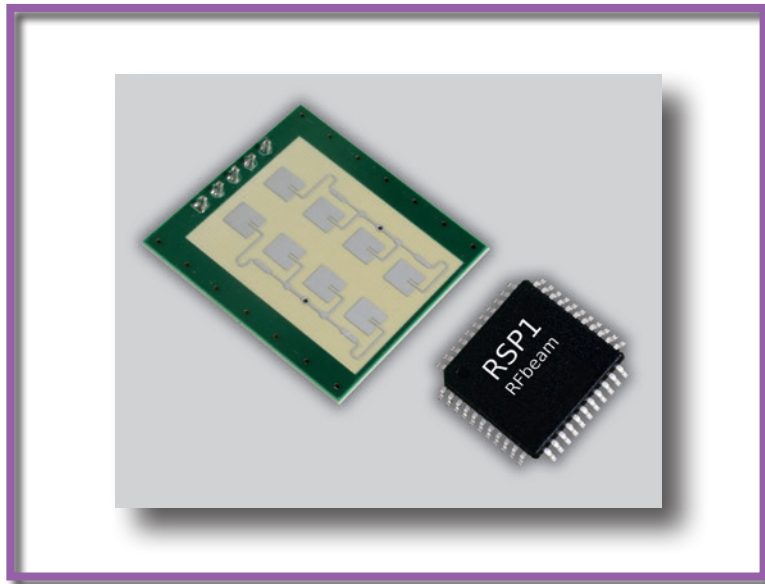


# endrich news

www.endrich.com

## Our Product of the Month

### RSP1/K-LC2 – Radar Signal Controller and Radar Transceiver



- Controller, designed for smart evaluation of signals from radar front-ends, optimal for radar transceiver K-LC2
- Complex FFT based signal processing
- Evaluation board available
- Applications: Movement detection for lighting applications, building automation, burglar alarm, door opener, traffic control, speed measurement

## RFbeam

Innovative Sensor Technologies

## 6 A/10 A STEP-DOWN POWER MODULES – MPM3680/82

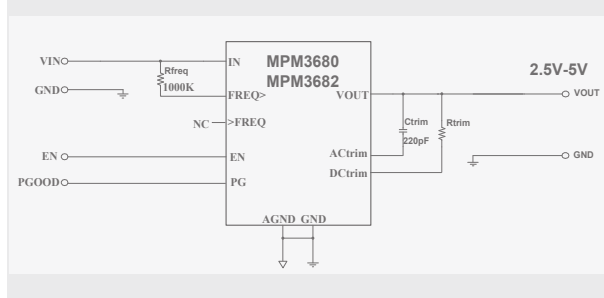
The **MPM3680/82** are easy-to-use fully integrated 6A/10A step-down DC/DC power modules. They integrate the DC/DC converter, power inductor, input/output capacitors and the necessary resistors/capacitors in a compact QFN 12mm×12mm×4mm package. This total power solution needs as few as two external components (one resistor and one capacitor) to work. MPM3680/82 can deliver 6A/10A output current over a wide input supply voltage range with excellent load and line regulation. The MPM3680/82 use Constant-On-Time (COT) control to provide fast transient response and ease the loop stabilization. The default under voltage lockout threshold is internally set around 4.1 V, but a resistor network on the enable pin can increase this threshold. The MPM3680/82 has an internal LDO to power the control circuits and the integrated power devices. This LDO can be disabled by an external 5V to boost the efficiency. The MPM3680/82 have an internal about 3 ms soft start (SS) timer. It can be increased with an extra SS capacitor. An open drain power good signal indicates that the output voltage is within nominal voltage range. The MPM3680 /82 have fully integrated protection features that include over-current protection, over-voltage protection and thermal shutdown.

