27.0MHz VCXO Clock Genrerator

AK8145

Features

- 27.0MHz Crystal Input
- One 27.0MHz-Refrence output
- Built-in VCXO
  - Pull Range +/-100ppm
- Low Jitter Performance
  - Period Jitter:
    100 psec (p-p,Typ.)
  - Long term Jitter:
    150 psec (1000cycles,p-p,Typ.)
- Low Current Consumption:
  4.5mA (Typ.) at 3.3V
  60μA (Max.) at Power down
- Supply Voltage:
  3.0 – 3.6V
- Operating Temperature Range:
  -20 to +85℃
- Package:
  8-pin MSOP (Lead free)

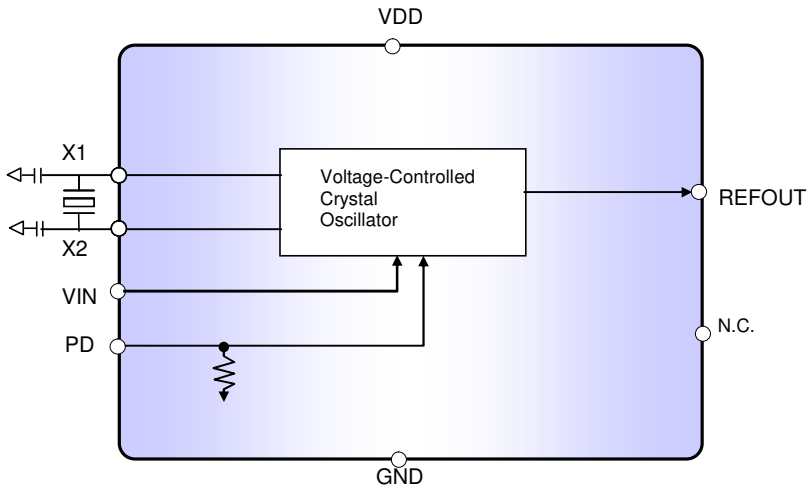
Description

The AK8145 is a low power, low jitter VCXO IC. AK8145 accepts 27MHz fundamental crystal input and produces a low-jitter output at the same frequency. 0V to +3.3V signal to VIN is used to control the output clock frequency. The AK8145 is available in a 8-pin MSOP package.

Applications

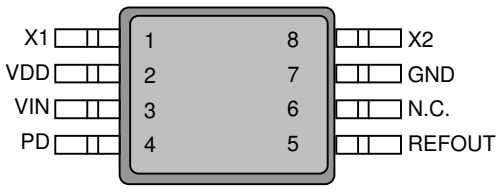
- Digital TV Sets
- Personal Video Recorders
- Set-Top-Boxes
- Multi Media Receivers

Block Diagram



AK8145 27MHz VCXO Clock Generator

Pin Descriptions



Package: 8-Pin MSOP(Top View)

Pin No.	Pin Name	Pin Type	Description
1	X1	XO	Crystal connection, Connect to 27.000MHz crystal
2	VDD	PWR	Power supply.
3	VIN	PWR	VCXO Control Voltage Input
4	PD	IN	Power down control. (1) L: REFOUT ON, H: Power down.
5	REFOUT	OUT	Reference Clock Output of VCXO based on 27.000MHz Crystal High-z at power down mode.
6	N.C.	IN	N.C. Please connect to GND.
7	GND	PWR	Ground.
8	X2	XI	Crystal connection, Connect to 27.000MHz crystal

(1) Internal pull down 100kΩ(Typ.)

Ordering Information

Part Number	Marking	Shipping Packaging	Package	Temperature Range
AK8145	8145	Tape and Reel	8-pin MSOP	-20 to 85 ℃

Absolute Maximum Rating

Over operating free-air temperature range unless otherwise noted (1)

Items	Symbol	Ratings	Unit
Supply voltage	VDD	-0.3 to 4.6	V
Input voltage	Vin	VSS-0.3 to VDD+0.3	V
Input current (any pins except supplies)	I_{IN}	± 10	mA
Storage temperature	Tstg	-55 to 130	°C

Note

(1) Stress beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to absolute-maximum-rating conditions for extended periods may affect device reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.

ESD Sensitive Device

This device is manufactured on a CMOS process, therefore, generically susceptible to damage by excessive static voltage. Failure to observe proper handling and installation procedures can cause damage. AKEMD recommends that this device is handled with appropriate precautions.

