ASM3P2180A

Peak Reducing EMI Solution

Product Description

The ASM3P2180A is a versatile spread spectrum frequency modulator designed specifically for a wide range of clock frequencies. ASM3P2180A reduces electromagnetic interference (EMI) at the clock source, allowing system wide reduction of EMI of down stream clock and data dependent signals. ASM3P2180A allows significant system cost savings by reducing the number of circuit board layers, and shielding that are traditionally required to pass EMI regulations. ASM3P2180A 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. ASM3P2180A uses the most efficient and optimized modulation profile approved by the FCC and is implemented by using a proprietary all-digital method.

Features

- Generates a 1x EMI Optimized Clock Output
- Input Frequency:
  - 6 MHz − 10 MHz
  - 18 MHz − 30 MHz
- Output Frequency:
  - 6 MHz − 10 MHz
  - 18 MHz − 30 MHz
- Two Selectable Down Spread Options
- Selectable Frequency Range
- Integrated Loop Filter Components
- Operates with a 3.3 V Supply
- CMOS Design
- 8-Pin SOIC Packages
- This Device is Pb-Free, Halogen Free and is RoHS Compliant

Applications

The ASM3P2180A is targeted towards notebook LCD displays, other displays using an LVDS interface, PC peripheral devices and embedded systems.

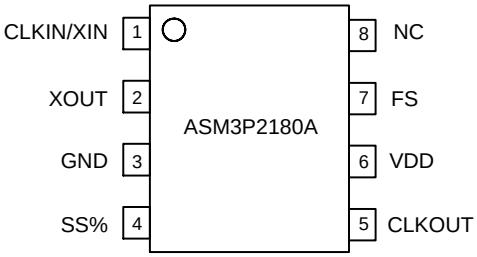
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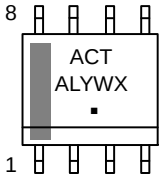


SOIC−8 NB
CASE 751

PIN CONNECTION



MARKING DIAGRAM



ACT	= Specific Device Code
A	= Assembly Location
L	= Wafer Lot
Y	= Year
W	= Work Week
▪	= Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

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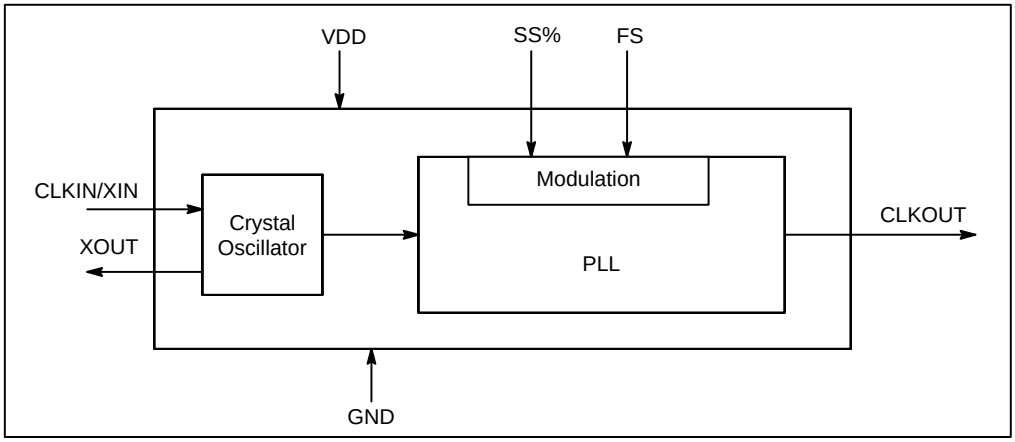