### APPLICATIONS

- » Telecom and Networking Systems
- » Base Stations
- » Servers
- » Personal Video Recorders
- » Flat Panel Television and Monitors
- » Distributed Power Systems

### APPLICATION CIRCUIT

Wide input voltage range from 2.5V to 18V



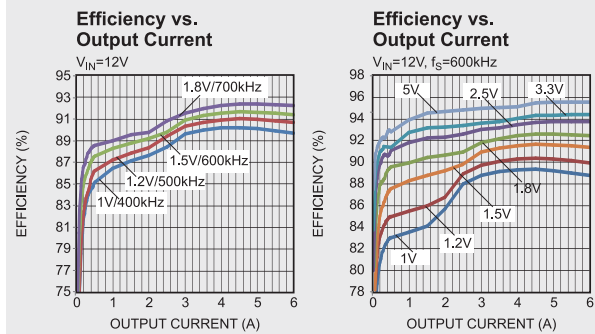
### FEATURES

- » Complete 6A/10A DC-to-DC Solution
- » Wide input voltage range from 2.5V
  - 2.5V to 18V with external 5V bias
  - 4.5V to 18V with internal bias
- » 1% Reference Voltage Over 0°C to 70°C junction temperature range
- » adaptive COT control for ultrafast transient response
- » Programmable Switching Frequency from 200 kHz to 1 MHz
- » Support pre-bias start up
- » Programmable soft-start time with default 3 ms
- » Non-latch OCP, OVP and thermal shutdown
- » Output adjustable from 0.65V to 5V
- » QFN-57 (12mm×12mm×4mm) package

### EFFICIENCY VS. OUTPUT CURRENT

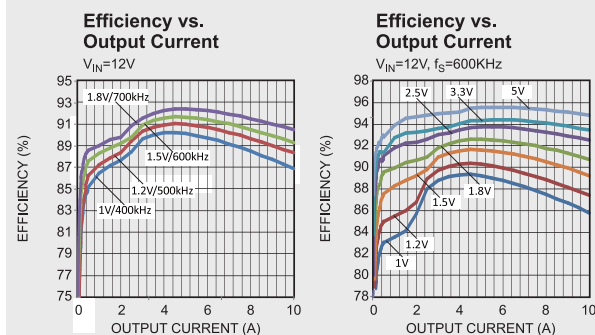
#### MPM3680

$V_{IN}=12V$ ,  $V_{OUT}=1.2V$ ,  $T_A=25^\circ C$ , unless otherwise noted.

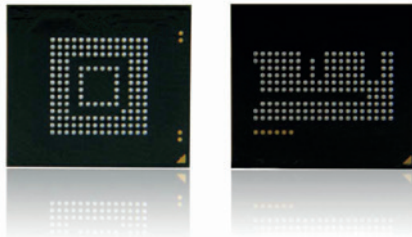


#### MPM3682

$V_{IN}=12V$ ,  $V_{OUT}=1.2V$ ,  $T_A=25^\circ C$ , unless otherwise noted.



# eMMC/eMCP FROM MEMORIGHT CORPORATION



## eMCP M1870L

**Key Features:**  
 eMMC v5.1 compliant  
 Comprises eMMC and LPDDR2 DRAM  
 Excellent storage solution for mobile phones

Capacity	4+4 / 8+8
Package	BGA 162 Ball
NAND type	MLC
DRAM type	LP-DDR2
Sequential R/W (Max)	200/45 MB/s
Operation Temperature	-25°C ~ +85°C
Dimensions (mm)	11.5*13*1.0 11.5*13*1.2
VCCQ Voltage (V)	3.3V / 1.8V

## eMCP M1880L

**Key Features:**  
 eMMC v5.1 compliant  
 Comprises eMMC and LPDDR3 DRAM  
 Excellent storage solution for mobile phones

Capacity	8+8 / 16+8
Package	BGA 221 Ball
NAND type	MLC
DRAM type	LP-DDR3
Sequential R/W (Max)	270/96 MB/s
Operation Temperature	-25°C ~ +85°C
Dimensions (mm)	11.5*13*1.0 11.5*13*1.2
VCCQ Voltage (V)	3.3V / 1.8V

## eMMC M1560

**Key Features:**  
 eMMC 4.5 form factor  
 Interface: BGA 169 ball  
 MLC NAND Type  
 Wide Temperature: -25°C~+85°C

Capacity	4 / 8 GB
Package	BGA 153 Ball
NAND type	MLC
Sequential R/W (Max)	~30/15 MB/s
Operation Temperature	-25°C ~ +85°C
Dimensions (mm)	11.5*13*1.0 (Max)
VCCQ Voltage (V)	3.3V / 1.8V

