

Low Frequency EMI Reduction

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 32MHz
- Internal loop filter minimizes external components and board space
- Two selectable spread ranges
- 3.3V Operating Voltage
- Ultra low power CMOS design: 5.50 mA @3.3V
- Supports notebook VGA and other LCD timing controller applications
- Available in 8-pin SOIC and TSSOP

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.

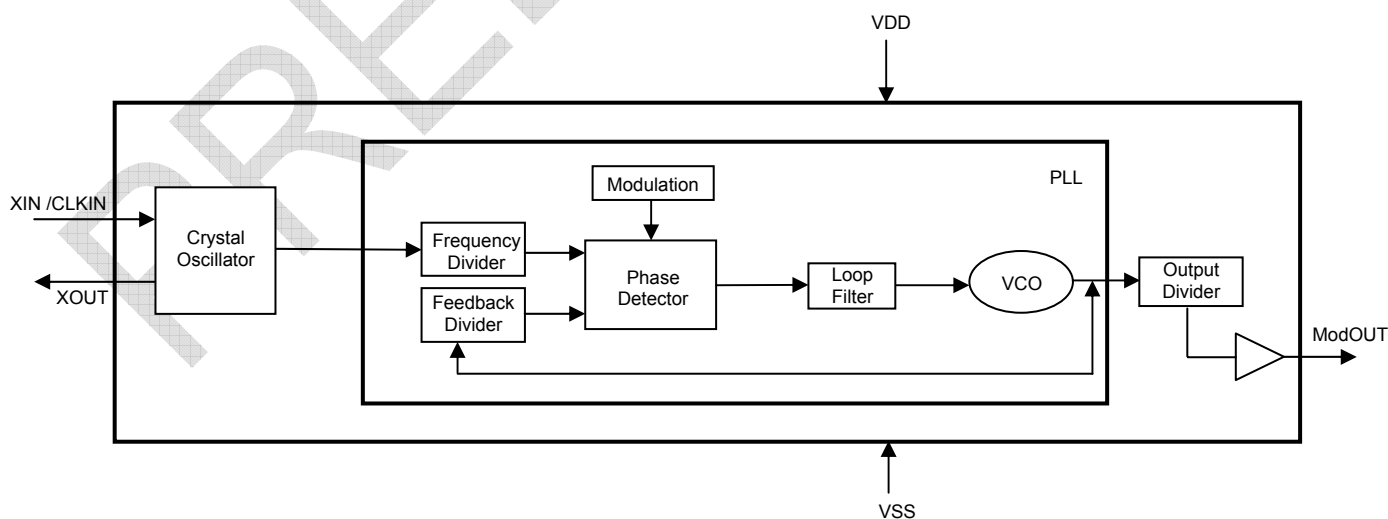
Applications

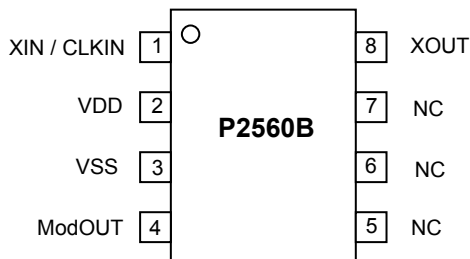
The P2560B is targeted toward the notebook VGA chip and other displays using an LVDS interface, PC peripheral devices and embedded systems.

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

Block Diagram





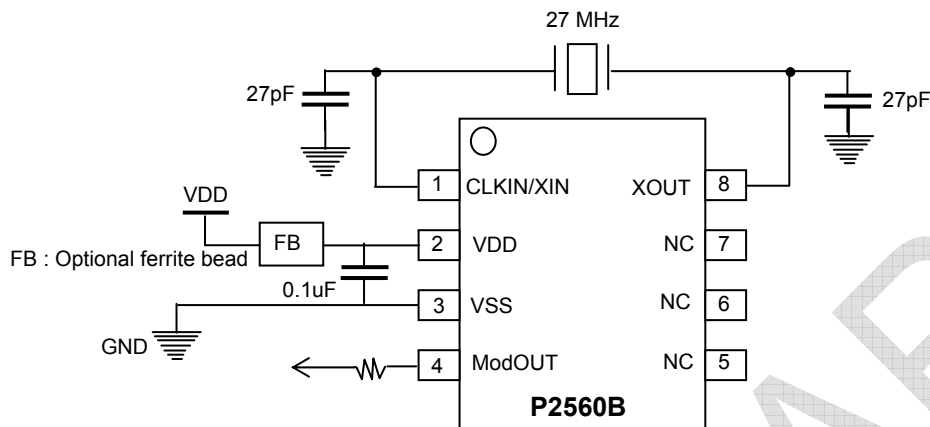
Pin Description

Pin#	Pin Name	Type	Description
1	XIN / CLKIN	I	Crystal Connection or external frequency input. This pin has dual functions. It can be connected to either an external crystal or an external reference clock
2	VDD	P	Power Supply for the entire chip.
3	VSS	P	Ground to entire chip.
4	ModOUT	O	Spread spectrum low EMI output.
5	NC	-	No Connect
6	NC	-	No Connect
7	NC	-	No Connect
8	XOUT	O	Crystal Connection. If using an external reference, this pin must be left unconnected.

