High Speed Six Channel Digital Isolator

GENERAL DESCRIPTION

The SiLM576x devices are high performance, six channel digital isolator with 5.0 kV_{RMS} (SOP16W) isolation rating per UL1577. The SiLM576x devices provide high electromagnetic immunity and low emissions at low power consumption.

The SiLM5760 device has all channels in the same direction, the SiLM5761 device has five channels in forward direction and one channel in reverse direction, the SiLM5762 device has four channels in forward direction and two channels in reverse direction and the SiLM5763 device has three channels in forward direction and three channels in reverse 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

- Data rate 100Mbps
- Propagation delay 12ns (Typ)
- CMTI 150kV/us (Typ)
- Low power consumption: 1.5mA/Channel (Typ) at 1Mbps
- Wide supply voltage: 2.25V to 5.5V
- 2.25V to 5.5V level translation
- Default output High (SiLM576x) and Low (SiLM576xF) 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
- Operation temperature: –40°C to +125°C
- Safety certifications:
  - 5.0kV_{RMS} isolation for 1 minute per UL 1577
  - CQC certification per GB4943.1-2022
  - DIN VDE 0884-17: 2021-10

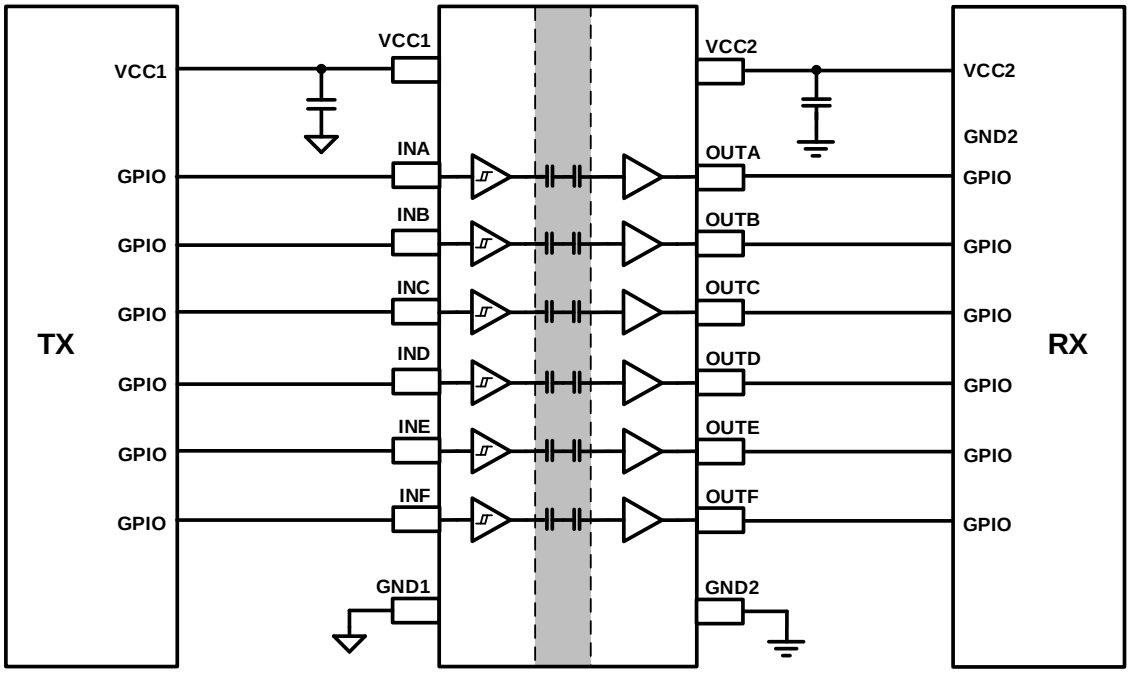

Figure 1. SiLM5760 Typical Application Circuit

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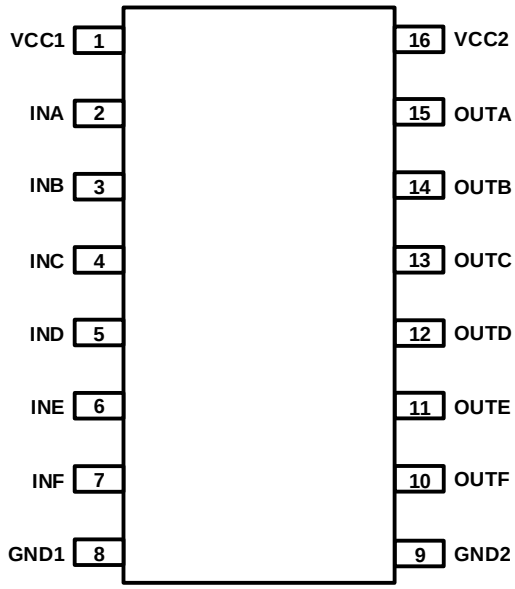
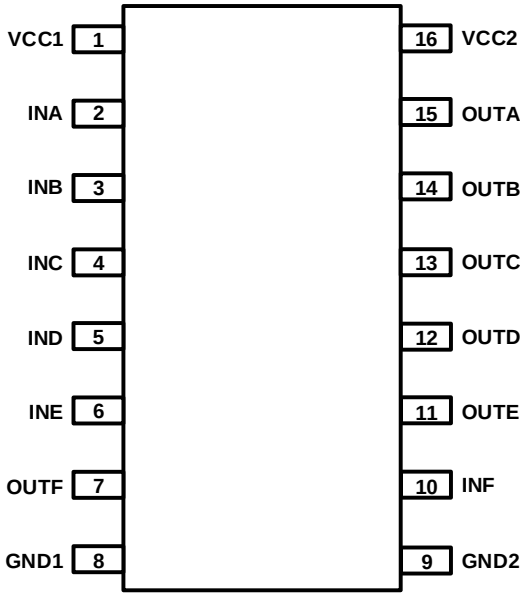
PIN CONFIGURATION

