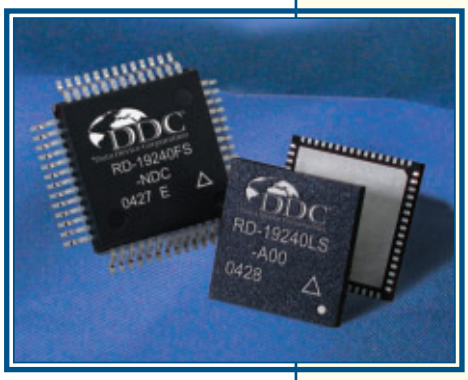
14-BIT RESOLVER-TO-DIGITAL CONVERTER SERIES

MODEL: RD-19240



FEATURES

- Accuracy to 8 Arc Minutes
- Internal Synthesized Reference
  - Up to 45 Degree Phase Shift Correction
- +5 Volt Only Option
- Programmable:
  - Resolution 10, 12, or 14 Bit
  - Bandwidth
  - Tracking Rate
- Built-In-Test (BIT) Output
- Internal Encoder Emulation (A quad B)
- Programmable for LVDT Input
- Velocity Output
- -40 to +125° C Operating Temperature Option
- Two Package Options
  - 9.0 mm. sq. LPCC Package
  - 10.0 mm. sq. MQFP Package

DESCRIPTION

The RD-19240 is a low cost programmable 10-, 12-, or 14-, bit resolution ASIC tracking resolver-to-digital converter. This converter offers off-the-shelf solutions for today's high demand motion feedback applications. This ASIC converter features programmable parameters such as resolution with accuracies to 8 arc minutes. The converter may be configured for operation with a single +5VDC power supply. Programmable bandwidth for dual applications with a single converter and a velocity output used to replace tachometers may be scaled to your application needs. The velocity scale factor / tracking rate is programmed with a single resistor. The optional internal synthesized reference feature eliminates errors due to quadrature voltage and ensures operation with a rotor-to-stator phase shift of up to 45 degrees. Inputs may be configured for resolver, synchro, LVDT / RVDT and DC SIN / COS.

APPLICATIONS

This converter offers versatile performance at low cost for use in industrial and automotive applications. Typical applications include:

- Textile machine control
- Packaging
- Wafer fabrication
- Material handling
- Robotics
- A quad B function allows resolvers to be used in encoder based systems
- Electronic steering
- Throttle control
- Stability control

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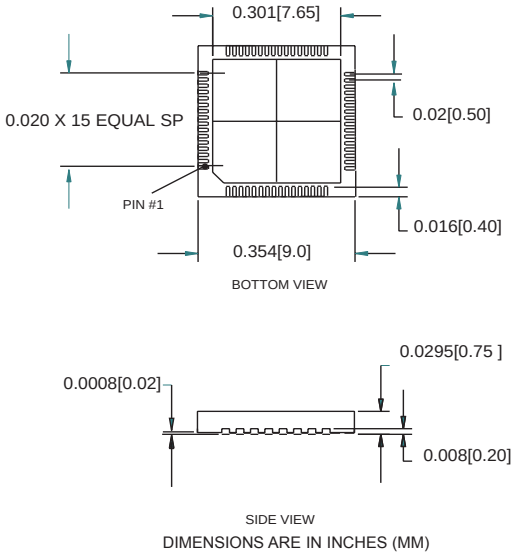
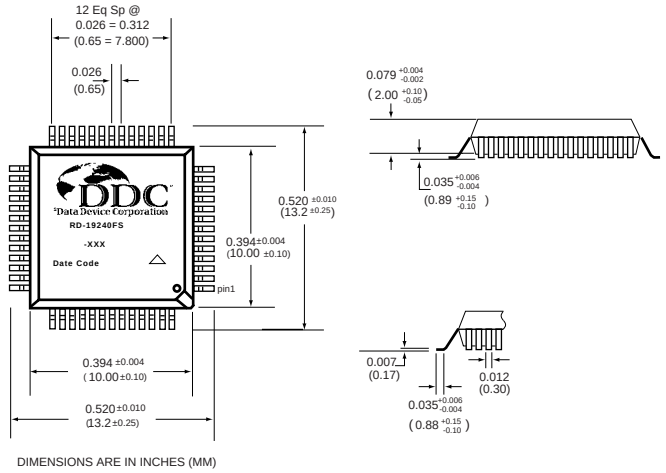
RD-19240 Mechanical Drawing