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	±1.10%	
32 MHz	±1.10%	

Schematic for Notebook VGA Application



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{DD}, V_{IN}	Voltage on any pin with respect to Ground	-0.5 to +4.6	V
T_{STG}	Storage temperature	-65 to +125	°C
T_A	Operating temperature	-40 to +85	°C
T_s	Max. Soldering Temperature (10 sec)	260	°C
T_J	Junction Temperature	150	°C
T_{DV}	Static Discharge Voltage (As per JEDEC STD 22- A114-B)	2	KV

Note: These are stress ratings only and are not implied for functional use. Exposure to absolute maximum ratings for prolonged periods of time may affect device reliability.

DC Electrical Characteristics

Symbol	Parameter		Min	Typ	Max	Unit
V _{IL}	Input Low Voltage		VSS – 0.3	-	0.8	V
V _{IH}	Input High Voltage		2.0	-	VDD + 0.3	V
I _{IL}	Input Low current		-60.0	-	-35	μA
I _{IH}	Input High current		-	-	35	μA
I _{XOL}	XOUT Output low current	V _{XOL} at 0.4V, V _{DD} = 3.3V	-	3	-	mA
I _{XOH}	XOUT Output high current	V _{XOH} at 2.5V, V _{DD} = 3.3V	-	3	-	mA
V _{OL}	Output Low Voltage	V _{DD} = 3.3V, I _{OH} = 20mA	-	-	0.4	V
V _{OH}	Output High Voltage	V _{DD} = 3.3V, I _{OH} = 20mA	2.5	-	-	V
I _{DD}	Static supply current	CLKIN / XIN pulled LOW	-	0.6	-	mA
I _{CC}	Dynamic supply current	3.3V and 10pF loading	3.2	-	7.0	mA
V _{DD}	Operating Voltage		3.0	3.3	3.6	V
t _{ON}	Power up time (first locked clock cycle after power up)		-	0.18	-	mS
Z _{OUT}	Clock Output impedance		-	50	-	Ω

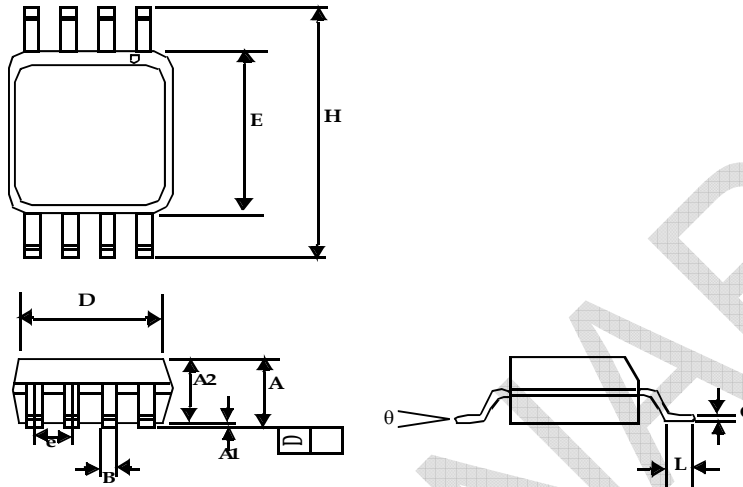
AC Electrical Characteristics

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 from 0.8V to 2.0V	0.7	0.9	1.1	nS
t _{HL} ¹	Output Fall time	Measured from 2.0V to 0.8V	0.6	0.8	1.0	nS
t _{JC}	Jitter (Cycle to cycle)		-	-	360	pS
t _D	Output Duty cycle		45	50	55	%