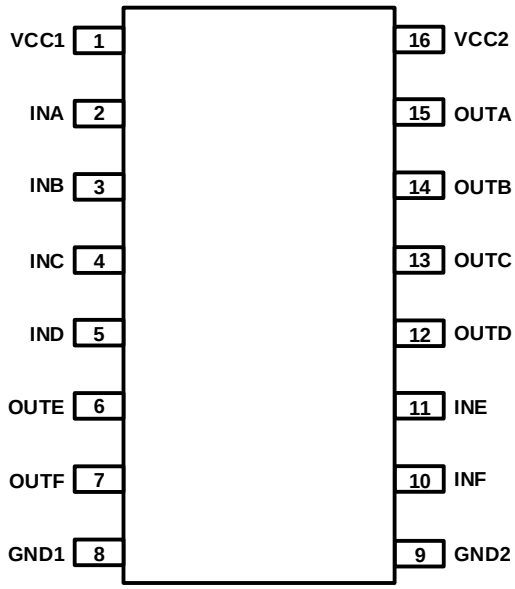
SiLM5760



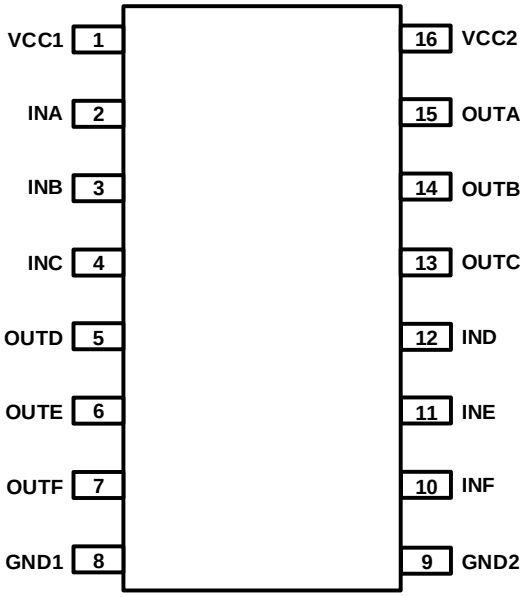
SiLM5761



SiLM5762



SiLM5763



PIN DESCRIPTION

Pin Name	Pin No.				Description
	SiLM5760	SiLM5761	SiLM5762	SiLM5763	
VCC1	1	1	1	1	Power supply for side1.
INA	2	2	2	2	Channel A input
INB	3	3	3	3	Channel B input
INC	4	4	4	4	Channel C input
IND	5	5	5	12	Channel D input
INE	6	6	11	11	Channel E input
INF	7	10	10	10	Channel F input
GND1	8	8	8	8	Power ground for side1.
GND2	9	9	9	9	Power ground for side2.
OUTF	10	7	7	7	Channel F output
OUTE	11	11	6	6	Channel E output
OUTD	12	12	12	5	Channel D output
OUTC	13	13	13	13	Channel C output
OUTB	14	14	14	14	Channel B output
OUTA	15	15	15	15	Channel A output
VCC2	16	16	16	16	Power supply for side2.

