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Home Healthcare & Remote Patient Monitoring Application Guide

TTI, Inc., – A Berkshire Hathaway Company



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The Specialist in Electronic Component Distribution



Why Choose TTI?

Founded in 1971, TTI has steadily grown to become a world leading specialist distributor of electronic components. The company was founded on the premise that passive component purchasing could be made more efficient by offering product specialization, customer-driven service and proprietary supply chain solutions.

Global Distribution Centres

Our European headquarters is located just outside of Munich, Germany in Maisach-Gernlinden. In total, we have 42,600m² of dedicated warehouse space and local sales and technical support in over 38 locations across Europe. TTI has more than 195,000m² of automated warehousing in North America, Europe and Asia. All are linked into a global warehouse management system that provides superior customer service and overall business efficiencies. Wherever you are in the world, TTI can support you.

Year after year, customers rate our inventory availability, on-time delivery and accuracy among the very best in the industry – contact us today to find out what a true specialist has to offer.

Quality and Reliability

TTI's global warehouses are all ISO-registered and have received certification to the ISO 9001 and ISO 14001 Standards. TTI Europe is also certified to EN9120/EN9100, IECQ-CECC and ISO/IEC 27001 Standards. Additionally, our European sales branches are ISO 9001 certified. TTI has one global documentation system that ensures that every TTI branch and warehouse in the world follows the same processes.

Global Distribution Centres
with more than 195,000m²
of automated warehousing
in North America, Europe
and Asia.



Application Guide

With a growing elderly population, there is a rising incidence of chronic diseases, leading to a growing need for cost-effective healthcare treatment.

This includes home testing and diagnosis, home healthcare therapeutic equipment, and self-monitoring wearables, all supported by an improved data communication network – Telehealth.

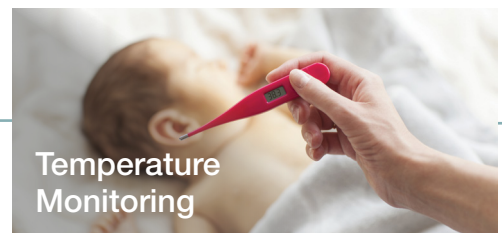
This is leading to a growth in technological advancements in home-care medical devices as listed below.

Home Monitoring

- Activity monitor wristbands
- Peak flow meters
- Heart rate monitors and ECG devices
- Fetal monitoring devices
- Blood pressure monitors
- Blood glucose monitoring
- Pulse oximeters
- Temperature monitors
- Hearing aids

Therapeutic/Remedial Products







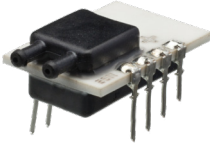

- Oxygen delivery systems
- Nebulizers/inhalers
- Ventilators
- Sleep apnea therapeutic devices
- Wound care products
- IV equipment, drug delivery devices
- Dialysis equipment
- Insulin delivery devices
- Automated external defibrillators (AEDs)




