

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA2066F

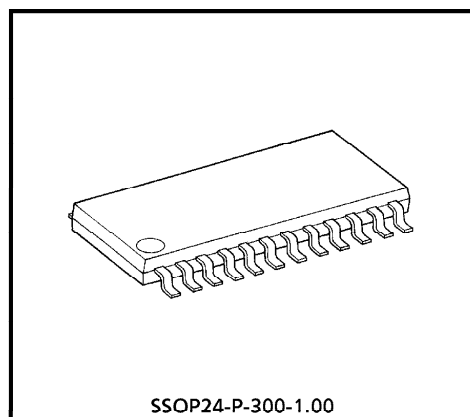
RF AMPLIFIER FOR DIGITAL SERVO CD SYSTEM

TA2066F is a 3-beam type PUH compatible RF Amplifier to be used in the CD system.

In combination with a CMOS single chip processor TC9295F/TC9296F/TC9405F/TC9406F, a CD system can be composed very simply.

FEATURES

- Built in amplifier for reference 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 TC9295F/TC9296F/TC9405F/TC9406F
- Low power decimation
- Capable of Double speed operation and quadruple operation



Weight : 0.3g (Typ.)

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LDC

LDC	S ₁	S ₂	S ₃
L	OFF	OFF	ON
H	ON	ON	OFF

HS

HS ₁	S ₄
L	OFF
H	ON

The schematic diagram illustrates the internal circuitry of the LDC2114 evaluation board. It features a 1.35V reference voltage source and a 100 μA current source. The circuit includes several op-amp buffers (MD, LD, FN, FP, TP, TN, FNL, FPL, FE, TE, ADD) and comparators (BGR). The board is populated with 24 pins, with pins 1-12 on the left and 13-24 on the right. A truth table for the LDC and HS control signals is provided at the top.

PIN FUNCTION

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
1	GND	—	Ground terminal.	—
2	$\overline{\text{HSI}}$	I	Analog switch control signal input terminal for hi speed control.	—
3	MDI	I	Monitor photo diode amp input terminal.	Connected to monitor photo diode.
4	LDO	O	Laser diode amp input terminal.	Connected to laser diode circuit.
5	FNI	I	Main beam I-V amp input terminal.	Connected to pin diode B + D.
6	FPI	I	Main beam I-V amp input terminal.	Connected to pin diode A + C.
7	TPI	I	Sub beam I-V amp input terminal.	Connected to pin diode F.
8	TNI	I	Sub beam I-V amp input terminal.	Connected to pin diode E.
9	LDC	I	Laser diode control signal input terminal.	—
10	TEB	I	Tracking balance control signal input terminal.	—
11	C2VR	I	Reference supply input terminal.	—
12	2VRO	O	Reference signal output terminal. ($2V_{\text{REF}} = 4.2\text{V}$ when $V_{\text{CC}} = 5\text{V}$)	—
13	SBAD	O	Sub beam adder signal output terminal.	—
14	TEO	O	Tracking error signal output terminal.	—
15	TEN	I	TE amp negative input terminal.	Connected TEO through feedback register.
16	TEP	I	TE amp positive input terminal.	Connected VRO.
17	FEP	I	FE amp positive input terminal.	Connected VRO through resister.
18	FEN	I	FE amp negative input terminal.	Connected FEO through feedback register.
19	FEO	O	Focus error signal output terminal.	—
20	VRO	O	Reference signal output terminal. ($V_{\text{REF}} = 2.1\text{V}$ when $V_{\text{CC}} = 5\text{V}$)	—
21	RFO	O	RF signal output terminal.	—
22	RFN	I	RF amp negative input terminal.	Connected RFO through RF amp feedback circuit.
23	VCC	—	Power supply input terminal.	—
24	HSSW	O	Hi speed control signal output terminal.	Connected RF amp feedback circuit.

MAXIMUM RATINGS (Ta = 25°C)

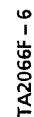
CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V _{CC}	-0.3~12.0	V
Power Dissipation	P _D	400 (*)	mW
Operating Temperature	T _{opr}	-35~85	°C
Storage Temperature	T _{stg}	-55~150	°C

(*) Derated above 25°C in the proportion 3.2mW/°C.