## eMMC M1880

**Key Features:**  
 eMMC v5.1 compliant  
 Support CMD queue and HS400 protocol  
 Low power consumption  
 Excellent storage solution for mobile applications

Capacity	8 / 16 / 32 GB
Package	BGA 153 Ball
NAND type	MLC
Sequential R/W (Max)	270/96 MB/s
Operation Temperature	-25°C ~ +85°C
Dimensions (mm)	11.5*13*1.0 11.5*13*1.2 (Max)
VCCQ Voltage (V)	3.3V / 1.8V

## eMMC M1890

**Key Features:**  
 eMMC v5.1 compliant  
 Dedicated qualification for reliable-oriented IPC applications  
 Compact form factor is designed for IPC embedded applications

Capacity	8 / 16 / 32 GB
Package	BGA 153 Ball
NAND type	MLC
Sequential R/W (Max)	90/60 MB/s
Operation Temperature	-25°C ~ +85°C
Dimensions (mm)	11.5*13*1.0 (Max)
VCCQ Voltage (V)	3.3V

# GIGADEVICE – SPI NOR FLASH PRODUCT LIST

PART NO.	DENSITY	VOLTAGE	ORGANIZATION	I/O BUS	FREQUENCY [MHz]	PACKAGES
GD25Q512MC	512Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP16 300mil WSON8 8*6mm
GD25Q256C	256Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP16 300mil WSON8 8*6mm
GD25Q128C	128Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 208mil VSOP8 208mil DIP8 300mil WSON8 8*6mm TFBGA -24ball 8*6mm (4*6ball array)
GD25B128C	128Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 208mil WSON8 6*5mm DIP8 300mil
GD25R128C	128Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 208mil
GD25Q64B*	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil TFBGA -24ball 8*6mm (4*6ball array)
GD25Q64C	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil TFBGA -24ball 8*6mm (4*6ball array)
GD25B64B*	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil WSON8 6*5mm
GD25B64C	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil WSON8 6*5mm
GD25R64B*	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25R64C	64Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25Q32B*	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil TFBGA -24ball 8*6mm (4*6ball array)
GD25Q32C	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil TFBGA -24ball 8*6mm (4*6ball array)
GD25B32B*	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil WSON8 6*5mm
GD25B32C	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil DIP8 300mil WSON8 6*5mm
GD25R32B*	32Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25Q16B*	16Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil DIP8 300mil USON8 4*4mm (0.55mm)
GD25Q16C	16Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil WSON8 6*5mm USON8 3*3mm USON8 3*2mm (0.45mm)
GD25B16B*	16Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil WSON8 6*5mm
GD25B16C	16Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25Q80B*	8Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil DIP8 300mil USON8 3*2mm (0.55mm)
GD25Q80C	8Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil WSON8 6*5mm USON8 3*2mm (0.45mm)
GD25Q41B	4Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil TSSOP8 173mil USON8 3*2mm (0.55mm)

