

Features

- Monolithic 2-differential-pair common-mode choke filter (with 2 chokes for 2 pairs of differential signals)
- With ESD Protector for each input pin
- Differential mode cutoff frequency $\geq 2\text{GHz}$
- 0.5mm pin pitch
- Provide ESD protection for each input pin to IEC 61000-4-2 (ESD) $\pm 8\text{kV}$ (air/contact)
- For low operating voltage applications: 5V and below.
- Fast turn-on and Low clamping voltage
- Solid-state silicon-avalanche and active circuit triggering technology
- Dual Flat No-lead (DFN) packaging and small PCB space occupying: $\leq 5\text{mm}^2$
- High reliability provided by monolithic integration
- Lead free package
- Green Part

Applications

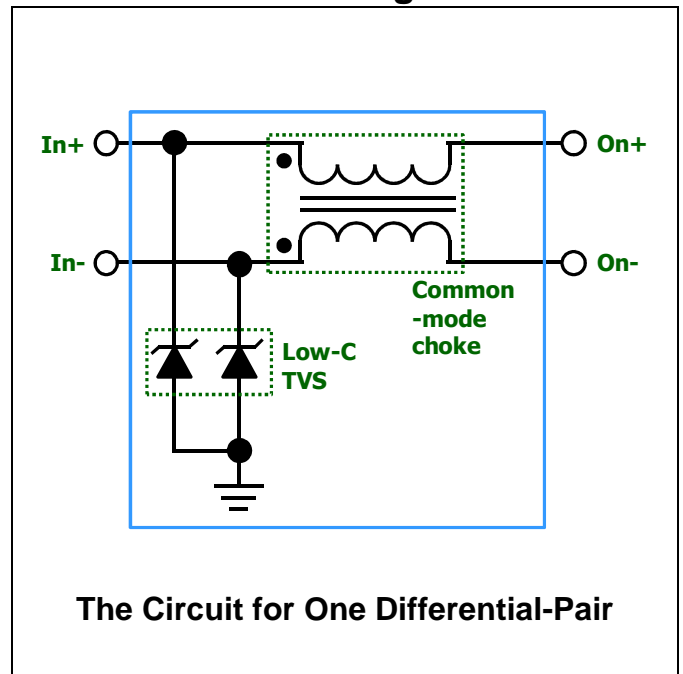
- HDMI 1.4a
- Hand Held Portable Applications: EMI filtering and ESD protection for high-speed differential -pair I/O ports

Description

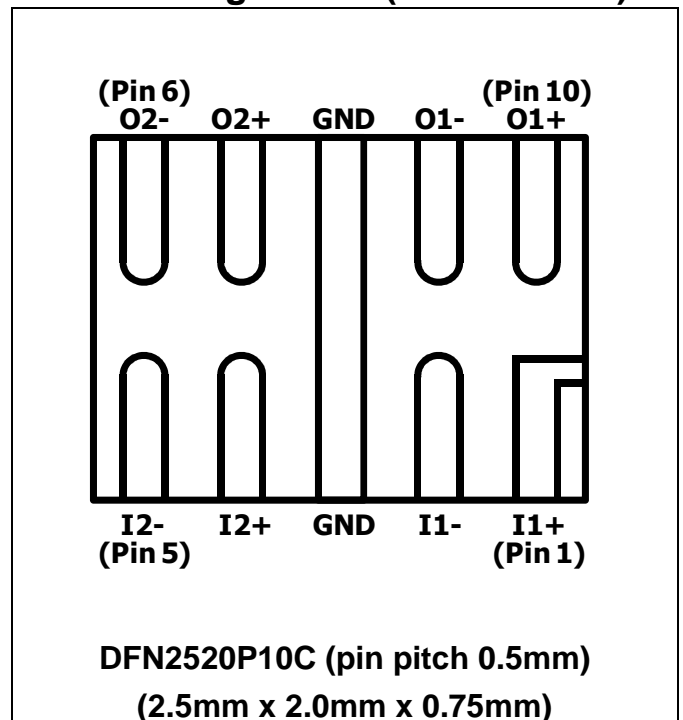
The AZM-HDMI1-02F is a monolithic 2-differential-pair common-mode choke filter (with 2 chokes for 2 pairs of differential signals). It is highly integrated and designed to suppress EMI noise in high-speed systems.

