PulseCore

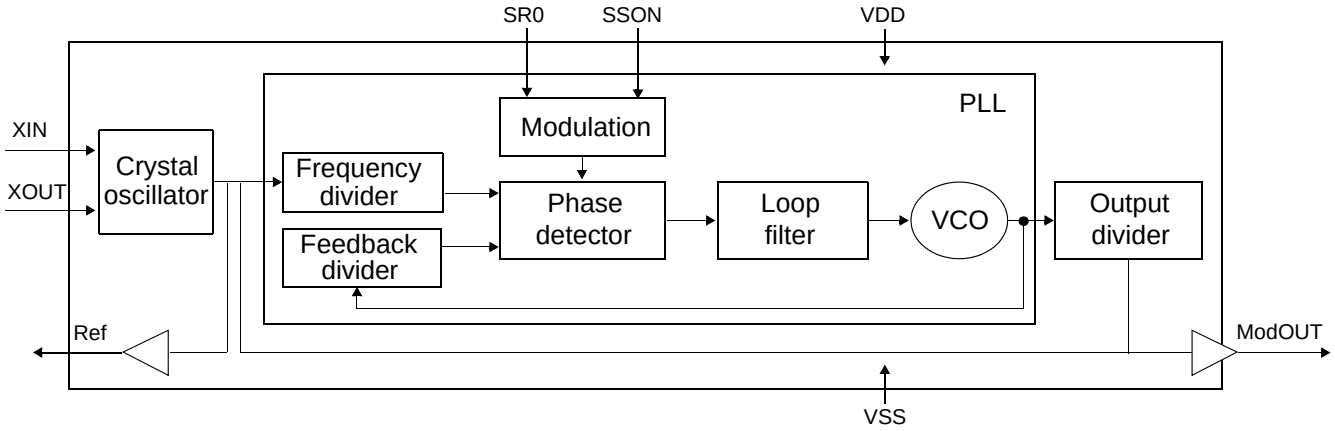
P1817A/B

Low-Power Mobile VGA EMI Reduction IC

Features

- FCC approved method of EMI attenuation
- Generates a low EMI spread spectrum and a non-spread reference signal of the input clock frequency
- Optimized for frequency range from
  - P1817A: 20 to 32 MHz operation
  - P1817B: 10 to 20 MHz operation
- Internal loop filter minimizes external components and board space
- Two selectable spread ranges
- Low inherent cycle-to-cycle jitter
- 3.3 and 5.0 V operating voltage
- CMOS/TTL compatible inputs and outputs
- ***Ultra low power*** CMOS design:
  3.17mA @3.3V, 10 MHz 6.20mA @5.0V, 10 MHz
  4.28mA @3.3V, 14 MHz 7.50mA @5.0V, 14 MHz
  5.50mA @3.3V, 20 MHz 9.50mA @5.0V, 20 MHz
- Supports notebook VGA and other LCD timing controller applications
- SSON pin for Spread Spectrum On/Off and Standby Mode controls
- Available in 8-pin SOIC and TSSOP

Block Diagram



Product Description

The P1817 is a versatile spread spectrum frequency modulator designed specifically for a wide range of clock frequencies. It reduces electromagnetic interference (EMI) at the clock source allowing system-wide reduction of EMI of downstream clock and data dependent signals. It allows significant system cost savings by reducing the number of circuit board layers and shielding traditionally required to pass EMI regulations.

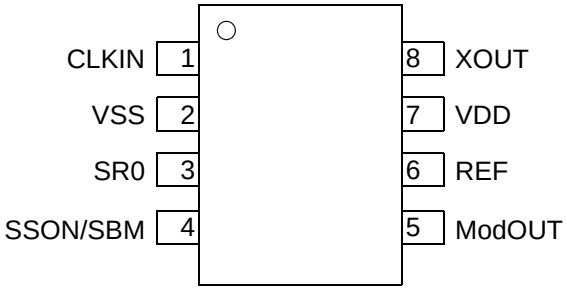
The P1817 modulates the output of a single PLL in order to spread the bandwidth of a synthesized clock, thereby decreasing the peak amplitudes of its harmonics. This results in significantly lower system EMI compared to the typical narrow band signal produced by oscillators and most clock generators. Lowering EMI by increasing a signal's bandwidth is called spread spectrum clock generation.

The P1817 uses the most efficient and optimized modulation profile approved by the FCC and is implemented by using a proprietary all-digital method.

Applications

The P1817 is targeted toward the notebook VGA chip and other displays using an LVDS interface, PC peripheral devices, and embedded systems.

