

# 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.)
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#### Single Output Models

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%

#### Double Output Models

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%



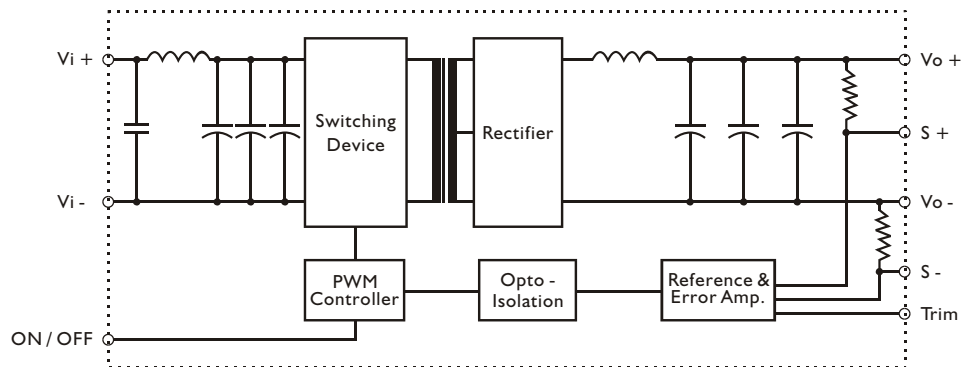
## MODEL LIST

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%

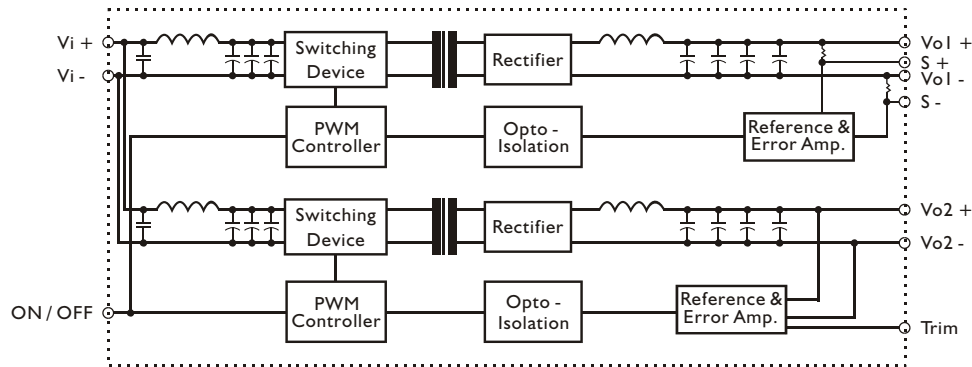
- SUFFIX "X=P" : PCB MOUNTING TYPE, HEAT SINK WILL BE ADDED ON MODULE.
- SUFFIX "X=T" : CHASSIS MOUNTING TYPE:(TERMINAL BLOCK), NO HEAT SINK.  
USE CHASSIS AS HEAT SINK OR FAN FORCE COOLING.  
INDICATE SUFFIX WHEN ORDER.

## CIRCUIT SCHEMATIC

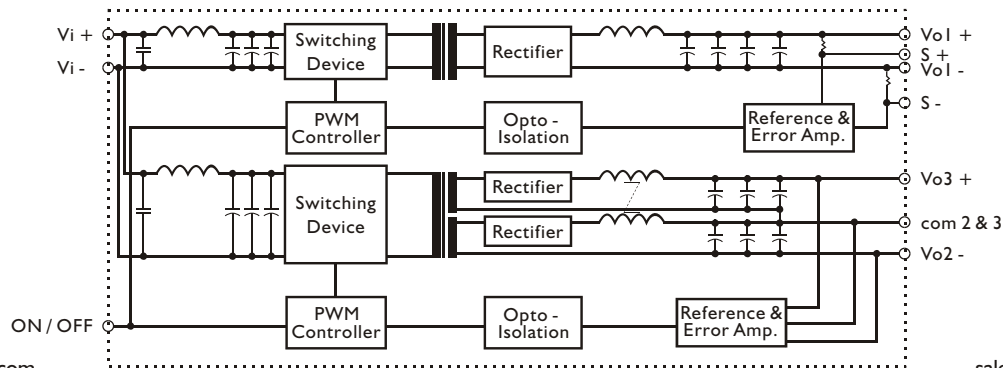
- Block diagram for HDD60 series with single output



