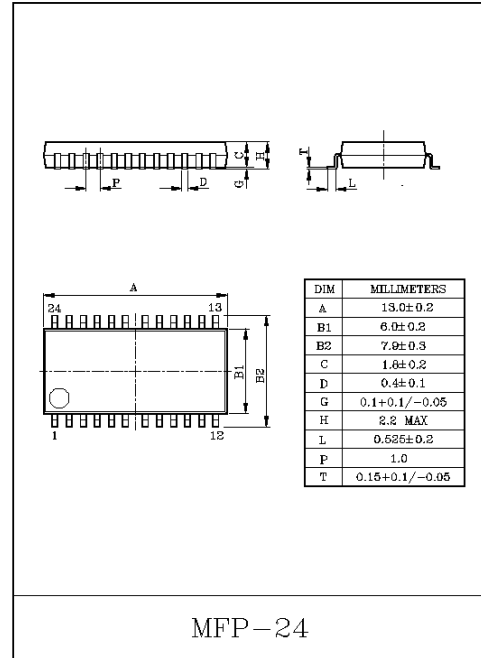


RF Amplifier for Digital servo CD system.

KIA2019F is a 3-beam type PUH compatible RF Amplifier for Digital Servo to be used in the CD system. In combination with a CMOS single chip processor KIC9432F/AF, a CD system can be composed very simply.

FEATURES

- Built in amplifier for reference (VREF, 2VREF) supply.
- Built in Auto Laser Power Control circuit.
- Built in RF amplifier.
- Built in focus error amp and tracking error amp.
- Built in sub-beam adder signal amplifier.
- Capable of tracking balance control with KIC9432F/AF.
- Capable of RF gain adjustment circuit with KIC9432F/AF.
- Built in signal amplifier for track counter.
- Capable of 4 times speed operation.
- 24 pin mini flat package.



Wight : 0.3g (Typ.)

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AC CHARACTERISTICS (Unless otherwise specified, Ta=25°C, V_{CC}=5V)

