



**KAMAKA**

**Electronic**  
Bauelemente Vertriebs GmbH

## **Hi-Rel Solutions**

**Avionics**

**Defence**

**High Temperature**

**RF Products**

**Space**

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Products	Description
<b>Isolated DC/DC Converters</b>	<b>Power 5W-120W - through hole technology - (THT)- High Reliability DC/DC Converters with Magnetic Coupled Feedback</b>
Operating Temperature	-55°C to +125°C
DC - Input Voltage Range	16V-50V, 30V-80V, 80V-160V, 160V-400V
Single Output Voltage	3.3V, 5V, 6V, 9V, 12V, 15V, 28V
Dual Output Voltage	±5V, ±12V, ±15V
Triple Output Voltage	5V/±12V, 5V/±15V
Case	Metal Case / option: with flange

Manufactured in a facility fully qualified to MIL-PRF-38534, these converters are fabricated utilizing DSCC qualified processes. For available screening options, refer to device screening table in the data sheet. Variations in electrical, mechanical and screening requirements can be accommodated.

	Output Power	Hi-Rel Hermetic					
		Single		Dual		Triple	
ASA and AHV are designed to meet stringent 80V, 0.1 second per MIL-STD-704A without external filtering required	5W	ASA		ASA		-	
	5W	HTB <sub>new</sub>					
	6W	ASAP		ASAP		-	
ATS includes MIL-STD-461 (CE03) compliant EMI input filter • Product Development Direction	12W	AHF		AHF		-	
	15W	AHV		AHV		AHV, ATO	
	15W	AHE		AHE		AHFP	
AHP/AFL Series: – Parallel for higher power with equal current/ stress sharing – AHP270/AFL270 offers highest power density in the industry – Strong heritage - AHP/AFL >100K units since intro over 10 years ago.	20W	HTA		HTA		-	
	25W	AHFP	AHE	AHFP	AHE	-	
		ATR, ATS		ATS		-	
	30W	ATR		ATR		ATR	
	40W	ATW		ATW		ATRP	
		ATRP		ATRP		HM	
	55W	HTH				-	
	66W	AFL, AHP				-	
	Product Development Direction – Hermetic designs driven by cost, power density, efficiency – Reviewing non-hermetic power solutions – Leveraging core design for downhole drilling applications up to 210°C and on engine aircraft usage HT Series +185°C without derating.	80W	AFL, AHP		AFL, AHP		-
		90W	AFL, AHP				-
92W		HTM				-	
96W				AFL, AHP		-	
100W				AFL, AHP		-	
108W		AFL, AHP				-	
112W		AFL, AHP				-	
120W		AFL, AHP				-	
						+185°C rated temperature	
						+165°C rated temperature	
DLA SMD part number available							

## MIL-Filter for DC/DC-Converters

Product Family	Filter Family	Vin Max	Iin Max	Input Transient	CE03	CS06
ASA, AHF, AMA, AMF	ASF461	50V	0.42A	50V	Y	
All converters except AFL	AFC461	40V	4A	40V	Y	
	AFV461	40V	4A	704A	Y	
	AFM704A	80V	4A	704A	Y	Y
S28	AFH461	40	2A	100V	Y	
ART, ARH, S28	ARF461	80	5A	100V	Y	
AHF, ASA, AMA, AMF	AMH461	50	2A	100V	Y	
AFL28, AHP28	AME28-461	40V	15A	100V	Y	
AFL50	AME50-461	100V	7A	300V	Y	
AFL120, AFL270	AME270-461	400V	1.5A	720V	Y	
AHP270	AME270-461	400V	1.5A	720V	Y	
ATS28	Internal				Y	

EMI Filters are available for design that must be compliant with conducted emission CE03 requirements of MIL-STD-461 - I<sub>max</sub> 0.42A to 15A