Figure 1. Block Diagram

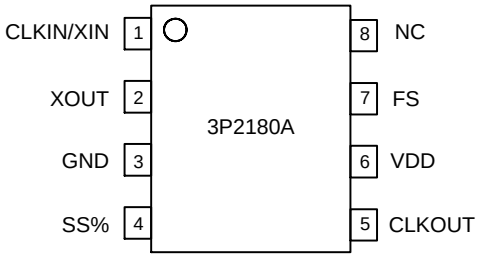


Figure 2. Pin Diagram

Table 1. PIN DESCRIPTION

Pin#	Pin Name	Type	Description
1	CLKIN/XIN	I	Crystal Connection or External Reference Clock Input
2	XOUT	O	Connection for an External Crystal. If using an External Reference, this Pin must be Left Unconnected
3	GND	P	Ground to Entire Chip
4	SS%	I	Spread Selection Input. Has an Internal Pull-Up Resistor
5	CLKOUT	O	Modulated Clock Output
6	VDD	P	Power Supply for the Entire Chip
7	FS	I	Frequency Selection Bit. This Pin Selects the Frequency Range of Operation (See Table 2). Has an Internal Pull-Up Resistor
8	NC	−	No Connect

Table 2. FREQUENCY RANGE SELECTION

FS	Frequency Range (MHz)
0	6−10
1	18−30

Table 3. SPREAD SELECTION

SS%	Frequency (MHz)		Deviation (%) (Typ)
	FS = 0	FS = 1	
0	6	18	−2
	8	24	−1.5
	10	30	−1
1	6	18	−4
	8	24	−3
	10	30	−2

Table 4. 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	−60 to +125	°C
T_S	Maximum Soldering Temperature (10 s)	260	°C
T_J	Junction Temperature	150	°C
T_{DV}	Static Discharge Voltage (as per JEDEC STD22−A114−B)	2	kV

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Table 5. RECOMMENDED OPERATING CONDITIONS

Parameter	Description	Min	Max	Unit
VDD	Supply Voltage	2.8	3.7	V
T_A	Operating Temperature (Ambient Temperature)	−40	+85	°C
C_L	Load Capacitance	−	15	pF
C_{IN}	Input Capacitance	−	4	pF

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

Table 6. 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	−	V_{DD} + 0.3	V
I_{IL}	Input Low Current (Pull-Up Resistors on Inputs SS%, FS)	−	−	−27	μA
I_{IH}	Input High Current	−	−	18	μA
I_{XOL}	X_{OUT} Output Low Current (@ 0.4 V, V_{DD} = 3.3 V)	−	3	−	mA
I_{XOH}	X_{OUT} Output High Current (@ 2.5 V, V_{DD} = 3.3 V)	−	4	−	mA
V_{OL}	Output Low Voltage (V_{DD} = 3.3 V, I_{OL} = 4 mA)	−	−	0.4	V
V_{OH}	Output High Voltage (V_{DD} = 3.3 V, I_{OH} = 4 mA)	2.5	−	−	V
I_{CC}	Dynamic Supply Current Normal Mode (3.3 V and 10 pF Loading)	10	15	25	mA
I_{DD}*	Static Supply Current Standby Mode	−	−	7	mA
V_{DD}	Operating Voltage	2.8	3.3	3.7	V
t_{ON}	Power-Up Time (First Locked Clock Cycle after Power-Up)	−	0.18	−	ms
Z_{OUT}	Clock Output Impedance	−	50	−	Ω

* CLKIN pin pulled to GND.

Table 7. AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Min	Typ	Max	Unit
CLKIN	Input Frequency FS = 0 FS = 1	 6 18	 – –	 10 30	MHz
CLKOUT	Output Frequency FS = 0 FS = 1	 6 18	 – –	 10 30	MHz
t_{LH}*	Output Rise Time (Measured at 0.8 V to 2.0 V)	1.2	1.3	1.4	ns
t_{HL}*	Output Fall Time (Measured at 2.0 V to 0.8 V)	0.8	0.9	1.0	ns
t_{JC}	Jitter (Cycle to Cycle)	–	±325	–	ps
t_D	Output Duty Cycle	45	50	55	%

