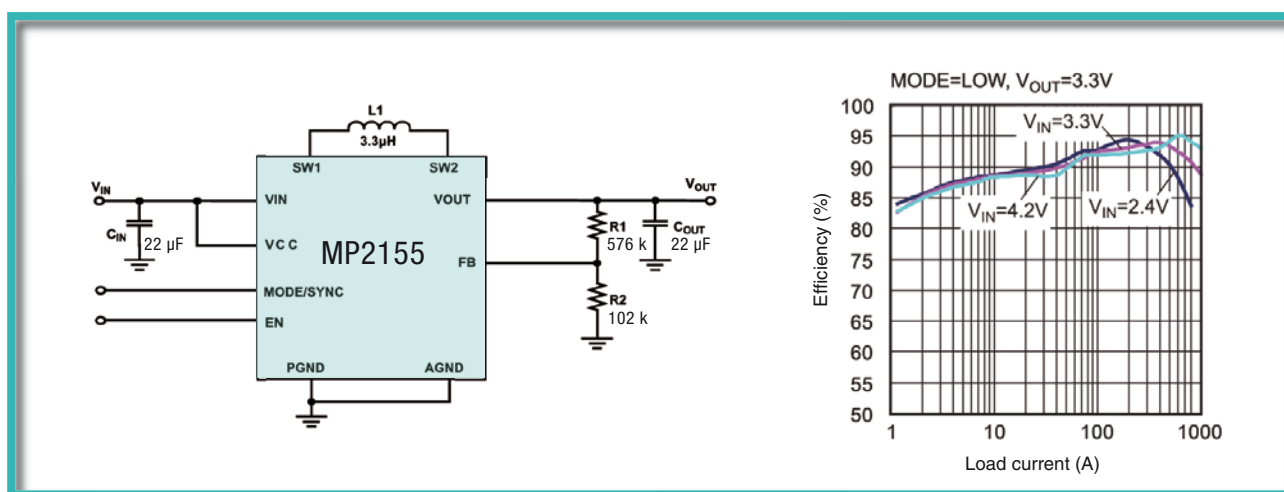


endrich news

www.endrich.com

Our Product of the Month Single Inductor Buck-Boost Converter



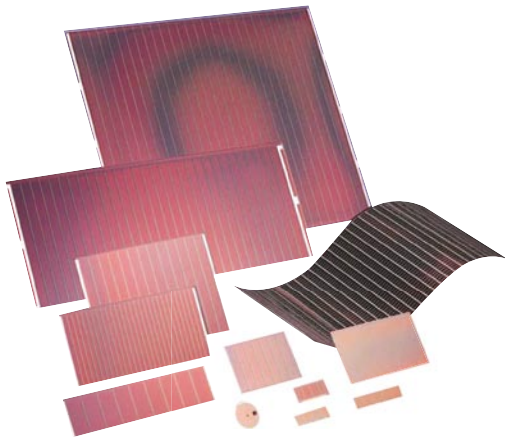
MP2155 Demoboard



- Single inductor buck-boost converter
- High light load efficiency, low standby power
- Minimal external components
- Small 3 mm \times 3 mm QFN10 package
- Suitable for limited space
- High switching frequency, smaller inductor size
- Smooth and reliable mode transition between buck boost

Active Components – MPS Converters

AMORTON – AMORPHOUS SILICON SOLAR CELLS



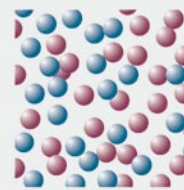
FEATURES

- For indoor and outdoor use
- Glass substrate:
 - low price (basic substrate)
- Stainless steel substrate:
 - Thin, light weight, unbreakable, can easily be formed in arbitrary shapes, highly precise dimensions
- Film substrate:
 - Thin, light weight, unbreakable, bendable, can easily be formed in arbitrary shapes
- Solar cells with a variety of voltages can be created
- Solar cells with a variety of shapes can be created

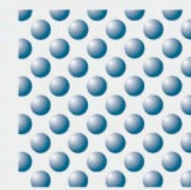
Solar cells are classified acc. to the material employed, i. e., crystal silicon, amorphous silicon, and compound semiconductor solar cells. Unlike crystal silicon, in which atomic arrangements are regular, amorphous silicon features irregular atomic arrangements as shown in the figures below.

