rev 1.0

Notebook LCD Panel EMI Reduction IC

Features

- FCC approved method of EMI attenuation.
- Provides up to 15dB EMI reduction.
- Generates a low EMI spread spectrum clock and a non-spread reference clock of the input frequency.
- Optimized for frequency range from 20 to 40MHz.
- Internal loop filter minimizes external components and board space.
- Selectable spread options: Down and Center.
- Low inherent cycle-to-cycle jitter.
- Eight spread % selections: ±0.625% to –3.5%.
- 3.3V operating voltage range.
- TTL or CMOS compatible inputs and outputs.
- Low power CMOS design.
- Supports notebook VGA and other LCD timing controller applications.
- Power down function for mobile application.
- Products available for industrial temperature range.
- Available in 8-pin SOIC and TSSOP.

Product Description

The P1819 is a versatile spread spectrum frequency modulator designed specifically for input clock frequencies from 20 to 40MHz. *Refer Input Frequency and Modulation Rate Table.* The P1819 reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of down stream clock and data dependent signals. The P1819 allows significant system cost savings by reducing the number of circuit board layers ferrite beads, shielding and other passive components that are traditionally required to pass EMI regulations.

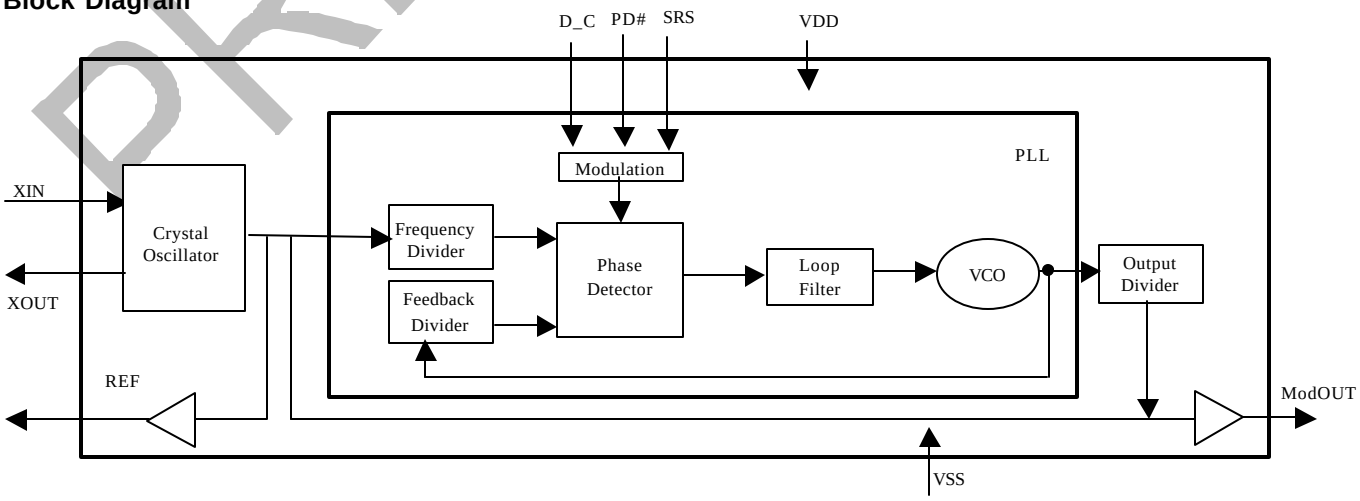
The P1819 modulates the output of a single PLL in order to "spread" the bandwidth of a synthesized clock, and more importantly, decreases the peak amplitudes of its harmonics. This results in significantly lower system EMI compared to the typical narrow band signal produced by oscillators and most frequency generators. Lowering EMI by increasing a signal's bandwidth is called 'spread spectrum clock generation'.

The P1819 uses the most efficient and optimized modulation profile approved by the FCC and is implemented in a proprietary all digital method.

