

The JTD20 series is a range of ultra-compact, regulated PCB-mount medical DC-DC converters which offers single and dual output voltages ranging from 5 to 15VDC. Housed in a 40.6 x 25.4mm (1" x 1.6") plastic case, the JTD20 series features a 4:1 input voltage range and offers a $\pm 10\%$ output trim on single output versions. Its low no load power increases efficiency and extends runtime in battery powered applications.

The JTD20 series features worldwide medical approvals, 2 x MOPP 5kVAC reinforced isolation and extremely low leakage currents benefitting system designers with easy integration into a wide range of BF and CF rated medical applications including imaging, patient monitoring, surgical equipment, patient treatment and dentistry.



Features

- ▶ Regulated single outputs 3.3 to 15VDC
- ▶ Regulated dual outputs ± 5 , ± 12 & ± 15 VDC
- ▶ 4:1 input range
- ▶ Output trim $\pm 10\%$ for single output models
- ▶ 40.6 x 25.4mm (1.6" x 1") footprint, 10.4mm (0.41") profile
- ▶ 3.0kVDC isolation
- ▶ Remote On/Off
- ▶ -40°C to +100°C operating temperature
- ▶ Full power to +65°C
- ▶ 3 year warranty

Applications



Dimensions

40.6 x 25.4 x 10.4mm (1.6" x 1.0" x 0.41")

Models & ratings

Model number	Input voltage	Output voltage	Output current	Efficiency	Input current ⁽¹⁾		Maximum capacitive load ⁽²⁾
					No load	Full load	
JTD2024S3V3	9-36VDC	3.3VDC	5500mA	89.0%	10mA	850 mA	10000 μ F
JTD2024S05		5VDC	4000mA	89.0%	10mA	935 mA	6800 μ F
JTD2024S12		12VDC	1670mA	88.5%	10mA	945 mA	1000 μ F
JTD2024S15		15VDC	1330mA	88.0%	15mA	945 mA	680 μ F
JTD2024D05		± 5 VDC	± 2000 mA	86.0%	10mA	970 mA	± 2200 μ F
JTD2024D12		± 12 VDC	± 835 mA	88.5%	15mA	945 mA	± 470 μ F
JTD2024D15		± 15 VDC	± 665 mA	88.5%	15mA	940 mA	± 330 μ F

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Notes:

1. Input currents measured at nominal input voltage.

2. Maximum capacitive load is per output.

Models & ratings

Model number	Input voltage	Output voltage	Output current	Efficiency	Input current ⁽¹⁾		Maximum capacitive load ⁽²⁾
					No load	Full load	
JTD2048S3V3	18-75VDC	3.3VDC	5500mA	89.5%	8mA	425mA	10000μF
JTD2048S05		5VDC	4000mA	90.0%	8mA	465mA	6800μF
JTD2048S12		12VDC	1670mA	90.0%	8mA	465mA	1000μF
JTD2048S15		15VDC	1330mA	91.0%	8mA	455mA	680μF
JTD2048D05		±5VDC	±2000mA	87.0%	8mA	480mA	±2200μF
JTD2048D12		±12VDC	±835mA	90.0%	8mA	465mA	±470μF
JTD2048D15		±15VDC	±665mA	90.5%	10mA	460mA	±330μF

Notes:

1. Input currents measured at nominal input voltage.

2. Maximum capacitive load is per output.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	9		36	VDC	24VDC nominal
	18		75		48VDC nominal
Inrush reflected ripple current		20		mA pk-pk	Through 12μH inductor and 47μF capacitor
Input surge			50	VDC for 100ms	24VDC nominal
			100		48VDC nominal

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	3.3		30	VDC	See models & ratings table
Output trim	±10			%	Single output only, see application note
Initial set accuracy			±1	%	At full load
Minimum load	0			%	No minimum load required
Line regulation			±0.5	%	From min to max input voltage
Load regulation			0.5/1.0	%	From 0% to full load for single/dual output
Cross regulation			±5	%	On dual output models, when one output is at 100% load and other is varied from 25% load to full load
Start up time		30		ms	
Ripple & noise			75/60	mV pk-pk	Single/dual output, measured using 20MHz bandwidth and 10μF/25VDC MLCC per output
Short circuit protection	Continuous, hiccup mode with auto recovery				
Maximum capacitive load	See models & ratings table				
Temperature coefficient			0.02	%/ °C	
Overvoltage protection			140	%	
Remote On/Off	Output is on if remote on/off (pin 3) is open or high (3-12VDC) Output turns off if remote on/off (pin 3) is low (<1.2VDC max), e.g. short pin 6 to pin 2 -Vin. Idle input current 2mA typical				

