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NEC
ELECTRON DEVICE

PRELIMINARY DATA SHEET
BIPOLAR ANALOG INTEGRATED CIRCUIT
 μ PC2134GT
READ/WRITE IC FOR RIGID DISK DRIVE

The μ PC2134 is a low noise, high speed monolithic bipolar integrated circuit for rigid disk drives, performing both read and write functions. The μ PC2134 is applicable for four center-tapped read/write heads and features low noise and high bandwidth, so the μ PC2134 is suitable for high density small size (5.25/3.5 inch) rigid disk drive.

The μ PC2134 consists of four write drivers, eight read preamplifiers, a switching matrix to select one of eight heads, and associated control and monitoring functions.

FEATURES

- Low Noise and Low Capacitance
0.8nV/ $\sqrt{\text{Hz}}$ (typ.), 10pF(yp.)
- High Bandwidth
70MHz(yp.)
- Selectable Functions are available
Gain: 100V/V or 200V/V
Internal Dumping Resistor: 750 Ω or less
Read Data Output Impedance: low Fix or High Impedance except Read Mode
- Applicable for Four Center-tapped Read/Write Heads
- TTL Compatible Interface
- Power Supply
+5V and +12V
- Package
24 pin SOP(375mil)

ORDERING INFORMATION

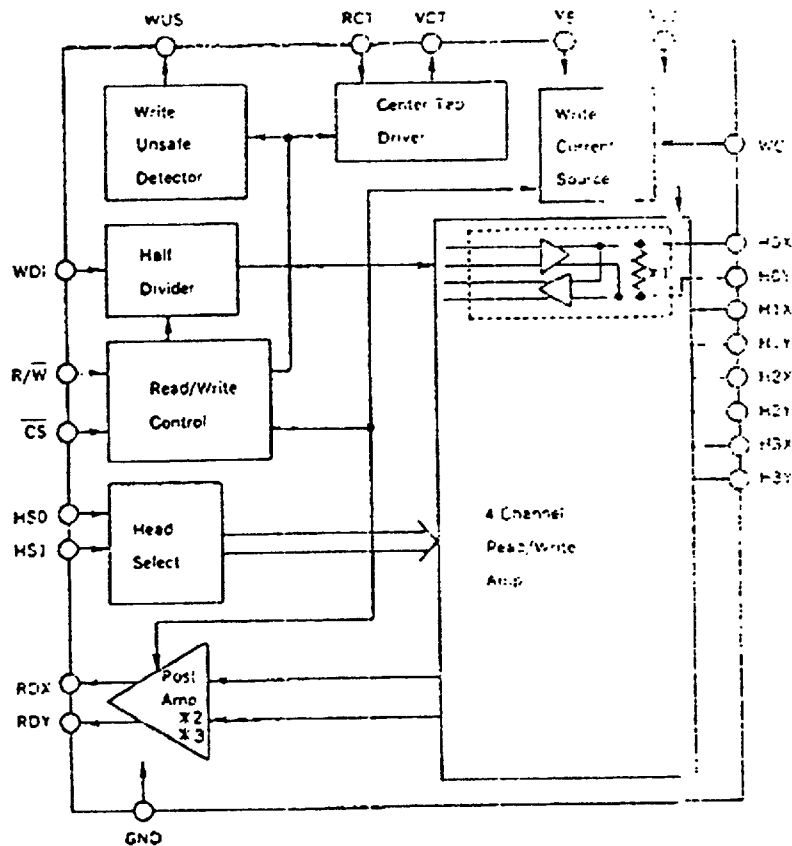
Order Code	Gain	Read Data Output	Internal resistor
μ PC2134GT-004	200	Low Impedance	Less

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NEC reserves the right to make changes at any time without notice in order to improve design and supply the product possible.