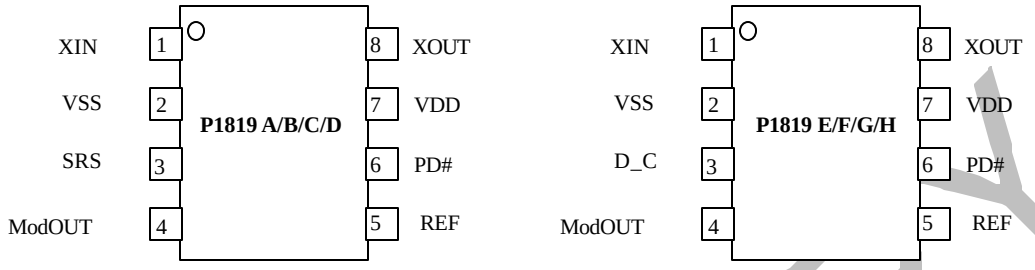
Applications

The P1819 is targeted towards EMI management for memory and LVDS interfacesin mobile graphic chipsets and high-speed digital applications such as PC peripheral devices, consumer electronics, and embedded controller systems.

Block Diagram



Pin Configuration



Pin Description

Pin#		Pin Name	Type	Description
1819A/B/C/D	1819E/F/G/H			
1	1	XIN	I	Connect to externally generated clock signal or crystal.
2	2	VSS	P	Ground Connection. Connect to system ground.
3		SRS	I	Spread range select. Digital logic input used to select frequency deviation. *(Refer Spread Deviation Selections Table.)* This pin has an internal pull-up resistor.
	3	D_C	O	Digital logic input used to select Down (LOW) or Center (HIGH) spread options. *Refer Spread Deviation Selections Table.* This pin has an internal pull-up resistor.
4	4	ModOUT	O	Spread spectrum clock output. *(Refer Input Frequency and Modulation Rate Selections Table and Spread Deviations Selections Table)*
5	5	REF	O	Non-modulated reference clock output of the input frequency.
6	6	PD#	I	Power down control pin. Pull LOW to enable Power-Down mode. This pin has an internal pull-up resistor.
7	7	VDD	P	Connect to +3.3V.
8	8	XOUT	O	Connect to crystal. No connect if externally generated clock signal is used.

Input Frequency and Modulation Rate

Part Number	Input Frequency Range	Output Frequency range	Modulation rate
P1819	20MHz to 40MHz	20MHz to 40MHz	Input Frequency / 512

Spread Deviation Selections

Part Number	SRS	D_C	Spread Deviation
P1819A	0	NA	-2.50% (DOWN)
	1		-3.50% (DOWN)
P1819B	0	NA	-1.25% (DOWN)
	1		-1.75% (DOWN)
P1819C	0	NA	±1.25% (CENTER)
	1		±1.75% (CENTER)
P1819D	0	NA	±0.625% (CENTER)
	1		±0.875% (CENTER)
P1819E	NA	0	-1.25% (DOWN)
		1	±0.625% (CENTER)
P1819F	NA	0	-2.5% (DOWN)
		1	±1.25% (CENTER)
P1819G	NA	0	-1.75% (DOWN)
		1	±0.875% (CENTER)
P1819H	NA	0	-3.5% (DOWN)
		1	±1.75% (CENTER)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{DD}, V_{IN}	Voltage on any pin with respect to GND	-0.5 to + 7.0	V
T_{STG}	Storage temperature	-65 to +125	°C
T_A	Operating temperature	0 to 70	°C
Note: These are stress ratings only and functional operation is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.			

