NXP Semiconductors
Product Brief

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Kinetis KE1xZ64 – General Purpose MCUs with High Robustness Touch and CAN

Up to 64 KB Flash and 8 KB SRAM

1. Introduction

Kinetis E family provides the highly scalable portfolio for 5 V robust MCUs, from 20 MHz Arm® Cortex®-M0+ MCUs to 168 MHz Arm Cortex-M4 MCUs. With 2.7-5.5 V supply and focus on exceptional EMC/ESD robustness, Kinetis E family is well suited to a wide range of applications in electrical harsh environments, and is optimized for cost sensitive applications. The Kinetis E family offers a broad range of memory, peripheral and package options.

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2. Overview

Kinetis KE1xZ64 MCUs are based on Arm Cortex-M0+ core, up to 48 MHz. Providing up to 64 KB flash, 8 KB RAM, and the complete set of analog/digital features, KE1xZ64 extends Kinetis E family to higher performance and broader scalability. Robust TSI provides high level stability and accuracy to customers' UI system. 1MSPS ADC, Flextimer and PDB are perfect solution for BLDC motor control systems. MSCAN will be ideal for the industrial CAN node control and auto-related applications.

- **KE14Z:** broad offering with mixed-signal integration, ADC, ACMP, Timers, PDB
- **KE15Z:** expansion from KE14Z family, with addition of TSI module
- **KE16Z:** expansion from KE15Z family, with addition of CAN module

3. Key features

- FIRC provides internal ±0.5% accuracy 48 MHz clock in -40-105˚C. Arm Cortex-M0+ core supporting a broad range of processing bandwidth requirements while maintaining excellent cost-effectiveness, easy to use packages and a wide range of memory densities.
- Enhanced robust IOs make sure the high performance under noisy environment.
- Robust TSI supports both mutual-cap mode and self-cap mode, providing flexibility for up to 25 touch sensing channels.
- Implementation of CAN protocol - version 2.0A/B, which supports both standard and extended data frames, 0-8 Byte data length, up to 1 Mbps.
- Flextimer features 6-channel PWM supporting 3-phase motor control with dead time insertion and fault detection.
- 1 M SPS 12b ADC, with up to 16-channel input, provides fast sampling rate for prompt data conversion and storage.
- Analog comparator for fast response to external analog change.
- Programmable Delay Block (PDB) with flexible trigger system provides various interconnections for on-chip modules, including ADC, Flextimers, ACMP, etc.
- Faster time to market with comprehensive enablement solutions, including SDK (drivers, touch library, stacks), IDE, online community and more.

