XSOM®-CORE : System-on-Module for Driving Photonic Integrated Circuits

1 Features

- SO-DIMM connector for all signals and power:
  - 16 voltage output channels, up to ±20 V (bipolar) or 0–20 V (unipolar)
  - 16 current-limited output channels, programmable up to 300 mA per channel
  - 16 single-ended analog input channels
  - 16 differential analog input channels
  - Ethernet interface for host communication
- 16-bit DAC and ADC resolution
- Update (output) or sampling (input) rate up to 100 kHz per channel
- Bipolar or unipolar supply operation

2 Description

XSOM®-CORE is a System-on-Module (SOM) designed for precision control and measurement of Photonic Integrated Circuits (PICs). It interfaces with a carrier board via a single 262-pin SO-DIMM connector, consolidating all signal and power connections into one compact footprint.

The module provides 16 voltage output channels with selectable bipolar (±5 V, ±10 V, ±20 V) or unipolar (0–5 V, 0–10 V, 0–20 V) output ranges, backed by a 16-bit DAC with update rates up to 100 kHz per channel and settling times as low as 10 µs. Sixteen programmable current-limited output channels support current limiting up to 300 mA per channel, also at 16-bit resolution and 100 kHz update rates. For signal acquisition, the module includes 16 single-ended analog input channels (0–10 V) and 16 differential analog input channels (±0.1 V differential, 0–10 V common-mode), each with 16-bit ADC resolution and sampling rates up to 100 kHz. Host communication is provided via a standard Ethernet interface.

XSOM®-CORE is designed to be paired with a carrier board that supplies power and routes signals to the device under test (DUT). This flexible architecture allows the carrier board to serve as a passive interface, an active expansion platform, or both—making XSOM®-CORE suitable for industrial, laboratory, and test and measurement applications.

