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 input frequency range from 20 to 32 MHz
- Internal loop filter minimizes external components and board space
- Two selectable spread ranges
- Low inherent cycle-to-cycle jitter
- 3.3 V or 5 V operating voltage
- CMOS/TTL compatible inputs and outputs
- Ultra low power CMOS design: 5.50 mA @3.3 V
- 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

Product Description

The P2560B 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.

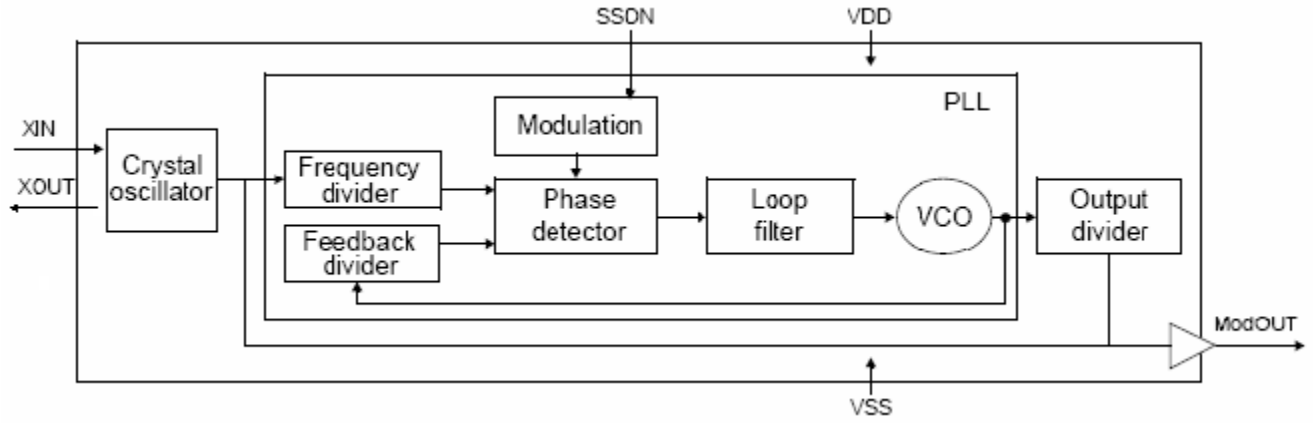
The P2560B modulates the output of a single PLL in order to spread the bandwidth of a synthesized clock, thereby decreasing the peak amplitudes of its harmonics. This results in significantly lower system EMI compared to the typical narrow band signal produced by oscillators and most clock generators. Lowering EMI by increasing a signal's bandwidth is called spread spectrum clock generation.

The P2560B uses the most efficient and optimized modulation profile approved by the FCC and is implemented by using a proprietary all-digital method.

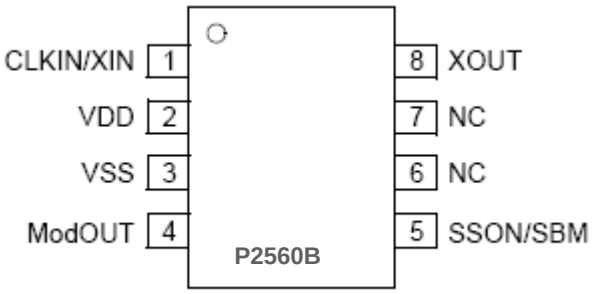
Applications

The P2560B is targeted toward the notebook VGA chip and other displays using an LVDS interface, PC peripheral devices, and embedded systems

Block Diagram



Pin Configuration



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

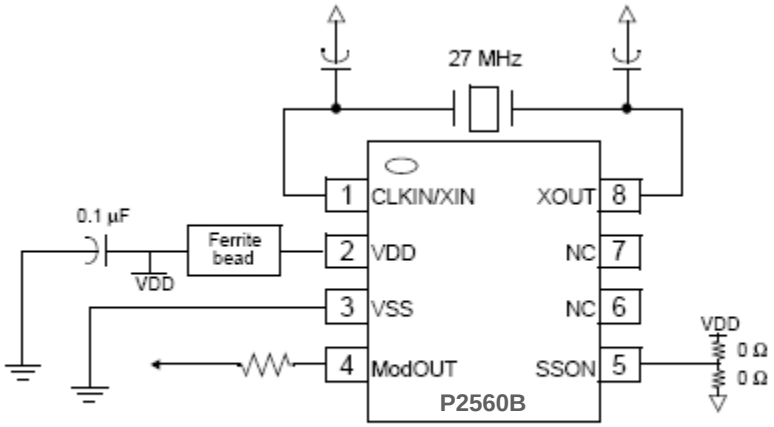
Spread Range Selection, VDD = 3.3 V

CLKIN frequency	Spreading range	Modulation rate
20 MHz	±1.16%	(CLKIN/10) * 20.83 kHz
25 MHz	±1.13%	
27 MHz	±1.11%	
30 MHz	±1.0%	
32 MHz	±1.0%	

Pin Description

Pin#	Pin Name	Type	Description
1	XIN/CLK	I	Crystal connection or external reference frequency input. This pin has dual functions. It can be connected to either an external crystal or an external reference clock.
2	XOUT	O	Crystal connection. If using an external reference, this pin must be left unconnected.
3	DIV2	I	Digital logic input used to select normal output mode or divide-by-2 output mode. When this pin is HIGH, the frequency of the output clock is the same as the input clock frequency. When it is tied LOW, the output frequency is half the input clock frequency. This pin has an internal pull-up resistor.
4	VSS	P	Ground to entire chip.
5	SR0	I	Digital logic input used to select Spreading Range (Refer Spread Deviation Table). This pin has an internal pull-up resistor.
6	SSON#	I	Digital logic input used to enable Spread Spectrum function (Active LOW). Spread Spectrum function enabled when LOW, disabled when HIGH. This pin has an internal pull-low resistor.
7	MODOUT	O	Spread spectrum low EMI output.
8	VDD	P	Power supply for the entire chip (5V).

