

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8190F, TA8191F

CD FOCUS TRACKING SERVO LSI

The TA8190F, TA8191F is a 3-beam type PUH compatible focus tracking servo LSIs to be used in the CD player system.

In combination with a CMOS single chip processor TC9236AF, a CD player system can be composed very simply.

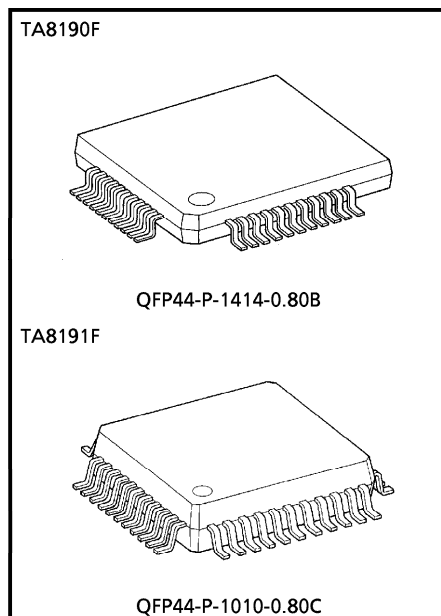
FEATURES

- Built-in RF amp, focus error amp, and tracking error amp.
- Built-in focus tracking servo amp.
- Built-in phase compensation amp and LPF amp. (Regarding these amp, the pin connection differs between the TA8190F and the TA8191F.)
- Built-in ALPC amp.
- Connections between PUH and power driver IC for motor driver allow simplified structuring of CD player system.

TA8190F : Directly connectable to a transistor push-pull or power driver (TA8212F).

TA8191F : Directly connectable to BTL amp (TA8192F) or PWM driver (TA8460F).

- Differences between TA8190F and TA8191F are as follows :



Weight
 QFP44-P-1414-0.80B : 1.15g (Typ.)
 QFP44-P-1010-0.80C : 0.5g (Typ.)

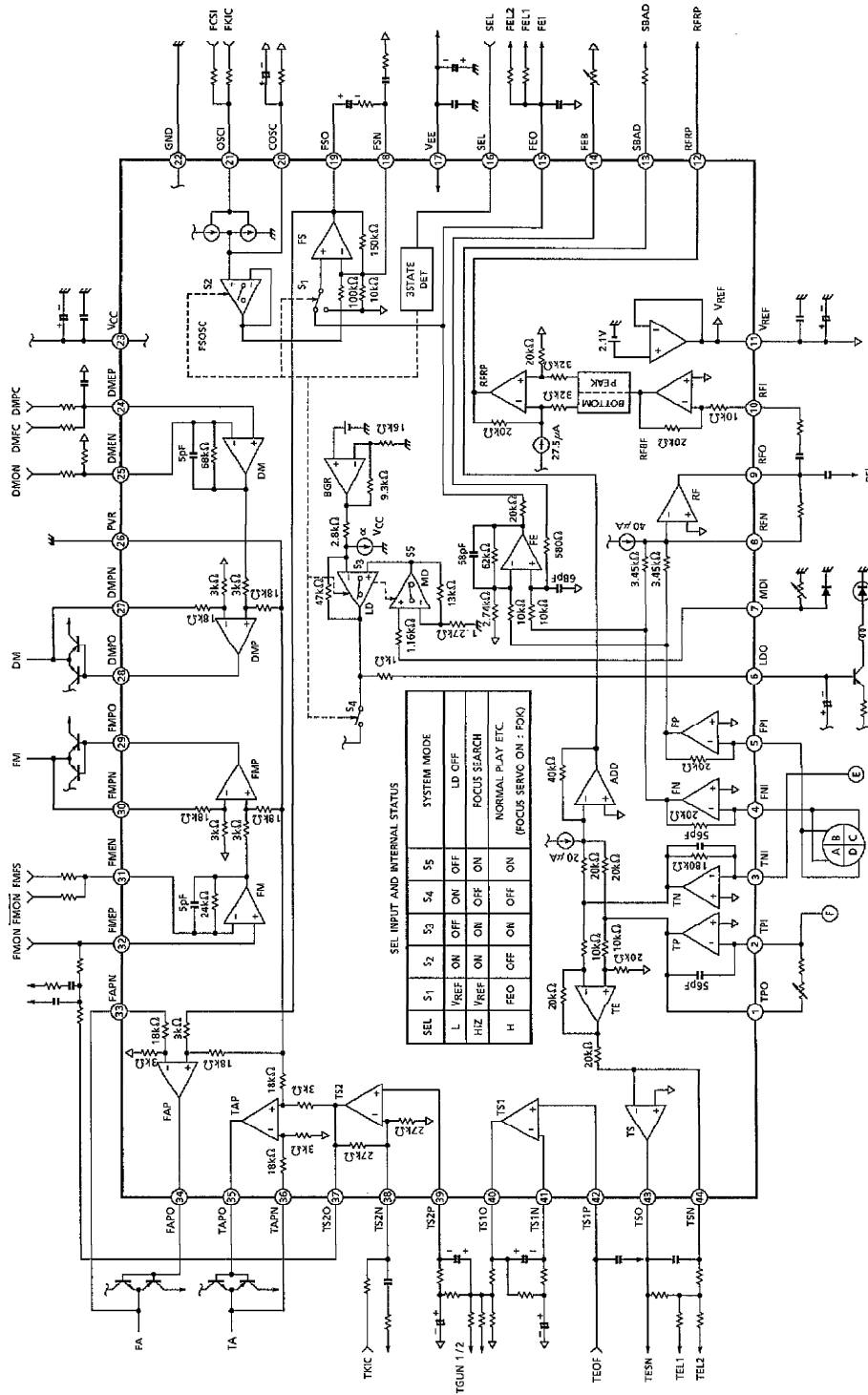
MODEL	REFERENCE VOLTAGE TERMINAL		PACKAGE (FLAT PACKAGE 44 PIN)	POWER SUPPLY	APPLICATION
	V _{REF}	2V _{REF}			
TA8190F	Yes	No	QFP44-P-1414B	± 5V double power supply	CD player
TA8191F	Yes	Yes	QFP44-P-1010C	+ 5V single power supply	Portable CD player Radio-cassette CD player

