

Product Datasheet - Technical Specifications



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Specifications

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Analog Input Specifications

Table 25 lists the specifications for the analog input subsystem on a DT9816 Series module.

Table 25: Analog Input Subsystem Specifications

Feature	Specifications
Number of analog input channels	6 single-ended
Number of gains	2 (1, 2)
Resolution	16-bit
Data encoding	offset binary
System accuracy, to % of FSR (Averaged over 50 readings)	$\pm 0.08\%$ typical @ gain of 1
Range	± 10 V, ± 5 V
Nonlinearity	0.015%
Differential nonlinearity	0.003%
Inherent quantizing error	$\pm \frac{1}{2}$ LSB
Drift Zero: Gain:	± 25 $\mu\text{V}/^\circ\text{C}$ ± 50 ppm/ $^\circ\text{C}$
Differential linearity:	monotonic to 14 bits
Input impedance ^a Off channel: On channel:	– 10 M Ω , 10 pf
Input bias current	± 10 nA
Maximum input voltage (without damage) Power on: Power off:	± 35 V ± 20 V
A/D conversion time DT9816 and DT9816-OEM: DT9816-A: DT9816-S and DT9816-S-WTR:	8 μs 4 μs 950 ns
Channel acquisition time ($\pm \frac{1}{2}$ LSB)	1 μs
Sample-and-hold Aperture uncertainty: Aperture delay: Aperture match: Gain match: Zero match:	1 ns 35 ns 5 ns 0.05% ± 3.0 mV
Maximum throughput DT9816 and DT9816-OEM: DT9816-A: DT9816-S and DT9816-S-WTR:	50 kHz per channel 153.846 kHz per channel 750 kHz per channel

Table 25: Analog Input Subsystem Specifications (cont.)

Feature	Specifications
Signal bandwidth (to -3 dB point) DT9816 and DT9816-OEM: DT9816-A: DT9816-S and DT9816-S-WTR:	4 MHz typical 4 MHz typical 40 MHz typical
ESD protection (per spec) Arc: Contact:	8 kV 4 kV
Reference	2.5 V
Monotonicity	Yes
Input FIFO DT9816-S and DT9816-S-WTR: Other DT9816 Series modules:	8 kSamples 1.5 kSamples

- a. Very high input impedance minimizes any source error. When using high sampling rates on the DT9816-S and DT9816-S-WTR, it is recommended that you use an input impedance of 100 Ω or less.

Digital I/O Specifications

Table 26 lists the specifications for the digital input and digital output subsystems on a DT9816 Series module.

Table 26: Digital I/O Subsystem Specifications

Feature	Specifications
Number of digital I/O lines	16 (8 each; dedicated)
Number of ports	2, 8-bit
Input termination	Series 1 k Ω ; Series 33.2 Ω
Logic family	TTL
Logic sense	Positive true
Inputs Input type: Input logic load: High input voltage: Low input voltage: Low input current:	Level sensitive 1 TTL Load 2.4 V min 0.8 V max -0.4 mA max
Outputs High output: Low output: High output current (source): Low output current (sink):	2.8 V min 0.6 V max 4.5 mA 10 mA
Software I/O selectable	Yes
ESD protection (per spec) Arc: Contact:	8 kV 4 kV

Counter/Timer Specifications

Table 27 lists the specifications for the counter/timer subsystem on a DT9816 Series module.

Table 27: Counter/Timer Subsystem Specifications

Feature	Specifications
Number of counter/timers	1
Counter/timer modes	Event counting, frequency measurement, rate generation
Resolution	16-bit
Minimum pulse width: (minimum amount of time it takes a C/T to recognize an input pulse)	25 ns
Logic family	TTL
Inputs ^a Input logic load: High input voltage: Low input voltage: Low input current:	Level sensitive 1 TTL Load 2.4 V min 0.8 V max –0.4 mA max
Outputs High output: Low output: High output current (source): Low output current (sink):	2.8 V min 0.6 V max 2 mA 12 mA
ESD protection (per spec) Arc: Contact:	8 kV 4 kV
Internal clock frequency	60 Hz to 6 MHz
External clock divider	2 to 65534

a. Counter 0 In has a 22.1 k Ω pull-up to +5 V. Therefore, when this pin is unconnected, the signal goes to +5 V.

External Trigger Specifications

Table 28 lists the external A/D trigger specifications for the DT9816 Series modules.

Table 28: External A/D Trigger Specifications

Feature	DT9816 Series Specifications
Input type	HCT rising-edge sensitive ^a
Inputs High input voltage: Low input voltage:	2.4 V min 0.8 V max
Minimum pulse width High: Low:	84 ns 84 ns
Maximum frequency	5.95 MHz

- a. The external trigger input has a 22.1 k Ω pull-up to +5 V. Therefore, when this pin is unconnected, the signal goes to +5 V.

External Clock Specifications

Table 29 lists the external A/D clock specifications DT9816 Series modules.

Table 29: External A/D Clock Specifications

Feature	DT9816 Series Specifications
Input type	HCT rising-edge sensitive ^a
Inputs High input voltage: Low input voltage:	2.4 V min 0.8 V max
Minimum pulse width High: Low:	3.4 μ s (666.7 ns for DT9816-S and DT9816-S-WTR) 3.3 μ s (666.7 ns for DT9816-S and DT9816-S-WTR)
Maximum frequency	150 kHz (750 kHz for DT9816-S and DT9816-S-WTR)
External clock divider	1 ^b

- a. The external clock input has a 22.1 k Ω pull-up to +5 V. Therefore, when this pin is unconnected, the signal goes to +5 V.
- b. On the DT9816 and DT9816-A, the base clock frequency of the internal clock is divided by 12, resulting in an effective base clock frequency of 4 MHz for the internal clock. On the DT9816-S and DT9816-S-WTR, the internal base clock frequency is divided by 4, resulting in an effective base clock frequency of 12 MHz for the internal clock. The driver divides the effective base clock frequency by an internal clock divider from 2 to 65534 to achieve the desired sampling frequency.

Power, Physical, and Environmental Specifications

Table 30 lists the power, physical, and environmental specifications for the DT9816 Series modules.

Table 30: Power, Physical, and Environmental Specifications

Feature	Specifications
Power +5 V Enumeration: Operation:	< 100 mA < 250 mA
Physical Dimensions (board): Dimensions (box with screw terminals and feet): Weight (board): Weight (box with screw terminals and feet):	100 mm (L) x 100 mm (W) x 15.5 mm (H) 107.7 mm (L) x 100 mm (W) x 33.5 mm (H) 65.8 g 138.8 g
Environmental Operating temperature range: Storage temperature range: Relative humidity:	–40 to 85° C for the DT9816-S-WTR, 0 to 55° C on all other DT9816 Series modules –40 to 85° C to 95% non-condensing

Regulatory Specifications

The DT9816 Series modules are CE-compliant. [Table 31](#) lists the regulatory specifications for the DT9816 Series modules.

Table 31: Regulatory Specifications

Feature	DT9812 Series, DT9813 Series, DT9814 Series 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)

Mating Connector Specifications

Table 32 lists the mating connector specifications for the DT9816-OEM module.

Table 32: Mating Connector Specifications for the DT9816-OEM Module

Connector on Module	Mating Connector Specifications
USB Connector	Bulgin part#14193 USB cable
Analog Input Connector (J3)	Tyco part# 1658622-4
Digital I/O Connector (J4)	Tyco part# 1658622-4