Figure 1



"64-PAD (LPCC) PACKAGE"

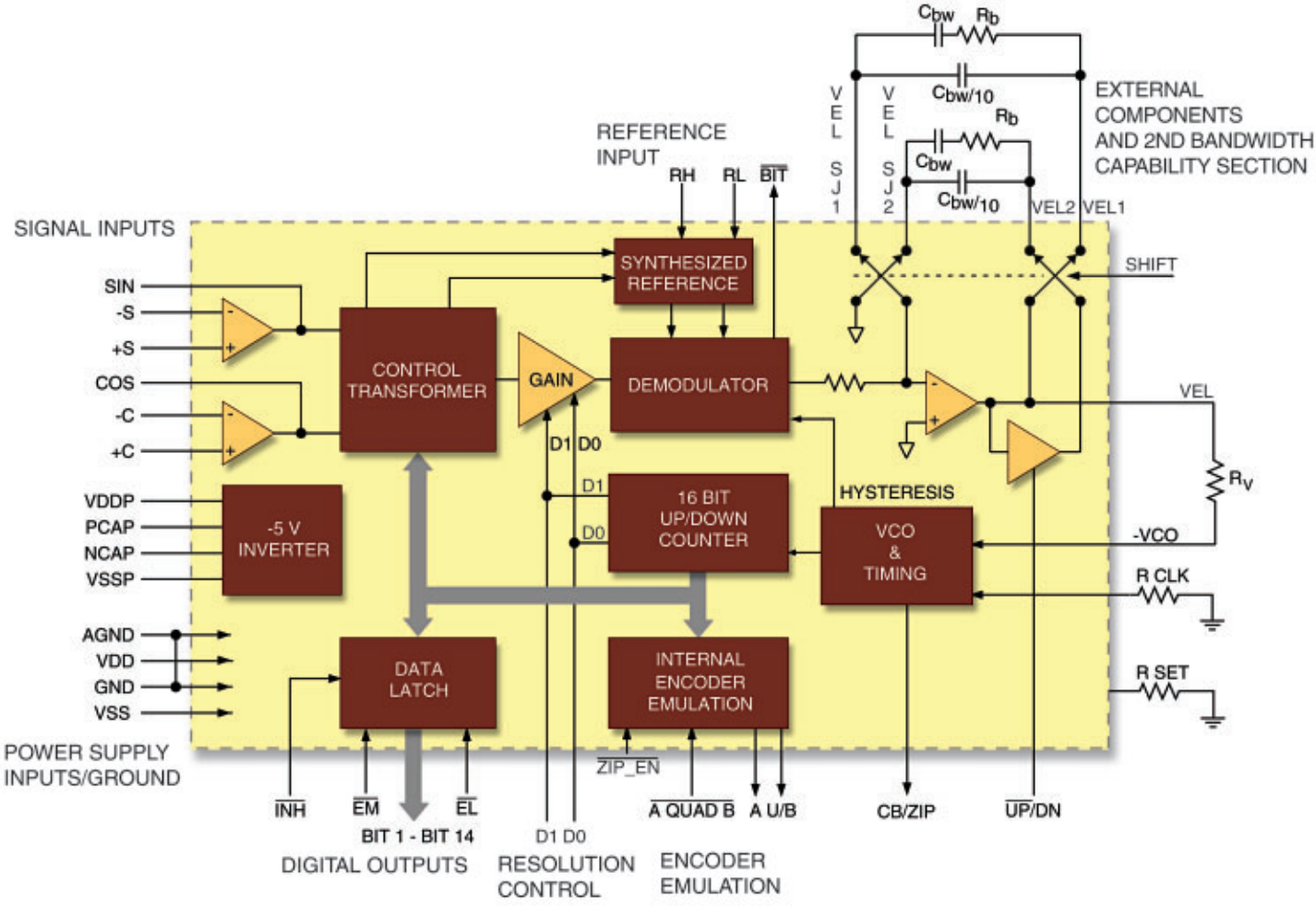
Note: Underside pad is connected to pin 33 (+5v).



"52-PIN FLATPACK (MQFP) PACKAGE"

RD-19240 Block Diagram

Figure 2



Specifications

These specifications apply over the rated power supply, temperature, and reference frequency ranges; 10% signal amplitude variation & 10% harmonic distortion.

