

Product Datasheet - Technical Specifications



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Analog Input Specifications

Table 31 lists the specifications for the A/D subsystem on the DT9834 Series modules.

Table 31: A/D Subsystem Specifications

Feature	Specifications
Number of analog input channels ^a Single-ended: Pseudo-differential: Differential:	Up to 32 Up to 32 Up to 16
Number of gains	4 (1, 2, 4, 8)
Resolution	12 bits or 16 bits, depending on the model of the module that you are using ^b
Data encoding	Offset binary
System accuracy, to % of FSR 12-bit resolution Gain = 1: Gain = 2: Gain = 4: Gain = 8: 16-bit resolution Gain = 1: Gain = 2: Gain = 4: Gain = 8:	 ±0.03% ±0.04% ±0.05% ±0.07% ±0.01% ±0.02% ±0.02% ±0.03%
Range	±10 V, ±5 V, ±2.5 V, ±1.25 V
Nonlinearity	< ½ LSB
Differential nonlinearity	½ LSB
Inherent quantizing error	½ LSB
Drift Zero: Gain: Differential linearity: 16-bit resolution: 12-bit resolution:	 ±10 µV/°C ±30 ppm of FSR/°C ±2 ppm of FSR/°C ±3 ppm of FSR/°C
Input impedance Off channel: On channel:	 100 MΩ, 10 pF 100 MΩ, 100 pF
Input bias current	±20 nA
Common mode voltage	±11 V, maximum
Common mode rejection ratio 16-bit resolution: 12-bit resolution:	 80 dB, gain = 1 @ 1 kΩ 74 dB, gain = 1 @ 1 kΩ
Maximum input voltage (without damage) Power on: Power off:	 ±30 V ±20 V

Table 31: A/D Subsystem Specifications (cont.)

Feature	Specifications
A/D conversion time	2.0 μ s
Channel acquisition time ($\pm 1/2$ LSB)	1 μ s, typical
Sample-and-hold Aperture uncertainty: Aperture delay:	0.2 ns, typical 50 ns, typical
Throughput Single channel: Multiple channel:	500 kSamples/s 500 kSamples/s $\pm 0.05\%$ per channel
ESD protection Arc: Contact:	8 kV 4 kV
Reference	+5 V ± 0.010 V
Monotonicity 16-bit resolution: 12-bit resolution:	1 LSB Yes
Effective Number of Bits (ENOB) at full-scale	14.6 bits typical
Spurious Free Dynamic Range (SFDR)	100 dB typical

- a. The channel type and the number of channels available depend on the model you purchase.
- b. Of the modules that support analog input operations, models DT9834-16-0-12-OEM, DT9834-16-0-12-BNC, DT9834-08-0-12-BNC, DT9834-16-4-12-OEM, DT9834-16-4-12-BNC, and DT9834-08-4-12-BNC have 12-bit resolution; models DT9834-16-0-16-OEM, DT9834-16-0-16-BNC, DT9834-08-0-16-BNC, DT9834-16-4-16-OEM, DT9834-16-4-16-BNC, DT9834-08-4-16-BNC, DT9834-32-0-16-STP, and DT9834-32-0-16-OEM have 16-bit resolution.

Analog Output Specifications

Table 32 lists the specifications for the D/A subsystem on the DT9834 Series modules.

Table 32: D/A Subsystem Specifications

Feature	Specifications
Number of analog output channels	Up to 4 Simultaneous
Number of elements	2; element 0 is for the analog output voltage and element 1 is for the analog input threshold trigger
Resolution	Element 0: 12 bits or 16 bits, depending on the model of the module that you are using ^a Element 1: 8 bits
Data encoding	Offset binary
Nonlinearity 16-bit resolution: 12-bit resolution:	1.0 LSB ½ LSB
Differential nonlinearity 16-bit resolution: 12-bit resolution:	1.0 LSB ½ LSB
Inherent quantizing error 16-bit resolution: 12-bit resolution:	1.0 LSB ½ LSB
Output range	±10 V
Error Zero: Gain:	±0.0003 V ±0.0003 V
Drift Zero (bipolar): Gain:	±10 ppm of FSR/°C ±30 ppm of FSR/°C
Throughput Waveform generation mode: Continuously paced analog output mode	500 kSamples/s per channel 500 kSamples/s per channel
FIFO	128 kSamples, total
Current output	±5 mA maximum load
Output impedance	0.1 Ω maximum
Capacitive driver capability	0.004 μF
Protection	Short circuit to analog ground
Power-on voltage	0 V ±10 mV maximum

Table 32: D/A Subsystem Specifications (cont.)

