

High Speed Dual Channel Digital Isolator

GENERAL DESCRIPTION

The SiLM572x-AQ devices are high performance, dual channel digital isolator with 5.0 kV_{RMS} (SOP8W) and 3 kV_{RMS} (SOP8) isolation rating per UL1577. The SiLM572x-AQ devices provide high electromagnetic immunity and low emissions at low power consumption.

The SiLM5720-AQ device has both channels in the same direction while the SiLM5721-AQ device has both channels in the opposite direction. In the event of input power or signal loss, the default output is high for devices without suffix F and low for devices with suffix F.

APPLICATION

- Isolated line receiver
- Microprocessor system interface
- Digital isolation for A/D, D/A conversion
- PLC, ATE input/output isolation
- Power transistor isolation in motor drives
- Isolation of high-speed logic systems

FEATURES

- AEC-Q100 qualified for automotive application
 - Temperature grade 1: -40°C to +125°C, T_A
- Data rate 100Mbps
- Propagation delay 12ns (Typ)
- CMTI 150kV/us (Min)
- Low power consumption: 1.5mA/Channel (Typ)
- Wide supply voltage: 2.25V to 5.5V
- 2.25V to 5.5V level translation
- Default output High (SiLM572x-AQ) and Low (SiLM572xF-AQ) Options
- Robust electromagnetic compatibility (EMC)
 - System Level ESD, EFT, and surge immunity
 - ±8 kV IEC 61000-4-2 contact discharge protection across isolation barrier
 - Low emissions
- Safety certifications:
 - 3kV_{RMS} isolation for 1 minute per UL 1577 for SOP8 package
 - 5.0kV_{RMS} isolation for 1 minute per UL 1577 for SOP8W package
 - CQC certification per GB4943.1-2022
 - TUV certification per EN/IEC 61010-1: 2010+A1 and EN/IEC 62368-1: 2018
 - DIN V VDE 0884-17: 2021-10 (Pending)

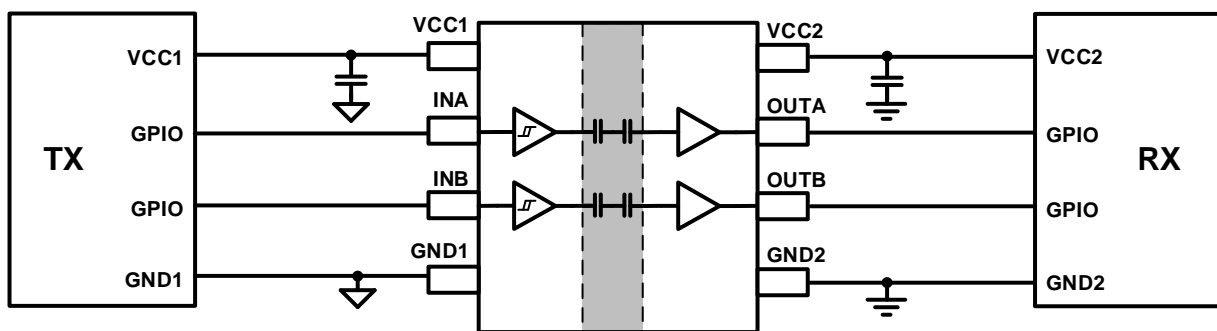


Figure 1. SiLM5720-AQ Typical Application Circuit

TABLE OF CONTENTS

General Description	1
Application	1
Features.....	1
PIN Configuration.....	3
PIN Description.....	4
Functional Block Diagram.....	5
Ordering Information.....	6
Absolute Maximum Ratings	7
Recommended Operation Conditions	7
ESD Ratings	7
Thermal Information.....	7
Package Specifications.....	8
Insulation Specifications	8
Safety Related Certifications (SOP8)	10
Safety Limiting Values (SOP8)	10
Safety Related Certifications (SOP8W).....	11
Safety Limiting Values (SOP8W).....	11
Electrical Characteristics (DC) with 5V Supply	12
Switching Characteristics (AC) with 5V Supply	13
Electrical Characteristics (DC) with 3.3V Supply	15
Switching Characteristics (AC) with 3.3V Supply	16
Electrical Characteristics (DC) with 2.5V Supply	18
Switching Characteristics (AC) with 2.5V Supply	19
Parameter Measurement Information	21
Switching Characteristics Test Timing	21
CMTI Testing	21
Feature Description	22
Device Functional Modes	22
Power Supply Recommendation	22
Package Case Outlines	23
Revision History	24

PIN CONFIGURATION

Part Name	Pin Configuration (Top View)
	SOP8/SOP8W
SiLM5720-AQ	
SiLM5721-AQ	
SiLM5722-AQ	

PIN DESCRIPTION

Table 1. SiLM5720-AQ SOP8/SOP8W Pin Description

No.	Pin Name	Description
1	VCC1	Input power supply
2	INA	Channel A input
3	INB	Channel B input
4	GND1	Input power ground
5	GND2	Output power ground
6	OUTB	Channel B output
7	OUTA	Channel A output
8	VCC2	Output power supply

Table 2. SiLM5721-AQ SOP8/SOP8W Pin Description

No.	Pin Name	Description
1	VCC1	Input power supply
2	OUTA	Channel A output
3	INB	Channel B input
4	GND1	Input power ground
5	GND2	Output power ground
6	OUTB	Channel B output
7	INA	Channel A input
8	VCC2	Output power supply

Table 3. SiLM5722-AQ SOP8/SOP8W Pin Description

No.	Pin Name	Description
1	VCC1	Input power supply
2	INA	Channel A input
3	OUTB	Channel B output
4	GND1	Input power ground
5	GND2	Output power ground
6	INB	Channel B input
7	OUTA	Channel A output
8	VCC2	Output power supply