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

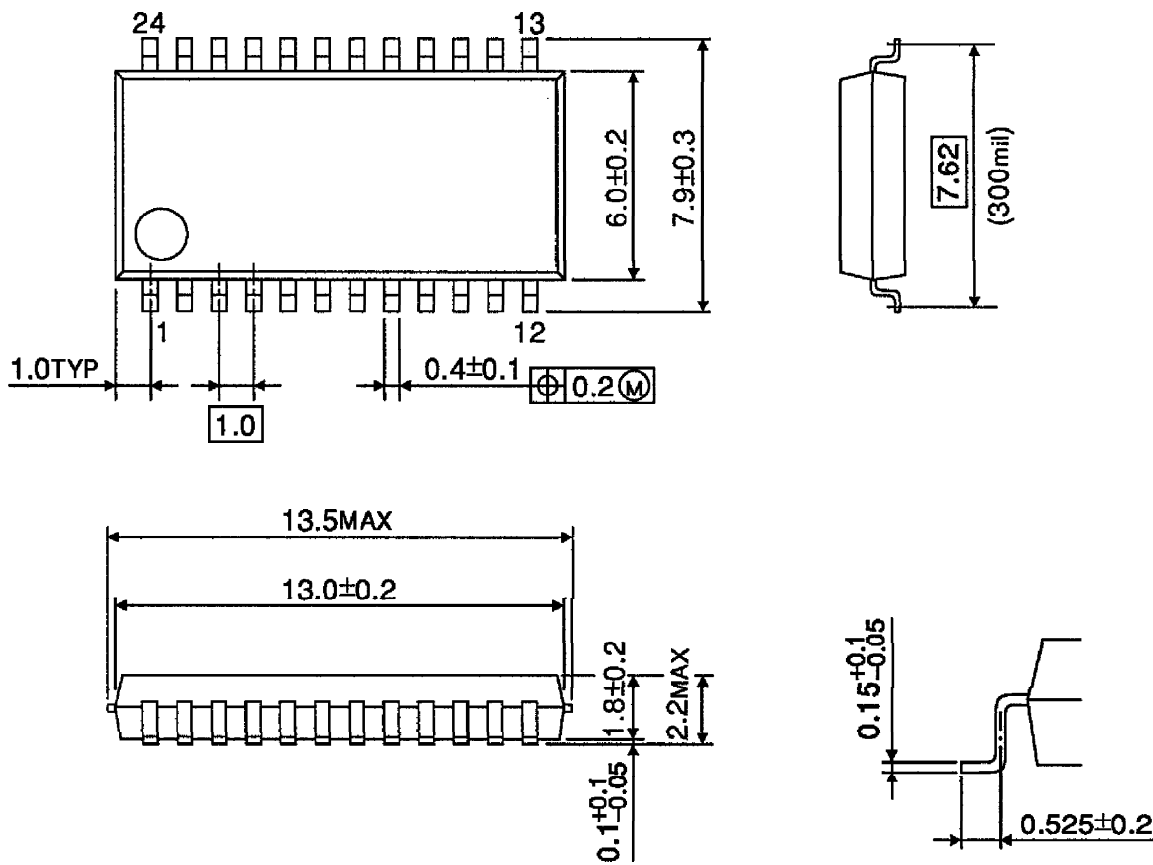
CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply	Assured Supply Voltage	V _{CC}	—	—	3.5	5.0	5.5	V
	Power Supply Current	I _{CC}	—	SEL = HiZ	—	16.0	22.0	mA
Reference Voltage : 2V _{REF}	Reference Voltage	2VR	—	—	4.0	4.2	4.4	V
	Output Current	I _{OH}	—	ΔV = -0.1V	5.0	—	—	mA
	Input Current	I _{OL}	—	ΔV = 0.1V	0.1	—	—	mA
Reference Voltage : V _{REF}	Reference Voltage	VR	—	—	2.0	2.1	2.2	V
	Reference Voltage Limit	ΔVR	—	(2·VR / 2VR) - 1	-3.0	—	3.0	%
	Output Current	I _{OH}	—	ΔV = -0.1V	5.0	—	—	mA
	Input Current	I _{OL}	—	ΔV = 0.1V	5.0	—	—	mA
APC	Gain Voltage	G _V	—	f = 1kHz	—	200	—	V/V
	Operation Reference Voltage	V _{MDI}	—	V _{LDO} = 3.5V _{DC}	170	178	192	mV
	LD Off Voltage	V _{LDOF}	—	LDC = L, V _{CC} Reference	-0.7	—	—	V
	Input Bias Current	I _I	—	—	-200	—	200	nA
RF	Transfer Resistance	R _T	—	f = 100kHz	120	133	147	kΩ
	Frequency Characteristic	f _c	—	-3dB Point	—	3.0	—	MHz
	Output Slew Rate	SR	—	C _{RFO} = 20pF	—	20	—	V/μs
	Total Harmonic Distortion	THD	—	f = 100kHz, V _{RF} = 1.4V _{p-p}	—	-50	—	dB
	Operation Reference Voltage	V _{OPR}	—	VR Reference	-1.03	-0.94	-0.84	V
	Upper Limit Output Voltage	V _{OH}	—	GND Reference	3.6	—	—	V
	Lower Limit Output Voltage	V _{OL}	—	GND Reference	—	—	0.7	V
	Permissible Load Resistance	R _{LM}	—	—	10	—	—	kΩ
	HSSW ON Voltage (DC)	V _{HSON}	—	VR Reference	—	—	50	mV
	HSSW ON Voltage (AC)	V _{HSON}	—	f = 100kHz, V _{RFI} = 1.0V _{p-p}	—	-50	—	dB

CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
FE	Transfer Resistance	R_T	—	$f = 1\text{kHz}$	211	234	257	$k\Omega$
	Gain Balance	G_B	—	$f = 1\text{kHz}$	- 1.0	—	1.0	dB
	Frequency Characteristic	f_c	—	- 3dB Point	—	22	—	kHz
	Total Harmonic Distortion	THD	—	$f = 1\text{kHz}$, $V_{FEO} = 2.7V_{p-p}$	—	- 70	—	dB
	Output Offset Voltage	V_{OS}	—	VR Reference	- 80	—	80	mV
	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	—	—	$k\Omega$
TE	Transfer Resistance	R_T	—	$f = 1\text{kHz}$	1.60	1.78	1.96	$M\Omega$
	Transfer Resistance Adjusting Range	ΔR_T	—	TEB = 2VR, TEB = VR Reference	- 55	- 45	- 35	%
				TEB = GND, TEB = VR Reference	35	45	55	
	Gain Balance	G_B	—	$f = 1\text{kHz}$, TEB = VR	- 1.0	—	1.0	dB
	Frequency Characteristic	f_c	—	- 3dB Point	—	22	—	kHz
	Total Harmonic Distortion	THD	—	$f = 1\text{kHz}$, $V_{TEO} = 2.7V_{p-p}$	—	- 50	—	dB
	Input Terminal Voltage	V_I	—	VR Reference	—	- 150	—	mV
	Output Offset Voltage	V_{OS}	—	VR Reference	- 80	—	80	mV
	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	Transfer Resistance	R_T	—	$f = 1\text{kHz}$	324	450	594	$k\Omega$
	Frequency Characteristic	f_c	—	—	—	22	—	kHz
	Total Harmonic Distortion	THD	—	$f = 1\text{kHz}$, $V_{SBAD} = 2.0V_{p-p}$	—	- 50	—	dB
	Operation Reference Voltage	V_{OPR}	—	VR Reference	- 1.1	- 1.0	- 0.9	V
	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	—	—	$k\Omega$



OUTLINE DRAWING
SSOP24-P-300-1.00

Unit : mm



Weight : 0.3g (Typ.)