Low Power Notebook LCD Panel EMI Reduction IC

Features

- FCC approved method of EMI attenuation
- Generates a low EMI spread spectrum of the input clock frequency
- Optimized for frequency range:
  P1727X: 20MHz to 40MHz
- Internal loop filter minimizes external components and board space
- 8 different frequency deviations ranging from +/-0.625% to –3.50%
- Low inherent Cycle-to-cycle jitter
- 3.3V Operating Voltage
- Supports notebook VGA and other LCD timing controller applications
- Available in 8 pin SOIC and TSSOP
- Qualified for Industrial Temp Spec. (-40°C to +85°C)

Product Description

The P1727 is a versatile spread spectrum frequency modulator designed specifically for a wide range of clock frequencies. The P1727 reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of down stream (clock and data dependent signals). The P1727 allows significant system cost savings by reducing the number of circuit board layers and shielding that are traditionally required to pass EMI regulations.

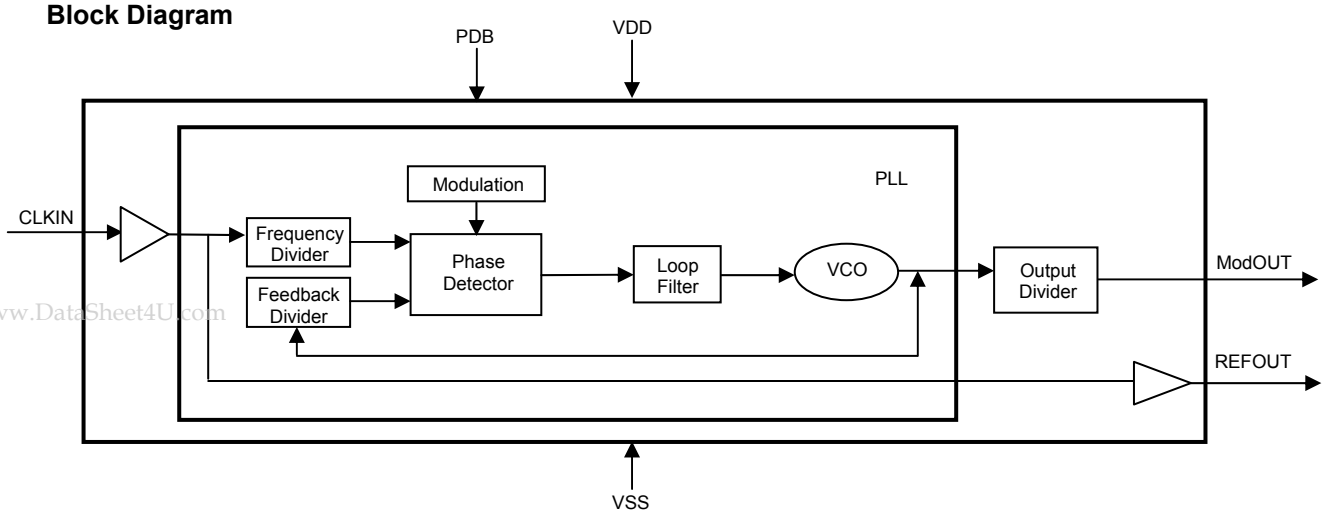
The P1727 modulates the output of a single PLL in order to “spread” the bandwidth of a synthesized clock, thereby decreasing the peak amplitudes of its harmonics. This result in significantly lower system EMI compared to the typical narrow band signal produced by oscillators and most clock generators. Lowering EMI by increasing a signal’s bandwidth is called “spread spectrum clock generation”.

The P1727 uses the most efficient and optimized modulation profile approved by the FCC and is implemented by using a proprietary all-digital method.

Applications

The P1727 is targeted towards notebook LCD displays, other displays using an LVDS interface, PC peripheral devices and embedded systems.

