GF40: 5V GPIO

Libraries

Name	Process	Form Factor
RGO_GF40_25V5_LP_20C	LP	Staggered CUP
RGO_GF40_25V5_LP_40C	LP	Inline CUP

Summary

The 5V 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.

Additionally, this library provides a full complement of cells to support the assembly of a functional pad ring by abutment for GPIO and other I/O library offerings from Aragio Solutions that use a compatible pad ring bus structure.

This 40nm library is available in both staggered CUP and inline CUP wire bond implementations with a staggered flip chip option.

The 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)
  - 200V ESD Machine Model (MM)
  - 500V ESD Charge Device Model (CDM)

Latch-up Immunity:

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

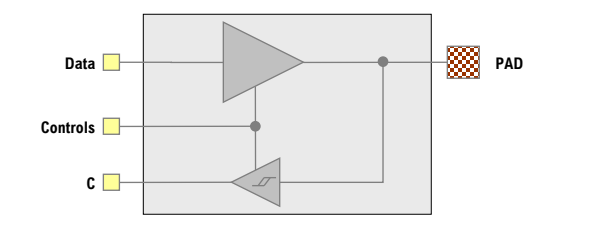
Cell Size & Form Factor

- Staggered (pad-limited) – 35µm x 200µm
- Inline (core-limited) – 50µm x 140µm

Recommended operating conditions

	Description	Min	Nom	Max	Units
		0.90	1.0	1.10	V
V_{VDD}	Core supply voltage	0.99	1.1	1.21	V
		1.08	1.2	1.26	V
V_{DVDD}	I/O supply voltage	4.5	5.0	5.5	V
T_J	Junction temperature	-40	25	175	°C
V_{PAD}	Voltage at PAD	V_{DVSS} -0.3	-	V_{DVDD} +0.3	V

SRx_BI_SDS_5V_STB



Bidirectional GPIO Driver Features

- 5V operation
- 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 (hi-Z/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 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.

Support Cells

Name	Description
Digital Pads	
STx_IN_001_5V_NC	Input-only buffer
I/O Power / Ground Pads	
PWx_VD_RDO_5V	I/O power (DVDD)
PWx_VS_RDO_5V	I/O ground (DVSS)
Core Power / Ground Pads	
PWx_VD_RCD_1250V	Core power (VDD)
PWx_VS_RCD_1250V	Core ground (VSS)
Analog Pads	
ANx_BI_DWR_5V	Isolated analog input cell
Analog Power / Ground Pads	
PWx_VD_ANA_1250V	Analog power (AVDD) 1.0V
PWx_VS_ANA_1250V	Analog ground (AVSS)
PWx_VD_ANA_5V	Analog power (ADVDD) 3.3V
PWx_VS_ANA_5V	Analog ground (ADVSS)
Support Pads	
SPx_CO_000_5V	Corner cell (rail splitter)
SPx_CO_001_5V	Corner cell (continuous)
SPx_SP_000_5V	0.1µm spacer
SPx_SP_001_5V	1µm spacer
SPx_SP_005_5V	5µm spacer
SPx_SP_010_5V	10µm spacer
SPx_RS_005_5V	Rail splitter
SPP_RE_SVR_5V	VREF generator
SPP_SP_POC_5V	POC generator

© Aragio Solutions 2006-2022

Characterization Corners

Nominal VDD	Model	VDD	DVDD = 5V	Temperature
	FF	+5%	+10%	-40°C
	FFF	+5%	+10%	125°C
	FFF	+5%	+10%	150°C
	FFF	+5%	+10%	175°C
1.2	TT	nominal	nominal	25°C
	SS	-10%	-10%	-40°C
	SS	-10%	-10%	125°C
	SS	-10%	-10%	150°C
	SS	-10%	-10%	175°C
	FF	+10%	+10%	-40°C
	FFF	+10%	+10%	125°C
	FFF	+10%	+10%	150°C
	FFF	+10%	+10%	175°C
1.1 / 1.0	TT	nominal	nominal	25°C
	SS	-10%	-10%	-40°C
	SS	-10%	-10%	125°C
	SS	-10%	-10%	150°C
	SS	-10%	-10%	175°C

CUP Cells

Staggered CUP Cells	
CUP_GF40NM_5V_79P9X43P6_IN	79.9µm X 43.6µm Inner
CUP_GF40NM_5V_79P9X43P6_OUT	79.9µm X 43.6µm Outer
CUP_GF40NM_5V_79P9X44P6_IN	79.9µm X 44.6µm Inner
CUP_GF40NM_5V_79P9X44P6_OUT	79.9µm X 44.6µm Outer
CUP_GF40NM_5V_FC	Flip chip structure
Inline CUP Cells	
CUP_GF40NM_5V_85X43_INLINE	85µm X 43µm Inline

© 2006-2022 Aragio Solutions. All rights reserved.

Information in this document is subject to change without notice. Aragio Solutions may have patents, patent applications, trademarks, copyrights or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from Aragio, the furnishing of this document does not give you any license to the patents, trademarks, copyrights, or other intellectual property.

Published by:

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/

While every precaution has been taken in the preparation of this book, the publisher assumes no responsibility for errors or omissions, or for damages resulting from the use of the information contained herein. This document may be reproduced and distributed in whole, in any medium, physical or electronic, under the terms of a license or nondisclosure agreement with Aragio.

Printed in the United States of America