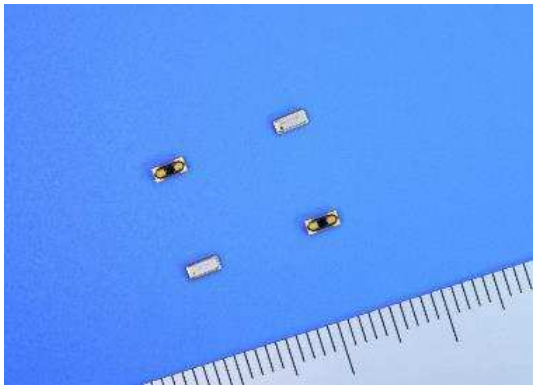
High accuracy Crystal Oscillator 32.768kHz SH-32R



Features

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

Applications

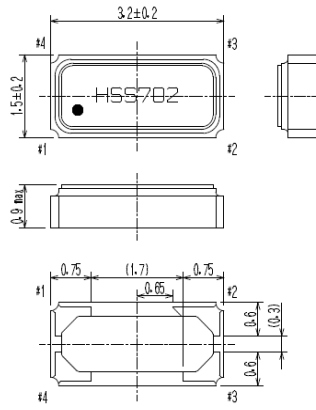
Smart Meter, IoT,Wearable device,
Industry device,High precision timing device,
Event data recorder

Specifications

Item	Symbol	Specifications	Unit	Conditions Note
Nominal Frequency	f_nom	32.768	kHz	
Frequency tolerance	f_tol	±3	$\times10^{-6}$	
Frequency temperature coefficient	f0-Tc	±50	$\times10^{-6}$	-40 to +85℃(+25℃ is reference)
Frequency / voltage coefficient	f0_V_{DD}	±1	$\times10^{-6}$/V	V_{DD}1.5V to 3.63V
Supply Voltage	V_{DD}	1.5～3.63	V	
Storage temperature	T_stg	-40～+105	℃	
Operating temperature	T_use	-40～+85	℃	
Current consumption	IDD	1.3 typ.	μA	No load condition
		2.5 max.	μA	
Symmetry	SYM	40/60	%	Load：30pF
Rise time	tr	40 max.	ns	Load：30pF output level 0.1V_{DD}→0.9V_{DD}
Fall time	tf	40 max.	ns	Load：30pF output level 0.9V_{DD}→0.1V_{DD}
Input voltage	V_{IL}	0.2VDD max.	V	INHN terminal
	V_{IH}	0.8VDD min.	V	INHN terminal
Output voltage	V_{OL}	0.1VDD max.	V	Q terminal
	V_{OH}	0.9VDD min.	V	Q terminal
Output load condition (CMOS)	C_{LOUT}	30 max.	pF	CMOS Loading
Start-up time	t_str	0.5 max.	sec	
Frequency aging	f_aging	±3	$\times10^{-6}$	First year

Unless otherwise stated, characteristics (specifications) shown in the above table are based on the Ta=+25℃、V_{DD}=3.3V condition.

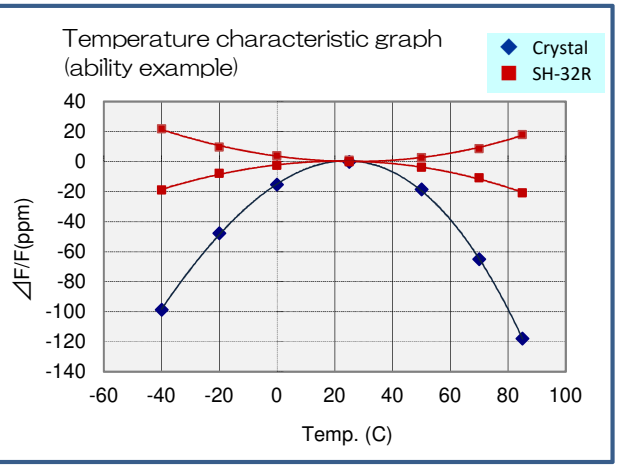
Dimensions



PIN Map

Pin	Connection	Function
#1	INHN	Q terminal output selector
#2	V_{SS}	Connects to GND
#3	Q	Outputs 32.768kHz
#4	V_{DD}	Connects to V_{DD}

