

EM78P345/6/7N

**8-Bit Microprocessor
with OTP ROM**

Product Specification

DOC. VERSION 1.0

ELAN MICROELECTRONICS CORP.

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Specification Revision History

Doc. Version	Revision Description	Date
1.0	Initial released version	2007/04/25

1 General Description

EM78P345N, EM78P346N and EM78P347N are 8-bit microprocessors designed and developed with low-power and high-speed CMOS technology. Each in the series has as an on-chip 4K×13-bit Electrical One Time Programmable Read Only Memory (OTP-ROM). Each provides a protection bit to prevent intrusion of user's OTP memory code. Three Code option bits are also available to meet user's requirements.

With its enhanced OTP-ROM feature, the device provides a convenient way of developing and verifying user's programs. Moreover, this OTP 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

- CPU configuration
 - 4K×13 bits on-chip ROM
 - 144×8 bits on-chip registers (SRAM)
 - 8-level stacks for subroutine nesting
 - 4 programmable Level Voltage Detector (LVD) : 4.5V, 4.0V, 3.3V, 2.3V
 - 4 programmable Level Voltage Reset (LVR) : 4.1V, 3.7V, 2.8V (POR)
 - Less than 1.5 mA at 5V/4MHz
 - Typically 15 μA, at 3V/32kHz
 - Typically 2 μA, during sleep mode
- I/O port configuration
 - 3 bidirectional I/O ports
 - Wake-up port : P6
 - 21 programmable pull-down I/O pins
 - 21 programmable pull-high I/O pins
 - 22 programmable open-drain I/O pins
 - 4 programmable high-sink I/O pins
 - External interrupt : P50
- Operating voltage range:
 - 2.1V~5.5V at 0°C~70°C (commercial)
 - 2.3V~5.5V at -40°C~85°C (industrial)
- Operating frequency range (base on 2 clocks):
 - Crystal mode: DC ~ 12MHz, 4V; DC ~ 8MHz, 3V; DC ~ 4MHz, 2.1V
 - RC mode: DC ~ 16MHz, 4.5V; DC ~ 12MHz, 4V; DC ~ 4MHz, 2.1V
 - Internal RC Drift Rate (Ta=25°C, VDD=5V±5%, VSS=0V)

Internal RC Frequency	Drift Rate			
	Temperature (-40°C+85°C)	Voltage (2.3V~5.5V)	Process	Total
455kHz	±5%	±5%	±4%	±14%
1MHz	±5%	±5%	±4%	±14%
4MHz	±5%	±5%	±4%	±14%
16MHz	±5%	±5%	±4%	±14%

- All these four main frequencies can be trimmed by programming with four calibrated bits in the ICE345N Simulator. OTP is auto trimmed by ELAN Writer.

- Fast set-up time requires only 0.8ms (HXT2, 4MHz) in high Crystal and 255 CLKS in IRC mode from wake up to operating mode
- Peripheral configuration
 - 8-bit real time clock/counter (TCC) with selective signal sources, trigger edges, and overflow interrupt
 - 8-bit multi-channel Analog-to-Digital Converter with 12-bit resolution in Vref mode
 - Three Pulse Width Modulation (PWM) with 10-bit resolution
 - One pair of comparator (offset voltage: 5mV)
 - One pair of OP (offset voltage: 5mV)
 - Power-down (Sleep) mode
 - High EFT immunity(4MHZ,4clocks)
- Six available interrupts
 - TCC overflow interrupt
 - Input-port status changed interrupt (wake up from sleep mode)
 - External interrupt
 - ADC completion interrupt
 - PWM period match completion
 - Comparator high/low interrupt
- Programmable free running Watchdog Timer
 - Watchdog Timer: 16.5ms ± 5% with Vdd =5V at 25°C, Temperature range ± 5% (-40°C ~+85°C)
 - Watchdog Timer: 18ms ± 5% with Vdd =3V at 25°C, Temperature range ± 5% (-40°C~+85°C)
 - Two clocks per instruction cycle
- Package Type:
 - 18-pin DIP 300mil : EM78P345NPSxJ
 - 18-pin SOP 300mil : EM78P345NMS/J
 - 20-pin DIP 300mil : EM78P346NPS/J
 - 20-pin SOP 300mil : EM78P346NMS/J
 - 20-pin SSOP 209mil: EM78P346NKMS/J
 - 24-pin skinny DIP 300mil : M78P347NPS/J
 - 24 pin SOP 300mil : EM78P347NMS/J
 - 24 pin SSOP 150mil : EM78P347NKMS/J

Note: Green products do not contain hazardous substances.