Schematic for Notebook VGA Application



Use either pull-up or pull-down resistors with 0 Ω.

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

DC Electrical Characteristics

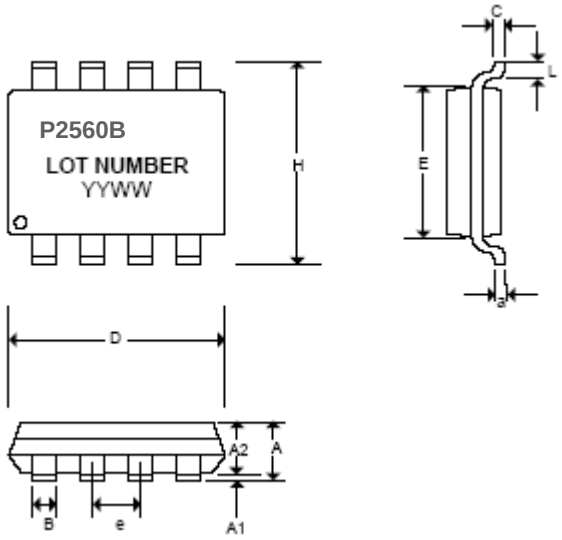
Symbol	Parameter		Min	Typ	Max	Unit
V_{IL}	Input low voltage		GND - 0.3	–	0.8	V
V_{IH}	Input high voltage		2.0	–	VDD + 0.3	V
I_{IL}	Input low current (pull-up resistor on inputs SR0 and SSON/SBM)		–	–	-35	µA
I_{IH}	Input high current		–	–	35	µA
I_{XOL}	XOUT output low current	at 0.4 V, V_{DD} = 3.3V	–	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:	fIN-min	fIN-typ	fIN-max	
		3.3 V and 10 pF loading	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	Unit
f_{IN}	Input frequency		20	–	32	MHz
f_{OUT}	Output frequency		20	–	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	%

Package Information

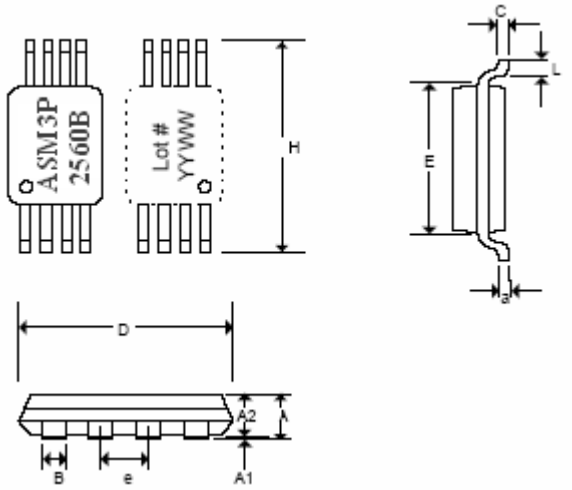
8-Pin SOIC



SYMBOL	INCHES			MILLIMETERS		
	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	0.010	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

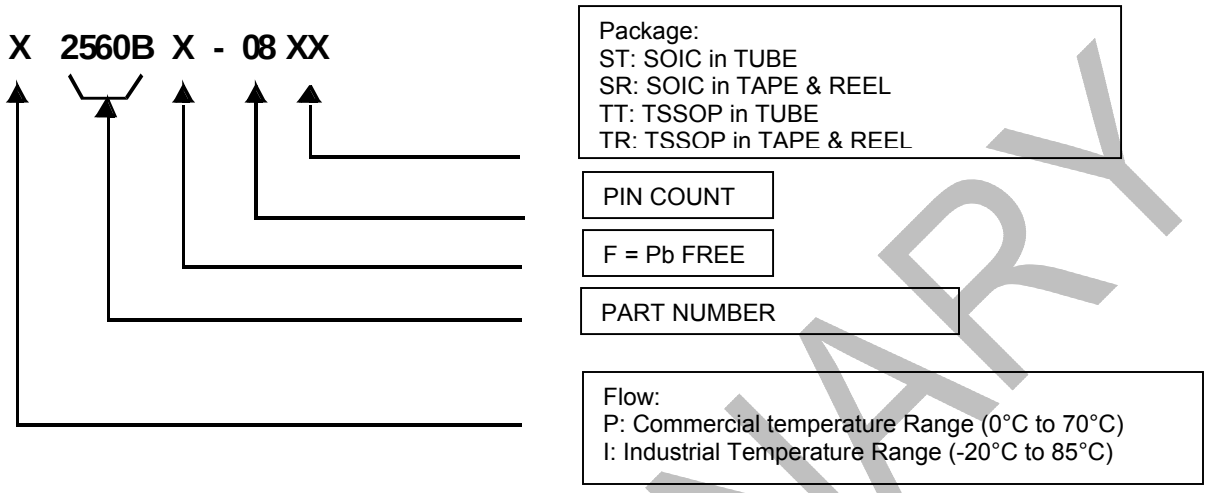
8-Pin TSSOP



SYMBOL	INCHES			MILLIMETERS		
	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



Examples

Ordering Code	Package Type	Operating Range
P2560B-08ST	8-pin 150mil SOIC	Commercial
I2560B-08SR	8-pin SOIC T&R	Industrial
P2560BF-08ST	8-pin TSSOP Tube	Commercial
I2560BF-08SR	8-pin TSSOP T&R	Industrial

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