FUNCTIONAL BLOCK DIAGRAM

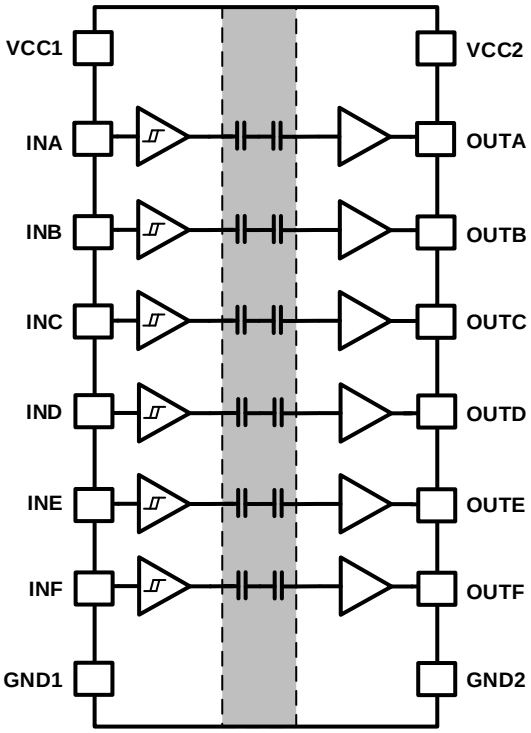


Figure 2. SiLM5760 Functional Block

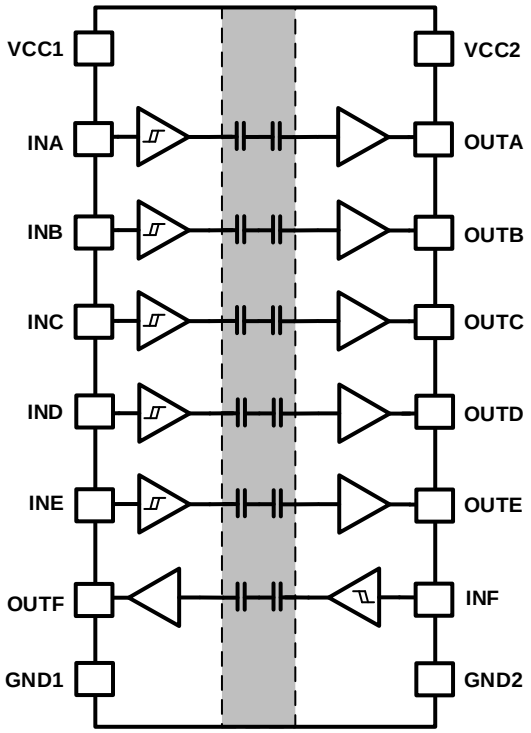


Figure 3. SiLM5761 Functional Block

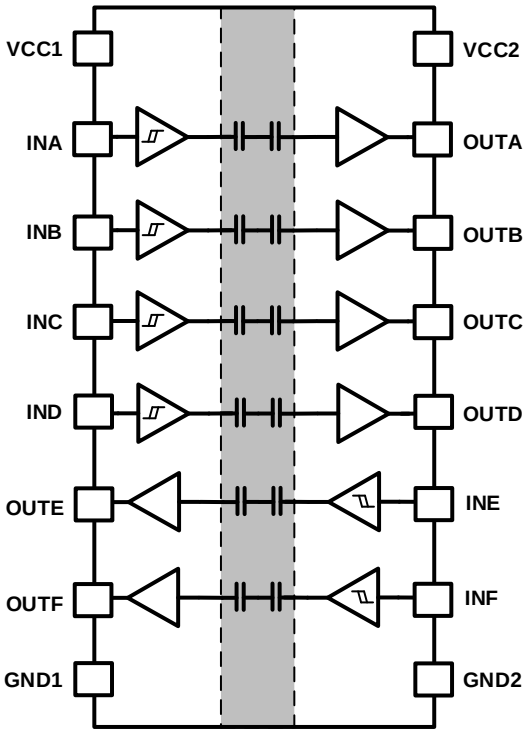


Figure 4. SiLM5762 Functional Block

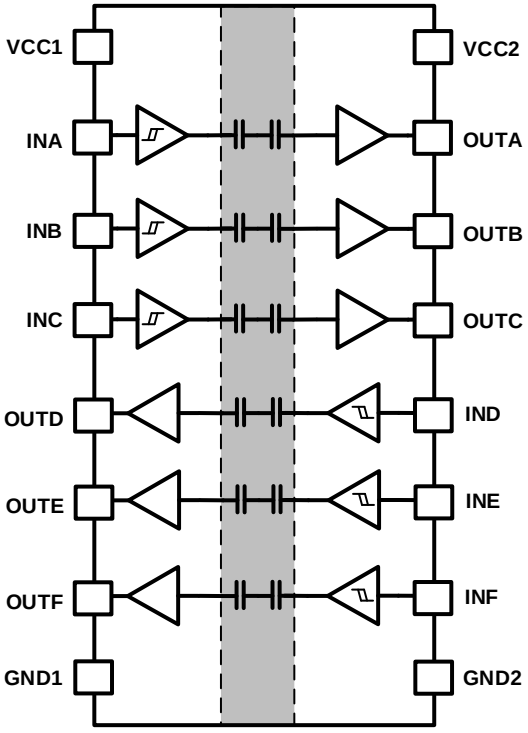


Figure 5. SiLM5763 Functional Block

ORDERING INFORMATION

Order Part No.	Package	QTY
SiLM5760CG-DG	SOP16W, Pb-Free	1500/Reel
SiLM5760FCG-DG	SOP16W, Pb-Free	1500/Reel
SiLM5761CG-DG	SOP16W, Pb-Free	1500/Reel
SiLM5761FCG-DG	SOP16W, Pb-Free	1500/Reel
SiLM5762CG-DG	SOP16W, Pb-Free	1500/Reel
SiLM5762FCG-DG	SOP16W, Pb-Free	1500/Reel
SiLM5763CG-DG	SOP16W, Pb-Free	1500/Reel
SiLM5763FCG-DG	SOP16W, Pb-Free	1500/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_{CCI}+0.3	V
V_{OUT}	Voltage at OUTx, reference to output side ground	-0.3	V_{CCO}+0.3	V
I_O	Output Current	-15	15	mA
T_J	Junction temperature	-55	150	°C
T_S	Storage temperature	-65	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× V_{CCI}	V_{CCI}(1)	V
V_{IL}	Low Level Input Voltage	0	0.3× V_{CCI}	V
DR	Data Rate	0	100	Mbps
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
$R_{\theta JA}$	Junction to ambient thermal resistance	83.5	°C/W
$R_{\theta JC}$	Junction to case (top) thermal resistance	40	°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)		1		pF

INSULATION SPECIFICATIONS

Symbol	Definition	Test Condition	Value	Units
CLR	External clearance	Shortest terminal to terminal distance through air	>8.0	mm
CPG	External creepage	Shortest terminal to terminal distance across the package surface	>8.0	mm
DTI	Distance through the insulation	Minimum internal gap	>16	um
CTI	Comparative tracking index	DIN EN 60112 (VDE 0303-11), IEC 60112	>600	V
	Material Group		I	
	Overvoltage category	Rated mains voltage ≤150V_{RMS}	I-IV	
		Rated mains voltage ≤300 V_{RMS}	I-IV	
		Rated mains voltage ≤600 V_{RMS}	I-III	
		Rated mains voltage ≤1000 V_{RMS}	I-II	
DIN V VDE 0884-11(1)				
V_{IORM}	Maximum repetitive peak isolation voltage		1414	V_{PK}
V_{IOWM}	Maximum isolation working voltage	AC voltage (Sine wave)	1000	V_{RMS}
		DC voltage	1414	
V_{IOTM}	Maximum transient isolation voltage	60s	7000	V_{PK}
V_{IOSM}	Maximum surge isolation voltage	Test method per IEC62368, 1.2/50us waveform, V_{TEST}=1.6 x V_{IOSM}	6250	V_{PK}
q_{pd}	Apparent charge		≤5	pC
	Climatic Category		40/125/21	
	Pollution Degree		2	
UL1577(1)				
V_{ISO}	Withstand Isolation Voltage	V_{TEST}=V_{ISO}, t=60s (qualification), V_{TEST}=1.2 x V_{ISO}, t=1s (100% production)	5000	V_{RMS}