FUNCTIONAL BLOCK DIAGRAM

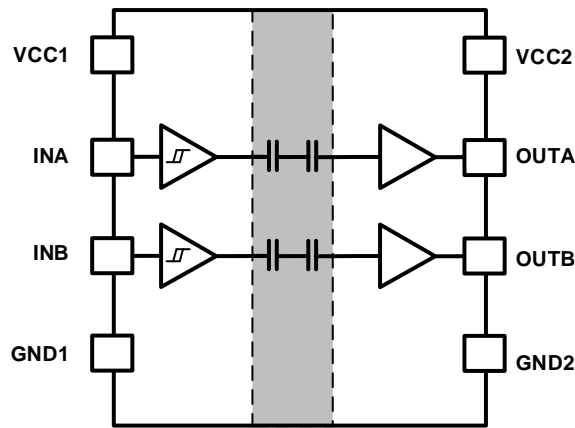


Figure 2. SiLM5720-AQ Functional Block

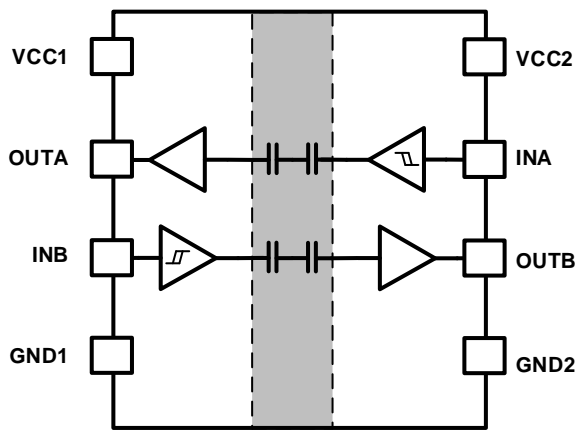


Figure 3. SiLM5721-AQ Functional Block

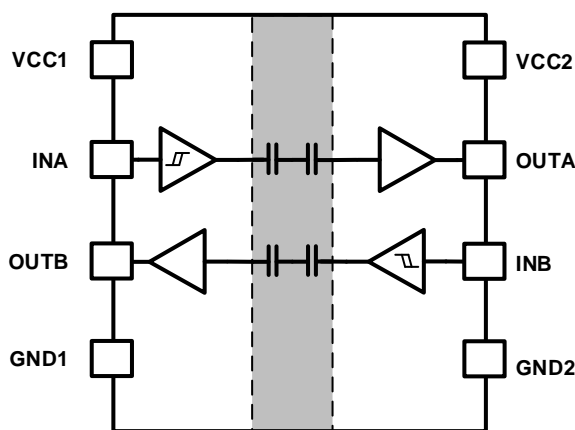


Figure 4. SiLM5722-AQ Functional Block

ORDERING INFORMATION

Order Part No.	Package	QTY
SiLM5720CA-AQ	SOP8, Pb-Free	2500/Reel
SiLM5720CM-AQ	SOP8W, Pb-Free	1000/Reel
SiLM5720FCA-AQ	SOP8, Pb-Free	2500/Reel
SiLM5720FCM-AQ	SOP8W, Pb-Free	1000/Reel
SiLM5721CA-AQ	SOP8, Pb-Free	2500/Reel
SiLM5721CM-AQ	SOP8W, Pb-Free	1000/Reel
SiLM5721FCA-AQ	SOP8, Pb-Free	2500/Reel
SiLM5721FCM-AQ	SOP8W, Pb-Free	1000/Reel
SiLM5722CA-AQ	SOP8, Pb-Free	2500/Reel
SiLM5722CM-AQ	SOP8W, Pb-Free	1000/Reel
SiLM5722FCA-AQ	SOP8, Pb-Free	2500/Reel
SiLM5722FCM-AQ	SOP8W, Pb-Free	1000/Reel

ABSOLUTE MAXIMUM RATINGS

Symbol	Definition	Min.	Max.	Units
V_{CC1}, V_{CC2}	Supply voltage, VCC1 and VCC2	-0.3	6	V
V_I	Voltage at Inx, referenced to input side ground	-0.3	$V_{CC}+0.3$	V
V_{OUT}	Voltage at OUTx, reference to output side ground	-0.3	$V_{CC}+0.3$	V
I_o	Output Current	-15	15	mA
T_J	Junction temperature	-55	150	°C
T_S	Storage temperature	-55	150	°C

Note: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the Recommended Operation Conditions is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. All voltage parameters are referenced to local ground terminal, GND1 or GND2.

RECOMMENDED OPERATION CONDITIONS

Symbol	Definition	Min.	Max.	Units
V_{CC1}, V_{CC2}	Supply voltage	2.25	5.5	V
I_{OH}	High level output current @ $V_{CCO}^{(1)}=5V$	-4		mA
	High level output current @ $V_{CCO}=3.3V$	-2		mA
	High level output current @ $V_{CCO}=2.5V$	-1		mA
I_{OL}	Low level output current @ $V_{CCO}=5V$		4	mA
	Low level output current @ $V_{CCO}=3.3V$		2	mA
	Low level output current @ $V_{CCO}=2.5V$		1	mA
V_{IH}	High Level Input Voltage	$0.7 \times V_{CCI}$	$V_{CCI}^{(1)}$	V
V_{IL}	Low Level Input Voltage	0	$0.3 \times V_{CCI}$	V
DR	Data Rate	0	100	Mbps
T_J	Junction temperature	-40	150	°C
T_A	Ambient temperature	-40	125	°C

(1) V_{CCI} =Input side V_{CC} , V_{CCO} =Output side V_{CC}

ESD RATINGS

Symbol	Definition	Value	Units
V_{ESD}	HBM	±8000	V
	CDM	±2000	V

THERMAL INFORMATION

Symbol	Definition	Value		Unit
		SOP8	SOP8W	
$R_{\theta JA}$	Junction to ambient thermal resistance	135.3	84.5	°C/W
$R_{\theta JC}$	Junction to case (top) thermal resistance	48	43	°C/W

PACKAGE SPECIFICATIONS

Symbol	Definition	Min.	Typ.	Max.	Units
R _{IO}	Resistance (Input Side to Output Side)		10 ¹²		Ω
C _{IO}	Capacitance (Input Side to Output Side)		0.95		pF