Amorton is an integrated amorphous silicon solar cell which has been developed by SANYO. Amorton uses silane (SiH_4) as its source gas and is fabricated using a plasma CVD method. Three amorphous silicon layers – p-layer, i-layer, and n-layer – are formed consecutively on a glass substrate. This p-i-n junction corresponds to the p/n junction of a crystal silicon solar cell. In the process of this junction formation, a number of cells are connected in series on a substrate at one time. This allows any desired voltage to be obtained for a variety of equipment operation.

AMORPHOUS ATOMIC ARRANGEMENT

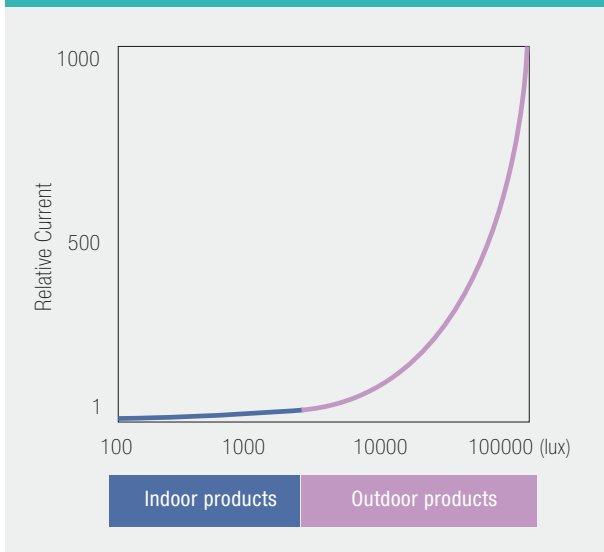


AMORPHOUS

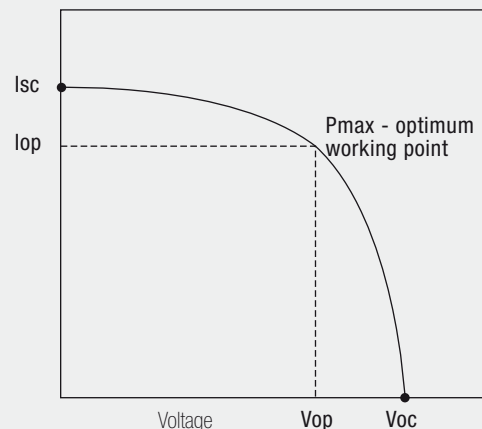


CRYSTAL

RELATIONSHIP BETWEEN ILLUMINATION LEVEL AND OUTPUT



CURRENT-VOLTAGE CURVE



Voc: open-circuit voltage Vop: optimum operating voltage
 Isc: short-circuit current Iop: optimum operating current
 Pmax: maximum output

AMORTON – AMORPHOUS SILICON SOLAR CELLS

OUTPUT CHARACTERISTICS — INDOOR USE AMORTON

Indoors, artificial light, such as fluorescent and incandescent light, is used. The illuminance of these light sources ranges from 20 lux to 1,000 lux. Indoors, therefore, Amorton is most suitable for small equipment such as electronic calculators. Please use indoor Amorton solar cells under 1,000 lux.

TYPICAL CELL CHARACTERISTICS

OPEN-CIRCUIT VOLTAGE	SHORT-CIRCUIT CURRENT	MAXIMUM OUTPUT	LIGHT SOURCE
0.63 V/cell	17.0 $\mu\text{A}/\text{cm}^2$	7.0 $\mu\text{W}/\text{cm}^2$	FL200 lux

OUTPUT CHARACTERISTICS — OUTDOOR USE AMORTON

Natural light ranges in illuminance from 10,000 lux to 100,000 lux (AM-1.5, 100mW/cm²) or more.