Feature	Specifications
Settling time to 0.01% of FSR 16-bit resolution: 12-bit resolution:	4.0 μ s, 100 mV steps 5.0 μ s, 10 V steps 1.0 μ s, 100 mV steps 2.0 μ s, 10 V steps
Slew rate	10 V/ μ s
Glitch energy	12 nV/s, typical
ESD protection Arc: Contact:	8 kV 4 kV
Monotonicity 16-bit resolution: 12-bit resolution:	1 LSB Yes

- a. Of the modules that support analog output operations, models DT9834-00-4-12-OEM, DT9834-00-4-12-BNC, DT9834-16-4-12-OEM, DT9834-16-4-12-BNC, and DT9834-08-4-12-BNC have 12-bit resolution; models DT9834-00-4-16-OEM, DT9834-00-4-16-BNC, DT9834-16-4-16-OEM, DT9834-16-4-16-BNC, and DT9834-08-4-16-BNC have 16-bit resolution.

Digital I/O Specifications

Table 33 lists the specifications for the DIN/DOOUT subsystems on the DT9834 Series modules.

Table 33: DIN/DOOUT Subsystem Specifications

Feature	Specifications
Number of digital I/O lines	32 (16 digital input, 16 digital output)
Number of ports	2 (16 bits each)
Number of dynamic digital output lines	1
Input termination	Inputs tied to +3.3 V through 15 k Ω pull-up resistors
Logic family	LVTTL (+5 V tolerance)
Logic sense	Positive true
Inputs Input type: Input logic load: High input voltage: Low input voltage: Low input current:	Level-sensitive 1 LVTTL 2.0 V minimum 0.8 V maximum –0.4 mA maximum
Outputs High output: Low output:	2.4 V minimum with up to 6 mA 0.4 V maximum with up to 3 mA
Interrupt on change	Yes
Clocked with sample clock	Yes
Software I/O selectable	No

Counter/Timer Specifications

Table 34 lists the specifications for the C/T subsystems on the DT9834 Series modules.

Table 34: C/T Subsystem Specifications

Feature	Specifications
Number of counter/timers	5
Internal reference clock	18 MHz
Resolution	32 bits per channel
Clock divider Minimum: Maximum:	2 4,294,967,296
Clock output Minimum: Maximum:	0.0042 Hz 9 MHz
Maximum clock or gate input frequency	9 MHz
Minimum pulse width (minimum amount of time it takes a C/T to recognize an input pulse)	55.5 ns
Maximum input frequency	9.009 MHz
Logic family	LVTTL (+5 V tolerance)
Inputs Input logic load: High input voltage: Low input voltage: Low input current:	1 LVTTL 2.0 V minimum 0.8 V maximum -0.4 mA maximum
Outputs High output: Low output:	2.4 V minimum with up to 6 mA 0.4 V maximum with up to 3 mA

Trigger Specifications

Table 35 lists the specifications for the external A/D and D/A triggers on the DT9834 Series modules.

Table 35: External A/D and D/A Trigger Specifications

Feature	Specifications
Trigger sources Internal: External:	Software-initiated Software-selectable
Input type	Edge-sensitive
Logic family	LVTTL (+5 V tolerance)
Inputs Input logic load: Input termination: High input voltage: Low input voltage: High input current: Low input current:	1 LVTTL 2.2 k Ω pull-up to +3.3 V 2.0 V minimum 0.8 V maximum 25 μ A maximum -0.25 mA maximum
Minimum pulse width High: Low:	25 ns 25 ns
Triggering modes Single scan: Continuous scan: Triggered scan:	Yes Yes Yes

Clock Specifications

Table 36 lists the specifications for the internal A/D and D/A clocks on the DT9834 Series modules.

Table 36: Internal A/D and D/A Clock Specifications

Feature	Specifications
Reference frequency	18 MHz
Divisor range	3 to 4,294,967,295
Usable range	0.00210 Hz to 500 kHz
Oscillator accuracy (recording time error)	±50 ppm

Table 37 lists the specifications for the external A/D and D/A clocks on the DT9834 Series modules.

Table 37: External A/D and D/A Clock Specifications

Feature	Specifications
Input type ^a A/D: D/A:	falling edge rising edge
Logic family	LVTTL (+5 V tolerance)
Inputs Input logic load: Input termination: High input voltage: Low input voltage: Low input current:	1 LVTTL 2.2 kΩ pull-up to +3.3 V 2.0 V 0.8 V 1.2 mA
Oscillator frequency	DC to 9 MHz
Minimum pulse width High: Low:	25 ns 25 ns

- a. A quiet (glitch-free) stable clock is required for best results and to prevent overclock conditions. In addition, it is recommended that you avoid gating the clock unless gating on and off is synchronous to the clock.