INSULATION SPECIFICATIONS

Symbol	Definition	Test Condition	Value		Units
			SOP8	SOP8W	
CLR	External clearance	Shortest terminal to terminal distance through air	>4.0	>8.0	mm
CPG	External creepage	Shortest terminal to terminal distance across the package surface	>4.0	>8.0	mm
DTI	Distance through the insulation	Minimum internal gap	>16	>16	um
CTI	Comparative tracking index	DIN EN 60112 (VDE 0303-11), IEC 60112	>600	>600	V
	Material Group		I		
	Overvoltage category	Rated mains voltage ≤150V _{RMS}	I-IV	I-IV	
		Rated mains voltage ≤300 V _{RMS}	I-III	I-IV	
		Rated mains voltage ≤600 V _{RMS}	I-II	I-III	
		Rated mains voltage ≤1000 V _{RMS}	I-I	I-II	
DIN V VDE 0884-11 ⁽¹⁾					
V _{IORM}	Maximum repetitive peak isolation voltage		1000	1414	V _{PK}
V _{IOWM}	Maximum isolation working voltage		707	1000	V _{RMS}
V _{IOTM}	Maximum transient isolation voltage	60s	4242	7000	V _{PK}
V _{IOSM}	Maximum surge isolation voltage	Test method per IEC62368, 1.2/50us waveform, V _{TEST} =1.3xV _{IOSM} for SOP8, V _{TEST} =1.6 x V _{IOSM} for SOP8W	6000	6250	V _{PK}
q _{pd}	Apparent charge		≤5	≤5	pC
	Climatic Category		40/125/21	40/125/21	
	Pollution Degree		2	2	

Symbol	Definition	Test Condition	Value		Units
			SOP8	SOP8W	
UL1577					
V_{ISO}	Withstand Isolation Voltage	$V_{TEST}=V_{ISO}$, t=60s (qualification), $V_{TEST}=1.2 \times V_{ISO}$, t=1s (100% production)	3000	5000	V_{RMS}

Note1: Certification pending

SAFETY RELATED CERTIFICATIONS (SOP8)

VDE	UL	CQC	TUV
DIN VDE 0884-17: 2021-10	UL 1577 component recognition program	Certified according to GB4943.1-2022	Certified according to EN IEC 61010-1: 2010+A1 and EN IEC 62368-1: 2018
Basic Insulation, $V_{IORM} = 1000 V_{PK}$ $V_{IOTM} = 4242 V_{PK}$	Single protection, 3000 V_{RMS}	Basic insulation, Altitude $\leq 5000m$	3000Vrms basic insulation
Certification Pending	File number: E521801	File number: CQC23001373092	Ref.Certif.No: DE 2-040207 Ref.Certif.No: JPTUV-152104 Certificate No: R 50600851 0001

SAFETY LIMITING VALUES (SOP8)

Symbol	Parameter	Condition	Value	Unit
I_s	Safety input, output, or supply current	$R_{\theta JA} = 135.3^{\circ}C/W$, $V_{CC1} = V_{CC2} = 5.5V$, $T_J = 150^{\circ}C$, $T_A = 25^{\circ}C$	168	mA
P_s	Safety input, output, or total power	$R_{\theta JA} = 135.3^{\circ}C/W$, $T_J = 150^{\circ}C$, $T_A = 25^{\circ}C$	924	mW
T_s	Maximum safety temperature		150	$^{\circ}C$

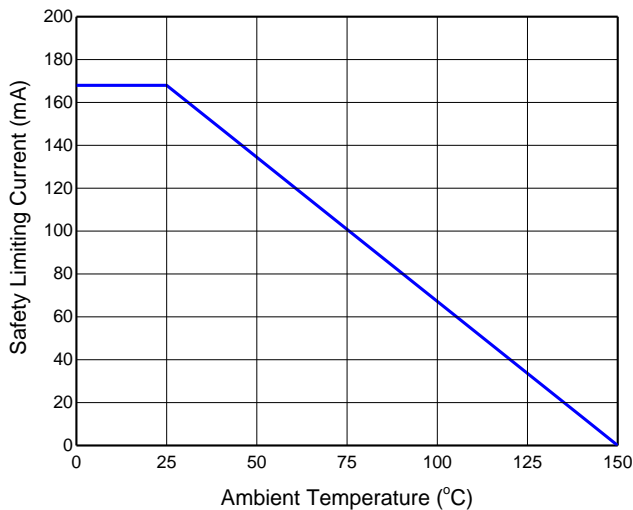


Figure 5. Thermal Derating Curve for Limiting Current per VDE (SOP8)

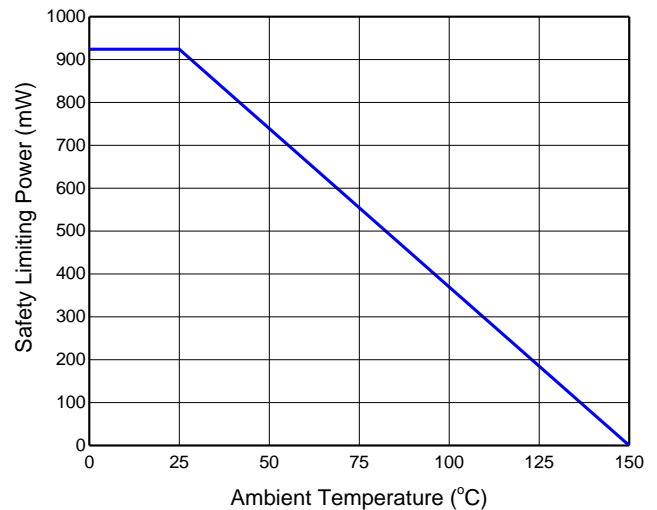


Figure 6. Thermal Derating Curve for Limiting Power per VDE (SOP8)

SAFETY RELATED CERTIFICATIONS (SOP8W)

VDE	UL	CQC	TUV
DIN VDE 0884-17: 2021-10	UL 1577 component recognition program	Certified according to GB4943.1-2022	Certified according to EN IEC 61010-1: 2010+A1 and EN IEC 62368-1: 2018
Reinforced insulation, $V_{IORM} = 1500 V_{PK}$ $V_{IOTM} = 7000 V_{PK}$	Single protection, 5000 V_{RMS}	Reinforced insulation, Altitude $\leq 5000m$	5000Vrms reinforced insulation
Certification Pending	File number: E521801	File number: CQC23001376521	Ref.Certif.No: DE 2-040497 Ref.Certif.No: JPTUV-153602 Certificate No: R 50605766 0001

SAFETY LIMITING VALUES (SOP8W)

