

60 Watts

- Market leading 2" x 1" power dense package
- Efficiency up to 93%
- 4:1 Input range
- Single and dual outputs
- 1600VDC Isolation
- Remote on/off and 10% output trim
- 3 Year warranty



The HTX60 series of high power dense DC/DC converters come in both single and dual outputs. Inputs are available in 24 & 48V versions with 4:1 range and outputs from 5 to 15V single and dual. The DC/DC converters are very high efficiency of up to 93%, come complete with remote on/off and 10% trim as standard. The units operate from -40 to +100°C. All models have a FiDUS 3 year warranty.

Dimensions:

2.00 x 1.00 x 0.45" (50.8 x 25.4 x 11.5mm)

Models & Ratings

Model Number ⁽¹⁾	Input Voltage	Output Voltage	Output Current	Input Current		Maximum Capacitive Load	Efficiency
				No Load	Full Load		
HTX602405	9-36V	5V	12000mA	25mA	2703mA	30000uF	93%
HTX602412		12V	5000mA	25mA	2703mA	5850uF	93%
HTX602415		15V	4000mA	25mA	2688mA	3900uF	93%
HTX602412D		±12V	±2500mA	40mA	2747mA	±3900uF	91%
HTX602415D		±15V	±2000mA	50mA	2747mA	±2400uF	91%
HTX604805	18-75V	5V	12000mA	25mA	1344mA	30000uF	93%
HTX604812		12V	5000mA	25mA	1351mA	5850uF	93%
HTX604815		15V	4000mA	25mA	1344mA	3900uF	93%
HTX604812D		±12V	±2500mA	40mA	1373mA	±3900uF	91%
HTX604815D		±15V	±2000mA	50mA	1373mA	±2400uF	91%

Notes

1. For Heat Sink add 'SK' to the model number
2. Under no load conditions the unit may not meet all specifications

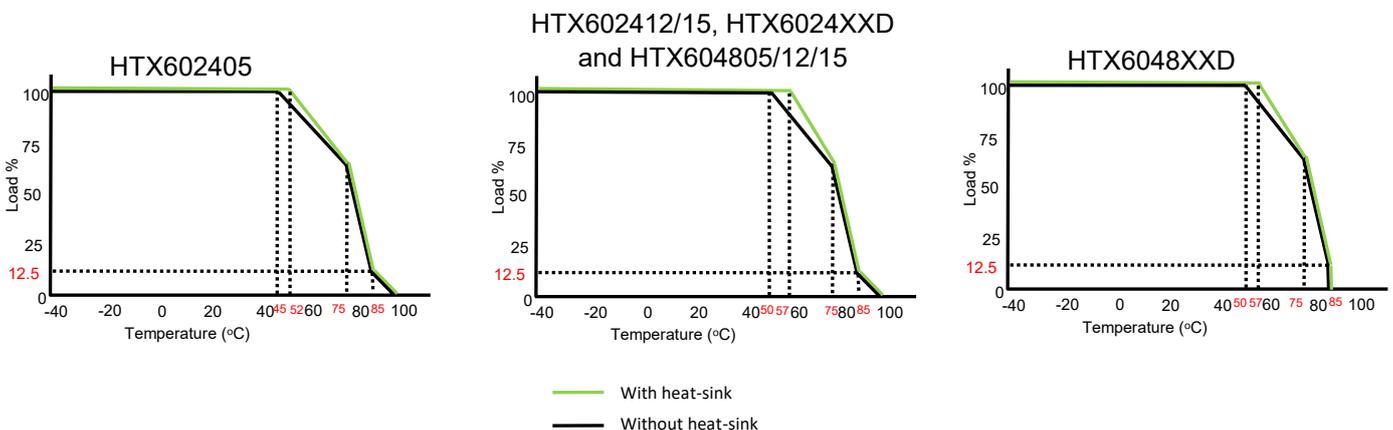
Undervoltage lock-out

Model	Voltage
24V Input ON/OFF	8.6Vdc / 7.9Vdc
48V Input ON/OFF	17.8Vdc / 16Vdc

Input

Parameter	Rating
Input voltage range	See table
Input reflected ripple current	20mA pk-pk through 1uH inductor and 22uF source capacitor (ESR<10hm @ 100KHz).
Input surge (100mS max)	24V Models 50VDC Max. 48V Models 100VDC Max.
Input filter	Pi type

Derating Curves



Output					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Output voltage	5		15	VDC	See Model & Ratings table
Set point accuracy			±1	%	
Line regulation			±0.5	%	Low line to High line
Load regulation			±0.5	%	Single outputs. 0 to 100% load change
			±1		Dual outputs. 0 to 100% load change
Cross regulation			±5	%	On dual output models when one load is varied by 25 to 100% and the other is 100% load.
Ripple & Noise			100	mV pk-pk	All models measured with 1uF capacitor. 20 MHz bandwidth
Overvoltage protection	5V output 6.2V, 12V output 15V, 15V output 20V.			VDC	
Transient response		±3		% Deviation	For a 25% load change, recovery to within 3% within 250uS typically
Short circuit protection					Continuous with automatic recovery
Maximum capacitive load					See Model and Ratings table
Remote on/off	ON:3 to 12Vdc or open circuit. OFF <1.2Vdc or short circuit pins 2 & 3. Off idle current :5mA typical.				
Output Trim	±10% please see p5 for details				

