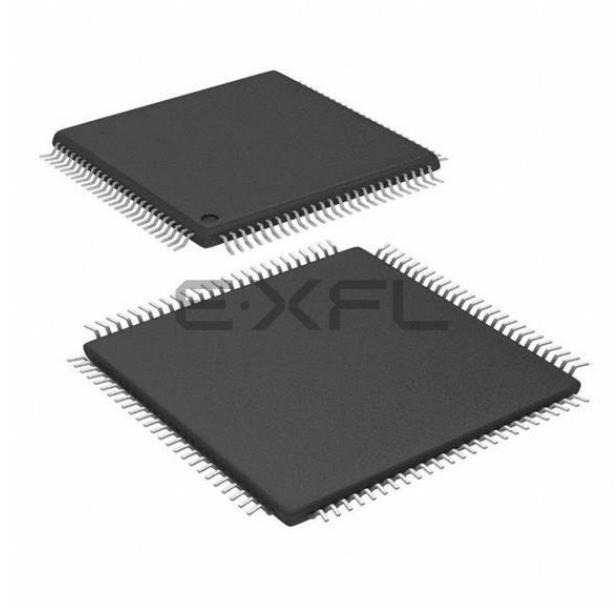
# Microchip Technology - DSPIC33FJ64GS610-50I/PT Datasheet



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"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

## Applications of "Embedded - Microcontrollers"

| Details | |
|---|---|
| Product Status | Active |
| Core Processor | dsPIC |
| Core Size | 16-Bit |
| Speed | 50 MIPs |
| Connectivity | CANbus, I²C, IrDA, LINbus, SPI, UART/USART |
| Peripherals | Brown-out Detect/Reset, DMA, QEI, POR, PWM, WDT |
| Number of I/O | 85 |
| Program Memory Size | 64KB (64K x 8) |
| Program Memory Type | FLASH |
| EEPROM Size | - |
| RAM Size | 9K x 8 |
| Voltage - Supply (Vcc/Vdd) | 3V ~ 3.6V |
| Data Converters | A/D 24x10b; D/A 1x10b |
| Oscillator Type | Internal |
| Operating Temperature | -40°C ~ 85°C (TA) |
| Mounting Type | Surface Mount |
| Package / Case | 100-TQFP |
| Supplier Device Package | 100-TQFP (12x12) |
| Purchase URL | https://www.e-xfl.com/product-detail/microchip-technology/dspic33fj64gs610-50i-pt |

