



RD-20418

WT-QTSD reference design RD-20418

Description:

This white paper describes a reference design module which allows the WT-QTSD to be used in many different scenarios for evaluating the WT-QTSD, it is also for use as a direct plug in for end products. The design has several features which are listed below. A high quality optimised FR4 printed circuit board, part number PCB20418, is available for this reference design from Widget-tronics.

Features:

- Complete multi use unit for use in testing and production.
- On board solder bridge jumpers to select output polarity.
- Integrated ENABLE inversion capabilities
- +5vdc auxiliary output
- Schmitt trigger inputs protected to +12vdc.
- High power outputs protected against shorts to ground

Function:

- Conversion of quadrature signals to discrete step and direction and level shift driver for ENABLE.

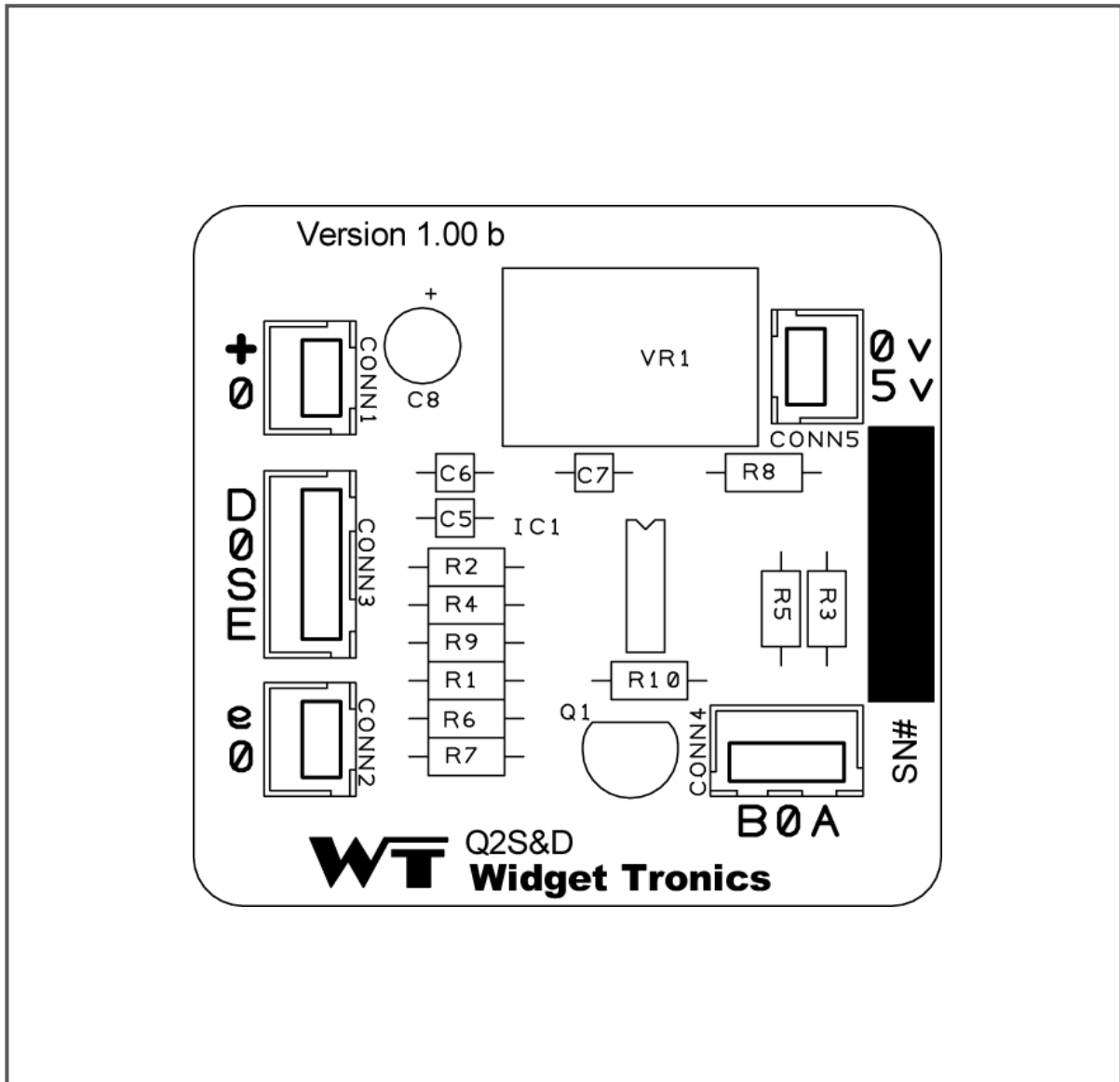
Operating Characteristics:

- Operating Speed :
 - DC – 28KHz signal input
 - DC – 5 KHz signal output
- Input level absolute maximum :
 - High input level up to +12V
 - Low input level down to -5V
- Operating Voltage Range:
 - 9.0V to 50v (see below *)
- Temperature Range:
 - Industrial: -40°C to +85°C
- On-board current limited 5.0vdc output for powering sensors and opto-couplers.
- On-board signal level inverter for driver unit enable (High to Low conversion)
- Output source/sink direct short to ground protection – no time limit.
- Output source/sink direct short to +12V protection – no time limit.
- 47mm x 47mm self-contained board with 40mm x 40mm spaced mounting holes.

