



APPLICATION GUIDE

Module on Board DC/DC converters,
Point of Load converters and AC/DC
front end converters

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Innovating reliable power

About TDK-Lambda

TDK-Lambda Corporation is one of the world's largest manufacturers of standard and configurable power supplies, DC-DC converters and a recognized leader in the Telecom power supply markets. As a power supply specialist TDK-Lambda has products and solutions for most applications and customer demands.

Throughout the company history, TDK-Lambda has continually explored the limits of the possible, striving to discover each new breakthrough in technology. With advancing digital networks and the rise of 'intelligent' products, today's electronics industry is on the verge of an unprecedented new era.

TDK-Lambda will continue to provide solid support for this ever-widening range of new applications. Ever committed to our role as technology pioneer, TDK-Lambda will continue Innovating Reliable power solutions.

Manufacturing and Logistics

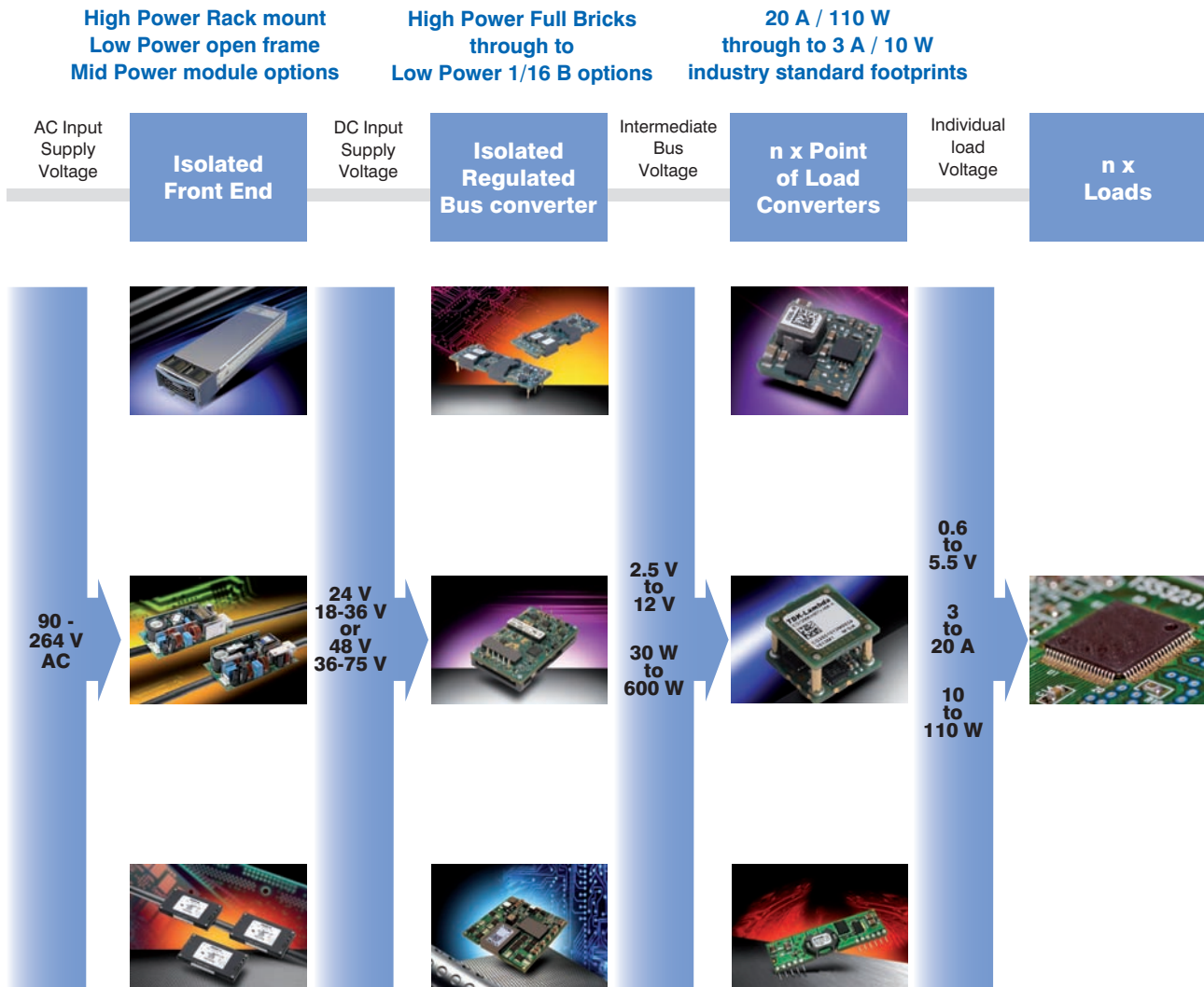


TDK-Lambda can provide the optimum manufacturing strategy for your needs from state of the art facilities in Europe, Japan, China, Malaysia and Thailand. These facilities coupled with our global network of warehouses enable us to deliver cutting edge logistic services to our major customers.