**NOTES:**

**NOTES:**

**FIGURE 2-10: PHASE-SHIFTED FULL-BRIDGE CONVERTER**

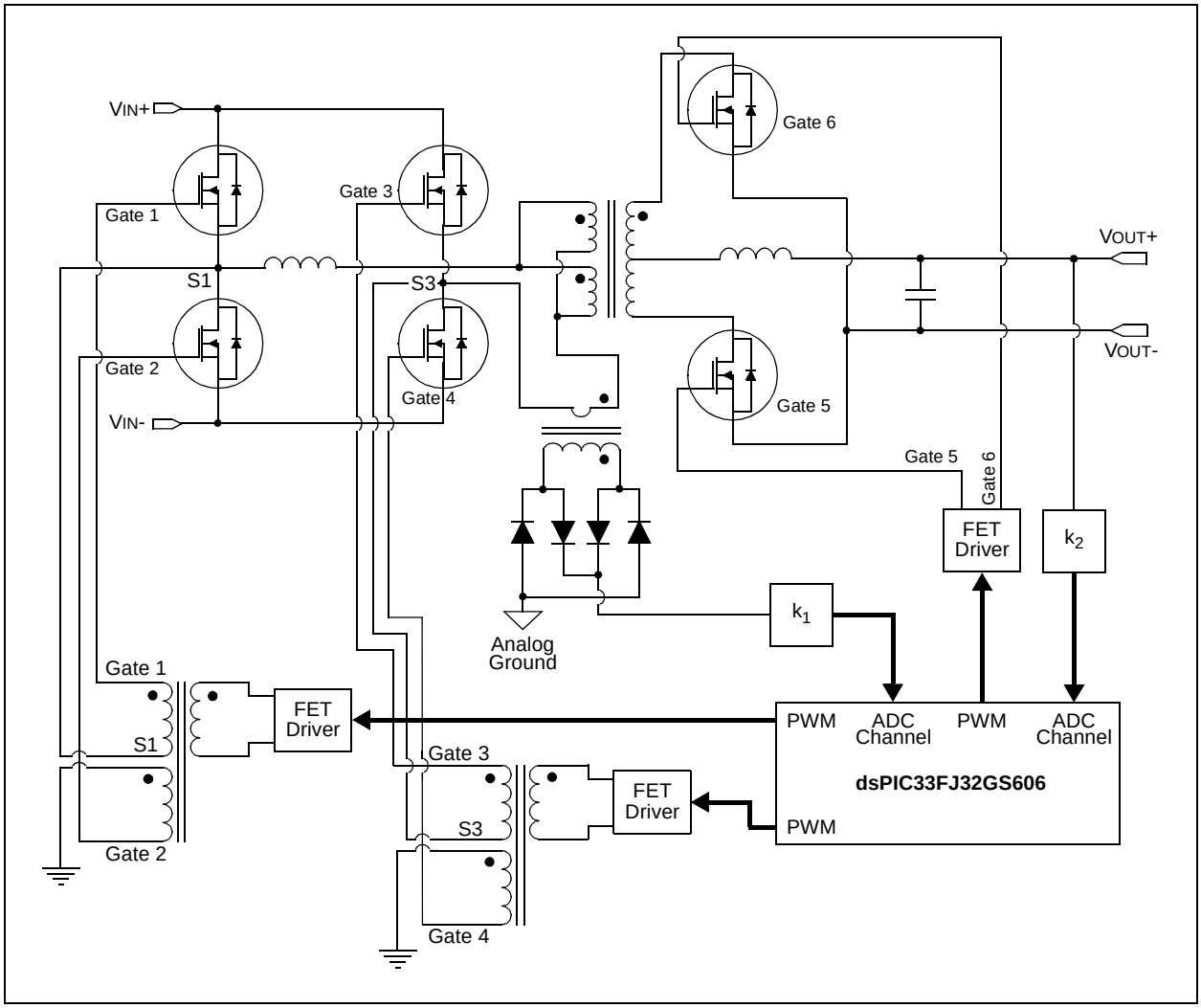

**TABLE 4-25: HIGH-SPEED PWM GENERATOR 9 REGISTER MAP FOR dsPIC33FJ32GS610 AND dsPIC33FJ64GS610 DEVICES**

| File Name | SFR Addr | Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | All Resets |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PWMCON9 | 0520 | FLTSTAT | CLSTAT | TRGSTAT | FLTIEN | CLIEN | TRGIEN | ITB | MDCS | DTC1 | DTC0 | DTCP | — | MTBS | CAM | XPRES | IUE | 0000 |
| IOCON9 | 0522 | PENH | PENL | POLH | POLL | PMOD1 | PMOD0 | OVRENH | OVRENL | OVRDAT1 | OVRDAT0 | FLTDAT1 | FLTDAT0 | CLDAT1 | CLDAT0 | SWAP | OSYNC | 0000 |
| FCLCON9 | 0524 | IFLTMOD | CLSRC4 | CLSRC3 | CLSRC2 | CLSRC1 | CLSRC0 | CLPOL | CLMOD | FLTSRC4 | FLTSRC3 | FLTSRC2 | FLTSRC1 | FLTSRC0 | FLTPOL | FLTMOD1 | FLTMOD0 | 0000 |
| PDC9 | 0526 | PDC9<15:0> | | | | | | | | | | | | | | | | 0000 |
| PHASE9 | 0528 | PHASE9<15:0> | | | | | | | | | | | | | | | | 0000 |
| DTR9 | 052A | — | — | DTR9<13:0> | | | | | | | | | | | | | | 0000 |
| ALTDTR9 | 052A | — | — | ALTDTR9<13:0> | | | | | | | | | | | | | | 0000 |
| SDC9 | 052E | SDC9<15:0> | | | | | | | | | | | | | | | | 0000 |
| SPHASE9 | 0530 | SPHASE9<15:0> | | | | | | | | | | | | | | | | 0000 |
| TRIG9 | 0532 | TRGCMP<15:0> | | | | | | | | | | | | | | | | 0000 |
| TRGCON9 | 0534 | TRGDIV3 | TRGDIV2 | TRGDIV1 | TRGDIV0 | — | — | — | — | DTM | — | TRGSTRT5 | TRGSTRT4 | TRGSTRT3 | TRGSTRT2 | TRGSTRT1 | TRGSTRT0 | 0000 |
| STRIG9 | 0536 | STRGCMP<15:0> | | | | | | | | | | | | | | | | 0000 |
| PWMCAP9 | 0538 | PWMCAP<12:0> | | | | | | | | | | | | | — | — | — | 0000 |
| LEBCON9 | 053A | PHR | PHF | PLR | PLF | FLTLEBEN | CLLEBEN | — | — | — | — | BCH | BCL | BPHH | BPHL | BPLH | BPLL | 0000 |
| LEBDLY9 | 053C | — | — | — | — | LEB<8:0> | | | | | | | | | — | — | — | 0000 |
| AUXCON9 | 053E | HRPDIS | HRDDIS | — | — | BLANKSEL3 | BLANKSEL2 | BLANKSEL1 | BLANKSEL0 | — | — | CHOPSEL3 | CHOPSEL2 | CHOPSEL1 | CHOPSEL0 | CHOPHEN | CHOPLEN | 0000 |

