HTR25 Series

FiDUS
power in motion...

25 Watts

- EN50155 for Rail Applications
- EN50121-3-2 Class A Emissions for Rail Applications without Additional Components
- Single output
- 3000VDC Isolation
- -40 to 100°C Operation
- Remote on/off and 10% Output Trim
- 5 Year warranty

The HTR25 series of single output DC/DC converters come in a 2.09 x 1.09" package. With a nominal input of 72V and outputs from 5 to 24V. The HTR25 series has both EN50155 and EN50121-3-2 approvals for rail applications. The units operate from –40 to +100ºC and come complete with remote on/off function and output trim. All models have a FiDUS 5 year warranty.

Dimensions:

2.09 x 1.09 x 0.65" (53.0 x 27.6 x 16.6mm)

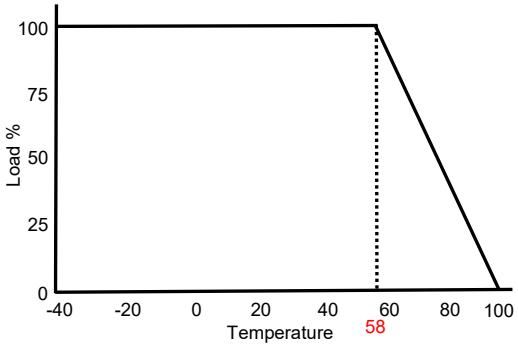
Models & Ratings

Model Number	Input Voltage	Output Voltage	Output Current	Input Current		Maximum Capacitive Load	Efficiency
				No Load	Full Load		
HTR257205SK	16-160V	5V	5000mA	10mA	413.36mA	6800uF	84%
HTR257212SK		12V	2080mA	10mA	412.70mA	1000uF	84%
HTR257215SK		15V	1670mA	10mA	409.31mA	820uF	85%
HTR257224SK		24V	1040mA	10mA	407.84mA	470uF	85%

Notes

1. Under no load conditions the unit may not meet all specifications
2. Series diode or mosfet required for reverse polarity protection

Derating curve



Input

Parameter	Rating
Input voltage range	See table
Input reflected ripple current	20mA pk-pk through 22uH inductor and capacitor C1 (8.2uF, 250V) and C2 (10uF, 250V)
Input surge (100mS max)	176VDC max.
Input filter	Pi type
Undervoltage lockout	ON/OFF 13.8Vdc/12Vdc

Output

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	5		24	VDC	See Model & Ratings table
Set point accuracy			±1	%	
Line regulation			±0.2	%	Low line to High line
Load regulation			±0.5	%	0 to 100% load change
Output voltage adjustability			±10	%	
Ripple & Noise			100	mV pk-pk	All models measured with 10uF/25V electrolytic capacitor and 20MHz bandwidth
Overvoltage protection		125		%	
Overload protection		150		%	
Short circuit protection					Continuous with automatic recovery
Transient response			±4	% Deviation	For a 25% load change (75-50-25%) at nominal Vin recovery to within 500us at 0.1A/uS typically.
Remote on/off	Module on: 3.0 to 12.0 Vdc or open circuit. Module off: short circuit pin 2/3 or 0 to 1.2 Vdc. Off input current 3mA typ.				
Output voltage trim	See applications pages 3 and 4				

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General

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	84		85	%	See Model & Ratings table
Isolation	3000			VDC	Input to output
	1600				Case to Input / Output
Isolation resistance	1000			M Ohm	
Isolation capacitance			2000	pF	
Switching frequency		250		KHz	
Power density			16.9	W/In^3	
MTBF		>230		KHrs	As per MIL-HDBK-217F, 25°C GB

Environmental

Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	-40		100	°C	Max. 58°C at 100% load. See de-rating curve p1
Storage temperature	-55		125	°C	
Max Case temperature			105	°C	
Cooling					Convection cooled
Humidity			95	% RH	Non-condensing

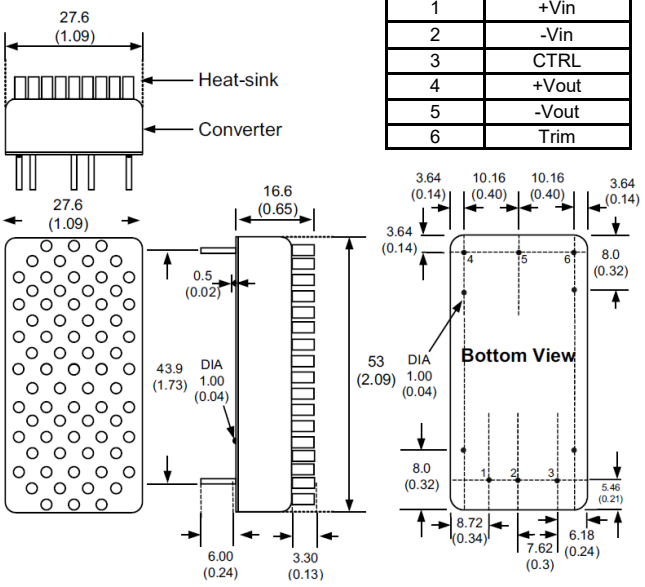
EMC: Emissions

	Standard	Notes & Conditions
Conducted	EN50121-3-2	To meet 79dBuV from 0.15-0.5MHz and 73dBuV from 0.5-30MHz (EN55032) EMI filter required see p3
Radiated	EN50121-3-2	