Power, Physical, and Environmental Specifications

Table 38 lists the power, physical, and environmental specifications for the DT9834 Series modules.

Table 38: Power, Physical, and Environmental Specifications

Feature	Specifications
Power, +5 V	±5% @ 2 A maximum
Physical Dimensions (OEM): Dimensions (BNC): Dimensions (STP): Weight (OEM): Weight (STP):	190 mm x 100 mm x 20 mm 184.4 mm x 100 mm (7.30 X 3.94 inches) 216 mm x 106 mm x 51 mm 4.6 ounces 2.1 lbs
Environmental Operating temperature range (OEM): Operating temperature range (BNC): Operating temperature range (STP): Storage temperature range: Relative humidity:	0° C to 55° C 0° C to 45° C 0° C to 45° C □□-25° C to 85° C To 95%, noncondensing

Connector Specifications

Table 39 lists the mating cable connectors for the connectors on the BNC connection box, the OEM version of the DT9834 Series module, and the EP353 and EP356 accessory panels.

Table 39: Mating Cable Connectors

Module/Panel	Connector	Part Number on Module (or Equivalent)	Mating Cable Connector
BNC connection box	Analog input	AMP/Tyco AMP 5747375-8	AMP/Tyco 5-747917-2
	Digital I/O	AMP/Tyco 5747301-8	AMP/Tyco 5-747916-2
	C\T, DAC, Clk, Trig	AMP/Tyco 5747301-8	AMP/Tyco 5-747916-2
OEM version	J2	AMP/Tyco 6-104068-8	AMP/Tyco 3-111196-4 ^a
	J3	AMP/Tyco 6-104068-8	AMP/Tyco 3-111196-4 ^a
	TB1 ^b	Phoenix Contact 1707434	Phoenix Contact 1839610
EP353 accessory panel	J1	AMP/Tyco 5102321-6	AMP/Tyco 1658622-6
	J2	AMP/Tyco 5747375-8	AMP/Tyco 5-747917-2
EP356 accessory panel	J1	AMP/Tyco 5747301-8	AMP/Tyco 5-747916-2
	J2	AMP/Tyco 5747301-8	AMP/Tyco 5-747916-2

a. The mating PCB receptacle is AMP/Tyco 6-104078-3.

b. Secondary power connector.

Regulatory Specifications

The DT9834 Series modules are CE-compliant. [Table 40](#) lists the regulatory specifications for the DT9834 Series module.

Table 40: Regulatory Specifications

Feature	Specifications
Emissions (EMI)	FCC Part 15, Class A EN55011:2007 (Based on CISPR-11, 2003/A2, 2006)
Immunity	EN61326-1:2006 Electrical Equipment for Measurement, Control, and Laboratory Use <u>EMC Requirements</u> EN61000-4-2:2009 Electrostatic Discharge (ESD) 4 kV contact discharge, 8 kV air discharge, 4 kV horizontal and vertical coupling planes EN61000-4-3:2006 Radiated electromagnetic fields, 3 V/m, 80 to 1000 MHz; 3 V/m, 1.4 GHz to 2 GHz; 1 V/m, 2 GHz to 2.7 GHz EN61000-4-4:2004 Electrical Fast Transient/Burst (EFT) 1 kV on data cables EN61000-4-6:2009 Conducted immunity requirements, 3 Vrms on data cables 150 kHz to 80 MHz
RoHS (EU Directive 2002/95/EG)	Compliant (as of July 1st, 2006)

External Power Supply Specifications

Table 41 lists the specifications for the EP361 +5 V external power supply that is used with the DT9834 Series modules.

Table 41: External Power Supply (EP361) Specifications

Feature	Specifications
Type	Total Power medical power supply (TPES22-050400 or TPEMG24-S050400-7)
Input voltage	Typical 90 - 264 V AC
Input current TPES22-050400	Typical 0.38 A at 115 V AC, 0.15 A at 230 V AC
TPEMG24-S050400-7	Typical 0.347 A at 115 V AC, 0.215 A at 230 V AC
Frequency	47 to 63 Hz
Inrush current TPES22-050400	35 A at 230 V AC typical or less than 30 A by adding thermistor
TPEMG24-S050400-7	6.274 A RMS at 230 V AC
Output voltage	5 V DC
Output current	4.0 A
Output wattage TPES22-050400	Typical 22 - 24 W
TPEMG24-S050400-7	Typical 20 - 24 W
Noise and ripple	1% peak to peak
Regulatory specifications TPES22-050400	UL, N, CE, FCC Class B
TPEMG24-S050400-7	UL, ITE, CE, FCC Class B, Energy Star compliant