**Legend:** x = unknown value on Reset, — = unimplemented, read as '0'. Reset values are shown in hexadecimal.

**EXAMPLE 5-2: LOADING THE WRITE BUFFERS**

```
; Set up NVMCON for row programming operations
        MOV     #0x4001, W0               ;
        MOV     W0, NVMCON                ; Initialize NVMCON
; Set up a pointer to the first program memory location to be written
; program memory selected, and writes enabled
        MOV     #0x0000, W0               ;
        MOV     W0, TBLPAG                ; Initialize PM Page Boundary SFR
        MOV     #0x6000, W0               ; An example program memory address
; Perform the TBLWT instructions to write the latches
; 0th_program_word
        MOV     #LOW_WORD_0, W2           ;
        MOV     #HIGH_BYTE_0, W3          ;
        TBLWTL  W2, [W0]                  ; Write PM low word into program latch
        TBLWTH  W3, [W0++]                ; Write PM high byte into program latch
; 1st_program_word
        MOV     #LOW_WORD_1, W2           ;
        MOV     #HIGH_BYTE_1, W3          ;
        TBLWTL  W2, [W0]                  ; Write PM low word into program latch
        TBLWTH  W3, [W0++]                ; Write PM high byte into program latch
;  2nd_program_word
        MOV     #LOW_WORD_2, W2           ;
        MOV     #HIGH_BYTE_2, W3          ;
        TBLWTL  W2, [W0]                  ; Write PM low word into program latch
        TBLWTH  W3, [W0++]                ; Write PM high byte into program latch
        •
        •
        •
; 63rd_program_word
        MOV     #LOW_WORD_31, W2          ;
        MOV     #HIGH_BYTE_31, W3         ;
        TBLWTL  W2, [W0]                  ; Write PM low word into program latch
        TBLWTH  W3, [W0++]                ; Write PM high byte into program latch
```

**EXAMPLE 5-3: INITIATING A PROGRAMMING SEQUENCE**

```
        DISI    #5                        ; Block all interrupts with priority <7
                                          ; for next 5 instructions
        MOV     #0x55, W0
        MOV     W0, NVMKEY                ; Write the 55 key
        MOV     #0xAA, W1                 ;
        MOV     W1, NVMKEY                ; Write the AA key
        BSET    NVMCON, #WR               ; Start the erase sequence
        NOP                               ; Insert two NOPs after the
        NOP                               ; erase command is asserted
```

**TABLE 7-1: INTERRUPT VECTORS**

| Vector Number | Interrupt Request (IQR) | IVT Address | AIVT Address | Interrupt Source |
|---|---|---|---|---|
| Highest Natural Order Priority | | | | |
| 8 | 0 | 0x000014 | 0x000114 | INT0 – External Interrupt 0 |
| 9 | 1 | 0x000016 | 0x000116 | IC1 – Input Capture 1 |
| 10 | 2 | 0x000018 | 0x000118 | OC1 – Output Compare 1 |
| 11 | 3 | 0x00001A | 0x00011A | T1 – Timer1 |
| 12 | 4 | 0x00001C | 0x00011C | DMA0 – DMA Channel 0 |
| 13 | 5 | 0x00001E | 0x00011E | IC2 – Input Capture 2 |
| 14 | 6 | 0x000020 | 0x000120 | OC2 – Output Compare 2 |
| 15 | 7 | 0x000022 | 0x000122 | T2 – Timer2 |
| 16 | 8 | 0x000024 | 0x000124 | T3 – Timer3 |
| 17 | 9 | 0x000026 | 0x000126 | SPI1E – SPI1 Fault |
| 18 | 10 | 0x000028 | 0x000128 | SPI1 – SPI1 Transfer Done |
| 19 | 11 | 0x00002A | 0x00012A | U1RX – UART1 Receiver |
| 20 | 12 | 0x00002C | 0x00012C | U1TX – UART1 Transmitter |
| 21 | 13 | 0x00002E | 0x00012E | ADC – ADC Group Convert Done |
| 22 | 14 | 0x000030 | 0x000130 | DMA1 – DMA Channel 1 |
| 23 | 15 | 0x000032 | 0x000132 | Reserved |
| 24 | 16 | 0x000034 | 0x000134 | SI2C1 – I2C1 Slave Event |
| 25 | 17 | 0x000036 | 0x000136 | MI2C1 – I2C1 Master Event |
| 26 | 18 | 0x000038 | 0x000138 | CMP1 – Analog Comparator 1 Interrupt |
| 27 | 19 | 0x00003A | 0x00013A | CN – Input Change Notification Interrupt |
| 28 | 20 | 0x00003C | 0x00013C | INT1 – External Interrupt 1 |
| 29-31 | 21-23 | 0x00003E-0x000042 | 0x00013E-0x000142 | Reserved |
| 32 | 24 | 0x000044 | 0x000144 | DMA2 – DMA Channel 2 |
| 33 | 25 | 0x000046 | 0x000146 | OC3 – Output Compare 3 |
| 34 | 26 | 0x000048 | 0x000148 | OC4 – Output Compare 4 |
| 35 | 27 | 0x00004A | 0x00014A | T4 – Timer4 |
| 36 | 28 | 0x00004C | 0x00014C | T5 – Timer5 |
| 37 | 29 | 0x00004E | 0x00014E | INT2 – External Interrupt 2 |
| 38 | 30 | 0x000050 | 0x000150 | U2RX – UART2 Receiver |
| 39 | 31 | 0x000052 | 0x000152 | U2TX – UART2 Transmitter |
| 40 | 32 | 0x000054 | 0x000154 | SPI2E – SPI2 Error |
| 41 | 33 | 0x000056 | 0x000156 | SPI2 – SPI2 Transfer Done |
| 42 | 34 | 0x000058 | 0x000158 | C1RX – ECAN1 Receive Data Ready |
| 43 | 35 | 0x00005A | 0x00015A | C1 – ECAN1 Event |
| 44 | 36 | 0x00005C | 0x00015C | DMA3 – DMA Channel 3 |
| 45 | 37 | 0x00005E | 0x00015E | IC3 – Input Capture 3 |
| 46 | 38 | 0x000060 | 0x000160 | IC4 – Input Capture 4 |
| 47-56 | 39-48 | 0x000062-0x000074 | 0x000162-0x000174 | Reserved |
| 57 | 49 | 0x000076 | 0x000176 | SI2C2 – I2C2 Slave Events |
| 58 | 50 | 0x000078 | 0x000178 | MI2C2 – I2C2 Master Events |
| 59-60 | 51-52 | 0x00007A-0x00007C | 0x00017A-0x00017C | Reserved |
| 61 | 53 | 0x00007E | 0x00017E | INT3 – External Interrupt 3 |
| 62 | 54 | 0x000080 | 0x000180 | INT4 – External Interrupt 4 |

