



EM78P259N Errata document

Specification Revision History

Doc. Version	Revision Description	Date
1.0	Initial official version	2005/06/16
1.1	Added the IRC drift rate in the feature	2006/05/29
1.2	<ol style="list-style-type: none">1. Improved the contents and format of the Features section, Fig.4-1 EM78P259N/260N Functional Block Diagram, Fig.6-2 TCC and WDT Block Diagram and Fig.6-11 IR/PWM System Block Diagram.2. Modified Section 6.7 Analog-to-Digital Converter(ADC)3. Modified Section 6.13.1 Code Option Register (Word 0) and Section 6.13.2 Code Option Register (Word 1)4. Added Internal RC Electrical Characteristics5. Modified Section 8.1 AD Converter Characteristics, Section 8.2 Comparator (OP) Characteristics and Appendix A. Package Type.	2007/05/18
1.3	Added EM78P2581N SOP 16-pin Package	2007/10/23
1.4	<ol style="list-style-type: none">1. Added DIP 、 SOP 14-pin Package2. Rename EM78P259N from EM78P2581N 、 EM78P259N 、 EM78P260N	2007/11/30



Version 1.3 to Version 1.4

A. attached items

1	Page 1	2. Features	Added DIP 、 SOP 14Pin Package																													
<p>2. Features</p> <ul style="list-style-type: none"> ■ CPU configuration <ul style="list-style-type: none"> • 2K×13 bits on-chip ROM • 80×8 bits on-chip registers (SRAM) • 8-level stacks for subroutine nesting • Less than 1.9 mA at 5V/4MHz • Typically 15 μA, at 3V/32kHz • Typically 1 μA, during Sleep mode ■ I/O port configuration <ul style="list-style-type: none"> • 3 bidirectional I/O ports : P5, P6, P7 • 17 I/O pins • Wake-up port : P5 • 8 Programmable pull-down I/O pins • 8 programmable pull-high I/O pins • 8 programmable open-drain I/O pins • External interrupt : P60 ■ Operating voltage range <ul style="list-style-type: none"> • Operating voltage: 2.3V~5.5V (Commercial) • Operating voltage: 2.5V~5.5V (Industrial) ■ Operating temperature range <ul style="list-style-type: none"> • Operating temperature: 0°C ~70°C (Commercial) • Operating temperature: -40°C ~85°C (Industrial) ■ Operating frequency range <ul style="list-style-type: none"> • Crystal mode: DC~20MHz/2clks @ 5V, DC~100ns inst. cycle @ 5V DC~8MHz/2clks @ 3V, DC~250ns inst. cycle @ 3V • ERC mode: DC~16MHz/2clks @ 5V, DC~125ns inst. cycle @ 5V DC~8MHz/2clks @ 3V, DC~250ns inst. cycle @ 3V • IRC mode: Oscillation mode : 4MHz, 8MHz, 1MHz, 455kHz <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>All these four main frequencies can be trimmed by programming with four calibrated bits in the ICE259N Simulator. OTP is auto trimmed by ELAN Writer.