ON Semiconductor®

ASM3P2853A

Peak EMI Reducing Solution

Features

- Generates an EMI optimized clock signal at output.
- Input frequency: 25MHz.
- Frequency outputs:
  - o USB Clock (48MHz unmodulated)
  - o 50MHz (modulated), ±1% centre spread
- Modulation rate: 39KHz.
- Spread Spectrum ON/OFF control
- Supply voltage range 2.5V ± 5%.
- Available in 8-Pin SOIC package.

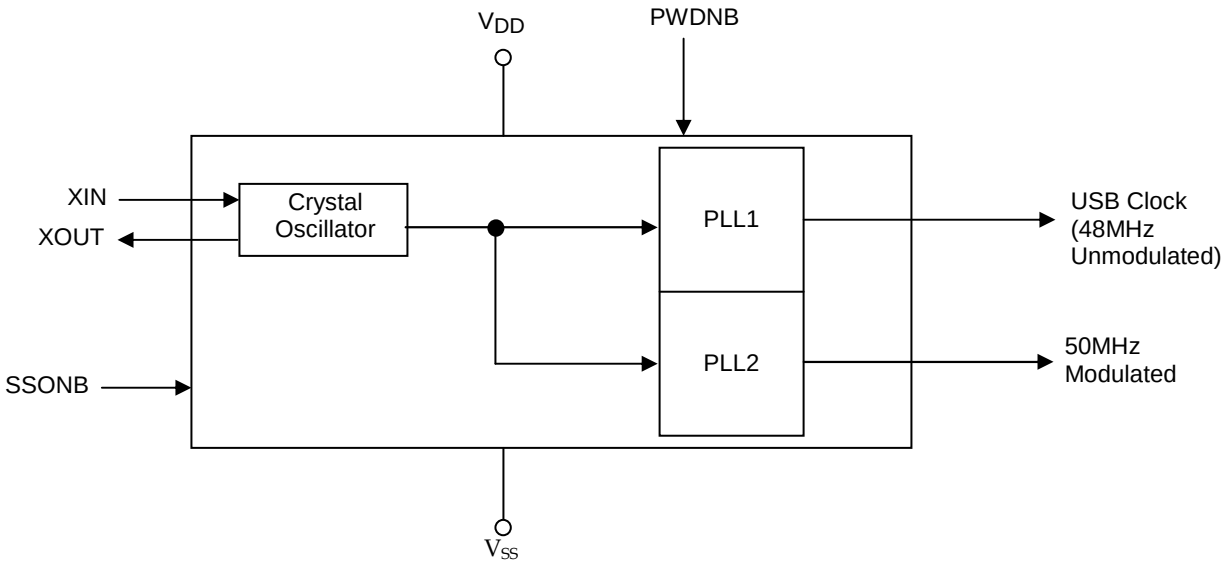
Product Description

The ASM3P2853A is a versatile spread spectrum frequency modulator. The ASM3P2853A reduces electromagnetic interference (EMI) at the clock source. The ASM3P2853A allows significant system cost savings by reducing the number of circuit board layers and shielding that are required to pass EMI regulations. The ASM3P2853A modulates the output of 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.

Applications

ASM3P2853A is targeted towards EMI management for high speed digital applications such as PC peripheral devices, consumer electronics and embedded controller systems.

Block Diagram



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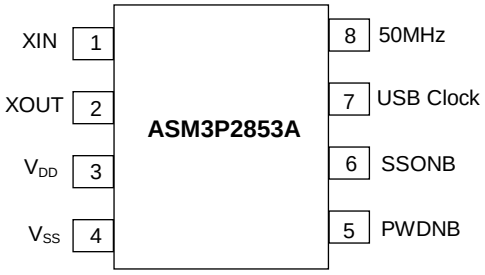
Pin Configuration



Pin Description

Pin#	Pin Name	Type	Description
1	XIN	I	Connection to crystal or external reference frequency input. This pin has dual functions. It can be connected either to an external crystal or an external reference clock.
2	XOUT	O	Connection to crystal. If using an external reference clock, this pin must be left unconnected.
3	V_{DD}	P	Power supply for the analog and digital blocks.
4	V_{SS}	P	Ground to entire chip.
5	PWDNB	I	Power-down control pin. Pull low to enable the power-down mode. Connect to VDD, if not used.
6	SSONB	I	Digital logic input used to enable spread spectrum function (Active LOW). Spread spectrum is enabled when LOW, disabled when HIGH.
7	USB Clock	O	Clock output-1 (48MHz unmodulated).
8	50MHz	O	Clock output-2 (50MHz modulated).