Recommended Operation Conditions

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating temperature	Ta		-20		85	°C
Supply voltage (1)	VDD		3.0	3.3	3.6	V
Output Load Capacitance	Cpl	Pin: REFOUT			25	pF

Note:

(1) Power to VDD requires to be supplied from a single source. A decoupling capacitor of 0.1μF for power supply line should be installed close to each VDD pin.

DC Characteristics

All specifications at VDD: over 3.0 to 3.6V, Ta: -20 to +85℃, 27MHz Crystal, unless otherwise noted

Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
Input leak current 1	I_{L1}	Pin: PD	-10		+75	μA
Input leak current 2	I_{L2}	Pin: VIN	-3		+3	μA
High Level Output Voltage	V_{OH}	Pin: REFOUT I_{OH}=-4mA	0.8VDD			V
Low level Output Voltage	V_{OL}	Pin: REFOUT I_{OL}=+4mA			0.2VDD	V
High Level Input Voltage	VI_H	Pin: PD	0.7VDD			V
Low level Input Voltage	VI_L	Pin: PD			0.3VDD	V
Current Consumption 1	I_{DD1}	No load PD=L Ta=25℃		4.5		mA
Current Consumption 2	I_{DD1}	No load PD=H Ta=25℃		0	60	μA

AC Characteristics

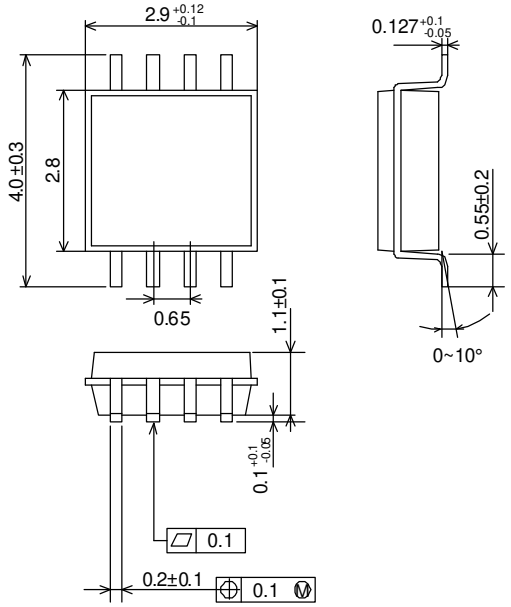
All specifications at VDD: over 3.0 to 3.6V, Ta: over -20 to +85℃, 27MHz Crystal, unless otherwise noted

Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
Crystal Clock Frequency				27.0		MHz
VCXO Pullable Range(2)		VIN at over 0 to VDD V	±100			ppm
VCXO Gain		VIN range at 1.5V±1.0V		100		ppm/V
Period Jitter (3)		REFOUT at 27.000MHz		100		ps
Long Term Jitter (3)		REFOUT at 27.000MHz 1000 cycle delay		150		ps
Output Clock Duty Cycle		Pin: REFOUT(1)	40	50	50	%
Output Clock Rise Time	t_{rise}	Pin: REFOUT(1)		2.0	4.0	ns
Output Clock Fall Time	t_{fall}	Pin: REFOUT(1)		2.0	4.0	ns
Power-up Time(5)		Pin: REFOUT (1)		1	2	ms

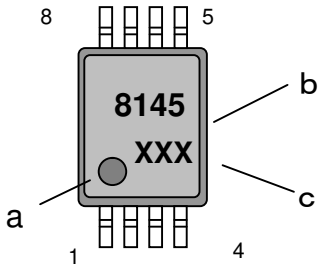
(1) Measured with load capacitance of 25pF
(2) Pullable range depends on crystal characteristics, on-chip load capacitance, and stray capacity of PCB. Min. ±100ppm is applied to AKEMD's authorized test condition.
(3) ± 3s in 10000 sampling or more
(4) Time to settle output into ± 0.1% of specified frequency

Package Information

- **Mechanical data**



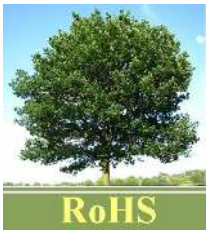
- **Marking**



a: #1 Pin Index
b: Part number
c: Date code (3 digits)

AKM and the logo - AKM - are the brand of AKEMD's IC's and identify that AKEMD continues to offer the best choice for high performance mixed-signal solution under this brand.

- **RoHS Compliance**



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(*) RoHS compliant products from AKEMD are identified with "Pb free" letter indication on product label posted on the anti-shield bag and boxes.

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