

# HDD60 SERIES



## DC - DC CONVERTER

50 ~ 60W SINGLE, DOUBLE & TRIPLE OUTPUT

### FEATURES

- 50W TO 60W DC/DC CONVERTER
- 2:1 INPUT RANGE, Pi INPUT FILTER
- ISOLATION INPUT AND OUTPUT
- HIGH PERFORMANCE UP TO 86%
- SHORT CIRCUIT PROTECTION
- 2 YEARS WARRANTY

### MODEL LIST

MODEL NO.	INPUT VOLTAGE	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)
<b>Single Output Models</b>					
HDD60 - 12S05-X	9~18 VDC	60 WATTS	+ 5 VDC	12000 mA	79%
HDD60 - 12S12-X	9~18 VDC	60 WATTS	+ 12 VDC	5000 mA	82%
HDD60 - 12S15-X	9~18 VDC	60 WATTS	+ 15 VDC	4000 mA	82%
HDD60 - 12S24-X	9~18 VDC	60 WATTS	+ 24 VDC	2500 mA	84%
HDD60 - 24S05-X	18~36 VDC	60 WATTS	+ 5 VDC	12000 mA	80%
HDD60 - 24S12-X	18~36 VDC	60 WATTS	+ 12 VDC	5000 mA	84%
HDD60 - 24S15-X	18~36 VDC	60 WATTS	+ 15 VDC	4000 mA	84%
HDD60 - 24S24-X	18~36 VDC	60 WATTS	+ 24 VDC	2500 mA	85%
HDD60 - 48S05-X	36~72 VDC	60 WATTS	+ 5 VDC	12000 mA	83%
HDD60 - 48S12-X	36~72 VDC	60 WATTS	+ 12 VDC	5000 mA	85%
HDD60 - 48S15-X	36~72 VDC	60 WATTS	+ 15 VDC	4000 mA	85%
HDD60 - 48S24-X	36~72 VDC	60 WATTS	+ 24 VDC	2500 mA	86%
<b>Double Output Models</b>					
HDD60 - 12D05-X	9~18 VDC	50 WATTS	5V / 5V	5 A / 5 A	78%
HDD60 - 12D12-X	9~18 VDC	60 WATTS	12V / 12V	2.5A / 2.5A	80%
HDD60 - 12D15-X	9~18 VDC	60 WATTS	15V / 15V	2 A / 2 A	80%
HDD60 - 12D512-X	9~18 VDC	55 WATTS	5V / 12V	5 A / 2.5A	79%
HDD60 - 24D05-X	18~36 VDC	50 WATTS	5V / 5V	5 A / 5 A	80%
HDD60 - 24D12-X	18~36 VDC	60 WATTS	12V / 12V	2.5A / 2.5A	82%
HDD60 - 24D15-X	18~36 VDC	60 WATTS	15V / 15V	2 A / 2 A	82%
HDD60 - 24D512-X	18~36 VDC	60 WATTS	5V / 12V	6 A / 2.5A	80%
HDD60 - 48D05-X	36~72 VDC	50 WATTS	5V / 5V	5 A / 5 A	80%
HDD60 - 48D12-X	36~72 VDC	60 WATTS	12V / 12V	2.5A / 2.5A	84%
HDD60 - 48D15-X	36~72 VDC	60 WATTS	15V / 15V	2 A / 2 A	84%
HDD60 - 48D512-X	36~72 VDC	60 WATTS	5V / 12V	6 A / 2.5A	81%