**REGISTER 7-40: IPC24: INTERRUPT PRIORITY CONTROL REGISTER 24**

| U-0 | R/W-1 | R/W-0 | R/W-0 | U-0 | R/W-1 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| — | PWM6IP2 | PWM6IP1 | PWM6IP0 | — | PWM5IP2 | PWM5IP1 | PWM5IP0 |
| bit 15 | | | | | | | bit 8 |

| U-0 | R/W-1 | R/W-0 | R/W-0 | U-0 | R/W-1 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| — | PWM4IP2 | PWM4IP1 | PWM4IP0 | — | PWM3IP2 | PWM3IP1 | PWM3IP0 |
| bit 7 | | | | | | | bit 0 |

| **Legend:** | | | |
|---|---|---|---|
| R = Readable bit | W = Writable bit | U = Unimplemented bit, read as ‘0’ | |
| -n = Value at POR | ‘1’ = Bit is set | ‘0’ = Bit is cleared | x = Bit is unknown |

bit 15 **Unimplemented:** Read as ‘0’

bit 14-12 **PWM6IP<2:0>:** PWM6 Interrupt Priority bits
111 = Interrupt is Priority 7 (highest priority)
•
•
•
001 = Interrupt is Priority 1
000 = Interrupt source is disabled

bit 11 **Unimplemented:** Read as ‘0’

bit 10-8 **PWM5IP<2:0>:** PWM5 Interrupt Priority bits
111 = Interrupt is Priority 7 (highest priority)
•
•
•
001 = Interrupt is Priority 1
000 = Interrupt source is disabled

bit 7 **Unimplemented:** Read as ‘0’

bit 6-4 **PWM4IP<2:0>:** PWM4 Interrupt Priority bits
111 = Interrupt is Priority 7 (highest priority)
•
•
•
001 = Interrupt is Priority 1
000 = Interrupt source is disabled

bit 3 **Unimplemented:** Read as ‘0’

bit 2-0 **PWM3IP<2:0>:** PWM3 Interrupt Priority bits
111 = Interrupt is Priority 7 (highest priority)
•
•
•
001 = Interrupt is Priority 1
000 = Interrupt source is disabled

**REGISTER 7-43: IPC27: INTERRUPT PRIORITY CONTROL REGISTER 27**

| U-0 | R/W-1 | R/W-0 | R/W-0 | U-0 | R/W-1 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| — | ADCP1IP2 | ADCP1IP1 | ADCP1IP0 | — | ADCP0IP2 | ADCP0IP1 | ADCP0IP0 |
| bit 15 | | | | | | | bit 8 |

| U-0 | U-0 | U-0 | U-0 | U-0 | U-0 | U-0 | U-0 |
|---|---|---|---|---|---|---|---|
| — | — | — | — | — | — | — | — |
| bit 7 | | | | | | | bit 0 |

| **Legend:** | | | |
|---|---|---|---|
| R = Readable bit | W = Writable bit | U = Unimplemented bit, read as '0' | |
| -n = Value at POR | '1' = Bit is set | '0' = Bit is cleared | x = Bit is unknown |

