

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

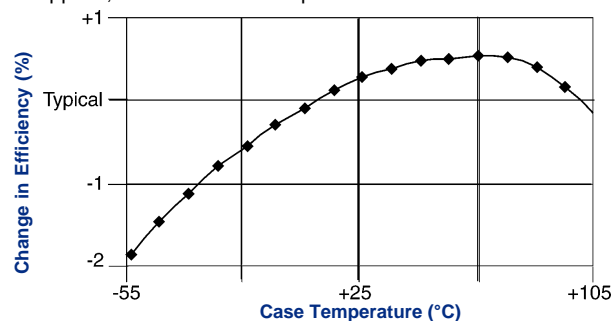
MODEL	INPUT VOLTAGE (VDC)	RATED VOUT (VDC)			RATED MAXIMUM IOUT (A)		
		V1 (±)	V2 (±)	V3 (±)	V1(±)	V2(±)	V3(±)
IHB60T240312	24 (18-40)	3.3	12	12	18	2.5	2.5
IHB60T240315	24 (18-40)	3.3	15	15	18	2.0	2.0
IHB60T240512	24 (18-40)	5.1	12	12	12	2.5	2.5
IHB60T240515	24 (18-40)	5.0	15	15	12	2.0	2.0
IHB60T480312	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 $T_{CASE} = +40^{\circ}C$ nominal input voltage unless otherwise specified.

	PARAMETER	CONDITIONS	MIN			TYP			MAX			UNITS
			MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	
INPUT	Voltage Range											
	IHB60T24XX Series		18		24		40		V _{DC}			
	IHB60T48XX Series		33		48		75		V _{DC}			
	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			

	PARAMETER	CONDITIONS	MIN			TYP			MAX			UNITS
			MIN	NOM	MAX	MIN	NOM	MAX	MIN	NOM	MAX	
GENERAL	ISOLATION											
	Input to Output	Peak Test	1500									V _{DC}
	Input to Baseplate		1500									V _{DC}
	Channel to Channel	Any Channel to Any Channel	500									V _{DC}
	Resistance, Input - Output		10									MΩ
	Capacitance, Input - Output					2000						pF
	Leakage Current	$V_{ISO} = 240V_{AC}, 60Hz$				180						μA, rms
	GENERAL											
	Set Point Accuracy	$V_{IN} = \text{Nominal}, 50\% \text{ Load}$							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 Impedance								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 Impedance		Case to Ambient				8.2						°C/W

	PARAMETER	CONDITIONS	V1			V2			V3			UNITS
			Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	
IHB60TX0312**	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							V
	Output Temperature Drift		.02	.05		.02	.05		.02	.05		%/°C
	Line Regulation	$V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$	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	$V_{OUT}, 1\% \text{ of } V_{OUT,Nom}$	35	50								μSec	
Overvoltage Limit		4.2	5.0								V	
Efficiency	$I_{OUT1}=9A, (I_{OUT2}+I_{OUT3})=2.5A$ F.L. $V_{IN}=\text{Nominal}$	85	86								%	

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

** X = Either 24 or 48

SPECIFICATIONS, ALL MODELS

Specifications are at $T_{CASE} = +40^{\circ}C$ nominal input voltage unless otherwise specified.

PARAMETER	CONDITIONS	V1			V2			V3			UNITS	
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max		
IHB60TX0315** OUTPUT	Output Power	Total Combined O/P Power = 60 Watts Max.									W	
	Set Point Voltage	$I_{O,Nom}$			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*									mV	
	Output Adjust Range	See Application Notes*									V	
	Output Temperature Drift	Dependent on V1									%/°C	
	Line Regulation	$V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$	0.05	1.0	1.0	2.0	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			3.2			4.0			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	$I_{OUT1}=9A, (I_{OUT2}+I_{OUT3})=2A$ F.L. V_{IN} =Nominal	85	86								%