DC Electrical Characteristics

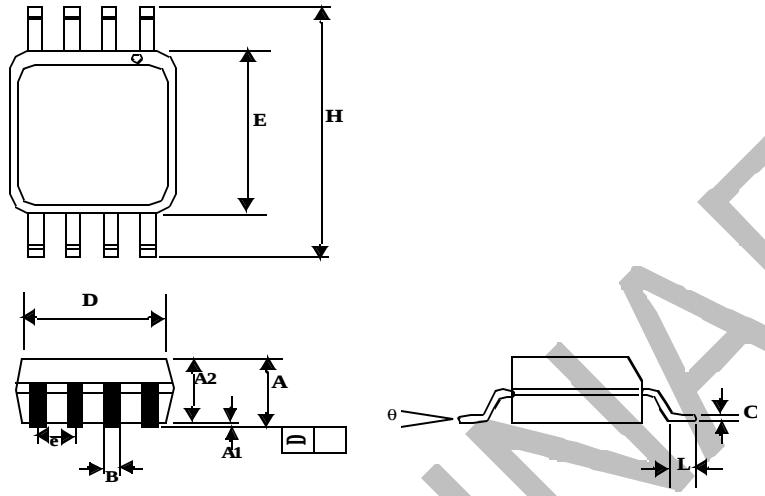
Symbol	Parameter	Min	Typ	Max	Unit
V_{IL}	Input low voltage	GND – 0.3	-	0.8	V
V_{IH}	Input high voltage	2.0	-	V_{DD} + 0.3	V
I_{IL}	Input low current (inputs D_C, PD#, SRS)	-60.0	-	-20.0	µA
I_{IH}	Input high current	-	-	1.0	µA
I_{XOL}	X_{OUT} output low current @ 0.4V, V_{DD} = 3.3V	2.0	-	12.0	mA
I_{XOH}	X_{OUT} output high current @ 2.5V, V_{DD} = 3.3V	-	-	12.0	mA
V_{OL}	Output low voltage V_{DD} = 3.3V, I_{OL} = 20mA	-	-	0.4	V
V_{OH}	Output high voltage V_{DD} = 3.3V, I_{OH} = 20mA	-	-	2.8	V
I_{CC}	Dynamic supply current normal mode 3.3V and 25pF probe loading	7.1 $f_{IN\ -min}$	-	26.9 $f_{IN\ -max}$	mA
I_{DD}	Static supply current standby mode	-	4.5	-	mA
V_{DD}	Operating voltage	-	3.3	-	V
t_{ON}	Power up time (first locked clock cycle after power up)	-	0.18	-	mS
Z_{OUT}	Clock output impedance	-	50	-	

AC Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
f_{IN}	Input frequency	20	-	40	MHz
f_{OUT}	Output frequency	20	-	40	MHz
t_{LH}*	Output rise time Measured at 0.8V to 2.0V	-	0.66	-	ns
t_{HL}*	Output fall time Measured at 0.8V to 2.0V	-	0.65	-	ns
t_{JC}	Jitter (cycle to cycle)	-200	-	200	ps
t_D	Output duty cycle	45	50	55	%
*t_{LH} and t_{HL} are measured into a capacitive load of 15pF					

Package Information

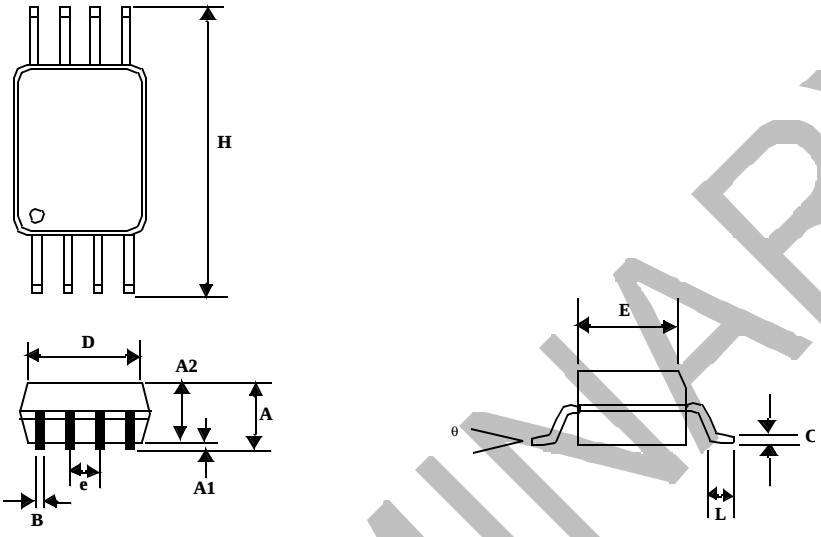
Mechanical Package Outline 8-Pin SOIC



Symbol	Dimensions in inches		Dimensions in millimeters	
	Min	Max	Min	Max
A	0.057	0.071	1.45	1.80
A1	0.004	0.010	0.10	0.25
A2	0.053	0.069	1.35	1.75
B	0.012	0.020	0.31	0.51
C	0.004	0.01	0.10	0.25
D	0.186	0.202	4.72	5.12
E	0.148	0.164	3.75	4.15
e	0.050 BSC		1.27 BSC	
H	0.224	0.248	5.70	6.30
L	0.012	0.028	0.30	0.70
è	0°	8°	0°	8°

Note: Controlling dimensions are millimeters
SOIC – 0.074 grams unit weight

Mechanical Package Outline 8-Pin TSSOP



	Dimensions in inches		Dimensions in millimeters	
Symbol	Min	Max	Min	Max
A		0.047		1.10
A1	0.002	0.006	0.05	0.15
A2	0.031	0.041	0.80	1.05
B	0.007	0.012	0.19	0.30
C	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.244	0.260	6.20	6.60
L	0.018	0.030	0.45	0.75
è	0°	8°	0°	8°