Symbol	Parameter	Condition	Value	Unit
I_s	Safety input, output, or supply current	$R_{\theta JA}=84.5^{\circ}C/W$, $V_{CC1}=V_{CC2}=5.5V$, $T_J=150^{\circ}C$, $T_A=25^{\circ}C$	269	mA
P_s	Safety input, output, or total power	$R_{\theta JA}=84.5^{\circ}C/W$, $T_J=150^{\circ}C$, $T_A=25^{\circ}C$	1480	mW
T_s	Maximum safety temperature		150	$^{\circ}C$

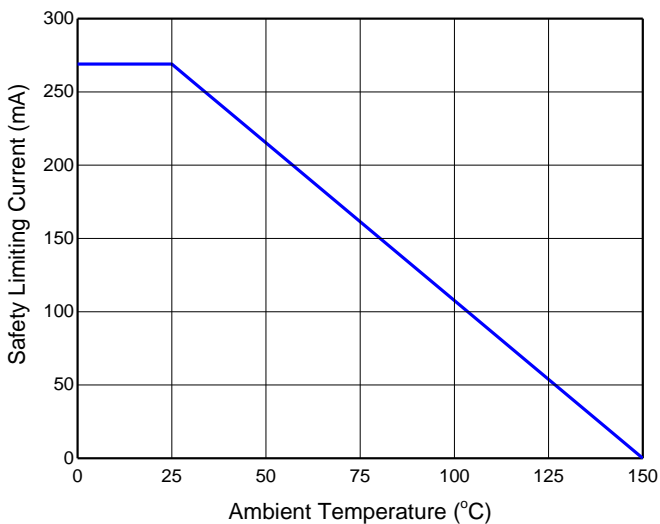


Figure 7. Thermal Derating Curve for Limiting Current per VDE (SOP8W)

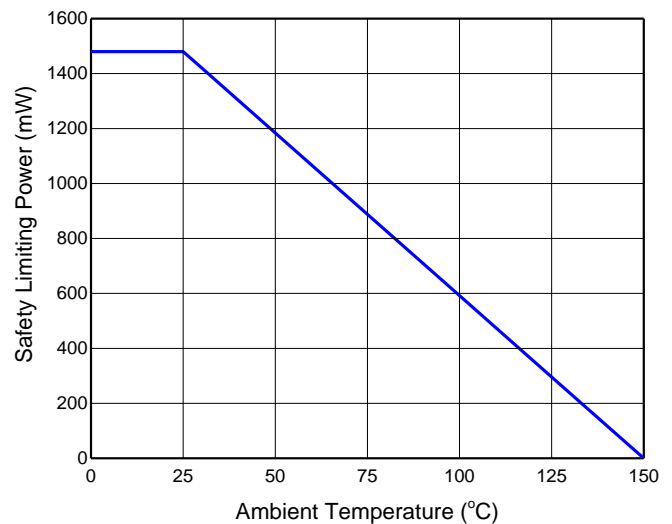


Figure 8. Thermal Derating Curve for Limiting Power per VDE (SOP8W)

ELECTRICAL CHARACTERISTICS (DC) WITH 5V SUPPLY
 $V_{CC1} = V_{CC2} = 5V \pm 10\%$ (over recommended operating conditions unless otherwise specified.)

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
Power Supply UVLO						
UVLO _R	Under Voltage Lockout V_{CCx} rising			2.05	2.25	V
UVLO _F	Under Voltage Lockout V_{CCx} falling		1.7	1.9		V
UVLO _{HYS}	Under Voltage Lockout Hysteresis			0.15		V
Power Supply Current (SiLM5720-AQ)						
I _{CC1_QH}	Current on VCC1 with DC Signal	$V_I = V_{CCI}$ (SiLM5720-AQ), $V_I = 0$ V (SiLM5720F-AQ)		0.4	0.6	mA
I _{CC1_QL}		$V_I = 0$ V (SiLM5720-AQ), $V_I = V_{CCI}$ (SiLM5720F-AQ)		2.8	4.1	mA
I _{CC2_QH}	Current on VCC2 with DC Signal	$V_I = V_{CCI}$ (SiLM5720-AQ), $V_I = 0$ V (SiLM5720F-AQ)		1.4	2.0	mA
I _{CC2_QL}		$V_I = 0$ V (SiLM5720-AQ), $V_I = V_{CCI}$ (SiLM5720F-AQ)		1.5	2.2	mA
I _{CC1_OP_1M}	Current on VCC1 with AC signal. All channel switching with square wave clock input.	1 Mbps, $C_L = 15$ pF		1.6	2.3	mA
I _{CC1_OP_10M}		10 Mbps, $C_L = 15$ pF		1.6	2.4	mA
I _{CC1_OP_100M}		100 Mbps, $C_L = 15$ pF		2.1	2.9	mA
I _{CC2_OP_1M}	Current on VCC2 with AC signal. All channel switching with square wave clock input.	1 Mbps, $C_L = 15$ pF		1.7	2.3	mA
I _{CC2_OP_10M}		10 Mbps, $C_L = 15$ pF		3.6	4.9	mA
I _{CC2_OP_100M}		100 Mbps, $C_L = 15$ pF		15.9	22	mA
Power Supply Current (SiLM5721/2-AQ)						
I _{CC1_QH}	Current on VCC1 with DC Signal	$V_I = V_{CCI}$ (SiLM5721/2-AQ), $V_I = 0$ V (SiLM5721/2F-AQ)		0.9	1.3	mA
I _{CC1_QL}		$V_I = 0$ V (SiLM5721/2-AQ), $V_I = V_{CCI}$ (SiLM5721/2F-AQ)		2.1	3.1	mA
I _{CC2_QH}	Current on VCC2 with DC Signal	$V_I = V_{CCI}$ (SiLM5721/2-AQ), $V_I = 0$ V (SiLM5721/2F-AQ)		0.9	1.3	mA
I _{CC2_QL}		$V_I = 0$ V (SiLM5721/2-AQ), $V_I = V_{CCI}$ (SiLM5721/2F-AQ)		2.2	3.1	mA
I _{CC1_OP_1M}		1 Mbps, $C_L = 15$ pF		1.6	2.3	mA