Note1: Certification pending

SAFETY RELATED CERTIFICATIONS

VDE	UL	CQC
DIN VDE 0884-17: 2021-10	UL 1577 component recognition program	Certified according to GB4943.1-2022
Reinforced Insulation	Single protection, 5000 V_{RMS}	Reinforced insulation, Altitude≤ 5000m, Tropical climate
Pending	Pending	File number: CQC23001379622

SAFETY LIMITING VALUES

Symbol	Parameter	Condition	Value	Unit
I_S	Safety input, output, or supply current	$R_{\theta JA}$=83.5°C/W, V_{CC1}=V_{CC2}=5V, T_J=150°C, T_A=25°C	299	mA
P_S	Safety input, output, or total power	$R_{\theta JA}$=83.5°C/W, V_{CC1}=V_{CC2}=5V, T_J=150°C, T_A=25°C	1496	mW
T_S	Maximum safety temperature		150	°C

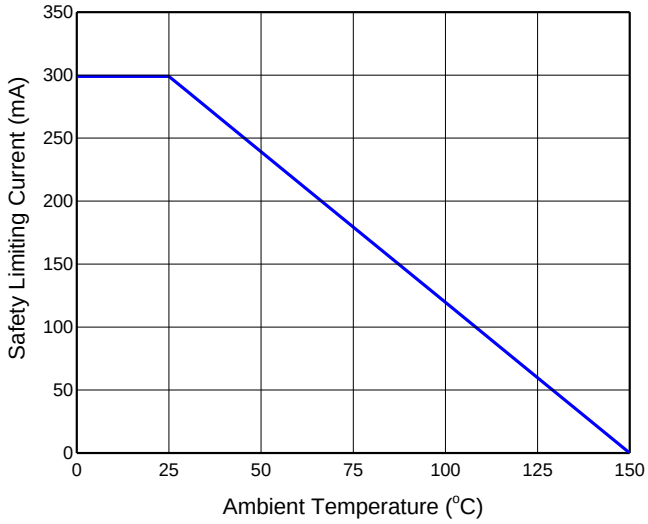


Figure 6. Thermal Derating Curve for Limiting Current per VDE

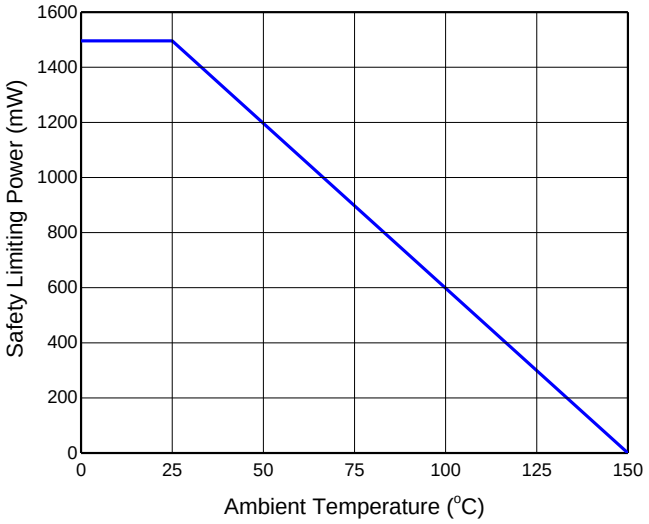


Figure 7. Thermal Derating Curve for Limiting Power per VDE

ELECTRICAL CHARACTERISTICS (DC) WITH 5V SUPPLY

V_{CC1} = V_{CC2}=5V±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 (SiLM5760)						
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5760), V_I = 0 V (SiLM5760F)		0.7	1.0	mA
		V_I = 0 V (SiLM5760), V_I = V_{CCI} (SiLM5760F)		7.8	11.2	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5760), V_I = 0 V (SiLM5760F)		3.2	4.8	mA
		V_I = 0 V (SiLM5760), V_I = V_{CCI} (SiLM5760F)		3.4	5.0	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.2	6.0	mA
		10 Mbps, C_L = 15pF		4.1	6.2	mA
		50 Mbps, C_L = 15pF		4.5	6.3	mA
		100 Mbps, C_L = 15pF		4.8	6.7	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.1	6.0	mA
		10 Mbps, C_L = 15pF		10.3	14.7	mA
		50 Mbps, C_L = 15pF		26.2	34.1	mA
		100 Mbps, C_L = 15pF		39.1	50.8	mA
Power Supply Current (SiLM5761)						
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5761), V_I = 0 V (SiLM5761F)		1.2	1.8	mA
		V_I = 0 V (SiLM5761), V_I = V_{CCI} (SiLM5761F)		7.2	10.2	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5761), V_I = 0 V (SiLM5761F)		3.1	4.5	mA

