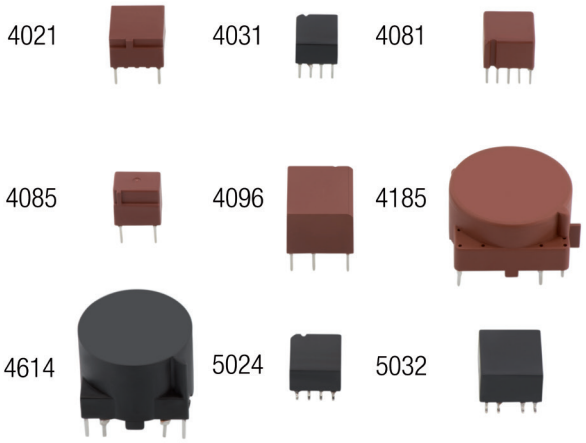
ISOLATION TRANSFORMERS FOR NARROWBAND PLC SYSTEMS

INDUSTRIAL APPLICATIONS



MAIN FEATURES

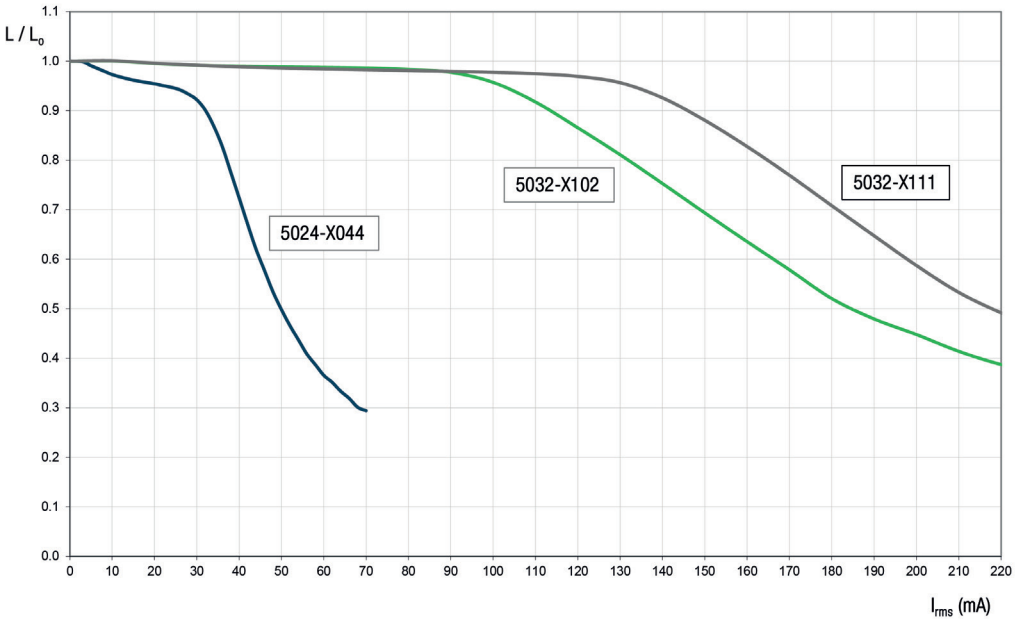
- Excellent transmission characteristics
- High mains current capability, low THD
- Matching with all leading IC (modulation methods FSK, DCSK and OFDM)
- Compliant with all PLC standards (HomePlug, CENELEC ...)
- Compact designs in THT and SMT housings
- Insulation according to IEC 60950, UL 1950 and IEC 61558

DESCRIPTION

Power line communication (PLC) is a type of communication technology that enables the use of existing wiring infrastructure to transfer data and information over power lines. PLC is one of the favored technologies for reliable, cost-effective and high-performance communication networking technology in multiple domains.

For narrowband PLC systems where the operating frequency may be up to 500 kHz isolation transformers based on amorphous VITROVAC® or nanocrystalline VITROPERM® offer excellent transmission characteristics, high robustness against EMC interferences and safe galvanic insulation.

MAINS CURRENT CAPABILITY OF PLC TRANSFORMERS (EXAMPLES)



Saturation characteristics of PLC transformers (examples)

