TSMC05: 1.8V GPIO

Libraries

Name	Process	Form Factor
RGO_TSMC05_15V18_N5_45F	N5	Inline

Summary

The 1.8V GPIO library provides general purpose bidirectional I/O cells. These programmable, multi-voltage I/O's give the system designer the flexibility to design to a wide range of performance targets.

This 5nm library is available in an inline flip chip implementation.

To design a functional I/O power domain with these cells, an additional library is required – 1.8V Support: Power. That library contains isolated analog I/O, and a full complement of power cells along with 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.

ESD Protection:

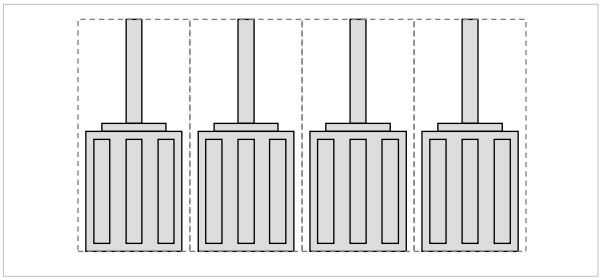
- JEDEC compliant
  - 2KV ESD Human Body Model (HBM)
  - 500 V ESD Charge Device Model (CDM)

Latch-up Immunity:

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

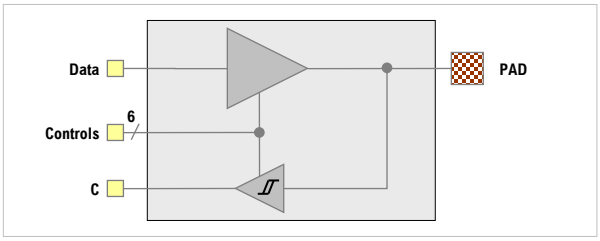
Cell Size & Form Factor

Inline (core-limited) – 138.18µm x 100.1µm



Orientation-limited cells are only provided in the vertical-only (_V) orientation.

SRC_BI_SDS_1218V_STB



Bi-directional GPIO Driver Features

- Multi-Voltage (1.2V, 1.5V, 1.8V)
- LVCMOS / LVTTL input with selectable hysteresis
- Selectable drive strength (R_{ON} = 33Ω / 50Ω)
- Selectable output slew rate
- Optimized for EMC with SSO factor of 8
- Open-drain output mode
- Programmable input options (hi-Z / pull-up / pull-down)
- Power sequencing independent design with Power-On Control

In the full-drive mode, this buffer can operate at a frequency up to 50MHz driving a 20pF load at the far end.

Recommended operating conditions

	Description	Min	Nom	Max	Units
V_{VDD}	Core supply voltage	0.675	0.75	0.825	V
		0.765	0.85	0.935	V
V_{DVDD}	I/O supply voltage	1.62	1.8	1.98	V
		1.35	1.5	1.65	V
		1.08	1.2	1.32	V
T_J	Junction temperature	-40	25	125	°C
V_{PAD}	Voltage at PAD	V_{DVSS} -0.3	-	V_{DVDD} +0.3	V

Characterization Corners

Model	LPE Type	VDD [1]	DVDD [2]	Temp
FFGNP	Cbest_CCbest	+10%	+10%	-40°C
FFGNP	Cbest_CCbest	+10%	+10%	0°C
FFGNP	Cbest_CCbest	+10%	+10%	125°C
TT	Ctypical	nominal	nominal	25°C
TT	Ctypical	nominal	nominal	85°C
SSGNP	Cworst_CCworst	-10%	-10%	-40°C
SSGNP	Cworst_CCworst	-10%	-10%	0°C
SSGNP	Cworst_CCworst	-10%	-10%	125°C

[1] VDD = 0.75V & 0.85V
[2] DVDD = 1.2V, 1.5V & 1.8V

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