

AN8587SH

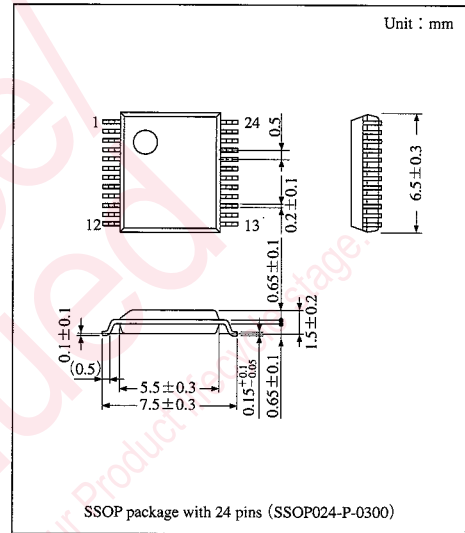
Cellular Telephone PLL IC Incorporating VCO

Overview

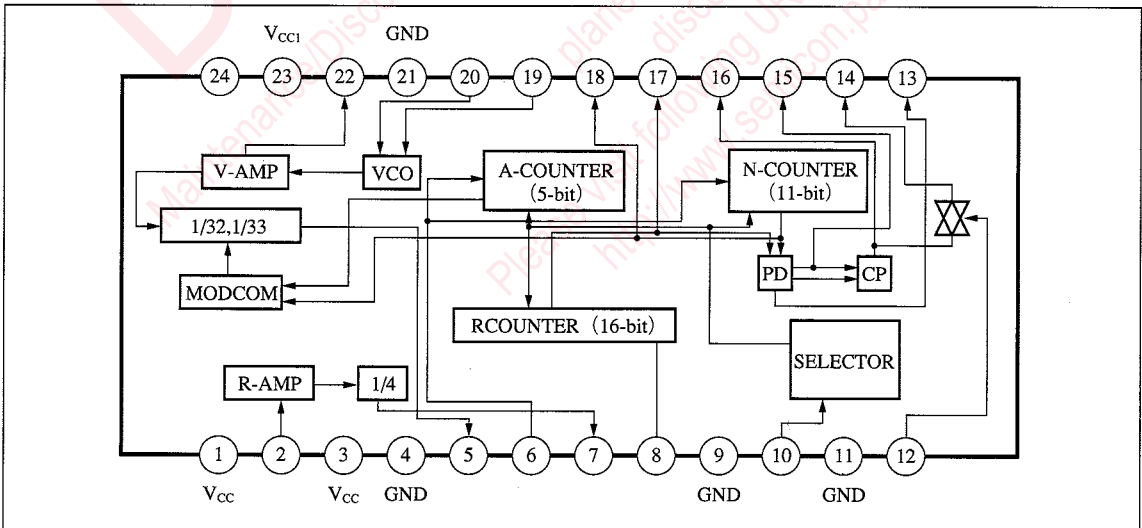
The AN8587SH is a mobile communication PLL IC (Bi-CMOS) incorporating a transmission VCO (TX IF : 90/110 MHz).

Features

- LPF switching for high-speed charge up
- VCO components and a PLL are integrated into an IC.
- Small-outline surface-mount package with 0.5 mm pitch
- Provides for a product with fewer components.



Block Diagram



Mobile
Communication

Pin Descriptions

Pin No.	Description	Pin No.	Description
1	V _{CC}	13	Lock detector output
2	Reference input	14	Phase detector output (2)
3	GND	15	External phase detector output (2)
4	V _{CC}	16	Phase detector output (1)
5	Var. prescaler (1/32, 1/33) output	17	Ref. counter output
6	Var. counter input	18	Var. counter output
7	Ref. prescaler (1/4) output	19	RES1
8	Ref. counter input	20	RES2
9	GND	21	GND
10	Frequency division switching control (1)	22	RF output
11	Frequency division switching control (2)	23	V _{CC1}
12	Phase detection output (2) control SW	24	Regulator output (2.5V)