(V_{REF} = 2.1V, 2V_{REF} = 4.2V)

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BLOCK DIAGRAM
TA8190F



TA8190,91F-2

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PIN FUNCTION
 (Common)

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
1	TPO	O	Sub-beam I-V amp (TP AMP) output terminal.	Connected to TPI through adjusting feedback resistor.
2	TPI	I	Sub-beam I-V amp (TP AMP) input terminal.	Connected to PIN diode F.
3	TNI	I	Sub-beam I-V amp (TN AMP) input terminal.	Connected to PIN diode E.
4	FNI	I	Main-beam I-V amp (FN AMP) input terminal.	Connected to PIN diode A + C.
5	FPI	I	Main-beam I-V amp (FP AMP) input terminal.	Connected to PIN diode B + D.
6	LDO	O	Laser diode amp (LD AMP) input terminal.	Connected to laser diode circuit.
7	MDI	I	Monitor photo diode amp (MD AMP) input terminal.	Connected to monitor photo diode.
8	RFN	I	RF amp (RF AMP) negative phase input terminal.	Connected to RFO through feedback resistor.
9	RFO	O	RF amp (RF AMP) output terminal.	—
10	RFI	I	RF ripple signal generating circuit input terminal.	Connected to RFO through CR.
11	V _{REF}	O	Reference voltage supply output terminal. (+2.1V)	—
12	RFRP	O	RF ripple signal output terminal.	—
13	SBAD	O	Defects detection signal output terminal.	—
14	FEB	I	Focus error balance adjusting input terminal.	Adjusting semi-fixed resistor connected.
15	FEO	O	Focus error amp (FE AMP) output terminal.	Gain adjusting resistor is connected.
16	SEL	I	Analog switch control signal input terminal.	—
17	V _{EE}	—	Power source terminal. (TA8190F : -5V, TA8191F : GND)	—
18	FSN	I	Focus output amp (FS AMP) negative phase input terminal.	Connected to FSO through feedback CR.
19	FSO	O	Focus output amp (FS AMP) output terminal.	—
20	COSC	O	Focus search signal generating capacitor connecting terminal.	CR is connected.
21	OSCI	I	Focus search signal generating built-in current source control input terminal.	—
22	GND	—	Ground terminal.	—

(Common)