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

Package Information

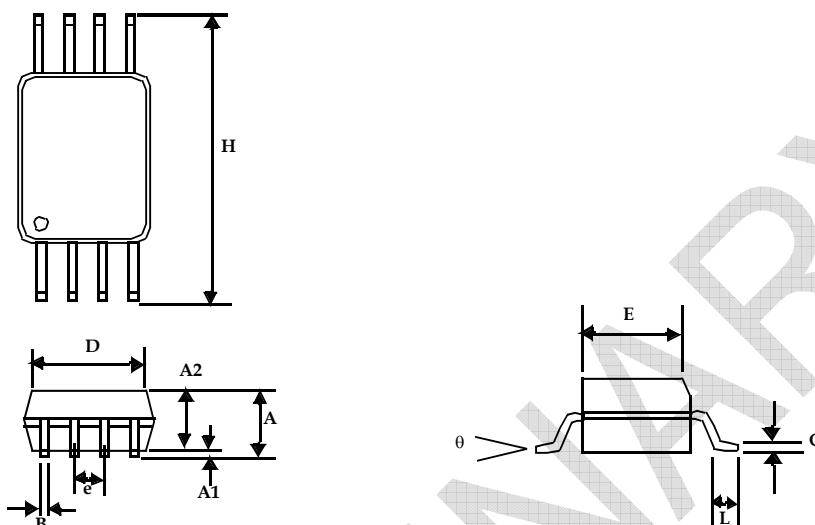
8-lead (150-mil) SOIC Package



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A1	0.004	0.010	0.10	0.25
A	0.053	0.069	1.35	1.75
A2	0.049	0.059	1.25	1.50
B	0.012	0.020	0.31	0.51
C	0.007	0.010	0.18	0.25
D	0.193 BSC		4.90 BSC	
E	0.154 BSC		3.91 BSC	
e	0.050 BSC		1.27 BSC	
H	0.236 BSC		6.00 BSC	
L	0.016	0.050	0.41	1.27
θ	0°	8°	0°	8°

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

8-lead Thin Shrunk Small Outline Package (4.40-MM Body)



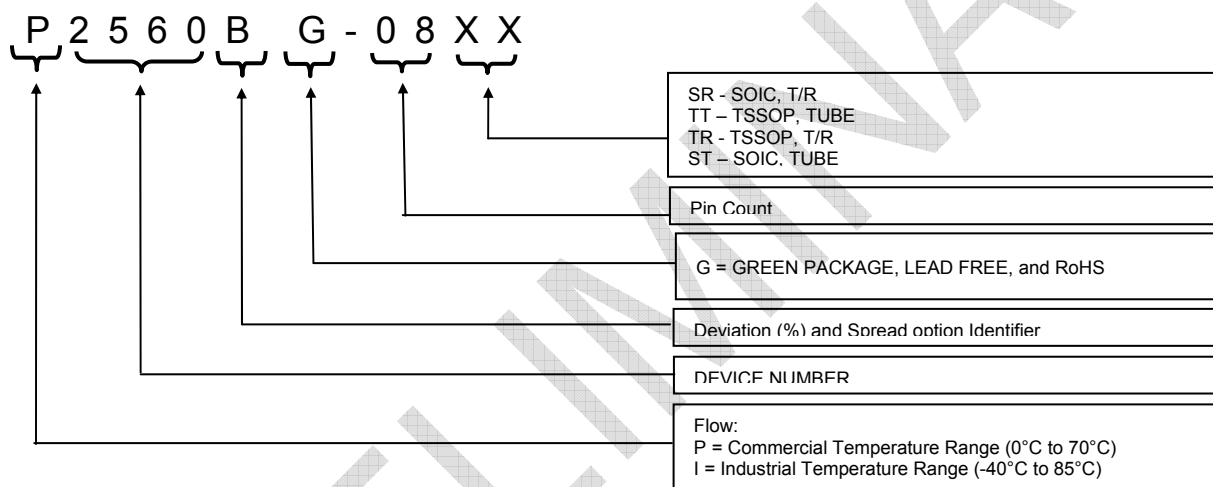
Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A		0.043		1.10
A1	0.002	0.006	0.05	0.15
A2	0.033	0.037	0.85	0.95
B	0.008	0.012	0.19	0.30
c	0.004	0.008	0.09	0.20
D	0.114	0.122	2.90	3.10
E	0.169	0.177	4.30	4.50
e	0.026 BSC		0.65 BSC	
H	0.252 BSC		6.40 BSC	
L	0.020	0.028	0.50	0.70
θ	0°	8°	0°	8°

Note: Controlling dimensions are millimeters
TSSOP – 0.0325 grams unit weight

Ordering Information

Part number	Marking	Package Configuration	Temperature Range
P2560BG-08ST	P2560BG	8-Pin SOIC, Tube, Green	Commercial
P2560BG-08SR	P2560BG	8-Pin SOIC, Tape and Reel, Green	Commercial
I2560BG-08ST	I2560BG	8-Pin SOIC, Tube, Green	Industrial
I2560BG-08SR	I2560BG	8-Pin SOIC, Tape and Reel, Green	Industrial
P2560BG-08TT	P2560BG	8-Pin TSSOP, Tube, Green	Commercial
P2560BG-08TR	P2560BG	8-Pin TSSOP, Tape and Reel, Green	Commercial
I2560BG-08ST	I2560BG	8-Pin TSSOP, Tube, Green	Industrial
I2560BG-08SR	I2560BG	8-Pin TSSOP, Tape and Reel, Green	Industrial

Device Ordering Information





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Note: This product utilizes US Patent # 6,646,463 Impedance Emulator Patent issued to PulseCore Semiconductor, dated 11-11-2003

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