# GIGADEVICE – SPI NOR FLASH PRODUCT LIST

PART NO.	DENSITY	VOLTAGE	ORGANIZATION	I/O BUS	FREQUENCY [MHz]	PACKAGES
GD25Q21B	2Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil    SOP8 208mil TSSOP8 173mil USON8 3*2mm (0.55mm)
GD25Q10*	1Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil    TSSOP8 173mil USON8 3*2mm (0.55mm)
GD25D10B	1Mb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual Output	80MHz(x1, x2)	SOP8 150mil    TSSOP8 173mil USON8 3*2mm (0.55mm)
GD25Q512*	512Kb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 150mil    TSSOP8 173mil USON8 3*2mm (0.55mm)
GD25D05B	512Kb	2.7V-3.6V	4KB / 32KB / 64KB	Single / Dual Output	80MHz(x1, x2)	SOP8 150mil    TSSOP8 173mil USON8 3*2mm (0.55mm)
GD25VQ16C	16Mb	2.3V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil    SOP8 208mil USON8 3*2mm (0.45mm)
GD25VQ80C	8Mb	2.3V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil    SOP8 208mil USON8 3*2mm (0.45mm)
GD25VQ41B	4Mb	2.3V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil    SOP8 208mil TSSOP8 173mil    VSOP8 150mil USON8 3*2mm (0.55mm)
GD25VQ21B	2Mb	2.3V-3.6V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil    SOP8 208mil TSSOP8 173mil    VSOP8 150mil USON8 3*2mm (0.55mm)
GD25LQ256C	256Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	WSON8 6*5mm
GD25LQ128C	128Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	WSON8 6*5mm    VSOP8 208mil LGA8 4*4mm
GD25LB128C	128Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25LQ64C	64Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	133MHz(x1, x2, x4)	VSOP8 208mil    WSON8 6*5mm SOP8 208mil    USON8 3*4mm
GD25LB64C	64Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	133MHz(x1, x2, x4)	SOP8 208mil
GD25LQ32C	32Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	133MHz(x1, x2, x4)	VSOP8 208mil    WSON8 6*5mm SOP8 208mil    USON8 3*4mm USON8 4*4mm (0.45mm)
GD25LB32C	32Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	133MHz(x1, x2, x4)	SOP8 208mil
GD25LQ16	16Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	VSOP8 150mil    VSOP8 208mil SOP8 150mil    USON8 4*3mm SOP8 208mil    WSON8 6*5mm USON8 4*4mm (0.45mm)
GD25LB16	16Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	SOP8 208mil
GD25LQ80*	8Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	VSOP8 150mil    VSOP8 208mil SOP8 150mil    USON8 4*3mm SOP8 208mil    WSON8 6*5mm
GD25LQ80B	8Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil    SOP8 208mil USON8 3*2mm (0.55mm)
GD25LQ40*	4Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	120MHz(x1, x2, x4)	VSOP8 150mil    VSOP8 208mil SOP8 150mil    USON8 4*3mm SOP8 208mil    WSON8 6*5mm
GD25LQ40B	4Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	104MHz(x1, x2, x4)	SOP8 150mil USON8 3*2mm (0.55mm)
GD25LQ20B	2Mb	1.65V-1.95V	4KB / 32KB / 64KB	Single / Dual / Quad	80MHz(x1, x2, x4)	SOP8 150mil USON8 3*2mm (0.55mm)

\* Für Neuentwicklungen nicht empfohlen

## RADAR SIGNAL CONTROLLER RSP1



### FEATURES

- » Universal Doppler Radar signal processor
- » Complete I/Q Radar sensor interface
- » Double detection distance compared to traditional solutions
- » Object speed and direction detection
- » Complex FFT based signal processing
- » Efficient adaptive interference suppression
- » Inherent object speed detection up to 135 km/h
- » Stand-alone or hosted operation

### TECHNICAL KEY DATAS

- » 12 Bit ADC
- » Differential analog inputs for I and Q signals
- » Internal programmable gain amplifier
- » Sampling rates from 1280 Hz to 22.5 kHz
- » Efficient 256 pt complex FFT
- » Logarithmic detection algorithms
- » Adaptive noise and interference analysis and canceling algorithms
- » Serial command and debug/streaming interfaces
- » Highly configurable by serial interface and/or digital and analog inputs
- » Application settings can be down- and uploaded from chip
- » Sophisticated serial outputs like peak magnitude, frequency and sign, noise level and many more

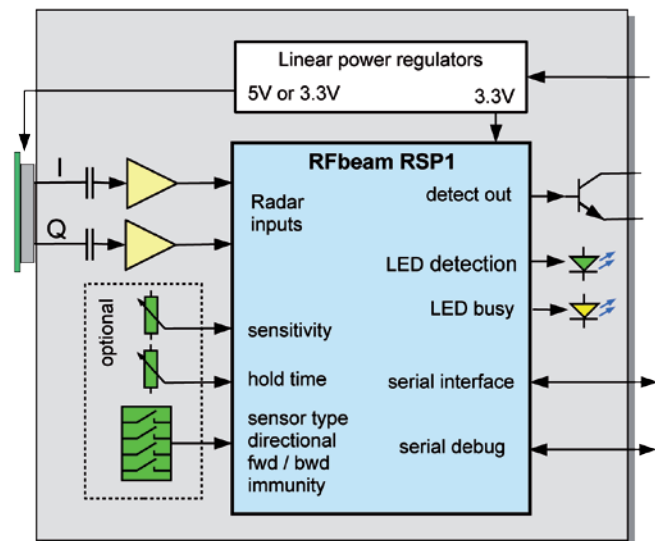
### RSP1 is a member of RFbeam Radar signal

processors. The RSPx family helps users concentrating on their application know-how instead of investing time and money in raw signal processing. RSP1 contains all signal processing for Doppler Radar. It covers slow movement detectors as well as speed estimators up to 200 km/h. It can be used as stand alone processor or as a co-processor in higher complexity systems. User has only to add an input amplifier and digital output drivers and gets a high performance detection system.