EMC: Immunity

	Standard	Criteria	Notes & Conditions
ESD	EN50121-3-2	A	Air ±8KV, Contact ±6KV
Radiated	EN50121-3-2	A	20V/m
EFT/Burst	EN50121-3-2	A	2KV: External input capacitor required: 2x in parallel 100uF/250V
Surges	EN50121-3-2	A	2KV: External input capacitor required: 2x in parallel 100uF/250V
Conducted	EN50121-3-2	A	10Vrms
Magnetic fields	EN61000-4-8	A	100A/m

Mechanical Details



Pin	Single
1	+Vin
2	-Vin
3	CTRL
4	+Vout
5	-Vout
6	Trim

Physical

Parameter	Rating
Case material	Aluminium
Pin material	1.0mm Brass solder coated
Potting material	Epoxy (UL94V-0)
Weight	48g
Dimensions	2.09 x 1.09 x 0.65"
Soldering temperature	1.5mm from case, 10s and 260°C max.

Notes

1. All dimensions shown in millimetres (inches)
2. Pin diameter 1.0 ±0.05 (0.04 ±0.002)
3. Case tolerance ±0.5 (±0.002)
4. Stand-off tolerance ±0.1 (±0.004)
5. Pin pitch tolerance ±0.35 (±0.014)

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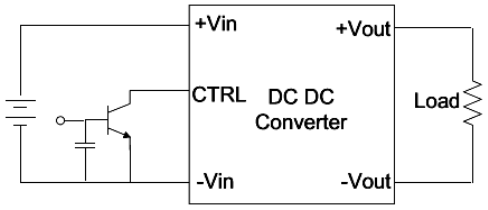
Application notes

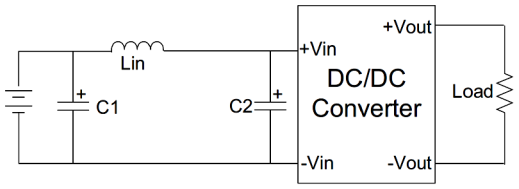
Remote ON/OFF

The HTR25 series output can be turned on and off using the remote on/off function. If Pin 3 is left open circuit or 3-12VDC then the unit is ON. Module off: short circuit pin 3 and 2 or 0 to 1.2 Vdc. Off input current 3mA typ.



EMI Filter

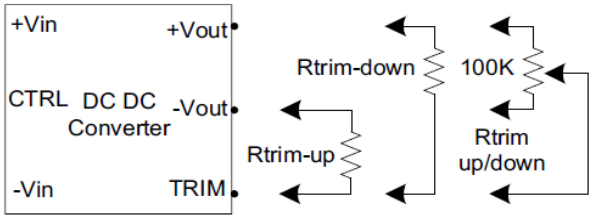
The input filter components C1/2 and Lin can be fitted to help meet conducted emission requirements for 79dBuV between 0.15-0.5MHz and 73dBuV between 0.5-30MHZ. They should be mounted as close as possible to the module. Lead lengths should be minimized and where possible avoid running input and output tracks under the module as part of good design practice for best EMC performance.



Model number	C1	C2	L1
HTR2572xx	8.2uF/250V	10uF/250V	22uH

Trim Tables

Output voltage trim function allows the user to increase or decrease the output voltage set point. The module may be connected with an external resistor (Rtrim) between TRIM pin and either +Vout or –Vout. By adjusting Rtrim, the output voltage can be changed by ±10% of nominal the output voltage.



HTR257205SK											
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	4.950	4.900	4.850	4.800	4.750	4.700	4.650	4.600	4.550	4.500	Volts
Rtrim-down	248.700	110.625	66.263	44.381	31.346	22.695	16.534	11.924	8.345	5.485	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	5.050	5.100	5.150	5.200	5.250	5.300	5.350	5.400	5.450	5.500	Volts
Rtrim-up	227.338	109.310	68.596	47.972	35.510	27.166	21.187	16.694	13.193	10.389	KOhms

HTR257212SK											
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	11.880	11.760	11.640	11.520	11.400	11.280	11.160	11.040	10.920	10.800	Volts
Rtrim-down	323.351	138.100	79.928	51.470	34.591	23.418	15.477	9.542	4.939	1.264	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	12.120	12.240	12.360	12.480	12.600	12.720	12.840	12.960	13.080	13.200	Volts
Rtrim-up	367.425	179.645	113.623	79.929	59.489	45.767	35.919	28.508	22.728	18.094	KOhms

HTR257215SK											
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	14.850	14.700	14.550	14.400	14.250	14.100	13.950	13.800	13.650	13.500	Volts
Rtrim-down	174.366	91.104	56.589	37.706	25.796	17.598	11.611	7.047	3.453	0.548	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	15.150	15.300	15.450	15.600	15.750	15.900	16.050	16.200	16.350	16.500	Volts
Rtrim-up	661.510	231.250	134.05	91.042	66.818	51.270	40.445	32.475	26.362	21.524	KOhms

HTR257224SK											
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	23.760	23.520	23.280	23.040	22.800	22.560	22.320	22.080	21.840	21.600	Volts
Rtrim-down	881.316	466.830	293.177	197.709	137.326	95.690	65.243	42.009	23.696	8.891	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	24.240	24.480	24.720	24.960	25.200	25.440	25.680	25.920	26.160	26.400	Volts
Rtrim-up	2846.648	955.230	542.693	362.055	260.681	195.786	150.682	117.514	92.097	71.999	KOhms