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
23	V _{CC}	—	Power source terminal. (+5V)	—
24	DMEP	I	Disc motor amp (DM AMP) positive phase input terminal.	—
25	DMEN	I	Disc motor amp (DM AMP) negative phase input terminal.	—
31	FMEN	I	Feed motor amp (FM AMP) negative phase input terminal.	—
32	FMEP	I	Feed motor amp (FM AMP) positive phase input terminal.	—
37	TS2O	O	Tracking servo amp 2 (TS2 AMP) output terminal.	—
38	TS2N	I	Tracking servo amp 2 (TS2 AMP) negative phase input terminal.	—
39	TS2P	I	Tracking servo amp 2 (TS2 AMP) positive phase input terminal.	—
40	TS1O	O	Tracking servo amp 1 (TS1 AMP) output terminal.	—
41	TS1N	I	Tracking servo amp 1 (TS1 AMP) negative phase input terminal.	Connected to TS1O through feedback CR.
42	TS1P	I	Tracking servo amp 1 (TS1 AMP) positive phase input terminal.	—
43	TSO	O	Tracking output amp (TS AMP) output terminal.	—
44	TSN	I	Tracking output amp (TS AMP) negative phase input terminal.	Connected to TSO through feedback CR.

(TA8190F)

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
26	PVR	I	Driving amp reference voltage input terminal.	Connect to GND.
27	DMPN	I	Disc motor driving amp (DMP AMP) negative phase input terminal.	—
28	DMPO	O	Disc motor driving amp (DMP AMP) output terminal.	Connected to DMPN through external output Tr.
29	FMPO	O	Feed motor driving amp (FMP AMP) output terminal.	Connected to EMPN through external output Tr.
30	FMPN	I	Feed motor driving amp (FMP AMP) negative phase input terminal.	—
33	FAPN	I	Focus actuator driving amp (FAP AMP) negative phase input terminal.	—
34	FAPO	O	Focus actuator driving amp (FAP AMP) output terminal.	Connected to FAPN through external output Tr.
35	TAPO	O	Tracking actuator driving amp (TAP AMP) output terminal.	Connected to TAPN through external output Tr.
36	TAPN	I	Tracking actuator driving amp (TAP AMP) negative phase input terminal.	—

(TA8191F)

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
26	DMEO	O	Disc motor amp (DM AMP) output terminal.	—
27	DMPO	O	Disc motor driving amp (DM AMP) output terminal.	—
28	PVR	I	Driving amp reference voltage input terminal.	Connected to V _{REF} .
29	FMPO	O	Feed motor driving amp (FMP AMP) output terminal.	—
30	FMEO	O	Feed motor amp (FM AMP) output terminal.	—
33	FAPO	O	Focus actuator driving amp (FAP AMP) output terminal.	—
34	2VRO	O	2V _{REF} amp (2V _{REF} AMP) output terminal.	Connected to 2VRP through external output Tr.
35	2VRP	I	2V _{REF} amp (2V _{REF} AMP) positive phase input terminal.	—
36	2VRN	I	2V _{REF} amp (2V _{REF} AMP) negative phase input terminal.	—

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Power Supply Voltage		$V_{CC}-V_{EE}$	0.3~12.0	V
Power Dissipation	TA8190F	P_D	960 (*1)	mW
	TA8191F		780 (*2)	
Operating Temperature		T_{opr}	-25~75	°C
Storage Temperature		T_{stg}	-55~150	°C

(*1) Derated above 25°C in the proportion of 7.7mW/°C.