General					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency			93	%	See Model & Ratings table
Isolation			1600	VDC	Input to output
Isolation resistance	1000			M Ohm	
Isolation capacitance			2200	pF	
Switching frequency		225		kHz	
Power density			66.7	W/in ³	
MTBF		>210		KHrs	As per MIL-HDBK-217F, 25°C GB
Start up time		60		ms	Nominal Vin and constant resistive load

Environmental					
Parameter	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating temperature	-40		100	°C	Max. 50°C at 100% load. See derating curve pg1
Storage temperature	-55		125	°C	
Case temperature			110	°C	
Cooling					Convection cooled
Humidity			95	% RH	Non-condensing
Temperature coefficient			±0.02	%/°C	
Thermal Impedance	8.5		9.5	°C/W	8.5°C/W with heat-sink 9.5°C/W without heatsink

EMC: Emissions

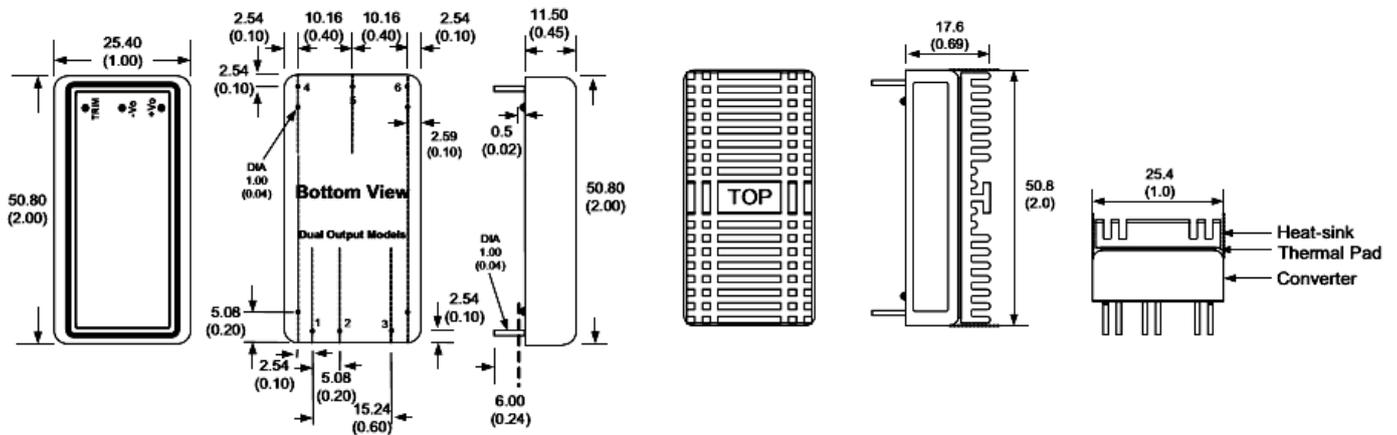
	Standard	Test level	Notes & Conditions
Conducted	EN55032	Class A	Extra components required please see p4 application notes
Radiated	EN55032	Class A	Extra components required please see p4 application notes

EMC: Immunity

	Standard	Test level	Criteria	Notes & Conditions
ESD	EN61000-4-2	3	A	8kV air discharge, 6kV contact discharge
Radiated	EN61000-4-3	3	A	80~1000 MHz, 10V/m, 80% AM (1kHz)
EFT/Burst	EN61000-4-4	3	A	Components required see p3. Power line : 2kV
Surges	EN61000-4-5	4	A	Components required see p3 .1.2/50 μ s Open Circuit Voltage, 8/20 μ s Short Circuit Current, DC Port, Line to line : 2.0kV
Conducted	EN61000-4-6	3	A	0.15 ~ 80 MHz, 10Vrms, 80% AM (1kHz)
Magnetic fields	EN61000-4-8	5	A	50Hz, 100A/m

Mechanical Details

With Heat Sink



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)

