

SMALL SOJ HIGH-FREQUENCY CRYSTAL OSCILLATOR

SG-636 series

- 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.
- Provided with output enable function.
- 3.3 V operation, stand-by function available.

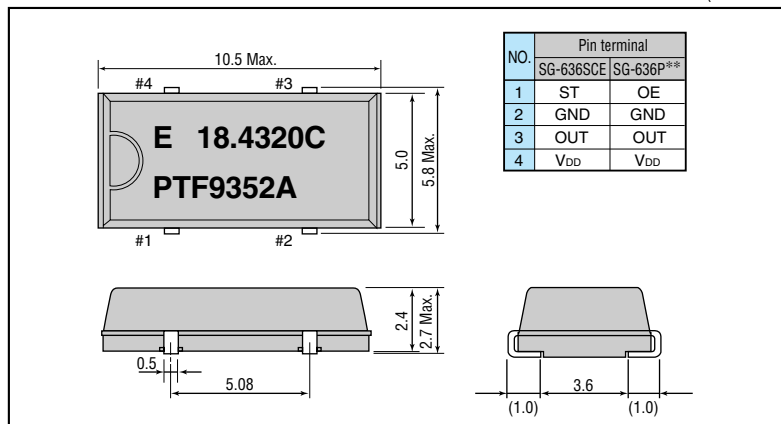
Specifications (characteristics)

Item	Symbol	SG-636PTF	SG-636PTJ	SG-636PH	SG-636SCE/PCE	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	-0.3 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		
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				
Soldering condition	T_{SOL}	Twice at under +260 °C within 10 s or under +230 °C within 3 min.					
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.	No load condition	
Duty	C-MOS level	t_w/t	40 % to 60 %	—	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 voltage	V_{OH}	$V_{DD} - 0.4$ V Min.	2.4 V Min.	$V_{DD} - 0.4$ V Min.			
	(I_{OH})	-8 mA	-400 μ A	-4 mA			
	V_{OL}	0.4 V Max.					
	(I_{OL})	16 mA	8 mA	4 mA			
Output load condition (fan out)	C-MOS	C_L	50 pF Max.	15 pF	20 pF Max. (≤ 55 MHz) 15 pF Max. (> 55 MHz)	30 pF Max.	
	TTL	N	10 TTL Max.	5 TTL Max.	5 LSTTL Max.	—	$C_L \leq 15$ pF
Output enable/disable input voltage	V_{IH}	2.0 V Min.	3.5 V Min.	2.0 V Min.	0.8 V_{DD} Min.	$I_{IH} = 1 \mu$ A Max. (OE= V_{DD}) PTF, PTJ, PH $I_{IL} = -100 \mu$ A Min. (OE=GND) PTF, PH -500 μ A Min. (OE=GND) PTJ	
	V_{IL}	0.8 V Max.	1.5 Max.	0.8 V Max.	0.2 V_{DD} Max.		
Output disable current	I_{OE}	10 mA Max.	28 mA Max.	20 mA Max.	5 mA Max.	OE=GND, ST=GND 2 μ A Max. (SCE) C-MOS load: 20 % \rightarrow 80 % V_{DD}	
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_{fHL}	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 4.5 V to be 0 s	
Aging	fa	$\pm 5 \times 10^{-6}$ /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 of this product. This won't affect any quality, reliability or electrical spec.

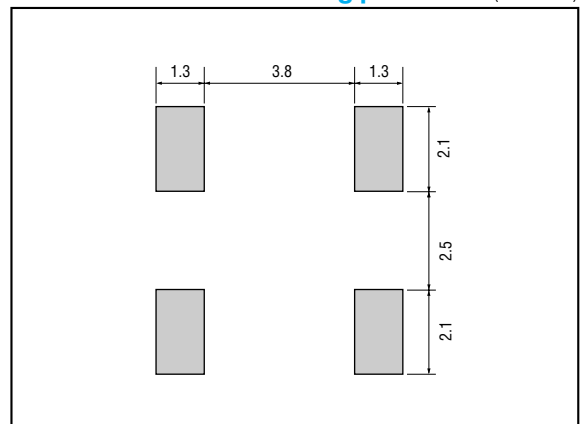
External dimensions

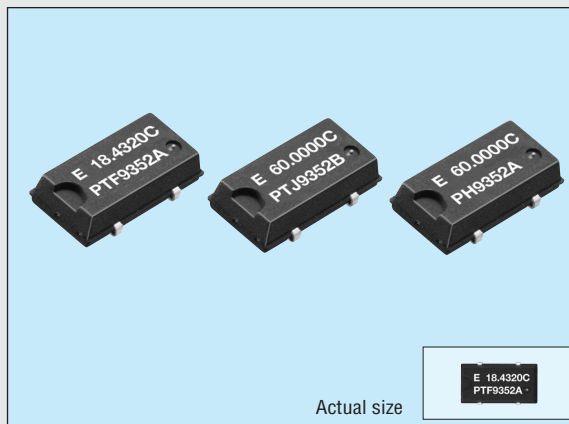
(Unit: mm)



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±0.5 V	3.3 V±0.3 V	
Temperature range	Storage temperature	T_{STG}	-55 °C to +100 °C		
	Operating temperature	T_{OPR}	-20 °C to +70 °C		
Soldering condition (lead part)	T_{SOL}	Twice at under 260 °C within 10 s or under 230 °C within 3 min.			
Frequency stability	$\Delta f/f_0$	B: ±50 x 10 ⁻⁶ C: ±100 x 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.	OE=GND(P*W)
Output disable current	I_{ST}	50 µA Max.			ST=GND(S*W)
Duty	C-MOS level	t_w/t	40 % to 60 %		C-MOS load: 1/2 V_{DD}
	TTL level	t_w/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.	OE,ST
	V_{IL}	0.8 V Max.		0.2 V_{DD} Max.	OE,ST
Output rise time	C-MOS level	t_{rLH}	4 ns Max.	4 ns Max.	C-MOS load: 20 %→80 % V_{DD}
	TTL level	t_{rLH}	4 ns Max.	—	TTL load: 0.4 V→2.4 V
Output fall time	C-MOS level	t_{fHL}	4 ns Max.	4 ns Max.	C-MOS load: 80 %→20 % V_{DD}
	TTL level	t_{fHL}	4 ns Max.	—	TTL load: 2.4 V→0.4 V
Oscillation start up time	t_{OSC}	10 ms Max.			Time at 4.5 V to be 0 s
Aging	f_a	±5 x 10 ⁻⁶ /year Max.			$T_a = +25$ °C, $V_{DD} = 5$ V
Shock resistance	S.R.	±20 x 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±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±0.3 V	Frequency stability:B (-20 to +70 °C)		32	135	
	Frequency stability:C (-20 to +70 °C)	2.21675	41	135	