

SPECIFICATION

for

MRD510B

Single Channel F2F Decoder IC



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CONTENTS

1. DESCRIPTION.....	1
2. FEATURES.....	1
3. APPLICATIONS	1
4. PIN DESCRIPTION	2
5. FUNCTION DESCRIPTION.....	2
6. ABSOLUTE MAXIMUM RATINGS	3
7. RECOMMENDED OPERATING CONDITIONS.....	3
8. APPLICATION CIRCUIT	4
9. TIMING DIAGRAM FOR MRD510B.....	5
10. OUTLINE DIMENSION	6



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1. DESCRIPTION

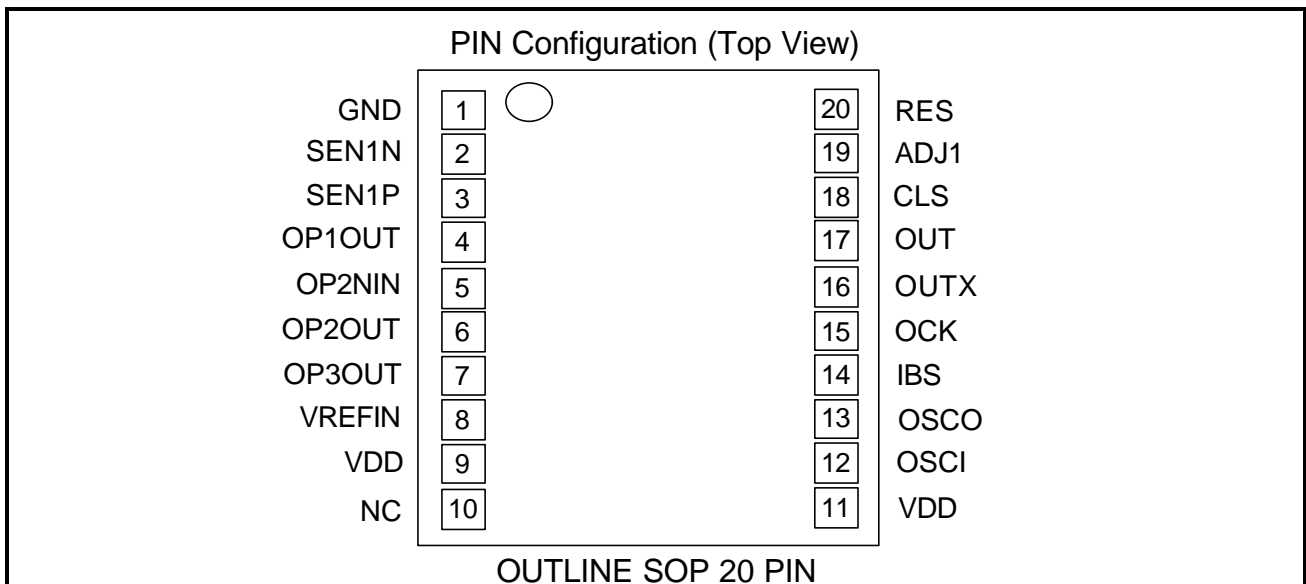
The MRD510B is a 1.2um CMOS integrated circuit for purpose of amplification and decoding for F2F magnetic stripe encoding card reader.

2. FEATURES

- Integrated Amplification Circuitry for magnetic head signals.
- Number of start bits (4/8 bits) to ignore selectable.
- Both output polarity supported.
- Adjustable read data output clock pulse width.
- Single channel support for 75/210 BPI recording density.
- Magnetic head data input frequency range from 300 bit/sec to 12600 bit/sec.
- Idle mode controllable by external hardware or micro-processor.

3. APPLICATIONS

- Magnetic stripe card reader.
- POS keyboard.





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4. PIN DESCRIPTION

1	GND	
2	SEN1N	Input from magnetic head
3	SEN1P	Input from magnetic head
4	OP1OUT	Amplifier OP1 output
5	OP2NIN	Amplifier OP2 - input
6	OP2OUT	Amplifier OP2 output
7	OP3OUT	Amplifier OP3 output
8	VREFIN	Reference voltage for analog signal processing
9	VDD	
10	NC	
11	VDD	
12	OSCI	RC oscillator input
13	OSCO	RC oscillator output
14	IBS	Select ignore leading bit, "LOW" for 4 bits and "HIGH" for 8 bits
15	OCK	Negative read out clock for F2F channel 1
16	OUTX	Negative read out data for F2F channel 1
17	OUT	Positive read out data for F2F channel
18	CLS	Card Loading Signal output, "LOW" after ignore bits, "HIGH" if no input for around 12.5mS
19	ADJ	Adjust read out clock pulse width for F2F channel 1
20	RES	Power on reset, LOW reset the logic circuit and enter idle mode. Approx. 10mS after HIGH level to normal function