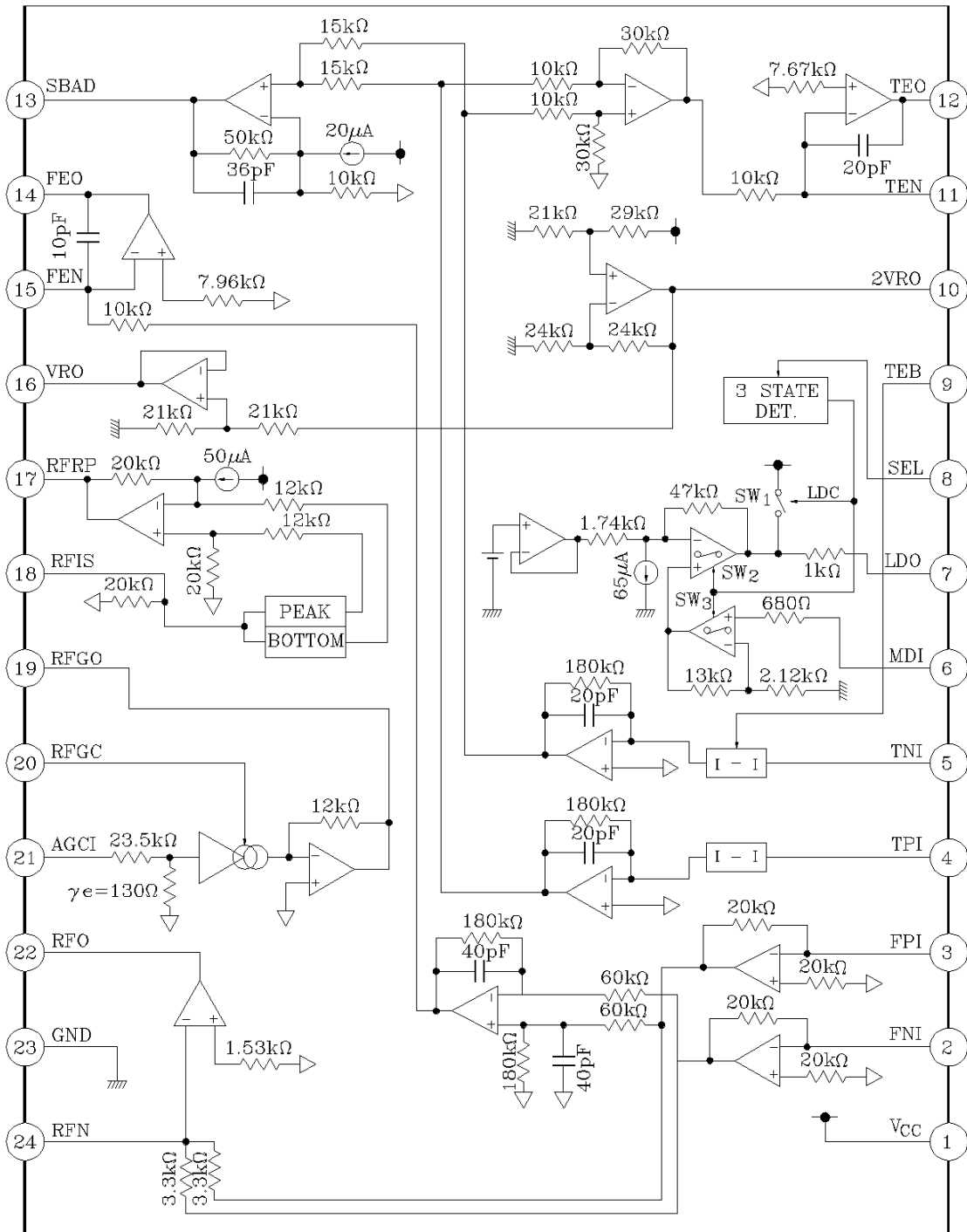
CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply	Assured Supply Voltage	V _{CC}	-		4.5	5.0	5.5	V
	Power Supply Voltage	I _{CC}	-	SEL=V _{CC}	18	24	30	mA
Reference Voltage : 2VREF	Reference Voltage	2VR	-		4.0	4.2	4.4	V
	Output Current	I _{OH2}	-	ΔV=-0.1V	3.0	-	-	mA
	Input Current	I _{OL2}	-	ΔV=+0.1V	0.1	-	-	mA
Reference Voltage : VREF	Reference Voltage	VR	-		2.0	2.1	2.2	V
	Reference Voltage Limit	ΔVR	-	2×VR/2VR-1	-3.0	0.0	3.0	%
	Output Current	I _{OH1}	-	ΔV=-0.1V	5.0	-	-	mA
	Input Current	I _{OL1}	-	ΔV=+0.1V	5.0	-	-	mA
RF1 FPI (FNI) →RFO	Transfer Resistance	R _T	-	f=100kHz, R _{NF} =22kΩ	117	133	143	kΩ
	Frequency Characteristic	f _c	-	-3dB point	-	5.0	-	MHz
	Output Slew Rate	SR	-	C _{RFO} =20pF	10	20	-	V/us
	Noise/distortion rate	THD	-	f=100kHz, V _{RFO} =1.2V _{P-P}	-	-40	-	dB
	Upper Limit Output Voltage	V _{OH}	-	GND Reference	3.6	-	-	V
	Lower Limit Output Voltage	V _{OL}	-	GND Reference	-	-	0.7	V
	Permissive Load Resistance	R _{LM}	-		10	-	-	kΩ
RF2 (AGC) RFO →RFGO	Lower Limit Gain Voltage	G _{V1}	-	f=100kHz, RFGC=0.6V	0.66	0.73	0.80	V/V
	Upper Limit Gain Voltage	G _{V2}	-	f=100kHz, RFGC=3.6V	1.60	1.75	1.90	V/V
	Frequency Characteristic	f _c	-	-3dB point	-	5.0	-	MHz
	Output Slew Rate	SR	-	C _{RFGO} =20pF	10	20	-	V/us
	Upper Limit Output Voltage	V _{OH}	-	GND Reference	3.6	-	-	V
	Lower Limit Output Voltage	V _{OL}	-	GND Reference	-	-	0.7	V
	Noise/distortion rate	THD	-	f=100kHz, V _{RFGO} =1.2V _{P-P}	-	-40	-	dB
Permissive Load Resistance	R _{LM}	-		10	-	-	kΩ	
APC MDI →LDO	Gain Voltage	G _V	-	f=1kHz	-	200	-	V/V
	Operation Reference Voltage	V _{MDI}	-	V _{LDO} =3.5V _{DC}	170	178	192	mA
	LD Off Voltage	V _{LDOF}	-	LDC=L, V _{CC} Reference, SEL=L	-0.7	-	-	V
	Input Vias Current	I _I	-	V _{MDI} =178mV	-200	-	200	nA
FE FNI (FPI) →FEO	Transfer Resistance	R _T	-	f=1kHz, R _{NF} =39kΩ	198	220	242	kΩ
	Gain Balance	GB	-		-1.0	-	+1.0	dB
	Frequency Characteristic	f _c	-	-3dB point	-	22	-	kHz
	Output Offset Voltage	V _{OS}	-	VR Reference, input open	-30	-	30	mV
	Noise/distortion rate	THD	-	f=1kHz, V _{FEO} =2.4V _{P-P}	-	-40	-	dB
	Upper Limit Output Voltage	V _{OH}	-	GND Reference	3.8	-	-	V
	Lower Limit Output Voltage	V _{OL}	-	GND Reference	-	-	0.5	V
Permissive Load Resistance	R _{LM}	-		10	-	-	kΩ	