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

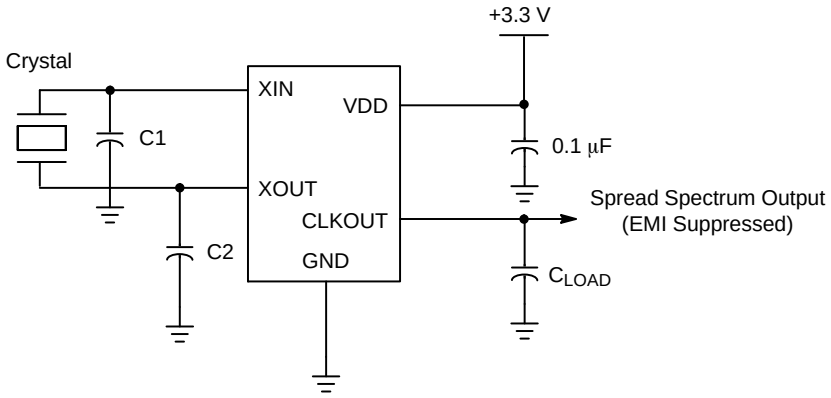


Figure 3. Typical Test Circuit

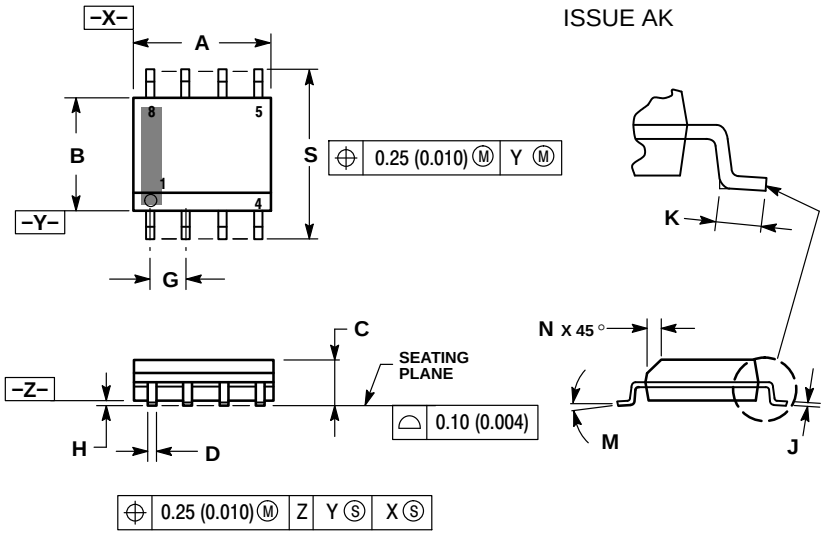
Table 8. ORDERING INFORMATION

Part Number	Marking	Package	Temperature	Shipping†
ASM3P2180AF-08SR	ACT	SOIC−8 NB (Pb-Free)	0 to 70°C	2500 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

PACKAGE DIMENSIONS

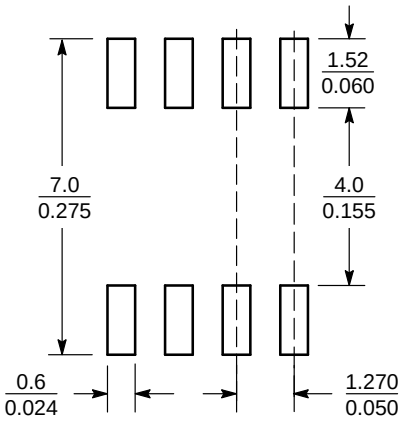
SOIC−8 NB
CASE 751−07
ISSUE AK



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751−01 THRU 751−06 ARE OBSOLETE. NEW STANDARD IS 751−07.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0 °	8 °	0 °	8 °
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

SOLDERING FOOTPRINT*



SCALE 6:1 (mm / inches)

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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