5. FUNCTION DESCRIPTION

Data signal inputs read from a magnetic card via a magnetic head are fed into the SEN1P and SEN1N pins, amplified and wave shaped by internal analog circuitry, then converted to logic level F2F data format. Once the F2F signals are detected, the decoding logic ignores the leading 4 or 8 bits (set by IBS pin), via the ignored bits the reference bit length is determined. The succeeding inputs are identified as bit 0 or 1 by the average bit length of preceding two bits, if the data toggles before 70% of the reference bit length then the data is identified as a "1" bit and the next data toggle regarded as the beginning of next data bit. If the data toggles after 70% of the reference bit length then the data is identified as a "0" bit and the current data toggle is as the beginning of next data.

After the ignored bits, then pin CLS will be pulled low, the succeeding data bit will be shifted out after the beginning of next data bit.

The pin OCK will be pulled low after the next data is detected and a 12uS delay inserted, it will be kept low for 14 to 60uS depending on the external resistor connected to pin ADJ. If the next bit comes before OCK goes high, then OCK1 (OCK2) will be forced to pull high and then begins next cycle, it means that the data signals will be ready before OCK goes low and stay valid till 12uS before next down edge of OCK.



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MRD510B

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6. ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Conditions	Ratings	Unit
VCC	Supply Voltage	VDD	-0.5 to +7.0	V
VIN1	Input Voltage	IBS,OSCI,RES,ADJ1,ADJ2	-0.5 to VCC +0.5	V
VIN2	Input Voltage	OP2NIN,OP5NIN	-0.5 to VCC +0.5	V
IO	Output Current	OP1OUT,OP2OUT,OP3OUT, OP4OUT,OP5OUT,OP6OUT, OSCO2,OUT2,OUT2X,OUT1, OUT1X,OCK1,OCK2	-10 to +10	mA
VID	Differential Input Voltage	SEN1P ~ SEN1N, SEN2P ~SEN2N	-1.0 to +1.0	V
TOPR	Operating Temperature		-10 to +70	
TSTG	Storage Temperature		-50 to +140	

7. RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Conditions	Ratings			Unit
			Min.	Typ.	Max.	
VCC	Supply Voltage		4.5	5	5.5	V
VIH	Input High Voltage	IBS, RES	VCC -0.5		VCC +0.5	V
VIL	Input Low Voltage	IBS, RES	-0.5	0	0.5	V
IOH	Output High Source Current at VOH=VCC -0.4	OCK1,OUT1,OUT1X, OCK2, OUT2,OUT2X	-1.5			mA
IOH	Output High Source Current at VOH=VCC -0.4	CLS	-0.1			mA
IOL	Output Low Sink Current at VOL=0.4	OCK1,OUT1,OUT1X, OCK2,OUT2, OUT2X,CLS	3			mA
VIN	Differential Input Voltage	SEN1P ~ SEN1N SEN2P ~ SEN2N	5		80	mV
FIN	Input Frequency	SEN1P ~ SEN1N SEN2P ~ SEN2N	300		13000	Hz
FOSC	Oscillation Frequency			2.3		MHz
ROSC	External resistor between OSCI & OSCO			30		Kohm
IOPR	Signal input at 12.6K bps			3.4	4.0	mA
ISBY	No signal input			2.5	3.0	mA
IDLE	Reset = Vss			1.6	2.0	mA