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency		85		%	See models & ratings table
Isolation: input to output	3000			VDC	60s functional
Isolation: input and output to case	1600			VDC	60s
Switching frequency		270/330		kHz	3V3 & 5VDC models/other models
Isolation resistance	10 ⁹			Ω	
Isolation capacitance		2000		pF	
Power density			1.83 (30)	W/cm ³ (W/in ³)	
Mean time between failure	400			khrs	MIL-HDBK-217F, +25°C GB
Weight		29.0 (0.064)		g (lb)	
Solder profile			260	°C	1.5mm from case, 10s max
Case material	Black plastic UL94V-0				
Potting material	Epoxy, UL84V-0 rated				
Pin material	Brass, Solder coated				
Solder profile	260°C max, 1.5mm from case, 10s max				

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-40		+100	°C	See derating curve
Storage temperature	-55		+125	°C	
Case temperature			+105	°C	
Humidity			95	%RH	Non-condensing
Cooling	Natural convection				
Thermal impedance to air	12			°C/W	

Safety approvals

Safety agency	Standard	Notes & conditions
UL	UL/cUL60950-1, 62368-1	
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

EMC: emissions

Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55032	Class B	No external components required
Radiated	EN55032	Class B	No external components required

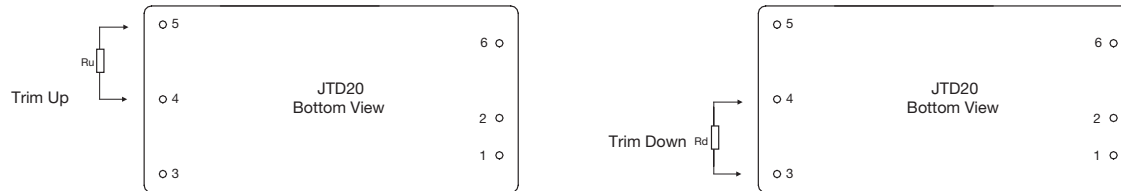
EMC: immunity

Phenomenon	Standard	Test Level	Criteria	Notes & conditions
ESD immunity	EN61000-4-2	$\pm 6\text{kV}$	A	Contact
		$\pm 8\text{kV}$		Air
Radiated immunity	EN61000-4-3	20V/m	A	
EFT/Burst	EN61000-4-4	2kV	A	Requires 330 μF /100VDC electrolytic and 3kW TVS (SMDJ58A for 24VDC input, SMDJ120A for 48VDC input), see application notes.
Surge	EN61000-4-5	2kV	A	Requires 330 μF /100VDC electrolytic and 3kW TVS (SMDJ58A for 24VDC input, SMDJ120A for 48VDC input), see application notes.
Conducted immunity	EN61000-4-6	10Vrms	A	
Magnetic fields	EN61000-4-8	100A/m	A	

Application notes

External output trimming

Output can be externally trimmed by using the method as below, (single output models only)



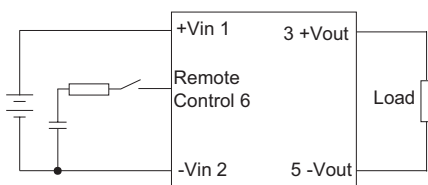
Trim down resistor values (Rd)

Model	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
	Voutx0.99	Voutx0.98	Voutx0.97	Voutx0.96	Voutx0.95	Voutx0.94	Voutx0.93	Voutx0.92	Voutx0.91	Voutx0.90
3V3DC	309.0k Ω	165.4k Ω	105.6k Ω	72.9k Ω	52.3k Ω	38.0k Ω	27.6k Ω	19.7k Ω	13.5k Ω	8.40k Ω
5VDC	119.9k Ω	77.70k Ω	50.50k Ω	35.2k Ω	25.3k Ω	18.4k Ω	13.4k Ω	9.50k Ω	6.40k Ω	3.90k Ω
12VDC	345.0k Ω	138.1k Ω	79.90k Ω	51.5k Ω	34.6k Ω	23.4k Ω	15.5k Ω	9.50k Ω	4.90k Ω	1.26k Ω
15VDC	174.4k Ω	91.10k Ω	56.60k Ω	37.7k Ω	25.8k Ω	17.6k Ω	11.6k Ω	7.00k Ω	3.50k Ω	0.55k Ω

