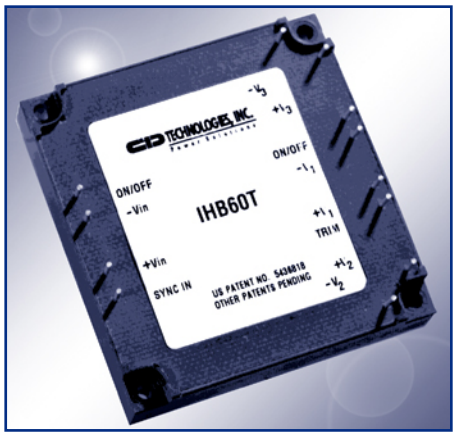
C&D TECHNOLOGIES
Power Solutions

Corporate: www.cdtechno.com
Product: www.cdpowerelectronics.com

IHB60T

60 Watt Triple Output Half Brick DC/DC Converter



- 18 - 40 & 33 - 75V Input Range
- Each Channel Independently Current Limited
- High Efficiency: 87% Typical
- 1500VDC Isolation Between Input and Output
- Operation to 100°C Baseplate Temperature
- 50µS Transient Recovery, 0-90% Load Step
- Primary & Secondary Remote On/Off
- IHB60T48 Series Approved to UL/CUL 1950, EN60950

The IHB60T series triple output standard half brick modules are designed for today's demanding industrial applications. Available in two wide range inputs, these isolated converters offer many features in the standard models. With a complement of safety agency approvals and low noise operations, the converters respond extremely fast to change in load conditions. Inherent in the design are very well-controlled output voltages and minimal need for minimum loading on main (V1) output.

PRODUCT SELECTION CHART

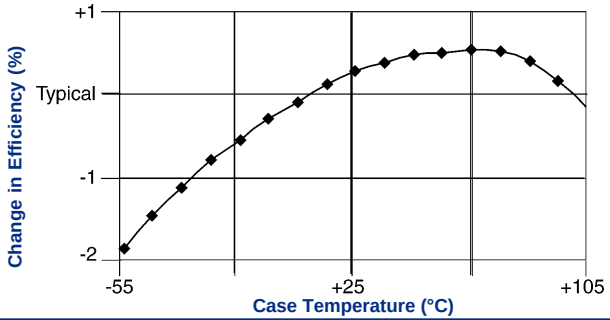
MODEL	INPUT VOLTAGE (VDC)	RATED VOUT (VDC)			RATED MAXIMUM IOUT (A)		
		V1 (±)	V2 (±)	V3 (±)	V1(±)	V2(±)	V3(±)
IHB60T240312	24 (18-40)	3.3	12	12	18	2.5	2.5
IHB60T240315	24 (18-40)	3.3	15	15	18	2.0	2.0
IHB60T240512	24 (18-40)	5.1	12	12	12	2.5	2.5
IHB60T240515	24 (18-40)	5.0	15	15	12	2.0	2.0
IHB60T480312	48 (33-75)	3.3	12	12	18	2.5	2.5
IHB60T480315	48 (33-75)	3.3	15	15	18	2.0	2.0
IHB60T480512	48 (33-75)	5.1	12	12	12	2.5	2.5
IHB60T480515	48 (33-75)	5.0	15	15	12	2.0	2.0

ABSOLUTE MAX. RATINGS

Output Short-Circuit Duration	Continuous
Baseplate Temperature	+100°C
Lead Temperature (soldering, 10 seconds max)	+300°C
Storage Temperature	+125°C
Input to Output Isolation	1500 VDC

EFFICIENCY vs TEMPERATURE

T_{CASE} = +40°C, nominal input voltage, nominal load, recommended external components applied, unless otherwise specified.*



SPECIFICATIONS, ALL MODELS

Specifications are at T_{CASE} = +40°C nominal input voltage unless otherwise specified.