TYPICAL CELL CHARACTERISTICS

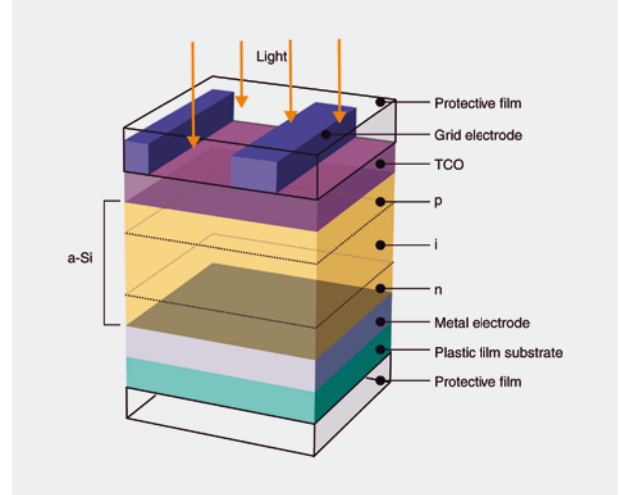
OPEN-CIRCUIT VOLTAGE	SHORT-CIRCUIT CURRENT	MAXIMUM OUTPUT	LIGHT SOURCE
0.84 V/cell	13.3 mA/cm ²	7.48 mW/cm ²	AM-1.5, 100mW/cm ²

AMORTON FLEXIBLE FILM

Amorton Film is an exceptionally thin, light and flexible amorphous silicon solar cell fabricated on plastic film. In addition to these advantages, Amorton Film is also resistant to crack. Its standard configuration includes a protective film covering the amorphous silicon solar cell which measures about 0.4mm in overall thickness.



AMORTON FILM CONFIGURATION



SPECIFICATIONS - AMORTON FILM

MODEL	TYPICAL OPERATING CHARACTERISTICS (INITIAL)		EXTERNAL DIMENSIONS (mm)	WEIGHT (g)
	100mW/cm ²	SS 50 klux (Reference Value)		
AT-7664	3.0V / 104mA	3.0V / 46.5mA	73.0 × 112.0 × 0.4	4
AT-7665	3.0V / 38.6mA	3.0V / 17.3mA	58.4 × 56.0 × 0.4	2
AT-7666	3.0V / 343.0mA	3.0V / 154.0mA	146.0 × 167.5 × 0.4	13
AT-7963	4.5V / 223.0mA	4.5V / 100.0mA	146.0 × 167.5 × 0.4	13
AT-7S63	15.0V / 134.0mA	15.0V / 60.5mA	292.0 × 168.0 × 0.4	25
AT-7S64	15.0V / 269.0mA	15.0V / 121.0mA	292.0 × 336.0 × 0.4	50



AMORTON – AMORPHOUS SILICON SOLAR CELLS

SPECIFICATIONS - AMORTON GLASS SUBSTRATE

INDOOR PRODUCTS

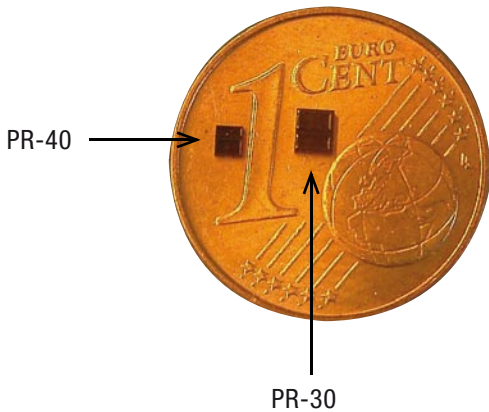
MODEL	TYPICAL OPERATING CHARACTERISTICS (INITIAL)		EXTERNAL DIMENSIONS (mm)	WEIGHT (g)
	FL-200 lux	FL50 lux (Reference Value)		
AM-1407	1.5V / 11.5µA	1.4V / 2.85µA	38.0 × 12.5	1.3
AM-1417	1.5V / 12.5µA	1.4V / 3.10µA	35.0 × 13.9	1.3
AM-1424	1.5V / 20.0µA	1.4V / 5.00µA	53.0 × 13.8	2.0
AM-1437	1.5V / 8.0µA	1.4V / 2.00µA	29.6 × 11.8	1.0
AM-1454	1.5V / 31.0µA	1.4V / 7.75µA	41.6 × 26.3	3.0
AM-1456	1.5V / 5.3µA	1.4V / 1.30µA	25.0 × 10.0	0.7
AM-1513	1.8V / 15.0µA	1.6V / 3.75µA	55.0 × 13.5	2.0
AM-1801	3.0V / 18.5µA	2.6V / 4.60µA	53.0 × 25.0	3.6
AM-1805	3.0V / 15.5µA	2.6V / 3.85µA	55.0 × 20.0	3.0
AM-1815	3.0V / 42.0µA	2.6V / 10.50µA	58.1 × 48.6	7.8
AM-1816	3.0V / 84.0µA	2.6V / 21.00µA	96.7 × 56.7	15.6