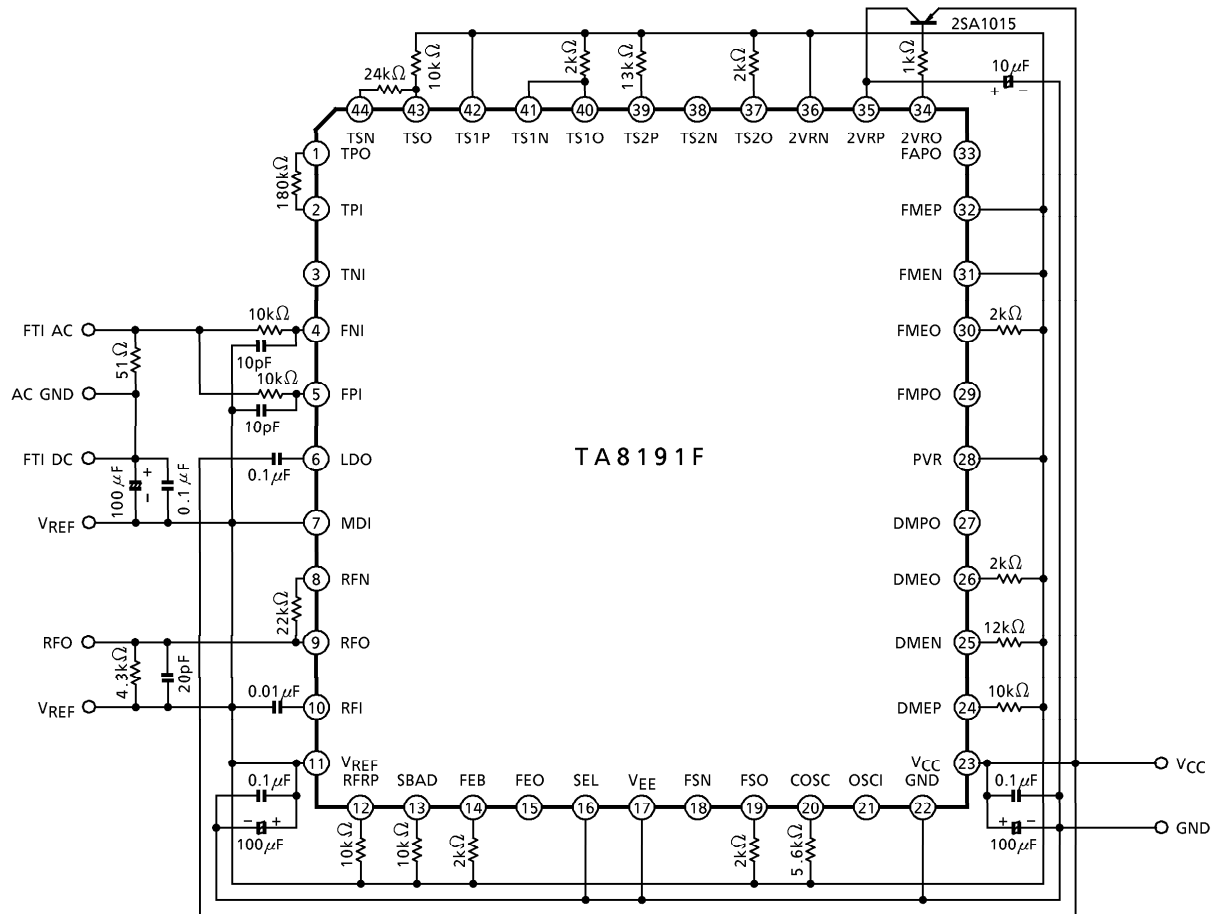
(*2) Derated above 25°C in the proportion of 6.2mW/°C.

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, TA8190F : $V_{CC}=5V$, $V_{EE}=-5V$, $T_a=25^\circ C$)
 TA8191F : $V_{CC}=5V$, $V_{EE}=GND$, $T_a=25^\circ C$)