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CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
TE TPI (TNI) →TEO	Transfer Resistance	R_T	-	f=1kHz, TEB=VR, $R_{NF}=33k\Omega$	1.53	1.70	1.87	$M\Omega$
	Transfer Resistance Range max. Transfer Resistance max. Transfer Resistance	ΔR_T	-	TEB=VR Reference TEB=GND TEB=2VR	35 -55	45 -45	55 -35	% %
	Gain Balance	GB	-	TEB=VR	-1.0	-	+1.0	dB
	Frequency Characteristic Cut-Off Frequency 1 Cut-Off Frequency 2	f_{c1} f_{c2}	-	$R_{NF}=33k\Omega$	- -	44 240	- -	kHz kHz
	Output Offset Voltage	VOS	-	VR Reference, input open	-80	-	+80	mV
	Noise/distortion rate	THD	-	f=1kHz, $V_{TEO}=2.0V_{P-P}$	-	-40	-	dB
	Upper Limit Output Voltage	V_{OH}	-	GND Reference	3.8	-	-	V
	Lower Limit Output Voltage	V_{OL}	-	GND Reference	-	-	0.5	V
	Permissive Load Resistance	R_{LM}	-		10	-	-	$k\Omega$
SBAD TPI (TNI) → SBAD	Transfer Resistance	R_T	-	f=1kHz, TEB=VR	416	520	624	$k\Omega$
	Frequency Characteristic	f_c	-	-3dB point	-	44	-	kHz
	Noise/distortion rate	THD	-	f=1kHz, $V_{SBAD}=1.5V_{P-P}$	-	-40	-	dB
	Operation Reference Voltage	V_{OPR}	-	TNI/TPI=VR VR Reference	-1.1	-1.0	-0.9	V
				TNI/TPI=Hi-Z VR Reference	-1.2	-1.1	-1.0	V
	Upper Limit Output Voltage	V_{OH}	-	GND Reference	3.8	-	-	V
Permissive Load Resistance	R_{LM}	-		10	-	-	$k\Omega$	
RFRP RFRI → RFRP	Gain Voltage	G_V	-		1.37	1.46	1.54	V/V
	Operation Reference Voltage 1	V_{OPR1}	-	VR Reference, No Signal	-1.1	-1.0	-0.9	V
	Operation Reference Voltage 2	V_{OPR2}	-	VR Reference 700kHz, $1.2V_{P-P}$	0.65	0.75	0.85	V
	Permissive Load Resistance	R_{LM}	-		10	-	-	$k\Omega$