Block Diagram



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Pin Configuration

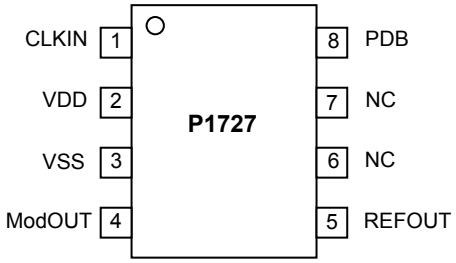


Table 1 – Power Down Selection

PDB	Spread Spectrum	ModOUT	PLL	Mode
0	N/A	Disabled	Disabled	Power Down
1	ON	Normal	Normal	Normal

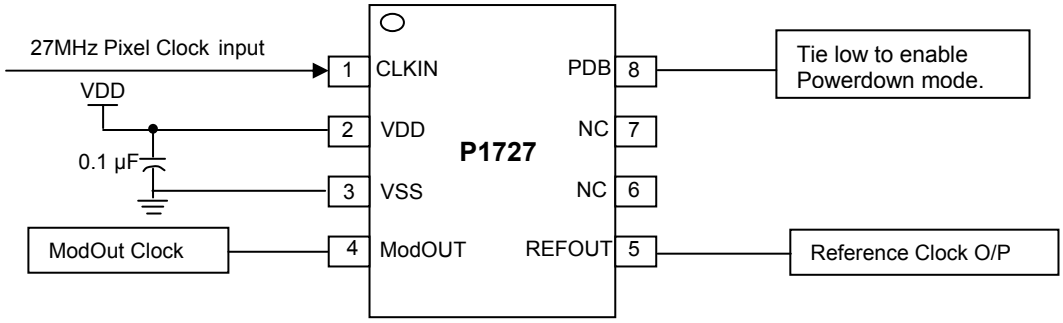
Table 2 Frequency Deviation Selection

P/ N	Deviation	P/N	Deviation
P1727A	-1.25%	P1727E	+/-0.625%
P1727B	-1.75%	P1727F	+/-0.875%
P1727C	-2.50%	P1727G	+/-1.25%
P1727D	-3.50%	P1727H	+/-1.75%

Pin Description

Pin#	Pin Name	Type	Description
1	CLKIN	I	External reference frequency input. Connect to externally generated reference signal.
2	VDD	P	Connect to +3.3V
3	VSS	P	Ground Connection. Connect to system ground.
4	ModOUT	O	Spread Spectrum Clock output
5	REFOUT	O	Reference output.
6	NC		No connect
7	NC		No connect
8	PDB	I	Powerdown Pin.Pull low to disable spread spectrum clock output.

Schematic for notebook VGA application



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VDD, V_{IN}	Voltage on any pin with respect to Ground	-0.5 to +7	V
T_{STG}	Storage temperature	-65 to +125	°C
T_s	Max. Soldering Temperature (10 sec)	260	°C
T_J	Junction Temperature	150	°C
T_{DV}	Static Discharge Voltage (As per JEDEC STD22- 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				-35	µA
I_{IH}	Input High current				35	µA
V_{OL}	Output Low current	VDD = 3.3V, I_{OL} = 20mA			0.4	V
V_{OH}	Output High current	VDD = 3.3V, I_{OH} = 20mA	2.5			V
I_{DD}	Static Supply Current (CLKIN, PDB pulled Low)				2	mA
I_{CC}	Dynamic Supply Current (No Load)			14	18	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
T_A	Operating temperature		0		70	°C

