

GENERAL DESCRIPTION

The SGM4554 is a 1-bit, non-inverting, bidirectional voltage-level translator which features two independent configurable power-supply lines. The A and B ports track the V_{CCA} supply and V_{CCB} supply respectively. The supply voltage range is 1.2V to 5.0V for A port and 1.65V to 5.5V for B port. The device provides a bidirectional translation function among the different voltage nodes (including 1.2V, 1.5V, 1.8V, 2.5V, 3.3V and 5V).

The SGM4554 has an output enable (OE) function, which controls the outputs states. When OE goes low, all outputs enter into the high-impedance state. The OE should be connected to GND via a pull-down resistor, and the minimum resistor value is depended on the current source capability of the driver.

The SGM4554 is available in Green UTDFN-1.45×1-6L and SC70-6 packages. It operates over an ambient temperature range of -40°C to +85°C.

FEATURES

- **Power Supply Voltage Range ($V_{CCA} \leq V_{CCB}$)**
 - ♦ **A Port: 1.2V to 5.0V**
 - ♦ **B Port: 1.65V to 5.5V**
- **Support V_{CCA} or V_{CCB} Isolation**
 - ♦ **When V_{CCA} or V_{CCB} is Low, Device Enters Power-Down Mode**
- **OE Input Circuit Referenced to V_{CCA}**
- **Support Partial-Power-Down Function**
- **Support Push-Pull Output**
- **Low Power Consumption**
- **-40°C to +85°C Operating Temperature Range**
- **Available in Green UTDFN-1.45×1-6L and SC70-6 Packages**

APPLICATIONS

Universal Asynchronous Receiver/Transmitter
General Purpose I/O (GPIO)

TYPICAL APPLICATION

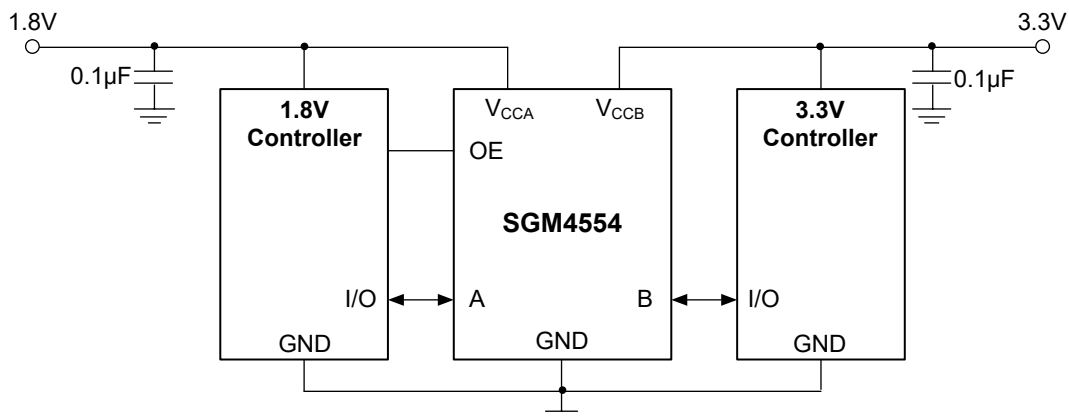


Figure 1. Typical Application Circuit

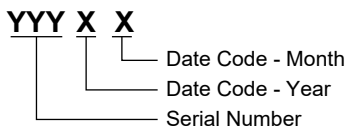
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM4554	SC70-6	-40°C to +85°C	SGM4554YC6G/TR	SM1XX	Tape and Reel, 3000
	UTDFN-1.45×1-6L	-40°C to +85°C	SGM4554YUDL6G/TR	N7X	Tape and Reel, 5000

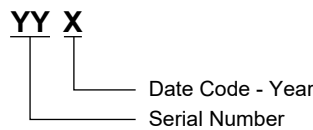
MARKING INFORMATION

NOTE: X = Date Code. XX = Date Code.

SC70-6



UTDFN-1.45×1-6L



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage Range

V_{CCA}, V_{CCB} -0.3V to 6V

Input Voltage Range, V_I⁽¹⁾ -0.3V to 6V

Output Voltage Range for the High-Impedance or Power-Off State, V_O⁽¹⁾

A Port -0.3V to 6V

B Port -0.3V to 6V

Output Voltage Range for the High or Low State, V_O⁽¹⁾⁽²⁾

A Port -0.3V to V_{CCA} + 0.3V

B Port -0.3V to V_{CCB} + 0.3V

Input Clamp Current, I_{IK} (V_I < 0) -50mA

Output Clamp Current, I_{OK} (V_O < 0) -50mA

Continuous Output Current, I_O ±50mA

Continuous Current through V_{CCA}, V_{CCB}, or GND ±100mA

Junction Temperature +150°C

Storage Temperature Range -65°C to +150°C

Lead Temperature (Soldering, 10s) +260°C

ESD Susceptibility

HBM 4000V

MM 400V

NOTES:

- When the input and output current ratings are observed, the input and I/O negative voltage ratings may be exceeded.
- V_{CCA} and V_{CCB} values are shown in the recommended operating conditions in Electrical Characteristics section.