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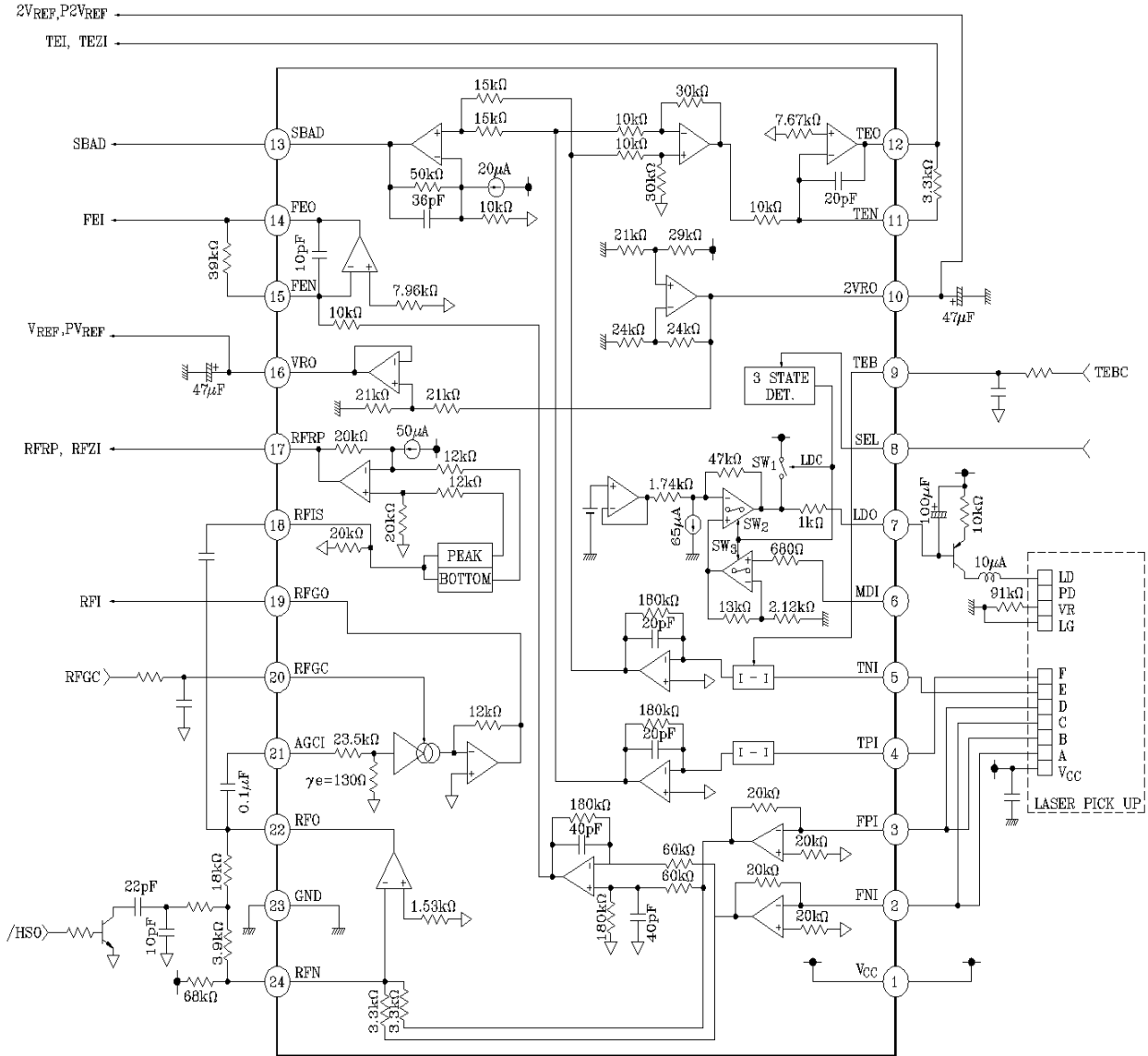
BLOCK DIAGRAM



SEL	LDC		
	SW1	SW2	SW3
L	ON	OFF	OFF
Hi-Z	OFF	ON	ON
H	OFF	ON	ON

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APPLICATION CIRCUIT



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PIN FUNCTION

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARK
1	VCC	-	Power supply input terminal	-
2	FNI	I	Main beam I-V amp input terminal	connected to pin diode A,C
3	FPI	I	Main beam I-V amp input terminal	connected to pin diode B,D
4	TPI	I	Sub beam I-V amp input terminal	connected to pin diode F
5	TNI	I	Sub beam I-V amp input terminal	connected to pin diode E
6	MDI	I	Monitor photo diode amp input terminal	connected to monitor photo diode
7	LDO	O	Laser diode amp output terminal	connected to laser control circuit
8	SEL	I	Laser diode control signal input terminal and APC circuit ON/OFF control signal input terminal	3 signal input (VCC, Hi-Z, VSS)
9	TEB	I	Tracking error balance adjustment signal input terminal Controlled by 3 PWM signal (PWM carrier=88.2kHz)	3 signal input (2VREF, VREF, VSS)
10	2VRO	O	Reference voltage (2VREF) output terminal 2VREF=4.2V when VCC=5V	-
11	TEN	I	TE amp negative input terminal	connected to TEO through feedback register
12	TEO	O	TE error signal output terminal	-
13	SBAD	O	Sub beam adder signal output terminal	-
14	FEO	O	Focus error signal output terminal	-
15	FEN	I	FE amp negative input terminal	connected to FEO through feedback register
16	VRO	O	Reference signal(VREF) output terminal VREF=2.1V when VCC=5V	-
17	RFRP	O	Track count signal output terminal	-
18	RFIS	I	RFRP detect circuit input terminal	connected to RFO through condenser
19	RFGO	O	RF gain signal output terminal	-
20	RFGC	I	RF amplitude adjustment control signal input terminal controlled by 3 PWM signal (PWM carrier=88.2kHz)	3 signal input (2VREF, VREF, VSS)
21	AGCI	I	RF signal amplitude adjustment amp input terminal	connected to RFO through condenser
22	RFO	O	RF signal output terminal	-
23	GND	-	Ground terminal	-
24	RFN	I	RF amp negative input terminal	-