An Infineon Technologies Company

**Space DC/DC Converter Class H, K  
Isolated and non-isolated**

Products	Description
<b>Isolated and non Isolated</b>	<b>Power 5W - 350W</b>
<b>DC/DC Converter Class H, K</b>	<b>RAD Hard &amp; Rad Hard Tolerant</b>
Operating Temperature	-55°C to +125 °C
DC- Input Voltage Range	16V-40V, 30V-80V, 80V-160V, 160V-400V
Single Output Voltage	3.3V, 5V, 6V, 9V, 12V, 15V , 28V
Dual Output Voltage	+/+ 3.3V/5V, +/+1.8V/3.3V, ±5V, ±12V, ±15V
Tripple Output Voltage	+5V/+12V or +5V/ +/- 15V
Control connector+	Remote on/off / telemetry DATA (open design Version)
Adjustment	Voltage & Sync-Frequency & Sense Connector
EMI	Mil-Std.-461-CE03 conducted emission
DCDC with internal Filter	M3G, M3L, M3H, LS, LSO, GH, GHP, EC, ZA, ZB, EA EB, EAR, EC, EAR-T, EGA MA, MB, MAB, MBH, MAH, ML, MAS, MNL, CLP

Output Power	Rad-Tolerant TID: 25-50Krads SEE: 37-60MeV			Rad-Hard TID: 100K-1Mrads SEE: 37-83MeV			
	Single	Dual	Triple	Single	Dual	Triple	Quad
5W	AMA	AMA	-	ARE	ARE MA ML	MA MAB MLN	-
10W	AMF	D	-	S	S	-	-
	-	DH	-	-	MAH	MAH MAS	MAH
12W	AMF	AMF	-	LS	-	-	-
15W	-	-	-	-	MB CLP	MB	-
20W	SBB <sup>(2)</sup>	-	-	LS	MBH	MBH	-
25W	M3L	M3L	-	LS	-	-	-
30W	-	AMR	-	ARH M3H M3G	-	ARM	-
	-	-	-	LS	LS	ART	-
	-	-	-	LSO <sup>(1)</sup>	LSO <sup>(1)</sup>	-	-
	-	-	-	SBB <sup>(2)</sup>	-	-	-
40W	M3H	M3H	M3H	M3G	M3G	M3G	-
50W	-	-	-	GH	-	-	-
55W	-	-	-	-	-	EA	-
60W	-	-	-	ZA	CEP	EA	-
80W	-	-	-	ZA	-	-	-
100W	-	-	-	ZA	-	-	-
105W	-	-	-	-	EAR	-	-
120W	-	-	-	GHP	GHP	EAR-T	-
150W	-	-	-	-	-	EB	-
250W	-	-	-	ZB	-	-	EC
300W	-	-	-	-	-	EGA	-
(1)	Includes output overvoltage protection and input current telemetry						
(2)	POL- Converter						

**Point of load DCDC Space DCDC Converter  
Features SBB Serie:**

- 4.5 to 5.5V DC input
- Output rating: 14W to 30W / 14A
- 100Krads, 83 MeV, prompt dose and neutron rated
- Fixed 400KHz Operating Frequency
- Discrete PWM controller
- DLA Qualified SMD Part Number
- Output Voltage 1V, 1.2V, 1.5V, 1.8V, 2.5V, 3.3V
- Typ Eff% up to 89%
- Remote sense / External Sync. / Output Adj. +/-10%
- No external Filtering / OLP / SCP
- Under Voltage Lockout ( UVLO)
- Output Status Telemetry (POK)
- Derating per Mil-STD-1547 for space flight
- MTBF > 2.8million hours for space flight environments

**Point of load DCDC Space DCDC Converter  
Features SBP Serie:**

- 3.3V to 12V DC input
- Output rating: up to 20W / 6A
- 100Krads (Si), SEE hardness rated, SEL/SEB/SET/SEGR withLET>86MeV-cm<sup>2</sup>/mg
- Output Voltage: Adjustable from 0.8V to 3.3V
- with external Resistor
- Fixed 500KHz Operating Frequency
- Typ Eff% up to 93%
- Remote sense
- No external Filtering / OLP /SCP/ telemetry & Timing
- Adjustable Soft Start and Input Under Voltage Lockout
- Output Sequencing of Multiple Modules via Track and
- Enables Pins
- Derating per Mil-STD-1547 and NASA EEE-INST-002

LS, LSO, M3H, M3L series: MIL-STD-461 compliant filter included  
LSO series also includes OVP and input telemetry

Hi-Rel PWB-based Hi-Rel DC/DC Converters for space digital- and RF-applications.  
High level power management solutions.  
Specific mechanical interface between EPC and RF-part