Pin Diagram



Standby Mode Selection

CLKIN	SSON/SBM	Spread Spectrum	ModOUT	PLL	Mode
Disabled	0	N/A	Disabled	Disabled	Standby
Disabled	1	N/A	Disabled	Free running	Free running
Enabled	0	Off	Reference	Disabled	Buffer out
Enabled	1	On	Normal	Normal	Normal

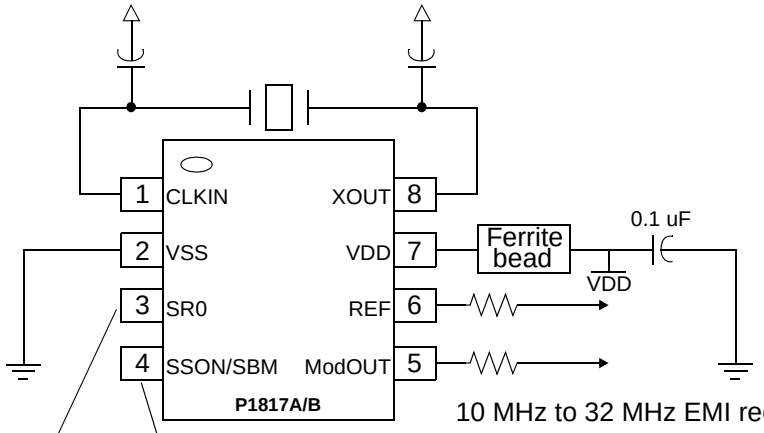
Spread Range Selection

SR0	Spreading range	Modulation rate
0	± 1.50%	(Fin/10) * 20.83 KHz
1	± 1.25%	(Fin/10) * 20.83 KHz

Pin Description

Pin #	Name	Type	Description
1	CLKIN	I	Connect to externally generated clock signal. To put the part into standby mode, disable the input clock signal to this pin and pull SSON/SBM (pin 4) low. (See Standby Mode Selection.)
2	VSS	P	Ground connection. Connect to system ground.
3	SR0	I	Digital logic input used to select Spreading Range. (See Spread Spectrum Selection.) This pin has an internal pull-up resistor.
4	SSON/SBM	I	Spread Spectrum On/Off and Standby Mode control. (See Standby Mode Selection.) This pin has an internal pull-up resistor.
5	ModOUT	O	Spread Spectrum clock output or Reference output. (See Standby Mode Selection.)
6	REF	O	Reference output.
7	VDD	P	Connect to +3.3 V or 5.0 V.
8	XOUT	I	Connect to crystal. No connect if externally generated clock signal is used.

Schematic for Notebook VGA Application



10 MHz to 32 MHz EMI reduced clock output.

Tie pin 3 SR0 high/low according to spread range desired. External resistors are not needed to pull these pins high.

Pin 4 SSON should be left unconnected to turn on Spread Spectrum.

Pull this pin low to turn Spread Spectrum off and enable Standby Mode.[1]

[1] To set the P1817 to standby mode, disable the input clock (pin 1 CLKIN), and pull pin 4 SSON/SBM low.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
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

DC Electrical Characteristics

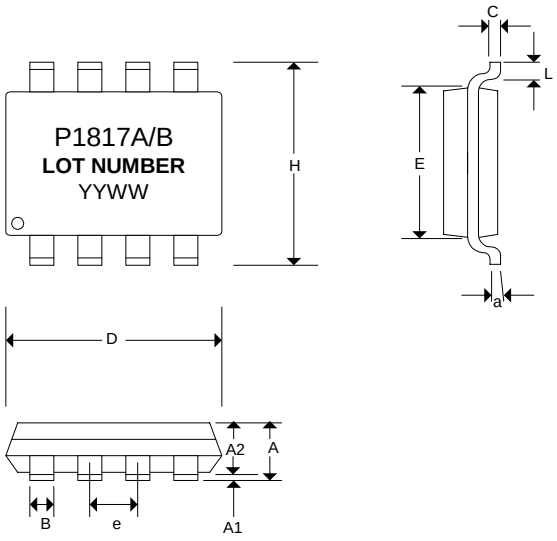
Symbol	Parameter		Min	Typ	Max	Units
V_{IL}	Input low voltage		GND - 0.3	–	0.8	V
V_{IH}	Input high voltage		2.0	–	V_{DD} + 0.3	V
I_{IL}	Input low current (pull-up resistor on inputs SR0 and SSON/SBM)		–	–	-35	µA
I_{IH}	Input high current		–	–	35	µA
I_{XOL}	XOUT output low current	at 0.4 V, V_{DD} = 3.3V	–	3	–	mA
		at 0.4 V, V_{DD} = 5.0 V	–	20	–	mA
I_{XOH}	XOUT output high current	at 2.5 V, V_{DD} = 3.3 V	–	3	–	mA
		at 4.5 V, V_{DD} = 5.0 V	–	20	–	mA
V_{OL}	Output low voltage	V_{DD} = 3.3 V, I_{OL} = 20 mA	–	–	0.4	V
		V_{DD} = 5.0 V, I_{OL} = 20 mA	–	–	–	V
V_{OH}	Output high voltage	V_{DD} = 3.3 V, I_{OL} = 20 mA	2.5	–	–	V
		V_{DD} = 5.0 V, I_{OL} = 20 mA	4.5	–	–	V
I_{DD}	Static supply current standby mode		–	0.6	–	mA
I_{CC}	Dynamic supply current	Normal mode: 3.3 V and 10 pF loading	f_{IN-min}	f_{IN-typ}	f_{IN-max}	
			3.2	–	7.0	mA
		5.0 V and 10 pF loading	6.2	–	13.6	mA
V_{DD}	Operating voltage		2.7	3.3	5.5	V
t_{ON}	Power-up time (first locked cycle after power up)		–	0.18	–	mS
Z_{OUT}	Clock output impedance		–	50	–	Ω