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range..... -40°C to +85°C

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

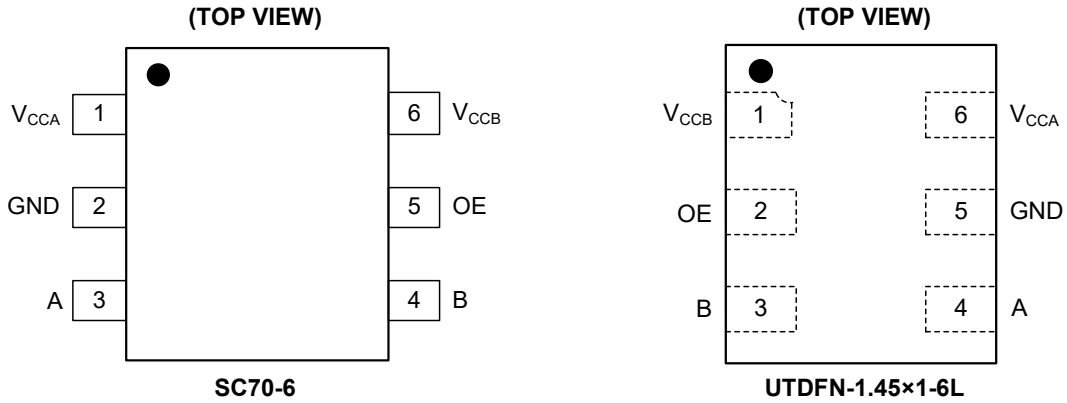
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATIONS



PIN DESCRIPTION

PIN		NAME	FUNCTION
SC70-6	UTDFN-1.45x1-6L		
1	6	V _{CCA}	Supply Voltage on A Port. It can be operated from 1.2V to 5.0V, and V _{CCA} is always ≤ V _{CCB} .
2	5	GND	Ground.
3	4	A	Input/Output A. It tracks the V _{CCA} supply.
4	3	B	Input/Output B. It tracks the V _{CCB} supply.
5	2	OE	Output Enable Control Pin. Active high. When OE goes low, all outputs enter into the high-impedance state. It tracks the V _{CCA} supply.
6	1	V _{CCB}	Supply Voltage on B Port. It can be operated from 1.65V to 5.5V.

ELECTRICAL CHARACTERISTICS

(Full = -40°C to +85°C, typical values are at T_A = +25°C, unless otherwise noted.)

PARAMETER		SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Recommended Operating Conditions ⁽¹⁾								
Supply Voltage		V _{CCA}			1.2		5.0	V
		V _{CCB}			1.65		5.5	
High-Level Input Voltage	Data Inputs	V _{IH}	V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V		V _{CCI} × 0.85		V _{CCI}	V
	OE Input		V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V		V _{CCA} × 0.85		5.5	
Low-Level Input Voltage	Data Inputs	V _{IL}	V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V		0		V _{CCI} × 0.2	V
	OE Input		V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V		0		V _{CCA} × 0.2	
Input Transition Rise or Fall Rate	A Port Input	Δt/ΔV	V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V				40	ns/V
	B Port Input		V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V				40	
Electrical Characteristics ^{(1) (2)}								
A Port High-Level Output Voltage	V _{OHA}	I _{OH} = -20μA	V _{CCA} = 1.2V	+25°C		1.05		V
			V _{CCA} = 1.4V to 5.0V	Full	V _{CCA} - 0.4			
A Port Low-Level Output Voltage	V _{OLA}	I _{OL} = 20μA	V _{CCA} = 1.2V	+25°C		0.1		V
			V _{CCA} = 1.4V to 5.0V	Full			0.4	
B Port High-Level Output Voltage	V _{OHB}	I _{OH} = -20μA	V _{CCB} = 1.65V to 5.5V	Full	V _{CCB} - 0.4			
B Port Low-Level Output Voltage	V _{OLB}	I _{OL} = 20μA	V _{CCB} = 1.65V to 5.5V	Full			0.4	
Input Leakage Current	OE	I _I	V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V	+25°C			±1	μA
				Full			±1.5	
Power-Off Leakage Current	A Port	I _{OFF}	V _I or V _O = 0V to 5.0V, V _{CCA} = 0V, V _{CCB} = 0V to 5.5V	+25°C			±0.5	μA
				Full			±1	
	B Port			+25°C			±0.5	
				Full			±1	
3-State Output Leakage	A or B Port	I _{OZ}	OE = GND, V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V	+25°C			±0.5	μA
				Full			±1	
Quiescent Supply Current	I _{CCA}	V _I = V _{CCI} or GND, I _O = 0A	V _{CCA} = 1.2V, V _{CCB} = 1.65V to 5.5V	+25°C		0.1		μA
			V _{CCA} = 1.4V to 5.0V, V _{CCB} = 1.65V to 5.5V				10	
			V _{CCA} = 5.0V, V _{CCB} = 0V	Full			10	
			V _{CCA} = 0V, V _{CCB} = 5.5V				-1	
	I _{CCB}	V _I = V _{CCI} or GND, I _O = 0A	V _{CCA} = 1.2V, V _{CCB} = 1.65V to 5.5V	+25°C		1		μA
			V _{CCA} = 1.4V to 5.0V, V _{CCB} = 1.65V to 5.5V				10	
			V _{CCA} = 5.0V, V _{CCB} = 0V	Full			-1	
			V _{CCA} = 0V, V _{CCB} = 5.5V				10	