bit 15 **Unimplemented:** Read as '0'

bit 14-12 **ADCP1IP<2:0>:** ADC Pair 1 Conversion Done Interrupt Priority bits
111 = Interrupt is Priority 7 (highest priority interrupt)
•
•
•
001 = Interrupt is Priority 1
000 = Interrupt source is disabled

bit 11 **Unimplemented:** Read as '0'

bit 10-8 **ADCP0IP<2:0>:** ADC Pair 0 Conversion Done Interrupt Priority bits
111 = Interrupt is Priority 7 (highest priority interrupt)
•
•
•
001 = Interrupt is Priority 1
000 = Interrupt source is disabled

bit 7-0 **Unimplemented:** Read as '0'

**REGISTER 9-6: REFOCON: REFERENCE OSCILLATOR CONTROL REGISTER**

| R/W-0 | U-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| ROON | — | ROSSLP | ROSEL | RODIV3(1) | RODIV2(1) | RODIV1(1) | RODIV0(1) |
| bit 15 | | | | | | | bit 8 |

| U-0 | U-0 | U-0 | U-0 | U-0 | U-0 | U-0 | U-0 |
|---|---|---|---|---|---|---|---|
| — | — | — | — | — | — | — | — |
| bit 7 | | | | | | | bit 0 |

| **Legend:** | | | |
|---|---|---|---|
| R = Readable bit | W = Writable bit | U = Unimplemented bit, read as '0' | |
| -n = Value at POR | '1' = Bit is set | '0' = Bit is cleared | x = Bit is unknown |

bit 15 **ROON:** Reference Oscillator Output Enable bit
1 = Reference oscillator output is enabled on the REFCLK0 pin
0 = Reference oscillator output is disabled

bit 14 **Unimplemented:** Read as '0'

bit 13 **ROSSLP:** Reference Oscillator Run in Sleep bit
1 = Reference oscillator output continues to run in Sleep mode
0 = Reference oscillator output is disabled in Sleep mode

bit 12 **ROSEL:** Reference Oscillator Source Select bit
1 = Oscillator crystal is used as the reference clock
0 = System clock is used as the reference clock

bit 11-8 **RODIV<3:0>:** Reference Oscillator Divider bits(1)
1111 = Reference clock divided by 32,768
1110 = Reference clock divided by 16,384
1101 = Reference clock divided by 8,192
1100 = Reference clock divided by 4,096
1011 = Reference clock divided by 2,048
1010 = Reference clock divided by 1,024
1001 = Reference clock divided by 512
1000 = Reference clock divided by 256
0111 = Reference clock divided by 128
0110 = Reference clock divided by 64
0101 = Reference clock divided by 32
0100 = Reference clock divided by 16
0011 = Reference clock divided by 8
0010 = Reference clock divided by 4
0001 = Reference clock divided by 2
0000 = Reference clock

bit 7-0 **Unimplemented:** Read as '0'

**Note 1:** The reference oscillator output must be disabled (ROON = 0) before writing to these bits.

**REGISTER 16-5: STCON: PWM SECONDARY MASTER TIME BASE CONTROL REGISTER**

| U-0 | U-0 | U-0 | HS/HC-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| — | — | — | SESTAT | SEIEN | EIPU(1) | SYNCPOL | SYNCOEN |
| bit 15 | | | | | | | bit 8 |

| R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| SYNCEN | SYNCSRC2 | SYNCSRC1 | SYNCSRC0 | SEVTPS3 | SEVTPS2 | SEVTPS1 | SEVTPS0 |
| bit 7 | | | | | | | bit 0 |

| **Legend:** | HC = Hardware Clearable bit | HS = Hardware Settable bit | |
|---|---|---|---|
| R = Readable bit | W = Writable bit | U = Unimplemented bit, read as '0' | |
| -n = Value at POR | '1' = Bit is set | '0' = Bit is cleared | x = Bit is unknown |

bit 15-13 **Unimplemented:** Read as '0'

bit 12 **SESTAT:** Special Event Interrupt Status bit
1 = Secondary special event interrupt is pending
0 = Secondary special event interrupt is not pending

bit 11 **SEIEN:** Special Event Interrupt Enable bit
1 = Secondary special event interrupt is enabled
0 = Secondary special event interrupt is disabled

bit 10 **EIPU:** Enable Immediate Period Updates bit(1)
1 = Active Secondary Period register is updated immediately
0 = Active Secondary Period register updates occur on PWM cycle boundaries

bit 9 **SYNCPOL:** Synchronize Input and Output Polarity bit
1 = SYNCIx/SYNCO2 polarity is inverted (active-low)
0 = SYNCIx/SYNCO2 polarity is active-high

bit 8 **SYNCOEN:** Secondary Master Time Base Synchronization Enable bit
1 = SYNCO2 output is enabled.
0 = SYNCO2 output is disabled

bit 7 **SYNCEN:** External Secondary Master Time Base Synchronization Enable bit
1 = External synchronization of secondary time base is enabled
0 = External synchronization of secondary time base is disabled

bit 6-4 **SYNCSRC<2:0>:** PWM Secondary Time Base Synchronization Source Selection bits
111 = Reserved
101 = Reserved
100 = Reserved
011 = SYNCI4
010 = SYNCI3
001 = SYNCI2
000 = SYNCI1

bit 3-0 **SEVTPS<3:0>:** PWM Secondary Special Event Trigger Output Postscaler Select bits
1111 = 1:16 Postcale
0001 = 1:2 Postcale
•
•
•
0000 = 1:1 Postscale