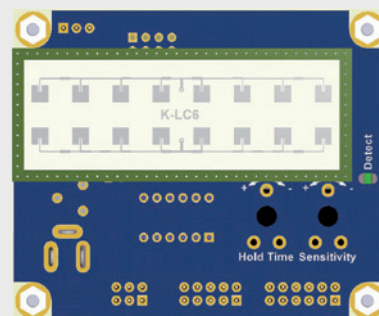
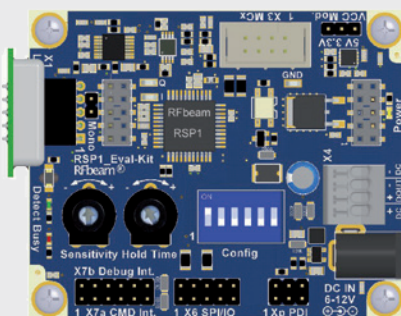
RSP1 is applicable for movement detectors, lighting control systems, security applications, object speed detection, etc.

### TYPICAL STAND-ALONE APPLICATION CIRCUIT

Typical applications need minimal external components. Configuration can be made by switches and potentiometers or fully digital via serial interface.



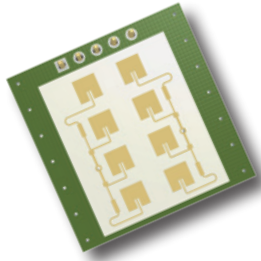
### RSP1-EVALUATION KIT



RSP1\_Eval-Kit; Left: K-LC2 sensor on front connector; Right: Backside equipped with K-LC6 sensor

With RSP1 Evaluation Kit, you may explore most features of RSP1 working with different RFbeam sensors. Using a RSP\_Terminal you have access to more than 30 parameters. Explore FFT, noise and other signals with the RFbeam SerialScope PC Software, that also makes part of the kit. All schematics, PCB layout and BOM are included as a reference.

## K-LC2 RADAR-TRANSCEIVER



### FEATURES

- » 24 GHz K-band miniature I/Q transceiver
- » 140 MHz sweep FM input
- » 2 × 4 patch antenna
- » 2 balanced mixer with 50 MHz bandwidth
- » Excellent noise cancelling ability through I/Q technology
- » Beam aperture 80°/34°
- » 15 dBm EIRP output power
- » 25×25 mm<sup>2</sup> surface, <6.5 mm thickness
- » Low-cost design

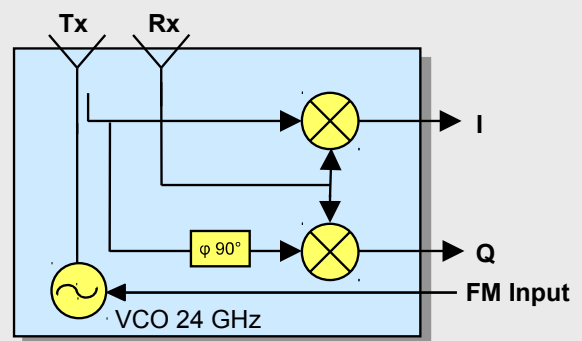
### APPLICATIONS

- » Direction sensitive movement detectors
- » Security systems
- » Object speed measurement systems
- » Simple ranging detection using FSK
- » Industrial sensors

**K-LC2** is a 2×4 patch Doppler module with an asymmetrical beam for low-cost short distance applications. Its typical applications are movement sensors in the security and presence detection domain. In building automation this module may be an alternative for infrared PIR or AIR systems thanks to its outstanding performance/cost ratio.

