

CF5741 series Analog Clock CMOS IC

OVERVIEW

The CF5741 series are analog clock driver ICs using 32.768kHz reference frequency of crystal oscillator. Some versions in accordance with the combinations of each motor drive and alarm output characteristics can provide a wide range of applications for various clock specifications.

FEATURES

- Operating voltage 1.2 to 2.0V
- Low current 1.2µA (typ) / 1.5V
- Built-in oscillator circuits (32.768 kHz)
- Built-in crystal oscillator capacitors (C_G, C_D)
- Motor output Various motor output
- Alarm output Various alarm output
- Reset function
- Input debounce function (AI, RST/TC)
- Chip form (CF5741××)

PINOUT

(Top View)



SERIES LINEUP

		CF57	41AA	CF57	41AB	CF57	41BA	CF57	41BB	
Duilt in conscitor	XT terminal C _G (pF)	0		25		0		27		
Built-in capacitor	XTN terminal C _D (pF)	25		25		25		25		
Reset input	Active level	Low (Pull-up resistor)		Low (Pull-up resistor)		Low (Pull-up resistor)		Low (Pull-up resistor)		
Motor output	Active level	High		High		High		High		
	Hand drive cycle t _{CY} (sec)	1		1		1		1		
	Pulse width t _{PW} (msec)	31.25		31.25		46.875		46.875		
Alarm input	Active level		ow resistor)		Low (Pull-up resistor)		Low (Pull-up resistor)		Low (Pull-up resistor)	
	Test function (1/2V _{DD})	Yes		Yes		Yes		Yes		
Alarm output	Terminal	AO1	AO2/F	AO1	AO2/F	AO1	AO2/F ¹	AO1	AO2/F ¹	
	Active level	High	High	High	High	High	Low	High	Low	
	Fundamental frequency f _{PW} (Hz)	2048	32	2048	32	2048	2048	2048	2048	
	Modulation frequency f _{CY} (Hz)	8+1	-	8+1	-	8+1	8 + 1	8+1	8+1	

1. AO is complete reverse phase of AO. (even output is inactive.)

ORDERING INFORMATION

Device	Package		
CF5741××	Chip form		

BLOCK DIAGRAM



PIN DESCRIPTION

Number	Name	Description	Dimensions (µm)		
Number		Description	X	Y	
1	VSS	Ground	147	1048	
2	AO1	Alarm signal output1	147	867	
3	AO2 / F	Alarm signal output2/Frequency output	147	685	
4	XTN	Crystal oscillator connection	146	446	
5	ХТ	Crystal oscillator connection	146	206	
6	VDD	Power supply pin	1072	147	
7	RST / TC	Reset/Test clock input	1073	386	
8	AI	Alarm input	1073	626	
9	OUT1	Motor drive output 1	1072	867	
10	OUT2	Motor drive output 2	1072	1048	

SPECIFICATIONS

Absolute Maximum Ratings

Parameter	Parameter Symbol Condition		Rating	Unit
Supply voltage	$V_{DD} - V_{SS}$		- 0.3 to 5.0	V
Input voltage	V _{IN}		$V_{SS} \leq V_{IN} \leq V_{DD}$	V
Operating temperature	T _{OPR}		- 30 to 80	°C
Storage temperature	T _{STG}		- 65 to 150	°C

Electrical Characteristics

Ta = 25°C, V_{DD} = 1.5V, V_{SS} = 0V, X'tal (fo = 32.768kHz, $C_I \le 35k\Omega$), unless otherwise noted.

Parameter	Symbol	Condition		Rating		
Parameter			min	typ	max	– Unit
Supply voltage	V _{DD}		1.2	1.5	2.0	V
Current consumption	I _{DD}	OUT1, OUT2 = Open		1.2	4.0	μΑ
Ossillatan atart un time		$V_{DD} = 1.2V$			5.0	sec
Oscillator start-up time	t _{sta}	$V_{DD} = 1.5V$			2.0	sec
Motor output current	Імот	$V_{DD} = 1.2V, R_L = 200\Omega^1$	4.0			mA
Input resistance ² (AI, RST/TC)	R _{IN}		200		1200	kΩ
Oscillator stability	Δ f/f	$V_{DD} = 1.2V$ to 2.0V		0.5	1.0	ppm / 0.1V
	I _{OL1}	$V_{OL} = 0.75V$	900			μA
Alarm output current	I _{OL2}	V _{OL} = 0.75V	10			μΑ
(AO1, AO2/F)	I _{OH1}	V _{OH} = 0.75V	900			μΑ
	I _{OH2}	V _{OH} = 0.75V	10			μA
Frequency output voltage	V _F	$V_{DD} = 1.2V, C_{L} = 50pF$	0.4			V
Internal consoltance ³	C _G					pF
Internal capacitance ³	CD					pF

1. R_L is resistor of motor coil, that connect OUT1 between OUT2. 2. $R_{IN} = V_{DD}/I_{IS}$. I_{IS} is current that flow into VSS from AI, RST/TC, when AI, RST/TC short VSS. (AI, RST/TC build-in pull-up resistor.) 3. C_G is internal capacitor between VDD and XT. C_D is internal capacitor between VDD and XTN.

FUNCTIONAL DESCRIPTION

Motor Output

Stepping motor drive type



Sweeping motor drive type



Input Debounce Function (AI ,RST/TC)

Setting bouncing delay time prevents the circuit from the erroneous operation by AI and RST/TC input bouncing.

 $\label{eq:tons} \begin{array}{l} t_{ON} < 62.5 \mbox{ msec} : Alarm \mbox{ and reset input is ignored}. \\ 62.5 \le t_{ON} \le 125 \mbox{ msec} : Alarm \mbox{ and reset input is ignored or accepted}. \\ t_{ON} > 125 \mbox{ msec} : Alarm \mbox{ and reset input is accepted}. \end{array}$



Reset Function

RST/TC goes to active level when motor output can be stopped. Motor output(AO1,AO2) restart of another stopped output after reset off.



Alarm Output

Alarm input/output



- f_{PW} : Alarm fundamental frequency
- f_{CY} : Alarm modulation frequency

Test Function

Fundamental frequency alarm output function

AI goes to $1/2V_{DD}$ when AO1 and AO2 output alarm fundamental frequency. This frequency can used to adjust frequency.



Gain fast function

RST/TC is active level more than 125 msec. And RST/TC input outside clock when motor output gain fast. t_{CPW} is more less than 0.9765625 msec.



 $\begin{array}{l} t_{RES} \geq 125msec \\ t_{CPW} \leq 0.9765625msec \end{array}$

APPLICATION CIRCUITS



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