**Note 1:** This bit only applies to the secondary master time base period.

**REGISTER 16-21: FCLCONx: PWM FAULT CURRENT-LIMIT CONTROL x REGISTER (CONTINUED)**

bit 9 **CLPOL:** Current-Limit Polarity for PWM Generator # bit(1)
1 = The selected current-limit source is active-low
0 = The selected current-limit source is active-high

bit 8 **CLMOD:** Current-Limit Mode Enable for PWM Generator # bit
1 = Current-Limit mode is enabled
0 = Current-Limit mode is disabled

bit 7-3 **FLTSRC<4:0>:** Fault Control Signal Source Select for PWM Generator # bits(2,3)
11111 = Reserved
11110 = Fault 23
11101 = Fault 22
11100 = Fault 21
11011 = Fault 20
11010 = Fault 19
11001 = Fault 18
11000 = Fault 17
10111 = Fault 16
10110 = Fault 15
10101 = Fault 14
10100 = Fault 13
10011 = Fault 12
10010 = Fault 11
10001 = Fault 10
10000 = Fault 9
01111 = Fault 8
01110 = Fault 7
01101 = Fault 6
01100 = Fault 5
01011 = Fault 4
01010 = Fault 3
01001 = Fault 2
01000 = Fault 1
00111 = Reserved
00110 = Reserved
00101 = Reserved
00100 = Reserved
00011 = Analog Comparator 4
00010 = Analog Comparator 3
00001 = Analog Comparator 2
00000 = Analog Comparator 1

bit 2 **FLTPOL:** Fault Polarity for PWM Generator # bit(1)
1 = The selected Fault source is active-low
0 = The selected Fault source is active-high

bit 1-0 **FLTMOD<1:0>:** Fault Mode for PWM Generator # bits
11 = Fault input is disabled
10 = Reserved
01 = The selected Fault source forces PWMxH, PWMxL pins to FLTDAT values (cycle)
00 = The selected Fault source forces PWMxH, PWMxL pins to FLTDAT values (latched condition)

**Note 1:** These bits should be changed only when PTEN (PTCON<15>) = 0.

**2:** When Independent Fault mode is enabled (IFLTMOD = 1) and Fault 1 is used for Current-Limit mode (CLSRC<4:0> = b0000), the Fault Control Source Select bits (FLTSRC<4:0>) should be set to an unused Fault source to prevent Fault 1 from disabling both the PWMxL and PWMxH outputs.

**3:** When Independent Fault mode is enabled (IFLTMOD = 1) and Fault 1 is used for Fault mode (FLTSRC<4:0> = b0000), the Current-Limit Control Source Select bits (CLSRC<4:0>) should be set to an unused current-limit source to prevent the current-limit source from disabling both the PWMxH and PWMxL outputs.

**REGISTER 16-22: STRIGx: PWM SECONDARY TRIGGER x COMPARE VALUE REGISTER(1)**

| R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| STRGCMP<12:5> | | | | | | | |
| bit 15 | | | | | | | bit 8 |

| R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | U-0 | U-0 | U-0 |
|---|---|---|---|---|---|---|---|
| STRGCMP<4:0> | | | | | — | — | — |
| bit 7 | | | | | | | bit 0 |

| **Legend:** | | | |
|---|---|---|---|
| R = Readable bit | W = Writable bit | U = Unimplemented bit, read as ‘0’ | |
| -n = Value at POR | ‘1’ = Bit is set | ‘0’ = Bit is cleared | x = Bit is unknown |

bit 15-3 **STRGCMP<12:0>:** PWM Secondary Trigger Compare Value bits
When the secondary PWM functions in a local time base, this register contains the compare values that can trigger the ADC module.

bit 2-0 **Unimplemented:** Read as ‘0’