</p> </div> <div style="width: 45%;"> <ul style="list-style-type: none"> ■ Peripheral configuration <ul style="list-style-type: none"> • 8-bit real time clock/counter (TCC) with selective signal sources, trigger edges, and overflow interrupt • 8-bit real time clock/counter (TCCA, TCCC) and 16-bit real time clock/counter (TCCB) with selective signal sources, trigger edges, and overflow interrupt • 4-bit channel Analog-to-Digital Converter with 12-bit resolution in Vref mode • Easily implemented IR (Infrared remote control) application circuit • One pair of comparators or OP ■ Six available interrupts: <ul style="list-style-type: none"> • TCC, TCCA, TCCB, TCCC overflow interrupt • Input-port status changed interrupt (wake-up from sleep mode) • External interrupt • ADC completion interrupt • Comparators status change interrupt • IR/PWM interrupt ■ Special features <ul style="list-style-type: none"> • Programmable free running watchdog timer (4.5ms:18ms) • Power saving Sleep mode • Selectable Oscillation mode • Power-on voltage detector (2.0V ± 0.1V) ■ Package type: <ul style="list-style-type: none"> • 14-pin DIP 300mil : EM78P259ND14J/S • 14-pin SOP 150mil : EM78P259NSO14J/S • 16-pin SOP 150mil : EM78P259NSO16AJ/S • 18-pin DIP 300mil : EM78P259ND18J/S • 18-pin SOP 300mil : EM78P259NSO18J/S • 20-pin DIP 300mil : EM78P259ND20J/S • 20-pin SOP 300mil : EM78P259NSO20J/S • 20-pin SSOP 209mil : EM78P259NSS20J/S </div> </div> <table border="1" style="margin-top: 10px; width: 100%;"> <thead> <tr> <th rowspan="2">Internal RC Frequency</th> <th colspan="4">Drift Rate</th> </tr> <tr> <th>Temperature (-40°C~85°C)</th> <th>Voltage (2.3V~5.5V)</th> <th>Process</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>4MHz</td> <td>±10%</td> <td>±5%</td> <td>±4%</td> <td>±19%</td> </tr> <tr> <td>8MHz</td> <td>±10%</td> <td>±6%</td> <td>±4%</td> <td>±20%</td> </tr> <tr> <td>1MHz</td> <td>±10%</td> <td>±5%</td> <td>±4%</td> <td>±19%</td> </tr> <tr> <td>455kHz</td> <td>±10%</td> <td>±5%</td> <td>±4%</td> <td>±19%</td> </tr> </tbody> </table>				Internal RC Frequency	Drift Rate				Temperature (-40°C~85°C)	Voltage (2.3V~5.5V)	Process	Total	4MHz	±10%	±5%	±4%	±19%	8MHz	±10%	±6%	±4%	±20%	1MHz	±10%	±5%	±4%	±19%	455kHz	±10%	±5%	±4%	±19%
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3. Pin Assignment