In addition to suppress EMI noise, the AZM-HDMI1-02F also includes an ESD protection circuitry at each input pin, which prevents the device from destruction or interference when subjected to ESD stress up to IEC 61000-4-2, $\pm 8\text{kV}$ air/contact discharge.

Circuit Diagram



Pin Configuration (Bottom Side)



Pin Function Description

Pin Name	Parameter	Pin no.	Description	Note
In+	n=1, 2	1, 4	Input channel #n+ to external connector	with ESD protector
In-	n=1, 2	2, 5	Input channel #n- to external connector	with ESD protector
On+	n=1, 2	10, 7	Output channel #n+ to internal ASIC	
On-	n=1, 2	9, 6	Output channel #n- to internal ASIC	
GND	N/A	3, 8	Ground Pin	

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS			
PARAMETER	SYMBOL	RATING	UNITS
Operating DC Voltage (each I/O to GND)	V_{DC}	6	V
ESD per IEC 61000-4-2 Each Input to GND, (Air/contact) Each Output to GND, (Air/contact)	V_{ESD}	± 8 ± 4	kV
Lead Soldering Temperature	T_{SOL}	260 (10 sec.)	$^{\circ}C$
Operating Temperature	T_{OP}	-30 to +85	$^{\circ}C$
Storage Temperature	T_{STO}	-55 to +150	$^{\circ}C$

ELECTRICAL CHARACTERISTICS						
PARAMETER	SYMBOL	CONDITIONS	MINI	TYP	MAX	UNITS
Reverse Stand-Off Voltage	V_{RWM}	$T=25^{\circ}C$, each Input Pin to GND.			5	V
Reverse Leakage Current	I_{Leak}	$V_{RWM}=5V$, $T=25^{\circ}C$, each Input Pin to GND.			1.5	μA
Reverse Breakdown Voltage	V_{BV}	$I_{BV}=1mA$, $T=25^{\circ}C$, each Input Pin to GND.	6			V
Forward Voltage	V_F	$I_F=15mA$, $T=25^{\circ}C$, GND to each Input Pin.		0.9	1.2	V
ESD Clamping Voltage	V_{clamp}	IEC 61000-4-2 +6kV, $T=25^{\circ}C$, Contact mode, each Input Pin to GND.		12.5		V

ESD Dynamic Turn-on Resistance	$R_{dynamic}$	IEC 61000-4-2 0~+6kV, T=25 °C, Contact mode, each Input Pin to GND.	0.3		Ω
Series Resistance between Input and Output	$R_{I/O}$	T=25 °C.	14.9		Ω
Input Capacitance per input pin	C_{in}	$V_R = 0V, f = 1MHz, T=25 °C,$ each Input Pin to GND.	1.2	2.0	pF
Differential Mode Cut-off Frequency	f_{3dB}	Source and Load with 50-ohm Termination	2		GHz

Typical Characteristics

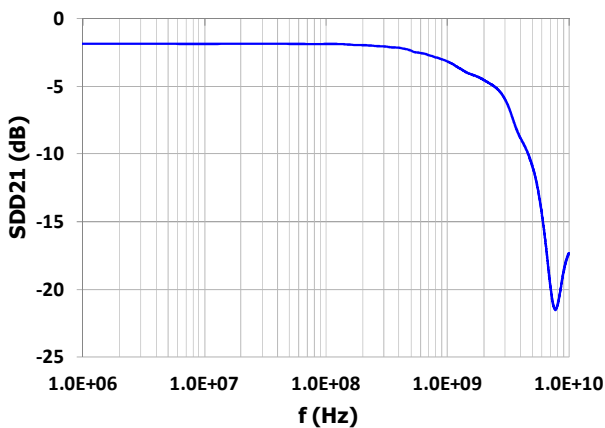


Figure 1. Differential Mode Attenuation (SDD21, $Z_{diff} = 100\Omega$).