NOTES:

- V_{CCI} is the supply voltage associated with the input port.
- V_{CCO} is the supply voltage associated with the output port.

ELECTRICAL CHARACTERISTICS (continued)

(Full = -40°C to +85°C, typical values are at T_A = +25°C, unless otherwise noted.)

PARAMETER		SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS	
Quiescent Supply Current		I _{CCA} + I _{CCB}	V _I = V _{CC1} or GND, I _O = 0A	V _{CCA} = 1.2V, V _{CCB} = 1.65V to 5.5V	+25°C	1		μA	
				V _{CCA} = 1.4V to 5.0V, V _{CCB} = 1.65V to 5.5V	Full		15		
		I _{CCZA}	V _I = V _{CC1} or GND, I _O = 0A, OE = GND	V _{CCA} = 1.2V, V _{CCB} = 1.65V to 5.5V	+25°C		0.1		μA
				V _{CCA} = 1.4V to 5.0V, V _{CCB} = 1.65V to 5.5V	Full		10		
		I _{CCZB}	V _I = V _{CC1} or GND, I _O = 0A, OE = GND	V _{CCA} = 1.2V, V _{CCB} = 1.65V to 5.5V	+25°C		0.1		μA
				V _{CCA} = 1.4V to 5.0V, V _{CCB} = 1.65V to 5.5V	Full		10		
OE Input Capacitance ()		C _I	V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V	+25°C		4		pF	
Input/Output Capacitance	A Port	C _{IO}	V _{CCA} = 1.2V to 5.0V, V _{CCB} = 1.65V to 5.5V	+25°C		4.5		pF	
	B Port					4.5			

TIMING REQUIREMENTS

(T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	V _{CCB} = 1.8V	V _{CCB} = 2.5V	V _{CCB} = 3.3V	V _{CCB} = 5V	UNITS
		TYP	TYP	TYP	TYP	
(V_{CCA} = 1.2V)						
Data Rate		20	20	20	20	Mbps
Pulse Duration (Data Inputs)	t _w	50	50	50	50	ns
(V_{CCA} = 1.5V)						
Data Rate		40	40	40	40	Mbps
Pulse Duration (Data Inputs)	t _w	25	25	25	25	ns
(V_{CCA} = 1.8V)						
Data Rate		60	60	60	60	Mbps
Pulse Duration (Data Inputs)	t _w	17	17	17	17	ns
(V_{CCA} = 2.5V)						
Data Rate			100	100	100	Mbps
Pulse Duration (Data Inputs)	t _w		10	10	10	ns
(V_{CCA} = 3.3V)						
Data Rate				100	100	Mbps
Pulse Duration (Data Inputs)	t _w			10	10	ns
(V_{CCA} = 5V)						
Data Rate					100	Mbps
Pulse Duration (Data Inputs)	t _w				10	ns