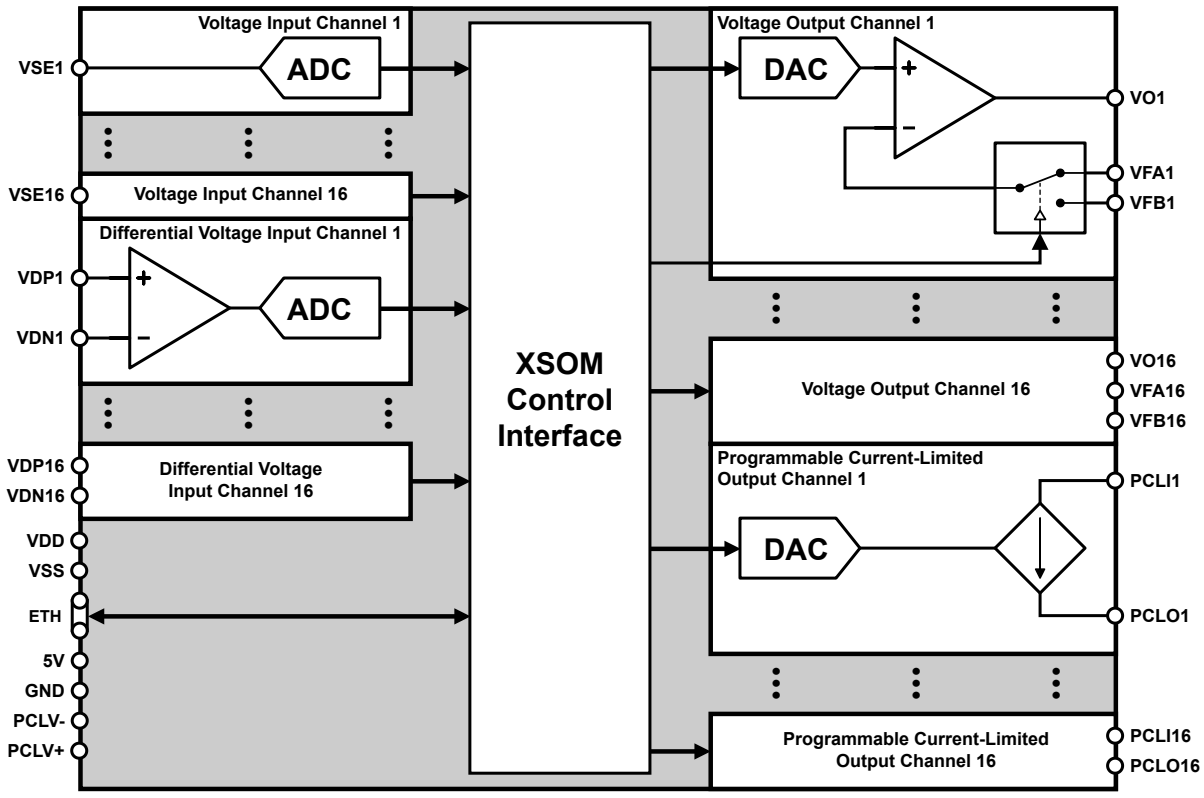


Figure 1 Functional Block Diagram

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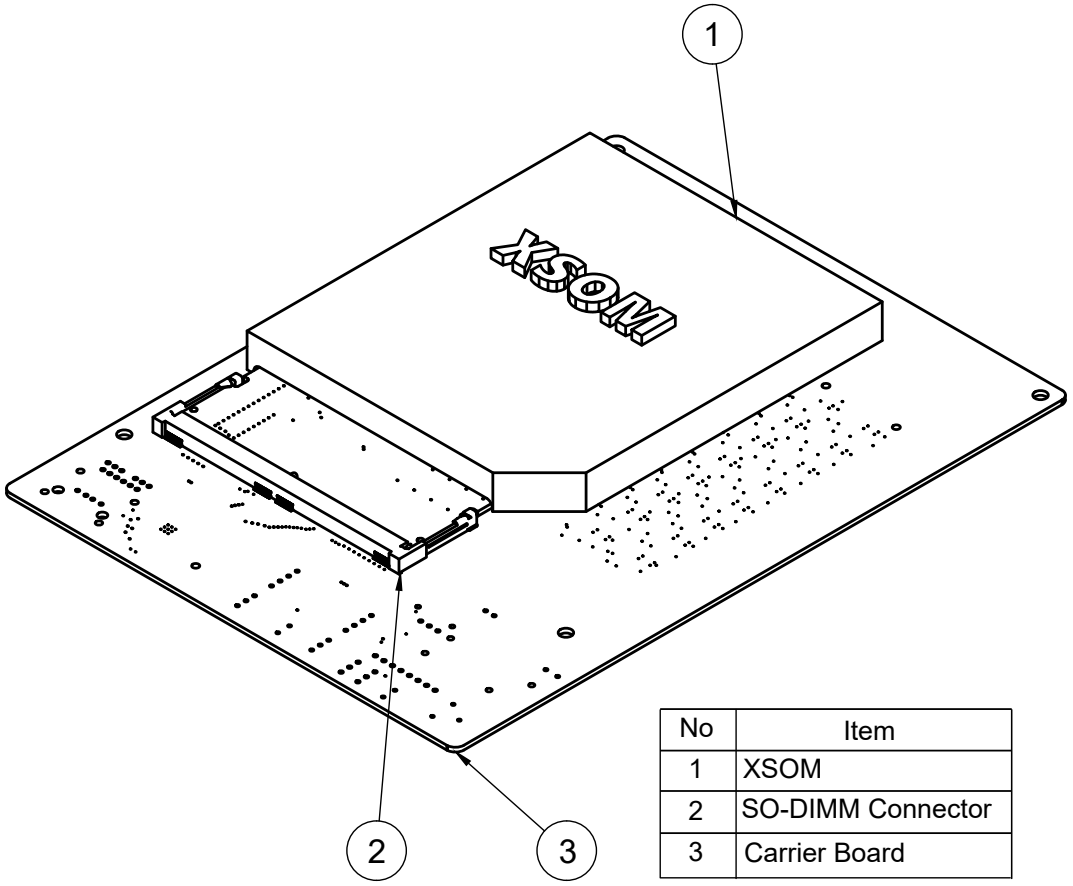
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3 Pin Configuration and Function Descriptions

3.1 Pin Configuration

XSOM®-CORE interfaces with the carrier board via a 262-pin SO-DIMM connector.