Rely on TDK-Lambda

By choosing TDK-Lambda as your strategic custom power solution partner you minimise risk for the entire life of your product. Our objective is high reliability in both our products and our business processes.

DPA solutions – typical architectures



The Distributed Power Architecture takes Grid AC supply, Isolates and converts into a regulated distribution Bus voltage, and then into individual high performance regulated voltages suitable for powering specific application loads.

TDK-Lambda have the complete product line-up to realise an entire DPA solution, either completely utilising card based 'Module on board' converters, or a mix of AC-DC front end PSUs combined with card level 'Module on board' converters. With an uncompromising focus on performance, quality and cost the designer is able to engineer an energy efficient, cost effective and reliable distributed power architecture system to address the most demanding of needs in today's evolving Information and Communication Technology equipment.



*DC / DC converters,
point of load converters –
non - isolated, regulated output*

TDK-Lambda's range of industry standard footprint point of load converters are compatible with all commonly used bus voltages and architectures from 3.3 to 12V and suited to almost any market application from harsh telecom mast mounted to exacting medical equipments.

iXF / iXG 2nd generation industry standard line up

The latest range of POL converters has been carefully optimised to provide outstanding performance without the need to 'tune' the product to match any particular load. This enables the user to achieve significantly better transient performance with a standard 'off the shelf' product, thus simplifying the design and qualification cycle, reducing risk, cost and time to market. With very high useable output power ratings, no de-rating with zero airflow these POLs are ideal for all applications.

- Very low profile, 3A only 3.45 mm tall
- Very high efficiency upto 96.5 %
- No Tuning required
- Can source or sink current
- Positive or negative on / off logic choice
- Sequencing options
- SMT package choice

Input Voltage Range 2.4 to 5.5V

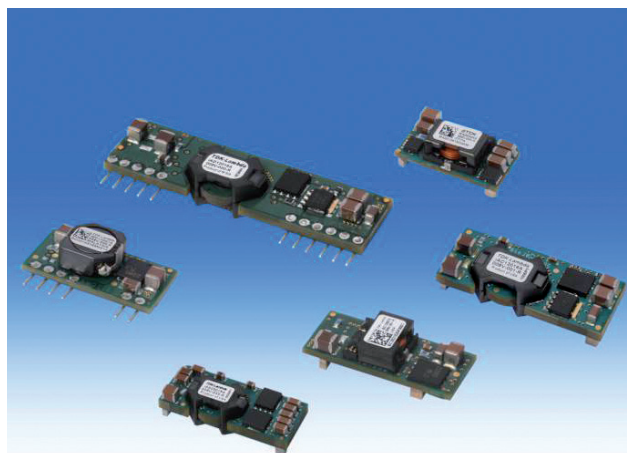
Series	iCF	iCG	NEW iBF	NEW iAF
Output current / power	3A / 10.89W	6A / 21.78W	12A / 43.56W	20A / 72.6W
Efficiency	upto 95.5 %	upto 96.5 %	upto 95 %	upto 95 %
Output voltage range	0.6 to 3.63V	0.6 to 3.63V	0.6 to 3.63V	0.6 to 3.63V
Format, LGA (DOSA) Edge Plated Castellation	open frame SMT open frame SMT	open frame SMT open frame SMT	open frame SMT open frame SMT	open frame SMT open frame SMT
Warranty	3 years	3 years	3 years	3 years

Input Voltage Range 4.5 to 14V

Series	NEW iCF	iCG	NEW iBF	NEW iAF
Output current / power	3A / 16.5W 4.5A / 24.75W	6A / 33W	12A / 66W	20A / 110W
Efficiency	upto 96.5 %	upto 96.5 %	upto 97 %	upto 96.5 %
Output voltage range	0.7 to 5.5V	0.7 to 5.5V	0.7 to 5.5V	0.7 to 5.5V
Format, LGA (DOSA) Edge Plated Castellation	open frame SMT open frame SMT	open frame SMT open frame SMT	open frame SMT open frame SMT	open frame SMT open frame SMT
Warranty	3 years	3 years	3 years	3 years

iAX/iBX, 1st generation industry standard line up

The first generation of POL converters with the choice of SMT or SIP packages offer higher levels of output current under given thermal conditions, than many competitor parts allowing existing user products to be upgraded to more power hungry loads without the need for a complete redesign.



