

## SMD Ultra-Low Phase Noise with Low G Sensitivity



17.4 x 14.38 x 5.6 mm  
Datasheet #1830A

### Features

- Small, Low Profile SMD Package
- Ultra-Low Phase Noise
- Low G sensitivity
- No Multiplication – no sub-harmonics

### Applications

- COTS/Dual use

### Absolute Maximum Ratings

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Input Break Down Voltage	Vcc		-0.5		5.5	V	
Storage temper.	Ts		-55		105	°C	
Control Voltage	Vc		-1		5.5	V	

### Electrical

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Frequency Range	F	Sine-wave	10		125	MHz	
Input Voltage	Vcc		3.135 4.75 4.7	3.30 5.0 4.8	3.465 5.25 4.9	V	A 0 D
Input Current	Icc	Sine			40 30 10	mA	@100MHz, 3.3V @100 MHz, 4.8 V @10 MHz, 3.3 V
Frequency Stability	$\Delta F/F$	vs. Temperature vs. Vcc aging		$\pm 10$ $\pm 0.1$ $\pm 1$ $\pm 3$ $\pm 4$	$\pm 12$	ppm ppm/V ppm/year ppm ppm	Except Option D First Year 7 years 10 years
G-sensitivity		Worst Direction		0.2 0.5	0.4	ppb/G	100 MHz 100 MHz, Option D 10 MHz
Setability	Vset		$V_{cc}/2 - 0.1V_{cc}$	$V_{cc}/2$	$V_{cc}/2 + 0.1 V_{cc}$	V	
Load		Sine CMOS	Internally AC-coupled 50 Ohm 10 KOhm // 15 pF				
Output power (output code "S")	P	Sine-wave Into 50 Ohms	7 10	10 13		dBm	3.3V 4.8V, 5.0V
Logic 1 (CMOS)	Voh		$0.7V_{cc}$			V	Output Code T
Logic 0 (CMOS)	Vol				0.1V	V	Output Code T
Duty Cycle			45/55		55/45	%	Output Code T
Rise/Fall Time	Tr/Tf			2	3		Output Code T
Spurious		Not setup related 10 KHz to 1 MHz Over temperature			-80 -110	dBc	Option D Guaranteed by design
Activity Dips		Over temperature		None			
Harmonics		Sine-wave		-30	-25	dBc	

## SMD Ultra-Low Phase Noise with Low G Sensitivity



17.4 x 14.38 x 5.6 mm

Datasheet #1830A

*Electrical*

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
SSB Phase Noise	$\mathcal{L}(\Delta f)$	@10 Hz		-95		dBc/Hz	@100MHz, Grade U
		@100 Hz		-125			@100MHz, Option D
		@1 KHz		-152			
		@10 KHz		-165			
		@100 KHz		-170			
		@100 Hz			-115		
		@1 KHz			-145		
		@10 KHz			-163		
		@100 KHz			-168		
		@1 Hz		-90			@10 MHz, Grade U
		@10 Hz		-120			
		@100 Hz		-143			
		@1 KHz		-158			
		@10 KHz		-160			
		@100 KHz		-160			
ADEV		0.1 s to 1 s		1E-11			@10 MHz, Grade U
Input Impedance			>10K Ohm				
Control voltage	Vc		0 0.1		Vcc 4.7	V	Option D
Modulation bandwidth	MB				1	KHz	
Initial Pullability	$\Delta F/F$	As shipped	$\pm 20$			ppm	From Nominal F
Absolute Pull Range (Guaranteed Capture Range)	$\Delta F/F$	Over All Conditions	$\pm 5$	$\pm 7$		ppm	Includes temperature, Vcc variations, and aging 10 years