No	Item
1	XSOM
2	SO-DIMM Connector
3	Carrier Board

SO-DIMM Connector:

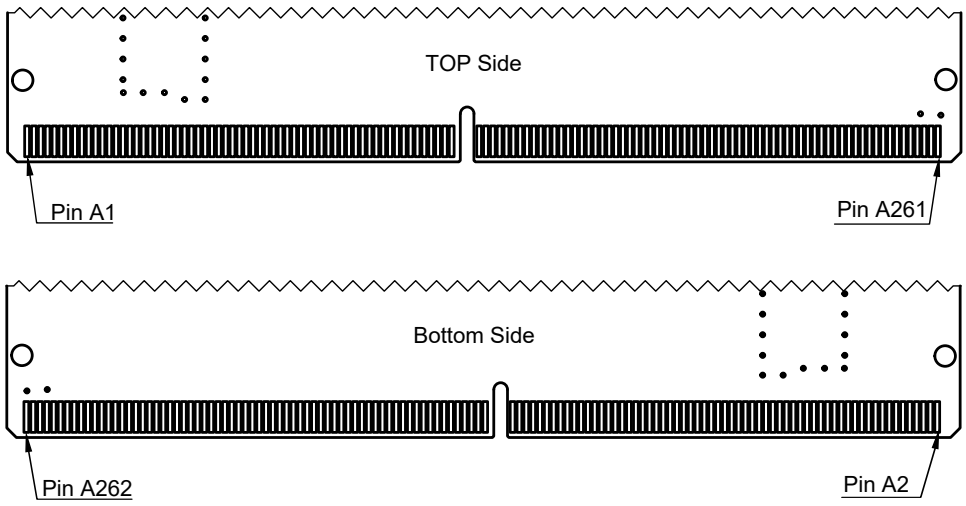


Figure 2 Pin Configuration Diagram

3.2 Pin Function Description

NAME	PIN #	TYPE	DESCRIPTION
POWER SUPPLIES			
5VIN	1, 3, 5, 7, 9, 11, 13, 15, 17, 19	Power	5 V supply voltage.
PCLV+	2, 4, 6, 8, 10, 12	Power	Programmable current-limited channels positive supply voltage.
PCLV-	16, 18, 20, 22, 24	Power	Programmable current-limited channels negative supply voltage.
VDD	199, 201, 203, 205, 207, 209	Power	Main positive supply voltage.
VSS	183, 185, 187, 189, 191, 193	Power	Main negative supply voltage.
GND	29, 35, 41, 47, 53, 213, 214, 219, 220, 225, 226, 231, 232, 237, 238, 243, 244, 249, 250, 255, 256, 261, 262	Ground	Ground.
ETHERNET INTERFACE			
ETH_MDIP0	31	Input/Output	Ethernet MDI pair 0, positive.
ETH_MDIN0	33	Input/Output	Ethernet MDI pair 0, negative.
ETH_MDIP1	37	Input/Output	Ethernet MDI pair 1, positive.
ETH_MDIN1	39	Input/Output	Ethernet MDI pair 1, negative.
ETH_MDIP2	43	Input/Output	Ethernet MDI pair 2, positive.
ETH_MDIN2	45	Input/Output	Ethernet MDI pair 2, negative.
ETH_MDIP3	49	Input/Output	Ethernet MDI pair 3, positive.
ETH_MDIN3	51	Input/Output	Ethernet MDI pair 3, negative.
VOLTAGE OUTPUT CHANNELS			
VO1	122	Output	Channel 1 voltage output.
VFA1	115	Input	Channel 1 feedback A input.
VFB1	117	Input	Channel 1 feedback B input.
VO2	130	Output	Channel 2 voltage output.
VFA2	119	Input	Channel 2 feedback A input.
VFB2	121	Input	Channel 2 feedback B input.
VO3	114	Output	Channel 3 voltage output.
VFA3	123	Input	Channel 3 feedback A input.
VFB3	125	Input	Channel 3 feedback B input.
VO4	118	Output	Channel 4 voltage output.
VFA4	129	Input	Channel 4 feedback A input.
VFB4	131	Input	Channel 4 feedback B input.
VO5	140	Output	Channel 5 voltage output.
VFA5	133	Input	Channel 5 feedback A input.
VFB5	135	Input	Channel 5 feedback B input.