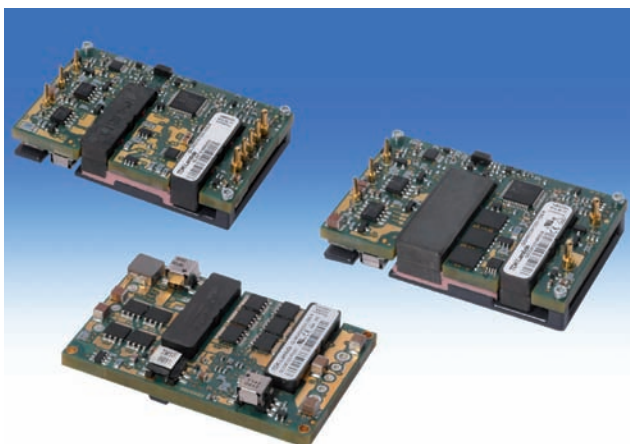
- Low profile
- Very high efficiency upto 97 %
- Positive or negative on / off logic choice
- Sequencing options
- SMT or SIP package choices

Input Voltage Range 3.0 to 5.5V

Series	iBA	iAA
Output current / power	8A / 26 W	15A / 50W
Efficiency	upto 97 %	upto 97 %
Output voltage range	0.75 to 3.36V	0.75 to 3.63V
Format DOSA	open frame SMT	open frame SMT
Warranty	3 years	3 years

Input Voltage Range 6.0 to 14.0V

Series	iBC	iBD	iAC	iAD
Output current / power	7A / 35W	7A / 35W	16A / 80W	16A / 80W
Efficiency	upto 96 %	upto 96 %	upto 97 %	upto 97 %
Output voltage range	0.8 to 5.5V	0.8 to 5.5V	0.8 to 5.0V	0.8 to 5.0V
Format, DOSA	open frame SMT	open frame SIP	open frame SMT	open frame SIP
Warranty	3 years	3 years	3 years	3 years



DC/DC converters, intermediate bus architecture – isolated, regulated output

A series of products that offer a fully, tightly regulated output for powering 8.3, 9.6 or 12V intermediate bus architectures, overcoming shortcomings when using unregulated converters and allowing full telecom input voltage range operation, without compromise.

Quarter Brick

The addition of the iQG product series enhances the product line up by offering even greater useable output power and improved efficiency with limited airflow and high operating temperatures. A further benefit is the capability to increase the power rating to 800W by operating two modules in parallel using the built in 'droop output' regulation technique.

- 1500V basic isolation
- 13.2 mm tall (12.7 mm no baseplate)
- No baseplate option
- Monotonic start - up
- Starts into pre - biased load
- Constant switching frequency
- Pin length choice
- Positive or negative on / off logic choice
- Latching / non latching protection options
- Current share version, droop technique

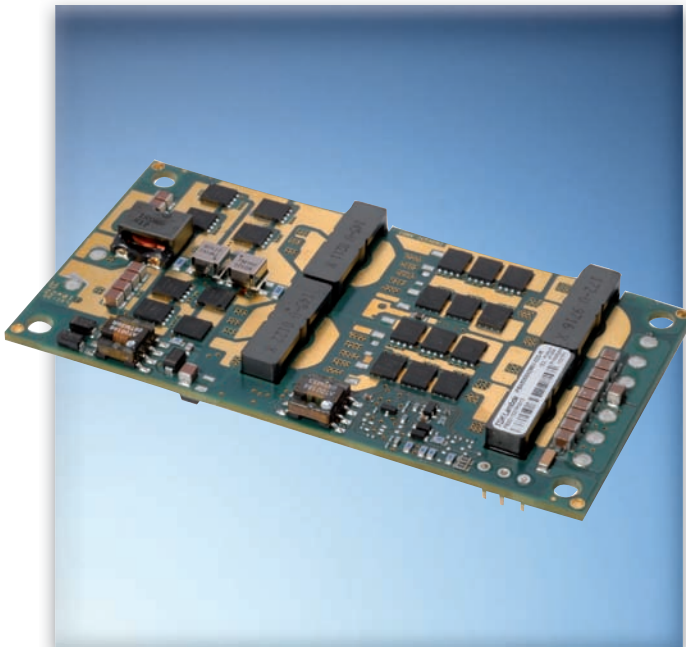
Series	NEW iQG	iQL
Output current / power	upto 33A / 400W	upto 30A / 300W
Efficiency	upto 96 %	upto 95 %
Output voltage	9.6V, 12V	8.3V, 9.6V, 12V
Input voltage range	36 – 75V	36 – 75V
Output trim feature	no	yes
Remote sense feature	no	no
Format, DOSA	open frame	open frame
Industry standard	quater brick, thru hole	quater brick, thru hole
Baseplate	option	option
Warranty	3 years	3 years