SWITCHING CHARACTERISTICS

(V_{CCA} = 1.2V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	V _{CCB} = 1.8V	V _{CCB} = 2.5V	V _{CCB} = 3.3V	V _{CCB} = 5V	UNITS	
			TYP	TYP	TYP	TYP		
Propagation Delay	t _{PD}	A to B	t _{PLH}	22.1	20.7	19.9	19.4	ns
			t _{PHL}	31.1	29.3	29.9	31.5	
		B to A	t _{PLH}	29.8	29.7	25.1	30.6	
			t _{PHL}	22.8	19.9	20.1	18.2	
Enable Time	t _{EN}	OE to A	t _{PZH}	66.9	67.3	66.7	65.8	ns
			t _{PZL}	48.2	47.6	47.2	46.2	
		OE to B	t _{PZH}	32.6	28.8	28.5	29.6	
			t _{PZL}	62.7	60.5	61.5	63.7	
Disable Time	t _{DIS}	OE to A	t _{PHZ}	1161	1170	1165	1168	ns
			t _{PLZ}	521	524	528	529	
		OE to B	t _{PHZ}	1135	1166	1180	1186	
			t _{PLZ}	532	567	578	563	
Rise Time	t _{rA}	A port	21.9	21.6	20.0	18.8	ns	
	t _{rB}	B port	3.9	2.3	1.9	1.6	ns	
Fall Time	t _{fA}	A port	5.9	6.3	5.2	3.9	ns	
	t _{fB}	B port	2.3	1.9	1.7	1.6	ns	
Data Rate			20	20	20	20	Mbps	

SWITCHING CHARACTERISTICS (continued)

(V_{CCA} = 1.5V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	V _{CCB} = 1.8V	V _{CCB} = 2.5V	V _{CCB} = 3.3V	V _{CCB} = 5V	UNITS	
			TYP	TYP	TYP	TYP		
Propagation Delay	t _{PD}	A to B	t _{PLH}	14.8	14.2	13.2	12.5	ns
			t _{PHL}	15.1	12.3	11.7	12.9	
		B to A	t _{PLH}	13.0	13.6	11.5	10.8	
			t _{PHL}	11.9	9.9	9.5	8.3	
Enable Time	t _{EN}	OE to A	t _{PZH}	28.9	29.0	28.8	28.6	ns
			t _{PZL}	27.6	23.3	22.2	21.7	
		OE to B	t _{PZH}	22.8	18.4	17.4	17.1	
			t _{PZL}	31.2	26.8	26.5	26.6	
Disable Time	t _{DIS}	OE to A	t _{PHZ}	1141	1132	1139	1138	ns
			t _{PLZ}	536	531	535	534	
		OE to B	t _{PHZ}	1112	1151	1165	1173	
			t _{PLZ}	530	558	568	553	
Rise Time	t _{rA}	A port	7.7	7.9	8.4	8.2	ns	
	t _{rB}	B port	4.0	2.3	1.8	1.5	ns	
Fall Time	t _{fA}	A port	3.1	2.9	3.0	2.4	ns	
	t _{fB}	B port	2.3	2.0	1.8	1.6	ns	
Data Rate			40	40	40	40	Mbps	

SWITCHING CHARACTERISTICS (continued)(V_{CCA} = 1.8V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	V _{CCB} = 1.8V	V _{CCB} = 2.5V	V _{CCB} = 3.3V	V _{CCB} = 5V	UNITS	
			TYP	TYP	TYP	TYP		
Propagation Delay	t _{PD}	A to B	t _{PLH}	11.3	12.3	11.4	10.6	ns
			t _{PHL}	11.0	8.8	8.0	8.4	
		B to A	t _{PLH}	8.6	10.6	9.1	7.4	
			t _{PHL}	9.2	6.8	8.0	5.7	
Enable Time	t _{EN}	OE to A	t _{PZH}	19.0	19.0	19.0	19.1	ns
			t _{PZL}	21.7	17.9	16.5	15.8	
		OE to B	t _{PZH}	20.1	15.6	14.6	14.0	
			t _{PZL}	22.6	19.2	18.7	18.5	
Disable Time	t _{DIS}	OE to A	t _{PHZ}	1170	1169	1170	1170	ns
			t _{PLZ}	541	540	541	542	
		OE to B	t _{PHZ}	1099	1142	1157	1166	
			t _{PLZ}	533	560	566	554	
Rise Time	t _{rA}	A port	4.8	4.6	4.4	3.9	ns	
	t _{rB}	B port	4.3	2.3	1.8	1.6	ns	
Fall Time	t _{fA}	A port	2.3	2.6	2.5	2.3	ns	
	t _{fB}	B port	2.3	2.1	1.8	2.2	ns	
Data Rate			60	60	60	60	Mbps	