*Environmental and Mechanical*

Parameter	Description
Operating temp. range	-20°C to 70°C MAX, for wider range only 5V or 4.8 V Vcc option is available, contact factory, see table to specify.
Mechanical Shock	Per MIL-STD-202, Method 213, Cond. E
Thermal Shock	Per MIL-STD-883, Method 1011, Cond. A
Vibration	Per MIL-STD-883, Method 2007, Cond. A
Soldering Conditions	See MAX reflow profile; The device may be reflowed once. Reflowing upside down is not allowed. NO CLEAN assembly is recommended.
Hermetic Seal	Leak rate less than $1 \times 10^{-8}$ atm.cc/s of helium (crystal only)



## Creating a Part Number

**AN - X 3A UX XX 5 - X - XX.XXX MHZ - X**

**Package Code**  
AN → 8 Pad 17x14x6mm SMD

Supply Voltage	
Code	Specification
0	5V ±5%
A	3.3V ±5%
D	4.8V ±0.1 V

Phase Noise Grade	
Code	Specification
U	Ultimate

Output	
Code	Specification
S	Sinewave
T	CMOS/TTL

Packaging	
Blank	Bulk

**Output Frequency**  
Please specify the frequency in units of MHz out to 3-digit accuracy after the decimal.  
Example: 10.000MHZ

Environmental	
Code	Specification
L	Contains a level of lead that is in excess of RoHS directive
R	RoHS compliant

Absolute Pull Range	
Code	Specification
5	±5.0 ppm

Temperature Range	
Code	In 5°C steps
First letter	Lowest temperature from A = -40°C
Second letter	Highest temperature to Z = 85°C
Examples	
IS	0°C to 50°C
GU	-10°C to 60°C
EW	-20°C to 70°C

Not all combinations are available. Consult Factory.