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
I _{CC1_OP_10M}	Current on VCC1 with AC signal. All channel switching with square wave clock input.	10 Mbps, C _L = 15pF		2.7	3.7	mA
I _{CC1_OP_100M}		100 Mbps, C _L = 15pF		8.8	12	mA
I _{CC2_OP_1M}	Current on VCC2 with AC signal. All channel switching with square wave clock input.	1 Mbps, C _L = 15pF		1.6	2.3	mA
I _{CC2_OP_10M}		10 Mbps, C _L = 15pF		2.7	3.7	mA
I _{CC2_OP_100M}		100 Mbps, C _L = 15pF		8.8	12	mA
Input Logic Interface						
V _{IH}	Rising input threshold voltage			0.6× V _{CCI}	0.7× V _{CCI}	V
V _{IL}	Falling input threshold voltage		0.3× V _{CCI}	0.4× V _{CCI}		V
V _{IHYS}	Input threshold voltage hysteresis		0.1× V _{CCI}	0.2× V _{CCI}		V
I _{IH}	High level input current	I _{Nx} = V _{CCI}			15	uA
I _{IL}	Low level input current	I _{Nx} = 0V	-15			uA
Output Logic Interface						
V _{OH}	High level output voltage	I _{OH} = -4mA	V _{CCO} -0.4	4.8		V
V _{OL}	Low level output voltage	I _{OL} = 4mA		0.12	0.3	V
CMTI						
CMT _{IH}	Output High Level Common Mode Transient Immunity	V _I = V _{CCI} , V _{CM} =1200V, C _L =15pF	150	200		kV/us
CMT _{IL}	Output Low Level Common Mode Transient Immunity	V _I = 0V, V _{CM} =1200V, C _L =15pF	150	200		kV/us

SWITCHING CHARACTERISTICS (AC) WITH 5V SUPPLY

V_{CC1} = V_{CC2}=5V±10% (over recommended operating conditions unless otherwise specified.)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
t _{PLH}	Propagation delay, Low to High	C _L =15pF		12	20	ns
t _{PHL}	Propagation delay, High to Low	C _L =15pF		12	20	ns
t _r	Turn on rise time	C _L =15pF		2		ns

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
t_f	Turn off fall time	$C_L=15\text{pF}$		2		ns
t_{PWD}	Pulse Width Distortion	$C_L=15\text{pF}$			10	ns
t_{SKO}	Channel to Channel Output Skew Time	$C_L=15\text{pF}$, same direction in single device			8	ns
t_{SKP}	Part to Part Skew Time	$C_L=15\text{pF}$, same direction			8	ns
t_{DO}	Default output delay time from input power loss	Measured from the time that the input voltage goes below 1.7V, $C_L = 15\text{pF}$		40		ns

ELECTRICAL CHARACTERISTICS (DC) WITH 3.3V SUPPLY
 $V_{CC1} = V_{CC2} = 3.3V \pm 10\%$ (over recommended operating conditions unless otherwise specified.)

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
Power Supply UVLO						
UVLO _R	Under Voltage Lockout V_{CCx} rising			2.05	2.25	V
UVLO _F	Under Voltage Lockout V_{CCx} falling		1.7	1.9		V
UVLO _{HYS}	Under Voltage Lockout Hysteresis			0.15		V
Power Supply Current (SiLM5720-AQ)						
I _{CC1_QH}	Current on VCC1 with DC Signal	$V_I = V_{CCI}$ (SiLM5720-AQ), $V_I = 0$ V (SiLM5720F-AQ)		0.4	0.6	mA
I _{CC1_QL}		$V_I = 0$ V (SiLM5720-AQ), $V_I = V_{CCI}$ (SiLM5720F-AQ)		2.8	4.0	mA
I _{CC2_QH}	Current on VCC2 with DC Signal	$V_I = V_{CCI}$ (SiLM5720-AQ), $V_I = 0$ V (SiLM5720F-AQ)		1.3	2.0	mA
I _{CC2_QL}		$V_I = 0$ V (SiLM5720-AQ), $V_I = V_{CCI}$ (SiLM5720F-AQ)		1.5	2.1	mA
I _{CC1_OP_1M}	Current on VCC1 with AC signal. All channel switching with square wave clock input.	1 Mbps, $C_L = 15$ pF		1.6	2.3	mA
I _{CC1_OP_10M}		10 Mbps, $C_L = 15$ pF		1.6	2.3	mA
I _{CC1_OP_100M}		100 Mbps, $C_L = 15$ pF		2.0	2.7	mA
I _{CC2_OP_1M}	Current on VCC2 with AC signal. All channel switching with square wave clock input.	1 Mbps, $C_L = 15$ pF		1.5	2.2	mA
I _{CC2_OP_10M}		10 Mbps, $C_L = 15$ pF		2.3	3.3	mA
I _{CC2_OP_100M}		100 Mbps, $C_L = 15$ pF		10.2	13.7	mA
Power Supply Current (SiLM5721/2-AQ)						
I _{CC1_QH}	Current on VCC1 with DC Signal	$V_I = V_{CCI}$ (SiLM5721/2-AQ), $V_I = 0$ V (SiLM5721/2F-AQ)		0.9	1.3	mA
I _{CC1_QL}		$V_I = 0$ V (SiLM5721/2-AQ), $V_I = V_{CCI}$ (SiLM5721/2F-AQ)		2.1	3.0	mA
I _{CC2_QH}	Current on VCC2 with DC Signal	$V_I = V_{CCI}$ (SiLM5721/2-AQ), $V_I = 0$ V (SiLM5721/2F-AQ)		0.9	1.3	mA
I _{CC2_QL}		$V_I = 0$ V (SiLM5721/2-AQ), $V_I = V_{CCI}$ (SiLM5721/2F-AQ)		2.1	3.0	mA
I _{CC1_OP_1M}		1 Mbps, $C_L = 15$ pF		1.5	2.2	mA