SWITCHING CHARACTERISTICS (continued)(V_{CCA} = 2.5V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	V _{CCB} = 2.5V	V _{CCB} = 3.3V	V _{CCB} = 5V	UNITS	
			TYP	TYP	TYP		
Propagation Delay	t _{PD}	A to B	t _{PLH}	9.4	7.1	5.2	ns
			t _{PHL}	6.1	5.7	5.1	
		B to A	t _{PLH}	7.8	5.5	4.6	
			t _{PHL}	5.7	5.2	3.6	
Enable Time	t _{EN}	OE to A	t _{PZH}	13.0	12.7	13.0	ns
			t _{PZL}	14.4	13.0	12.2	
		OE to B	t _{PZH}	13.7	12.5	12.1	
			t _{PZL}	14.5	14.1	13.4	
Disable Time	t _{DIS}	OE to A	t _{PHZ}	1188	1188	1189	ns
			t _{PLZ}	571	571	573	
		OE to B	t _{PHZ}	1127	1151	1158	
			t _{PLZ}	566	570	553	
Rise Time	t _{rA}	A port	2.6	3.2	3.7	ns	
	t _{rB}	B port	2.2	2.2	2.3	ns	
Fall Time	t _{fA}	A port	2.4	2.6	2.7	ns	
	t _{fB}	B port	1.8	2.2	1.8	ns	
Data Rate			100	100	100	Mbps	

SWITCHING CHARACTERISTICS (continued)

(V_{CCA} = 3.3V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	V _{CCB} = 3.3V	V _{CCB} = 5V	UNITS	
			TYP	TYP		
Propagation Delay	t _{PD}	A to B	t _{PLH}	6.2	4.1	ns
			t _{PHL}	5.0	4.0	
		B to A	t _{PLH}	5.0	3.7	
			t _{PHL}	4.6	3.0	
Enable Time	t _{EN}	OE to A	t _{PZH}	11.5	11.0	ns
			t _{PZL}	12.3	11.3	
		OE to B	t _{PZH}	11.8	11.5	
			t _{PZL}	12.4	11.7	
Disable Time	t _{DIS}	OE to A	t _{PHZ}	1196	1190	ns
			t _{PLZ}	583	584	
		OE to B	t _{PHZ}	1139	1150	
			t _{PLZ}	578	557	
Rise Time	t _{rA}	A port	5.8	2.8	ns	
	t _{rB}	B port	1.9	1.7	ns	
Fall Time	t _{fA}	A port	4.4	2.3	ns	
	t _{fB}	B port	2.0	2.1	ns	
Data Rate			100	100	Mbps	

SWITCHING CHARACTERISTICS (continued)

(V_{CCA} = 5V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	V _{CCB} = 5V	UNITS	
			TYP		
Propagation Delay	t _{PD}	A to B	t _{PLH}	3.5	ns
			t _{PHL}	2.9	
		B to A	t _{PLH}	3.0	
			t _{PHL}	2.6	
Enable Time	t _{EN}	OE to A	t _{PZH}	11.5	ns
			t _{PZL}	11.7	
		OE to B	t _{PZH}	11.3	
			t _{PZL}	10.7	
Disable Time	t _{DIS}	OE to A	t _{PHZ}	1196	ns
			t _{PLZ}	578	
		OE to B	t _{PHZ}	1146	
			t _{PLZ}	559	
Rise Time	t _{rA}	A port	3.4	ns	
	t _{rB}	B port	1.7	ns	
Fall Time	t _{fA}	A port	3.1	ns	
	t _{fB}	B port	1.7	ns	
Data Rate			100	Mbps	

OPERATING CHARACTERISTICS

(T_A = +25°C, unless otherwise noted.)

PARAMETER		CONDITIONS	V _{CCA}									UNITS
			1.2V	1.2V	1.5V	1.8V	2.5V	2.5V	3.3V	3.3V	5V	
			V _{CCB}									
			5V	1.8V	1.8V	1.8V	2.5V	5V	3.3V	5V	5V	
			TYP	TYP	TYP	TYP	TYP	TYP	TYP	TYP	TYP	
C _{PDA}	A Port Input, B Port Output	C _L = 0, f = 10MHz, t _r = t _f = 1ns, OE = V _{CCA} (Outputs Enabled)	61	56	13	6	7	7	8	8	9	pF
	B Port Input, A Port Output		9	9	9	9	9	9	9	9	10	pF
C _{PDB}	A Port Input, B Port Output		10	9	9	9	9	9	9	9	9	pF
	B Port Input, A Port Output		20	92	7	7	7	9	8	9	10	pF
C _{PPA}	A Port Input, B Port Output	C _L = 0, f = 10MHz, t _r = t _f = 1ns, OE = GND (Outputs Disabled)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	pF
	B Port Input, A Port Output		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	pF
C _{PPB}	A Port Input, B Port Output		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	pF
	B Port Input, A Port Output		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	pF