Absolute Maximum Ratings (T_a = 25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	4.5	V
Supply current	I _{CC}	28	mA
Power dissipation	P _D	126	mW
Operating ambient temperature	T _{opr}	-20 to +75	°C
Storage temperature	T _{stg}	-55 to +125	°C

Recommended Operating Range

Parameter	Symbol	Range
Operating supply voltage range	V _{CC}	3.4V to 4.0V

Electrical Characteristics (T_a = 25 ± 2°C)

Parameter	Symbol	Condition	min	typ	max.	Unit
Current consumption	I _{CC}	SELECT1 to V _{CC} , SELECT2 to GND	—	16.0	19	mA
Reference input level	X _{in}	f _{in} = 10 to 20MHz f _{rout} = f _{in} /4	0.5	—	1.0	V _{P-P}
Power output (1)	P _{out1}	SELECT1 to V _{CC} , SELECT2 to GND (P _{out} : f _{out} = 110.0MHz)	-15	-11.0	—	dBm
Output leak current (1)	I _{LCP1}	V _{CC1} = 0V V _{CP1} = 3.7V, 0V	-1.0	0	1.0	μA
Output leak current (2)	I _{LCP2}	V _{CC1} = V _{CC} SWCONT grounded, V _{CP2} = 3.7V, 0V	-1.0	0	1.0	μA
Output voltage (High)	V _{HCP}	V _{CC1} = 0V I _{CP} = -1mA	2.9	3.35	3.8	V
Output voltage (Low)	V _{LCP}	V _{CC1} = 0V I _{CP} = 1mA	-0.10	0.17	0.80	V

Note) Unless otherwise specified, V_{CC} = 3.7V

Reference input : When SELECT1 is connected to V_{CC} and SELECT2 to GND,
f_{in} = 12.8MHz, and X_{in} = 0.7V_{P-P}.

Electrical Characteristics (Design Values for Reference) (Ta=25±2°C)

The following are design values for reference only (not guaranteed).

Parameter	Symbol	Condition	Typical value	Unit
Power output (2)	Pout2	SELECT1 to GND, SELECT2 to GND (Pout : fout=90.0MHz)	-11.0	dBm
Power output (3)	Pout3	SELECT1 to GND, SELECT2 to Vcc (Pout : fout=90.0MHz)	-11.0	dBm

Note) Unless otherwise specified, Vcc=3.7V

Reference input : When SELECT1 is connected to GND and SELECT2 to GND, fin = 12.80MHz, and Xin=0.7Vp-p.
When SELECT1 is connected to GND and SELECT2 to Vcc, fin = 15.36MHz, and Xin=0.7Vp-p.

Usage Note

Surge Breakdown Level

The following are design values for reference only (not guaranteed).

Condition : C=200pF, and R=0Ω

Pin No.	Positive breakdown level (V)
23	200 to 230

Counter Frequency Dividing Ratio

Status of SELECT1	L	L	H	H
Status of SELECT2	L	H	L	H
Ref Counter	256	256	256	×
A Counter	0	16	0	×
N Counter	225	187	275	×

◎ VCO's oscillation frequency, fout, is calculated as follows :
 $f_{out} = [(32 \times N) + A] \times [(f_{in}/4) \div R]$