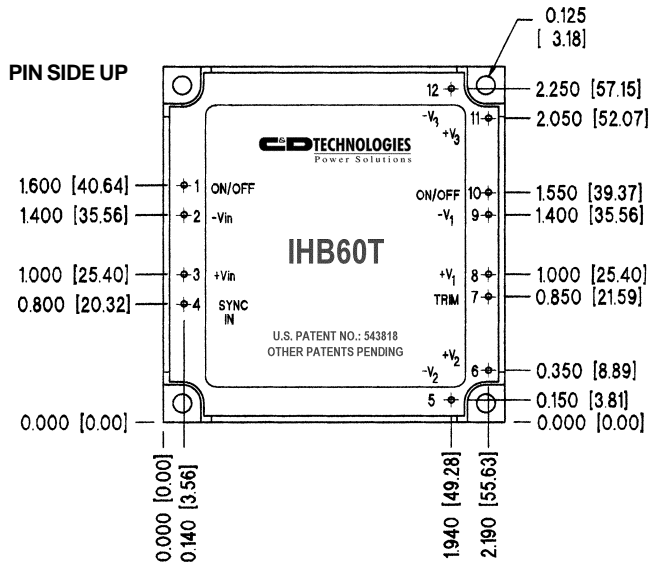
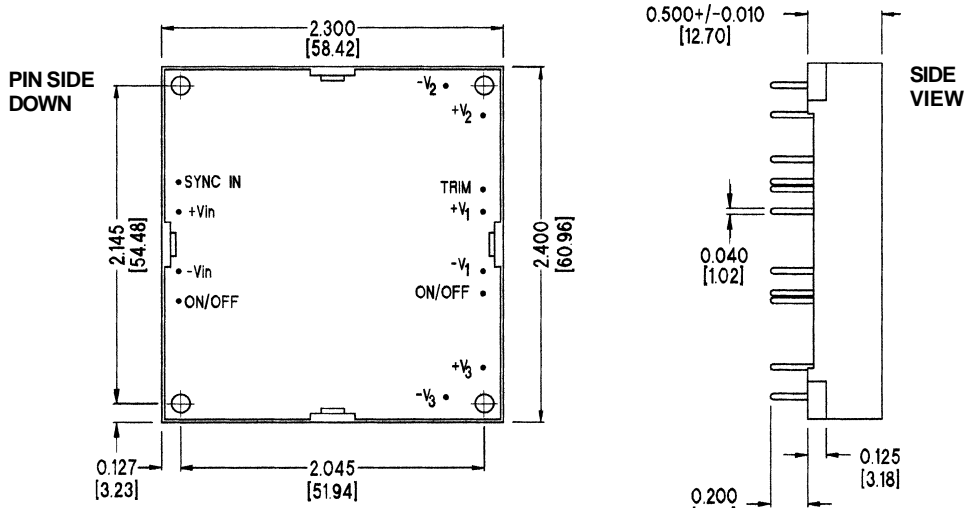
PARAMETER	CONDITIONS	V1			V2			V3			UNITS	
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max		
IHB60TX0512** OUTPUT	Output Power	Total Combined O/P Power = 60 Watts Max									W	
	Set Point Voltage	$I_{O,Nom}$			12			12			V	
	Output Current, I_{OUT}	0.5	6.0	12	0	1.25	2.5	0	1.25	2.5	A	
	Output Ripple, p-p	DC to 20MHz*									mV	
	Output Adjust Range	* Dependent on V1									V	
	Output Temperature Drift	Dependent on V1									%/°C	
	Line Regulation	$V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$	0.05	0.10	1.0	2.0	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	16			5.0			5.0			A
	Short-Circuit Current		12.6			4.0			5.0			A
	Transient Response	50 to 100% Load Step										
	Peak Deviation		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								%

PARAMETER	CONDITIONS	V1			V2			V3			UNITS	
		Min	Nom	Max	Min	Nom	Max	Min	Nom	Max		
IHB60TX0515** OUTPUT	Output Power	Total Combined O/P Power = 60 Watts Max									W	
	Set Point Voltage	$I_{O,Nom}$			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*									mV	
	Output Adjust Range	* Dependent on V1									V	
	Output Temperature Drift	Dependent on V1									%/°C	
	Line Regulation	$V_{IN,Min} \leq V_{IN} \leq V_{IN,Max}$ $I_O = I_{O,Nom}$	0.05	0.10	1.0	2.0	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	16			4.0			4.0			A
	Short-Circuit Current		12.6			3.2			4.0			A
	Transient Response	50 to 100% Load Step										
	Peak Deviation		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

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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.

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