

Libraries

Name	Process	Form Factor
RGO_TSMC28_18V33_HPM_20C_I2C	HPM	Staggered CUP
RGO_TSMC28_18V33_HPC_20C_I2C	HPC	Staggered CUP
RGO_TSMC28_18V33_HPCP_20C_I2C	HPC+	Staggered CUP

Summary

The I2C I/O pad is an open-drain bi-directional I/O cell that is designed for the I2C two-line interface. Utilized with the 3.3V GPIO library, it is compliant with the I2C-bus specification

- Conforms to UM10204 I2C-bus specification and user manual, Rev.4 – 13 February 2012, NXP
- Supported I2C operating modes:
 - Standard-mode (Sm) – 100 Kbps data rate
 - Fast mode (Fm) – 400 Kbps data rate
 - Fast mode (Fm+) – 3.4 Mbps data rate

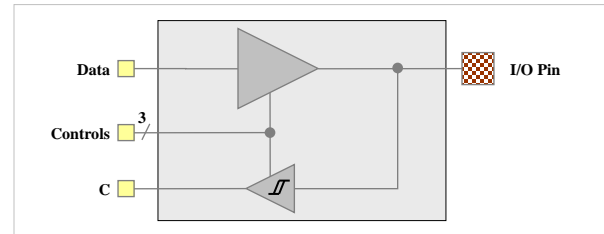
ESD Protection:

- JEDEC compliant
 - 2KV ESD Human Body Model (HBM)
 - 200 V ESD Machine Model (MM)
 - 500 V ESD Charge Device Model (CDM)

Latch-up Immunity:

- JEDEC compliant
 - Tested to I-Test criteria of $\pm 100\text{mA}$ @ 125°C

I2P_ON_003_33V_NC



Product Features

- Supported I2C operating modes:
 - Standard-mode (Sm) – 100 Kbps data rate
 - Fast mode (Fm) – 400 Kbps data rate
 - Fast mode (Fm+) – 3.4 Mbps data rate
- Open drain operation only (floating NWELL with PMOS used for ESD protection only)
- Built-in output slew rate control to meet I²C T_{of} minimum of $(20 \times V_{DDP}/5.5\text{V}) \text{ ns}$
- Output enable
- Receiver enable
- ESD protection uses snap-back devices (no diode to the positive power supply)
- Standard LVCMOS compatible inputs with Schmitt trigger (hysteresis) option
- Power-on sequencing independent design with Power-On Control
- DVDD = 2.7V to 3.63V
- Pad VDDP (power supply reference for Output) = 2.7V to 3.63V, limited to V_{DVDD} .
- The circuit consumes no DC supply current in the static state

An open-drain design, this cell requires an external pull-up resistor to a high voltage power supply. The pull-up power supply (V_{DDP}) can be 3.63V maximum limited to the I/O cell power supply ($DVDD$). The sizing of the external resistor is application dependent and can range from 1.1 K Ω to 40 K Ω .

Recommended operating conditions

Description	Min	Nom	Max	Units
V_{DVDD} I/O supply voltage	2.70	3.3	3.63	V
V_{DDP} External pull-up supply to PAD	2.70	3.3	3.63	V
V_{VDD} Core supply voltage	0.81	0.9	0.99	V
T_J Junction temperature	-40	25	125	$^\circ\text{C}$
V_{PAD} Voltage at PAD	$V_{DVSS} - 0.3$	-	V_{DVDD}	V

Characterization Corners (HPM)

Nom VDD	Model	LPE	VDD	DVDD [1]	Temp
0.9V	FF	Cbest	+10%	+10%	-40°C
	FF	Cbest	+10%	+10%	0°C
	FF	Cbest	+10%	+10%	125°C
	FFG	Cworst	+10%	+10%	125°C
	TT	Ctypical	nominal	nominal	25°C
	TT	Ctypical	nominal	nominal	85°C
	SSG	Cworst	-10%	-10%	-40°C
	SSG	Cworst	-10%	-10%	0°C
	SSG	Cworst	-10%	-10%	125°C

[1] DVDD = 3.0V, 3.3V

Characterization Corners (HPC)

Nom VDD	Model	LPE	VDD	DVDD [1]	Temp
0.9V	FF	Cbest	+10%	+10%	-40°C
	FF	Cbest	+10%	+10%	0°C
	FF	Cbest	+10%	+10%	125°C
	FFG	Cworst	+10%	+10%	125°C
	TT	Ctypical	nominal	nominal	25°C
	TT	Ctypical	nominal	nominal	85°C
	SS	Cworst	-10%	-10%	-40°C
	SS	Cworst	-10%	-10%	0°C
	SS	Cworst	-10%	-10%	125°C

[1] DVDD = 3.0V, 3.3V

Characterization Corners (HPC+)

Nom VDD	Model	LPE	VDD	DVDD [1]	Temp
0.9V	FFG	Cbest	+10%	+10%	-40°C
	FFG	Cbest	+10%	+10%	0°C
	FFG	Cbest	+10%	+10%	125°C
	TT	Ctypical	nominal	nominal	25°C
	TT	Ctypical	nominal	nominal	85°C
	SSG	Cworst	-10%	-10%	-40°C
	SSG	Cworst	-10%	-10%	0°C
	SSG	Cworst	-10%	-10%	125°C

[1] DVDD = 3.0V, 3.3V

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