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ON Semiconductor®



# ASM3P2853A

## Peak EMI Reducing Solution

### Features

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

### Product Description

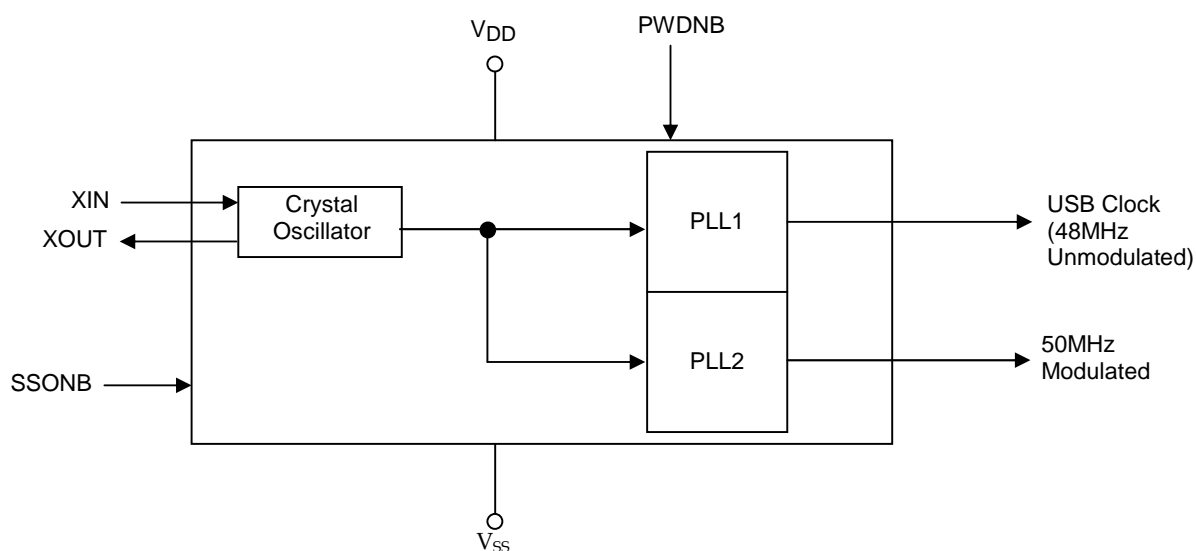
The ASM3P2853A is a versatile spread spectrum frequency modulator. The ASM3P2853A reduces electromagnetic interference (EMI) at the clock source. The ASM3P2853A allows significant system cost savings

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

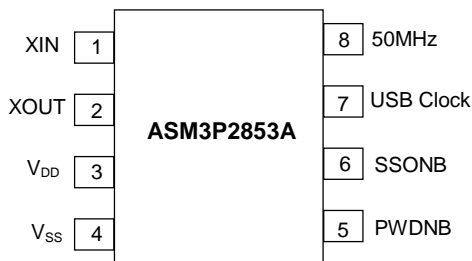
ASM3P2853A is targeted towards EMI management for high speed digital applications such as PC peripheral devices, consumer electronics and embedded controller systems.

### Block Diagram



# ASM3P2853A

## 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 <sub>DD</sub>	P	Power supply for the analog and digital blocks.
4	V <sub>SS</sub>	P	Ground to entire chip.
5	PWDNB	I	Power-down control pin. Pull low to enable the power-down mode. Connect to V <sub>DD</sub> , 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).

# ASM3P2853A

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
VDD, V <sub>IN</sub>	Voltage on any pin with respect to Ground	-0.5 to +4.6	V
T <sub>STG</sub>	Storage temperature	-65 to +125	°C
T <sub>s</sub>	Max. Soldering Temperature (10 sec)	260	°C
T <sub>J</sub>	Junction Temperature	150	°C
T <sub>DV</sub>	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

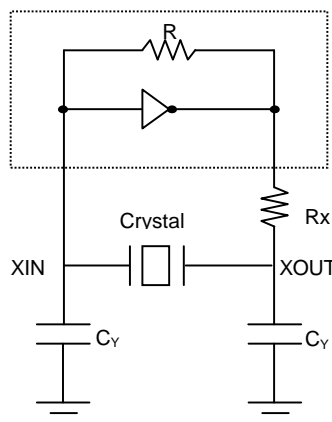
Parameter	Symbol	Condition / Description	Min	Typ	Max	Unit
Supply Voltage	V <sub>DD</sub>	2.5V ± 5%	2.375	2.5	2.625	V
Ambient Operating Temperature Range	T <sub>A</sub>		-40	-	+85	°C
Crystal Resonator Frequency	F <sub>XIN</sub>		25			MHz
Output Driver Load Capacitance	C <sub>L</sub>		-	-	15	pF

## Crystal Specifications

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

Note: C<sub>y</sub> is Load Capacitance and R<sub>x</sub> 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<sub>P</sub> = Load capacitance of crystal from crystal vendor datasheet  
 C<sub>S</sub> = Stray capacitance due to C<sub>IN</sub>, PCB, Trace etc.