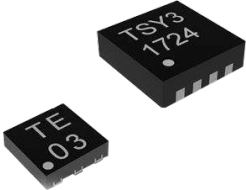


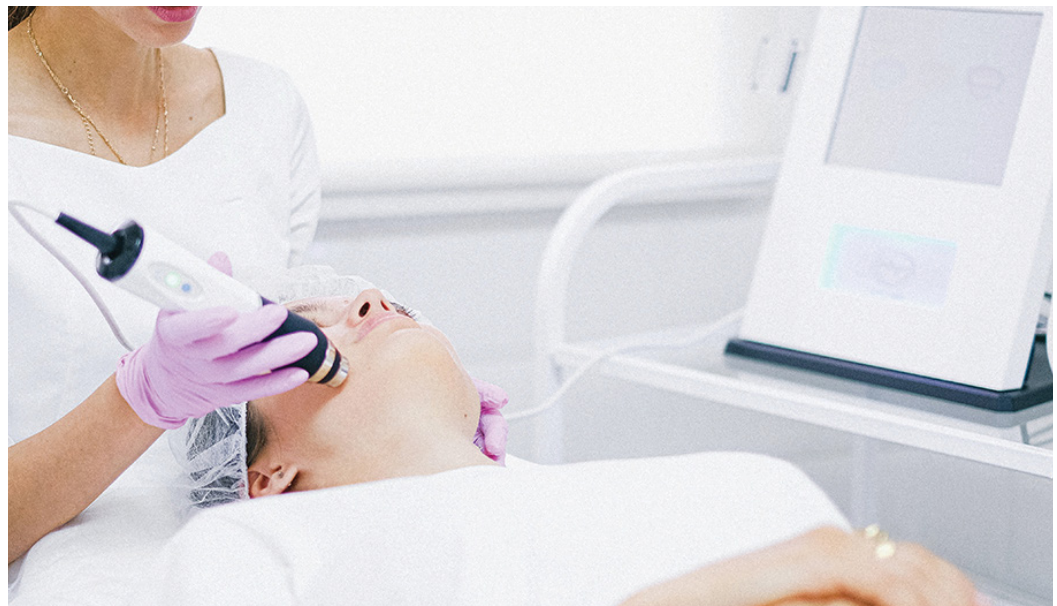
<p>Amphenol®</p>	<p>Amphenol®</p>	<p>Amphenol®</p>	<p>Amphenol®</p>
<p>ELV Series Pressure Sensors</p>	<p>ZTP Series Thermopile Sensors</p>	<p>SP Series NTC Glass Bead Thermistors</p>	<p>SC/MC Series NTC Thermistors</p>
<ul style="list-style-type: none"> • COBEAM-2 pressure sensors die • High performance die 	<ul style="list-style-type: none"> • Small form factor IR Thermopile non contact temperature sensors 	<ul style="list-style-type: none"> • SP Series ultra stable NTC thermistors match bead pairs • High accuracy and stability temperature measurement 	<ul style="list-style-type: none"> • Micro thermistor for medical sub assemblies, glucose monitors and catheter integration
			
<p>Honeywell</p>	<p>Honeywell</p>	<p>Honeywell</p>	<p>Honeywell</p>
<p>HAF Series AirFlow Sensors</p>	<p>ABP2 Series Board Mount Pressure</p>	<p>MPR Series Micro Pressure</p>	<p>TruStability Board Mount Pressure</p>
<ul style="list-style-type: none"> • Analogue AWM series and digital HAF Zeyphr AirFlow sensors 	<ul style="list-style-type: none"> • Small form factor good performance pressure sensors series for cost sensitive applications 	<ul style="list-style-type: none"> • Ultra small ported pressure sensors for low pressure medical applications e.g. Spirometry 	<ul style="list-style-type: none"> • HSC/SSC/RSC series pressure sensors high performance low pressure and ultra low pressure applications e.g. ventilators
			
<p>Honeywell</p>	<p>Honeywell</p>	<p>Honeywell</p>	<p>muRata INNOVATOR IN ELECTRONICS</p>
<p>City Technology MOX Series 3, 4, 20</p>	<p>Enivtec – O2</p>	<p>Enivtec – SP O2</p>	<p>Ionissimo Ioniser/Ozonizer</p>
<ul style="list-style-type: none"> • Electro-chemical oxygen concentration sensors for medical applications M16 connection 	<ul style="list-style-type: none"> • Oxygen concentration sensors Life-support systems in intensive care and emergency medicine 	<ul style="list-style-type: none"> • Pulse oximetry finder clips series 	<ul style="list-style-type: none"> • Ideal for air cleaning, sterilization and deodorization applications • Design that separates the high voltage power supply from the ion generator
			



 <p>INNOVATOR IN ELECTRONICS</p>			 <p>AUTHORIZED DISTRIBUTOR</p>
<p>BCGMCU</p>	<p>D6T MEMS Thermal Sensors</p>	<p>Kavlico PIK/P1J Series</p>	<p>FS20 Force Sensors</p>
<ul style="list-style-type: none"> • Embedded patient monitoring sensors with embedded inclinometer 	<ul style="list-style-type: none"> • Non contact temperature measurement using thermopile element. Human fever detection 	<ul style="list-style-type: none"> • Low pressure sensors suitable for medical equipment applications e.g. oxygen concentrators 	<ul style="list-style-type: none"> • FS20 Series – small form factor, low compression force cell suitable for applications like medical infusion pumps
			

 <p>AUTHORIZED DISTRIBUTOR</p>	 <p>AUTHORIZED DISTRIBUTOR</p>	 <p>AUTHORIZED DISTRIBUTOR</p>	 <p>AUTHORIZED DISTRIBUTOR</p>
<p>RTD Series Platinum Film Element</p>	<p>HTU 31x Humidity Sensors</p>	<p>SMI4x00</p>	<p>SMI9000 Ultra Low Digital Pressure</p>
<ul style="list-style-type: none"> • RTD temperature sensors PT100 PT1000 ultra stable temperature measurement for high performance medical applications 	<ul style="list-style-type: none"> • HTU31 – is one of the smallest and most accurate humidity sensors on the market • Available in digital and analogue versions 	<ul style="list-style-type: none"> • SMI 4x00 – multiple package styles • Digital and analogue pressure sensor dual output option 	<ul style="list-style-type: none"> • Ultra low pressure sensor series small footprint digital output only
			