INPUT

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Voltage Range					
IHB60T24XX Series		18	24	40	VDC
IHB60T48XX Series		33	48	75	VDC
Reflected Ripple Current	Peak - Peak			220	mA
Input Ripple Rejection	DC to 1KHz	50	60		dB
Maximum Input Current	Output Power = 60W				
IHB60T24XX Series	V_{IN} = 16V			6	A
IHB60T48XX Series	V_{IN} = 30V			3	A
No Load Power Dissipation	P_{OUT} = 0, $V_{IN,Min} < V_{IN} < V_{IN,Max}$			6	W
Inrush Charge					
IHB60T24XX Series				0.29	mC
IHB60T48XX Series				0.165	mC
Quiescent Operating Current					
Primary On/Off Disabled			7.5	10	mA
Secondary On/Off Disabled			15	25	mA

GENERAL

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
ISOLATION					
Input to Output	Peak Test	1500			VDC
Input to Baseplate		1500			VDC
Channel to Channel	Any Channel to Any Channel	500			VDC
Resistance, Input - Output		10			MΩ
Capacitance, Input - Output			2000		pF
Leakage Current	V_{ISO} = 240VAC, 60Hz		180		µA, rms
GENERAL					
Set Point Accuracy	V_{IN} = Nominal, 50% Load			1	%
Turn-on Time	Within 1% of Nominal V_{OUT}		3.5	5	mSec
Remote On/Off Control Inputs					
Primary	Open Collector/Drain				
Sink Current-Logic Low	$V_{IN} = V_{MAX}$			7	mA
Vlow				0.8	V
Vhigh				Open Collector	
Secondary	Open Collector/Drain				
Sink Current-Logic Low				100	µA
Vlow				0.4	V
Vhigh				Open Collector	
External Synchronization Input					
Frequency		440		520	KHz
Pulse Width		150		320	nSec
Source Impedence				47	Ω
Input High Voltage		4		5	V
Input Low Voltage		0		1	V
Input Impedance			470		Ω
Switching Frequency		470	480	490	KHz
Weight				3 (85)	oz (g)
TEMPERATURE	Case Temperature				
Operation/Specification		-40		+100	°C
Storage		-55		+125	°C
Shutdown		+100		+115	°C
Thermal Inpedance	Case to Ambient		8.2		°C/W

IHB60TX0312** OUTPUT

PARAMETER	CONDITIONS	V1 Min	V1 Nom	V1 Max	V2 Min	V2 Nom	V2 Max	V3 Min	V3 Nom	V3 Max	UNITS
Output Power	Total Combined O/P Power = 60 Watts Max.		30	60		15	30		15	30	W
Set Point Voltage	$I_{O\,Nom}$		3.3			12.2			12.2		V
Output Current, I_{OUT}		0.5	9	18	0	1.25	2.5	0	1.25	2.5	A
Output Ripple, p-p	DC to 20MHz*		100	200		150	250		150	250	mV
Output Adjust Range	*	3.15		3.80		Dependent on V1					V
Output Temperature Drift			.02	.05		.02	.05		.02	.05	%/°C
Line Regulation	$V_{IN,Min} \le V_{IN} \le V_{IN,Max}$ $I_O = I_{O,Nom}$		0.05	1.0		1.0	2.0		1.0	2.0	%
Load Regulation	Min Load to Rated Load		0.50	1.0	See Regulation Curves			See Regulation Curves			%
Current Limit Inception	Other Outputs Min Load		23			5.0			5.0		A
Short-Circuit Current			19	25		4.0	5.0		4.0	5.0	A
Transient Response	50 to 100% Load Step										
Peak Deviation			150	250							mV
Settling Time	V_{OUT}, 1% of $V_{OUT,Nom}$		35	50							µSec
Overvoltage Limit		4.2		5.0							V
Efficiency	I_{OUT1}=9A, (I_{OUT2}+I_{OUT3})=2.5A F.L. V_{IN}=Nominal	85	86								%

* See Application Notes available on the web at www.cdpowerelectronics.com

** X = Either 24 or 48

SPECIFICATIONS, ALL MODELS

Specifications are at T_{CASE} = +40°C nominal input voltage unless otherwise specified.