(1) 14-Pin DIP/SOP

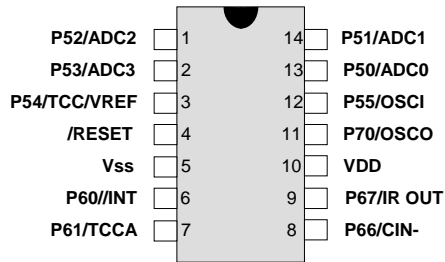


Fig. 3-1 EM78P259N – 14 Pin

(2) 16-Pin SOP

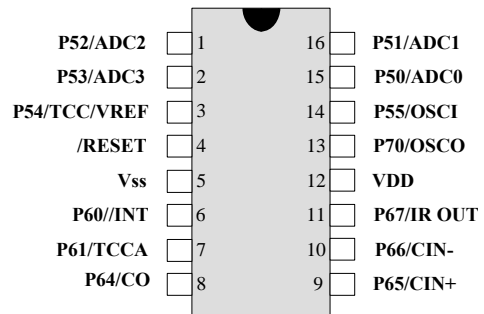


Fig. 3-2 EM78P259N – 16 Pin

(3) 18-Pin DIP/SOP

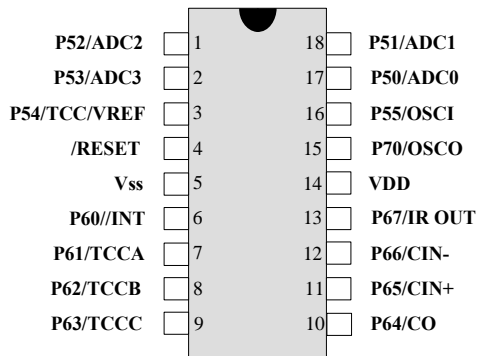


Fig. 3-3 EM78P259N – 18 Pin

(4) 20-Pin DIP/SOP/SSOP

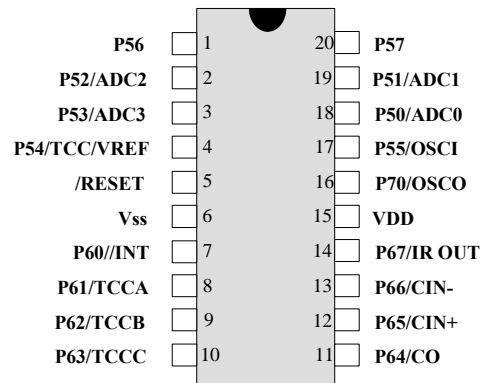


Fig. 3-4 EM78P259N – 20 Pin



5. Pin Description

5.1 EM78P259N – 14 Pin

Symbol	Pin No.	Type	Function
P70	11	I/O	General purpose input/output pin Default value after a power-on reset
P60, P61 P66, P67	6~9	I/O	General purpose input/output pin Open-drain Default value after a power-on reset
P50~P55	1~3 12~14	I/O	General purpose input/output pin Pull-high/pull-down Default value after a power-on reset Wake up from sleep mode when the status of the pin changes
OSCI	12	I	Crystal type: Crystal input terminal or external clock input pin RC type: RC oscillator input pin
OSCO	11	I/O	Crystal type: Crystal input terminal or external clock input pin. RC type: clock output with a duration of one instruction cycle External clock signal input
/RESET	4	I	If set as /RESET and remains at logic low, the device will be reset Voltage on /RESET/Vpp must not exceed Vdd during normal mode
TCC, TCCA	3, 7	I	External Counter input TCC is defined by CONT <5> TCCA is defined by IOC80 <1>
ADC0~ADC3	1, 2, 13, 14	I	Analog to Digital Converter Defined by ADCON (R9) <1:0>
IR OUT	9	O	IR mode output pin, capable of driving and sinking current=20mA when the output voltage drops to 0.7Vdd and rise to 0.3Vdd at Vdd=5V.
VREF	3	I	External reference voltage for ADC Defined by ADCON (R9) <7>
/INT	6	I	External interrupt pin triggered by a falling or rising edge Defined by CONT <7>
VDD	10	-	Power supply
VSS	5	-	Ground



4	Page 84	APPENDIX	Added DIP 、 SOP 14Pin Package																																				
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A Package Type																																							
<table border="1"><thead><tr><th>OTP MCU</th><th>Package Type</th><th>Pin Count</th><th>Package Size</th></tr></thead><tbody><tr><td>EM78P259ND14J/S</td><td>DIP</td><td>14</td><td>300 mil</td></tr><tr><td>EM78P259NSO14J/S</td><td>SOP</td><td>14</td><td>150 mil</td></tr><tr><td>EM78P259NSO16AJ/S</td><td>SOP</td><td>16</td><td>150 mil</td></tr><tr><td>EM78P259ND18J/S</td><td>DIP</td><td>18</td><td>300 mil</td></tr><tr><td>EM78P259NSO18J/S</td><td>SOP</td><td>18</td><td>300 mil</td></tr><tr><td>EM78P259ND20J/S</td><td>DIP</td><td>20</td><td>300 mil</td></tr><tr><td>EM78P259NSO20J/S</td><td>SOP</td><td>20</td><td>300 mil</td></tr><tr><td>EM78P259NSS20J/S</td><td>SSOP</td><td>20</td><td>209 mil</td></tr></tbody></table>				OTP MCU	Package Type	Pin Count	Package Size	EM78P259ND14J/S	DIP	14	300 mil	EM78P259NSO14J/S	SOP	14	150 mil	EM78P259NSO16AJ/S	SOP	16	150 mil	EM78P259ND18J/S	DIP	18	300 mil	EM78P259NSO18J/S	SOP	18	300 mil	EM78P259ND20J/S	DIP	20	300 mil	EM78P259NSO20J/S	SOP	20	300 mil	EM78P259NSS20J/S	SSOP	20	209 mil
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APPENDIX