OUTDOOR PRODUCTS

MODEL	TYPICAL OPERATING CHARACTERISTICS (INITIAL)		EXTERNAL DIMENSIONS (mm)	WEIGHT (g)
	100mW/cm ²	SS 50klux (Reference Value)		
AM-5302	1.5V / 105.0mA	1.5V / 47.0mA	31.2 × 117.8	16.3
AM-5412	2.0V / 39.0mA	2.0V / 17.2mA	50.1 × 33.1	7.3
AM-5413	2.0V / 16.3mA	2.0V / 7.2mA	33.0 × 23.9*	2.1
AM-5416	2.0V / 49.9mA	2.0V / 22.0mA	60.1 × 36.7	9.8
AM-5605	3.0V / 113.0mA	3.0V / 51.0mA	62.3 × 117.8	32.5
AM-5608	3.0V / 36.0mA	3.0V / 16.0mA	60.1 × 41.3	11.0
AM-5610	3.0V / 5.0mA	3.0V / 2.2mA	25.0 × 20.0	2.2
AM-5611	3.0V / 3.2mA	3.0V / 1.4mA	33.4 × 10.0*	0.9
AM-5613	3.0V / 31.5mA	3.0V / 14.0mA	60.1 × 36.7	9.8
AM-5706	3.5V / 45.0mA	3.5V / 20.0mA	70.0 × 60.0	15.5
AM-5710	3.5V / 32.0mA	3.5V / 14.0mA	62.3 × 37.0*	6.3
AM-5812	4.0V / 19.5mA	4.0V / 8.5mA	59.0 × 28.7	4.6
AM-5902	4.5V / 60.0mA	4.5V / 27.0mA	150.0 × 37.5	25.0
AM-5904	4.5V / 10.0mA	4.5V / 4.3mA	40.1 × 33.1	5.9
AM-5907	4.5V / 44.7mA	4.5V / 19.7mA	75.0 × 55.0	18.3
AM-5909	4.5V / 22.2mA	4.5V / 9.8mA	60.1 × 41.3	11.0
AM-5910	4.5V / 88.5mA	4.5V / 9.8mA	60.1 × 41.3	11.0
AM-5912	4.5V / 15.4mA	4.5V / 6.8mA	42.9 × 47.2*	5.6
AM-5913	4.5V / 30.1mA	4.5V / 13.3mA	60.1 × 55.1	14.7
AM-5914	4.5V / 23.2mA	4.5V / 10.2mA	50.1 × 55.1*	7.5
AM-5C03	6.0V / 28.0mA	6.0V / 12.5mA	75.0 × 55.0	18.3
AM-5D01	6.5V / 11.0mA	6.5V / 4.8mA	100.0 × 18.0	8.0
AM-5E02	7.0V / 23.3mA	7.0V / 10.3mA	75.0 × 55.0	18.3
AM-5S04	15.0V / 22.0mA	15.0V / 9.7mA	124.5 × 57.0*	19.3
AM-5S05	15.0V / 15.0mA	15.0V / 6.5mA	124.5 × 39.3*	13.4
AM-5S06	15.0V / 11.0mA	15.0V / 4.9mA	124.5 × 29.5*	10.0
AM-7A03	5.3V / 250.0mA	5.3V / 113.0mA	150.0 × 165.0	110.0
AM-7D08	7.0V / 190.0mA	7.0V / 85.0mA	150.0 × 165.0	110.0
AM-7E04	7.5V / 115.0mA	7.5V / 50.0mA	150.0 × 110.0	74.0
AM-7S03	15.0V / 77.0mA	15.0V / 34.5mA	150.0 × 165.0	110.0