### Temperature Code Table

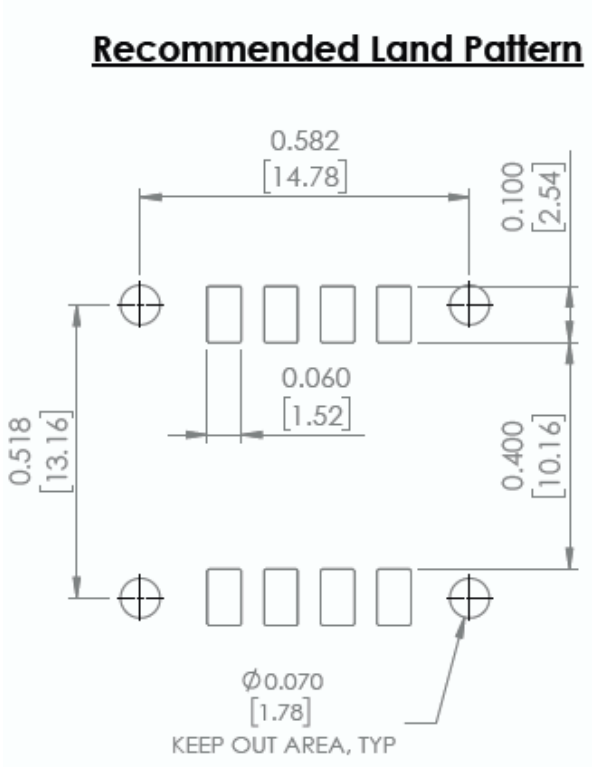
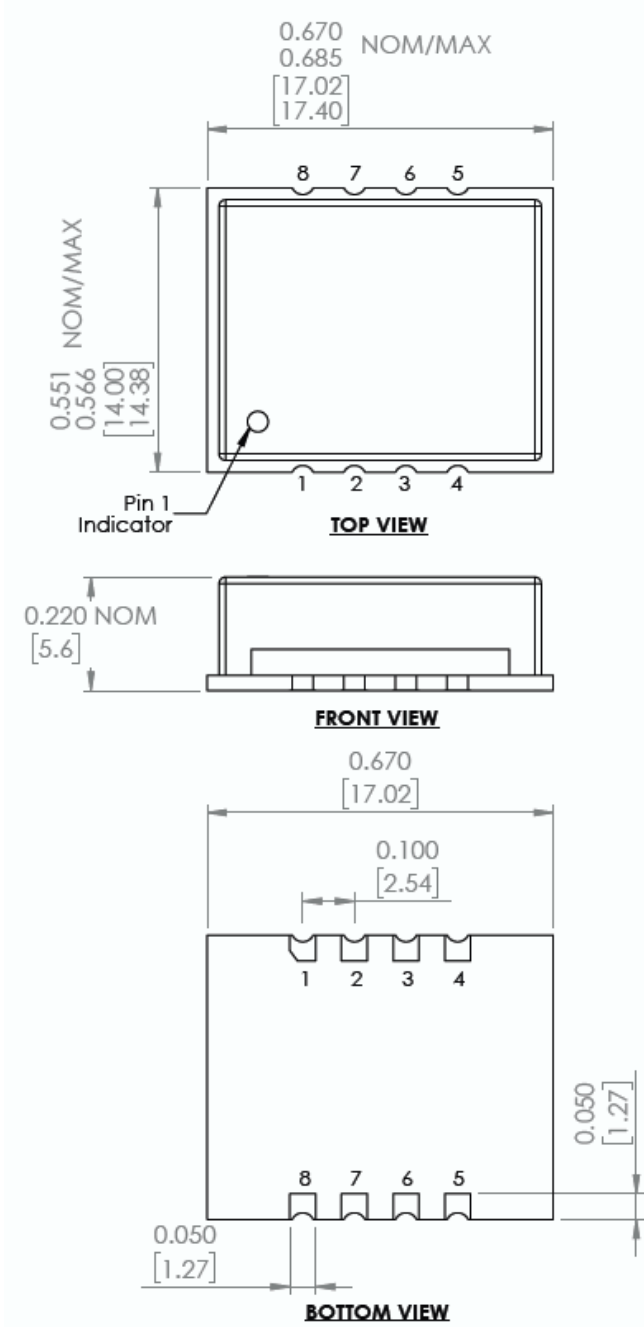
Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C
A	-40	F	-15	K	10	P	35	U	60	Z	85
B	-35	G	-10	L	15	Q	40	V	65		
C	-30	H	-5	M	20	R	45	W	70		
D	-25	I	0	N	25	S	50	X	75		
E	-20	J	5	O	30	T	55	Y	80		

Notes:

1) All parameters, unless otherwise specified, are at nominal conditions, i.e.: T=25°C, Nominal Vcc & Nominal Load