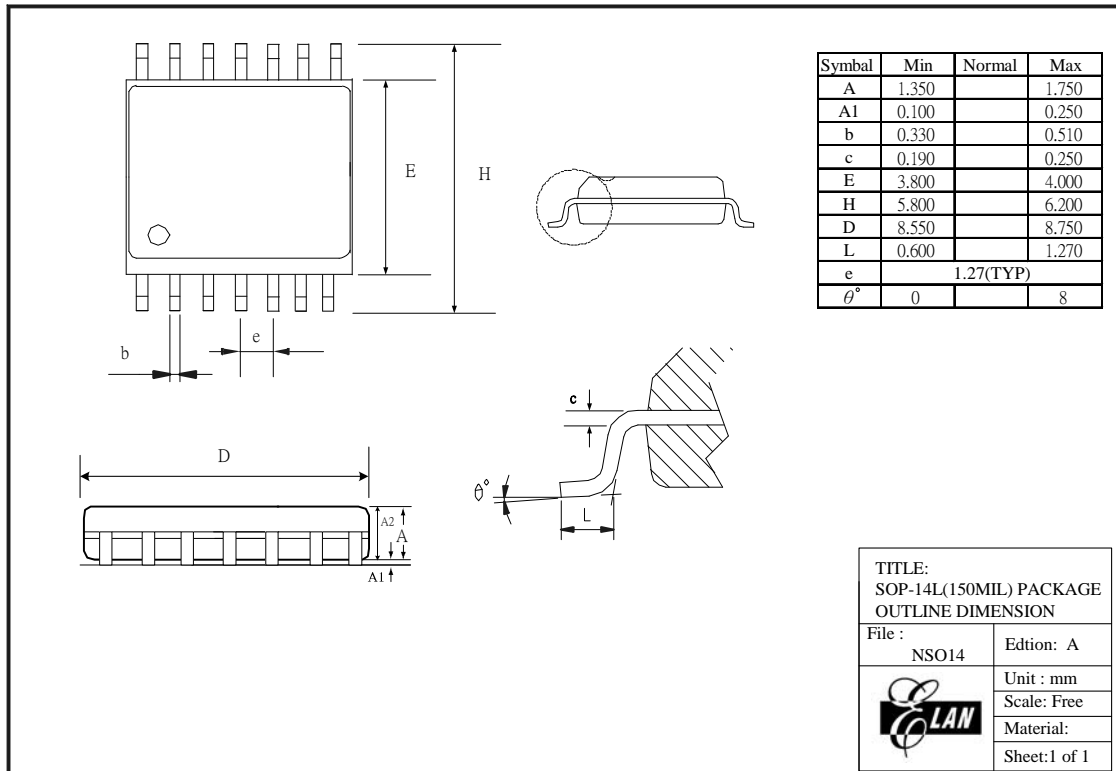
B Package Information

B.1 14-Lead Plastic Dual in line (PDIP) — 300 mil

Symbol	Min	Normal	Max
A			4.318
A1	0.381		
A2	3.175	3.302	3.429
c	0.203	0.254	0.356
D	18.796	19.050	19.304
E	6.174	6.401	6.628
E1	7.366	7.696	8.025
eB	8.409	9.017	9.625
B	0.356	0.457	0.559
B1	1.143	1.524	1.778
L	3.048	3.302	3.556
e	2.540(TYP)		
θ	0		15

TITLE: PDIP-14L 300MIL PACKAGE OUTLINE DIMENSION	
File : D14	Edtion: A
	Unit : mm
	Scale: Free
	Material:
	Sheet: 1 of 1

B.2 14-Lead Plastic Small Outline (SOP) — 150 mil



B. modified items

N.A.

C. deleted items

N.A.