ULTRA SMALL POSITION DETECTOR – CITISENSOR PR-40

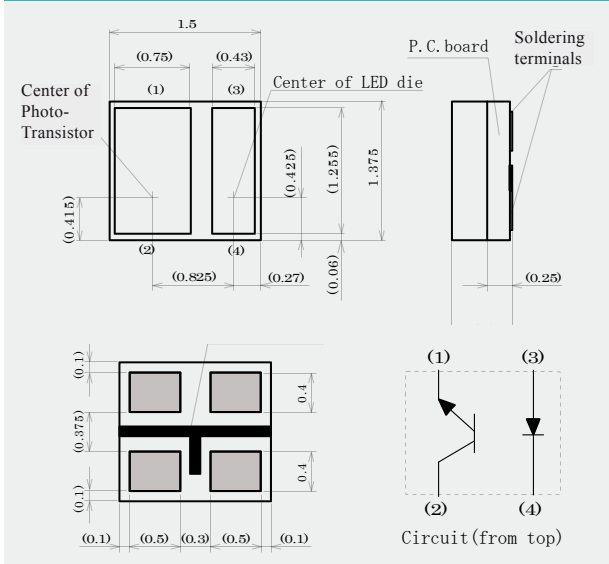


CITIZEN ELECTRONICS provides the new micro-sized photo-reflector PR-40. It is compared to standard PR-30 much smaller at the same electro-optical characteristics.

FEATURES

- » Thin and micro-sized
- » Detectable distance of approx. 1 mm
- » The adoption of the visible-light cutting resin prevents the malfunction of the photo-reflector PR-40, which may be caused by disturbance light.

DIMENSIONS (mm)



ABSOLUTE MAXIMUM RATING

	PARAMETER	RATING
Input	Power dissipation P_D	32.5 mW
	Forward current I_F	25 mA
	Pulse forward current I_{FP}	100 mA
	Reverse voltage V_R	6 V
Output	Collector dissipation P_C	75 mW
	Collector current I_C	20 mA
	Voltage betw. collector and emitter V_{CEO}	18 V
	Voltage betw. emitter and collector V_{ECO}	4 V
	Total power dissipation P	100 mW
	Operating temperature T_{opr}	-30°C ... +80°C
	Storage temperature T_{stg}	-40°C ... +85°C

ELECTRO-OPTICAL CHARACTERISTICS

	PARAMETER	CONDITIONS	MIN. TYP. MAX.			
			MIN.	TYP.	MAX.	
Input	Forward voltage V_F	$I_F = 4 \text{ mA}$	-	1.14	1.35	V
	Reverse current I_R	$V_R = 6 \text{ V}$	-	-	10	μA
	Peak wavelength λ_P	$I_F = 20 \text{ mA}$	-	940	-	nm
Output	Collector dark current I_{CEO}	$V_{CE} = 10 \text{ V}$	-	-	0.1	μA
	Light current I_C	$V_{CE} = 2 \text{ V}, I_F = 4 \text{ mA}, d = 1 \text{ mm}$	Rank A: 105 Rank B: 165 Rank C: 280	-	195 315 515	μA
Coupling Char.	Leakage current I_{LEAK}	$V_{CE} = 2 \text{ V}, I_F = 4 \text{ mA}$	-	-	1	μA
	Rise time t_r	$V_{CE} = 2 \text{ V}, I_C = 100 \mu\text{A}$	-	25	-	μs
	Fall time t_f	$R_L = 1 \text{ k}\Omega, d = 1 \text{ mm}$	-	30	-	μs

MP2155/28163—HIGH-EFF. SINGLE INDUCTOR BUCK-BOOST CONVERTERS

The **MP2155/MP28163** are high-efficiency, single inductor Buck-Boost converters, which operates from input voltage above, below and equal to the output voltage. The device provides power solution for products powered by a one-cell Lithium-Ion or multi-cell alkaline battery applications where the output voltage is within battery voltage range.