IHB60TX0315** OUTPUT

PARAMETER	CONDITIONS	V1 Min	V1 Nom	V1 Max	V2 Min	V2 Nom	V2 Max	V3 Min	V3 Nom	V3 Max	UNITS
Output Power	Total Combined O/P Power = 60 Watts Max.		30	60		15	30		15	30	W
Set Point Voltage	$I_{O\,Nom}$		3.3			15.85			15.85		V
Output Current, I_{OUT}		0.5	9	18	0	1	2	0	1	2	A
Output Ripple, p-p	DC to 20MHz*		100	200		125	250		125	250	mV
Output Adjust Range	See Application Notes*	3.15		3.80		Dependent on V1					V
Output Temperature Drift			.02	.05		.02	.05		.02	.05	%/°C
Line Regulation	$V_{IN,Min} \le V_{IN} \le V_{IN,Max}$ $I_O = I_{O,Nom}$		0.05	1.0		1.0	2.0		1.0	2.0	%
Load Regulation	Min Load to Rated Load		0.50	1.0	See Regulation Curves			See Regulation Curves			%
Current Limit Inception	Other Outputs Min Load		23			4.0			4.0		A
Short-Circuit Current			19	25		3.2	4.0		3.2	4.0	A
Transient Response Peak Deviation	50 to 100% Load Step		150	250							mV
Settling Time	V_{OUT}, 1% of $V_{OUT,Nom}$		35	50							µSec
Overvoltage Limit		4.2		5.0							V
Efficiency	I_{OUT1}=9A, (I_{OUT2}+I_{OUT3})=2A F.L. V_{IN}=Nominal	85	86								%

IHB60TX0512** OUTPUT

PARAMETER	CONDITIONS	V1 Min	V1 Nom	V1 Max	V2 Min	V2 Nom	V2 Max	V3 Min	V3 Nom	V3 Max	UNITS
Output Power	Total Combind O/P Power = 60 Watts Max		30	60		15	30		15	30	W
Set Point Voltage	$I_{O\,Nom}$		5.1			12			12		V
Output Current, I_{OUT}		0.5	6.0	12	0	1.25	2.5	0	1.25	2.5	A
Output Ripple, p-p	DC to 20MHz*		125	200		150	250		150	250	mV
Output Adjust Range	*	4.75		5.50		Dependent on V1					V
Output Temperature Drift			.02	.05		.02	.05		.02	.05	%/°C
Line Regulation	$V_{IN,Min} \le V_{IN} \le V_{IN,Max}$ $I_O = I_{O,Nom}$		0.05	0.10		1.0	2.0		1.0	2.0	%
Load Regulation	Min Load to Rated Load		0.50	1.0	See Regulation Curves			See Regulation Curves			%
Current Limit Inception	Other Outputs Min Load		16			5.0			5.0		A
Short-Circuit Current			12.6	16		4.0	5.0		4.0	5.0	A
Transient Response Peak Deviation	50 to 100% Load Step		200	300							mV
Settling Time	V_{OUT}, 1% of $V_{OUT,Nom}$		35	50							µSec
Overvoltage Limit		6.0		6.8							V
Efficiency	I_{OUT1}=6A, (I_{OUT2}+I_{OUT3})=2.5A F.L. V_{IN}=Nominal	86	87								%