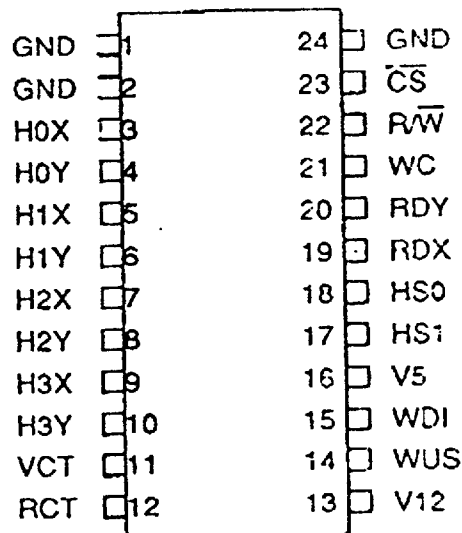
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BLOCK DIAGRAM



- *1 750 Ω or less selectable
- *2 100V/V or 200V/V selectable
- *3 low Fix or High Impedance except Head Mode

PIN CONFIGURATION



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ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Conditions	Rating	Unit
Plus 5V Supply Voltage	V_5		7.0	V
Plus 12V Supply Voltage	V_{12}		14	V
Write Current	I_w		40	mA
Digital Input Voltage	V_{DI}	$\overline{CS}, R/\overline{W}, \overline{WDI}, HSO, HS1$	-0.3 to $V_5+0.3$	V
Write Unsafe Output	V_{WUS}	WUS	-0.3 to $V_{12}+0.3$	V
	I_{WUS}	WUS	12	mA
Center Tap Output Current	I_{VCT}	VCT	-40	mA
Read Data Output Current	I_{ORD}	RDX, RDY	-10	mA
Head Input Output Voltage	V_{HIN}	H0X to H3X, H0Y to H3Y	0 to V_{12}	V
Differential Head Voltage Swing	V_{FB}	HnX-HrY	7.0	V
Storage Temperature	T_{stg}		-40 to +150	°C
Operating Temperature	T_{opt}		0 to +70	°C
Operating Junction Temperature	T_j		0 to +125	°C

RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Supply Voltage						
Plus 5V Supply Voltage	V_5		4.5	5.0	5.5	V
Plus 12V Supply Voltage	V_{12}		10.8	12.0	13.2	V
Digital Interface						
Low Level Input Voltage	V_{IL}		0		0.8	V
High Level Input Voltage	V_{IH}		2.0		V_5	V
Read/Write						
Head Inductance	L_H		5	15	20	μH
Dumping Resistor	R_T		500	750	2000	Ω
RCT Resistor	RCT	1/2 W Resistor	114	120	126	Ω
Differential Head Voltage Swing	V_{FB}	$I_w=30mA, L_H=15\mu H$			6.5	V
Write Current Range	I_w		10		30	mA

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ELECTRICAL CHARACTERISTICS

Power Supply and Dissipation
($T_a=0$ to 70°C , $V_{12}=12\text{V}\pm 10\%$, $V_s=5\text{V}\pm 10\%$)

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Supply Current	Plus 5V	I_{CC-1} Read Mode		10	15	mA
		I_{CC-2} Write Mode		12	17	mA
		I_{CC-3} Idle Mode		11	16	mA
	Plus 12V	I_{DD-1} Read Mode		29	40	mA
		I_{DD-2} Write Mode		22+ I_w	30+ I_w	mA
		I_{DD-3} Idle Mode		21	30	mA
Power Dissipation	P_{D-1}	Read Mode		400	610	mW
	P_{D-2}	Write Mode, $I_w=30\text{mA}$, $RCT=120\Omega$		580	760	mW
	P_{D-3}	Write Mode, $I_w=30\text{mA}$, $RCT=0\Omega$		685	685	mW
	P_{D-4}	Idle Mode		305	460	mW

Digital Interface
($T_a=0$ to 70°C , $V_{12}=12\text{V}\pm 10\%$, $V_s=5\text{V}\pm 10\%$)