WAVEFORMS

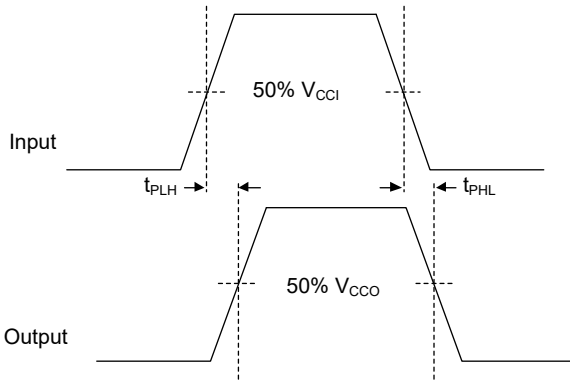


Figure 2. Propagation Delay

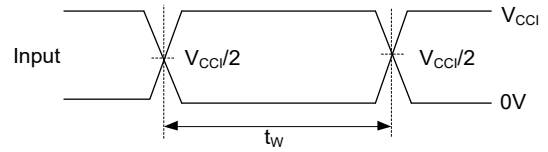


Figure 3. Pulse Duration

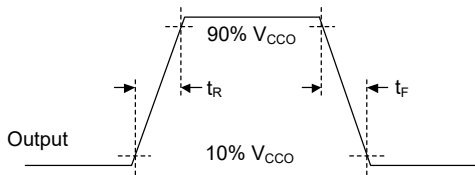
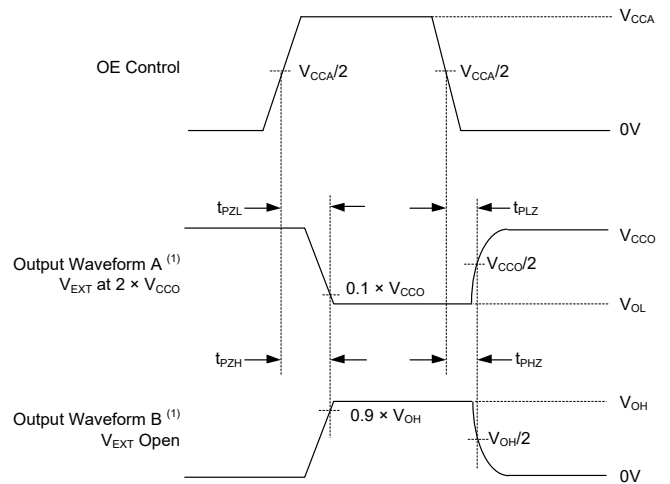


Figure 4. Rise Time and Fall Time of Data Output

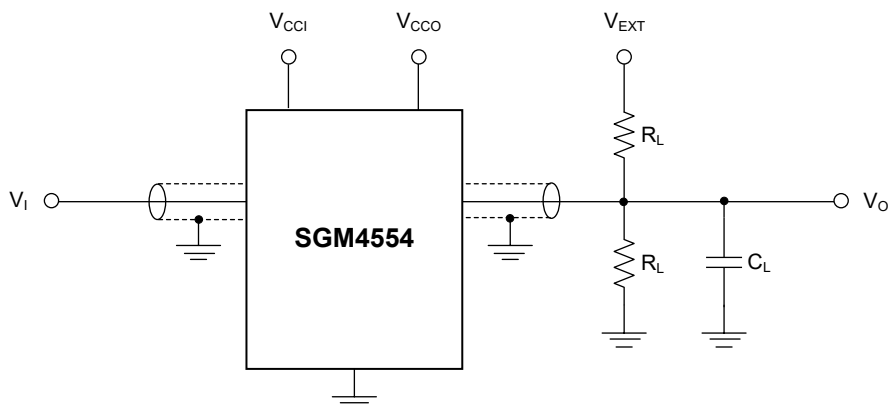


NOTE:

1. Waveform A indicates an output that is high except for OE is high. Waveform B indicates an output that is low except for OE is high.

Figure 5. Enable and Disable Times

TEST CIRCUIT



Definitions for test circuit:

R_L = Load resistance.

C_L = Load capacitance includes jig and probe capacitance.

V_{EXT} = External voltage for measuring switching times.

V_{CCI} = Supply voltage associated with the input.

V_{CCO} = Supply voltage associated with the output.