Half Brick

Sharing all the key attributes of the iQG / iQL families above, the iHG series extends the useable power to 456W for single unit and 900W for two modules using droop technique current share version.

NEW	
Series	iHG
Output current / power	upto 38A / 456W
Efficiency	upto 95 %
Output voltage	12V
Input voltage range	36 – 75V
Output trim feature	yes
Remote sense feature	yes
Format, DOSA	open frame
Industry standard Baseplate	1/2 B brick, thru hole option
Warranty	3 years

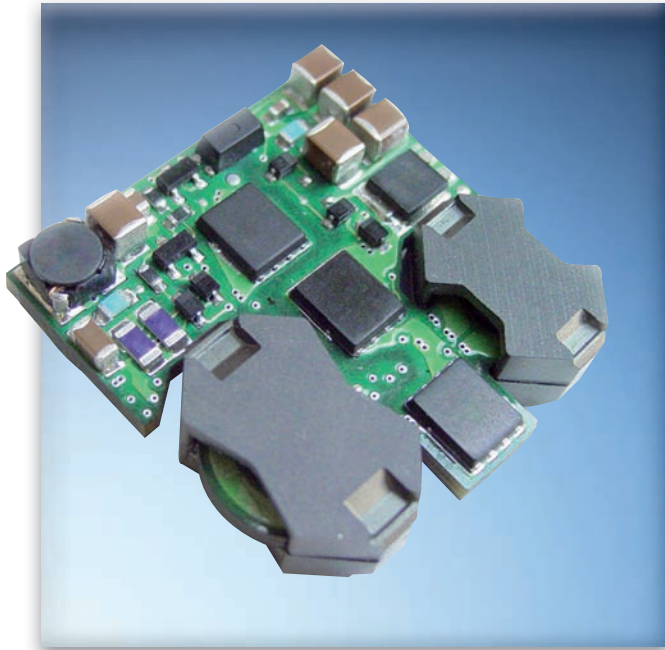


Full Brick

Targeted at very power hungry intermediate bus converter applications, the iFB offers extremely high levels of useable output power with low airflow and high operating temperatures. With non essential features removed, along with simplified droop load current share option offered extending the power rating up to 1200W, the iFB is ideal for cost sensitive high power DPA architectures.

- 1500V basic isolation
- 1/2" & low profile - contact cooling compatibility - baseplate options
- No baseplate option
- Very wide output voltage adjustment range
- Monotonic start - up
- Starts into pre - biased load
- Constant switching frequency
- Pin length choice
- Isolated remote on / off
- Current share option, droop technique

NEW	
Series	iFB
Output current / power	upto 58A / 600W
Efficiency	upto 95.5 %
Output voltage	9.6 and 12V
Input voltage range	36 – 75V
Output trim feature	yes
Remote sense feature	yes
Format, DOSA	open frame
Industry standard Baseplate	full brick, thru hole option
Warranty	3 years



*DC/DC converters,
fully featured – isolated,
regulated output*

Pico Brick

Providing full output power in high temperature environment and higher voltage outputs from a very low profile the Pico - brick is well suited to a very broad range of information and communication technology applications including LAN/WAN, servers and storage, radio, RF amplifiers and many more.