**Note 1:** STRIGx cannot generate the PWM trigger interrupts.

**REGISTER 19-3: I2CxMSK: I2Cx SLAVE MODE ADDRESS MASK REGISTER**

| U-0 | U-0 | U-0 | U-0 | U-0 | U-0 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| — | — | — | — | — | — | AMSK<9:8> | |
| bit 15 | | | | | | | bit 8 |

| R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| AMSK<7:0> | | | | | | | |
| bit 7 | | | | | | | bit 0 |

| **Legend:** | | | |
|---|---|---|---|
| R = Readable bit | W = Writable bit | U = Unimplemented bit, read as ‘0’ | |
| -n = Value at POR | ‘1’ = Bit is set | ‘0’ = Bit is cleared | x = Bit is unknown |

bit 15-10 **Unimplemented:** Read as ‘0’

bit 9-0 **AMSK<9:0>:** Mask for Address bit x Select bits

1 = Enables masking for bit x of incoming message address; bit match is not required in this position

0 = Disables masking for bit x; bit match is required in this position

**NOTES:**

**REGISTER 20-2: UxSTA: UARTx STATUS AND CONTROL REGISTER (CONTINUED)**

bit 5 **ADDEN:** Address Character Detect bit (bit 8 of received data = 1)
1 = Address Detect mode is enabled; if 9-bit mode is not selected, this does not take effect
0 = Address Detect mode is disabled

bit 4 **RIDLE:** Receiver Idle bit (read-only)
1 = Receiver is Idle
0 = Receiver is active

bit 3 **PERR:** Parity Error Status bit (read-only)
1 = Parity error has been detected for the current character (the character at the top of the receive FIFO)
0 = Parity error has not been detected

bit 2 **FERR:** Framing Error Status bit (read-only)
1 = Framing error has been detected for the current character (the character at the top of the receive FIFO)
0 = Framing error has not been detected

bit 1 **OERR:** Receive Buffer Overrun Error Status bit (clear/read-only)
1 = Receive buffer has overflowed
0 = Receive buffer has not overflowed; clearing a previously set OERR bit (1 → 0 transition) will reset the receiver buffer and the UxRSR to the empty state

bit 0 **URXDA:** UARTx Receive Buffer Data Available bit (read-only)
1 = Receive buffer has data, at least one more character can be read
0 = Receive buffer is empty

**Note 1:** Refer to **"UART"** (DS70188) in the *"dsPIC33/PIC24 Family Reference Manual"* for information on enabling the UART module for transmit operation. That section of the manual is available on the Microchip web site: www.microchip.com.

**REGISTER 21-7: CxINTE: ECANx INTERRUPT ENABLE REGISTER**

| U-0 | U-0 | U-0 | U-0 | U-0 | U-0 | U-0 | U-0 |
|---|---|---|---|---|---|---|---|
| — | — | — | — | — | — | — | — |
| bit 15 | | | | | | | bit 8 |

| R/W-0 | R/W-0 | R/W-0 | U-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| IVRIE | WAKIE | ERRIE | — | FIFOIE | RBOVIE | RBIE | TBIE |
| bit 7 | | | | | | | bit 0 |

| **Legend:** | | | |
|---|---|---|---|
| R = Readable bit | W = Writable bit | U = Unimplemented bit, read as ‘0’ | |
| -n = Value at POR | ‘1’ = Bit is set | ‘0’ = Bit is cleared | x = Bit is unknown |

bit 15-8 **Unimplemented:** Read as ‘0’

bit 7 **IVRIE:** Invalid Message Received Interrupt Enable bit
1 = Interrupt request is enabled
0 = Interrupt request is not enabled

bit 6 **WAKIE:** Bus Wake-up Activity Interrupt Flag bit
1 = Interrupt request is enabled
0 = Interrupt request is not enabled

bit 5 **ERRIE:** Error Interrupt Enable bit
1 = Interrupt request is enabled
0 = Interrupt request is not enabled

bit 4 **Unimplemented:** Read as ‘0’

bit 3 **FIFOIE:** FIFO Almost Full Interrupt Enable bit
1 = Interrupt request is enabled
0 = Interrupt request is not enabled

bit 2 **RBOVIE:** RX Buffer Overflow Interrupt Enable bit
1 = Interrupt request is enabled
0 = Interrupt request is not enabled

bit 1 **RBIE:** RX Buffer Interrupt Enable bit
1 = Interrupt request is enabled
0 = Interrupt request is not enabled

bit 0 **TBIE:** TX Buffer Interrupt Enable bit
1 = Interrupt request is enabled
0 = Interrupt request is not enabled

**REGISTER 21-16: CxRXFnSID: ECANx ACCEPTANCE FILTER n STANDARD IDENTIFIER REGISTER (n = 0-15)**

| R/W-x | R/W-x | R/W-x | R/W-x | R/W-x | R/W-x | R/W-x | R/W-x |
|---|---|---|---|---|---|---|---|
| SID10 | SID9 | SID8 | SID7 | SID6 | SID5 | SID4 | SID3 |
| bit 15 | | | | | | | bit 8 |

| R/W-x | R/W-x | R/W-x | U-0 | R/W-x | U-0 | R/W-x | R/W-x |
|---|---|---|---|---|---|---|---|
| SID2 | SID1 | SID0 | — | EXIDE | — | EID17 | EID16 |
| bit 7 | | | | | | | bit 0 |