- 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
M.T.B.F.	According to MIL-HDBK-217F, GF40		122,500		Hrs
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

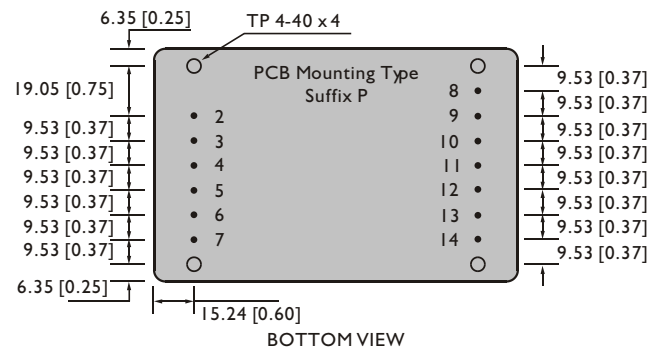
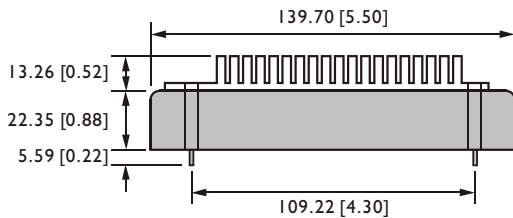
## MECHANISM & PIN CONFIGURATION

**REMOTE ON / OFF CONTROL**

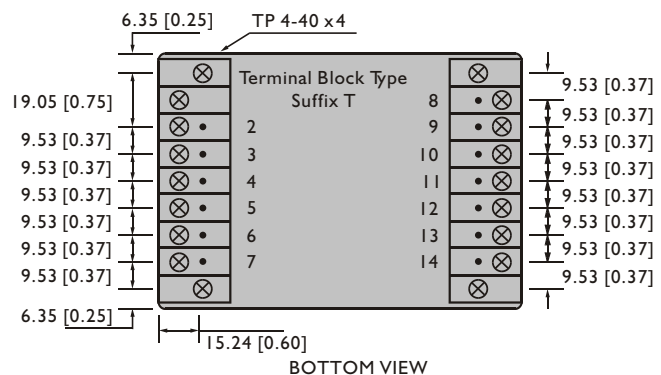
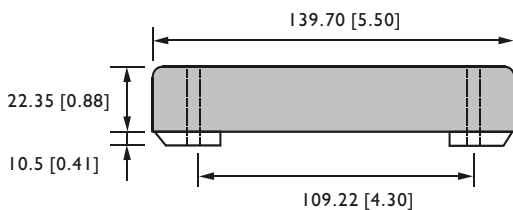
TERMINAL 6 CONTROL  
 LOGIC COMPATIBILITY : .....OPEN COLLECTOR TTL  
 CONTROL VOLTAGE. ON +5.5V MIN. OR OPEN CIRCUIT.  
 OFF .....+1.8V MAX.  
 CONVERTER SHUTDOWN IDLE CURRENT ..... 10 mA  
 CONTROL COMMON .....INPUT TERMINAL 2

**EXTERNAL OUTPUT TRIMMING**

CASE : HH- P- 60



CASE : HH- 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 -	SENSOR1 -	SENSOR1 -
9	Vo -	Vo1 -	Vo1 -
10	Vo +	Vo1 +	Vo1 +
11	Vo +	SENSOR1 +	SENSOR1 +
12	SENSOR -	Vo2 -	Vo2 -
13	Trim	Trim	Com2 & 3
14	SENSOR +	Vo2 +	Vo3 +

## DERATING