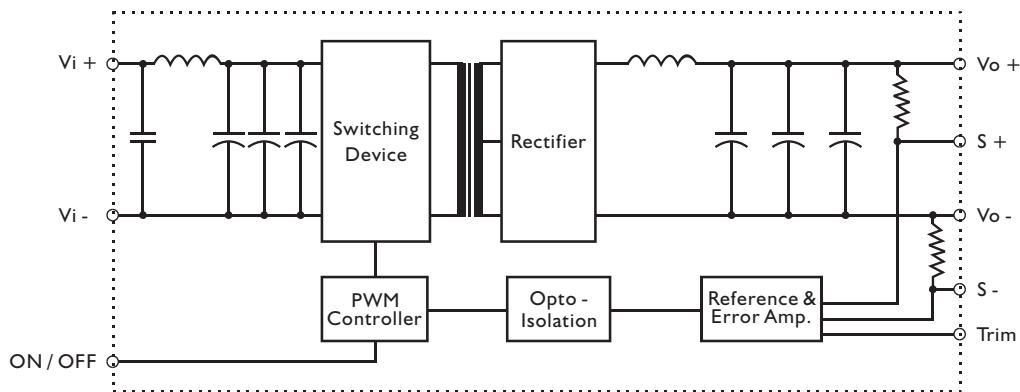
## MODEL LIST

MODEL NO.	INPUT VOLTAGE	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)
<b>Triple Output Models</b>					
HDD60 - 12T512-X	9~18 VDC	55 WATTS	+ 5V / $\pm$ 12V	+ 5A / $\pm$ 1.25A	78%
HDD60 - 24T512-X	18~36 VDC	55 WATTS	+ 5V / $\pm$ 12V	+ 5A / $\pm$ 1.25A	79%
HDD60 - 48T512-X	36~72 VDC	55 WATTS	+ 5V / $\pm$ 12V	+ 5A / $\pm$ 1.25A	80%

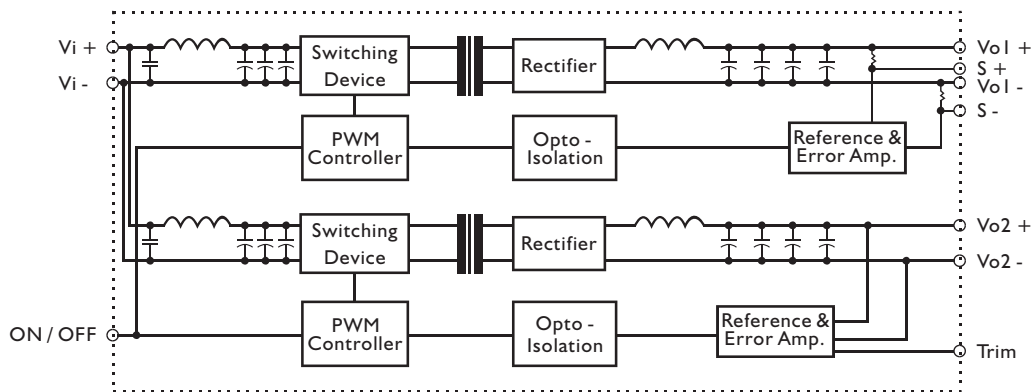
- SUFFIX "X=P" : PCB MOUNTING TYPE, HEAT SINK WILL BE ADDED ON MODULE.
- SUFFIX "X=T" : CHASSIS MOUNTING TYPE:(TERMINAL BLOCK), NO HEAT SINK.  
USE CHASSIS AS HEAT SINK OR FAN FORCE COOLING.  
INDICATE SUFFIX WHEN ORDER.