 <p>AUTHORIZED DISTRIBUTOR</p>
<p>TSYS03 Digital Temperature Sensors</p>
<ul style="list-style-type: none"> • Miniature digital temperature Sensors for medical probes and patient monitoring applications • Low power



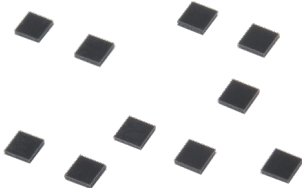







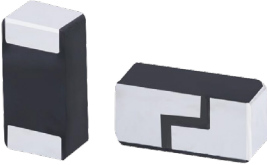

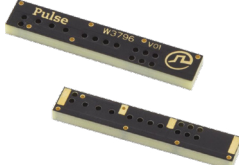











Connectivity



<p>Amphenol®</p>	<p>Amphenol ICC</p>	<p>Amphenol ICC</p>	<p>Amphenol ICC</p>
<p>pulseOne Cable Assemblies</p>	<p>USB Type C</p>	<p>Micro SD and SD Card Sockets</p>	<p>Bergstak Board-to-Board</p>
<ul style="list-style-type: none"> • 4 to 14 pole configurations • Friction-fit 'D' shaped connectors • Multiple keying options • Shielded connector and cable bundle options 	<ul style="list-style-type: none"> • From USB 2.0 to USB 4 Gen 3 in unsealed and waterproof versions • Partially loaded options when not all circuits are required 	<ul style="list-style-type: none"> • Many varieties of user friendly card sockets • Shielded with superior solder ability and performance 	<ul style="list-style-type: none"> • Bergstak micro pitch B-B from 0.4mm to 0.8mm, position options from 10 to 200, and stack height flexibility from 3mm to 20mm
			
<p>Amphenol LTW® <i>Unrivaled InterConnects for Harsh Environments</i></p>	<p>HARWIN</p>	<p>JAE</p>	<p>molex</p>
<p>FLOS & FLOS+</p>	<p>Datamate J-Tek Connectors</p>	<p>RK01 Series Wearable Connectors</p>	<p>IOT Antennas</p>
<ul style="list-style-type: none"> • FLOS & FLOS+ Series feature a push-pull and break-away mechanism, 360° EMI shielding, high performance and reliable connection power, data, signal or hybrid needs 	<ul style="list-style-type: none"> • Highly reliable 2mm pitch range featuring jackscrew hardware for increased security when failure is not an option 	<ul style="list-style-type: none"> • Connector system which is washable providing connectivity in fabric for smart clothing 	<ul style="list-style-type: none"> • FPC and ultra-thin ceramic and LDS/MID antennas are ideal for embedding internet and data connectivity in compact devices
			
<p>molex</p>	<p>molex</p>	<p>molex</p>	<p>molex</p>
<p>LPWAN Antennas</p>	<p>MMCX RF Connectors</p>	<p>Easy-On FFC/FPC Connectors</p>	<p>SlimStack Battery Power Supply</p>
<ul style="list-style-type: none"> • Wide range of low-power wide-area network (LPWAN) antennas for frequencies used by protocols like LoRa and SigFox (868/915 MHz) 	<ul style="list-style-type: none"> • Ideal for space-critical applications, the MMCX compact and lightweight connectors provide reliable electronic performance from DC to 6 GHz 	<ul style="list-style-type: none"> • Latching ZIF connector with dual contact point • Vibration and stress resistant • Wide temperature range and high data rate 	<ul style="list-style-type: none"> • Achieve up to 10.0A of power & electrical reliability in an ultra-compact design with SlimStack hybrid power connectors, designed for battery and other power applications
			