PARAMETER	UNIT	VALUE		
RESOLUTION	Bits	10, 12, or 14 (notes 1 and 4)		
FREQUENCY RANGE	Hz	47-10k		
ACCURACY	Min	8 +1 LSB		
Repeatability	LSB	± 1		
Differential Linearity	LSB	± 1		
REFERENCE		**(+ RH, - RL)**		
Type		Differential		
Voltage: differential	Vpp	10 max		
single ended	Vp	±5 max		
overload	V	±25 continuous, 100 transient		
Frequency	Hz	DC, 1K to 10K		
Input Impedance	Ohm	10M min || 20 pf		
±Sig/Ref Phase Shift (permissible)	deg	45		
SIGNAL INPUT		(+S, -S, SIN, +C, -C, COS)		
Type		Resolver, differential, groundbased		
Voltage: operating	Vrms	2 ±15%		
overload	V	±25 continuous		
Input Impedance	Ohm	10M min || 10 pF		
DYNAMIC CHARACTERISTICS		(at maximum bandwidth)		
Resolution	Bits	10	12	14
Tracking Rate-min	rps	1152	288	72
Bandwidth (Closed Loop) Max	Hz	1200	1200	600
Ka (acceleration constant - see note 2)	$1/sec^2$	5.7M	5.7M	1.4M
A1	1/sec	19.5	19.5	4.9
A2	1/sec	295k	295k	295k
A	1/sec	2400	2400	1200
B	1/sec	1200	1200	600
Acceleration (1 LSB lag)	deg/s^2	2M	500k	30k
Settling Time(179° step)	msec	2	8	20
VELOCITY CHARACTERISTICS				
Polarity		Positive for increasing angle		
Voltage Range (Full Scale)	V	±4 (at nominal ps)		
Scale Factor Error	%	10 typ.	20 max.	
Scale Factor TC	PPM/C	100 typ.		
Reversal Error	%	0.75 typ.	1.3 max.	
Linearity	%	0.5 typ		
Zero Offset	mV	5 typ.	10 max.	
Zero Offset TC	µV/C	15 typ.		
Load	k ohm		8 max.	
Noise	Vp/V	1 typ		
POWER SUPPLIES		(notes 3 and 5)		
Nominal Voltage	V	+5	-5	
Voltage Range	%	±5	±5	
Max Volt. w/o Damage	V	+7	-7	
Current	mA	14 typ, 22 max (each)		
TEMPERATURE RANGE Operating (case)				
-2xx	°C	-40 to +85		
-Axx	°C	-40 to +125		
Storage	°C	-65 to +150		
MSL		Level 2 tested in accordance with JDEC spec J-STD-020		
PHYSICAL CHARACTERISTICS				
Size: 64-pad plastic LPCC	in(mm)	0.35 x 0.35 (9.0 x 9.0)		
Size: 52-pin plastic MQFP	in(mm)	0.39 x 0.39 (10.0 x 10.0)		

Notes:
1. Unused data bits are set to logic "0."
2. For Ka definition, see the RDC-19220/RD-19230 Series Converters Applications Manual (MN-19220XX-001) acceleration lag section.
3. When using internally generated -5V the internal -5V charge pump when measured at the converter pad, may be as low as -20% (or -4V).
4. In LVDT mode, bit 12 is LSB for 10-bit mode resolution.
5. +5V supply is connected to pin 33 and the underside pad of LPCC package. See mechanical drawing on previous page.

Ordering Information

RD-19240XS - X 0 0 X

- Supplemental Process Requirements:
  - T = Tape and Reel
  - Blank = None of the Above
- Accuracy:
  - 0 = 8 min + 1 LSB
- Process Requirements:
  - 0 = Standard DDC Procedures
- Temperature Grade:
  - A = -40° to +125°C
  - 2 = -40° to +85°C
- Package Type:
  - L = LPCC (Plastic)
  - F = MQFP (Plastic)

Standard DDC Processing for Plastic Monolithic Products		
Test	MIL-STD-883	
	Method(s)	Condition(s)
Inspection/Workmanship	2017	--
Electrical Test	DDC ATP	--

See the DDC web site for the following RD-19240 converter documentation and support.

- Data sheet (RD-19240)
- Application manual (MN-19220XX-001)
- Component calculation software
- Evaluation card RD-19240EX-300

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