4. Block diagram

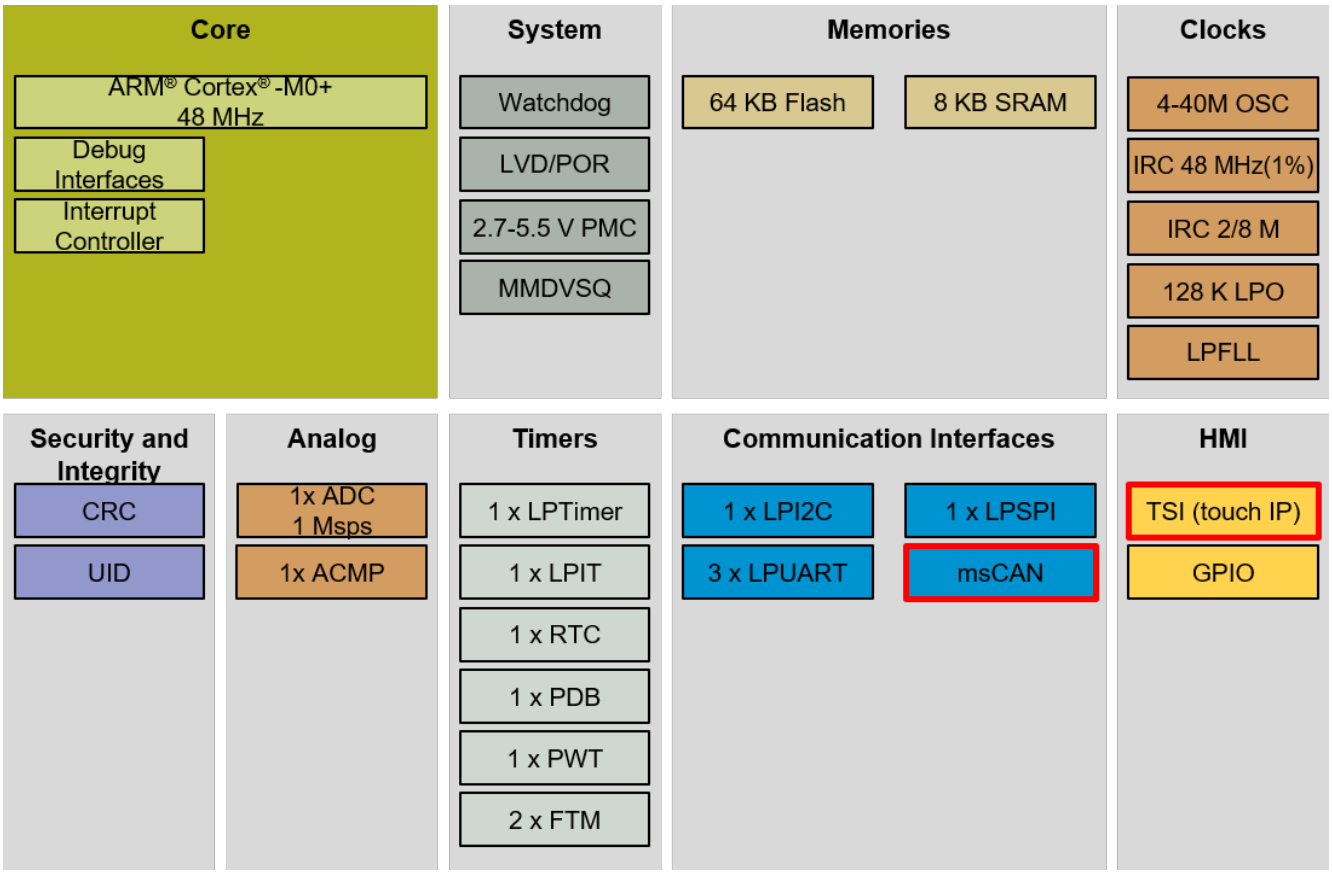

Figure 1. Block diagram

5. Family features

Table 1 lists the key feature summary for the KE1xZ64 families.

Table 1. Family feature summary

Sub-Family	KE14Z64	KE15Z64	KE16Z64
Core	CM0+	CM0+	CM0+
Frequency	48 MHz	48 MHz	48 MHz
Flash	32 KB/64 KB	32 KB/64 KB	32 KB/64 KB
SRAM	4 KB/8 KB	4 KB/8 KB	4 KB/8 KB
MMDVSQ	YES	YES	YES
Clock	48 M FIRC (1%), 8 M SIRC (3%), XOSC (4-40 M), 128 K LPO	48 M FIRC (1%), 8 M SIRC (3%), XOSC (4-40 M), 128 K LPO	48 M FIRC (1%), 8 M SIRC (3%), XOSC (4-40 M), 128 K LPO
WDT/POR/LVD	Yes	Yes	Yes
ADC	1 x 12b, 1us	1 x 12b, 1us	1 x 12b, 1us
ACMP	1	1	1
Timer	2 x FTM 1 x LPTMR 1 x PWT	2 x FTM 1 x LPTMR 1 x PWT	2 x FTM 1 x LPTMR 1 x PWT
PDB	1	1	1
PIT	1	1	1
RTC	1	1	1
CAN	-	-	YES
UART	3	3	3
SPI	1	1	1
I2C	1	1	1
TSI	-	25-channel TSI	25-channel TSI
VDD	2.7-5.5 V	2.7-5.5 V	2.7-5.5 V
Temperature (Ta)	-40-105°C	-40-105°C	-40-105°C
Package (GPIOs)	48/44 LQFP, 32 QFN/LQFP (in plan)	48/44 LQFP, 32 QFN/LQFP (in plan)	48/44 LQFP, 32 QFN/LQFP (in plan)