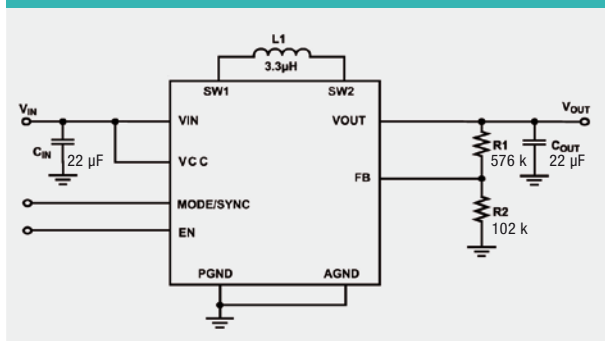
The MP2155/MP28163 use a current mode, fixed frequency PWM control for optimal stability and transient response. The fixed 1MHz switching frequency and integrated low RDS(ON) N-channel and P-channel MOSFETs to minimize the solution footprint while maintaining high efficiency.

To ensure the longest battery life MP2155/MP28163 have an optional pulse skipping mode that reduces switching frequency under light load conditions. For other low noise applications where variable frequency power save mode may cause interference, the logic control input MODE pin forces fixed frequency PWM operation under all load conditions.

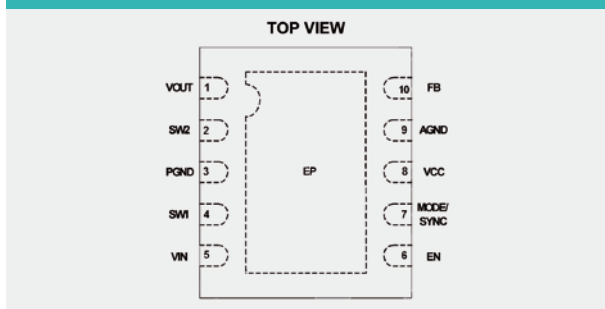
BENEFITS

- » Minimal external components - suitable for limited space
- » Low Iq - high light load efficiency, low standby power
- » High switching frequency - smaller inductor size
- » Smooth and reliable mode transition between buck boost

BASIC APPLICATION CIRCUIT



PIN ASSIGNMENT



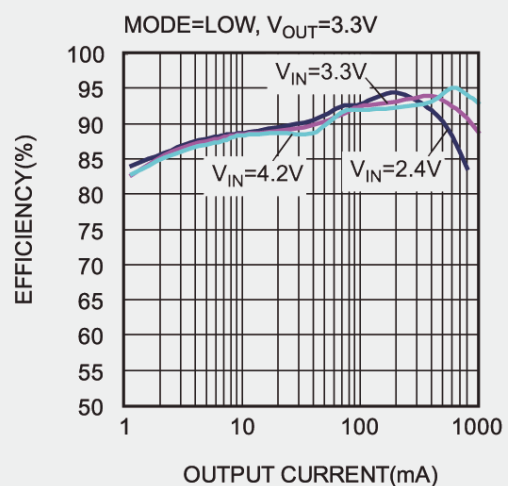
FEATURES

- » High efficiency up to **95%**.
- » **MP2155 - 2.2 A Switch Current Limit**
- » **MP28163 - 2.9 A Switch Current Limit**
- » Load disconnect during shutdown
- » Input voltage range: 2 V to 5.5 V
- » Adjustable output voltage from 1.5 V to 5 V
- » 1.2 MHz switching frequency
- » Power save mode at light load
- » Quiescent current less than 80 µA
- » Internal loop compensation for fast response
- » Internal soft start
- » OTP SCP and OVP for output voltage
- » Minimal external components
- » Available in small 3×3mm QFN10 package
- » Operating junction temperature: -40°C to +125°C
- » Storage temperature: -50°C to +165°C

APPLICATIONS

- » POS products
- » Portable instruments
- » Battery-powered devices
- » Tablet PCs
- » GSM/GPRS
- » System controls

