

GF22: 1.8V GPIO FT



Libraries

Name	Process	Form Factor
RGO_GF22_18V18_ULL_25C_FT	FDX_ULL	Staggered CUP
RGO_GF22_18V18_ULL_45C_FT	FDX_ULL	Inline CUP

Summary

The 1.8V GPIO FT library provides **ultra low leakage** 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.

These 22nm libraries are available in inline and staggered CUP wire bond implementations with a flip chip option.

To design a functional I/O power domain with these cells, an additional library is required – 1.8V Support: Power. That library contains an input-only buffer, 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.

ESD Protection:

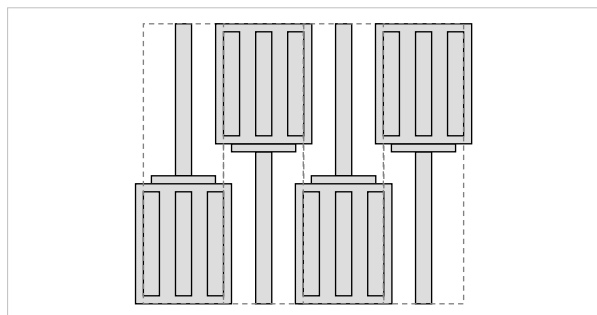
- JEDEC compliant
 - 2KV ESD Human Body Model (HBM)
 - 500 V ESD Charge Device Model (CDM)
 - 750V corner pin C4B package classification achieved by following key design priorities

Latch-up Immunity:

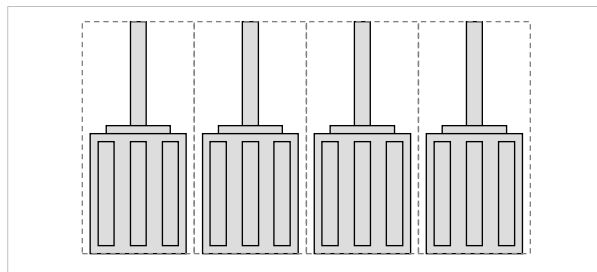
- JEDEC compliant
 - Tested to I-Test criteria of $\pm 100\text{mA}$ @ 125°C

Cell Size & Form Factor

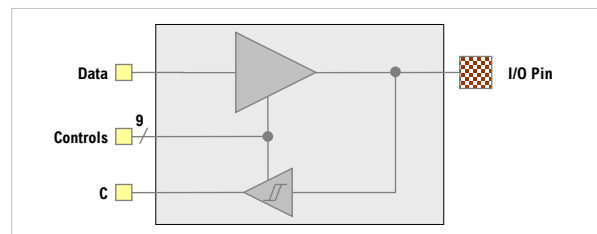
Staggered (pad-limited) – $69\mu\text{m} \times 79\mu\text{m}$



Inline (core-limited) – $48\mu\text{m} \times 108\mu\text{m}$



FRx_BI_SDS_18V_STB



Bidirectional GPIO Driver Features

- Ultra low leakage
- 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 sequencing independent design with Power-On Control

In full-drive mode, this driver can operate to frequencies in excess of 50MHz with 15pF external load. Actual frequency limits are load and system dependent.

Vertical-only ($_V$) and horizontal-only ($_H$) variants provided.

Recommended operating conditions

Description	Min	Nom	Max	Units
V_{DD} Core supply voltage	0.81	0.9	0.945	V
	0.72	0.8	0.88	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	$^\circ\text{C}$
V_{PAD} Voltage at PAD	$V_{DVSS} - 0.3$	-	$V_{DVDD} + 0.3$	V

Characterization Corners

Nominal VDD	Model	VDD	DVDD ^[1]	Temperature
0.8V	FFG	+10%	+10%	-40°C
	FFG	+10%	+10%	125°C
	TT	nominal	nominal	25°C
	TT	nominal	nominal	85°C
	SSG	-10%	-10%	-40°C
	SSG	-10%	-10%	125°C
0.9V Overdrive	FFG	+5%	+10%	-40°C
	FFG	+5%	+10%	125°C
	TT	nominal	nominal	25°C
	TT	nominal	nominal	85°C
	SSG	-10%	-10%	-40°C
	SSG	-10%	-10%	125°C

[1] DVDD = 1.2V, 1.5V & 1.8V

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Aragio Solutions
2201 K Avenue
Section B Suite 200
Plano, TX 75074-5918
Phone: (972) 516-0999
Fax: (972) 516-0998
Web: <http://www.aragio.com/>

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