# ST10F274Z4

## 16-bit MCU with MAC unit, up to 512 Kbytes Flash memory and up to 68 Kbytes RAM

**Data Brief**

## Feature

■ **High performance 40 MHz CPU with DSP functions**
  – 16-bit CPU with 4-stage pipeline
  – 50.0 ns instruction cycle time at 40 MHz max. CPU clock
  – Multiply/accumulate unit (MAC) 16 x 16-bit multiplication, 40-bit accumulator
  – Repeat unit
  – Enhanced boolean bit manipulation facilities
  – Additional instructions to support HLL and operating systems
  – Single-cycle context switching support

■ **Memory organization**
  – 512 Kbytes on-chip Flash memory single voltage with erase/program controller (full performance, 32-bit fetch)
  – 100K erasing/programming cycles.
  – Up to 16 Mbytes linear address space for code and data (5 Mbytes with CAN or $I^2C$)
  – 2 Kbytes on-chip internal RAM (IRAM)
  – Up to 66 Kbytes on-chip extension RAM (XRAM)

■ **Fast and flexible bus**
  – Programmable external bus characteristics for different address ranges
  – 8-bit or 16-bit external data bus
  – Multiplexed or demultiplexed external address/data buses
  – Five programmable chip-select signals
  – Hold-acknowledge bus arbitration support

■ **Interrupt**
  – 8-Channel peripheral event controller for single cycle interrupt driven data transfer
  – 16-Priority-level interrupt system with 56 sources, sampling rate down to 25 ns

■ **Timers**
  – Two multi-functional general purpose timer units with 5 timers



**PQFP144 (28 x 28 x 3.4 mm)**
**TQFP144 (20 x 20 x 1.4 mm)**
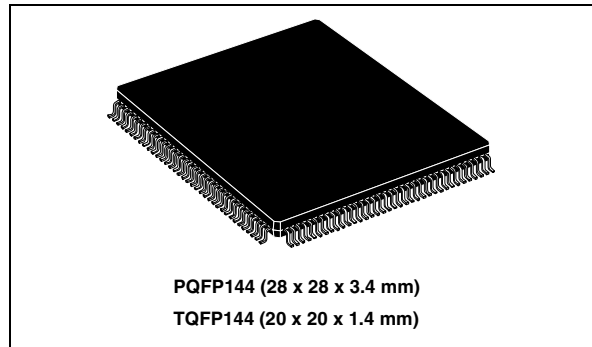
■ **Two 16-channel capture / compare units including 4 timers**

■ **A/D converter**
  – 24 channels with 10-bit resolution
  – 3 µs minimum conversion time

■ **2 units of 4 PWM timers**

■ **Serial channels**
  – Two synch. / asynch. serial channels
  – Two high-speed synchronous channels
  – $I^2C$ standard interface
  – Two CAN 2.0B C-CAN interfaces with 2x32 message objects

■ **Fail-safe protection**
  – Programmable watchdog timer
  – Oscillator watchdog

■ **On-chip bootstrap loader**

■ **Clock generation**
  – On-chip 4-12 MHz main oscillator
  – On-chip PLL
  – Direct or prescaled clock input

■ **Real-time clock and 32 kHz on-chip oscillator**

■ **Up to 111 general purpose I/O lines**
  – Individually programmable as input, output or special function
  – Programmable threshold (hysteresis)

■ **Idle, Power down and Stand-by modes**

■ **Single voltage supply: 5 V ±10% (embedded regulator for 1.8 V core supply)**

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# 1 Description

The ST10F274Z4 is a derivative of the ST10F276Z5.

## 1.1 Ordering information

Table 1. Ordering information

| Part Number | IFlash | XFlash | RAM | Temperature range (°C) | Package |
|---|---|---|---|---|---|
| ST10F274Z4Q7 | 512 Kbytes | 0 Kbyte | 68 Kbytes | 40/+105 | PQFP144 |
| ST10F274Z4T7 | 512 Kbytes | 0 Kbyte | 68 Kbytes | 40/+105 | TQFP144 |

## 1.2 ST10F276Z5/ST10F274Z4 compatibility

The only differences between ST10F276Z5 and ST10F274Z4 devices are the embedded Flash, the maximum frequency and the temperature range:

**Flash memory:** ST10F276Z5 includes 832 Kbytes of on-chip single voltage Flash divided into four banks allowing for Read-While-Write operations. Two banks are mapped on the internal 32-bit bus (IFlash) and the two others are mapped on 16-bit XBUS (XFlash).

However, in ST10F274Z4 devices, the XFlash banks are not available. As a consequence, only the standard ST10 bootstrap mode can be used (no Alternate Boot Mode).

**Maximum frequency:** the ST10F274Z4 maximum CPU frequency is 40 MHz, compared to 64 MHz for the ST10F276Z5.

**Temperature Range:** the temperature range for ST10F274Z4 is -40 to +105 °C, compared to -40 to +125 °C for the ST10F276Z5. All electrical characteristics from the ST10F276Z5 datasheet are valid for the ST10F274Z4 with the restriction of the temperature range (-40 to +105 °C).

*Note:* *There is no built-in feature to allow software to detect if the device is an ST10F276Z5 or an ST10F274Z4. The missing memory in the ST10F274Z4 can be seen as regular memory. To make two assemblies of the same PCB with the ST10F274Z4 and ST10F276Z5, it is recommended to put a pull-up resistor on an I/O to differentiate the two configurations by software.*

Table 2. XFlash block user mode size

| Block | Address | ST10F276Z5 | ST10F274Z4 |
|---|---|---|---|
| B2F0 | 09'0000h - 09'FFFFh | 64 Kbytes | Reserved |
| B2F1 | 0A'0000h - 0A'FFFFh | 64 Kbytes | Reserved |
| B2F2 | 0B'0000h - 0B'FFFFh | 64 Kbytes | Reserved |
| B3F0 | 0C'0000h - 0C'FFFFh | 64 Kbytes | Reserved |

**Table 2.    XFlash block user mode size**

| Block | Address | ST10F276Z5 | ST10F274Z4 |
|---|---|---|---|
| B3F1 | 0D'0000h - 0D'FFFFh | 64 Kbytes | Reserved |
| CTRL registers | 0E'0000h - 0E'FFFFh | 64 Kbytes | Reserved |

## 2        Related documents

This document provides the ST10F274Z4 ordering information, for detailed technical specifications, please refer to the ST10F276Z5 datasheet and user's manual.

# 3 Revision history

**Table 3. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 08-Mar-2006 | 1 | Initial release |
| 06-Mar-2009 | 2 | ST10F274 and ST10F274xx replaced with ST10F274Z4 ST10F276 replaced with ST10F276Z5. Added *Section 1: Description*. |

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