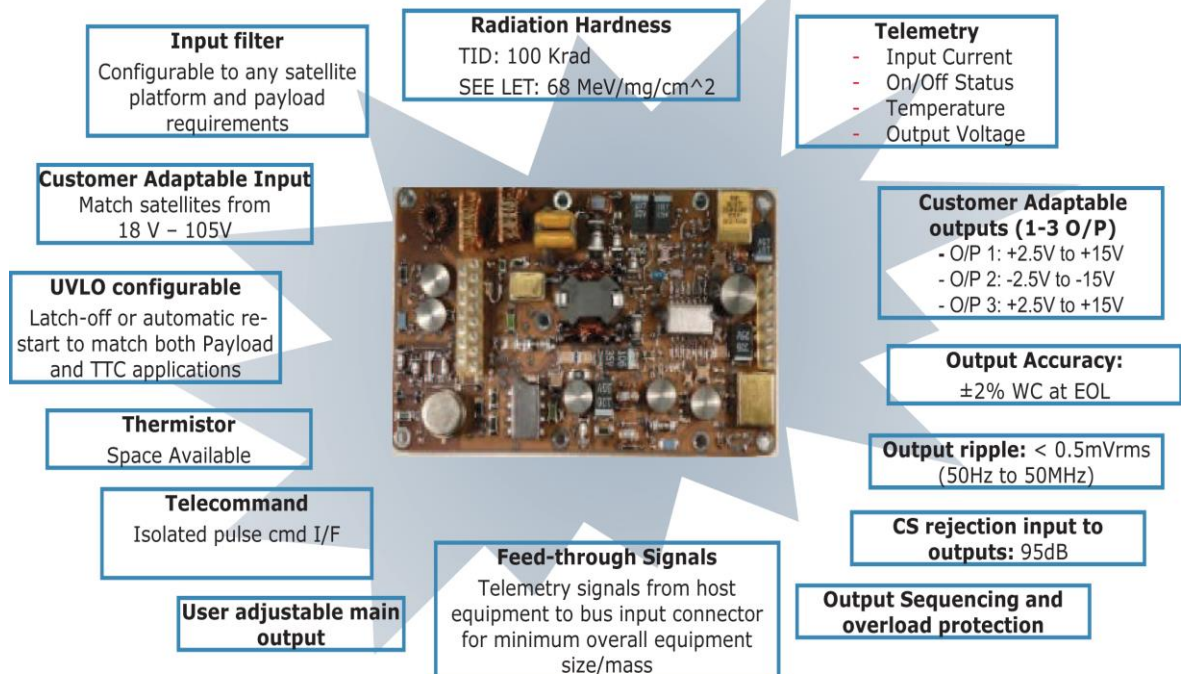
Pout	DC/DC – Converter	High CS rejection - power input to outputs
up to 10W	MA, MAB, MAH, MB, MBH, ML	Sequencing between positive and negative outputs
10 - 20W	MB, MBH, EA	Low noise outputs (filters and linear post regulators)
20 - 40W	MBH, EA	High efficiency & adjustable main output (high power EPC)
40 - 80W	EA, EB, EBR, EAR, ZA	High efficiency at low voltage / high current
up to 80W	EB, EC, EAR, EGA, ZA, ZB	SPFF regarding output over voltage

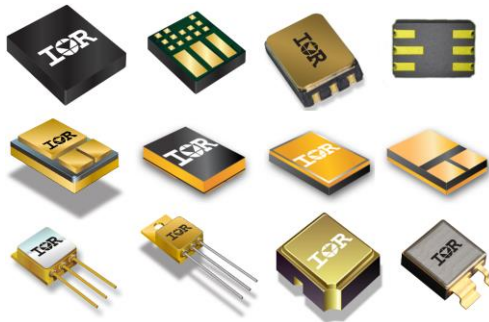
## Customer adaptable product platforms

Hi-Rel PWB-based Hi-Rel DC/DC Converters for space digital- and RF-applications.  
High level power management solutions.  
Specific mechanical interface between EPC and RF-part

Pout	DC/DC – Converter	High CS rejection - power input to outputs
5W - 10W	MA, MAB, MAH, ML, MLN, MAS	Sequencing between positive and negative outputs
15W - 20W	MB, MBH, CLP,	Low noise outputs (filters and linear post regulators)
55W - 120W	EA, CEP, EAR, EAR-T, ZA	High efficiency & adjustable main output (high power EPC)
250W - 300W	EC, EB, ZB, EGA	High efficiency at low voltage / high current
		SPFF regarding output over voltage

**IRD's customer adaptable product platforms** are designed to offer high performance and maximum flexibility. Typical features are:





## Military and Space Products

MIL-qualified N-, P-Channel MOSFETs  
Logic Level Rad Hard MOSFETs  
Radiation Hardened Power N-, P-Channel MOSFETs  
Single, Dual & Quad MOSFETs 30 to 600V  
RAD Hard MOSFETs SEE= 37, 60, 82, 85, 90MeV,  
TID= 100, 300, 500, 1000Krads  
Radiation Hardened Solid State Relays Single, Dual, Octal  
TID>100Krads, SEE immunity, Class K  
High Voltage Gate Driver IC TID>100Krads, SEE= 82MeV  
QPL Schottky Diodes Single Device, Doubler Common Cathode  
Ultra-Fast Diodes Single Device, Doubler Common Cathode  
Ultra LDO-Voltage Regulators, Linear Regulators  
EAR99 Space Grade Products  
**Approvals: MIL-PRF-19500 JANTX, JANTXV, JANS level**



## Manufacturer of Hi-Rel Space Products ESCC5000 and 5010 qualified HiRel components

### Rad-Hard Power MOSFETs (CoolMOS™ Technology)

100V, 150V, 250V in SMD-0.5, SMD-2, TO-254AA, TO-257AA  
TID>100Krads (300Krads on request), SEE >LET 55 / 85 MeV  
"SAM" are electrically functional samples  
"P" are professional level used on bread-boards and EM  
"ES" for ESA space level used for full qualified satellite flight modules



### Microwave Transistors

Silicon Bipolar Transistor Technology  
Supply voltage rating from 4V to 12V  
Output power from 20mA to 150mA  
Transition Frequency from 6.5GHz to 42GHz

### Microwave Silicon Diodes

Small Signal-, Schottky- and PIN-Diodes  
 $I_{Fmax} = 120mA$  to 5A,  $V_{BR} = 40V$  to 150V,  $R_F = 0.9\Omega$  to 10 $\Omega$



### Chips (bare die's) available

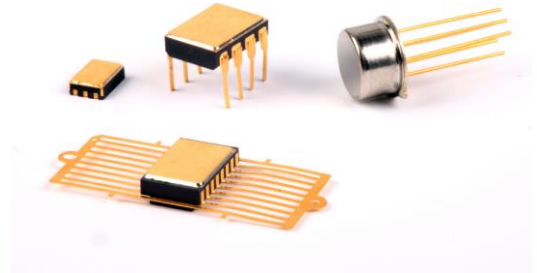
### Customer specific screening

Radiation Hard Power MOS, MW Transistors ESA qualification  
ESCC qualified products

**All products are produced in Europe – no export license required**

### Radiation Hard Optoelectronics

Space Rad Hard Optocouplers, Emitters, Detectors  
Operating across 100% to 1000%CTR  
Bare Dies tested to TID up to 150Krad(Si)  
Operating Temperatures of -150°C to +125°C  
High Speed-, High Gain-, Transistor-Optocouplers  
Analog and digital output devices  
Single-, Dual-, Quad-Channel Optocouplers  
Hi-Rel Military NATO Stock Numbers available  
Customized products  
Ceramic DIL, SMT LCC packages, Flat Pack, 4-Pin LCC  
Standard Optocouplers available for EM parts  
Applications: Isolation for high-voltage power systems  
ISO 9001:2008, IECQ-CECC (BSI) component approvals compliant  
with MIL-STD-883 and MIL-STD-19500 screening process  
Made in UK – Benefit of being ITAR free



## SPACE IC



### High-Reliability Hermetic Integrated Circuits

Radiation Hard ICs in BCD SOI for Power Management  
**POL Converter:** 24V 2A DC/DC Buck Regulator IC suitable for  
high efficiency (>90%) POL from 12V Power Input Rails  
LDR TID biased >40krad(Si); -40°C to +125°C  
SEL, SEFI and SEU immune  
Hermetic Ceramic FP-16 Power Package  
Qualification Tested and Screened According to  
ESCC 24600 quality standard  
POL SPPL12420RH registered in EPPL Listing  
Enables efficient & space-saving solutions in POL architecture  
Radiation Test Reports available  
Made in Germany - Benefit of being ITAR/EAR free

**Manufacturing semiconductors since 1962**

Development & production of electronic engineering products  
 Expertise in the field of analog, analog to digital technology  
**ITAR free** products are manufactured within the EU in Latvia