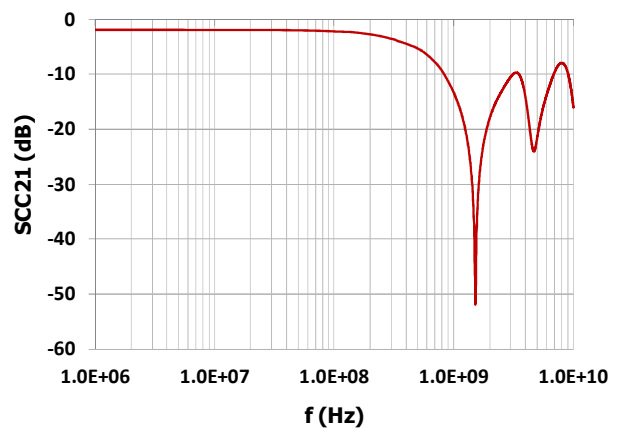


Figure 2. Common Mode Attenuation (SCC21, $Z_{comm} = 50\Omega$).

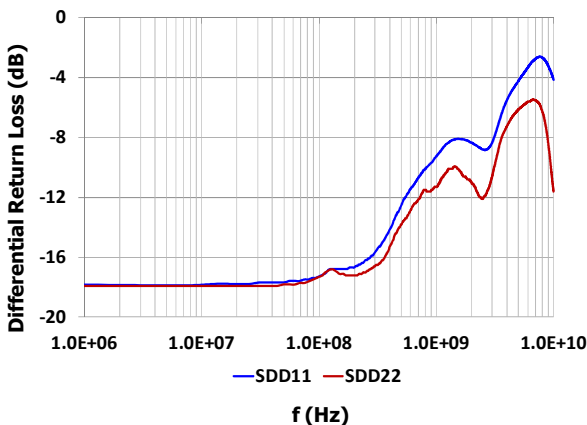


Figure 3. Differential Return Loss (SDD11 & SDD22, $Z_{diff} = 100\Omega$).

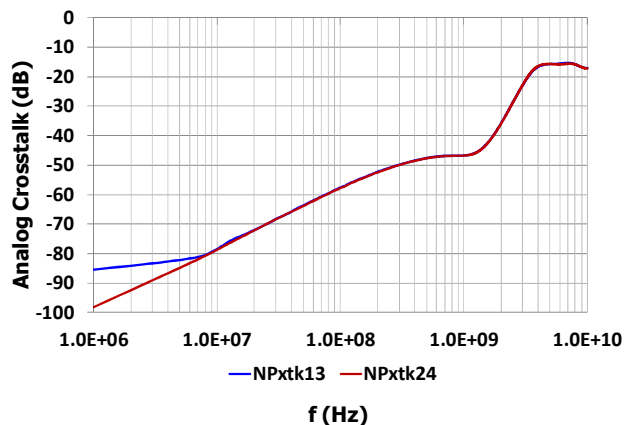


Figure 4. Near-pin (Pin 2,4,7,9) Analog Crosstalk of Adjacent Differential-Pair ($Z = 50\Omega$).