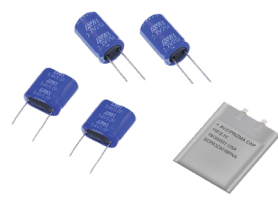
 <p>muRata INNOVATOR IN ELECTRONICS</p>	<p>Panasonic INDUSTRY</p>	<p>Panasonic INDUSTRY</p>	<p>Panasonic INDUSTRY</p>
<p>Ultra-miniature UHF RFID tags</p>	<p>PAN1781 BLE Module</p>	<p>PAN9026 WiFi/Bluetooth Module</p>	<p>PAN9520 Embedded WiFi Module</p>
<ul style="list-style-type: none"> World's smallest class FID tags Best fit for small applications such as wearable items and test vials 	<ul style="list-style-type: none"> BLE long range, direction finding, multi-protocol (BLE, Zigbee, thread). Low current consumption of 1.2uA in RTC deep sleep mode 	<ul style="list-style-type: none"> Dual band 2.4/5 GHz 802.11 a/b/g/n Wi-Fi/BT 5 combo module, multiregion certification 	<ul style="list-style-type: none"> 2.4Ghz 802 b/g/n WiFi module based on ESP32-S2, additional crystal for stable connection performance, small size
			
 <p>Pulse A YAGEO Company</p>	 <p>Pulse A YAGEO Company</p>	 <p>Pulse A YAGEO Company</p>	 <p>SCHURTER ELECTRONIC COMPONENTS</p>
<p>W3008C BLE Ceramic Chip Antenna</p>	<p>W3011A GNSS Ceramic Chip Antenna</p>	<p>W3796 LTE Composite PCB Antenna</p>	<p>Main Filter and Cord sets</p>
<ul style="list-style-type: none"> High-Efficiency ceramic chip antenna for WiFi, Bluetooth, Zigbee applications Resilient to hand loading effect 	<ul style="list-style-type: none"> GNSS Ceramic chip antenna, compact size, omnidirectional radiation pattern Resilient to hand loading effect 	<ul style="list-style-type: none"> High performance 4G LTE/Cat M1/NB-IoT composite PCB antenna, fully SMT compatible 	<ul style="list-style-type: none"> Sealed power entry modules Standard white colour Very low leakage current V-Lock cord retention system
			
			 <p>TE CONNECTIVITY AUTHORIZED DISTRIBUTOR</p>
<p>Eclipta Series Connectors</p>	<p>D Series Quick Disconnect Plastic</p>	<p>HyperGrip Circular Colour Coded</p>	<p>2108784-1 5G SMD PCB Antenna</p>
<ul style="list-style-type: none"> High density interconnect design Ideal for use with home healthcare devices and other disposable medical devices 	<ul style="list-style-type: none"> Ruggedised with push button latch Suitable for applications including patient monitors, infusion pumps and lab equipment 	<ul style="list-style-type: none"> Colour coded with push/pull latching design allowing for one-hand disconnect designed to meet medical industry requirements 	<ul style="list-style-type: none"> Onboard SMD PCB antenna offering wide band coverage for 5G, 4G, 3G, 2G with GNSS
			





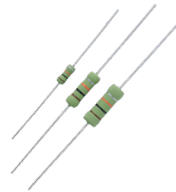


Relays, Switches & Opto-Electronics


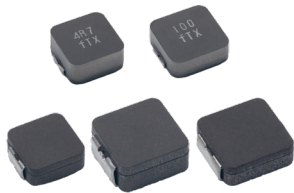


			
<p>CPC1008N</p>	<p>G3M G3M Solid State Relay</p>	<p>PhotoMOS® Relay AQY210EH</p>	<p>DRA1 SPF</p>
<ul style="list-style-type: none"> • Load currents up to 150mA at 100V AC/DC • 1500VRMS input/output isolation, fulfills low drive power requirements 	<ul style="list-style-type: none"> • 3 and 5A single in-line package SSR • Certified by UL, CSA, and VDE • Ideal for small heating systems 	<ul style="list-style-type: none"> • Controls low-level analogue signals • 5kV reinforced insulation for high safety • For blood pressure gauges & I/O in diagnostic systems 	<ul style="list-style-type: none"> • Suitable for small pumps, blood transfusion equipment, incubators, dialysis machines, warming blankets and sterilizers
			
			
<p>PBA-Series</p>	<p>HDT Series Micro Mini Detect Switch</p>	<p>KMT0-Series</p>	<p>DM-Series</p>
<ul style="list-style-type: none"> • Sealed to IP68 or IP69K, easy to clean metal surface 	<ul style="list-style-type: none"> • Low profile design allows top or side actuation. Low actuation force of 35 grams 	<ul style="list-style-type: none"> • Ultra low current, up to 1M cycle with IP68 sealing, suitable for Medical instruments and battery devices 	<ul style="list-style-type: none"> • Snap-in panel mount basic switch for appliance door lights and door interlocks, as well as service panels
			