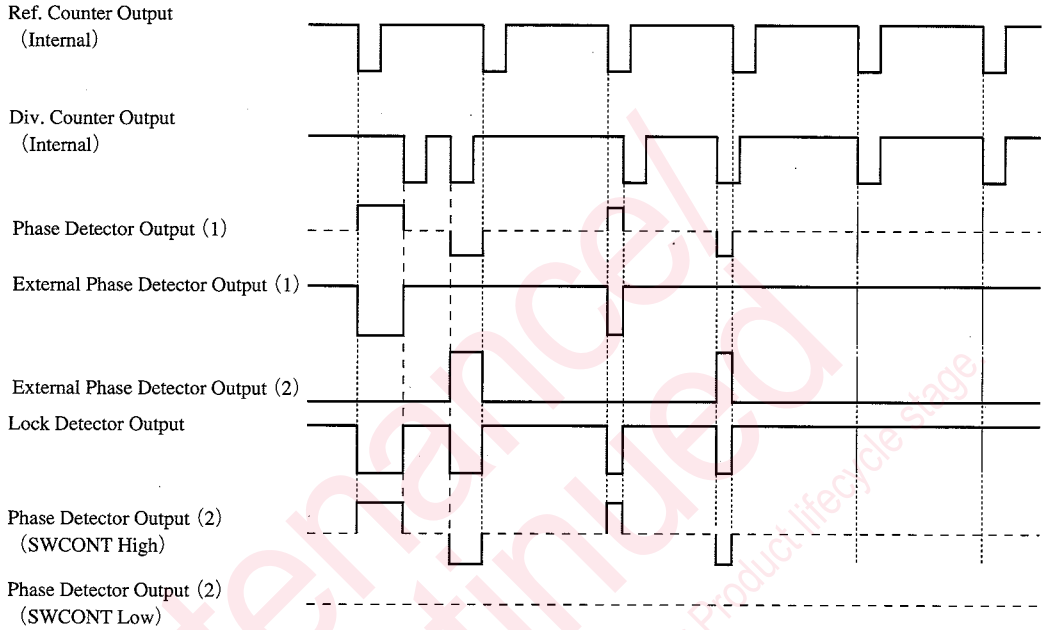
where R, A, and N are frequency dividing ratios of REF, A, and N counters respectively, and fin is the OSC frequency.
 If fin is 12.8MHz, then [(fin/4) ÷ R] is 12.5kHz.

◎ Examples of frequency dividing are :
 fout=90MHz, SELECT1 low, SELECT2 low, and fin=12.80MHz
 fout=90MHz, SELECT1low, SELECT2 high, and fin=15.36MHz
 fout=110MHz, SELECT1 high, SELECT2 low, and fin=12.80MHz

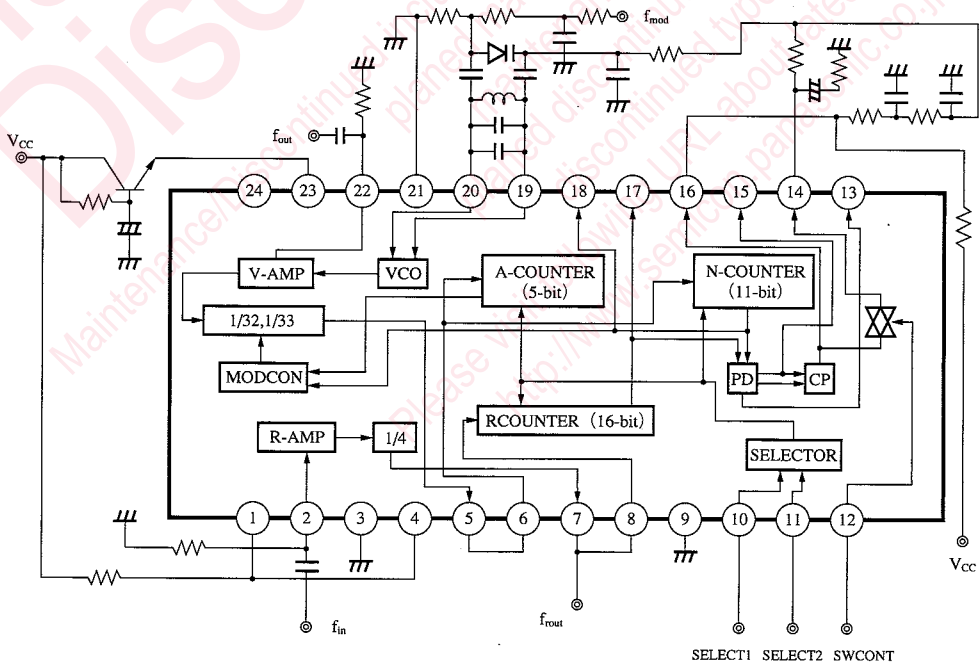
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■ PD Timechart



■ Application Circuit



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