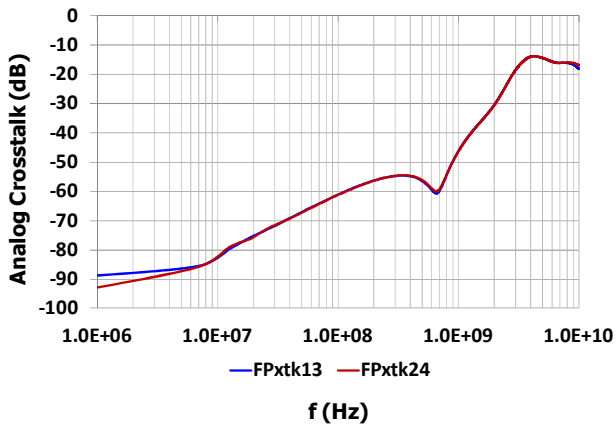


Figure 5. Far-pin (Pin 1,5,6,10) Analog Crosstalk of Different Differential-Pair ($Z = 50\Omega$).

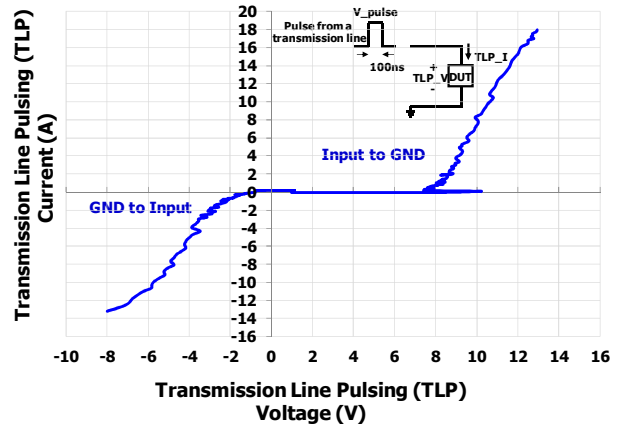


Figure 6. Transmission Line Pulsing (TLP) Measurement for Each Input Pin of Each Differential-pair.

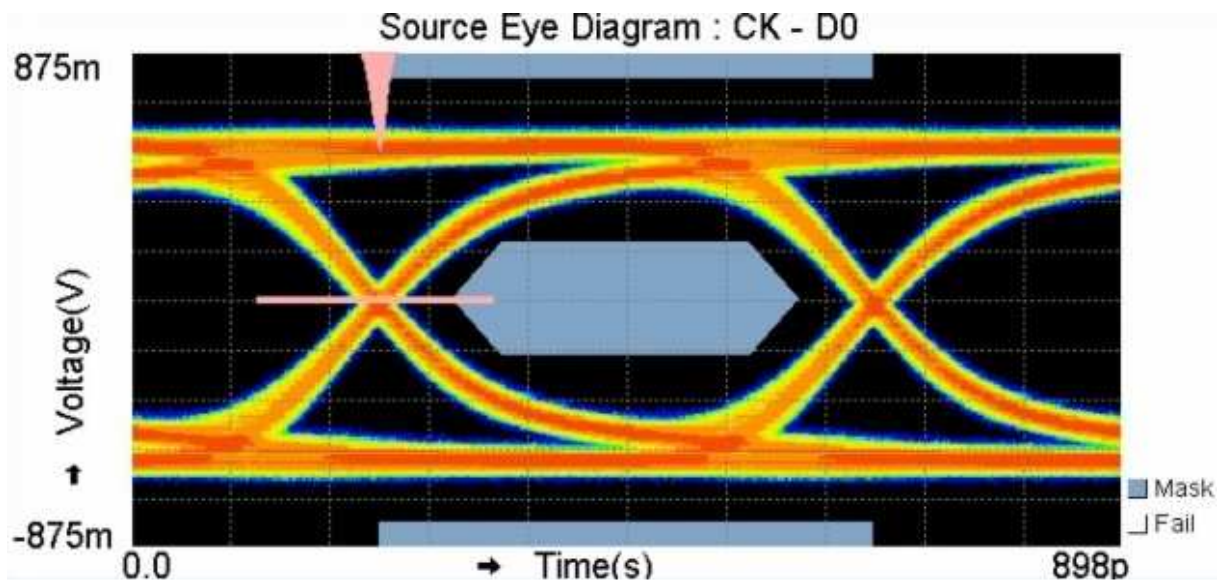
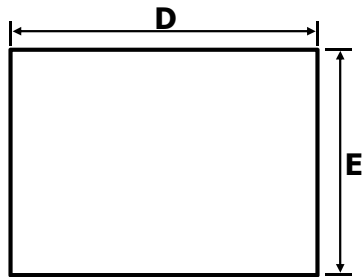