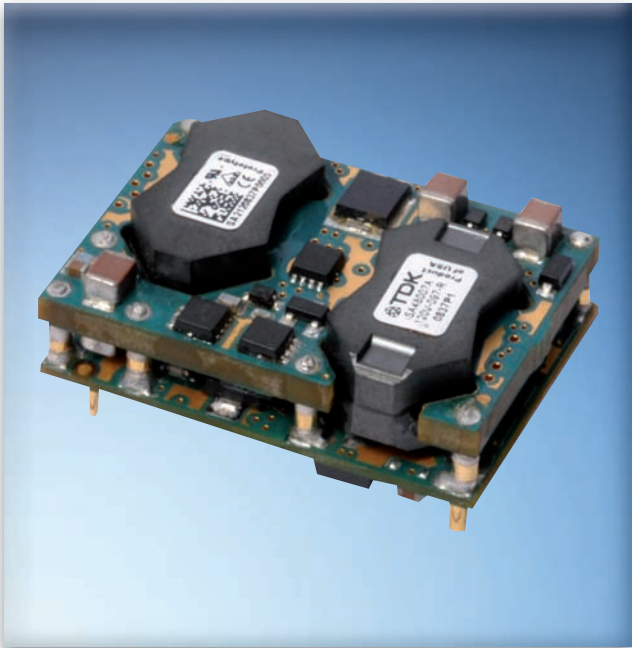
- 1500V basic isolation
- Very low profile – contact cooling compatibility
- Output voltage adjustment / trim range
- Remote sense
- Monotonic start – up & starts into pre – biased load
- Starts into pre – biased load
- Constant switching frequency
- SMT

Series	iPB
Output current / power	upto 10A / 35W
Efficiency	upto 90 %
Output voltage	3.3, 5, 12, 15 and 18V
Input voltage range	36 – 75V
Output trim feature	yes
Remote sense feature	yes
Format, DOSA	open frame
Industry standard	SMT
Baseplate	no
Warranty	3 years

Sixteenth Brick

The well established 1/16B family provides a broad series of fully featured products, compatible with conventional and contact cooling techniques, providing full rated power at high ambient temperature and low airflow, across the wide range of output voltages available.

- 1500V basic isolation
- ½ profile – contact cooling compatibility
- Good output voltage adjustment / trim range
- Remote sense
- Monotonic start – up
- Starts into pre – biased load
- Constant switching frequency
- Pin length choice
- Positive or negative on / off logic option

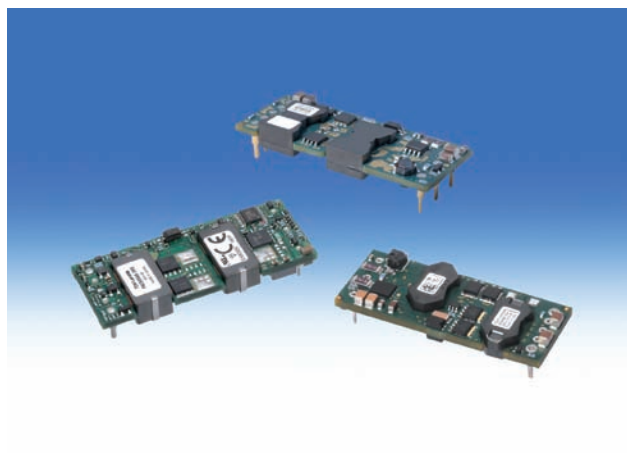


Series	iSA	iSF NEW
Output current / power	upto 30A / 78W	upto 5.5A / 27.5W
Efficiency	upto 92 %	upto 91 %
Output voltage	1.2, 1.5, 1.8, 2.5, 3.3, 5 and 12V	5V
Input voltage range	36 – 75V	36 – 75V
Output trim feature	yes	yes
Remote sense feature	yes	yes
Format, DOSA	open frame	open frame
Industry standard	1/16B brick, thru hole	1/16B brick, thru hole
Baseplate	no	no
Warranty	3 years	3 years

Eighth-Brick

TDK-Lambda's hugely successful family of eighth brick converters with the broadest range of output voltages available has recently been augmented by the addition of the new wide input voltage products, extending the scope of applications to include 'remotely powered' RF devices commonly found in latest LTE / GSM telecom equipment.