NAME	PIN #	TYPE	DESCRIPTION
VOLTAGE OUTPUT CHANNELS (Continued)			
VO6	146	Output	Channel 6 voltage output.
VFA6	137	Input	Channel 6 feedback A input.
VFB6	139	Input	Channel 6 feedback B input.
VO7	132	Output	Channel 7 voltage output.
VFA7	141	Input	Channel 7 feedback A input.
VFB7	143	Input	Channel 7 feedback B input.
VO8	138	Output	Channel 8 voltage output.
VFA8	145	Input	Channel 8 feedback A input.
VFB8	147	Input	Channel 8 feedback B input.
VO9	136	Output	Channel 9 voltage output.
VFA9	149	Input	Channel 9 feedback A input.
VFB9	151	Input	Channel 9 feedback B input.
VO10	134	Output	Channel 10 voltage output.
VFA10	153	Input	Channel 10 feedback A input.
VFB10	155	Input	Channel 10 feedback B input.
VO11	144	Output	Channel 11 voltage output.
VFA11	157	Input	Channel 11 feedback A input.
VFB11	159	Input	Channel 11 feedback B input.
VO12	142	Output	Channel 12 voltage output.
VFA12	161	Input	Channel 12 feedback A input.
VFB12	163	Input	Channel 12 feedback B input.
VO13	120	Output	Channel 13 voltage output.
VFA13	165	Input	Channel 13 feedback A input.
VFB13	167	Input	Channel 13 feedback B input.
VO14	116	Output	Channel 14 voltage output.
VFA14	169	Input	Channel 14 feedback A input.
VFB14	171	Input	Channel 14 feedback B input.
VO15	128	Output	Channel 15 voltage output.
VFA15	173	Input	Channel 15 feedback A input.
VFB15	175	Input	Channel 15 feedback B input.
VO16	124	Output	Channel 16 voltage output.
VFA16	177	Input	Channel 16 feedback A input.
VFB16	179	Input	Channel 16 feedback B input.
PROGRAMMABLE CURRENT-LIMITED CHANNELS			
PCLI1	80	Input	Channel 1 current-limited input.
PCLO1	82	Ouput	Channel 1 current-limited output.
PCLI2	86	Input	Channel 2 current-limited input.
PCLO2	84	Ouput	Channel 2 current-limited output.
PCLI3	88	Input	Channel 3 current-limited input.
PCLO3	90	Ouput	Channel 3 current-limited output.
PCLI4	94	Input	Channel 4 current-limited input.
PCLO4	92	Ouput	Channel 4 current-limited output.

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NAME	PIN #	TYPE	DESCRIPTION
PROGRAMMABLE CURRENT-LIMITED CHANNELS (Continued)			
PCLI5	81	Input	Channel 5 current-limited input.
PCLO5	83	Ouput	Channel 5 current-limited output.
PCLI6	87	Input	Channel 6 current-limited input.
PCLO6	85	Ouput	Channel 6 current-limited output.
PCLI7	89	Input	Channel 7 current-limited input.
PCLO7	91	Ouput	Channel 7 current-limited output.
PCLI8	95	Input	Channel 8 current-limited input.
PCLO8	93	Ouput	Channel 8 current-limited output.
PCLI9	96	Input	Channel 9 current-limited input.
PCLO9	98	Ouput	Channel 9 current-limited output.
PCLI10	102	Input	Channel 10 current-limited input.
PCLO10	100	Ouput	Channel 10 current-limited output.
PCLI11	104	Input	Channel 11 current-limited input.
PCLO11	106	Ouput	Channel 11 current-limited output.
PCLI12	110	Input	Channel 12 current-limited input.
PCLO12	108	Ouput	Channel 12 current-limited output.
PCLI13	97	Input	Channel 13 current-limited input.
PCLO13	99	Ouput	Channel 13 current-limited output.
PCLI14	103	Input	Channel 14 current-limited input.
PCLO14	101	Ouput	Channel 14 current-limited output.
PCLI15	105	Input	Channel 15 current-limited input.
PCLO15	107	Ouput	Channel 15 current-limited output.
PCLI16	111	Input	Channel 16 current-limited input.
PCLO16	109	Ouput	Channel 16 current-limited output.
SINGLE-ENDED VOLTAGE CHANNELS			
VSE1	148	Input	Channel 1 single-ended voltage input.
VSE2	150	Input	Channel 2 single-ended voltage input.
VSE3	152	Input	Channel 3 single-ended voltage input.
VSE4	154	Input	Channel 4 single-ended voltage input.
VSE5	156	Input	Channel 5 single-ended voltage input.
VSE6	158	Input	Channel 6 single-ended voltage input.
VSE7	160	Input	Channel 7 single-ended voltage input.
VSE8	162	Input	Channel 8 single-ended voltage input.
VSE9	164	Input	Channel 9 single-ended voltage input.
VSE10	166	Input	Channel 10 single-ended voltage input.
VSE11	168	Input	Channel 11 single-ended voltage input.
VSE12	170	Input	Channel 12 single-ended voltage input.
VSE13	172	Input	Channel 13 single-ended voltage input.
VSE14	174	Input	Channel 14 single-ended voltage input.
VSE15	176	Input	Channel 15 single-ended voltage input.
VSE16	178	Input	Channel 16 single-ended voltage input.