3 Pin Assignment

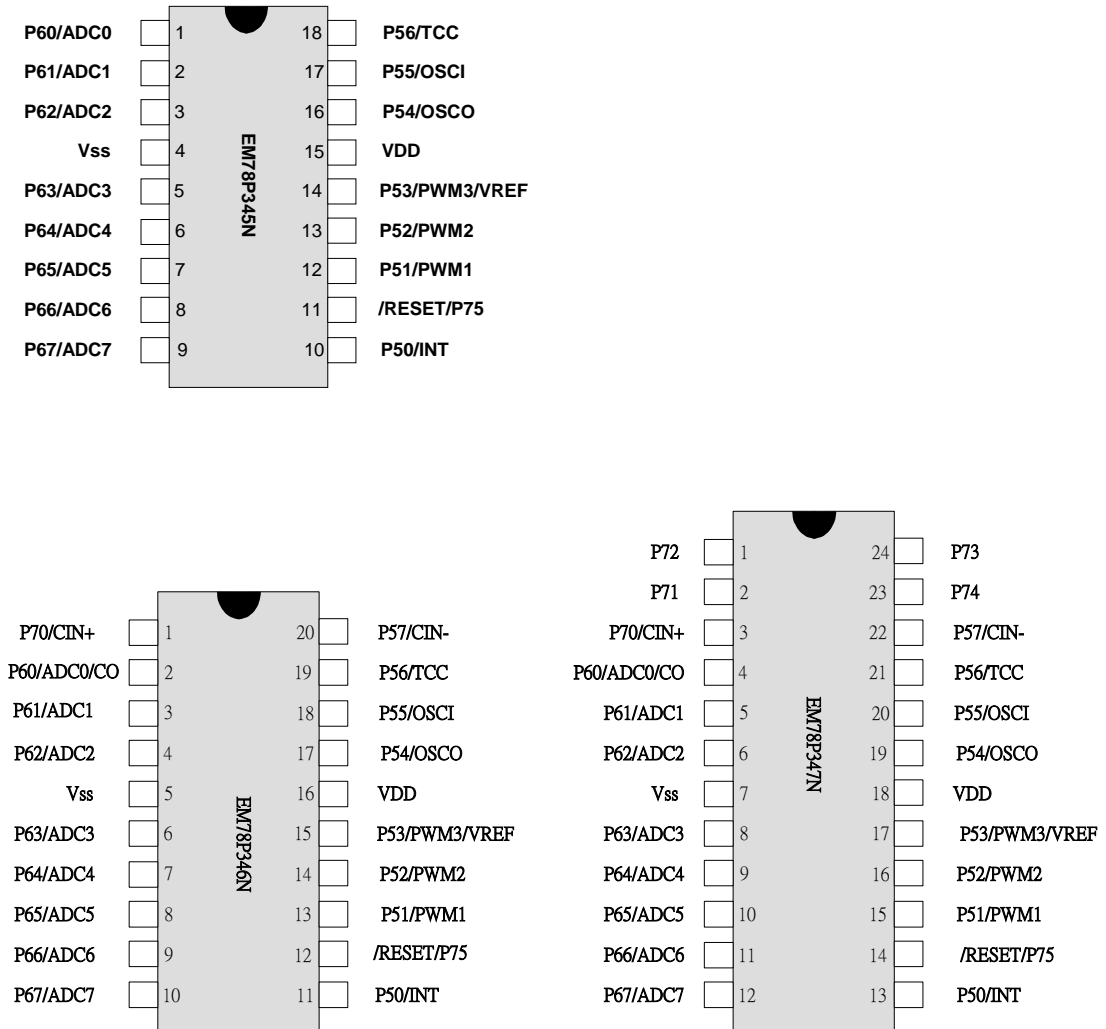


Fig. 3-1 EM78P345N, EM78P346N and EM78P347N Pin Assignment