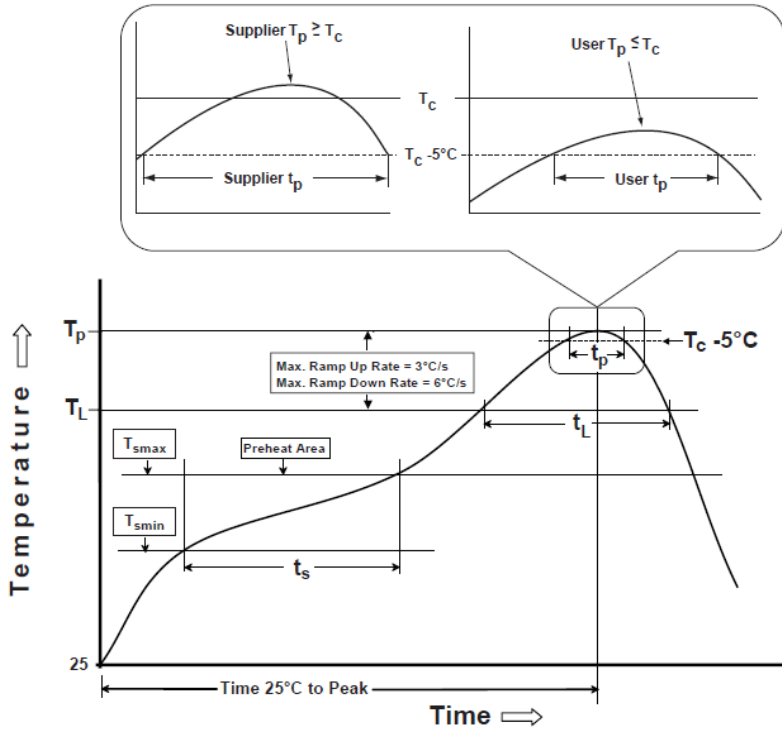
## Mechanical Dimensions



Pin #	Function
1	Vcc
2	GND
3	GND
4	GND
5	Output
6	Voltage Control
7	Do Not Connect
8	GND

Dimensions: inches [mm]

## Reflow Profile [JEDEC J-STD-020]



**Table 1**

SnPb Eutectic Process Classification Temperatures ( $T_c$ )		
Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5 mm	235°C	220°C
≥2.5 mm	220°C	220°C

**Table 2**

Pb-Free Process Classification Temperatures ( $T_c$ )			
Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350-2000	Volume mm <sup>3</sup> >2000
<1.6 mm	260°C	260°C	260°C
1.6 mm - 2.5 mm	260°C	250°C	245°C
>2.5 mm	250°C	245°C	245°C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum ( $T_{smin}$ )	100°C	150°C
Temperature maximum ( $T_{smax}$ )	150°C	200°C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate ( $T_{smax}$ to $T_p$ )	3°C/sec. max	3°C/sec. max
Liquidous temperature ( $T_L$ )	183°C	217°C
Time at liquidous ( $t_L$ )	60 - 150 sec.	60 - 150 sec.
Peak package body temperature ( $T_p$ )*	<b>see Table 1</b>	<b>see Table 2</b>
Time ( $t_p$ )** within 5°C of the specified classification temperature ( $T_c$ )	20 sec.	30 sec.
Ramp-down rate ( $T_p$ to $T_{smax}$ )	6°C/sec. max	6°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	1 max	1 max

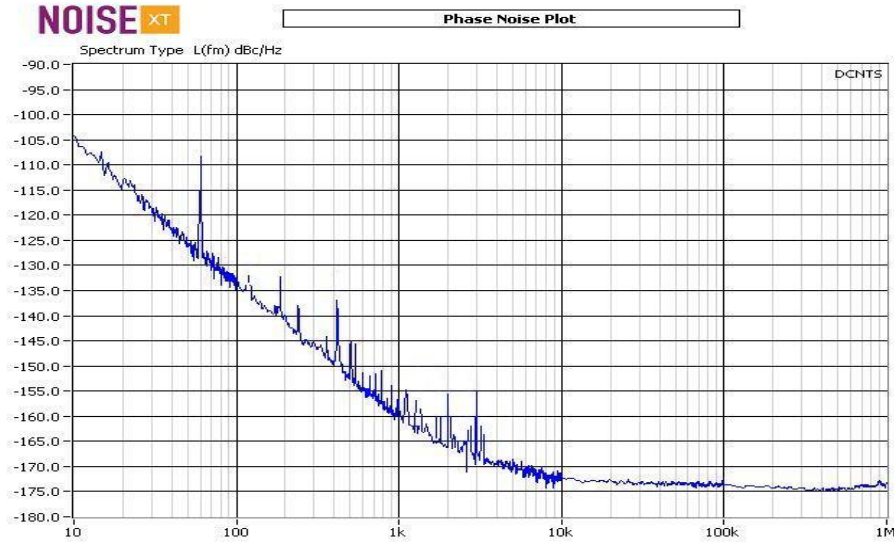
\*Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

\*\*Tolerance for time at peak profile temperature ( $t_p$ ) is defined as supplier minimum and a user maximum.



## Phase Noise Plots

100 MHz example



10 MHz example

