TSMC28: 1.8V GPIO

Libraries

Name	Process	Form Factor
RGO_TSMC28_18V18_HPM_20C	HPM	Staggered CUP
RGO_TSMC28_18V18_HPC_20C	HPC	Staggered CUP
RGO_TSMC28_18V18_HPCP_20C	HPC+	Staggered CUP

Summary

The 1.8V General Purpose I/O library provides bidirectional I/O, isolated analog I/O, and a full complement of power cells along with corner and spacer cells to assemble a complete pad ring by abutment. An included rail splitter allows multiple power domains to be isolated in the same pad ring while maintaining continuous VDD/VSS for robust ESD protection.

- Programmable bidirectional GPIO
- Input-only buffer
- Isolated analog I/O
- Full complement of power, corner, and spacer cells

ESD Protection:

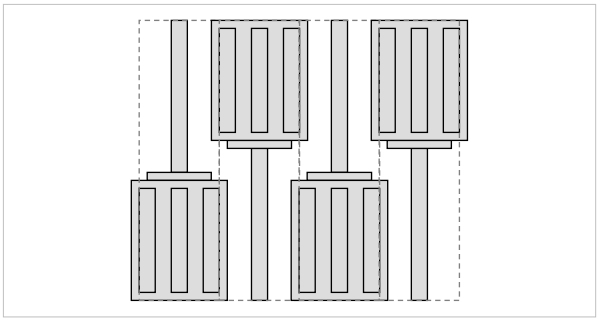
- JEDEC compliant
  - 2KV ESD Human Body Model (HBM)
  - 200 V ESD Machine Model (MM)
  - 500 V ESD Charge Device Model (CDM)

Latch-up Immunity:

- JEDEC compliant
  - Tested to I-Test criteria of ± 100mA @ 125°C

Cell Size & Form Factor

Staggered (pad-limited) – 20µm x 125µm

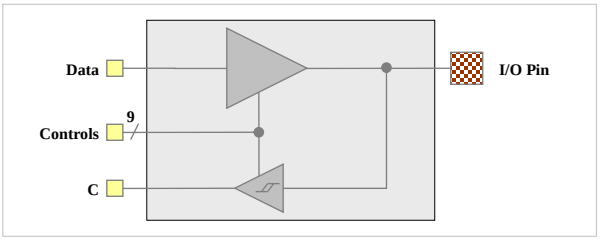


- Vertical-only and horizontal-only orientations

Recommended operating conditions

	Description	Min	Nom	Max	Units
V_{DVDD}	I/O supply voltage	1.08	1.2	1.32	V
		1.35	1.5	1.65	V
		1.62	1.8	1.98	V
V_{VDD}	Core supply voltage	0.81	0.9	0.99	V
T_J	Junction temperature	-40	25	125	°C
V_{PAD}	Voltage at PAD	V_{DVSS} -0.3	-	V_{DVDD} +0.3	V

SRP_BI_SDS_18V_STB

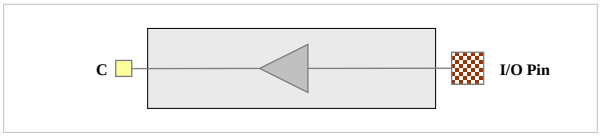


Bidirectional GPIO Driver Features

- Multi-Voltage (1.2V, 1.5V, 1.8V)
- LVCMOS / LVTTL input with selectable hysteresis
- Programmable drive strength (rated 2mA to 12mA)
- Selectable output slew rate
- Optimized for EMC with SSO factor of 8
- Open-drain output mode
- Programmable input options (pull-up/pull-down/repeater)
- Power-On Start (POS) capable
- Power sequencing independent design with Power-On Control

In full-drive mode, this driver can operate to frequencies in excess of 100MHz with 15pF external load and 125 MHz with 10pF load. Actual frequency limits are load and system dependent. A maximum of 200 MHz can be achieved under small capacitive loads.

STP_IN_001_18V_NC



Input-Only GPIO Features

- Multi-voltage (1.2V, 1.5V, 1.8V)
- Wide input slew-rate
- LVCMOS/LVTTL compatible input with no hysteresis
- Minimized skew for optimum performance over frequency
- No power sequence requirements

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 = 1.2V, 1.5V, 1.8V

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 = 1.2V, 1.5V, 1.8V

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 = 1.2V, 1.5V, 1.8V

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