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
		V_I = 0 V (SiLM5761), V_I = V_{CCI} (SiLM5761F)		4.6	6.7	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.4	6.5	mA
		10 Mbps, C_L = 15pF		5.3	7.8	mA
		50 Mbps, C_L = 15pF		8.2	11.5	mA
		100 Mbps, C_L = 15pF		11.5	16.1	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.4	6.5	mA
		10 Mbps, C_L = 15pF		9.4	13.4	mA
		50 Mbps, C_L = 15pF		22.5	32.2	mA
		100 Mbps, C_L = 15pF		33.6	47.0	mA
Power Supply Current (SiLM5762)						
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5762), V_I = 0 V (SiLM5762F)		1.7	2.4	mA
		V_I = 0 V (SiLM5762), V_I = V_{CCI} (SiLM5762F)		6.6	9.6	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5762), V_I = 0 V (SiLM5762F)		2.6	3.7	mA
		V_I = 0 V (SiLM5762), V_I = V_{CCI} (SiLM5762F)		5.3	7.6	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.4	6.2	mA
		10 Mbps, C_L = 15pF		6.5	9.6	mA
		50 Mbps, C_L = 15pF		12.0	16.8	mA
		100 Mbps, C_L = 15pF		18.4	25.8	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.4	6.5	mA
		10 Mbps, C_L = 15pF		8.4	12.0	mA
		50 Mbps, C_L = 15pF		18.5	25.9	mA
		100 Mbps, C_L = 15pF		28.4	39.8	mA
Power Supply Current (SiLM5763)						

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5763), V_I = 0 V (SiLM5763F)		2.1	3.0	mA
		V_I = 0 V (SiLM5763), V_I = V_{CCI} (SiLM5763F)		5.9	8.3	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5763), V_I = 0 V (SiLM5763F)		2.1	3.0	mA
		V_I = 0 V (SiLM5763), V_I = V_{CCI} (SiLM5763F)		5.9	8.3	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.2	6.1	mA
		10 Mbps, C_L = 15pF		7.2	10.3	mA
		50 Mbps, C_L = 15pF		15.2	21.3	mA
		100 Mbps, C_L = 15pF		25.7	36.0	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.2	6.1	mA
		10 Mbps, C_L = 15pF		7.2	10.3	mA
		50 Mbps, C_L = 15pF		15.2	21.3	mA
		100 Mbps, C_L = 15pF		25.7	36.0	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			0.2× V_{CCI}		V
I_{IH}	High level input current	INx = V_{CCI}			15	uA
I_{IL}	Low level input current	INx = 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		0.2	0.4	V
CMTI						
$CMTI_H$	Output High Level Common Mode Transient Immunity	V_I = V_{CCI}, V_{CM}=1200V, C_L=15pF	100	150		kV/us

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
$CMTI_L$	Output Low Level Common Mode Transient Immunity	V_I = 0V, V_{CM}=1200V, C_L=15pF	100	150		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	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
t_f	Turn off fall time	C_L=15pF		2		ns
t_{PWD}	Pulse Width Distortion	C_L=15pF			10	ns
t_{SKO}	Channel to Channel Output Skew Time	C_L=15pF, same direction in single device			8	ns
t_{SKP}	Part to Part Skew Time	C_L=15pF, same direction			8	ns
t_{DO}	Default output delay time from input power loss	Measured from the time V_{CC1} goes below 1.7V		0.15		us

ELECTRICAL CHARACTERISTICS (DC) 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
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 (SiLM5760)						
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5760), V_I = 0 V (SiLM5760F)		0.7	1.0	mA
		V_I = 0 V (SiLM5760), V_I = V_{CCI} (SiLM5760F)		7.7	11.2	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5760), V_I = 0 V (SiLM5760F)		3.1	4.6	mA
		V_I = 0 V (SiLM5760), V_I = V_{CCI} (SiLM5760F)		3.4	4.9	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.1	6.0	mA
		10 Mbps, C_L = 15pF		4.0	6.0	mA
		50 Mbps, C_L = 15pF		4.3	6.1	mA
		100 Mbps, C_L = 15pF		4.5	6.3	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		3.5	5.2	mA
		10 Mbps, C_L = 15pF		5.9	8.4	mA
		50 Mbps, C_L = 15pF		14.7	21.0	mA
		100 Mbps, C_L = 15pF		25.1	35.9	mA
Power Supply Current (SiLM5761)						
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5761), V_I = 0 V (SiLM5761F)		1.2	1.8	mA
		V_I = 0 V (SiLM5761), V_I = V_{CCI} (SiLM5761F)		7.1	10.0	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5761), V_I = 0 V (SiLM5761F)		3.1	4.5	mA

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
		V_I = 0 V (SiLM5761), V_I = V_{CCI} (SiLM5761F)		4.5	6.6	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.2	6.1	mA
		10 Mbps, C_L = 15pF		4.5	6.6	mA
		50 Mbps, C_L = 15pF		6.4	9.2	mA
		100 Mbps, C_L = 15pF		8.2	11.7	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.0	6.0	mA
		10 Mbps, C_L = 15pF		6.0	8.6	mA
		50 Mbps, C_L = 15pF		13.6	19.4	mA
		100 Mbps, C_L = 15pF		20.1	28.7	mA
Power Supply Current (SiLM5762)						
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5762), V_I = 0 V (SiLM5762F)		1.6	2.4	mA
		V_I = 0 V (SiLM5762), V_I = V_{CCI} (SiLM5762F)		6.6	9.6	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5762), V_I = 0 V (SiLM5762F)		2.6	3.7	mA
		V_I = 0 V (SiLM5762), V_I = V_{CCI} (SiLM5762F)		5.3	7.6	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.2	6.0	mA
		10 Mbps, C_L = 15pF		4.9	6.9	mA
		50 Mbps, C_L = 15pF		8.3	11.9	mA
		100 Mbps, C_L = 15pF		11.7	16.7	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.0	6.0	mA
		10 Mbps, C_L = 15pF		5.6	8.0	mA
		50 Mbps, C_L = 15pF		12.0	17.2	mA
		100 Mbps, C_L = 15pF		18.6	26.6	mA
Power Supply Current (SiLM5763)						

