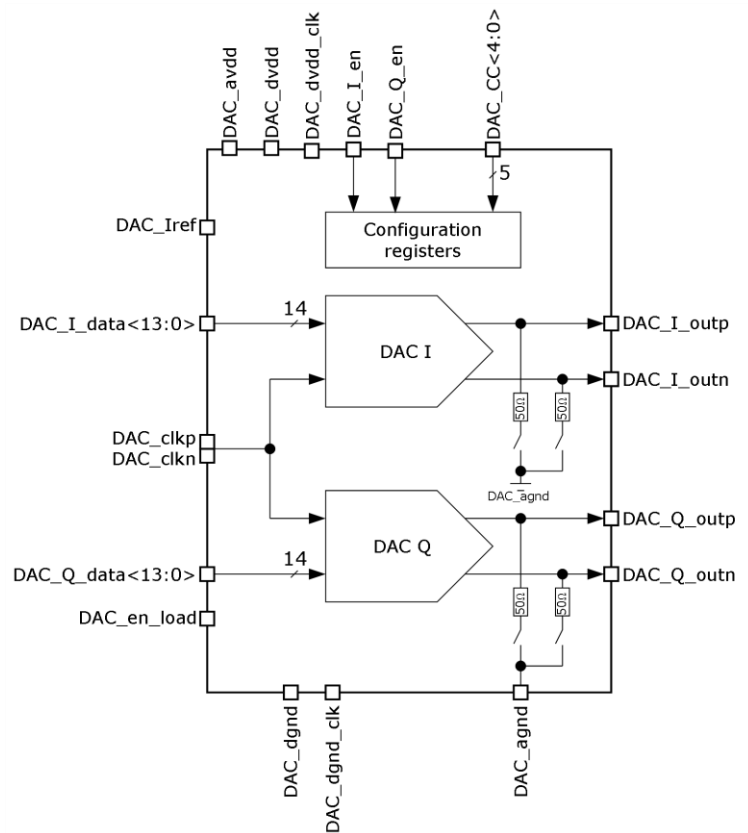


## 14-bit 2-channel 40-500MSPS current steering DAC

### OVERVIEW

065STM\_DAC\_01 is a two-channel high-speed 14-bit digital-to-analog converter (DAC) designed to convert a digital signal into an analog differential signal. The DAC is based on a segmented current steering architecture combined with dynamic element matching algorithm to achieve high dynamic range, statistical response, and wide bandwidth.

IP technology: STM CMOS 65nm  
 IP status: pre-silicon verification  
 Area: 0.708mm<sup>2</sup>



### ELECTRICAL CHARACTERISTICS

| Parameter                       | Symbol          | Conditions                                 | Value                       |       |                | Units |    |
|---------------------------------|-----------------|--|-----------------------------|-------|----------------|-------|----|
|                                 |                 |  | min                         | typ.  | max            |       |    |
| Supply voltage                  | $V_{avdd}$      | -  | 2.375                       | 2.5   | 2.625          | V     |    |
|                                 | $V_{dvdd}$      | -  | 1.08                        | 1.2   | 1.32           |       |    |
|                                 | $V_{dvdd\_clk}$ | -  | 1.08                        | 1.2   | 1.32           |       |    |
| Operating temperature range     | $T_j$           | -  | -40                         | +25   | +85            | °C    |    |
| Current consumption             | I               | per channel                                | $V_{avdd}$                  | -     | 23             | -     | mA |
|                                 |                 |  | $V_{dvdd}$                  | -     | 1.2            | -     |    |
|                                 |                 |  | $V_{dvdd\_clk}$             | -     | 1.4            | -     |    |
| Output resistance               | $R_{out}$       | DAC_en_load = "0"                          | -                           | 625   | -              | kOhm  |    |
|                                 |                 | DAC_en_load = "1"                          | -                           | 50    | -              | Ohm   |    |
| External load resistance        | $R_{load}$      | DAC_en_load = "0"<br>DAC_CC<4:0> = "10010" | -                           | 25    | -              | Ohm   |    |
| Input logic-high level          | $V_{IH}$        | -  | $0.9V_{dvdd}$               | -     | $V_{dvdd}+0.3$ | V     |    |
| Input logic-low level           | $V_{IL}$        | -  | -0.3                        | -     | +0.3           | V     |    |
| Resolution                      | N               | -  | -                           | 14    | -              | bit   |    |
| Bandwidth                       | BW              | -  | 0                           | -     | 250            | MHz   |    |
| Full-scale output current range | $A_{out}$       | DAC_CC<4:0> = "10010"                      | -                           | 20.48 | -              | mA    |    |
|                                 |                 | DAC_CC<4:0> = "11111"                      | -                           | 33.8  | -              |       |    |
| Sampling rate                   | $F_{SR}$        | -  | 40                          | -     | 500            | MSPS  |    |
| Differential nonlinearity       | DNL             | -  | -                           | -     | ±0.5           | LSB   |    |
| Integral nonlinearity           | INL             | -  | -                           | -     | ±1             | LSB   |    |
| Output rise time                | $t_R$           | -  | -                           | 142.3 | 186.6          | ps    |    |
| Output fall time                | $t_F$           | -  | -                           | 57.4  | 69.6           | ps    |    |
| Spurious-free dynamic range     | SFDR            | $F_{clk} = 500\text{MHz}$                  | $F_{out} = 145\text{MHz}$   | -     | 70.3           | -     | dB |
|                                 |                 |  | $F_{out} = 42.87\text{MHz}$ | -     | 83.8           | -     |    |