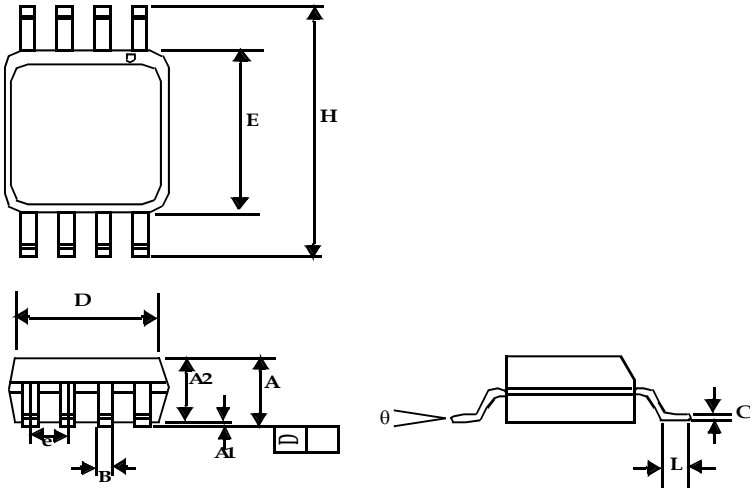
AC Electrical Characteristics

Symbol	Parameter		Min	Typ	Max	Unit
f_{IN}	Input Frequency:	P1727X	20		40	MHz
f_{OUT}	Output Frequency	P1727X	20		40	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)			225	325	pS
t_D	Output Duty cycle		45	50	55	%