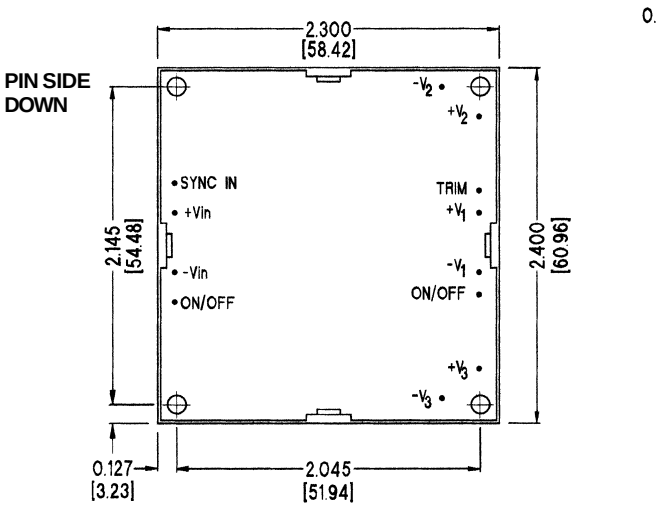
IHB60TX0515** OUTPUT

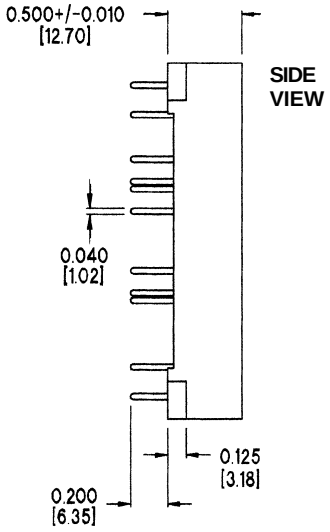
PARAMETER	CONDITIONS	V1 Min	V1 Nom	V1 Max	V2 Min	V2 Nom	V2 Max	V3 Min	V3 Nom	V3 Max	UNITS
Output Power	Total Combined O/P Power = 60 Watts Max		30	60		15	30		15	30	W
Set Point Voltage	$I_{O\,Nom}$		5.0			15.3			15.3		V
Output Current, I_{OUT}		0.5	6	12	0	1	2	0	1	2	A
Output Ripple, p-p	DC to 20MHz*		100	200		125	250		125	250	mV
Output Adjust Range	*	4.60		5.50		Dependent on V1					V
Output Temperature Drift			.02	.05		.02	.05		.02	.05	%/°C
Line Regulation	$V_{IN,Min} \le V_{IN} \le V_{IN,Max}$ $I_O = I_{O,Nom}$		0.05	0.10		1.0	2.0		1.0	2.0	%
Load Regulation	Min Load to Rated Load		0.50	1.0	See Regulation Curves			See Regulation Curves			%
Current Limit Inception	Other Outputs Min Load		16			4.0			4.0		A
Short-Circuit Current			12.6	16		3.2	4.0		3.2	4.0	A
Transient Response Peak Deviation	50 to 100% Load Step		200	300							mV
Settling Time	V_{OUT}, 1% of $V_{OUT,Nom}$		35	50							µSec
Overvoltage Limit		6.0		6.8							V
Efficiency	I_{OUT1}=6A, (I_{OUT2}+I_{OUT3})=2A F.L. V_{IN}=Nominal	86	87								%

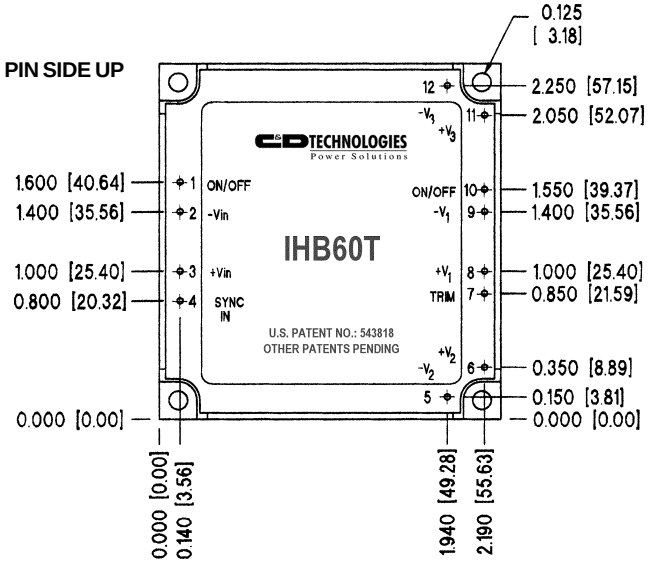
* See Application Notes available on the web at www.cdpowerelectronics.com

** X = Either 24 or 48

MECHANICAL







PIN CONNECTIONS	
1	PRIMARY ON/OFF
2	-VIN
3	+VIN
4	SYNC IN
5	-V2
6	+V2
7	TRIM
8	+V1
9	-V1
10	SECONDARY ON/OFF
11	+V3
12	-V3

NOTES:
All dimensions are in inches (millimeters).
PIN PLACEMENT TOLERANCE: ± 0.005"
MECHANICAL TOLERANCE: ± 0.015"
Marked with: specific model ordered, date code, job code.

MATERIAL: Units are encapsulated in a low thermal resistance molding compound which has excellent chemical resistance and electrical properties in high humidity environments and over a wide operating temperature range. The encapsulant and outer shell of the unit have UL94V-0 ratings. Lead material is solder plated to allow ease of solderability.

C&D Technologies (Power Electronics) Ltd.
Shannon, Co. Clare, Ireland
Tel: +353.61.474.133 Fax:+353.61.474.141

Power Electronics Division, United States
3400 E Britannia Drive, Tucson, Arizona 85706
Tel: 800.547.2537 Fax: 520.770.9369

C&D Technologies, (NCL)
Milton Keynes MK14 5BU UK
Tel: +44 (0)1908 615232 Fax: +44 (0)1908 617545

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