

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.) |
|-----------|---------------|----------------|----------------|----------------|-------------|
|-----------|---------------|----------------|----------------|----------------|-------------|

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% |



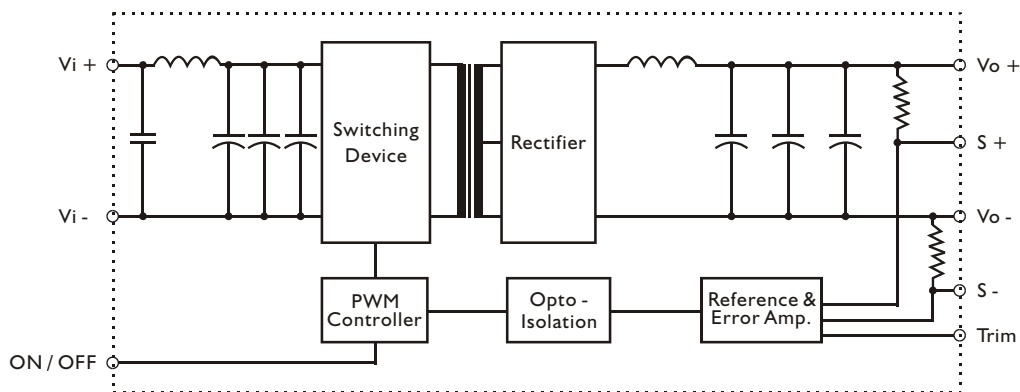
MODEL LIST

| MODEL NO. | INPUT VOLTAGE | OUTPUT WATTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | EFF. (min.) |
|-----------------------------|---------------|----------------|------------------|--------------------|-------------|
| Triple Output Models | | | | | |
| 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% |

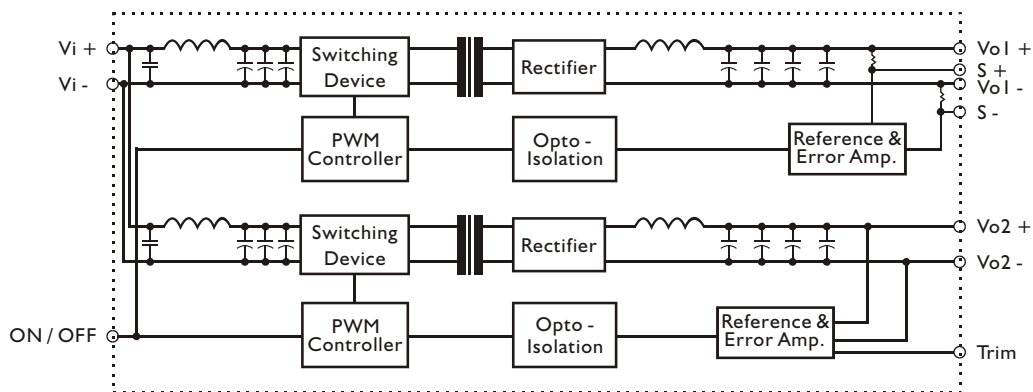
- SUFFIX "X=P" : PCB MOUNTING TYPE, HEAT SINK WILL BE ADDED ON MODULE.
- SUFFIX "X=T" : CHASSIS MOUNTING TYPE:(TERMINAL BLOCK), NO HEAT SINK.
USE CHASSIS AS HEAT SINK OR FAN FORCE COOLING.
INDICATE SUFFIX WHEN ORDER.

CIRCUIT SCHEMATIC

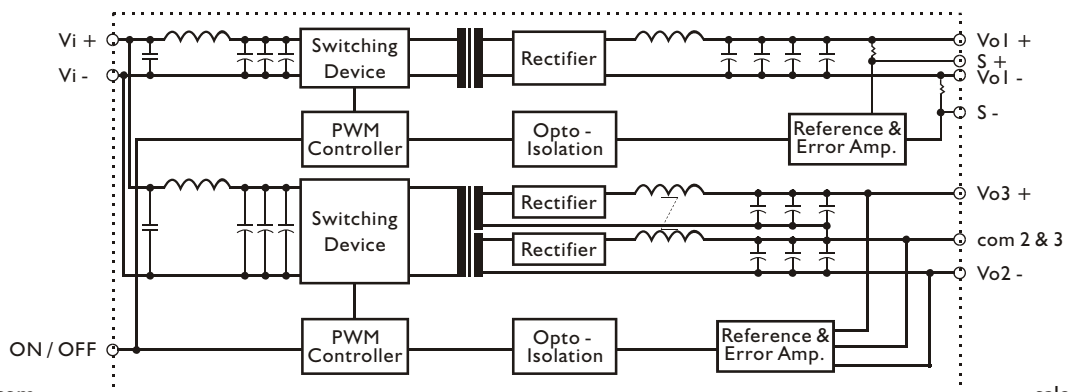
- Block diagram for HDD60 series with single output