**New Space Product Line**

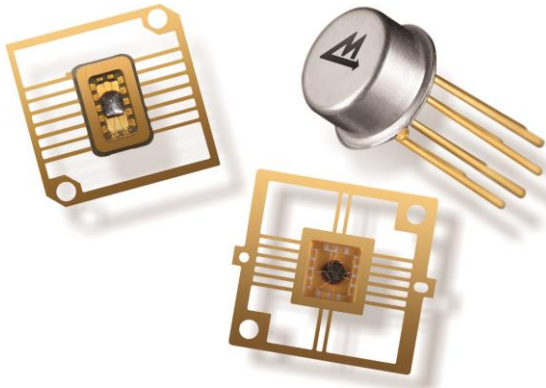
Monolithic Dual Transceivers 5V Version, MIL-STD-1553/1760  
 2-Terminal IC Temperature Transducer  
 Balanced Modulator-Demodulator  
 Internally Trimmed IC Precision Multiplier  
 Symmetrical Mixer  
 Innovative Solution for Optical Spectrum Measurement

In-house Design, Assembly, Electrical Test, Burn-in, Qualification  
 Process: using Bi-polar, Bi-FET, CMOS & Bi-CMOS

Analog Microcircuits, Analog switches  
 Amplifiers, Comparators  
 Multiplexers, Sample & Hold circuits  
 Transistor pairs  
 Custom IC solutions for obsolescence parts

Packages: LCC package, Metal Can, Flat Pack, Ceramic DIP  
 Standard Operating Temp from low - 60°C to +125°C

**Replacements to Analog Devices, Burr Brown, Calogic, Elantec, Harris, Intersil, NSC, Philips & TI**  
 Approvals: DIN EN ISO 9001:2008 certified



State of the Art, Inc.

**State of the Art**

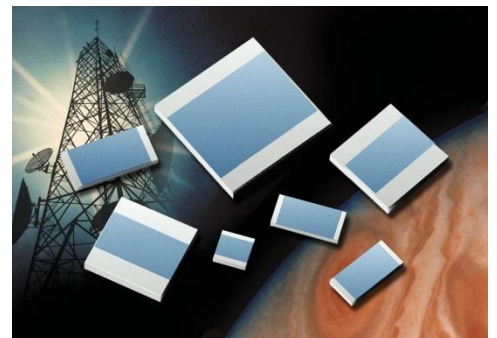
**Mission Critical Thick & Thin Film Resistor Products**

**Surface Mount Chip Resistors**

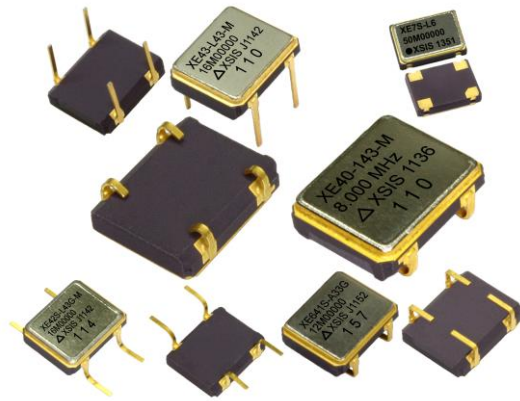
Established Reliability and Space Level Chip Resistors  
 MIL-PRF-55342 Thick Film C, M, P, R, S, U, V, T Level  
 MIL-PRF-55342 Thin Film C, M, P, R, S, U, V, T Level  
 MIL-PRF-32159 Zero Ohm Jumpers C, M, T Level  
 MIL-PRF-914 Surface Mount Resistor Networks  
 Standard Grade Thick Film from 0 Ω to 100 MΩ  
 Standard Grade Thin Film from 5 Ω to 10 MΩ  
 Solderable, Epoxy Bondable & Wire Bondable Finishes  
 High Frequency Chip Resistors up to 20 GHz  
 High Power Chip Resistors rated to 200 Watt  
 High Voltage up to 5 KV, High Value to 100 GΩ  
 Silicon Chip Resistors 5 Ω to 10 MΩ  
 Chip Attenuators from 1 to 20 dB  
 Thin Film Multi-Tap Attenuators  
 Thin Film Platinum Heater / Sensors  
 Temperature Variable Chip Attenuators (Second Source to IMC)  
 Current Sense Resistors at values as low as 20 mΩ  
 Power Moisture Compliant Chip Resistors  
 Standard Thin & Thick Film Products are RoHS compliant  
 High Temperature Chip Resistors with Termination Style Y and Z