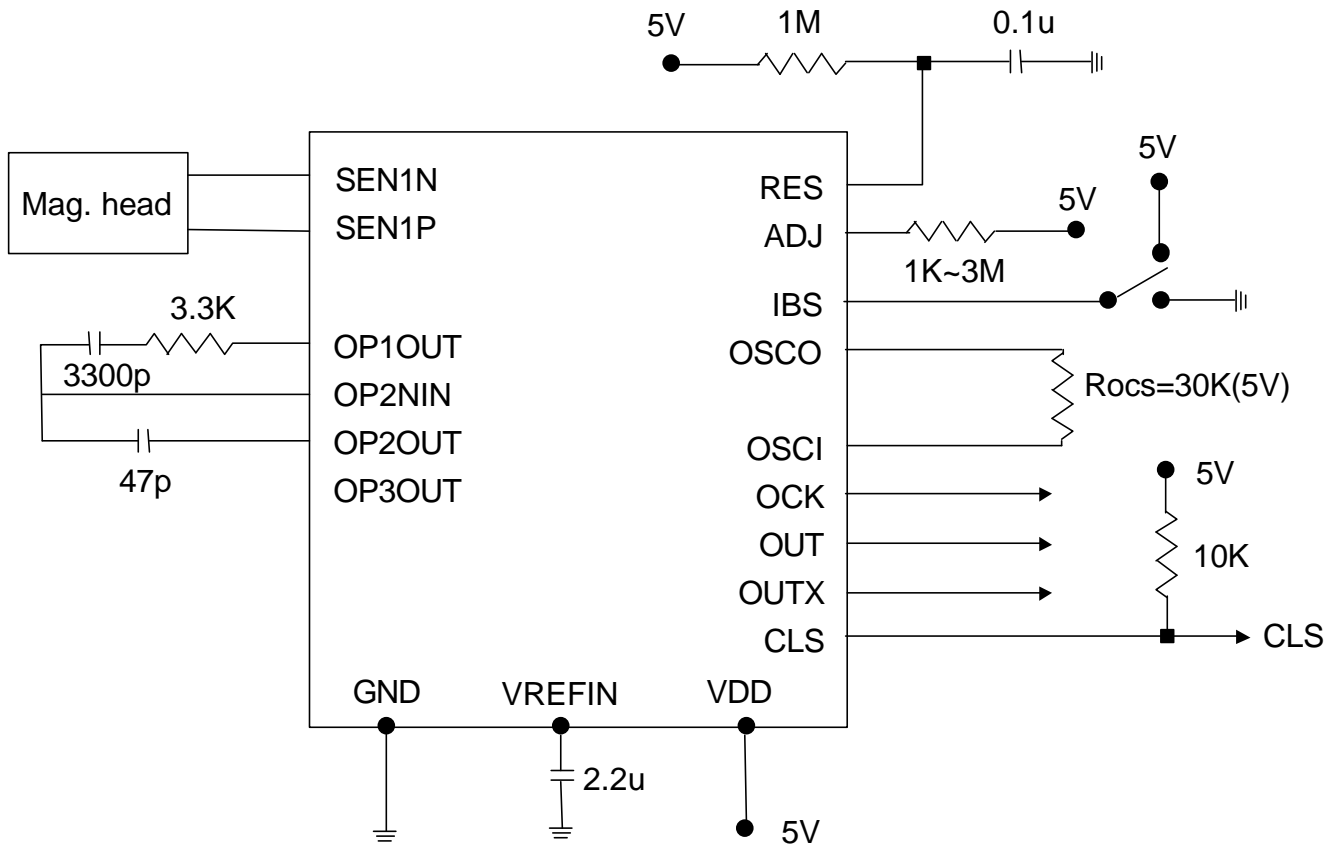


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MRD510B

Single Channel F2F Decoder IC

8. APPLICATION CIRCUIT



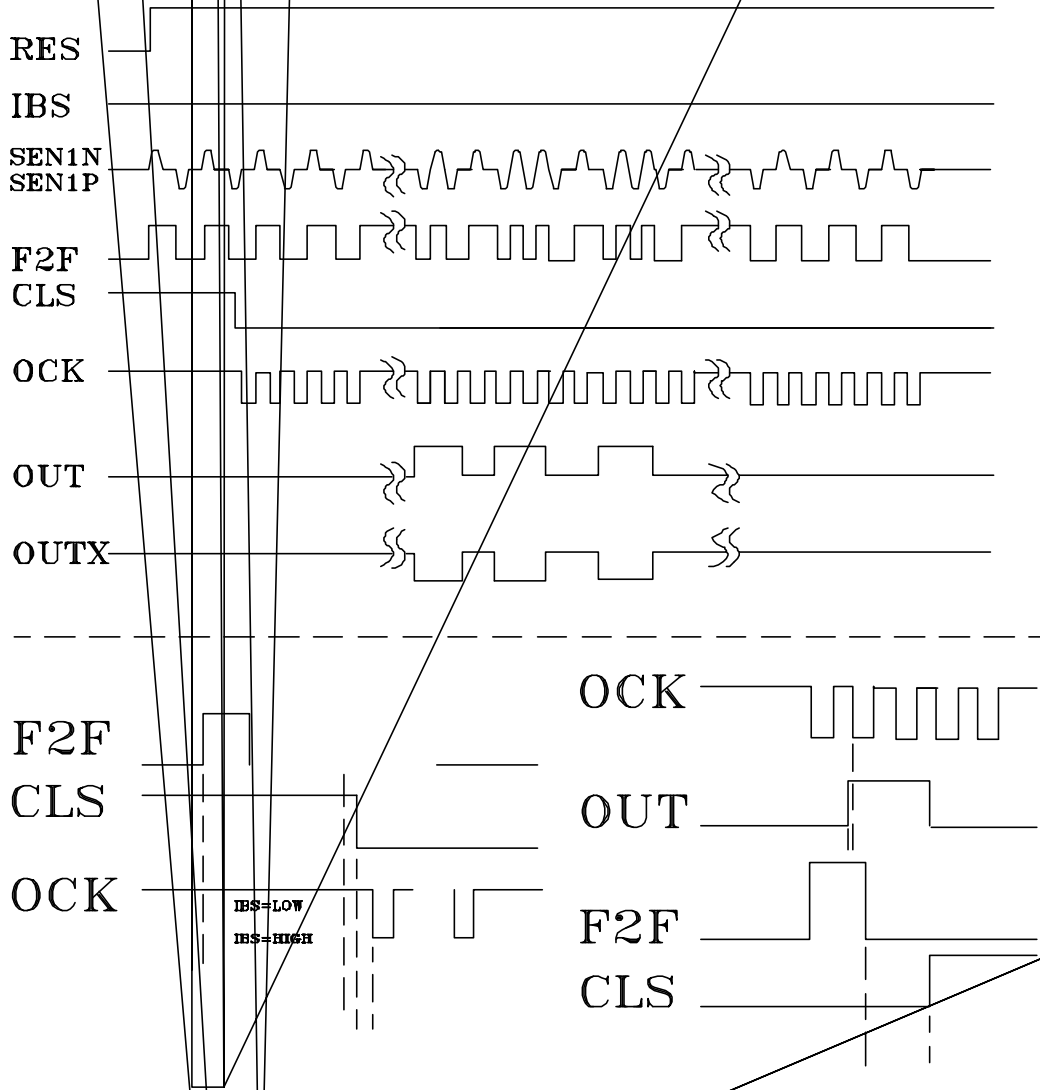


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MRD510B

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9. TIMING DIAGRAM FOR MRD510B



Time width of the A, B, C, D, E :

- A Approximate 2.4uS
- B One data bit
- C Adjustable from 14uS to 60uS
- D Approximate 12uS
- E Approximate

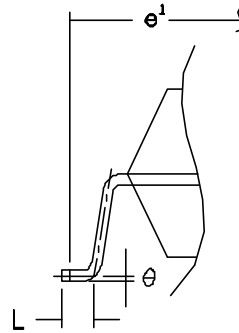
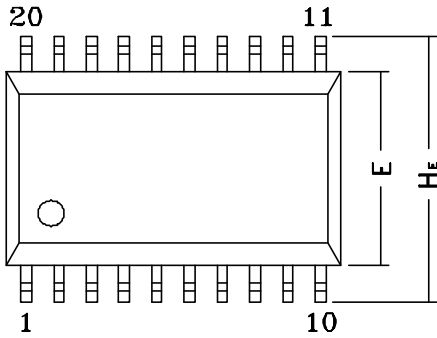


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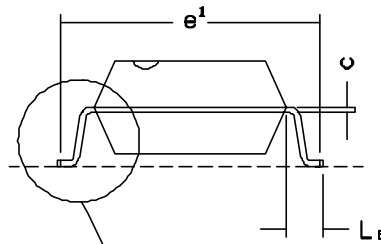