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NAME	PIN #	TYPE	DESCRIPTION
DIFFERENTIAL VOLTAGE CHANNELS			
VDP1	216	Input	Channel 1 differential voltage input, positive pin.
VDN1	218	Input	Channel 1 differential voltage input, negative pin.
VDP2	222	Input	Channel 2 differential voltage input, positive pin.
VDN2	224	Input	Channel 2 differential voltage input, negative pin.
VDP3	228	Input	Channel 3 differential voltage input, positive pin.
VDN3	230	Input	Channel 3 differential voltage input, negative pin.
VDP4	234	Input	Channel 4 differential voltage input, positive pin.
VDN4	236	Input	Channel 4 differential voltage input, negative pin.
VDP5	240	Input	Channel 5 differential voltage input, positive pin.
VDN5	242	Input	Channel 5 differential voltage input, negative pin.
VDP6	246	Input	Channel 6 differential voltage input, positive pin.
VDN6	248	Input	Channel 6 differential voltage input, negative pin.
VDP7	252	Input	Channel 7 differential voltage input, positive pin.
VDN7	254	Input	Channel 7 differential voltage input, negative pin.
VDP8	258	Input	Channel 8 differential voltage input, positive pin.
VDN8	260	Input	Channel 8 differential voltage input, negative pin.
VDP9	215	Input	Channel 9 differential voltage input, positive pin.
VDN9	217	Input	Channel 9 differential voltage input, negative pin.
VDP10	221	Input	Channel 10 differential voltage input, positive pin.
VDN10	223	Input	Channel 10 differential voltage input, negative pin.
VDP11	227	Input	Channel 11 differential voltage input, positive pin.
VDN11	229	Input	Channel 11 differential voltage input, negative pin.

NAME	PIN #	TYPE	DESCRIPTION
DIFFERENTIAL VOLTAGE CHANNELS (Continued)			
VDP12	233	Input	Channel 12 differential voltage input, positive pin.
VDN12	235	Input	Channel 12 differential voltage input, negative pin.
VDP13	239	Input	Channel 13 differential voltage input, positive pin.
VDN13	241	Input	Channel 13 differential voltage input, negative pin.
VDP14	245	Input	Channel 14 differential voltage input, positive pin.
VDN14	247	Input	Channel 14 differential voltage input, negative pin.
VDP15	251	Input	Channel 15 differential voltage input, positive pin.
VDN15	253	Input	Channel 15 differential voltage input, negative pin.
VDP16	257	Input	Channel 16 differential voltage input, positive pin.
VDN16	259	Input	Channel 16 differential voltage input, negative pin.
NO CONNECT			
NC	14, 21, 23, 25–28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 55–79, 112, 113, 126, 127, 181, 195, 197, 211, 212	No Connect	No connection.

4 Specifications

The following specifications are specific to XSOM®-CORE and can be expanded via custom carrier board implementations. See Section 5 for additional details.

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS\NOTES
VOLTAGE OUTPUTS (16 Channels)					
Output Voltage Range	0 0 0 -5 -10 -20		5 10 20 5 10 20	V	Selectable, per channel VDD $\geq$ VMAX + 1.5 VSS $\leq$ VMIN - 1.5
DAC Resolution		16		bits	
Update Rate			100	kHz	
Output Voltage Settling Time			10 10 15 25	µs	5 V span 10 V span 20 V span 40 V span
Output Current	-10		10	mA	
Slew Rate		0.8 4		V/µs	0-5 V range (1) All other ranges except 40 V span (1)
Output Impedance		0.05 0.05 25		Ω	DAC code at midscale(2) DAC code at full scale(2) DAC code at negative full scale(2)
PROGRAMMABLE CURRENT-LIMITED OUTPUTS (16 Channels)					
Current Limit Range	0		300	mA	
Resolution		16		bits	
Update Rate			100	kHz	
PCLIx Operating Range	0		PCLV+	V	
SINGLE-ENDED INPUTS (16 Channels)					
Voltage Input Range	0		10	V	
Resolution		16		bits	
Sampling Rate			100	kHz	
DIFFERENTIAL VOLTAGE INPUTS (16 Channels)					
Differential Input Range	-0.1		0.1	V	
Common-Mode Range	0		10	V	
Resolution		16		bits	
Sampling Rate			100	kHz	