## CIRCUIT SCHEMATIC

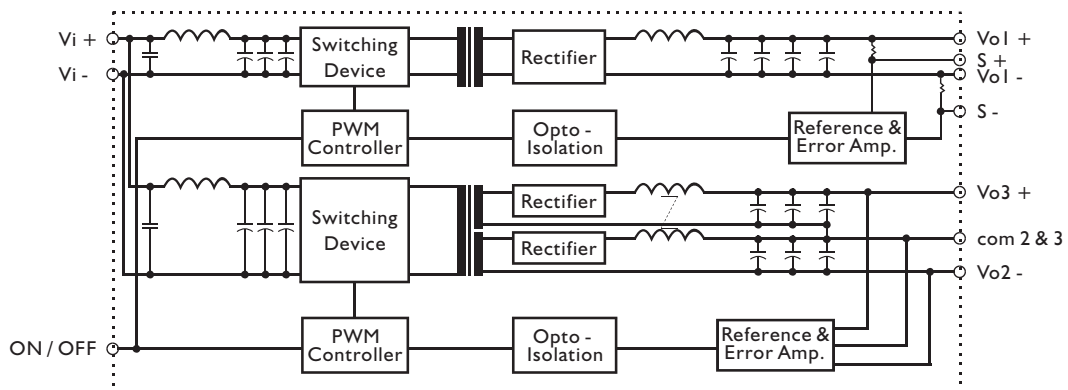
- Block diagram for HDD60 series with single output



- Block diagram for HDD60 series with double output



- Block diagram for HDD60 series with triple output



### SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

#### GENERAL

Characteristics	Conditions	min.	typ.	max.	unit
Switching frequency	Vi nom, Io nom		80		KHz
Isolation voltage	Input / Output	1,500			VDC
Isolation resistance	Input / Output, @ 500VDC	1G			Ω
Ambient temperature	Operating at Vi nom, Io nom	-25		+ 71	°C
Case temperature	Operating at Vi nom, Io nom			+ 95	°C
Derating	Vi nom	See derating curve			% / °C
Storage temperature	Non operational	-25		+ 100	°C
Dimension	L88.9 x W139.7 x H35.6 for "P" type				mm
	L88.9 x W139.7 x H32.9 for "T" type				mm
Cooling	Free air convection				
Case material	Metal				

#### INPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Input voltage range	Ta min ... Ta max, Io nom	9	12	18	VDC
		18	24	36	VDC
		36	48	72	VDC
No load input current	Vi nom, Io = 0	12V models		20	mA
		24V models		15	mA
		48V models		10	mA
Input voltage w/o damage	Io nom	12V models		20	VDC
		24V models		40	VDC
		48V models		75	VDC
Input filter	Pi type				

#### OUTPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Output voltage accuracy	Vi nom, Io nom			± 1	%
Minimum load	Vi nom	single & double output models	0		%
		+ 5V of triple output	0		%
		± 12V of triple output	20		%
Line regulation	Io nom, Vi min ... Vi max			± 1	%
Load regulation	Vi nom, Io min ... Io nom	single output models		± 2	%
		double output models		± 2	%
		triple output models		± 5	%
Transient recovery time	25% load, step changed		500		μS
Temperature coefficient	Vi nom, Io nom			± 0.02	% / °C
Ripple & noise	Vi nom, Io nom, BW = 20MHz			Vout x ± 1%	mV
Voltage trim range	Vi nom		10		%
Efficiency	Vi nom, Io nom, Po / Pi	Up to 86%, See model list			

## SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

### CONTROL AND PROTECTION

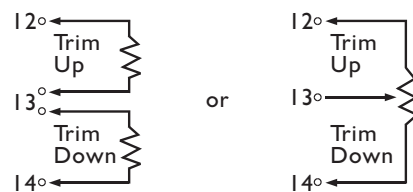
Remote ON / OFF	ON: opened or +5.5VDC applied, reference to input GND OFF: -1.8VDC applied, reference to input GND
Input reversed	Shunt diode built in, external fuse recommended
Output short circuit	Continuous

