

General Frequency Synthesizer

PRODUCT DESCRIPTION

The MS1152D is a general frequency synthesizer. Any clock output is generated ranging from 2.5kHz to 200MHz by I²C configuration. The MS1152D can replace crystal, crystal oscillator, PLL and output buffer.

APPLICATIONS

- High-Definition TV, Set-Top Box
- Printer, Scanner, Projector
- Handheld Device
- Network/Communication
- Server
- Quartz Crystal/ Crystal Oscillator/PLL Replacement

PRODUCT SPECIFICATION

Part Number	Package	Marking
MS1152D	DFN8	MS1152D

FEATURES

- 2-channel Outputs, 2.5kHz to 200MHz Clock
 - Output Frequency Error 0ppm
 - High Resolution, Low Output Jitter
 - 25MHz or 27MHz Quartz Crystal
 - Adjustable Output Clock Phase
 - Adjustable Output Delay
 - Controlled Output Clock Rising/Falling Time
 - Frequency Switch with no Glitch
 - Independent Power Supply Pin
- Internal Core Circuit Power Supply VDD: 3.0V
- Output-Stage Power Supply VDDO:
1.8V or 2.5V or 3.3V
- Internal High PSRR
 - Compatible with HCSL and PCIE Gen 1

BLOCK DIAGRAM

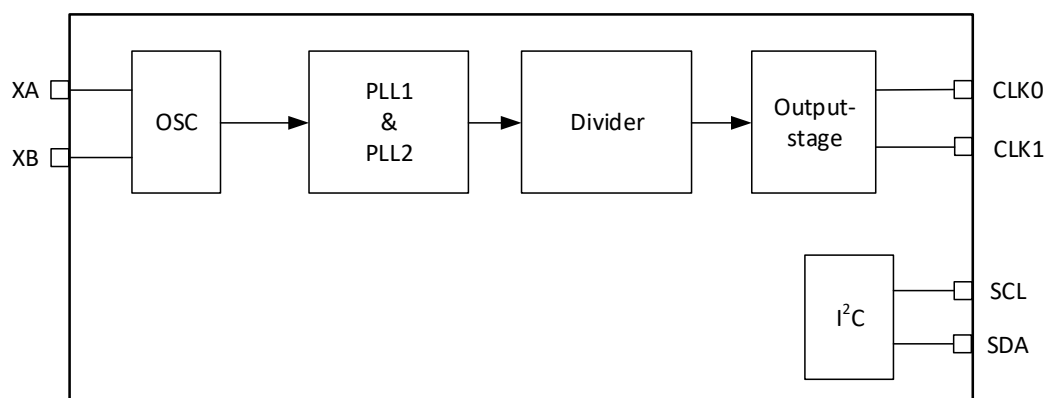
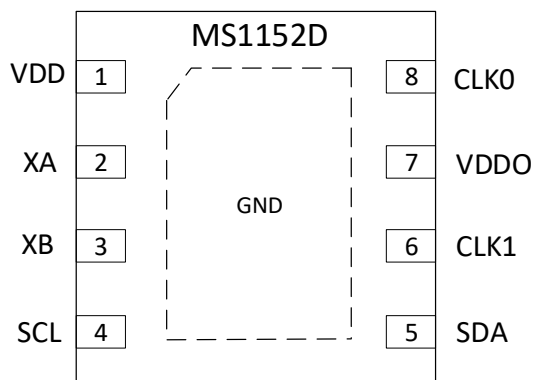


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PIN CONFIGURATION



PIN DESCRIPTION

Pin	Name	Type	Description
1	VDD	-	Internal Core Circuit Power Supply
2	XA	I	External Quartz Crystal Input
3	XB	I	External Quartz Crystal Input
4	SCL	I	I ² C Clock Input. At least 1kΩ pull-up resistor needs to be connected.
5	SDA	I/O	I ² C Data Input/Output. At least 1kΩ pull-up resistor needs to be connected.
6	CLK1	O	Output Clock
7	VDDO	-	Output-Stage Power Supply
8	CLK0	O	Output Clock
-	GND	-	Reference Ground

ABSOLUTE MAXIMUM RATINGS

Any exceeding absolute maximum rating application causes permanent damage to device. Because long-time absolute operation state affects device reliability. Absolute ratings just conclude from a series of extreme tests. It doesn't represent chip can operate normally in these extreme conditions.