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
I _{CC1_OP_10M}	Current on VCC1 with AC signal. All channel switching with square wave clock input.	10 Mbps, C _L = 15pF		2.0	2.8	mA
I _{CC1_OP_100M}		100 Mbps, C _L = 15pF		5.8	7.8	mA
I _{CC2_OP_1M}	Current on VCC2 with AC signal. All channel switching with square wave clock input.	1 Mbps, C _L = 15pF		1.5	2.2	mA
I _{CC2_OP_10M}		10 Mbps, C _L = 15pF		2.0	2.8	mA
I _{CC2_OP_100M}		100 Mbps, C _L = 15pF		5.8	7.8	mA
Input Logic Interface						
V _{IH}	Rising input threshold voltage			0.6× V _{CCI}	0.7× V _{CCI}	V
V _{IL}	Falling input threshold voltage		0.3× V _{CCI}	0.4× V _{CCI}		V
V _{IHYS}	Input threshold voltage hysteresis		0.1× V _{CCI}	0.2× V _{CCI}		V
I _{IH}	High level input current	I _{Nx} = V _{CCI}			12	uA
I _{IL}	Low level input current	I _{Nx} = 0V	-12			uA
Output Logic Interface						
V _{OH}	High level output voltage	I _{OH} = -2mA	V _{CCO} -0.3	3.2		V
V _{OL}	Low level output voltage	I _{OL} = 2mA		0.07	0.2	V
CMTI						
CMT _{IH}	Output High Level Common Mode Transient Immunity	V _I = V _{CCI} , V _{CM} =1200V, C _L =15pF	150	200		kV/us
CMT _{IL}	Output Low Level Common Mode Transient Immunity	V _I = 0V, V _{CM} =1200V, C _L =15pF	150	200		kV/us

SWITCHING CHARACTERISTICS (AC) WITH 3.3V SUPPLY

V_{CC1} = V_{CC2}=3.3V±10% (over recommended operating conditions unless otherwise specified.)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
t _{PLH}	Propagation delay, Low to High	C _L =15pF		12	25	ns
t _{PHL}	Propagation delay, High to Low	C _L =15pF		12	25	ns
t _r	Turn on rise time	C _L =15pF		2		ns

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
t_f	Turn off fall time	$C_L=15\text{pF}$		2		ns
t_{PWD}	Pulse Width Distortion	$C_L=15\text{pF}$			10	ns
t_{SKO}	Channel to Channel Output Skew Time	$C_L=15\text{pF}$, same direction in single device			8	ns
t_{SKP}	Part to Part Skew Time	$C_L=15\text{pF}$, same direction			8	ns
t_{DO}	Default output delay time from input power loss	Measured from the time that the input voltage goes below 1.7V, $C_L = 15\text{pF}$		40		ns

ELECTRICAL CHARACTERISTICS (DC) WITH 2.5V SUPPLY
 $V_{CC1} = V_{CC2} = 2.5V \pm 10\%$ (over recommended operating conditions unless otherwise specified.)

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
Power Supply UVLO						
UVLO _R	Under Voltage Lockout V_{CCx} rising			2.05	2.25	V
UVLO _F	Under Voltage Lockout V_{CCx} falling		1.7	1.9		V
UVLO _{HYS}	Under Voltage Lockout Hysteresis			0.15		V
Power Supply Current (SiLM5720-AQ)						
I _{CC1_QH}	Current on VCC1 with DC Signal	$V_I = V_{CCI}$ (SiLM5720-AQ), $V_I = 0$ V (SiLM5720F-AQ)		0.4	0.6	mA
I _{CC1_QL}		$V_I = 0$ V (SiLM5720-AQ), $V_I = V_{CCI}$ (SiLM5720F-AQ)		2.8	3.9	mA
I _{CC2_QH}	Current on VCC2 with DC Signal	$V_I = V_{CCI}$ (SiLM5720-AQ), $V_I = 0$ V (SiLM5720F-AQ)		1.3	1.9	mA
I _{CC2_QL}		$V_I = 0$ V (SiLM5720-AQ), $V_I = V_{CCI}$ (SiLM5720F-AQ)		1.5	2.1	mA
I _{CC1_OP_1M}	Current on VCC1 with AC signal. All channel switching with square wave clock input.	1 Mbps, $C_L = 15$ pF		1.6	2.2	mA
I _{CC1_OP_10M}		10 Mbps, $C_L = 15$ pF		1.6	2.3	mA
I _{CC1_OP_100M}		100 Mbps, $C_L = 15$ pF		2.1	2.7	mA
I _{CC2_OP_1M}	Current on VCC2 with AC signal. All channel switching with square wave clock input.	1 Mbps, $C_L = 15$ pF		1.5	2.1	mA
I _{CC2_OP_10M}		10 Mbps, $C_L = 15$ pF		2.1	3	mA
I _{CC2_OP_100M}		100 Mbps, $C_L = 15$ pF		8.1	10.8	mA
Power Supply Current (SiLM5721/2-AQ)						
I _{CC1_QH}	Current on VCC1 with DC Signal	$V_I = V_{CCI}$ (SiLM5721/2-AQ), $V_I = 0$ V (SiLM5721/2F-AQ)		0.9	1.3	mA
I _{CC1_QL}		$V_I = 0$ V (SiLM5721/2-AQ), $V_I = V_{CCI}$ (SiLM5721/2F-AQ)		2.1	3.0	mA
I _{CC2_QH}	Current on VCC2 with DC Signal	$V_I = V_{CCI}$ (SiLM5721/2-AQ), $V_I = 0$ V (SiLM5721/2F-AQ)		0.9	1.3	mA
I _{CC2_QL}		$V_I = 0$ V (SiLM5721/2-AQ), $V_I = V_{CCI}$ (SiLM5721/2F-AQ)		2.1	3.0	mA
I _{CC1_OP_1M}		1 Mbps, $C_L = 15$ pF		1.5	2.1	mA

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
I _{CC1_OP_10M}	Current on VCC1 with AC signal. All channel switching with square wave clock input.	10 Mbps, C _L = 15pF		1.8	2.6	mA
I _{CC1_OP_100M}		100 Mbps, C _L = 15pF		4.7	6.2	mA
I _{CC2_OP_1M}	Current on VCC2 with AC signal. All channel switching with square wave clock input.	1 Mbps, C _L = 15pF		1.5	2.1	mA
I _{CC2_OP_10M}		10 Mbps, C _L = 15pF		1.8	2.6	mA
I _{CC2_OP_100M}		100 Mbps, C _L = 15pF		4.7	6.2	mA
Input Logic Interface						
V _{IH}	Rising input threshold voltage			0.6× V _{CCI}	0.7× V _{CCI}	V
V _{IL}	Falling input threshold voltage		0.3× V _{CCI}	0.4× V _{CCI}		V
V _{IHYS}	Input threshold voltage hysteresis		0.1× V _{CCI}	0.2× V _{CCI}		V
I _{IH}	High level input current	I _{Nx} = V _{CCI}			10	μA
I _{IL}	Low level input current	I _{Nx} = 0V	-10			μA
Output Logic Interface						
V _{OH}	High level output voltage	I _{OH} = -1mA	V _{CCO} -0.2	2.45		V
V _{OL}	Low level output voltage	I _{OL} = 1mA		0.04	0.1	V
CMTI						
CMT _{IH}	Output High Level Common Mode Transient Immunity	V _I = V _{CCI} , V _{CM} =1200V, C _L =15pF	150	200		kV/us
CMT _{IL}	Output Low Level Common Mode Transient Immunity	V _I = 0V, V _{CM} =1200V, C _L =15pF	150	200		kV/us