Figure 7. The Eye Diagram shows the test result of the 3.4 Gbps HDMI Eye Pattern applied on the evaluation board with AZM-HDMI1-02F.

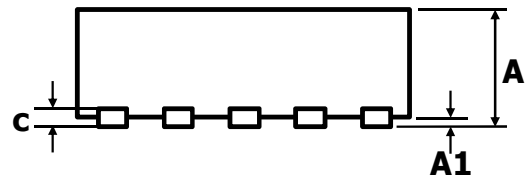
Mechanical Details

DFN2520P10C (2.5mm x 2.0mm x 0.75mm) PACKAGE DIAGRAMS

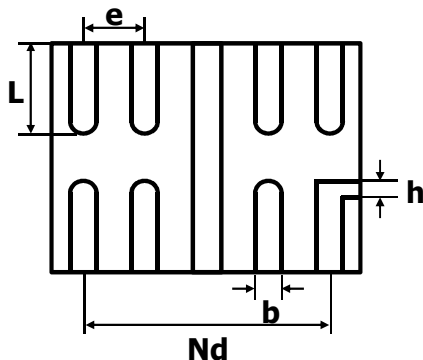
TOP VIEW



SIDE VIEW

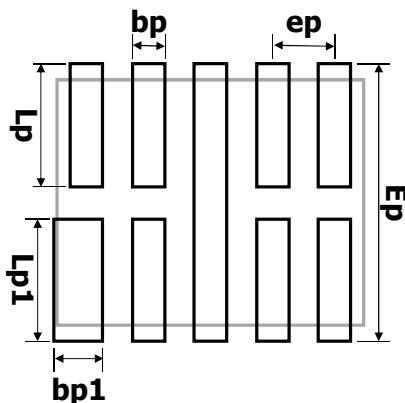


BOTTOM VIEW



Symbol	Millimeter		
	MIN	TYP	MAX
A	0.70	0.75	0.80
A1	---	0.02	0.05
b	0.15	0.20	0.25
c	0.18	0.20	0.25
D	2.40	2.50	2.60
e	0.50 BSC		
Nd	2.00 BSC		
E	1.90	2.00	2.10
L	0.70	0.80	0.90
h	0.10	0.15	0.20


LAND LAYOUT



Symbol	Millimeter
bp	0.30
bp1	0.45
ep	0.50
Ep	2.30
Lp	1.07
Lp1	1.00

Notes: This LAND LAYOUT is for reference purposes only. Please consult your manufacturing partners to ensure what your company's PCB design guidelines are met.

Marking Code

	<p>. = Pin1 orientation HD12 = Device Code WW = Date Code XX = Control Code G = Green Part</p>	<table border="1"> <tr> <th>Part Number</th> <th>Marking Code</th> </tr> <tr> <td>AZM-HDMI1-02F.R7G</td> <td>HD12 .WWXXG</td> </tr> </table>	Part Number	Marking Code	AZM-HDMI1-02F.R7G	HD12 .WWXXG
		Part Number	Marking Code			
AZM-HDMI1-02F.R7G	HD12 .WWXXG					

Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZM-HDMI1-02F.R7G	Green	T/R	7 inch	3,000/reel	4 reels=12,000/box	6 boxes=72,000/carton

Revision History

Revision	Modification Description
Revision 2014/09/15	Preliminary Release.
Revision 2014/12/15	Add the eye diagram measured result.
Revision 2016/12/05	Add ordering information.
Revision 2017/05/12	Formal Release.