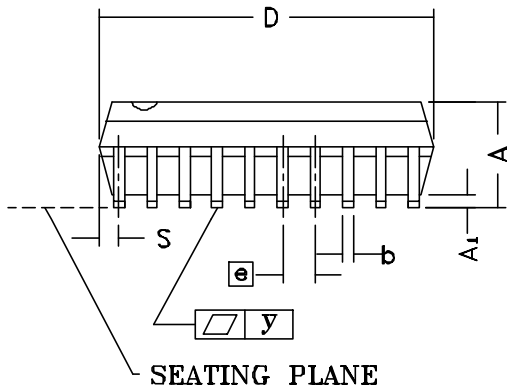
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10. OUTLINE DIMENSION



DETAIL F



SEE DETAIL F

Symbol	Dimensions in inch	Dimensions in mm
A	0.106 Max.	2.692 Max.
A1	0.004 Min.	0.102 Min.
b	0.016 +0.004 -0.002	0.406 +0.102 -0.051
c	0.010 +0.004 -0.002	0.254 +0.10 -0.05
D	0.504 typ (0.524 Max)	12.802 typ (13.310 Max)
E	0.295 +/-0.005	7.493 +/-0.13
e	0.050 +/-0.006	1.270 +/-0.152
e [†]	0.374 Nor.	9.50 Nor.
HE	0.406 +/-0.010	10.312 +/-0.254
L	0.032 +/-0.008	0.813 +/-0.203
LE	0.055 +/-0.008	1.397 +/-0.203
S	0.042 Max.	1.067 Max.
y	0.006 Max.	0.152 Max.
	0° ~ 8°	0° ~ 8°