- 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

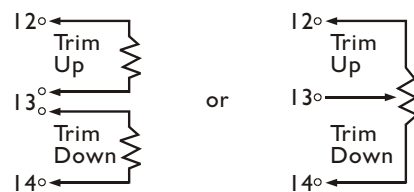
| | |
|----------------------|---|
| Remote ON / OFF | ON: opened or +5.5VDC applied, reference to input GND OFF: -1.8VDC applied, reference to input GND |
| Input reversed | Shunt diode built in, external fuse recommended |
| Output short circuit | Continuous |

MECHANISM & PIN CONFIGURATION

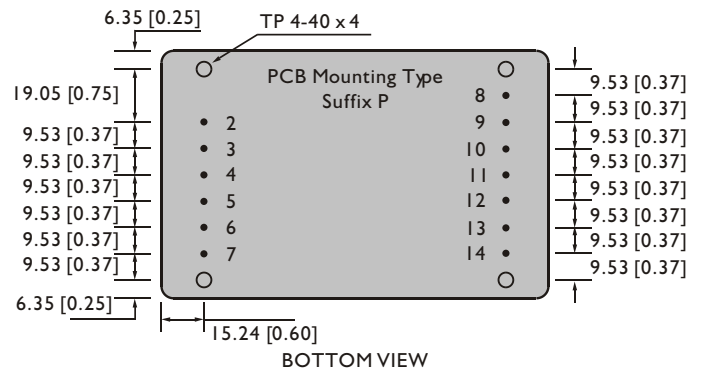
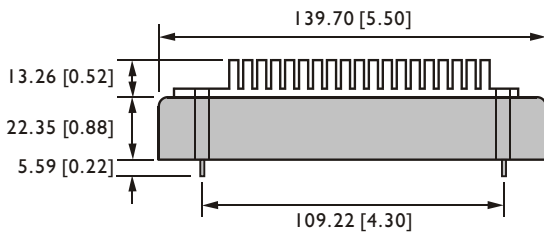
REMOTE ON / OFF CONTROL

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 COMMONINPUT TERMINAL 2

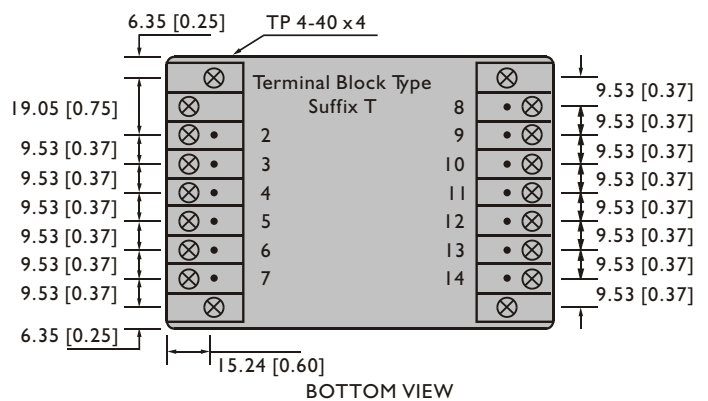
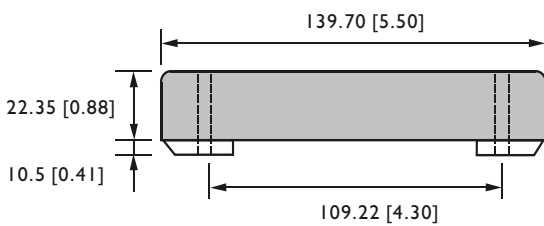
EXTERNAL OUTPUT TRIMMING



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 - | 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