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Low Level Input Current	I_{IL}	$V_{IL}=0.8\text{V}$			400	μA
High Level Input Current	I_{IH}	$V_{IH}=2.0\text{V}$			400	μA
Low Level Output Voltage	V_{OL}	$I_{OL}=8\text{mA}$, WUS pin			0.5	V
Highlevel Output Current	I_{OH}	$V_{OH}=5.0\text{V}$, WUS pin			100	μA
Read to Write Transition Time	t_{DRW}	Delay to 90% of Write Current		80	600	ns
Write to Read Transition Time	t_{DWR}	Delay to 90% of 10MHz Read Signal Envelope Write Current Delay of 10%		200	600	ns
Head Select Switching Delay	t_{DHS}	Read or Write Mode		70	600	ns
Chip Disable Transition Time	t_{DCD}	Read/Write to Idle Idle to Read/Write		45~ 160	600	ns
Unsafe to Safe Delay After Write Data Begins	t_{DUS}	$I_w=30\text{mA}$, $L_w=15\mu\text{H}$ $f=5\text{MHz}$			1.0	μs
Safe to Unsafe Delay	t_{DSU}	$I_w=30\text{mA}$, $L_w=15\mu\text{H}$ $f=5\text{MHz}$	1.6		6.0	μs

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Read Mode
($T_a=0$ to 70°C , $V_{1,2}=12\text{V}\pm 10\%$, $V_s=5\text{V}\pm 10\%$)

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Differential Voltage Gain	A_v	$V_{IN}=1\text{mV}_{P-P}$, $f=300\text{kHz}$ $Z_L=5.1\text{k}\Omega$ per side $T_a=25^\circ\text{C}$	80	100	120	V/V
			180	200	240	
Voltage Band Width(-3dB)	f_C	$Z_s<5\text{k}\Omega$, $V_{IN}=1\text{mV}_{P-P}$ $f_{\text{mid-band}}=300\text{kHz}$	40	70		MHz
Input Noise Voltage	V_N	$\text{BW}=15\text{MHz}$, $Z_s=0$, $T_a=25^\circ\text{C}$		0.8	1.0	nV/ $\sqrt{\text{Hz}}$
Differential Input Capacitance	C_{IN}	$f=5\text{MHz}$		10	15	pF
Differential Input Resistance	R_{IN}	$f=5\text{MHz}$	1.8			k Ω
		Internal Dumping Resistor	600	750	900	Ω
Input Bias Current	I_{IN}	per side		35	100	μA
Dynamic Range	V_{DR}	Gain Falls to 80% Gain 100V/V Gain 200V/V	10			mV dB
			5.0			
Common Mode Rejection Ratio	CMRR	$V_{IN}=100\text{mV}_{P-P}$, $f=5\text{MHz}$	50	70		dB
Power Supply Rejection Ratio	PSRR	100mV _{P-P} on V_s or $V_{1,2}$ $f=5\text{MHz}$	50	70		dB
Channel Separation	XT	Unselected Channels driven with $V_{IN}=100\text{mV}_{P-P}$, $f=5\text{MHz}$	40			dB
Output Offset Voltage	V_{OFF}	Read Mode Gain 100V/V Gain 200V/V			200	mV mV
					400	
		Write Mode, Idle Mode			100	mV
Common mode Output Voltage	V_{OUT}		5.0	6.0	7.0	V
Single Ended Output Impedance	R_{OUT}	$f=5\text{MHz}$			20	Ω

Write Mode
($T_a=0$ to 70°C , $V_{1,2}=12\text{V}\pm 10\%$, $V_s=5\text{V}\pm 10\%$)

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Write Current Constant	K	$K=I_w * R_{wc}$, $T_a=25^\circ\text{C}$	120	140	150	
Head Current Rise Time	t_R	$I_w=30\text{mA}$, $L_w=0\mu\text{H}$			20	ns
Head Current Delay	Time	$I_w=30\text{mA}$, $L_w=0\mu\text{H}$ V_{IL} Input to 50% output 1ns max input switching			30	ns
	Asymmetry		Δt_D		1.5	
Unselected Differential Head Current	ΔI_w	$I_w=30\text{mA}$, $L_w=15\mu\text{H}$				1 mA