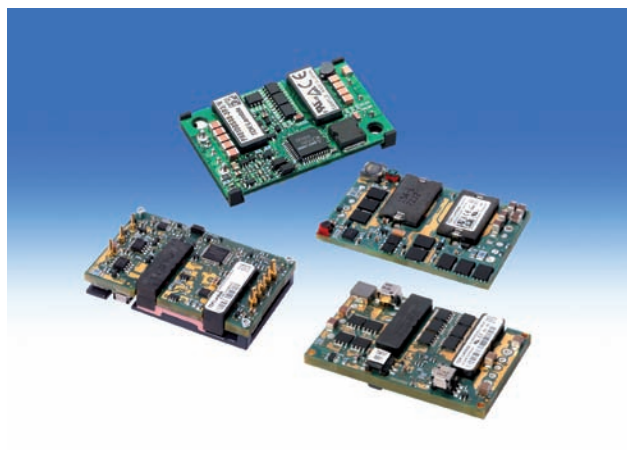
- 1500V basic isolation
- Low profile – contact cooling compatibility
- Good output voltage adjustment / trim range
- Remote sense
- Monotonic start – up
- Starts into pre – biased load
- Constant switching frequency
- Pin length choice, SMT options
- Positive or negative on / off logic option



Series	NEW iEE / iEE4W	iEF	NEW iEA / iEA4W	PAE
Output current / power	upto 15A / 66W	upto 15 A / 66 W	upto 25A / 78W	upto 30A / 100W
Efficiency	upto 92 %	upto 92 %	upto 91 %	upto 91 %
Output voltage	3.3, 5 and 12V 12V (iEE4W)	3.3, 5 and 12 V	1.2, 1.5, 1.8, 2.5, 3.3, 5, 12, 15, 18 and 28V 12V (iEA4W)	1.8, 2.5, 3.3, 5 and 6V
Input voltage range	36 – 75V 30 – 60V (iEE4W)	36 – 75V	36 – 75V 18 – 36 18 – 60V (iEA4W)	36 – 75V
Output trim feature	yes	yes	yes	yes
Remote sense feature	yes	yes	yes	yes
Format, DOSA	open frame	open frame	open frame	open frame
Industry standard	1/8B brick, thru hole	1/8 B brick, SMT	1/8B brick, thru hole	1/8B brick, thru hole
Baseplate	no	no	no	no
Warranty	3 years	3 years	3 years	2 years

Quarter-Brick

Covering from 1.2V to 28V and up to 300W, this is possibly the broadest range of Quarter Bricks available. Many available with 48V and 24V input versions, with high current and true useable power ratings the user has a choice of cooling strategies making the range of user applications possible almost limitless.



- 1500V basic isolation
- Low profile – contact cooling compatibility – baseplate options
- Very wide output voltage adjustment / trim range
- Remote sense
- Monotonic start – up
- Starts into pre – biased load
- Constant switching frequency
- Pin length choice
- Positive or negative on / off logic option

Series	PAQ	iQB	iQE	iQL
Output current / power	upto 20A / 100W	upto 25A / 150W	upto 40A / 204W	upto 70A / 308W
Efficiency	upto 90 %	upto 92 %	upto 94 %	upto 95 %
Output voltage	1.2, 1.8, 2.5, 3.3 and 5V	1.2, 1.5, 1.8, 2.5, 3.3, 5, 12	3.3, 5, 8, 12, 15	1.2, 1.5, 1.65, 1.8, 2.5, 3.3, 5, 5.7, 8, 8.3, 9.6, 12, 24 and 28V
Input voltage range	36 – 75V	36 – 75V 18 – 36V	36 – 75V 18 – 36V 18 – 75V (iQE4W)	36 – 75V 18 – 36V
4:1 Wide input				
Output trim feature	yes	yes	yes	yes
Remote sense feature	yes	yes	yes	yes
Format, DOSA	open frame	open frame	open frame	open frame
Industry standard	¼B brick, thru hole	¼B brick, thru hole	¼B brick, thru hole	¼B brick, thru hole
Baseplate	option	no	no	option
Warranty	2 years	3 years	3 years	3 years



Half-Brick

TDK-L's half brick line up offers solutions to a huge range of load demands by covering the output voltage range from 1 V to 53V enabling power hungry low voltage silicon or 'high voltage' GaN RF devices, POE circuits and almost everything in – between. With baseplate options and low component profiles these devices are equally at home in 'contact' or conventional air cooled environments in harsh and demanding Telecom and Datacom applications.