			
<p>EVPAW-Series</p>	<p>VLMU35CT20-275-120 UVC LED</p>	<p>VEML6035 I2C Ambient Light Sensors</p>	<p>VEMD4010X01 PIN Photodiode</p>
<ul style="list-style-type: none"> • Small size, high robustness against dust/water by new technology 	<ul style="list-style-type: none"> • Ceramic SMT package with quartz window • DC forward current: up to 200mA • Radiant power (typ.): 24.3mW at 200mA 	<ul style="list-style-type: none"> • 16-bit, low power, high sensitivity ALS • Very flat package with 0.4mm height • Operating voltage ranges from 1.7V to 3.6V 	<ul style="list-style-type: none"> • Very robust 0805 FAM package • Radiant sensitive area (in mm²): 0.42 • Angle of half sensitivity: $\pm 55^\circ$
			



 Powering Business Worldwide			 A KYOCERA GROUP COMPANY
Cylindrical Cell & Pack Supercaps	Nano Fuse	NTC Thermistors	Supercapacitors
<ul style="list-style-type: none"> • KR/KW coincells for RTC • Cylindrical packs PHV and PTV mostly for alarming • XV cells for Xray and medical backup 	<ul style="list-style-type: none"> • Surface mountable, compact footprint of 10.86 x 4.78mm • Small size/surface mountable type • Operating temperature range from -40°C to 85°C 	<ul style="list-style-type: none"> • NTC families with standard lead spacing design • NTC miniSensors • NTC with flexible wires • Wide variety of resistance values R (25°C) 	<ul style="list-style-type: none"> • Superior reliability, passes 4000 hours life tests • Customized options for modules • Molded encapsulation and prismatic case options
			





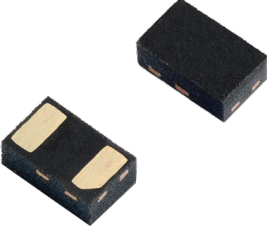
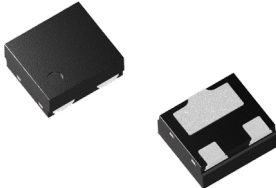
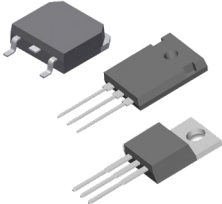



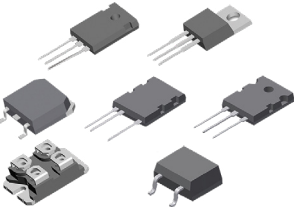
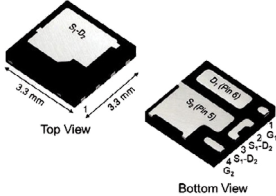

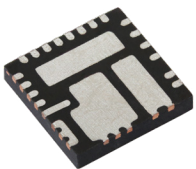




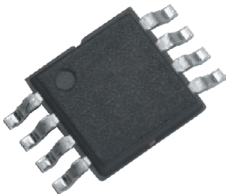

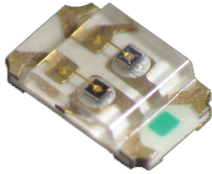
 INNOVATOR IN ELECTRONICS		Panasonic INDUSTRY	
Safety Capacitors	PCF Ceramic Pulse Resistors	Wide Terminal Shunt Resistors	Shielded Power Inductors
<ul style="list-style-type: none"> • Small size and low profile can help to reduce the size of the board and the height of the set • X1/Y1/Y2 class product which has acquired Safety Standard Certification 	<ul style="list-style-type: none"> • Full ceramic body for HV and surge currents • 20kV pulse voltage, power rating up to 2W • Non-inductive, AEC-Q200 qualified 	<ul style="list-style-type: none"> • Used in current sensing solutions • Small case size with high power • Excellent long term stability • Superior heat dissipation to avoid hot spots 	<ul style="list-style-type: none"> • High saturation current, up to 60A • Magnetically shielded • Low DCR • Inductance selection 0.1 – 15µH
			

 a YAGEO company
Power Inductors
<ul style="list-style-type: none"> • Metal composite core has high saturation characteristics maintaining function in rush current mode • Composite construction with low acoustic noise