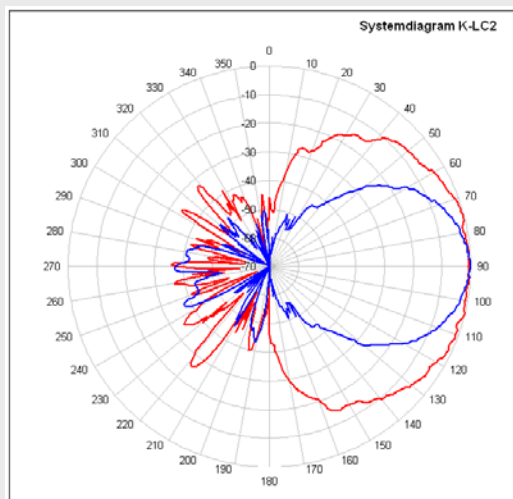
The module is extremely small and lightweight. With its IF bandwidth from DC to 50 MHz it opens many new applications. FSK is possible thanks to the unique RFbeam oscillator design. This allows to use this lowcost module even in ranging applications. Powerful starterkits (ST100 and ST200) with signal conditioning and visualization on the PC's are available.

### K-LC2 BLOCK DIAGRAM

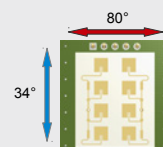


### ANTENNA SYSTEM DIAGRAM (LOGARITHMIC SCALE)

This diagram shows module sensitivity (output voltage) in both azimuth and elevation directions. It incorporates the transmitter and receiver antenna characteristics.

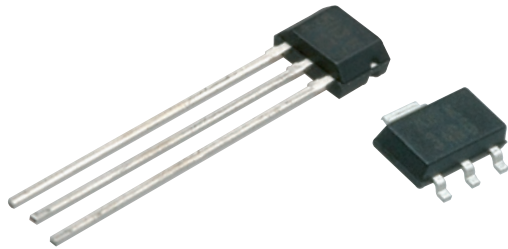


Horizontal 80° , vertical 34°  
at IF output voltage -6dB  
(corresponds to -3dB Tx power)



Remarks:  
The broader the antenna, the narrower the beam.

# LOW-COST HALL-EFFECT SENSOR FAMILY HAL<sup>®</sup> 1xy



These **Hall sensors** are produced in CMOS technology and include a temperature-compensated Hall plate with active offset compensation, a comparator, and an open-drain output transistor. The comparator compares the actual magnetic flux through the Hall plate (Hall voltage) with the fixed reference values (switching points). Accordingly, the output transistor is switched on or off.

	PART NUMBER	MAGNETIC CHARACTERISTICS $B_{ON}$ (mT), TYP. @ 25°C	MAGNETIC CHARACTERISTICS $B_{OFF}$ (mT), TYP. @ 25°C	TYPE	CONFIGURATION	PACKAGE
<b>Specifications of HAL 1xy Series</b>						
HAL 101	34.0	24.0	unipolar, low sensitivity	3-wire	T092 / SOT89	
HAL 102	2.6	-2.6	latching, high sensitivity	3-wire	T092 / SOT89	
HAL 103	7.6	-7.6	latching, medium sensitivity	3-wire	T092 / SOT89	
HAL 104	14.0	-14.0	latching, low sensitivity	3-wire	T092 / SOT89	
HAL 106	12.0	6.5	unipolar, high sensitivity	3-wire	T092 / SOT89	
HAL 107	26.5	22.5	unipolar, low sensitivity	3-wire	T092 / SOT89	
HAL 108	17.0	15.0	unipolar, medium sensitivity	3-wire	T092 / SOT89	
HAL 109	7.9	5.7	unipolar, high sensitivity	3-wire	T092 / SOT89	

## FEATURES

- » Temperature ranges:
  - C (commercial): 0°C ... +85°C
  - I (industrial): -20°C ... +125°C
- » Supply voltage: 3.8 V ... 24 V
- » Operates with static magnetic fields and dynamic fields up to 10 kHz
- » Overvoltage protection at all pins
- » Reverse-voltage protection at  $V_{DD}$  pin

## APPLICATIONS

- » White goods:
  - Selector switches
  - Door lock detection
  - RPM detection
- » Power tools
  - Speed control
  - Direction switch
- » Home automation
  - Garage/door opener
- » Industrial applications
  - Endposition detection
  - RPM measurement
  - Brushless DC motors
  - RPM measurements in flow meters
  - Replacement of micro switches

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