## MECHANISM & PIN CONFIGURATION

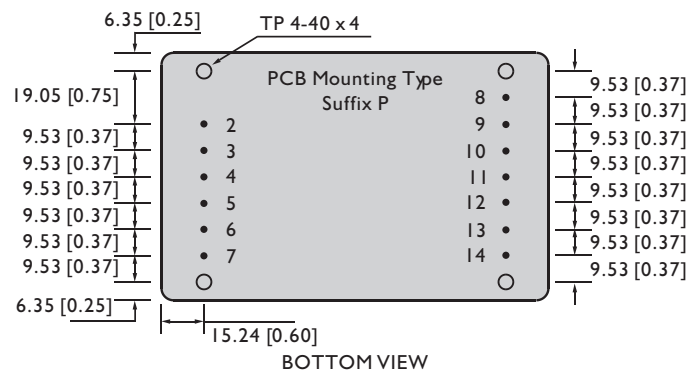
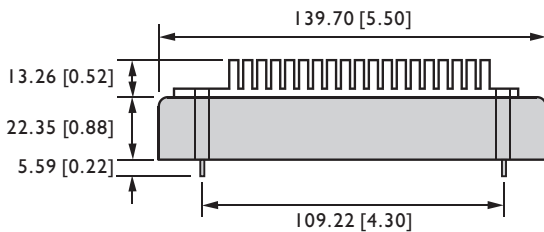
### REMOTE ON / OFF CONTROL

TERMINAL 6 CONTROL  
 LOGIC COMPATIBILITY : .....OPEN COLLECTOR TTL  
 CONTROL VOLTAGE. ON +5.5V MIN. OR OPEN CIRCUIT.  
 OFF ..... +1.8V MAX.  
 CONVERTER SHUTDOWN IDLE CURRENT .....10 mA  
 CONTROL COMMON .....INPUT TERMINAL 2

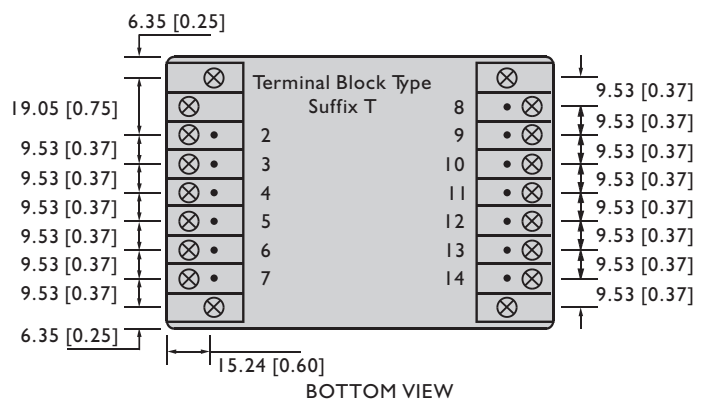
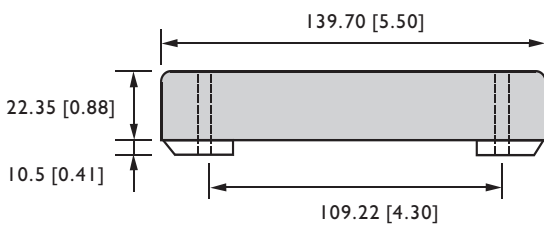
### EXTERNAL OUTPUT TRIMMING



CASE : HH 60-P



CASE : HH 60- T



## PHYSICAL CHARACTERISTICS

CASE SIZE	88.9 x 139.7 x 35.6 mm 3.5 x 5.5 x 1.4 inches for "P" type
	88.9 x 139.7 x 32.9 mm 3.5 x 5.5 x 1.29 inches for "T" type
CASE MATERIAL	Metal
WEIGHT	690 g for "P" type / 570 g for "T" type

## PIN ASSIGNMENT

GENERAL			
PIN NO.	SINGLE	DOUBLE	TRIPLE
1	NO PIN	NO PIN	NO PIN
2 & 3	Vi -	Vi -	Vi -
4 & 5	Vi +	Vi +	Vi +
6	REMOTE ON/OFF CONTROL		
7	N. C.	N. C.	N. C.
8	Vo -	SENSORI -	SENSORI -
9	Vo -	VoI -	VoI -
10	Vo +	VoI +	VoI +
11	Vo +	SENSORI +	SENSORI +
12	SENSOR -	Vo2 -	Vo2 -
13	Trim	Trim	Com2 & 3
14	SENSOR +	Vo2 +	Vo3 +

## DERATING

