



# Product Selector Magnetic Linear / Off-Axis Rotary Encoder ICs • Silicon for Motion®

Device	Linear and Off-Axis Rotary					Gear Tooth		
	<a href="#">iC-ML</a>	<a href="#">iC-MHL200</a>	<a href="#">iC-MU</a>	<a href="#">iC-MU150</a> new	<a href="#">iC-PVL</a> new	<a href="#">iC-SM2L</a>	<a href="#">iC-SM5L</a>	<a href="#">iC-MZ</a>
<b>Application</b>	Linear incremental	Linear incr./absol. Rotary incr.	Rotary/linear incremental ST/MT absolute Motor comm.	Rotary/linear incremental ST/MT absolute Motor comm.	Off-Axis Battery Multiturn	Linear incremental	Linear incremental	True Zero-Speed Gear Tooth Sensor
<b>Sensors</b>	Hall Line (1x)	Hall Line (1x)	Hall Line (2x)	Hall Line (2x)	Hall Line (1x)	MR Bridges	MR Bridges	Dual Hall pitch 2 mm
<b>Magnetic Setup</b>	Tape / Polewheel pitch 2.56 mm 20...100 kA/m	Tape / Polewheel pitch 2.0 mm 20...100 kA/m	2-Track Tape or Polewheel pitch 1.28 mm 15...100 kA/m	2-Track Tape or Polewheel pitch 1.50 mm 15...100 kA/m	Tape / Polewheel 10...100 kA/m pitch 1.5 mm typ. (1.0 ... 5.0 mm opt.)	Tape pitch 2 mm > 25 kA/m	Tape pitch 5 mm > 25 kA/m	Back bias magnet dH 4...120 kA/m DC max. 400 kA/m
<b>Rotary Speed</b>			12,000 rpm (19 bit)	12,000 rpm (19 bit)	> 12,000 rpm (adj.)	-	-	0 to 40 kHz
<b>Linear Speed</b>	5 m/s	8 m/s	16 m/s	18 m/s		-	-	1 bit
<b>Digital Resolution</b>	6 / 7 / 8 bit	up to 12 bit	18...20 bit	18...20 bit	3 bit	-	-	
<b>Angle Resolution</b>			2.5 arcsec (19 bit)	2.5 arcsec (19 bit)	45°	infinite	infinite	
<b>Linear Resolution</b>	20 µm	0.98 µm	0.156 µm	0.183 µm		typ. 10 µm	typ. 20 µm	
<b>Accuracy</b>	+/- 50 µm		+/- 0.1° (calibr.)	+/- 0.1° (calibr.)	+/- 10°			
<b>Position Lag</b>	20 µs	12...60 µs	10...3000 µs	10...3000 µs	10 µs			10 µs
<b>Digital Outputs</b>	A, B, Z Counter signals	A, B, Z (U, V, W)	A/B/Z FlexCount U/V/W (1-16 pp) STEP / DIR CW / CCW	A/B/Z FlexCount U/V/W (1-16 pp) STEP / DIR CW / CCW	Serial, 3-bit parallel			A/NA diff. push-pull
<b>Line Drivers</b>	-	RS422			-	-	-	4.5...36 V +/- 60 mA differential Hall voltage (340 mVpp)
<b>Analog Outputs</b>	Sin/Cos 2 Vpp; Sawtooth, Triangle (ratiometric)	(Sin/Cos with test mode)	Sin/Cos 250 mVpk	Sin/Cos 250 mVpk	-	dff. Sin/Cos (~80 mVpp @ 5V)	dff. Sin/Cos (~80 mVpp @ 5V)	-
<b>I/O Interfaces</b>	-	BiSS, SSI	BiSS, SSI, SPI, SSI Multiturn	BiSS, SSI, SPI, SSI Multiturn	Shift-Reg., SSI, 3-bit PAR	-	-	
<b>GPIO Ports</b>								
<b>Setup</b>	3 config. pins	BiSS OTP ROM	BiSS, SPI I²C (EEPROM)	BiSS, SPI I²C (EEPROM)	I²C multi-master (EEPROM)	-	-	-
<b>Supply (typ.)</b>	5 V (14 mA)	5 V (14 mA)	5 V (50 mA)	5 V (50 mA)	3...5 V (< 10 µA)	5 V (5 mA)	5 V (7 mA)	4.5...36 V (10 mA)
<b>OTR °C (chip)</b>	-40 to 125	-40 to 125	-40 to 110	-40 to 110	-40 to 125	-40 to 125	-40 to 125	-40 to 125
<b>Specials</b>								
<b>Package</b>	TSSOP20	TSSOP20	DFN16	DFN16	QFN16	SM2C LGA	SM2C LGA	DFN10
(board space)	6.5 x 6.5 mm²	6.5 x 6.5 mm²	5x5 mm²	5x5 mm²	4x4 mm²	7.6 x 2.8 mm²	7.6 x 2.8 mm²	4x4 mm²

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**Preliminary; please contact iC-Haus**