6. Comprehensive enablement solutions

6.1. Integrated development environments

- IAR Embedded Workbench® iar.com/kinetis
- Arm Keil® Microcontroller Development Kit keil.com/nxp
- NXP MCUXpresso nxp.com/mcuxpresso
  - An open-source software development kit (SDK)
  - An easy-to-use integrated development environment (IDE)
  - A comprehensive suite of system configuration tools, including pins, clocks, SDK builder and more
  - Broad Arm ecosystem support through NXP Connect partners

6.2. Online enablement with Arm mbed™ development platform

- Rapid and easy Kinetis MCU prototyping and development
- Online mbed SDK, developer community
- Free software libraries

6.3. Boot-loader

- Common boot-loader for all Kinetis MCUs
- In-system Flash programming over a serial connection: erase, program, verify
- ROM- or Flash-based boot-loader with open-source software and host-side programming utilities

6.4. Development hardware

- NXP Freedom development platforms
  - Low cost
  - Designed in an industry-standard compact form factor
  - Integrated open-standard serial and debug interface (OpenSDA)
  - Compatible with a rich-set of third-party expansion boards

7. Part identification

7.1. Description

The chip part numbers have fields that identify the specific part. You can use the values of these fields to determine the specific part you have received.

7.2. Format

The format of the device part numbers is: Q KE## A FFF T PP CC (N).

7.3. Fields

Table 2 lists the possible values for each field in the part number (not all combinations are valid).

Table 2. Part number field descriptions

Field	Description	Values
Q	Qualification status	M = Fully-qualified, general market flow P = Prequalification
KE##	Kinetis family	KE14Z KE15Z KE16Z
A	Key attribute	Z = Cortex-M0+
FFF	Program Flash memory size	64 = 64 KB 32 = 32 KB
R	Silicon revision	(Blank) = Main A = Revision after main
T	Temperature range	V = -40°C - 105°C
PP	Package identifier	LF = 48LQFP (7 mm × 7 mm) LD = 44LQFP (10 mm × 10 mm) LC = 32LQFP (7 mm × 7 mm)
CC	Maximum CPU frequency (MHz)	4 = 48 MHz
N	Packaging type	R = Tape and reel (Blank) = Trays

8. Orderable part numbers

Table 3. Ordering information

Product	Memory		Package		IO and ADC Channel		
MC part number	Flash	SRAM	Pin count	Package	GPIOs	GPIOs (INT/HD)	ADC channels (SE/DP)
MKE16Z64VLF4	64 KB	8 KB	48	LQFP	42	42/7	12/0
MKE16Z64VLD4	64 KB	8 KB	44	LQFP	38	38/6	12/0
MKE15Z64VLF4	64 KB	8 KB	48	LQFP	42	42/7	12/0
MKE15Z64VLD4	64 KB	8 KB	44	LQFP	38	38/6	12/0
MKE14Z64VLF4	64 KB	8 KB	48	LQFP	42	42/7	12/0
MKE14Z64VLD4	64 KB	8 KB	44	LQFP	38	38/6	12/0
MKE16Z32VLF4	32 KB	4 KB	48	LQFP	42	42/7	12/0
MKE16Z32VLD4	32 KB	4 KB	44	LQFP	38	38/6	12/0
MKE15Z32VLF4	32 KB	4 KB	48	LQFP	42	42/7	12/0
MKE15Z32VLD4	32 KB	4 KB	44	LQFP	38	38/6	12/0
MKE14Z32VLF4	32 KB	4 KB	48	LQFP	42	42/7	12/0
MKE14Z32VLD4	32 KB	4 KB	44	LQFP	38	38/6	12/0

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