MAGNETIC AND ELECTRICAL PROPERTIES

Part number T60403-K…	n	I_{rms} mA	L_m mH	L_s µH	C_k pF	R_{Cu} Ohm	$U_{is,rms}$ V	$U_{p,rms}$ kV	extra feature
Operational Isolation									
THT Design									
4021-X142	1.68:**1**	50	0.43	6	17	0.17	100	1.5	compact flat
SMT Design									
5024-X097	1.68:**1**	50	0.43	6	17	0.17	100	1.5	ultra-compact
5032-X104	1:**1**	90	0.5	6.6	15	0.09	100	1.0	compact
5032-X111	2:**1**	130	0.3	5.8	7	0.17	300	3.0	compact
IEC 60950									
THT Design									
4021-X144	1.37:**1**	120	0.43	1	35	0.22	450	5.1	compact flat
4021-X145	1.7:**1**	130	0.34	1	30	0.20	450	5.1	compact flat
4021-X146	1:**1**	100	0.68	1	35	0.26	450	5.1	compact flat
4081-X004	1:**1**	30	1.4	0.8	25	0.20	400	4.0	ultra-compact flat
4081-X007	2:**1**	35	0.9	0.3	25	0.11	250	5.5	ultra-compact flat
4081-X008	1.36:**1**	32	1.2	0.4	25	0.13	250	5.5	ultra-compact flat
4085-X004	1:**1**	30	1.4	0.8	25	0.20	300	4.0	ultra-compact upright
4096-X046	1:**1**	30	1.3	1	12	0.15	500	6.0	standard
4185-X047	1:**1**	50	1.4	0.8	15	0.20	400	10.0	high voltage
4614-X010	1:1:**2**	250	0.44	0.9	60	0.02	450	5.1	high current
SMT Design									
5024-X044*)	1:**1**	30	1.4	0.3	25	0.20	250	5.5	ultra-compact
5024-X078	1:**1**	15	2.5	0.9	50	0.30	250	3.0	ultra-compact
5024-X079	2:**1**	30	1.4	0.5	50	0.12	400	3.0	ultra-compact
5024-X090	1:1:**2**	35	0.88	0.4	30	0.10	400	3.0	ultra-compact
5024-X092**)	1:1:**2**	100	0.7	1	40	0.50	400	4.0	ultra-compact
5024-X099**)	1:1:**2**	100	0.7	1	40	0.50	400	3.0	ultra-compact
5024-X100	1:4:**4**	30	1.56	1	25	0.15	400	3.0	ultra-compact
5032-X102	1:1:**2**	100	0.7	1	30	0.23	450	5.1	compact
5032-X114	1:1.15:**1.62**	120	0.54	1	30	0.22	450	5.1	compact

*) UL 1950 certified

**) extended performance in the low frequency range

IEC 61558

THT Design

4031-X009	2:**1**	5	1.0	0.17	17	0.08	300	4.2	compact cubic
4096-X047	1:**1**	-	1.3	10	5	0.20	500	6.0	standard

TRANSFORMER SELECTION

The transformers have been designed to be compatible with PLC chipsets of various IC manufacturers. Depending on individual operating and/or mounting conditions a preselection may be made.

Part number T60403-K…	Atmel ATPL230A ATPL250A	Cypress CY8C56** CY8C58**	Enverv EV80*0	Maxim MAX2990 MAX2991	ON Semi AMIS 49587 NCN 49597 NCN 49599	Renesas M16C/6S	STM ST7538 ST7540 ST7570 ST7580 ST7590 STComet	TI F28PLC83 F28PLC35	Yitran IT800	Others various
Operational Isolation										
THT Design										
4021-X142										x
SMT Design										
5024-X097										x
5032-X104										x
5032-X111					x					
IEC 60950										
THT Design										
4021-X144										x
4021-X145										x
4021-X146										x
4081-X004	x	x				x				
4081-X007										x
4081-X008										x
4085-X004	x	x				x				
4096-X046				x						
4185-X047	x	x				x				
4614-X010			x				x			
SMT Design										
5024-X044*)	x	x				x				
5024-X078										x
5024-X079										x
5024-X090			x			x			x	
5024-X092**)						x	x		x	
5024-X099**)						x	x		x	
5024-X100	x									
5032-X102			x			x	x		x	
5032-X114								x		

*) UL 1950 certified

**) extended performance in the low frequency range

IEC 61558

THT Design

4031-X009					x					
4096-X047				x						

ISOLATION TRANSFORMERS FOR NARROWBAND PLC SYSTEMS

KEY

n = turns ratio (**bold**: mains side winding)

I_{rms} = max mains current (50/60Hz; related to mains side winding)

L_m = inductance of mains side winding (minimum value)

L_s = leakage inductance of mains side winding with IC side winding(s) shorted (typical value)

C_k = coupling capacitance between mains side winding and IC side winding(s) (typical value)

R_{Cu} = DC resistance of mains side winding (typical value)

$U_{is,rms}$ = insulation voltage, effective value between mains side winding and IC side winding(s) (identical to 'working voltage')

$U_{p,rms}$ = test voltage, effective value at 50 Hz between mains side winding and IC side winding(s)

THT = Through Hole Technology

SMT = Surface-Mounting Technology

NOTES

A part of above listed isolation transformers are built according to IEC 60950 for "Safety of Information technology equipment" or IEC 61558 "Safety of power transformers, power supplies, reactors and similar products". They all feature reinforced insulation. The classification to overvoltage category, pollution degree and insulation material group may be taken from the data sheet.

The data sheets can be downloaded from VAC's homepage.

Design modifications are possible upon request.

POSSIBLE APPLICATIONS

- Smart Grid
- Automated Meter Infrastructure (AMI)
- Indoor Networking / Home Automation
- Remote monitoring & control

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