# Electrical Specification

## DC Characteristics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameters** | | **Symbol** | **Min** | **Typ** | **Max** | **Units** |
| Digital general IO @1.8V | Input Low Voltage | VIL | -0.3 |  | 0.63 | V |
| Input High Voltage | VIH | 1.17 |  | 1.98 | V |
| Threshold Point | VT | 0.83 | 0.91 | 1 | V |
| Schmitt Trigger Low to High Threshold Point | VT+ | 0.95 | 1.03 | 1.11 | V |
| VT- | 0.67 | 0.79 | 0.9 | V |
| Input Leakage Current @VI=1.8V or 0V | II |  |  | ±10μ | A |
| Tri-state Output Leakage Current @VO=1.8V or 0V | IOZ |  |  | ±10μ | A |
| Pull-up Resistor | RPU | 54k | 80k | 120k | Ω |
| Pull-down Resistor | RPD | 55k | 95k | 176k | Ω |
| Output Low Voltage | VOL |  |  | 0.45 | V |
| Output High Volgate | VOH | 1.35 |  |  | V |
| Low Level Output Current @VOL(max) | IOL | | | | |
| 00 | 7.4 | 12.2 | 17.4 | mA |
| 01 | 14.8 | 24.3 | 34.5 | mA |
| 10 | 22.1 | 36.2 | 51.0 | mA |
| 11 | 29.3 | 47.8 | 66.6 | mA |
| Low Level Output Current @VOH(min) | IOH | | | | |
| 00 | 4.9 | 11.0 | 19.8 | mA |
| 01 | 9.8 | 21.9 | 39.5 | mA |
| 10 | 14.6 | 32.9 | 59.1 | mA |
| 11 | 19.5 | 43.7 | 78.6 | mA |
| Digital SD IO | Input Low Voltage | VIL | -0.3 |  | 0.7125 | V |
| Input High Voltage | VIH | 1.875 |  | 3.15 | V |
| Threshold Point | VT | 0.81 | 0.95 | 1.12 | V |
| Schmitt Trigger Low to High Threshold Point | VT+ | 1 | 1.1 | 1.23 | V |
| VT- | 0.74 | 0.9 | 1.08 | V |
| Input Leakage Current @VI=1.8V or 0V | II |  |  | ±10μ | A |
| Tri-state Output Leakage Current @VO=1.8V or 0V | IOZ |  |  | ±10μ | A |
| Pull-up Resistor | RPU | 33k | 59k | 89k | Ω |
| Pull-down Resistor | RPD | 34k | 61k | 95k | Ω |
| Output Low Voltage | VOL |  |  | 0.35625 | V |
| Output High Volgate | VOH | 2.1375 |  |  | V |
| Low Level Output Current @VOL(max) | IOL | | | | |
| 000 | 3.2 | 5.4 | 8.3 | mA |
| 001 | 4.7 | 8.0 | 12.3 | mA |
| 010 | 6.3 | 10.7 | 16.4 | mA |
| 011 | 7.8 | 13.2 | 20.2 | mA |
| 100 | 9.4 | 15.9 | 24.2 | mA |
| 101 | 10.9 | 18.4 | 28.1 | mA |
| 110 | 12.4 | 20.9 | 31.8 | mA |
| 111 | 13.9 | 23.4 | 35.5 | mA |
| Low Level Output Current @VOH(min) | IOH | | | | |
| 000 | 5.0 | 7.6 | 11.2 | mA |
| 001 | 7.5 | 11.4 | 16.8 | mA |
| 010 | 10.0 | 15.2 | 22.3 | mA |
| 011 | 12.4 | 18.9 | 27.8 | mA |
| 100 | 14.9 | 22.6 | 33.3 | mA |
| 101 | 17.4 | 26.3 | 38.7 | mA |
| 110 | 19.8 | 30.0 | 44.1 | mA |
| 111 | 22.3 | 33.7 | 49.5 | mA |
| Digital RGMII IO | Input Low Voltage | VIL | -0.3 |  | 0.8 | V |
| Input High Voltage | VIH | 2.0 |  | 3.465 | V |
| Threshold Point | VT | 1.02 | 1.18 | 1.37 | V |
| Schmitt Trigger Low to High Threshold Point | VT+ | 1.23 | 1.34 | 1.5 | V |
| VT- | 0.97 | 1.13 | 1.33 | V |
| Input Leakage Current @VI=1.8V or 0V | II |  |  | ±10μ | A |
| Tri-state Output Leakage Current @VO=1.8V or 0V | IOZ |  |  | ±10μ | A |
| Pull-up Resistor | RPU | 26k | 46k | 71k | Ω |
| Pull-down Resistor | RPD | 27k | 48k | 102k | Ω |
| Output Low Voltage | VOL |  |  | 0.4 | V |
| Output High Volgate | VOH | 2.4 |  |  | V |
|  | Low Level Output Current @VOL(max) | IOL | | | | |
|  | 000 | 4.0 | 6.3 | 8.9 | mA |
|  | 001 | 6.0 | 9.4 | 13.3 | mA |
|  | 010 | 8.0 | 12.6 | 17.7 | mA |
|  | 011 | 10.0 | 15.6 | 21.9 | mA |
|  | 100 | 12.0 | 18.7 | 26.2 | mA |
|  | 101 | 14.0 | 21.8 | 30.4 | mA |
|  | 110 | 15.9 | 24.7 | 34.5 | mA |
|  | 111 | 17.8 | 2707 | 38.5 | mA |
|  | Low Level Output Current @VOH(min) | IOH | | | | |
|  | 000 | 6.0 | 9.3 | 14.2 | mA |
|  | 001 | 9.0 | 14.0 | 21.3 | mA |
|  | 010 | 12.1 | 18.6 | 28.4 | mA |
|  | 011 | 15.1 | 23.3 | 35.5 | mA |
|  | 100 | 18.1 | 27.9 | 42.6 | mA |
|  | 101 | 21.1 | 32.5 | 49.7 | mA |
|  | 110 | 24.1 | 37.2 | 56.8 | mA |
|  | 111 | 27.1 | 41.8 | 63.8 | mA |