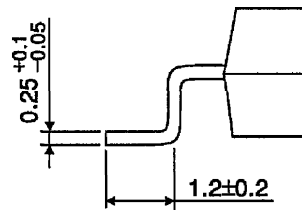
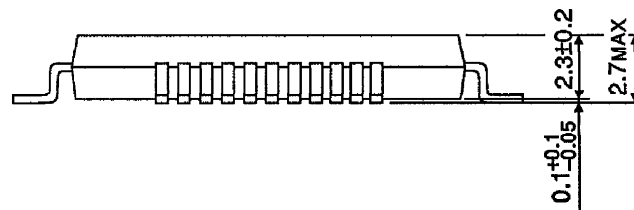
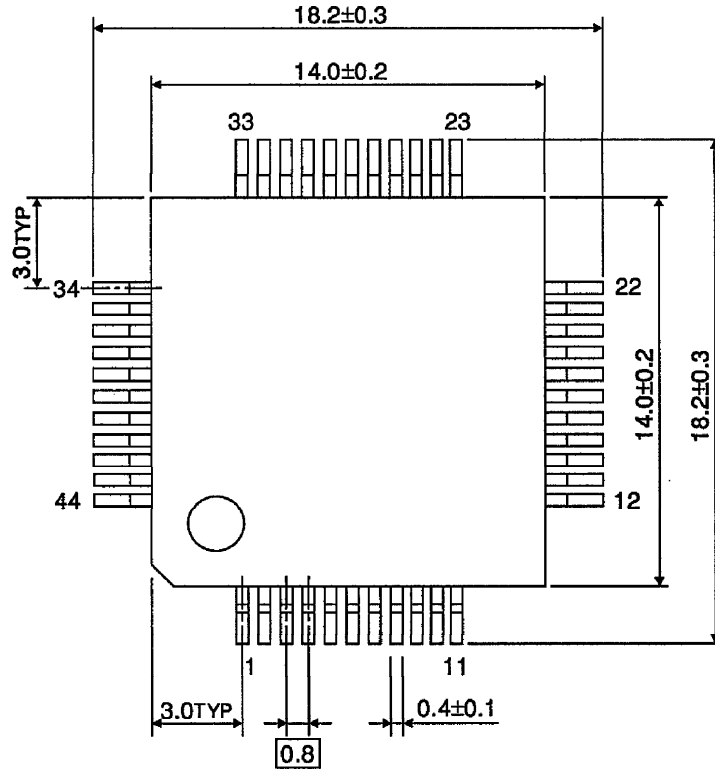
CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Power Source (TA8190F)	Power Supply Voltage	V_{CC}	—	$T_a = -25 \sim 75^\circ C$	4.5	5.0	5.5	V
		V_{EE}	—		-5.5	-5.0	-4.5	
	Power Supply Current	I_{CC}	1	SEL = HiZ	14.0	24.0	32.0	mA
		I_{EE}	1	—	3.0	5.0	7.0	
Power Source (TA8191F)	Power Supply Voltage	V_{CC}	—	$T_a = -25 \sim 75^\circ C$	4.5	5.0	5.5	V
	Power Supply Current	I_{CC}	3	—	14.0	24.0	32.0	mA
Reference Power Supply V_{REF} (Common)	Reference Voltage	V_{REF}	1, 3	—	1.95	2.10	2.25	V
	Reference Voltage Temperature Characteristic	$\Delta V / \Delta T$	1, 3	—	-3.0	-2.0	-1.0	mV/°C
	Output Current	I_{OH}	1, 3	—	5.0	—	—	mA
	Input Current	I_{OL}	1, 3	—	5.0	—	—	mA
FI ↓ RFO (Common)	Permissive Input Current	I_{IM}	1, 3	per each ch	30	—	—	μA
	Transfer Resistance	R_T	1, 3	$f = 100kHz$	115	127	140	$k\Omega$
	Frequency Characteristic	f_c	2, 4	-3dB point	3.0	—	—	MHz
	Output Signal Slew Rate	SR	2, 4	$CRFO = 20pF$	10	20	—	V/ μs
	Total Harmonic Distortion	THD	1, 3	$f = 100kHz$ $V_{REO} = 1.27V_{p-p}$	—	-40	-30	dB

TEST CIRCUIT 4



OUTLINE DRAWING
QFP44-P-1414-0.80B

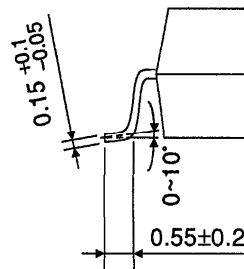
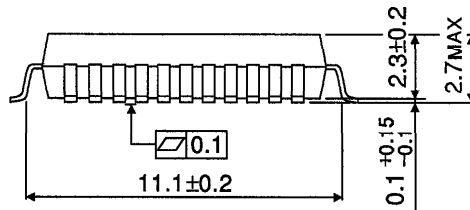
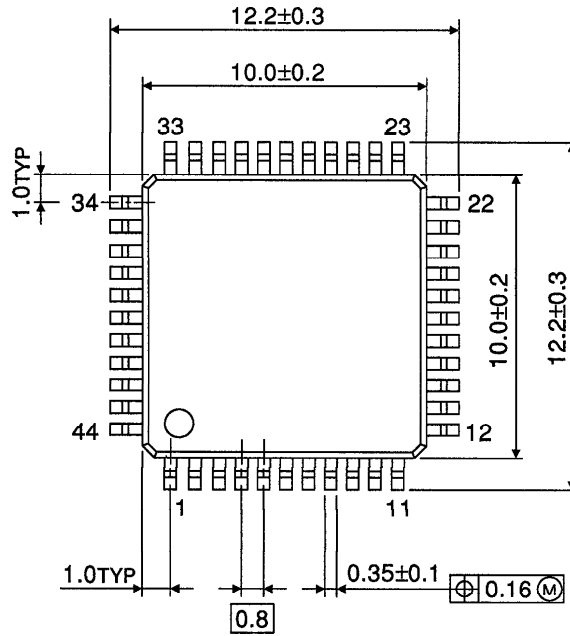
Unit : mm



Weight : 1.15g (Typ.)

OUTLINE DRAWING
QFP44-P-1010-0.80C

Unit : mm



Weight : 0.5g (Typ.)