Trim up resistor values (Ru)

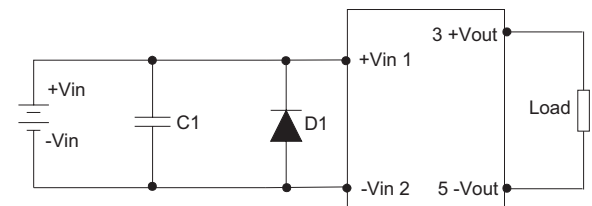
Model	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
	Voutx0.99	Voutx0.98	Voutx0.97	Voutx0.96	Voutx0.95	Voutx0.94	Voutx0.93	Voutx0.92	Voutx0.91	Voutx0.90
3V3DC	537.7k Ω	177.1k Ω	96.40k Ω	60.8k Ω	40.8k Ω	27.9k Ω	19.0k Ω	12.4k Ω	7.30k Ω	3.40k Ω
5VDC	635.2k Ω	170.0k Ω	92.80k Ω	61.1k Ω	43.8k Ω	32.9k Ω	25.4k Ω	20.0k Ω	15.8k Ω	12.5k Ω
12VDC	367.4k Ω	179.6k Ω	113.6k Ω	79.9k Ω	59.5k Ω	45.8k Ω	35.9k Ω	28.5k Ω	22.7k Ω	18.1k Ω
15VDC	661.5k Ω	231.3k Ω	134.0k Ω	91.0k Ω	66.8k Ω	51.3k Ω	40.4k Ω	32.5k Ω	26.4k Ω	21.5k Ω

Remote on/off



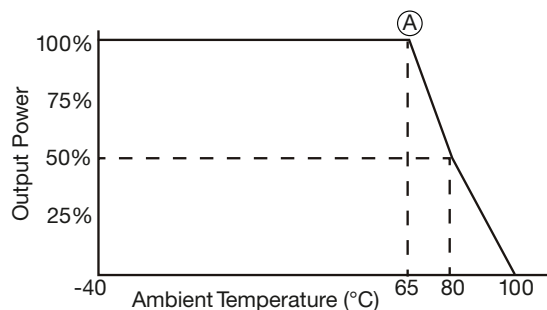
The module is enabled by positive logic. Adding a switch function between the remote control pin 6 and -Vin pin 2 will facilitate this (open drain or open collector type)

EFT surge filter



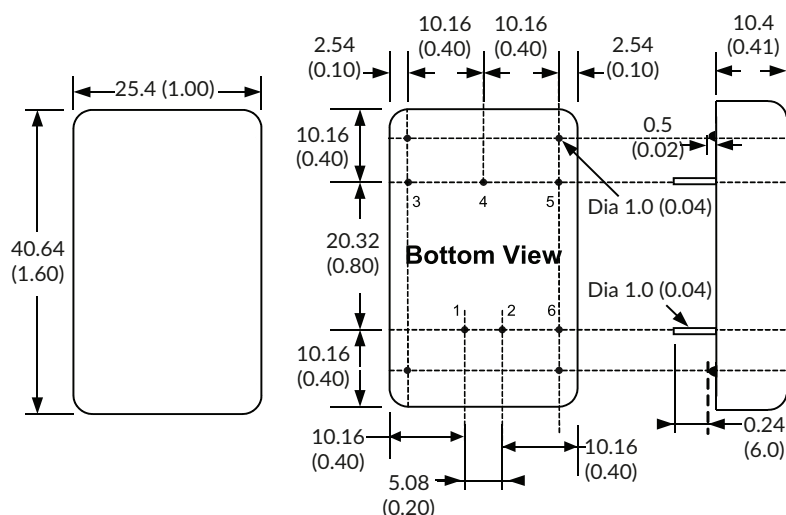
Model	C1	D1
JTD2024	330 μF , 100V	TVS, 58V, 3kW
JTD2048	330 μF , 100V	TVS, 120V, 3kW

Derating curve



Note: Point A is 60°C for dual 5VDC output models

Mechanical details



Pin connections		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Common
5	-Vout	-Vout
6	Remote On/Off	Remote On/Off

Notes:

- All dimensions are in mm (inches)
- Weight: 19.0 (0.042) g(lb) approx.
- Pin diameter: 1.0 ±0.05 (0.04 ±0.002)

- Pin pitch tolerance: ±0.35 (±0.014)
- Case tolerance: ±0.5 (±0.02)

Specifications subject to change without notice.