SWITCHING CHARACTERISTICS (AC) WITH 2.5V SUPPLY

V_{CC1} = V_{CC2}=2.5V±10% (over recommended operating conditions unless otherwise specified.)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
t _{PLH}	Propagation delay, Low to High	C _L =15pF		14	27	ns
t _{PHL}	Propagation delay, High to Low	C _L =15pF		14	27	ns
t _r	Turn on rise time	C _L =15pF		2		ns

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
t_f	Turn off fall time	$C_L=15\text{pF}$		2		ns
t_{PWD}	Pulse Width Distortion	$C_L=15\text{pF}$			10	ns
t_{SKO}	Channel to Channel Output Skew Time	$C_L=15\text{pF}$, same direction in single device			8	ns
t_{SKP}	Part to Part Skew Time	$C_L=15\text{pF}$, same direction			8	ns
t_{DO}	Default output delay time from input power loss	Measured from the time that the input voltage goes below 1.7V, $C_L = 15\text{pF}$		40		μs

PARAMETER MEASUREMENT INFORMATION

Switching Characteristics Test Timing

Figure 9 shows the timing of propagation delay, rise and fall time

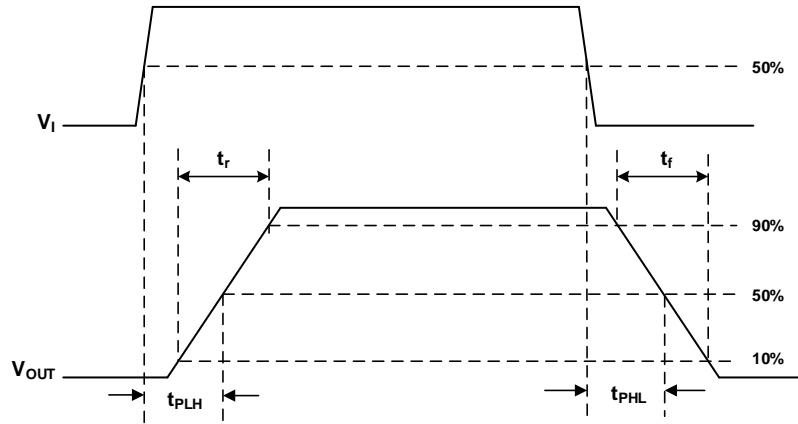


Figure 9. Propagation Delay, Rise Time and Fall Time

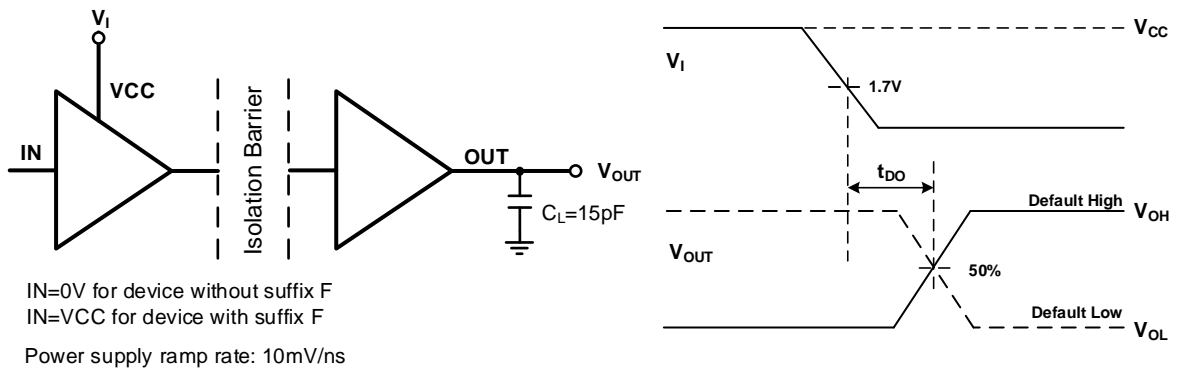


Figure 10. Default Output Delay Time Test

CMTI Testing

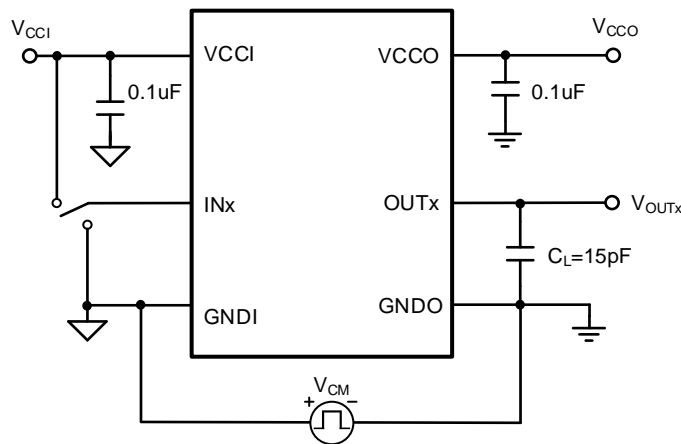


Figure 11. CMTI Test Configuration

FEATURE DESCRIPTION

The SiLM572x-AQ devices are high-performance, dual-channel digital isolators with default output state options to enable a variety of application uses. The supply voltage range is from 2.25 V to 5.5 V for both supplies, V_{CC1} and V_{CC2} . With innovative chip design and layout techniques, the electromagnetic compatibility of the SiLM572x-AQ devices has been significantly enhanced to improve the robustness of overall system.

Device Functional Modes

The Table 4 shows the functional modes of the SiLM572x-AQ.