**Aerospace, Defence & Medical Applications**

High Reliability Screening Specialist  
 Approvals: ISO9001 & AS9100 Certified, MIL-STD-790



### Hi-Rel Hybrid Microcircuit Crystal Oscillators



Space Qualified Oscillators, TID, SEL & SET Test Data  
 Military Qualified Oscillators 883B Screening  
 QPL to MIL-PRF-55310/08, /09, /11, /14, /15, /16, /17, /18, /19, /26  
 /27, /30, /33, /34, /35, /36, /37, /38, /39, & /40 parts  
 Custom Hi-Rel Screening  
 Very High-Temperature Down-Hole  
 Ultra High Shock & Vibration Designs  
 TTL- LVTL- CMOS- AC/HCMOS- LVHCMOS- ECL, Tristate Output  
 Multiple Frequency Outputs, Wide Frequency Ranges  
 Multiple Temperature Ranges  
 THT Package: CerDIP, TO-5  
 Surface Mount: Leadless-, J-Lead-, Gull Wing-Lead-Package  
**New:** Low Voltage 3.3V in 5x7 mm SMD  
 Approvals: AS9100, MIL-PRF-55310, MIL-PRF-3098



### Custom and mobile portable power systems

Military, Aerospace, Marine, safety & energy storage applications  
**Soldier Wearable Integrated Power Equipment System (SWIPES)**  
**Aerospace / UAV:** Rechargeable batteries  
 High energy density up to 240Wh/Kg  
 Military standard and custom Li-Ion rechargeable batteries  
 Military Tactical & Depot Chargers, Vehicle Lithium-Ion batteries  
 MIL-810 vibration, shock, thermal cycles, humidity, transportation  
 UN 38.3 Recommendations on the Transport of Dangerous Goods  
 Battery Management Systems (BMS) and Power Electronics  
 Renewable energy storage systems and Micro-grid







**EVANSCAPS - POWER WHEN YOU NEED IT!**

**EVANSCAPS have the highest energy and power density capacitors  
Military grade Tantalum Wet Capacitors - MTBF>5,000,000 hours**

10V-125V with over 100 capacitance ratings in broad range of form factors

Very low ESR, Very high current handling capability. Applications range from Avionics/Power hold up, Laser pulse power, Phased array radar pulse power, 200°C+ models available for oil and gas exploration.

THQ Hybrid Capacitors 1.40" dia	4,500µF to 200,000µF (10V-125V) 85°C (6V-75V) 125°C
TDD Hybrid Capacitors 1.40"square	1,500µF to 30,000µF (50V-125V) 85°C (30V-75V) 125°C
THS3 Hybrid Capacitors	4,200µF to 200,000µF (10V-125V) 85°C (6V-75V) 125°C
THQ & THS Hybrid Capacitors	Stud Mounting SM00 – SM05
HyCap Series Hybrid Capacitors	68µF to 2,200µF (25V-125V) 85°C (15V-85V) 125°C
HyCap Series Hybrid Capacitors	Standard DSCC 93026 & DSCC 10004 ratings
HyCap HT Hybrid Capacitors	68µF to 1,500µF (30V-75V) 175°C (25V-62V) 200°C
THQA2 Hybrid Capacitors	215µF to 10,000µF (10V-125V) 85°C (6V-75V) 125°C
THQA2-HT Hybrid Capacitors	215µF to 560µF (37.5V-62.5V) 175°C (30V-50V) 200°C
TQS2 Shock hard Hybrid Capacitors	1,600µF to 13,000µF (8V-50V) 85°C (4.8V-30V) 125°C
THQ3 Hybrid Capacitors	1,100µF to 50,000µF (10V-125V) 85°C (6V-75V) 125°C
3STHQ3 or 3PTHQ3 Series - 3" Pack	1,100µF to 450,000µF (10V-300V) 85°C (6V-180V) 125°C
6PTHQ3 Series - 6" Pack	20,000µF to 900,000µF (10V-125V) 85°C (6V-75V) 125°C
Capattery Series EDLC	0.47F to 1.5F (5.5V -25V) -55°C to +85°C
HQ Series Hybrid Capacitors	1,100µF to 50,000µF (10V-125V) 70°C