**Power supply input MUST be within specified Operating Voltage Range.*

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CIRCUIT BOARD LAYOUT AND CONNECTOR DIAGRAM

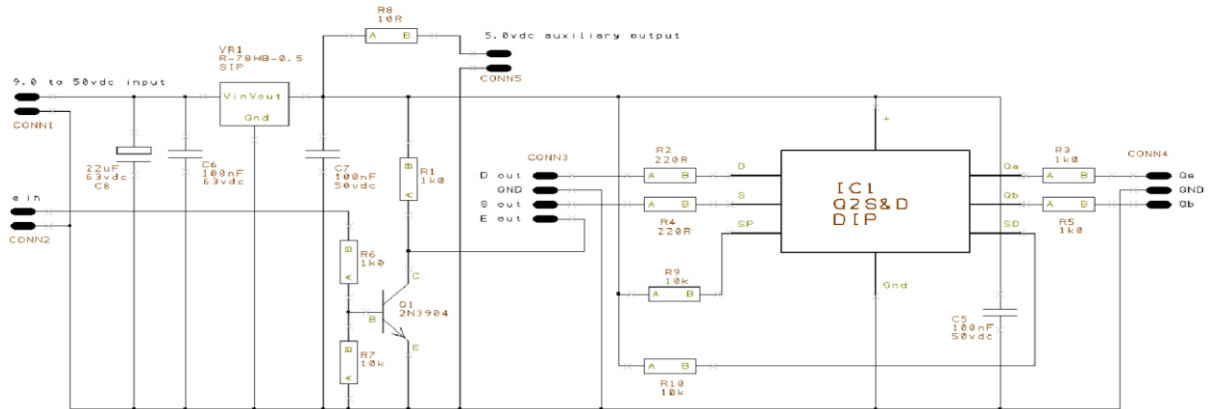


CONNECTOR	PIN	Direction	NAME	FUNCTION
CONN1	2	Output	0	Ground rail
	1	input	+	Supply voltage
CONN2	2	Output	0	Ground rail
	1	Input	e	enable term input
	1	input	D	Direction term polarity selection
CONN3	2	Output	0	Ground rail
	3	Input	S	Quadrature signal phase b input
	4	Output	E	ENABLE term output
	3	Input	B	Quadrature phase B input
CONN4	2	Output	0	Ground rail
	1	Input	A	Quadrature phase A input
	1	Output	5	Auxiliary 5vdc output
CONN5	2	Output	0	Ground rail

Schematic

The schematic in figure 1 shows the circuitry for the RD-20418 reference design board. (PCB20418)

Fig 1



Bill of materials for reference design

Component ref	Type	Qty	Value	Manufacturer part #	RS part #
IC1	Processor	1	Q2SD	WT-Q2SD	-
VR1	Regulator	1	78HB5.05	R-78HB5.0-0.5L	672-7095
Q1	Transistor	1	2N3904	2N3904TA	124-1317
C8	Capacitor	1	22uF 63vdc	SK063M0022BZF-0611	440-6480
C5,C6,C7	Capacitor	3	100nF 50vdc	K104K15X7RF5TH5	852-3277
R8	Resistor	1	10R	LR1F10R	125-1154
R2,R4	Resistor	2	220R	LR1F220R	148-348
R1,R3,R5,R6	Resistor	4	1K	LR1F1K0	148-506
R7,R9,R10	Resistor	3	10K	LR1F10K	148-736
CONN1,2,5	Socket	3	2 pin	B2B-XH-A(LF)(SN)	820-1554
CONN3	Socket	1	4 pin	B3B-XH-A(LF)(SN)	820-1557
CONN4	Socket	1	3 pin	B4B-XH-A(LF)(SN)	820-1551
PCB	FR4	1	1.6mm	PCB20418	-

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings (†)

Ambient temperature under bias.....	-40°C to +125°C
Storage temperature	-65°C to +150°C
Voltage on Input pins with respect to Vss.....	12.0V
Voltage on Output pins with respect to Vss.....	6.0V
Maximum sink/source @ 5.0V on output pins.....	23 mA
Maximum current with output pins connected to ground and 2KHz quadrature signal at inputs:	
-40°C ≤ TA ≤ +85°C	100 mA
+85°C ≤ TA ≤ +125°C	55 mA
Total power dissipation.....	400 mW
Maximum noise level on Vss.....	4 mv

Note 1: Maximum current rating requires even load distribution across I/O pins. Maximum current rating may be limited by the device package power dissipation characterizations, see “Thermal Characteristics” to calculate device specifications.

† IMPORTANT NOTICE: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied. Exposure above maximum rating conditions for extended periods may affect device reliability.

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