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5763), V_I = 0 V (SiLM5763F)		2.1	3.0	mA
		V_I = 0 V (SiLM5763), V_I = V_{CCI} (SiLM5763F)		5.9	8.3	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5763), V_I = 0 V (SiLM5763F)		2.1	3.0	mA
		V_I = 0 V (SiLM5763), V_I = V_{CCI} (SiLM5763F)		5.9	8.3	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.0	5.9	mA
		10 Mbps, C_L = 15pF		5.1	7.3	mA
		50 Mbps, C_L = 15pF		10.0	14.3	mA
		100 Mbps, C_L = 15pF		15.6	22.3	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.0	5.9	mA
		10 Mbps, C_L = 15pF		5.1	7.3	mA
		50 Mbps, C_L = 15pF		10.0	14.3	mA
		100 Mbps, C_L = 15pF		15.6	22.3	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			0.2× V_{CCI}		V
I_{IH}	High level input current	INx = V_{CCI}			15	uA
I_{IL}	Low level input current	INx = 0V	-15			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		0.1	0.3	V
CMTI						
$CMTI_H$	Output High Level Common Mode Transient Immunity	V_I = V_{CCI}, V_{CM}=1200V, C_L=15pF	100	150		kV/us

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
$CMTI_L$	Output Low Level Common Mode Transient Immunity	V_I = 0V, V_{CM}=1200V, C_L=15pF	100	150		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		13	25	ns
t_{PHL}	Propagation delay, High to Low	C_L=15pF		13	25	ns
t_r	Turn on rise time	C_L=15pF		2		ns
t_f	Turn off fall time	C_L=15pF		2		ns
t_{PWD}	Pulse Width Distortion	C_L=15pF			10	ns
t_{SKO}	Channel to Channel Output Skew Time	C_L=15pF, same direction in single device			8	ns
t_{SKP}	Part to Part Skew Time	C_L=15pF, same direction			8	ns
t_{DO}	Default output delay time from input power loss	Measured from the time V_{CC1} goes below 1.7V		0.15		us

ELECTRICAL CHARACTERISTICS (DC) 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
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 (SiLM5760)						
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5760), V_I = 0 V (SiLM5760F)		0.7	1.0	mA
		V_I = 0 V (SiLM5760), V_I = V_{CCI} (SiLM5760F)		7.6	11.2	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5760), V_I = 0 V (SiLM5760F)		3.1	4.6	mA
		V_I = 0 V (SiLM5760), V_I = V_{CCI} (SiLM5760F)		3.4	4.8	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.0	5.9	mA
		10 Mbps, C_L = 15pF		3.8	5.6	mA
		50 Mbps, C_L = 15pF		4.2	6.2	mA
		100 Mbps, C_L = 15pF		4.4	6.5	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		3.4	5.0	mA
		10 Mbps, C_L = 15pF		5.0	7.4	mA
		50 Mbps, C_L = 15pF		11.8	17.3	mA
		100 Mbps, C_L = 15pF		21.0	30.9	mA
Power Supply Current (SiLM5761)						
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5761), V_I = 0 V (SiLM5761F)		1.1	1.6	mA
		V_I = 0 V (SiLM5761), V_I = V_{CCI} (SiLM5761F)		7.0	10.3	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5761), V_I = 0 V (SiLM5761F)		3.0	4.4	mA

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
		V_I = 0 V (SiLM5761), V_I = V_{CCI} (SiLM5761F)		4.5	6.6	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.1	6.0	mA
		10 Mbps, C_L = 15pF		4.3	6.3	mA
		50 Mbps, C_L = 15pF		5.9	8.7	mA
		100 Mbps, C_L = 15pF		7.5	11.0	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		3.9	5.7	mA
		10 Mbps, C_L = 15pF		5.3	7.8	mA
		50 Mbps, C_L = 15pF		11.2	16.5	mA
		100 Mbps, C_L = 15pF		16.5	24.3	mA
Power Supply Current (SiLM5762)						
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5762), V_I = 0 V (SiLM5762F)		1.6	2.4	mA
		V_I = 0 V (SiLM5762), V_I = V_{CCI} (SiLM5762F)		6.5	9.6	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5762), V_I = 0 V (SiLM5762F)		2.5	3.7	mA
		V_I = 0 V (SiLM5762), V_I = V_{CCI} (SiLM5762F)		5.2	7.6	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		4.1	6.0	mA
		10 Mbps, C_L = 15pF		4.6	6.8	mA
		50 Mbps, C_L = 15pF		7.3	10.7	mA
		100 Mbps, C_L = 15pF		9.9	14.6	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		3.9	5.7	mA
		10 Mbps, C_L = 15pF		5.1	7.5	mA
		50 Mbps, C_L = 15pF		10.0	14.7	mA
		100 Mbps, C_L = 15pF		15.3	22.5	mA
Power Supply Current (SiLM5763)						