Figure 6. Test Circuit for Measuring Switching Times

APPLICATION INFORMATION

Applications

For the application of the SGM4554, it is often used in the voltage-level translation system.

Architecture

The SGM4554 can switch the direction of the transmission for port A and port B automatically without any external control. The output drivers can keep high or low in a DC state, however, they are designed to be weak so that they can be overdriven by external drivers when the data on the bus starts flowing in the opposite direction.

Figure 7 shows the architecture of an SGM4554 cell. The main explanation of the internal circuit for the SGM4554 is shown as below:

- The one-shot circuitry can be used to detect the rising edges or the falling edges of the signal for port A and port B automatically.
- When in the rising edge, two PMOSFETs (T1 and T3) are turned on by one-shot in a short time. The feature speeds up the transition from low to high.
- When in the falling edge, two NMOSFETs (T2 and T4) are turned on by one-shot in a short time. The feature speeds up the transition from high to low.
- The output impedance is 140Ω (TYP) when V_{CCO} voltage range is from 1.2V to 1.8V, it is 50Ω (TYP) when V_{CCO} voltage range is from 1.8V to 3.3V and 40Ω (TYP) when V_{CCO} voltage range is from 3.3V to 5V.

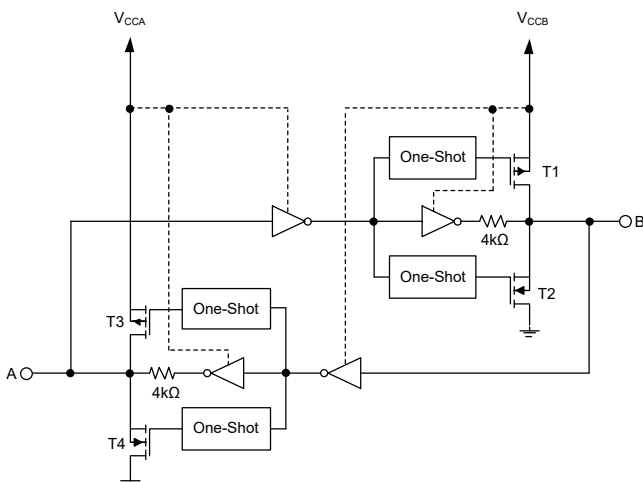
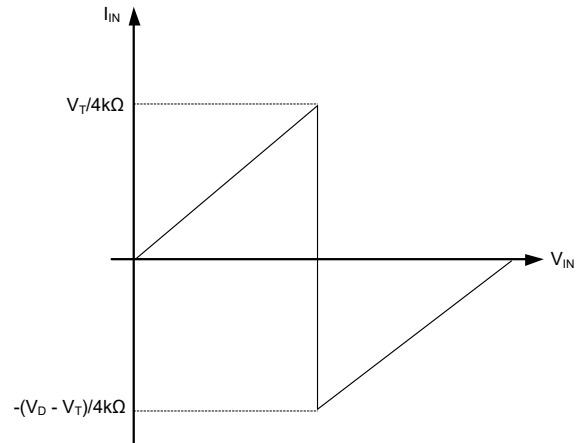


Figure 7. Architecture of an SGM4554 I/O Cell

Input Driver Requirements

Figure 8 shows a typical V_{IN} vs. I_{IN} curve. To ensure proper operation, the SGM4554 data I/Os must be driven by a device with a drive strength of at least ±2mA.



- NOTES:
1. V_T = Input threshold voltage (typically V_{CC}/2).
 2. V_D = External driver supply voltage.

Figure 8. Typical V_{IN} vs. I_{IN} Curve

Power-Up

For the application of the SGM4554, the V_{CCA} should be less than V_{CCB}. However, it does not matter if the power supply voltage is ramping, and the sequence of power-up for both V_{CCA} and V_{CCB} is not defined. The SGM4554 has a circuitry that disables all output ports when either V_{CC} is switched off (V_{CCA}/V_{CCB} = 0V).

Enable and Disable

The function of OE is used to disable SGM4554 by setting the transmitting I/O pins to high-impedance mode. The definition of disable time (t_{DIS}) is the time period between OE goes low and when all of the I/O pins are in high-impedance mode. The enable time (t_{EN}) is defined as the time period between OE goes to high position and one-shot part starts to operate.

Pull-Up or Pull-Down Resistors on I/O Lines

The SGM4554 features the drive capability that is designed to drive up to 70pF capacitive loads. The output drivers have the low DC drive strength. When the data I/Os are externally connected to the pull-up or pull-down resistors, the values must be greater than 50kΩ to ensure that they don't conflict with the output driver. Therefore, the SGM4554 is not used in one-wire or I²C applications. For the bidirectional data I/Os, an open-drain driver is connected. For these applications, please use the open-drain output SGM4552 which is pin-compatible with the SGM4554.