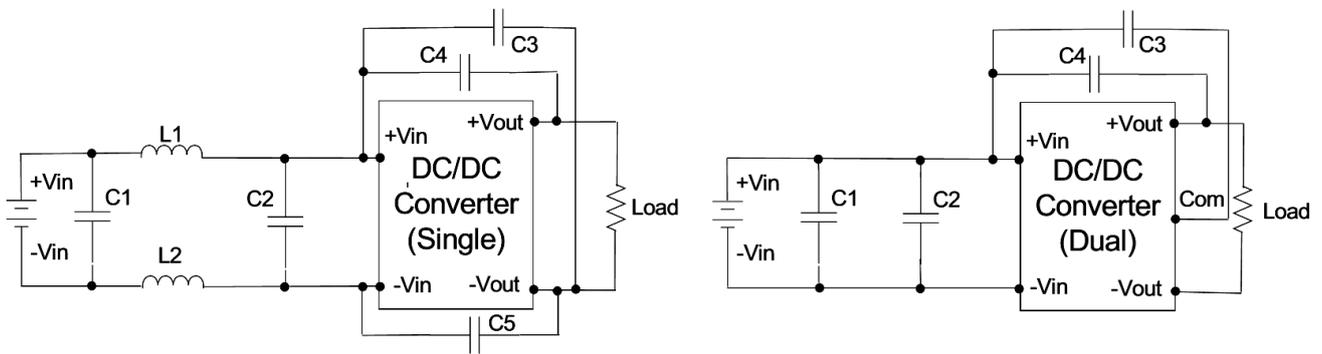
Pin Connections		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL	CTRL
4	+Vout	+Vout
5	-Vout	0V
6	Trim	-Vout

Physical	
Parameter	Rating
Case material	Copper
Pin material	1.0mm Brass solder coated
Potting material	Epoxy (UL94V-0)
Weight	45g
Dimensions	2.00 x 1.00 x 0.45"
Soldering temperature	1.5mm from case ,10s and 260°C max.

Application notes

EMI Filter

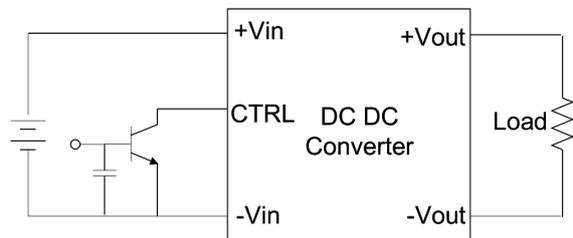
The input filter components must be fitted to help meet conducted emission requirements for the system. They should be mounted as close as possible to the module. Lead lengths should be minimized and where possible avoid running input and output tracks under the module as part of good design practice for best EMC performance. If the module is embedded in a system running from a AC/DC converter, this will have its own additional immunity protection and EMI filtering that will impact the overall system EMI performance.



Model number	C1	L1&2	C2	C3	C4	C5
HTX6024XX	1812, 4.7uF, 50V	12uH	1812, 4.7uF, 50V	1206, 470PF, 2KV	1206, 1000PF, 2KV	1206, 1000PF, 2KV
HTX6048XX	1812, 1.5uF, 100V	12uH	1812, 1.5uF, 100V	1206, 470PF, 2KV	1206, 1000PF, 2KV	1206, 1000PF, 2KV
HTX6024XXD	1812, 4.7uF, 50V		1812, 4.7uF, 50V	1206, 220PF, 2KV	1206, 1500PF, 2KV	
HTX6048D	1812, 1.5uF, 100V		1812, 4.7uF, 50V	1206, 220PF, 2KV	1206, 1500PF, 2KV	

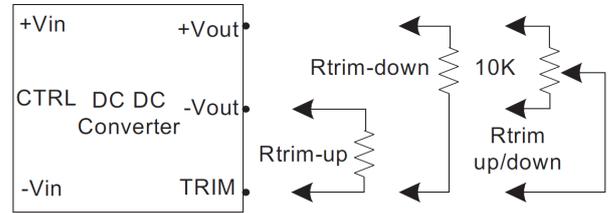
Remote on/off

The HTX60 series can be turned on and off using the remote on/off function. If Pin 3 is left open circuit or high impedance then the unit is ON. To turn off short pin 2 and 3 or supply 0-1.2V. Idle current 5mA typically.



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 $\pm 10\%$ of nominal the output voltage.



HTX60XX05

Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	4.95	4.9	4.85	4.8	4.75	4.7	4.65	4.6	4.55	4.5	Volts
Rtrim-down	151.458	133.906	83.261	59.01	44.786	35.435	28.819	23.892	20.079	17.042	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	5.05	5.1	5.15	5.2	5.25	5.3	5.35	5.4	5.45	5.5	Volts
Rtrim-up	256.848	37.895	23.952	16.708	12.271	9.273	7.113	5.482	4.207	3.183	KOhms

HTX60XX12

Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	11.88	11.76	11.64	11.52	11.4	11.28	11.16	11.04	10.92	10.8	Volts
Rtrim-down	638.7	309.724	198.291	142.236	108.494	85.954	69.831	57.727	48.305	40.763	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	12.12	12.240	12.36	12.48	12.6	12.72	12.84	12.96	13.08	13.2	Volts
Rtrim-up	215.446	97.176	58.401	39.133	27.61	19.944	14.476	10.379	7.195	4.649	KOhms

HTX60XX15

Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout=	14.85	14.7	14.55	14.4	14.25	14.1	13.95	13.8	13.65	13.5	Volts
Rtrim-down	842.916	431.715	283.823	207.666	161.238	129.974	107.488	90.539	77.305	6.6685	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	15.15	15.3	15.45	15.6	15.75	15.9	16.05	16.2	16.35	16.5	Volts
Rtrim-up	233.526	99.391	58.514	38.725	27.052	19.352	13.891	9.817	6.661	4.144	KOhms