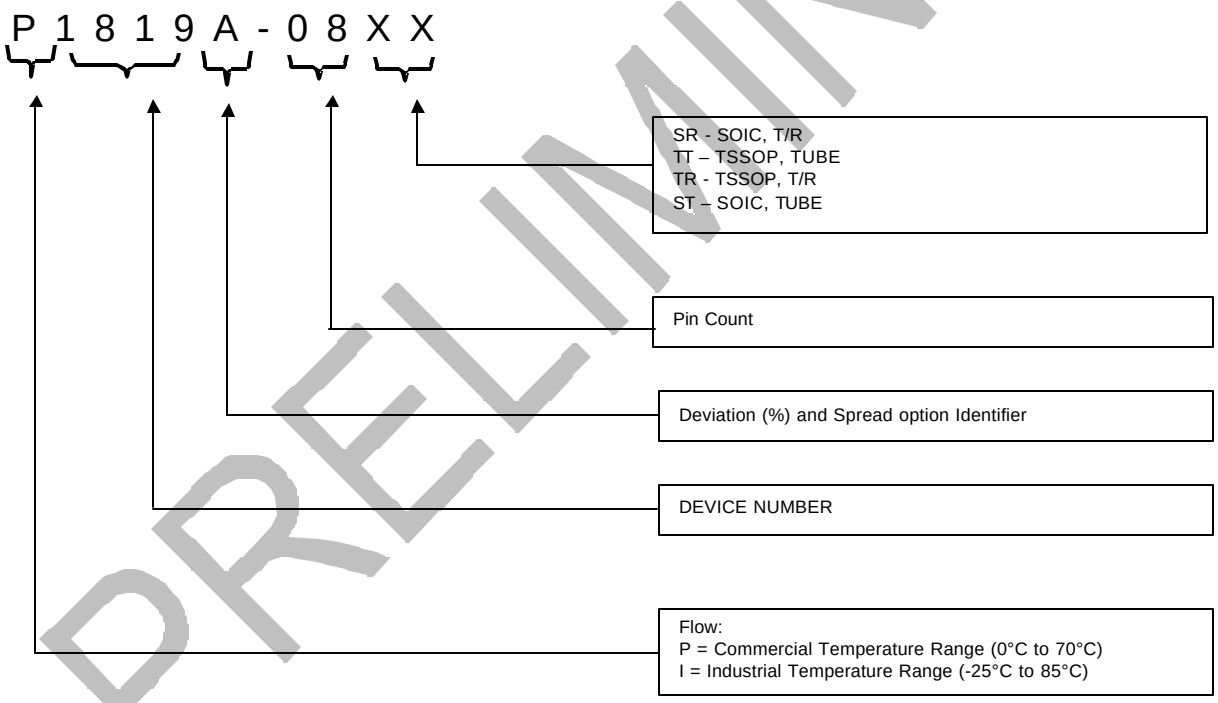
Note: Controlling dimensions are millimeters
TSSOP – 0.034 grams unit weight

Ordering Codes

X	1819	X	-08	XX
1	2	3	4	5

1. Flow Prefix:
   a. I = Industrial temperature range (-40°C to 85°C).
   b. P = Commercial temperature range (0°C to 70°C).
2. Device Number.
3. Deviation (%) and spread option identifier.
4. Device pin count.
5. Package Identifier.

Device Ordering Information



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Examples:

Part Number	Marking	Input Frequency (MHz)	Frequency Deviation (%)	Package Type	Qty / reel	Temperature (°C)
P1819A-08ST	P1819A	20-40	-2.5,-3.5	8-pin SOIC, tube		0 to 70
P1819A-08SR	P1819A	20-40	-2.5,-3.5	8-pin SOIC, tape & reel	2500	0 to 70
P1819A-08TT	P1819A	20-40	-2.5,-3.5	8-pin TSSOP, tube		0 to 70
P1819A-08TR	P1819A	20-40	-2.5,-3.5	8-pin TSSOP, tape and reel	2500	0 to 70

Products are available for industrial temperature range operation. Please contact factory for more information.

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Licensed under U.S patent numbers 5,488,627 and 5,631,920

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Preliminary Information
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