Temperature characteristic



Seiko Instruments Inc.
Quartz Crystal Sales Department
1-8, Nakase, Mihamaku, Chiba-shi, Chiba 261-8507, Japan
Tel: +81-43-211-1207 Fax: +81-43-211-8030

High accuracy Crystal Oscillator 32.768kHz SH-32R

Maximum Rating

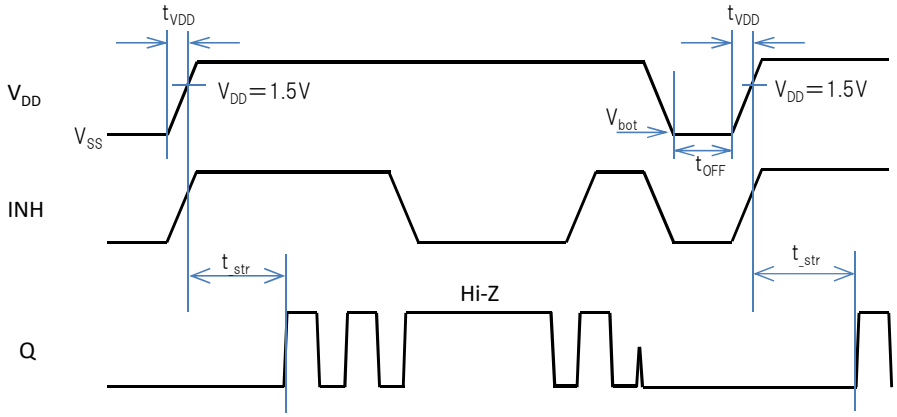
Item	Symbol	Conditions	Rated value	Unit
Supply voltage range	V_{DD}	V_{DD}-Vss	-0.3~+4.5	V
Input voltage range	Vin	input terminal (INHN)	-0.3~V_{DD}+0.3	V
Output voltage range	Vout	Output terminal (Q)	-0.3~V_{DD}+0.3	V
output current	Iout	Output terminal (Q)	±10	mA

*It is a value that should not be exceeded even for a moment.

Operating Condition

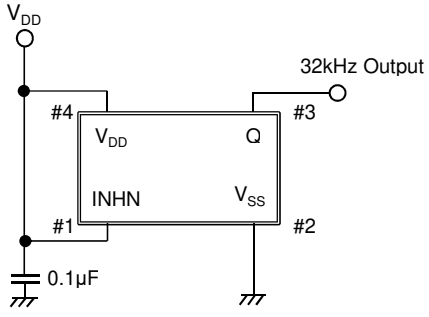
Item	Symbl	Conditions	Min.	Typ.	Max.	Unit
Supply voltage	V_{DD}		1.5	1.8	3.63	V
Input voltage	V_{IN}	Terminal INHN	V_{SS}	-	V_{DD}	V
Oscillation start	t_{VDD}		-	-	10	ms/V
	t_{OFF}		0.5	-	-	msec
	V_{bot}		-	-	0	V

Timing chart for applying power supply voltag



◆A power-on-clear circuit is built in to prevent unstable operation at power-on.
To ensure power-on-clear operation, V_{DD} must be held at 0V for 0.5msec or more and then started at less than 10ms/V.
◆In order to shorten the oscillation start-up time (t_str), a boot circuit is built in to increase the drive capability.
The boot circuit operates for 500msec after oscillation starts.
The oscillation frequency during boot circuit operation does not become 32.768kHz±3ppm.
◆If use it outside the operating condition range, it may affect the operation and reliability, so please use it within this range.

Circuit connection with MCU



Q terminal output setting

Terminal Q	Terminal INHN		remarks
32kHzOutput	High	0.8V_{DD}~V_{DD}+0.3	—
Hi-Z	Low	-0.3V~0.2V_{DD}	—
—	OPEN	—	Do not use

Input Low/High to the INHN pin to turn ON/OFF the 32kHz output.
Connect a bypass capacitor (0.01µF to 0.1µF) between the power supply pins (V_{DD}-V_{SS}).

Seiko Instruments Inc.
Quartz Crystal Sales Department
1-8, Nakase, Mihamaku, Chiba-shi, Chiba 261-8507, Japan
Tel: +81-43-211-1207 Fax: +81-43-211-8030