The design and manufacture of capacitors and capacitor modules for Aerospace and Defence customers  
Approvals: ISO 9001:2008, AS 9100:2009, in accordance with the requirements of AS9104/1:2012



Products	Description
<b>Isolated DC/DC Converter</b>	<b>MBH Series 1100 to 2100 Watt</b>
<b>MIL-STD-1275B / MIL-STD-461E</b>	<b>Custom and Standard Solutions for Industrial and Mil- Applications</b>
Input Voltage	10V-16VDC (1100W)
Output Voltage	28Vdc
Input Voltage	23V-32Vdc (2100W)
Output Voltage	12V & 13.5V
Efficiency	97%
Environment	Ideal for harsh Shock and Vibration Environments

<b>Isolated-Digital DC/DC Converter</b>	<b>WDE Serie 75 Watt 1/8 Brick Solution</b>
Input Voltage	4:1 / 9.0-36VDC / 18-75V DC
Output Voltage / 24V Input	5V, 12V, 24V, 28V, 48V
Output Voltage / 48V Input	24V, 28V, 48V
Telemetry-Data	Real Time Performance Data VIA PMbus <sup>th</sup>
Adjustment	Digital configurable voltage, current and over temperature & Sense Connectors
Control connector	Remote on/off
<b>Evaluation Board</b>	<b>WDE24-1, WDE24-2, WDE48-2 please contact Kamaka</b>

<b>Isolated-Analog DC/DC Converter</b>			<b>Brick Solution 75 Watts and up to 1000 Watts</b>			
Series	Watts	Package	V in Nom	V out	V in Range	Case/Size
QH	75	¼ Brick	24, 48	3.3 , 5, 12, 15, 24	2:1	1.45"x2.28"x0.52"
HEW	100	½ Brick	24, 48	3.3, 5, 12, 15, 24	4:1	2.4"x2.28"x0.55"
HEW	150	½ Brick	24, 48	5, 12, 15, 24	4:1	2.4"x2.28"x0.55"
GX	200	½ Brick	28	15, 24	2:1	2.4"x2.28"x0.55"
MTW	360	½ Brick	24	12, 15, 24, 28	4:1	2.4"x2.50"x0.55"
MXW	500	½ Brick	24	12, 15, 24, 28	4:1	2.4"x2.50"x0.55"
FXW	1000	Full Brick	24	24, 28	4:1	4.7"x2.50"x0.55"
FXP	1000	Full Brick	24	24, 28, 48, 53	4:1	4.7"x2.50"x0.55"
HD DUAL	75	½ Brick	24, 48	2.5 , 3.3, 5	2:1	2.4"x2.28"x0.55"
HE Triple	75	½ Brick	24, 48	3.3, 5,+/-12, +/-15, +/-17	2.1	2.4"x2.28"x0.55"
LT Triple	75	½ Brick	24	1.5, 1.8, 2.5, 3.3, 5	2:1	2.4"x2.28"x0.55"
Control Connector	Remote on/off					
Adjustment	Output voltage +/-10% & Sense Connectors					
EMI	Filter for 24V + 28Vdc nom. input voltage MIL-STD-461-E at full load 200W / 28V					
Load Share Module	LSL	¼ brick package, Dual input load sharing, DCDC trim function ; 60° output				
Hold Up Module	HU-28	¼ / ½ brick package 50ms hold-up time without external capacitor				



- Power distribution box-landed/ground based/portable
- X-Band/L-Band transmitters: radar sets
  - Autonomous robotic systems
  - Man packed radio/satellite terminals
  - RF inhibitors/jammers (EW)
  - Rugged computers
  - Thermal imaging

- Full Brick - 1000 Watt FXP Parallel
- Full Brick - 1000 Watt FXW Single
- 1/2 Brick - 500 Watt MXW Single
- 1/2 Brick - 360 Watt MTW Single
- 1/2 Brick - 200 Watt GX Single
- 1/4 Brick - 250 Watt QMW Single
- 1/4 Brick - 150 Watt QSW Single
- CBAM™-Power Quality (MIL-STD-1275B)
- EMI Filters (MIL-STD-461E)
- MBH 1100-2100 Watt with CAN-Bus option