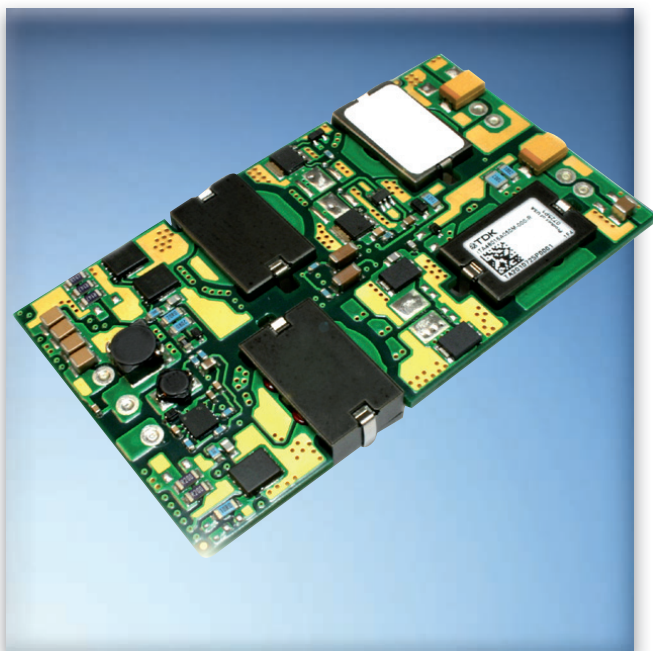
- 1500V basic isolation
- ½" & low profile – contact cooling compatibility – baseplate options
- Very wide output voltage adjustment / trim range
- Remote sense
- Monotonic start – up
- Starts into pre – biased load
- Constant switching frequency
- Pin length choice
- Positive or negative on / off logic option
- Current share option, droop technique

Series	iHG	PAH300 / 450
Output current / power	upto 80A / 456W	upto 30A / 450W
Efficiency	upto 95 %	upto 92 %
Output voltage	1.2, 1.5, 1.8, 2.5, 3.3, 5 and 12V	12, 28 and 48V
Input voltage range	36 – 75V	36 – 75V
Output trim feature	yes	yes
Remote sense feature	yes	yes
Format, DOSA	open frame	closed / open frame
Industry standard	1/2B brick, thru hole	1/2B brick, thru hole
Baseplate	yes	yes
Warranty	3 years	2 years



The iHI features the industry standard 1/2B pinning footprint, and with reduced module dimensions of 56.9 x 39.9 x 9.5 mm offers the user a neat solution to space impacted applications.

Series	NEW iHI
Output current / power	upto 25A / 82.5W
Efficiency	upto 92.5 %
Output voltage	3.3V
Input voltage range	36 – 75V
Output trim feature	yes
Remote sense feature	yes
Format, DOSA	closed / open frame
Industry standard	1/2B brick, thru hole
Baseplate	no
Warranty	3 years



Three Quarter Brick

This family of dual output converters provides two regulated output voltages. With sequenced start – up and optimised low ripple and noise, these converters are ideal for sensitive applications such as xDSL cards requiring power for both data processing and ‘line driver’ silicon.

- 1500V basic isolation
- 3/4 B size: 87.6 x 50.8 x 14.4 mm (3.45 x 2 x 0.57 ")
- Dual output
- Low output ripple and noise
- Sequenced output start – up
- Monotonic start – up
- Starts into pre – biased load
- Constant switching frequency
- Positive or negative on / off logic option

Series	NEW ITA	
	ITA	
Output power	upto 150W	
Efficiency	upto 91 %	
	OP1	OP2
Output voltage / current - 000	5V / 15.8A	15V / 2.3A
- 001	5V / 22A	16V / 2.5A
- 002	5V / 15.8A	20V / 2.5A
Input voltage range	36 – 75V	
Output trim feature	no	
Remote sense feature	no	
Format, Industry standard Baseplate	open frame 3/4B brick, thru hole no	
Warranty	3 years	

Full Brick

This range of Full Brick devices with very high output power capability, choice of 48V or 24V input and a range of output voltages is ideal across a broad range of applications. With an auxiliary rail available and active current share, coupled with a DC good indication, these products are extremely versatile.

- 1500V basic isolation
- Very wide output voltage adjustment / trim range
- Remote sense
- Monotonic start – up
- Starts into pre – biased load
- Constant switching frequency
- Active current share
- Auxiliary supply rail
- Isolated on / off control



Series	PAF
Output current / power	upto 100A / 700W
Efficiency	upto 90 %
Output voltage	1.8, 3.3, 5, 12, 24, 28 and 48V
Input voltage range	36 – 75V 18 – 36V
Output trim feature	yes
Remote sense feature	yes
Format, Industry standard Baseplate	closed frame full brick, thru hole yes
Warranty	2 years



380 V input voltage DC/DC converters – isolated, regulated output

Full Brick

A series of products with an input range of 200 – 400V DC that provide conversion to fully, tightly regulated low voltage output for powering a variety of loads. Typical applications include 'DC power distribution' or 'DC energy distribution' systems for the emerging higher voltage DC bus structures found in newer data centre power architectures and from TDK-L's 'PF' AC-DC PFC front end module.

