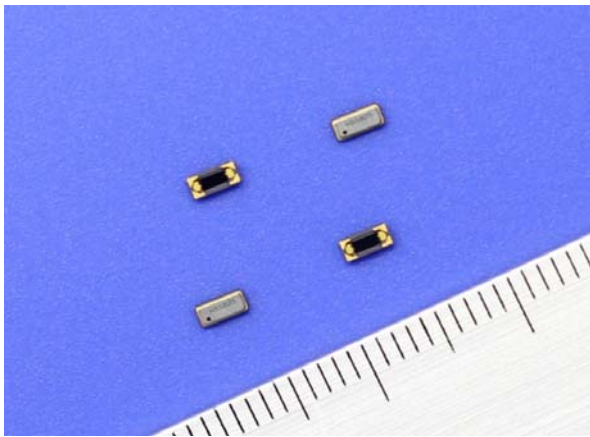


High accuracy Crystal Oscillator 32.768kHz SH-32S



Features

- Excellent frequency accuracy and Temperature characteristics
- Low current consumption
- Complete Pb-free
- Incorporated highly reliable photolithographic crystal resonator

Applications

Smart Meter, IoT, Wearable device, Industry device, High precision timing device, Event data recorder, etc

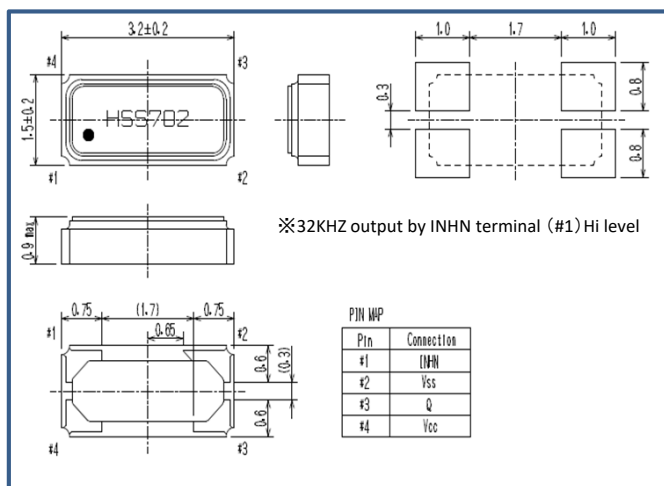
Specifications

Item	Symbol	Specifications	Unit	Conditions Note
Nominal Frequency	f_nom	32.768	kHz	
Supply Voltage	Vcc	1.3~5.5	V	(*1)
Temperature Compensated Voltage	VTEM	2.0~5.5	V	
Storage temperature	T_stg	-55~+125	°C	
Operating temperature	T_use	-40~+85	°C	
Frequency tolerance	f_tol	±3	×10 ⁻⁶	+25°C, Vcc=3.3 V
Frequency temperature coefficient	f0_Tc	±50	×10 ⁻⁶	-40~+85°C(+25°C is reference)
Frequency / voltage coefficient	f0_Vcc	±1	×10 ⁻⁶ /V	
Current consumption	Icc	1.0 Typ.	µA	3.3V, No load condition
		2.0 Max.	µA	
Symmetry	SYM	50±10	%	Load: 15pF
Rise time / Fall time	tr/tf	50 Max.	ns	Load: 15pF output level 20~80%
Input voltage	VIL	20% Vcc Max.	V	INH terminal
	VIH	80% Vcc Min.	V	INH terminal
Output voltage	VOL	0.4 Max.	V	
	VOH	Vcc-0.4 Min.	V	
Output load condition (CMOS)	CLOUT	15 Max.	pF	CMOS Loading
Start-up time	t_str	0.5 Max.	sec	+25°C
Frequency aging	f_aging	±3	×10 ⁻⁶	+25°C, Vcc=3.3V, First year

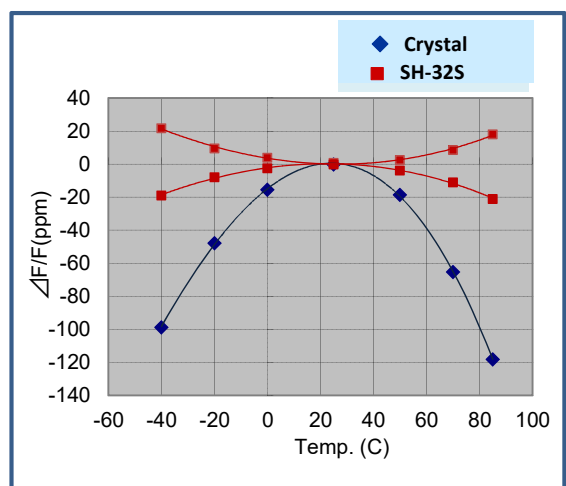
Unless otherwise stated, characteristics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.

(*1) When the supply voltage becomes below 2V, the frequency temperature compensation operation is inactivated.

Dimensions



Temperature characteristic



Absolute maximum rating

Item	Symbol	Condition	Rated	Unit
Power Supply & Voltage range	Vcc	Between Vcc-Vss	-0.3~+6.5	V
Input Voltage range	Vin	Input terminal(INHN)	-0.3~Vcc+0.3	V
Output Voltage range	Vout	Output terminal(Q)	-0.3~Vcc+0.3	V
Output Power supply	Iout	Output terminal(Q)	±10	mA

※In order to run SH-32 stability, please be mounted Ceramic-Chip Condenser by more than 0.1μF near SH-32 between Vcc-Vss.

Power consumption characteristics

Item	Symbol	Condition	MIN	TYP	MAX	Unit
Power consumption of starting (Temperature compensation interval in 2sec)	Icc	INHN=Vcc=3.3V,CLOUT=0pF Ta=-40°C~+85°C	—	1.0	2.0	μA
		INHN=Vcc=5.0V,CLOUT=0pF Ta=-40°C~+85°C	—	1.5	3.0	μA
Power consumption of booting	IBOOT	INHN=Vcc=3.3V,CLOUT=0pF Ta=-40°C~+85°C	—	1.5	2.5	μA
Power consumption of Disable	IDIS	INHN=Vss=0V,CLOUT=0pF Ta=-40°C~+85°C	—	0.6	1.5	μA

※In order to be short for oscillation starting time(t_str), It is the power consumption booting when increased the oscillation drive capability. Booting circuit works until 0.5sec(t_str+0.5s) from the power supply starting to oscillation starting.

The function for INHN terminal

Input terminal(INHN)	Output terminal(Q)	Oscillation	Notes
"H" Level	32.768kHz output	Oscillation	—
"L" Level	Hi-Z	Oscillation	—
OPEN	—	—	Unavailable

Frequency tolerance and Temperature characteristics

Temperature range(°C)	Frequency Tolerance (×10 ⁻⁶)
0~+50	±20
-10~+60	±30
-20~+70	±40
-40~+85	±50

The example for Circuit connection with MCU

