# TSMC 05: 1.2V GPIO

## Libraries

| Name | Process | Form Factor |
|---|---|---|
| RGO_TSMC05_15V12_N5_45F_SVD | N5 | Inline |

## Summary

This 1.2V GPIO library provides open-drain bi-directional I/O cells designed for the SVID three-line interface. It is compliant with the Intel SVID specification.

The library is available in an inline flip chip implementation.

To design an operational 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 functional 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

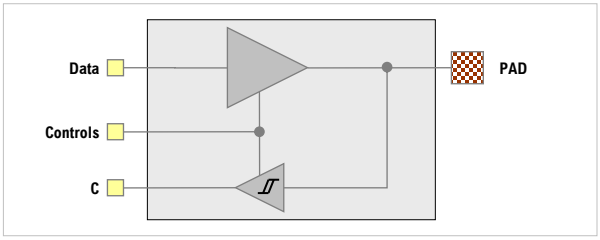
## Cell Size & Form Factor

- Inline (core-limited) – 99.82µm x 100.1µm
- 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 |
| | | 0.765 | 0.85 | 0.935 | V |
| $V_{DVDD}$ | I/O supply voltage | 1.08 | 1.2 | 1.32 | V |
| $V_{VDDP}$ | External pull-up supply to PAD | 0.95 | | 1.08 | V |
| $T_J$ | Junction temperature | -40 | 25 | 125 | °C |
| $V_{PAD}$ | Voltage at PAD | $V_{DVSS}$ -0.3 | - | 1.32 | V |

## FRC_BI_SVD_12V_NC




## Bi-directional GPIO Features

- Open drain operation only
  - 24mA rated sink current @ 1.2V
- Operating frequency – up to 25MHz
- Fault-tolerant to 1.32V at PAD (no current flow when DVDD = 0V)
- Output enable
- Receiver enable
- Standard LVCMOS compatible input with Schmitt trigger (hysteresis)
- Power-on sequencing independent design with Power-On Control
- DVDD = 1.08V to 1.32V
- Pad VDDP = 0.95V to 1.08V – independent of DVDD
- The circuit consumes no DC supply current in the static state
- A pull-down function is provided to prevent the PAD port from floating when an open-drain configuration is not used on the system board.

## 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

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