- Military-COTS, demanding, mission critical apps.
- Ultra-wide input range 4:1, 9-36V, 18-75V for battery powered/ back up applications
- High efficiency (up to 96.5%) for energy saving and easier thermal management
- High Power Density: 150W-250W @ quarter brick, 360W-500W @ half brick 1KW @ full brick : for board space saving
- Case operating temp.: -40°C to +100°C, extended -55°C to +110°C
- Shock and Vibration designed to meet MIL-STD-810G
- Complementary front end modules comply with MIL-STD-461E & MIL-STD-1275B
- Outputs: single to triple output voltages
- Isolation: 2250VDC (i/o), up to 4250VDC available
- Mounting: PCB (Bricks), Chassis
- Custom solutions available •5 year Warranty •EAR99 classified

**100% Testing under all operating conditions 5 Year warranty**

**Data Acquisition Products since 1970  
High-Temperature, Medical, Military, Space**

**Standard Products**

**A to D-Converters:** 7 to 8-bit CMOS Flash up to 20MSPS

Stand-alone 12-bit with 2 to 20  $\mu$ sec conversion rate

**Sampling A to D-Converters:** 12 to 24-Bit up to 20 MSPS

**D to A-Converters:** 8, 10, 12, 16-bit up to 250MHz with input latching

COTS: DAC-1412 14-bit 125MHz D-to-A-Converter, 28-Pin Plastic TSSOP

**Single-Package Data Acquisition Systems 12-bit**

Input Multiplexer, Instrumentation Amplifier, S & H Amplifier, A/D-Converter and various interface logic – fully qualified with screening

**CCD Signal Processor / Imaging Converters:** 12, 14, 16, 18-Bit ADC

with integrated Correlated Double Sampler for easy interface with CCD

**Stand alone CCD Image Converters:** Functionally complete 12 to 18-bit resolution ADCDS converter family

**Sample & Hold Amplifiers:** from 0.1% to 0.001% accuracy (10 to 16-bit equivalent resolutions) with acquisition speeds from  $\mu$ s to low tens of ns

**Precision Voltage references**

1.024; 1.25; 2.048; 2.5; 3.0; 3.3; 4.096; 5.0V

**LDO Linear Voltage regulators:** -15V; +15V ; from -55 to +125°C

**4- & 8-CH Multiplexers:** from 0.1% to 0.001% accuracy (10 to 16-bit equivalent resolutions) with fast settling time speeds in the low tens of ns

**Amplifiers:** 70 to 200ns from -55 to +125°C

**High Temperature Products:**

Amplifiers, Correlated Double Sampling Amplifiers, A/D & D/A-Converters  
Operating Temperature Range: -55 to +200°C

**Custom solutions:** Design of modified products for digital imaging, industrial, medical, aerospace, Hi-Rel Defence applications

**Obsolescence Solutions**

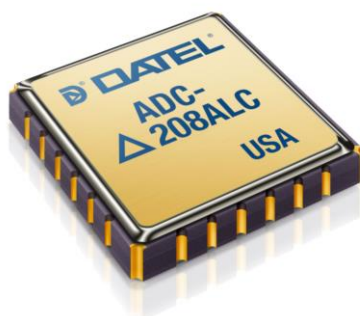
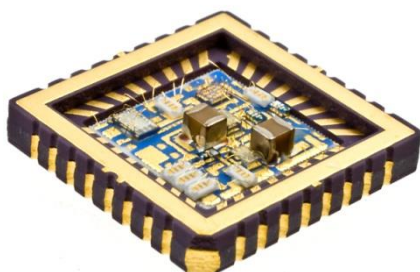
Reverse Engineering

Process Porting & Device Replication

Obsolete component replacement, Device Replication

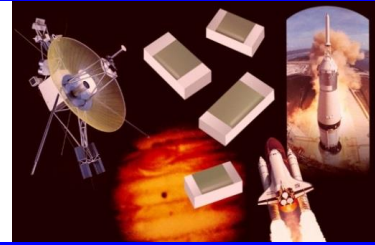
**Standard Microcircuit Drawings:** SMD5962-xxxx, DSCC/DLA certified

Approvals: MIL-883 certified components



## KAMAKA Service

**KAMAKA was established in 1992**  
**Quality Agreements possible**  
**Traceability is guaranteed**  
**No Counterfeiting parts**  
**Only original parts**  
**You will get the complete manufacturer guarantee**  
**You will get a manufacturer CoC**



## Quality Management System

**DIN EN 9120:2009 technically equivalent to AS9120A and SJAC9120**  
**DIN EN ISO 9001:2008**  
**DIN EN 61340-5-1 ESD compliant storage & handling process**

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