TSMC 06/07: 1.8V Support: Power

Libraries

Name	Process	Form Factor
RGO_TSMC06_18V18_6FF_20F_SPT	6FF	Staggered Flip Chip
RGO_TSMC07_18V18_7FF_20C_SPT	7FF	Staggered Flip Chip

Summary

The 1.8V Support: Power library provides a full complement of cells to support the assembly of a functional pad ring by abutment. It is supplied as a standard addition to the GPIO libraries and other I/O library offerings from Aragio Solutions that use a compatible pad ring bus structure.

This library is offered at both 6nm and 7nm. It is available in a staggered flip chip implementation.

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)
  - 500 V ESD Charge Device Model (CDM)

Latch-up Immunity:

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

Cell List

Name	Description
Digital Pads	
STP_IN_001_18V_NC	Input-only buffer
I/O Power / Ground Pads	
PWP_VD_PDO_18V	I/O power (DVDD) with POC
PWP_VD_RDO_18V	I/O power (DVDD)
PWP_VS_RDO_18V	I/O ground (DVSS)
Core Power / Ground Pads	
PWP_VD_RCD_10V	Core power (VDD)
PWP_VS_RCD_10V	Core ground (VSS)
Analog Pads *	
ANP_BI_DWR_18V	Isolated analog input cell
Analog Power / Ground Pads	
PWP_VD_ANA_10V	Analog power (AVDD) 0.8V
PWP_VS_ANA_10V	Analog ground (AVSS)
PWP_VD_ANA_18V	Analog power (ADVDD) 1.8V
PWP_VS_ANA_18V	Analog ground (ADVSS)
Support Pads	
SPP_CO_000_18V	Corner cell (rail splitter)
SPP_CO_001_18V	Corner cell (continuous)
SPP_SP_000_18V	0.1µm spacer
SPP_SP_001_18V	1µm spacer
SPP_SP_005_18V	5µm spacer
SPP_SP_010_18V	10µm spacer
SPP_RS_005_18V	Rail splitter

Cell Size & Form Factor

- Staggered (pad-limited) – 17.04µm x 214.68µm
- Flip chip implementation with CUP structure built in

Recommended Operating Conditions

	Description	Min	Nom	Max	Units
V_{VDD}	Core supply voltage	0.675	0.75	0.825	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 [1]	LPE Type	VDD=0.75V	DVDD [2]	Temp
FF	Cbest_CCbest	+10%	+10%	-40°C
FF	Cbest_CCbest	+10%	+10%	0°C
FF	Cbest_CCbest	+10%	+10%	125°C
FFG	Ctypical	+10%	+10%	125°C
TT	Ctypical	nominal	nominal	25°C
TT	Ctypical	nominal	nominal	85°C
SS	Cworst_CCworst	-10%	-10%	-40°C
SS	Cworst_CCworst	-10%	-10%	0°C
SS	Cworst_CCworst	-10%	-10%	125°C

[1] Listed models are for 7FF. 6FF models are FFGNP / TT / SSGNP.
[2] DVDD = 1.8V, 1.5V & 1.2V

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