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
I_{CC1_Q}	Current on VCC1 with DC Signal	V_I = V_{CCI} (SiLM5763), V_I = 0 V (SiLM5763F)		2.1	3.0	mA
		V_I = 0 V (SiLM5763), V_I = V_{CCI} (SiLM5763F)		5.8	8.2	mA
I_{CC2_Q}	Current on VCC2 with DC Signal	V_I = V_{CCI} (SiLM5763), V_I = 0 V (SiLM5763F)		2.1	3.0	mA
		V_I = 0 V (SiLM5763), V_I = V_{CCI} (SiLM5763F)		5.8	8.2	mA
I_{CC1_OP}	Current on VCC1 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		3.9	5.7	mA
		10 Mbps, C_L = 15pF		4.7	6.9	mA
		50 Mbps, C_L = 15pF		8.6	12.6	mA
		100 Mbps, C_L = 15pF		12.7	18.7	mA
I_{CC2_OP}	Current on VCC2 with AC Signal. All channel switching with square wave clock input	1 Mbps, C_L = 15pF		3.9	5.7	mA
		10 Mbps, C_L = 15pF		4.7	6.9	mA
		50 Mbps, C_L = 15pF		8.6	12.6	mA
		100 Mbps, C_L = 15pF		12.7	18.7	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			0.2× V_{CCI}		V
I_{IH}	High level input current	INx = V_{CCI}			10	uA
I_{IL}	Low level input current	INx = 0V	-10			uA
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		0.05	0.2	V
CMTI						
$CMTI_H$	Output High Level Common Mode Transient Immunity	V_I = V_{CCI}, V_{CM}=1200V, C_L=15pF	100	150		kV/us

Symbol	Parameter	Condition	Min	Typ.	Max.	Unit
$CMTI_L$	Output Low Level Common Mode Transient Immunity	V_I = 0V, V_{CM}=1200V, C_L=15pF	100	150		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
t_f	Turn off fall time	C_L=15pF		2		ns
t_{PWD}	Pulse Width Distortion	C_L=15pF			10	ns
t_{SKO}	Channel to Channel Output Skew Time	C_L=15pF, same direction in single device			8	ns
t_{SKP}	Part to Part Skew Time	C_L=15pF, same direction			8	ns
t_{DO}	Default output delay time from input power loss	Measured from the time V_{CC1} goes below 1.7V		0.15		us

PARAMETER MEASUREMENT INFORMATION

Switching Characteristics Test Timing

Figure 8 shows the timing of propagation delay, rise and fall time

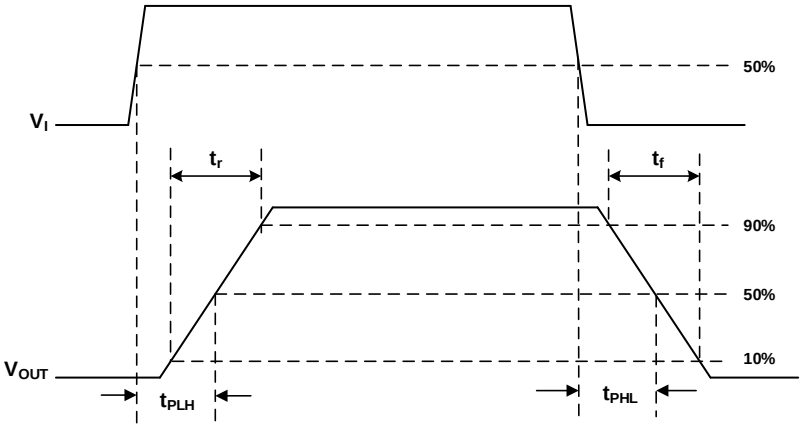


Figure 8. Propagation Delay, Rise Time and Fall Time

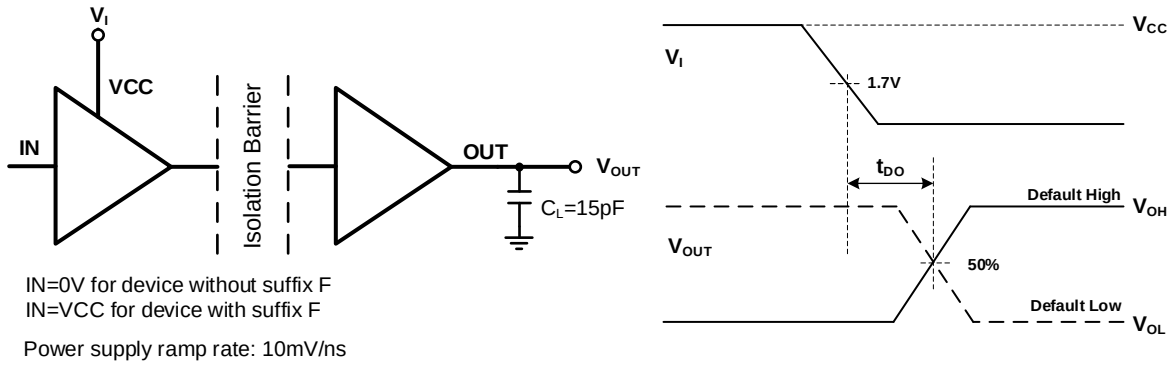


Figure 9. Default Output Delay Time Test

CMTI Testing

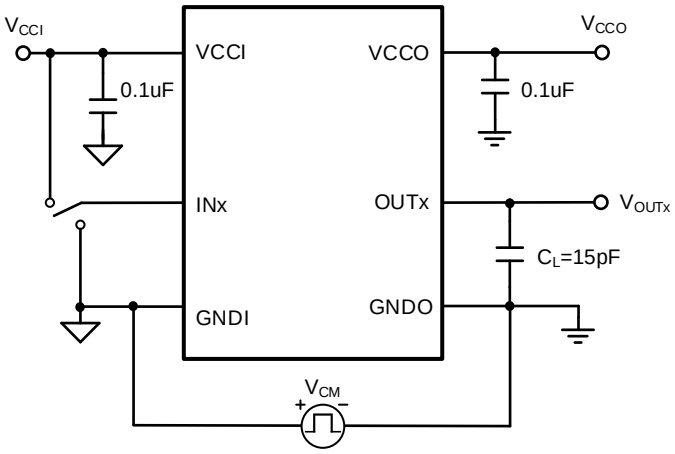


Figure 10. CMTI Test Configuration

FEATURE DESCRIPTION

The SiLM576x devices are high-performance, six-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 SiLM576x devices has been significantly enhanced to improve the robustness of overall system.