REVISION HISTORY

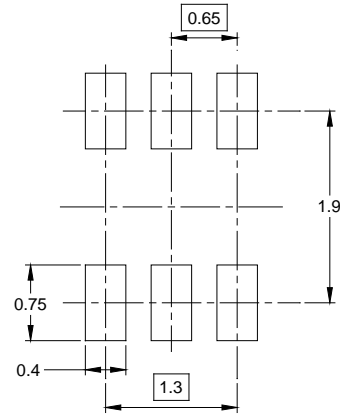
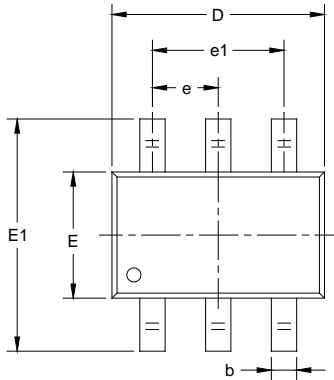
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

MAY 2023 – REV.A to REV.A.1	Page
Updated Package Outline Dimensions section	14

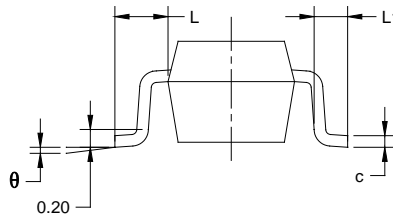
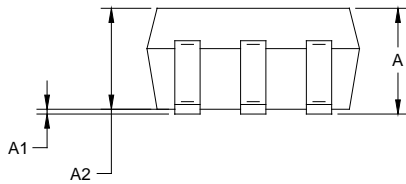
Changes from Original (AUGUST 2014) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

SC70-6



RECOMMENDED LAND PATTERN (Unit: mm)



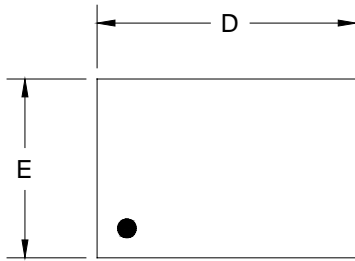
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.800	1.100	0.031	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	1.000	0.031	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.220	0.003	0.009
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.65 TYP		0.026 TYP	
e1	1.300 BSC		0.051 BSC	
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

NOTES:

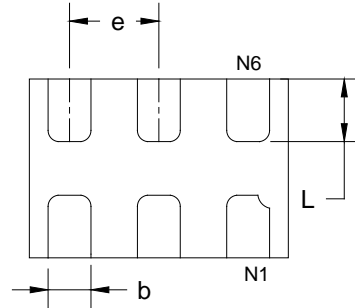
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

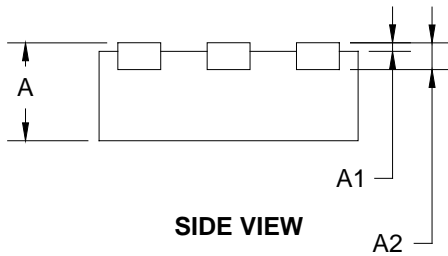
UTDFN-1.45x1-6L



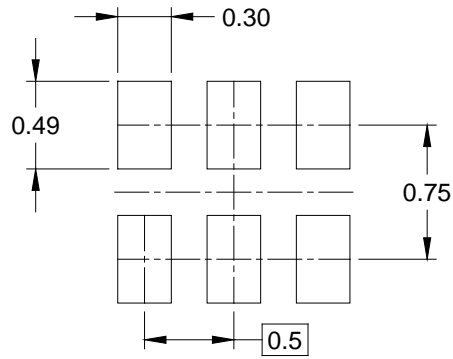
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.450	0.550	0.018	0.022
A1	0.000	0.050	0.000	0.002
A2	0.150 REF		0.006 REF	
D	1.374	1.526	0.054	0.060
E	0.924	1.076	0.036	0.042
b	0.180	0.300	0.007	0.012
e	0.500 TYP		0.020 TYP	
L	0.274	0.426	0.011	0.017

NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SC70-6	7"	9.5	2.40	2.50	1.20	4.0	4.0	2.0	8.0	Q3
UTDFN-1.45×1-6L	7"	9.5	1.15	1.60	0.75	4.0	4.0	2.0	8.0	Q1

000001

PACKAGE INFORMATION

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7" (Option)	368	227	224	8
7"	442	410	224	18

DD0002