| **Legend:** | | | |
|---|---|---|---|
| R = Readable bit | W = Writable bit | U = Unimplemented bit, read as '0' | |
| -n = Value at POR | '1' = Bit is set | '0' = Bit is cleared | x = Bit is unknown |

bit 15-5 **SID<10:0>:** Standard Identifier bits
1 = Message address bit, SIDx, must be '1' to match filter
0 = Message address bit, SIDx, must be '0' to match filter

bit 4 **Unimplemented:** Read as '0'

bit 3 **EXIDE:** Extended Identifier Enable bit
If MIDE = 1, then:
1 = Matches only messages with Extended Identifier addresses
0 = Matches only messages with Standard Identifier addresses
If MIDE = 0, then:
Ignores EXIDE bit.

bit 2 **Unimplemented:** Read as '0'

bit 1-0 **EID<17:16>:** Extended Identifier bits
1 = Message address bit, EIDx, must be '1' to match filter
0 = Message address bit, EIDx, must be '0' to match filter

**REGISTER 22-11: ADCPC5: ADC CONVERT PAIR CONTROL REGISTER 5**

| R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| IRQEN11 | PEND11 | SWTRG11 | TRGSRC114 | TRGSRC113 | TRGSRC112 | TRGSRC111 | TRGSRC110 |
| bit 15 | | | | | | | bit 8 |

| R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 | R/W-0 |
|---|---|---|---|---|---|---|---|
| IRQEN10 | PEND10 | SWTRG10 | TRGSRC104 | TRGSRC103 | TRGSRC102 | TRGSRC101 | TRGSRC100 |
| bit 7 | | | | | | | bit 0 |

| **Legend:** | | | |
|---|---|---|---|
| R = Readable bit | W = Writable bit | U = Unimplemented bit, read as '0' | |
| -n = Value at POR | '1' = Bit is set | '0' = Bit is cleared | x = Bit is unknown |

bit 15 **IRQEN11:** Interrupt Request Enable 11 bit
1 = Enables IRQ generation when requested conversion of Channels AN23 and AN22 is completed
0 = IRQ is not generated

bit 14 **PEND11:** Pending Conversion Status 11 bit
1 = Conversion of Channels AN23 and AN22 is pending; set when selected trigger is asserted
0 = Conversion is complete

bit 13 **SWTRG11:** Software Trigger 11 bit
1 = Starts conversion of AN23 and AN22 (if selected by the TRGSRCx<4:0> bits)**(1)**
This bit is automatically cleared by hardware when the PEND11 bit is set.
0 = Conversion is not started

**Note 1:** The trigger source must be set as an individual software trigger prior to setting this bit to '1'. If other conversions are in progress, the conversion is performed when the conversion resources are available.

**NOTES:**

**TABLE 28-4: DC CHARACTERISTICS: DOZE CURRENT (IDOZE)**

| DC CHARACTERISTICS | | | Standard Operating Conditions: 3.0V to 3.6V (unless otherwise stated)<br>Operating temperature -40°C ≤ TA ≤ +85°C for Industrial | | | | |
|---|---|---|---|---|---|---|---|
| **Parameter No.** | **Typical** | **Max** | **Doze Ratio** | **Units** | **Conditions** | | |
| **Doze Current (IDOZE)(1)** | | | | | | | |
| MDC74a | 49 | 70 | 1:2 | mA | -40°C | 3.3V | 50 MIPS |
| MDC74f | 43 | 70 | 1:64 | mA | | | |
| MDC74g | 43 | 70 | 1:128 | mA | | | |
| MDC75a | 47 | 70 | 1:2 | mA | +25°C | 3.3V | 50 MIPS |
| MDC75f | 41 | 70 | 1:64 | mA | | | |
| MDC75g | 41 | 70 | 1:128 | mA | | | |
| MDC76a | 46 | 70 | 1:2 | mA | +85°C | 3.3V | 50 MIPS |
| MDC76f | 40 | 70 | 1:64 | mA | | | |
| MDC76g | 40 | 70 | 1:128 | mA | | | |

**Note 1:** IDOZE is primarily a function of the operating voltage and frequency. Other factors, such as I/O pin loading and switching rate, oscillator type, internal code execution pattern and temperature, also have an impact on the current consumption. The test conditions for all IDOZE measurements are as follows:

- Oscillator is configured in EC mode and external clock is active, OSC1 is driven with external square wave from rail-to-rail (EC clock overshoot/undershoot < 250 mV required)
- CLKO is configured as an I/O input pin in the Configuration Word
- All I/O pins are configured as inputs and pulled to VSS
- $\overline{\text{MCLR}}$ = VDD, WDT and FSCM are disabled
- CPU, SRAM, program memory and data memory are operational
- No peripheral modules are operating; however, every peripheral is being clocked (all PMDx bits are '0's)
- CPU executing `while(1)` statement
- JTAG is disabled