Parameter	Symbol	Condition	Ratings	Unit
DC Power Supply	V_{DD}		-0.5 ~ 3.6	V
Output-Stage Power Supply	V_{DDO}		-0.5 ~ 3.8	V
Input Voltage	V_{IN_SCL}	SCL, SDA Pins	-0.5 ~ 3.8	V
	$V_{IN_XA/XB}$	XA, XB Pins	-0.5 ~ 1.3	V
Junction Temperature	T_J		-55 ~ 150	°C
Soldering Temperature (Lead Free)	T_{PEAK}		260	°C
Duration Time at T_{PEAK}	T_P		10	s
Storage Temperature	T_{STG}		-65 ~ 150	°C

RECOMMENDED OPERATING CONGITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_A	-20	25	85	°C
Core Circuit Voltage	V_{DD}	2.7	3.0	3.3	V
Output-Stage Voltage	V_{DDO}	1.71	1.8	1.89	V
		2.25	2.5	2.75	V
		3.0	3.3	3.6	V

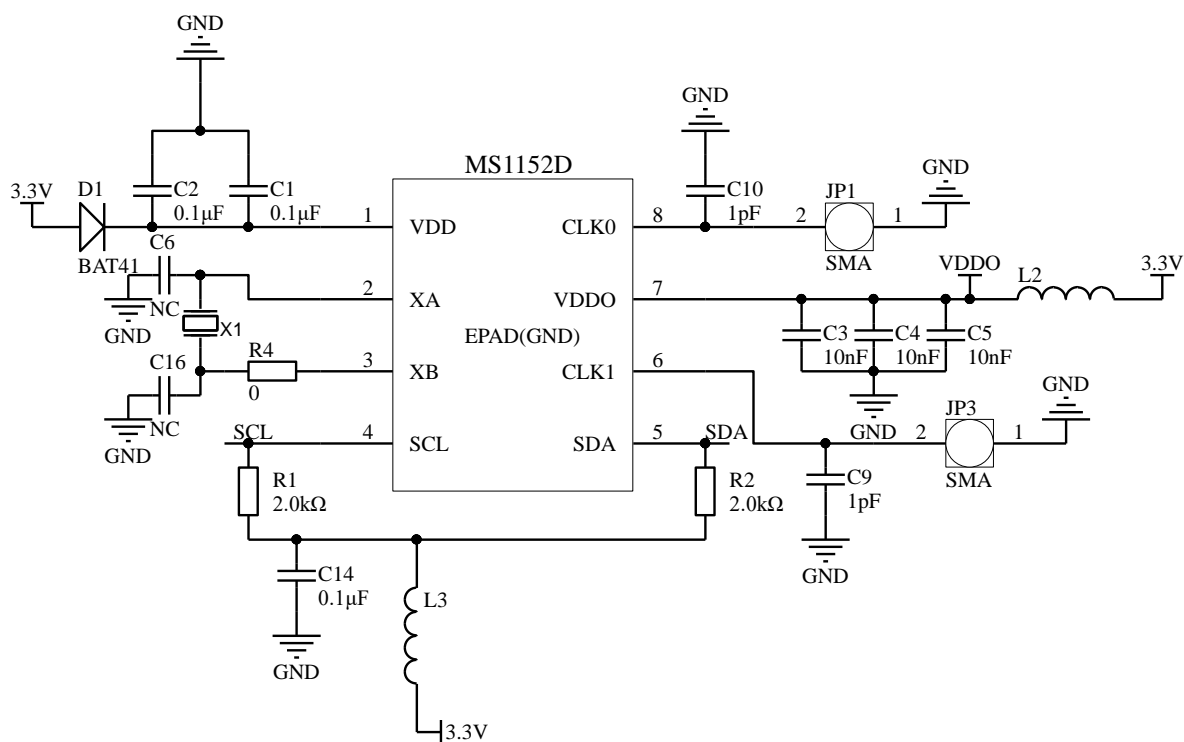
ELECTRICAL CHARACTERISTICS

Unless otherwise noted, $V_{DD}=V_{DDO}=3.0V$, $T_A=-20^{\circ}C\sim 85^{\circ}C$.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DC Characteristics						
VDD Current	I_{DD}	2-channel Outputs		31		mA
Output-Stage Current for Single Channel	I_{DDOx}	$C_L=5pF$, Maximum Driving Capacity less than 100MHz		5		mA
Input Current	I_{SCL}	SCL, SDA			10	μA
Output Impedance	Z_O	3.0V VDDO, High Drive		50		Ω
AC Characteristics						
Power-up Time	t_{RDY}	From VDDmin to Valid Output Clock, $f_{CLKn}>1MHz$		2		ms
Power-up Time, PLL Bypass	t_{BYP}	From VDDmin to Valid Output Clock, $f_{CLKn}>1MHz$		0.5		ms
Output Frequency Switch Time	t_{FREQ}	$f_{CLKn}>1MHz$			20	μs
Output Phase Offset	P_{STEP}	$t_{VCO}=1/f_{VCO}$		$t_{VCO}/4$		ps/step
Spread Spectrum Frequency Deviation	SS_{DEV}	Down Spread, 0.1% Each Step	-0.1		-2.5	%
		Center Spread, 0.1% Each Step	± 0.1		± 2.5	%
Spread Spectrum Modulation Rate	SS_{MOD}		30	31.5	33	kHz
Crystal Oscillator Specification						
Quartz Crystal Frequency	f_{XTAL}		25		27	MHz
Load Capacitor	C_{XL}		6		12	pF
Equivalent Series Resistor	r_{ESR}				150	Ω
Maximum Driving Level	d_L		100			μW
Input Voltage	$V_{IN_XA/AB}$	XA and XB Pins	-0.3		1.1	V