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

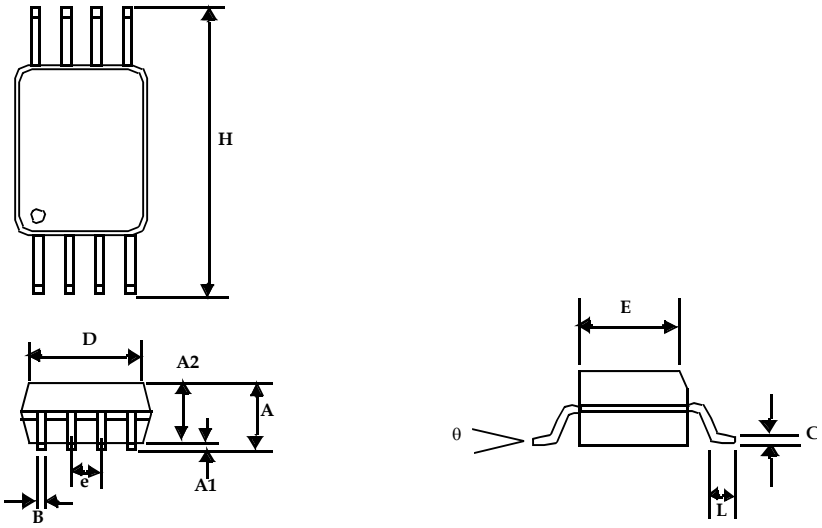
Package Information

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°

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°

Ordering Information

Part number	Marking	Package Configuration	Temperature Range
P1727AG-08ST	P1727AG	8 PIN SOIC, TUBE, Green	Commercial
P1727AG-08SR	P1727AG	8 PIN SOIC, TAPE & REEL, Green	Commercial
P1727AG-08TT	P1727AG	8 PIN TSSOP, TUBE, Green	Commercial
P1727AG-08TR	P1727AG	8 PIN TSSOP, TAPE & REEL, Green	Commercial
P1727BG-08ST	P1727BG	8 PIN SOIC, TUBE, Green	Commercial
P1727BG-08SR	P1727BG	8 PIN SOIC, TAPE & REEL, Green	Commercial
P1727BG-08TT	P1727BG	8 PIN TSSOP, TUBE, Green	Commercial
P1727BG-08TR	P1727BG	8 PIN TSSOP, TAPE & REEL, Green	Commercial
P1727CG-08ST	P1727CG	8 PIN SOIC, TUBE, Green	Commercial
P1727CG-08SR	P1727CG	8 PIN SOIC, TAPE & REEL, Green	Commercial
P1727CG-08TT	P1727CG	8 PIN TSSOP, TUBE, Green	Commercial
P1727CG-08TR	P1727CG	8 PIN TSSOP, TAPE & REEL, Green	Commercial
P1727DG-08ST	P1727DG	8 PIN SOIC, TUBE, Green	Commercial
P1727DG-08SR	P1727DG	8 PIN SOIC, TAPE & REEL, Green	Commercial
P1727DG-08TT	P1727DG	8 PIN TSSOP, TUBE, Green	Commercial
P1727DG-08TR	P1727DG	8 PIN TSSOP, TAPE & REEL, Green	Commercial
P1727EG-08ST	P1727EG	8 PIN SOIC, TUBE, Green	Commercial
P1727EG-08SR	P1727EG	8 PIN SOIC, TAPE & REEL, Green	Commercial
P1727EG-08TT	P1727EG	8 PIN TSSOP, TUBE, Green	Commercial
P1727EG-08TR	P1727EG	8 PIN TSSOP, TAPE & REEL, Green	Commercial
P1727FG-08ST	P1727FG	8 PIN SOIC, TUBE, Green	Commercial
P1727FG-08SR	P1727FG	8 PIN SOIC, TAPE & REEL, Green	Commercial
P1727FG-08TT	P1727FG	8 PIN TSSOP, TUBE, Green	Commercial
P1727FG-08TR	P1727FG	8 PIN TSSOP, TAPE & REEL, Green	Commercial
P1727GG-08ST	P1727GG	8 PIN SOIC, TUBE, Green	Commercial
P1727GG-08SR	P1727GG	8 PIN SOIC, TAPE & REEL, Green	Commercial
P1727GG-08TT	P1727GG	8 PIN TSSOP, TUBE, Green	Commercial
P1727GG-08TR	P1727GG	8 PIN TSSOP, TAPE & REEL, Green	Commercial
P1727HG-08ST	P1727HG	8 PIN SOIC, TUBE, Green	Commercial
P1727HG-08SR	P1727HG	8 PIN SOIC, TAPE & REEL, Green	Commercial
P1727HG-08TT	P1727HG	8 PIN TSSOP, TUBE, Green	Commercial
P1727HG-08TR	P1727HG	8 PIN TSSOP, TAPE & REEL, Green	Commercial

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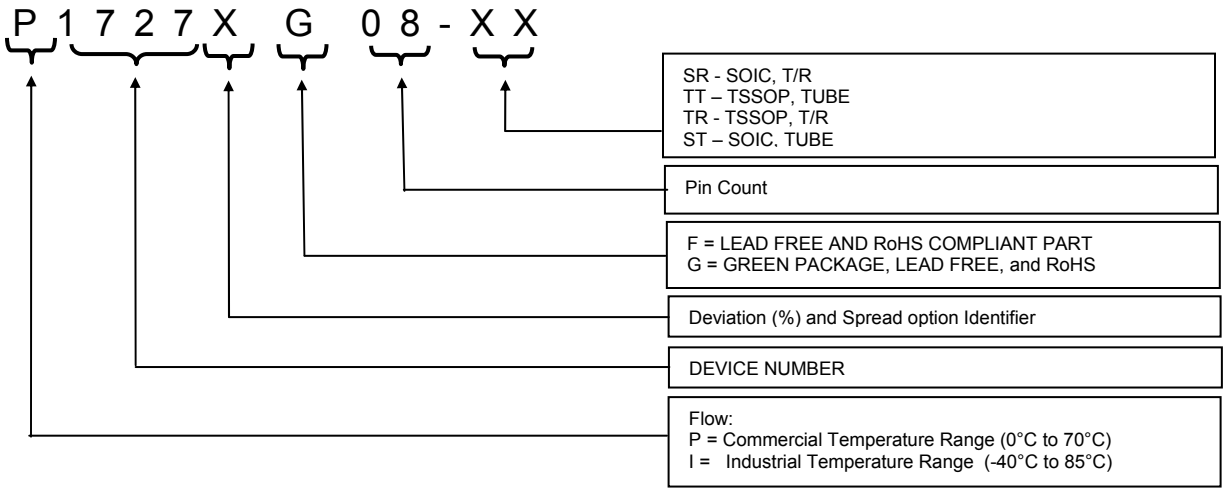
Device Ordering Information



PulseCore Semiconductor Corporation
1715 S. Bascom Ave Suite 200
Campbell, CA 95008
Tel: 408-879-9077
Fax: 408-879-9018
www.pulsecoresemi.com

Part Number: P1727
Document Version: 0.2

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