1   General Description

The EM78F652N is an 8-bit microprocessor designed and developed with low-power, high-speed CMOS technology and high noise immunity. It has a built-in 2K×13-bit Electrical Flash Memory & 256×8-bit in system programmable EEPROM. It provides three protection bits to prevent intrusion of user's Flash memory code. Twelve option bits are also available to meet user's requirements.

With its Flash-ROM feature, the EM78F652N provides a convenient way of developing and verifying user's programs. Moreover, this Flash-ROM device offers the advantages of easy and effective program updates, using development and programming tools. User can avail of the ELAN Writer to easily program his development code.

2   Features

- Operating voltage: 2.0V~5.5V

- Operating temperature: -40°C~85°C

- Endurance: 100K write/erase cycles

- More than 10 years data retention

- Operating frequency range (base on two clocks):
  - Crystal mode: DC~20MHz at 5V, DC~8MHz at 3V, DC~4MHz at 2.0V
  - ERC mode: DC~16MHz at 5V, DC~8MHz at 3V, DC~4MHz at 2.0V
  - IRC mode: DC~16MHz at 4.5~5.5V, DC~4MHz at 2.0V~5.5V

- Low power consumption:
  - Less than 2 mA at 5V/4MHz
  - 20 μA Typical at 3V/32kHz
  - 2 μA Typical, during sleep mode

- 2K×13 bits Flash memory

- Four programmable Level Voltage Detector (LVD)
  - Vdd power monitor and support low voltage detector interrupt flag

- Three security registers to prevent intrusion of Flash memory codes

- One configuration register to accommodate user's requirements

- 144×8 bits on-chip registers (SRAM, general purpose register)

- 256 bytes in-system programmable EEPROM
  - Endurance: 100,000 write/erase cycles

■ Three bidirectional I/O ports

■ 8-level stacks for subroutine nesting

■ 8-bit real time clock/counter (TCC) with selective signal sources, trigger edges, and overflow interrupt

■ 2/4/8/16 clocks per instruction cycle selected by code option

■ Power down (Sleep) mode

■ Ten available interrupts:
  ● Internal interrupt: 6
  ● External interrupt: 4

■ Programmable free running watchdog timer

■ 4 channels Analog-to-Digital Converter with 12-bit resolution

■ One set of 2 orders OP Amplifier

■ One 16-bit Timer/Counter
  ● TC2: Timer/Counter/Window

■ One 8-bit Timer/Counter
  ● TC3: Timer/Counter/PDO (programmable divider output) / PWM (pulse width modulation)

■ Serial transmitter/receiver interface
  ● Serial Peripheral Interface (SPI): Three-wire synchronous communication

■ Eight programmable pull-high pins

■ 12 programmable pull-down pins

■ Four programmable open-drain pins

■ Package type:
  ● 20-pin DIP   :   EM78F652NAP
  ● 20-pin SOP   :   EM78F652NAM
  ● 18-pin DIP   :   EM78F652NBP
  ● 18-pin SOP   :   EM78F652NBM
  ● 16-pin DIP   :   EM78F652NCP
  ● 16-pin SOP   :   EM78F652NCM

■ 99.9% Single instruction cycle commands

■ Four kinds of oscillation range in Crystal mode

Crystal Range	Oscillator Mode
20MHz ~ 6MHz	HXT
6MHz ~ 1MHz	XT
1MHz ~ 100kHz	LXT1
32.768kHz	LXT2

3　Pin Assignment
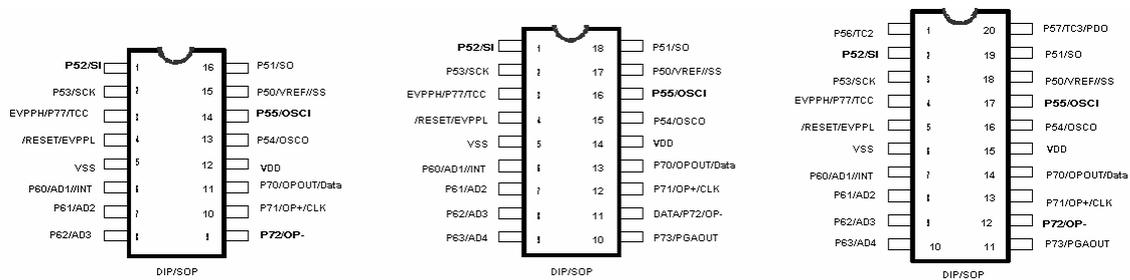
Fig 3-1　Pin Assignment for Smoker Market