# ASM3P2853A

## DC Electrical Characteristics

Parameter	Symbol	Conditions / Description	Min	Typ	Max	Unit
<b>Overall</b>						
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
<b>All input pins</b>						
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	$\mu A$
Low-Level Input Current (pull-up)	$I_{IL}$		-	-	-25	$\mu A$
<b>Clock Outputs</b>						
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	-	$\Omega$

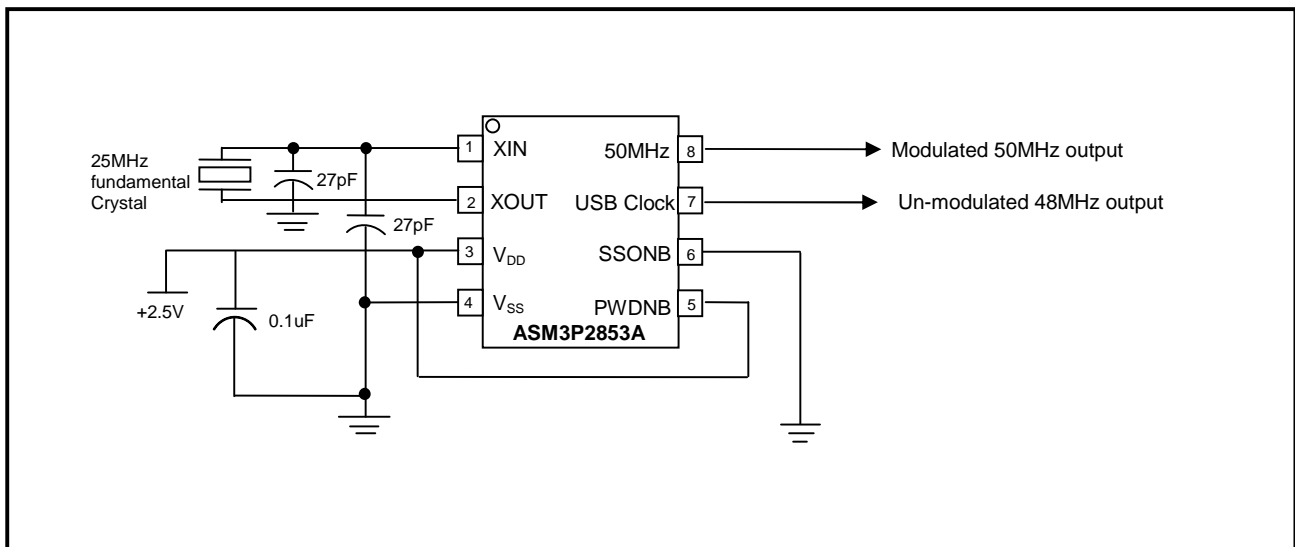
# ASM3P2853A

## AC Electrical Characteristics

Parameter	Symbol	Conditions / Description	Min	Typ	Max	Unit
Rise Time <sup>1</sup>	$t_r$	Measured from 20% to 80% of the signal level	-	2	-	nS
Fall Time <sup>1</sup>	$t_f$	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

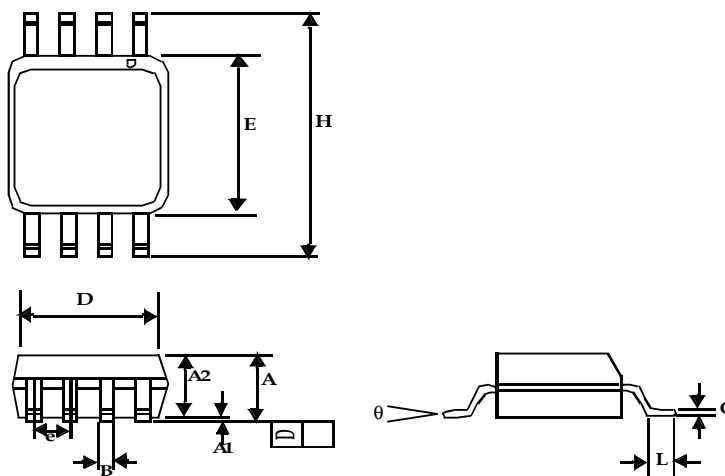
## Typical Application Schematic using ASM3P2853A Device



**ASM3P2853A**

**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

# ASM3P2853A

## Ordering Code

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

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.

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