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VDD, V_{IN}	Voltage on any pin with respect to Ground	-0.5 to +4.6	V
T_{STG}	Storage temperature	-65 to +125	℃
T_s	Max. Soldering Temperature (10 sec)	260	℃
T_J	Junction Temperature	150	℃
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.

Operating Conditions

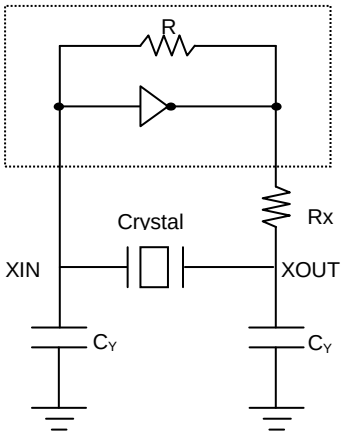
Parameter	Symbol	Condition / Description	Min	Typ	Max	Unit
Supply Voltage	V_{DD}	2.5V ± 5%	2.375	2.5	2.625	V
Ambient Operating Temperature Range	T_A		-40	-	+85	℃
Crystal Resonator Frequency	F_{XIN}			25		MHz
Output Driver Load Capacitance	C_L		-	-	15	pF

Crystal Specifications

Fundamental AT cut parallel resonant crystal	
Nominal frequency	25MHz
Frequency tolerance	±50ppm or better at 25℃
Operating temperature range	-25℃ to +85℃
Storage temperature	-40℃ to +85℃
Load capacitance	18pF
Shunt capacitance	7pF maximum
ESR	25Ω

Note: C_Y is Load Capacitance and Rx is used to prevent oscillations at overtone frequency of the Fundamental frequency.

Typical Crystal Interface Circuit



$C_Y = 2*(C_P - C_S)$,
Where C_P = Load capacitance of crystal from crystal vendor datasheet
C_S = Stray capacitance due to $C_{IN,}$ PCB, Trace etc.

DC Electrical Characteristics

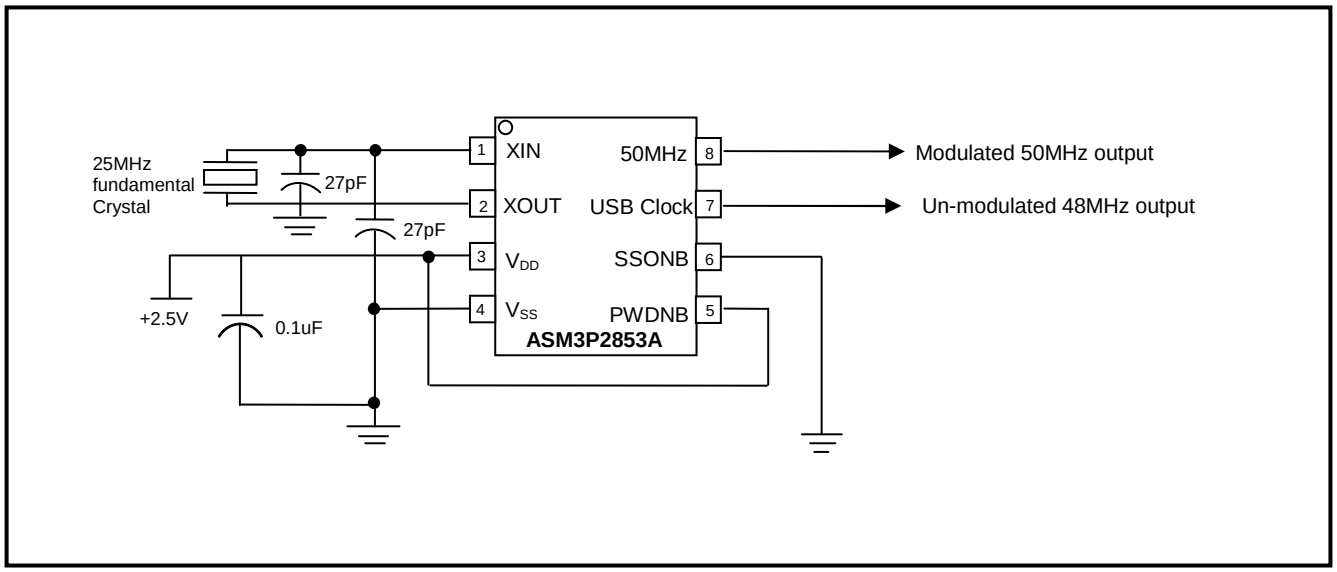
Parameter	Symbol	Conditions / Description	Min	Typ	Max	Unit
Overall						
Supply Current, Dynamic	I_{DD}	V_{DD} = 2.5V, F_{XIN} = 25MHz, C_L = 15pF	7	13	20	mA
Supply Current, Static	I_{DDL}	V_{DD} = 2.5V, X_{IN} = 0, PWDNB = 0	-	12	-	uA
All input pins						
High-Level Input Voltage	V_{IH}	V_{DD} = 2.5V	1.7	-	-	V
Low-Level Input Voltage	V_{IL}	V_{DD} = 2.5V	-	-	0.7	V
High-Level Input Current	I_{IH}		-	-	25	µA
Low-Level Input Current (pull-up)	I_{IL}		-	-	-25	µA
Clock Outputs						
High-Level Output Source Current	I_{xOH}	V_{DD} = 2.5V ,V(X_{IN}) = 0, V_O = 2V	-	-15	-	mA
Low-Level Output Sink Current	I_{xOL}	V_{DD} = V(X_{IN}) = 2.5V, V_O = 0.4V	-	15	-	mA
High-Level Output Source Current	I_{OH}	V_O = 2V	-	8	-	mA
Low-Level Output Sink Current	I_{OL}	V_O = 0.4V	-	8	-	mA
Output Impedance	Z_O		-	42	-	Ω