Device Functional Modes

The Table 1 shows the functional modes of the SiLM576x.

Table 1. Function Table

V_{CCI} (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 SiLM576x and low for SiLM576xF.
PD(2)	PU	X	Default	Default mode. When V_{CCI} is unpowered, channel output based on the default option. The default is high for SiLM576x and low for SiLM576xF.
X	PD	X	Undetermined(3)	When V_{CCO} is unpowered, channel output is undermined.

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

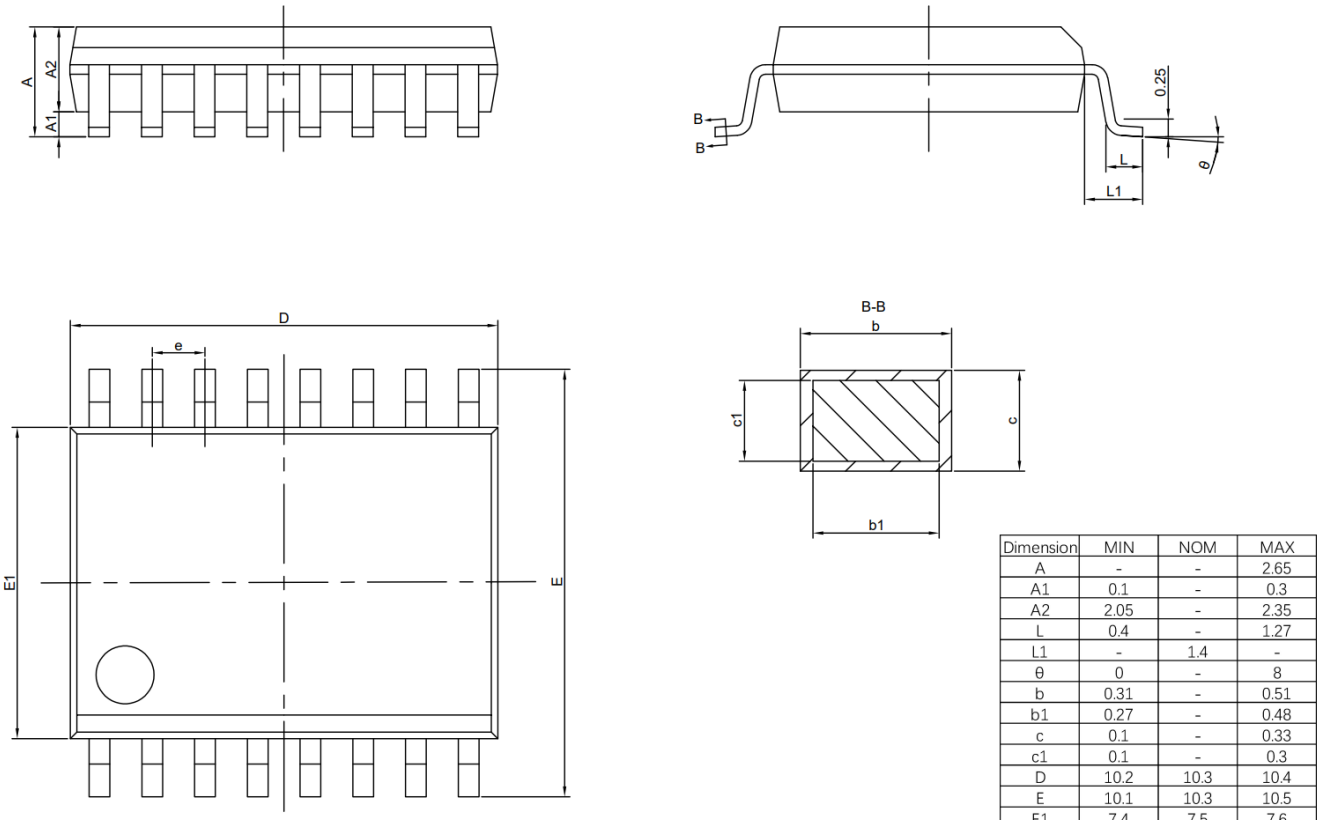
(2) PU=Powered up, $V_{CC} \geqslant 2.25V$; PD=Powered down, $V_{CC} \leqslant 1.7V$

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

Power Supply Recommendation

A 0.1μF 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



Dimension	MIN	NOM	MAX
A	-	-	2.65
A1	0.1	-	0.3
A2	2.05	-	2.35
L	0.4	-	1.27
L1	-	1.4	-
θ	0	-	8
b	0.31	-	0.51
b1	0.27	-	0.48
c	0.1	-	0.33
c1	0.1	-	0.3
D	10.2	10.3	10.4
E	10.1	10.3	10.5
E1	7.4	7.5	7.6
e	1.02	1.27	1.52
Unit : mm			

Figure 11. SOP16W 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: 2024-08-27	
Whole document	Initial datasheet release