Table 4. Function Table

$V_{CC1}^{(1)}$	$V_{CCO}^{(1)}$	Input (Inx)	Output (OUTx)	Function Description
PU ⁽²⁾	PU	H	H	Normal operation. The output is controlled by the input
		L	L	
		Open	Default	Default mode. When Inx is open, the corresponding output goes to the default logic. The default is high for SiLM572x-AQ and low for SiLM572xF-AQ.
PD ⁽²⁾	PU	X	Default	Default mode. When V_{CC1} is unpowered, channel output based on the default option. The default is high for SiLM572x-AQ and low for SiLM572xF-AQ.
X	PD	X	Undetermined ⁽³⁾	When V_{CCO} is unpowered, channel output is undermined.

(1) V_{CC1} =Input side V_{CC} , V_{CCO} =Output side V_{CC} .

(2) PU=Powered up, $V_{CC} \geq 2.25V$; PD=Powered down, $V_{CC} \leq 1.7V$

(3) The outputs are in undermined state when $1.7 < V_{CC1}$, $V_{CCO} < 2.25V$

Power Supply Recommendation

A 0.1 μ F bypass capacitor is recommended at the input and output supply pins (V_{CC1} and V_{CC2}) to help ensure reliable operation. The capacitors should be placed as close to the supply pins as possible.

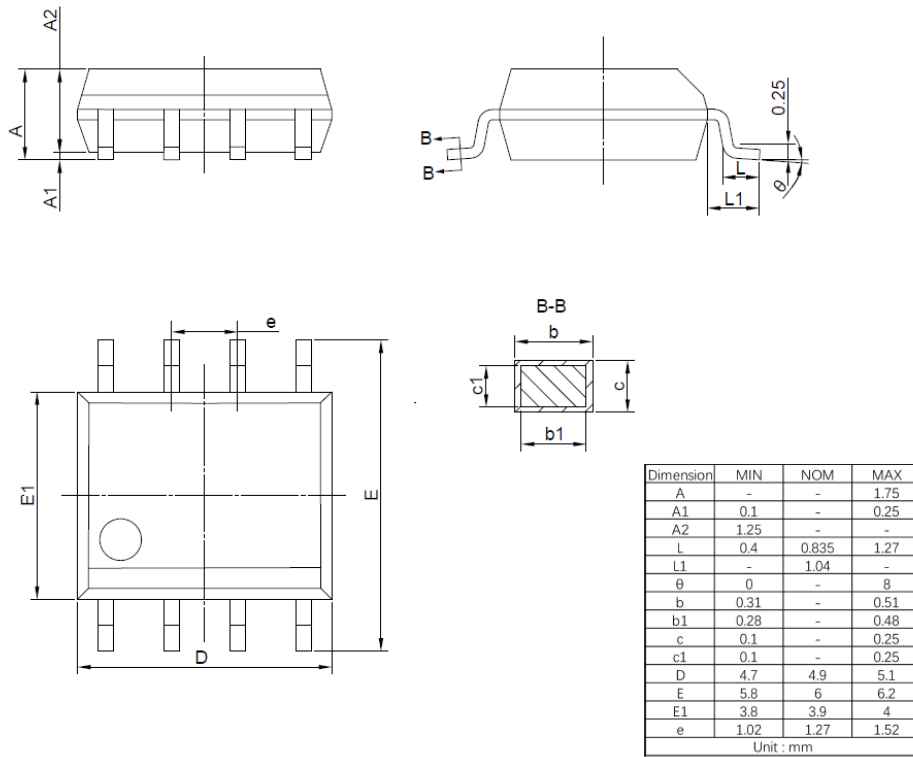
PACKAGE CASE OUTLINES


Figure 12. SOP8 Package Outline Dimensions

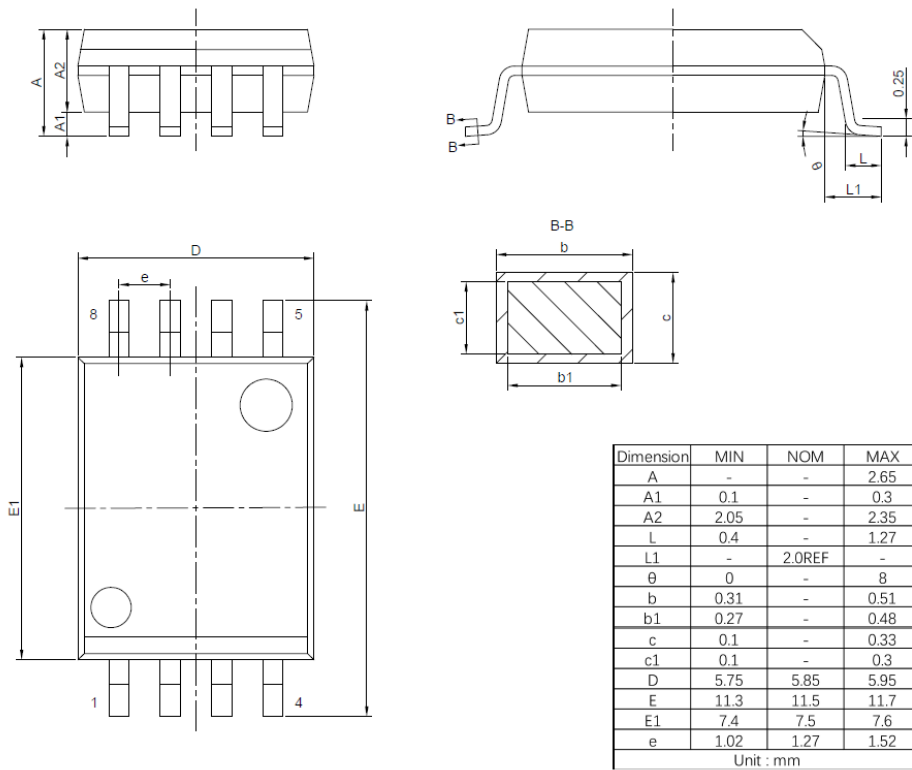


Figure 13. SOP8W Package Outline Dimensions

REVISION HISTORY

Note: page numbers for previous revisions may differ from page numbers in current version

Page or Item	Subjects (major changes since previous revision)
Rev 1.0 datasheet: 2023-05-30	
Whole document	Initial datasheet release
Rev 1.1 datasheet: 2023-10-30	
Page 10, 11	Add the TUV certification