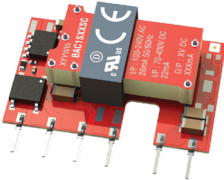
Discrete Semiconductors



			
<p>TBU-CA Series High-Speed Protectors</p>	<p>SP11xx-Series TVS Diodes</p>	<p>VBUS05M2-HT5 ESD Prot. Diodes</p>	<p>IGBT: BiMOSFET Series</p>
<ul style="list-style-type: none"> • Overcurrent and overvoltage protection • Blocks surges up to rated limits • High-speed performance • Small SMT package 	<ul style="list-style-type: none"> • Low clamping voltage • Low leakage current • AEC-Q101 qualified 	<ul style="list-style-type: none"> • Small DFN1110-3A • 2-line ESD protection • Low leakage current and low capacitance • Ideal for high speed data line e.g. HDMI, DisplayPort, eSATA 	<ul style="list-style-type: none"> • High blocking voltage • High power density • High current handling capability • Low conduction losses • MOS gate turn on for drive simplicity
			
			
<p>MOSFET: HiPerFETs Series</p>	<p>SIZF360DT Dual N-Ch 30V MOSFETs</p>	<p>IXD604 4A Ultrafast MOSFET Drivers</p>	<p>SIC474 3A DC/DC Converters</p>
<ul style="list-style-type: none"> • Suitable for battery chargers, temperature light controls, DC/DC converters • Compact, ultra-low profile SMPD package • Saving valuable PCB space 	<ul style="list-style-type: none"> • TrenchFET® Gen IV power MOSFET • Low side MOSFET with integrated Schottky • Double cooled feature 	<ul style="list-style-type: none"> • 4A source/sink drive current • wide operating voltage range: 4.5V to 35V • Logic input withstands negative swing of up to 5V 	<ul style="list-style-type: none"> • Versatile – single supply operation from 4.5V to 55V input voltage • Adjustable output voltage down to 0.8V • Scalable solution 3A
			
			
<p>DG469 SPDT Analogue Switch</p>	<p>KPHHS-1005LV Series SMD LED 0402, low current</p>	<p>KPHBM-2012 Series SMD 0805, low current, bi-colour</p>	<p>VCNL-Series: Digital IR Proximity Sensors</p>
<ul style="list-style-type: none"> • Low on resistance (3.6Ω typical) • On resistance flatness (0.4Ω typical) • 44V supply maximum rating • ± 15V analogue signal range 	<ul style="list-style-type: none"> • Low power consumption • Wide viewing angle • Ideal for backlight and indicator 	<ul style="list-style-type: none"> • Low power consumption • Wide viewing angle • Ideal for backlight and indicator 	<ul style="list-style-type: none"> • Fully integrated proximity and ambient light sensors with I2C interface for presence detection, gesture recognition, screen wakeup and many more touchless solutions
			

Power Supplies



			
<p>Medical DC/DC</p>	<p>LCM Series Bulk Power</p>	<p>GSM, GEM Series Medical Adaptor</p>	<p>MPM/On-Board</p>
<ul style="list-style-type: none"> • IEC60601-1 3rd Ed, IEC60601-1-2 4th Ed EMC, 2XMOOP, low leakage current • Some are suitable for B or BF rated applications 	<ul style="list-style-type: none"> • Power ratings of 300W-3kW • Output voltages from 12V-48V with adjustment range of $\pm 10\%$ • IEC60601-1 3rd Ed 	<ul style="list-style-type: none"> • 2xMOPP, low leakage current • Wide range Working temp. • Class II • Safety approvals: UL/CUL/TUV/EAC/FCC/CE 	<ul style="list-style-type: none"> • 2xMOPP level, low leakage current suitable for type BF • Class II, meets EN55011 Class B • -30~+80°C • Fully potted
			
			
<p>BAC Series 1-10W AC/DC On-Board</p>	<p>PQC250 AC/DC Power Supplies</p>	<p>MEJ Series DC-DC Converter</p>	<p>PicoBK™</p>
<ul style="list-style-type: none"> • 1-10W from -40°C to 55°C, up to 85°C with D • Small footprint, EMC class B • Low standby power for battery 	<ul style="list-style-type: none"> • IEC60601 Ed.3 medical • High efficiency: Up to 95.0% • IEC60601-1 4th Edition EMC standard • 250W compact high density 	<ul style="list-style-type: none"> • High efficiency • Temp. range: -40 to 85°C • Encapsulated 	<ul style="list-style-type: none"> • Very small SMT footprint • Efficiency 93% (typ.) • Low quiescent current • Excellent EMI and thermal performance
			





ttiurope.com



Contact TTI today to see what a true specialist can offer.

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