	5 mA Max.	No load condition
Output disable current	I_{OE}	10 mA Max.	20 mA Max.	5 mA Max.	3 mA Max.	OE=GND, ST=GND 2 μ A Max.(SCE)
Duty	C-MOS level	40 % to 60 %		45 % to 55 %		C-MOS load: 1/2 V_{DD} level
	TTL level	45 % to 55 %	—			TTL load: 1.4 V level
Output Joltage V_{OH}	V_{OL}	V_{DD} -0.4 V Min.				I_{OH} =-8 mA (PTF) /-4 mA (PH / SCE PCE / PDE)
	V_{OL}	0.4 V Max.				I_{OL} =16 mA (PTF) /4 mA (PH / SCE PCE / PDE)
Output load condition (fan out)	C-MOS	C_L	50 pF Max.	20 pF Max. (\leq 55 MHz) 15 pF Max. ($>$ 55 MHz)	30 pF Max.	15 pF Max.
	TTL	N	10 TTL Max.	5 LSTTL Max.	—	
Output enable/disable input voltage	V_{IH}	2.0 V Min.		0.8 V_{DD} Min.		OE,ST
	V_{IL}	0.8 V Max.		0.2 V_{DD} Max.		
Output rise time	C-MOS level	t_{RLH}	7 ns Max.	5 ns Max.		C-MOS load: 20 % \rightarrow 80 % V_{DD}
	TTL level		5 ns Max.	—		TTL load: 0.4 V \rightarrow 2.4 V
Output fall time	C-MOS level	t_{THL}	7 ns Max.	5 ns Max.		C-MOS load: 80 % \rightarrow 20 % V_{DD}
	TTL level		5 ns Max.	—		TTL load: 2.4 V \rightarrow 0.4 V
Oscillation start up time	t_{OSC}	4 ms Max.	10 ms Max.	4 ms Max.		Time at minimum operating voltage to be 0 s
Aging	f_a	$\pm 5 \times 10^{-6}$ /year Max.				T_a =+25 °C, V_{DD} =5 V, first year
Shock resistance	S.R.	$\pm 20 \times 10^{-6}$ Max.				Three drops on a hard board from 750 mm or excitation test with 29400 m/s ² x 0.3 ms x 1/2 sine wave in 3 directions

Note: • Unless otherwise stated, characteristics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.
 • External by-pass capacitor is required.
 • Metal may be exposed on the top or bottom of this product. This won't affect any quality, reliability or electrical spec.

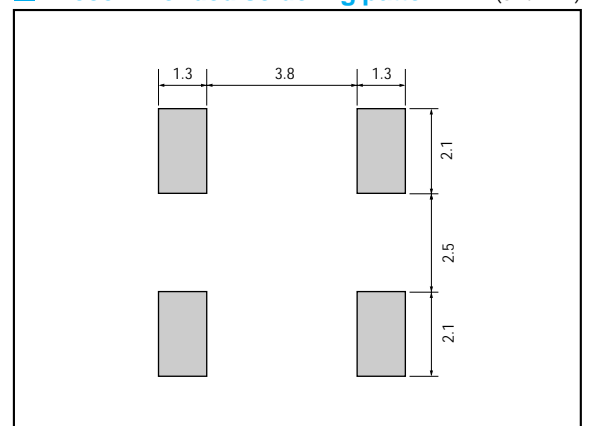
External dimensions

(Unit: mm)



Recommended soldering pattern

(Unit: mm)



Specifications (characteristics)

Item	Symbol	SG-636PTW/STW	SG-636PHW/SHW	SG-636PCW/SCW	Remarks	
		Specifications				
Output frequency range	f_0	32.0001 MHz to 135.0000 MHz				
Power source voltage	Max. supply voltage	V_{DD-GND}	-0.5 V to +7.0 V			
	Operating voltage	V_{DD}	5.0 V \pm 0.5 V	3.3 V \pm 0.3 V		
Temperature range	Storage temperature	T_{STG}	-55 °C to +100 °C		Stored as bare product after unpacking	
	Operating temperature	T_{OPR}	-20 °C to +70 °C			
Frequency stability	$\Delta f/f_0$	B: $\pm 50 \times 10^{-6}$ C: $\pm 100 \times 10^{-6}$				
Current consumption	I_{op}	45 mA Max.		28 mA Max.	No load condition	
Output disable current	I_{OE}	30 mA Max.		16 mA Max.	$\overline{OE}=\overline{GND}(P^*W)$	
Standby current	I_{ST}	50 μ A Max.			$\overline{ST}=\overline{GND}(S^*W)$	
Duty	C-MOS level	tw/t	—	40 % to 60 %	C-MOS load: 1/2 V_{DD}	
	TTL level	tw/t	40 % to 60 %	—	TTL load: 1.4 V	
Output voltage	V_{OH}		$V_{DD}-0.4$ V Min.		$I_{OH}=-16$ mA (*TW/HW)/-8 mA(*CW)	
	V_{OL}		0.4 V Max.		$I_{OL}=-16$ mA (*TW/HW)/8 mA(*CW)	
Output load condition (fan out)	C_L		15 pF Max.			
Output enable/disable input voltage	V_{IH}		2.0 V Min.	0.7 V_{DD} Min.	$\overline{OE}, \overline{ST}$	
	V_{IL}		0.8 V Max.	0.2 V_{DD} Max.	$\overline{OE}, \overline{ST}$	
Output rise time	C-MOS level	t_{rLH}	—	4 ns Max.	4 ns Max.	C-MOS load: 20 % \rightarrow 80 % V_{DD}
	TTL level	t_{rLH}	4 ns Max.	—	—	TTL load: 0.4 V \rightarrow 2.4 V
Output fall time	C-MOS level	t_{fHL}	—	4 ns Max.	4 ns Max.	C-MOS load: 80 % \rightarrow 20 % V_{DD}
	TTL level	t_{fHL}	4 ns Max.	—	—	TTL load: 2.4 V \rightarrow 0.4 V
Oscillation start up time	t_{osc}		10 ms Max.		Time at minimum operating voltage to be 0 s	
Aging	f_a		$\pm 5 \times 10^{-6}$ /year Max.		$T_a=+25$ °C, $V_{DD}=5$ V	
Shock resistance	S.R.		$\pm 20 \times 10^{-6}$ Max.		Three drops on a hard board from 750 mm or excitation test with 29400 m/s ² x 0.3 ms x 1/2 sine wave in 3 directions	

Operating condition and Frequency band

Operating condition		1 MHz	50 MHz	100 MHz	150 MHz
5 V \pm 0.5 V	Frequency stability:B (-20 to +70 °C)		32	135	
	Frequency stability:C (-20 to +70 °C)	2.21675	41	70	135
3.3 V \pm 0.3 V	Frequency stability:B (-20 to +70 °C)		32	135	
	Frequency stability:C (-20 to +70 °C)	2.21675	41	135	
2.5 V \pm 0.25 V	Frequency stability:C (-20 to +70 °C)	2.21675	41		