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FUNCTION TABLE

Head Select

HS1	HS0	Selected Head
L	L	0
L	H	1
H	L	2
H	H	3

Mode Select

CS	R/W	Selected Mode
L	L	Write
L	H	Read
H	L	Idle
H	H	Idle

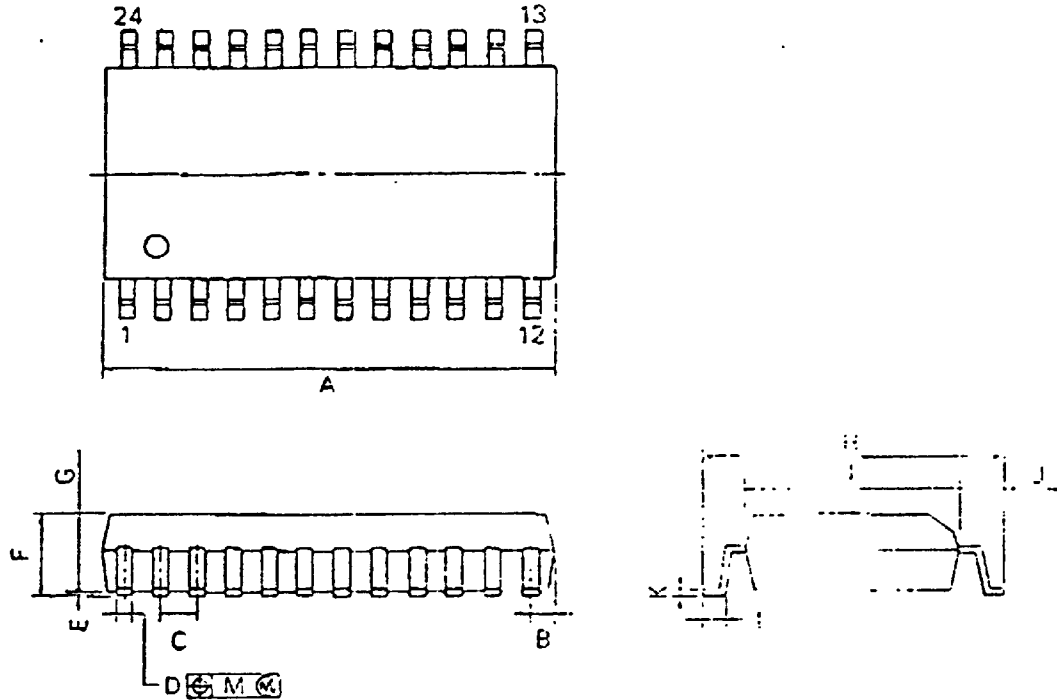
WRITE UNSAFE OPERATION

Write unsafe(WUS) pulls high whenever following error conditions exist.
(Normal write mode operation level is low.)

- ①The head is directory connected to the GND.
- ②The head is unconnected.(open)
- ③The head is connected each other.
- ④The head is directory connected to the center tap.
- ⑤The center tap is unconnected.(open)
- ⑥Write data transition rate too low.
- ⑦No write current.
- ⑧Combination of above situation.
- ⑨Read mode operation.
- ⑩Idle mode operation.

Package Outline

24 Pin SOP (375mil)



NOTE

Each lead centerline is located within 0.12 mm (0.005 inch) of its true position (T.P.) at maximum material condition.

P24GM 50 375B-1

ITEM	MILLIMETERS	INCHES
A	15.54 MAX	0.612 MAX
E	0.75 MAX	0.031 MAX
C	1.27 (T.P.)	0.050 (T.P.)
D	0.40 ^{+0.05}	0.016 ^{+0.002}
E	0.15 ^{+0.01}	0.006 ^{+0.004}
F	2.9 MAX	0.115 MAX
G	2.50	0.099
H	10.3 ^{+0.2}	0.406 ^{+0.008}
I	7.2	0.283
J	1.6	0.063
K	0.15 ^{+0.01}	0.006 ^{+0.004}
L	0.8 ^{+0.2}	0.031 ^{+0.008}
M	0.12	0.005