AC Electrical Characteristics

Symbol	Parameter		Min	Typ	Max	Units
f_{IN}	Input frequency		10	–	32	MHz
f_{OUT}	Output frequency		10	–	32	MHz
t_{LH}[1]	Output rise time	Measured at 0.8 V to 2.0 V	0.7	0.9	1.1	ns
		Measured at 1.2 V to 3.75 V	–	0.75	–	ns
t_{HL}[1]	Output fall time	Measured at 2.0 V to 0.8 V	0.6	0.8	1.0	ns
		Measured at 1.2 V to 3.75 V	–	0.75	–	ns
t_{JC}	Jitter (cycle to cycle)		–	–	360	ps
t_D	Output duty cycle		45	50	55	%

1 t_{LH} and t_{HL} are measured into a capacitive load of 15 pF.

Mechanical Package Outline (8-Pin SOIC)

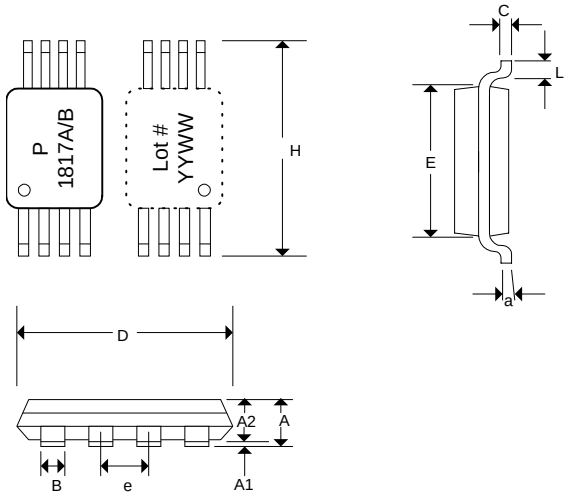


	INCHES			MILLIMETERS		
SYMBOL	MIN	NOR	MAX	MIN	NOR	MAX
A	0.057	0.064	0.071	1.45	1.63	1.80
A1	0.004	0.007	0.010	0.10	0.18	0.25
A2	0.053	0.061	0.069	1.35	1.55	1.75
B	0.012	0.016	0.020	0.31	0.41	0.51
C	0.004	0.006	0.001	0.10	0.15	0.25
D	0.186	0.194	0.202	4.72	4.92	5.12
E	0.148	0.156	0.164	3.75	3.95	4.15
e	0.050 BSC			1.27 BSC		
H	0.224	0.236	0.248	5.70	6.00	6.30
L	0.012	0.020	0.028	0.30	0.50	0.70
a	0°	5°	8°	0°	5°	8°

Note: Controlling dimensions are millimeters.

SOIC - 0.074 grams unit weight

Mechanical Package Outline (8-Pin TSSOP)



	INCHES			MILLIMETERS		
SYMBOL	MIN	NOR	MAX	MIN	NOR	MAX
A	–	–	0.047	–	–	1.10
A1	0.002	–	0.006	0.05	–	0.15
A2	0.031	0.039	0.041	0.80	1.00	1.05
B	0.007	–	0.012	0.19	–	0.30
C	0.004	–	0.008	0.09	–	0.20
D	0.114	0.118	0.122	2.90	3.00	3.10
E	0.169	0.173	0.177	4.30	4.40	4.50
e	0.026 BSC			0.65 BSC		
H	0.244	0.252	0.260	6.20	6.40	6.60
L	0.018	0.024	0.030	0.45	0.60	0.75
a	0°	–	8°	0°	–	8°

Note: Controlling dimensions are millimeters.

TSSOP - 0.034 grams unit weight

Ordering Information

Order Number	Marking	Input frequency (MHz)	Package type	Quantity/ reel	Temperature
P1817A-08ST	P1817A	20 – 32	8-pin SOIC, tube		0° C to 70° C
P1817A-08SR	P1817A	20 – 32	8-pin SOIC, tape & reel	2,500	0° C to 70° C
P1817A-08TT	P1817A	20 – 32	8-pin TSSOP, tube		0° C to 70° C
P1817A-08TR	P1817A	20 – 32	8-pin TSSOP, tape & reel	2,500	0° C to 70° C
P1817B-08ST	P1817B	10 – 20	8-pin SOIC, tube		0° C to 70° C
P1817B-08SR	P1817B	10 – 20	8-pin SOIC, tape & reel	2,500	0° C to 70° C
P1817B-08TT	P1817B	10 – 20	8-pin TSSOP, tube		0° C to 70° C
P1817B-08TR	P1817B	10 – 20	8-pin TSSOP, tape & reel	2,500	0° C to 70° C

Licensed under U.S. Patent Nos. 5,488,627 and 5,631,920.

Preliminary datasheet. Specifications subject to change without notice.