EFFICIENCY VS. OUTPUT CURRENT





QUARTZ CRYSTALS FROM CITIZEN FINETECH MIYOTA

Thinner, smaller and higher precision! The crystal device is called „salt of industries“ playing an important role, it is essential in various field not only electronics but also communication information, OA, home electronics and automobile. There are two kinds of crystal units. One is low frequency quartz crystal used in watches, and the other is high frequency quartz crystal used in computers, communications and information equipments and home electronics. High-precision processing technology is required in the entire manufacturing process, from processing of crystal blank, sealing to inspection. From Citizen Finetech Miyota, the maker of precision watches, comes a full line of kHz quartz crystals. Citizen Finetech Miyota

is one of the world's largest manufacturer of kHz quartz crystals in cylindrical, plastic, metal and ceramic packages.

EXAMPLES OF APPLICATIONS

The crystal device is essential for manufacturing products in various fields, not only electronics but also communication information, OA, home electronics and automobile. For example, without crystal, it is impossible to make mobile phone, PC and watch workable. Our ultra compact and wafer-thin products support people's lives.

SHAPE	PART NUMBER	DIMENSIONS, MAX.	FREQUENCY
 Lead Type	CFS-206	∅ 2.1 mm × 6.2 mm	32.768 kHz
	CFS-145	∅ 1.5 mm × 5.1 mm	32.768 kHz
	CFV-206	∅ 2.1 mm × 6.2 mm	30 kHz ... 100 kHz
 Lead Type	CMR200T	∅ 2.0 mm × 6.1 mm	32.768 kHz
 Lead Type	CMJ206	8.6 mm × 2.7 mm × 2.4 mm	32.768 kHz
 SMD Type	CM250C	8.0 mm × 3.8 mm × 2.55 mm	30 kHz ... 100 kHz
	CM200C	8.0 mm × 3.8 mm × 2.55 mm	32.768 kHz
	CM519	5.1 mm × 2.0 mm × 1.0 mm	32.768 kHz
 SMD Type	CM415	4.2 mm × 1.6 mm × 0.9 mm	32.768 kHz
	CM315	3.3 mm × 1.6 mm × 0.9 mm	32.768 kHz



HIGHLIGHTS OF EXHIBITION „EMBEDDED WORLD“ 2014, NUREMBERG



ISM-BAND MODULES



Transceivers, receivers and transmitters for the most popular ISM frequencies

- » WiFi/WLAN modules
- » ZigBee transceivers
- » Bluetooth modules
- » Proprietary network protocols

ANTENNAS



- » Standard and custom designed high-gain patch antennas for GPS, GLONASS, Galileo, Compass, SDARS, DAB, etc.
- » Active GNSS antenna modules
- » GSM, W-CDMA antennas, rod antennas, Helix or integrated custom designed antennas
- » ISM-Band, Bluetooth and W-LAN antennas (2,4 GHz, 5,12 GHz)



GNSS-MODULES



- » Modules to receive GPS, GPS/GALILEO and GLONASS datas
- » Different form factors are available
- » GNSS modules with and without integrated antenna
- » Software support and evaluation kits are available

new

Contact for information: Mr. Gensler · Tel. +49(0)7452-6007- 31 · e-mail: a.gensler@endrich.com

HEADQUARTERS

ENDRICH Bauelemente Vertriebs GmbH · P.O.Box 1251 · D-72192 Nagold
T +49 (0) 7452 6007-0 · F +49 (0) 7452 6007-70
endrich@endrich.com · www.endrich.com



SALES OFFICES IN EUROPE

France:

Angers: T +33/2 41 80 33 54 · v.rousseau@endrich.com
Paris: T +33/1 46 05 99 13 · e.cosperec@endrich.com

Austria & Slovenia

Vienna: T +43/1 66 52 52 521 · a.schwaha@endrich.com

Hungary:

Budapest: T +361 / 2 97 41 91 · z.kiss@endrich.com

Switzerland – Novitronic:

Zurich: T +41/44 306 91 91 · info@novitronic.ch

Spain:

Barcelona: T +34/93 217 31 44 · spain@endrich.com

Bulgaria:

Sofia: T +359 / 2 929 46 17 · veka@engineer.bg