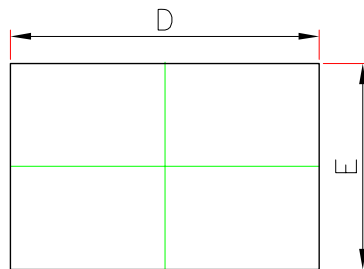
Parameter	Symbol	Condition	Min	Typ	Max	Unit	
Output Clock Specification							
Output Frequency	f _{CLK}		0.0025		200	MHz	
Load Capacitor	C _L				15	pF	
Duty Ratio	DC			50		%	
Rising Time	t _r	20%~80%, C _L =5pF Maximum Drive		0.5		ns	
Falling Time	t _f	20%~80%, C _L =5pF Maximum Drive		0.5		ns	
High-level Output Voltage	V _{OH}	C _L =5pF	VDDO-0.6			V	
Low-level Output Voltage	V _{OL}	C _L =5pF			0.6	V	
Periodical Jitter	J _{PER}	Simultaneous 2-channel Outputs		60	180	ps,pk	
Cycle-to-Cycle Clock Jitter	J _{CC}	Simultaneous 2-channel Outputs		60	180	ps,pk	
I ² C Specification (SCL, SDA)							
Parameter	Symbol	Condition	Standard Mode 100kbps		Fast Mode 400kbps		Unit
			Min	Max	Min	Max	
Low-level Input Voltage	V _{IL12C}		-0.5	0.3×V _{DD12C}	-0.5	0.3×V _{DD12C}	V
High-level Input Voltage	V _{IH12C}		0.7×V _{DD12C}	3.6	0.7×V _{DD12C}	3.6	V
Schmitt Hysteresis Voltage	V _{HYS}				0.1		V
Low-level Output Voltage	V _{OL12C}	V _{OL12C} =2.5/3.3V Open-drain, 3mA Current Sink	0	0.4	0	0.4	V
Input Current	I _{I12C}		-10	10	-10	10	μA
Pin Capacitor	C _{I2C}	V _{IN} =-0.1~V _{DD12C}		4		4	pF
I ² C Bus Timeout	t _{TO}	Timeout Enabled	25	35	25	35	ms

TYPICAL APPLICATION

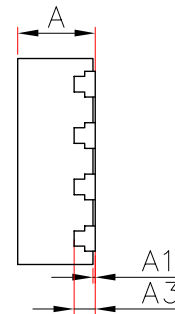


PACKAGE OUTLINE DIMENSIONS

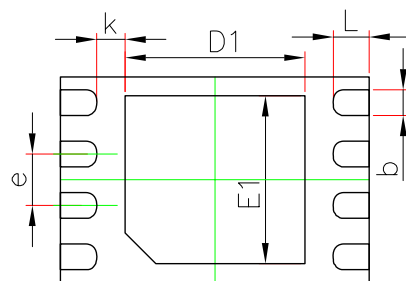
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TOP VIEW



SIDE VIEW

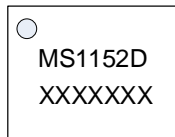


BOTTOM VIEW

Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF		0.008REF	
D	2.950	3.050	0.116	0.120
E	1.950	2.050	0.077	0.081
D1	1.650	1.850	0.065	0.073
E1	1.530	1.730	0.060	0.068
b	0.200	0.300	0.008	0.012
e	0.500BSC		0.020BSC	
k	0.275REF		0.011REF	
L	0.300	0.400	0.012	0.016

MARKING and PACKAGING SPECIFICATION

1. Marking Drawing Description



Product Name: MS1152D

Product Code: XXXXXXX

2. Marking Drawing Demand

Laser printing, contents in the middle, font type Arial.

3. Packaging Specification

Device	Package	Piece/Reel	Reel/Box	Piece /Box	Box/Carton	Piece/Carton
MS1152D	DFN8	3000	10	30000	4	120000

STATEMENT

- All Revision Rights of Datasheets Reserved for Ruimeng. Don't release additional notice.
Customer should get latest version information and verify the integrity before placing order.
- When using Ruimeng products to design and produce, purchaser has the responsibility to observe safety standard and adopt corresponding precautions, in order to avoid personal injury and property loss caused by potential failure risk.
- The process of improving product is endless. And our company would sincerely provide more excellent product for customer.

**MOS CIRCUIT OPERATION PRECAUTIONS**

Static electricity can be generated in many places. The following precautions can be taken to effectively prevent the damage of MOS circuit caused by electrostatic discharge:

1. The operator shall ground through the anti-static wristband.
2. The equipment shell must be grounded.
3. The tools used in the assembly process must be grounded.
4. Must use conductor packaging or anti-static materials packaging or transportation.



+86-571-89966911



Rm701, No.9 Building, No. 1 WeiYe Road, Puyan Street, Binjiang District, Hangzhou, Zhejiang



[http:// www.relmon.com](http://www.relmon.com)