AC Electrical Characteristics

Parameter	Symbol	Conditions / Description	Min	Typ	Max	Unit
Rise Time[1]	t_r	Measured from 20% to 80% of the signal level	-	2	-	nS
Fall Time[1]	t_f	Measured from 80% to 20% of the signal level	-	1.5	-	nS
Jitter (Cycle-to-Cycle)	t_{jc}		-	250	-	pS
Jitter (Period)	t_p		-	175	-	pS
Clock Duty Cycle	t_d	Ratio of pulse width (as measured from rising edge to next falling edge at $V_{DD}/2$) to one clock period	45	50	55	%
Power-up time	t_{ON}	first locked cycle after power-up (With stable V_{DD} and valid input clock)	-	-	5	mS

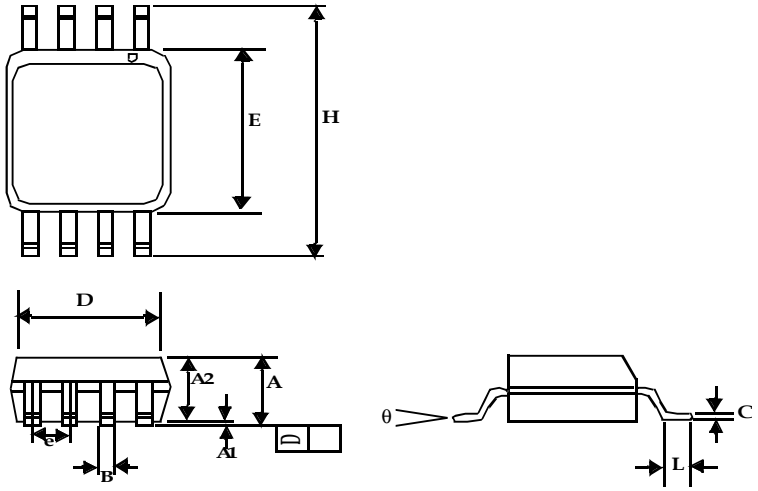
Note: 1. C_L = 15 pF, Input clock frequency = 25MHz

Typical Application Schematic using ASM3P2853A Device



Package Information

8-Pin 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°

Coplanarity ≤ 4 mil

Ordering Code

Part number	Marking	Package Configuration	Temperature Range
ASM3P2853AG-08SR	AEC	8-pin SOIC, TAPE & REEL, Green	0℃ to +70℃

A “microdot” placed at the end of last row of marking or just below the last row toward the center of package indicates Pb-free.

PUBLICATION ORDERING INFORMATION

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