(1) 10%FSR to 90%FSR
(2) DAC Unloaded

PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS\NOTES
POWER SUPPLY					
VDD Input Voltage	15		21.5	V	Relative to GND
VSS Input Voltage	-21.5		0	V	Relative to GND
Maximum Supply Span	15		43	V	Voltage Span = VDD - VSS
5V Operating Voltage	4.5		5.5	V	Relative to GND
PCLV+ Input Voltage	3.3		VDD	V	Relative to GND
PCLV- Input Voltage	-3.3		0	V	Relative to GND

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5 Application Information

XSOM®-CORE is designed to be used in conjunction with a carrier board, which forms the basis of a complete system integration. The carrier board is responsible for supplying power to the module and serves one or more additional roles depending on the application: it may act as a passive interface board, routing signals between the module and the device under test (DUT), or it may extend the capabilities of the module by providing additional peripherals, connectivity, or I/O expansion. The carrier board may fulfill both roles simultaneously, acting as both an interface to the DUT and an expansion platform for the module.

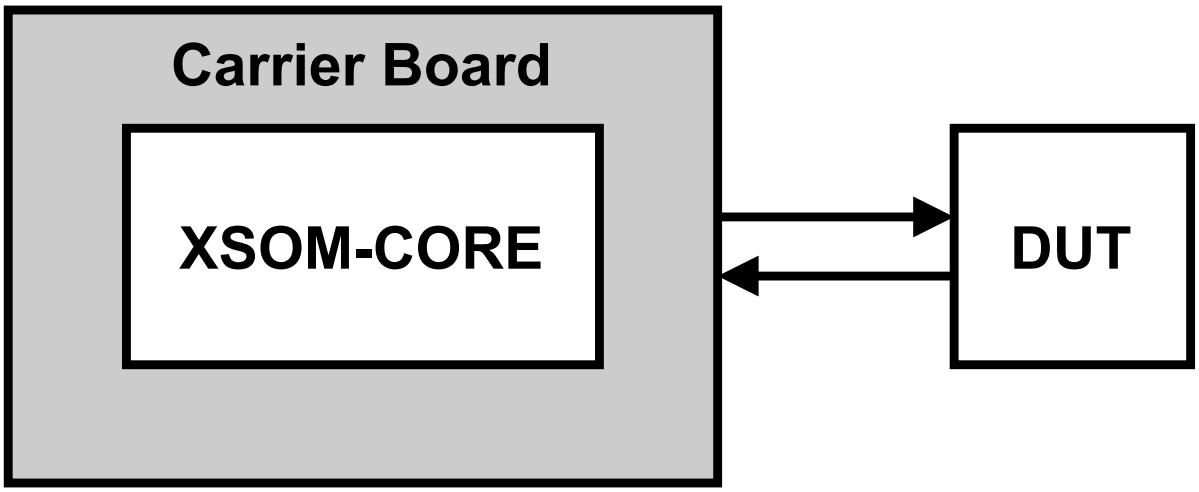


Figure 3 General Application Diagram

6 Version History

Revision Number	Release Date	Notes
0.3	2026-05-15	Updated Section 4.
0.2	2026-04-14	Added Figure 2.
0.1	2026-03-17	Updated Section 4.
0	2026-03-06	Initial draft release.

7 Notices and Disclaimers

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Specification Changes

Specifications and product descriptions are subject to change without notice. The manufacturer reserves the right to make improvements, modifications, or discontinuations of the product at any time.

Product Use

This product is intended for use in industrial, laboratory, and test and measurement applications. It is not designed, authorized, or warranted for use in life-support systems, medical devices, nuclear facilities, aviation control systems, or other applications where failure could result in personal injury, loss of life, or significant property damage.

External Power Responsibility

The programmable current-limited output channels require an external voltage source connected to the VDD terminal. These channels do not source current. Users are responsible for ensuring that external supply voltages and load conditions remain within the specified operating limits and Absolute Maximum Ratings.

Limitation of Liability

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Operation beyond the conditions specified in the Absolute Maximum Ratings section may result in permanent damage to the device. Functional operation beyond recommended operating conditions is not implied and may affect reliability.

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