- 3kV AC isolation input to output
- Very wide output voltage adjustment / trim range
- Remote sense
- Monotonic start – up
- Starts into pre – biased load
- Constant switching frequency
- Active current share
- Auxiliary supply rail
- Isolated on / off control
- Inverter 'good' signal

Series	PAF450 / 600 F280
Output current / power	upto 50A / 600W
Efficiency	upto 91 %
Output voltage	12, 24, 28 and 48 V
Input voltage range	200 – 400V
Output trim feature	yes
Remote sense feature	yes
Format	closed frame
Industry standard	full brick, thru hole
Baseplate	yes
Warranty	2 years

AC/DC converters, front end converters – regulated output

PFE Series, simple function

This range of 'front end' converters can be used to create quick to market, low profile single output PSU directly power user loads, or combined with any suitable DC-DC converter to facilitate a multi output 'custom' PSU, complete with PCF, harmonic compliance, and meeting latest IEC immunity standards.



- Wide AC input voltage range
- Power factor / harmonic correction
- 3kVAC input / output isolation
- IEC61000-4 immunity compliance
- Wide output voltage adjustment / trim range
- Remote sense
- Current share, droop mode (PFE700S)
- Constant switching frequency
- Power on signal

Series	PFE300S	PFE500S	PFE700S
Output current / power	upto 25A / 303W	upto 33A / 504W	upto 14A / 714W
Efficiency	upto 86 %	upto 86 %	upto 89 %
Output voltage	12, 28 and 48V	12, 28 and 48V	51V (semi reg)
Input voltage range	85 – 264V AC	85 – 264V AC	85 – 264V AC
Output trim feature	yes	yes	no
Remote sense feature	yes	yes	no
Format, Industry standard	closed full brick, thru hole	closed full brick, thru hole	closed full brick, thru hole
Baseplate	yes	yes	yes
Warranty	2 years	2 years	2 years

PFE Series, full function

These front end converters benefitting from the additional control elements below, facilitate an even greater level of functionality, allowing the user to simply realise complex high power 'custom' PSUs using standard building blocks.

- All above bullet features and additionally
- Isolated remote on / off
- Active current share
- Auxiliary supply

Series	PFE500F	PFE1000F
Output current / power	upto 25A / 303W	upto 33A / 504W
Efficiency	upto 86 %	upto 86 %
Output voltage	12, 28 and 48V	12, 28 and 48V
Input voltage range	85 – 264V	85 – 264V
Output trim feature	yes	yes
Remote sense feature	yes	yes
Format, Industry standard	closed 122 x 70 x 12.7 mm, thru hole	closed 160 x 100 x 13.4 mm, thru hole
Baseplate	yes	yes
Warranty	2 years	2 years



AC/DC converters, front end converters – regulated high voltage output

PF Series

The PF series of AC-DC front end converters provide a regulated high voltage DC output to power the TDK-L PF and PAF families of DC-DC converters, allowing the user to create a full 'custom' PSU, from standard parts, featuring wide input AC-DC operating range and power factor / harmonic correction. They may be connected in parallel to achieve higher power ratings or N+1 redundancy.

- Wide AC input voltage range
- Power factor / harmonic correction
- 3kVAC input / output isolation
- EN60555-2 compliant
- Active current share
- Enable signal
- Inverter good signal
- Constant switching frequency
- N+1 redundancy

Series	PFE500A	PFE1000A
Output power / Vin AC	upto 504W / 100V, 756W / 200V	upto 1008W / 100V, 1512W / 200V
Efficiency / Vin AC	upto 90 % / 100V, 95 % / 200V	upto 90 % / 100V, 95 % / 200
Output voltage	360V	360V
Input voltage range	85 – 264 AC	85 – 264V AC
Output trim feature	yes	yes
Remote sense feature	yes	yes
Format, Industry standard Baseplate	closed ½brick, thru hole yes	closed ½brick, thru hole yes
Warranty	2 years	2 years



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