LA9210M

3174

SANYO SEMICONDUCTOR CORP

Monolithic Linear IC

Analog Signal Processor for Compact Disc Players

OVERVIEW

The LA9210M is a bipolar analog signal processor and servocontroller IC for CD players. It is designed to be used with an LC7860/65 series digital signal processor and a minimum of external components to form a complete controller for a compact disc player.

The LA9210M operates from either a single 5 V supply, single-ended 5 V and 7 V supplies or a dual ±5 V supply and is available in 80-pin QIPs.

FUNCTIONS

- RF amplifier
- Slice level control
- Voltage-controlled oscillator (VCO)
- VCO control amplifier
- Automatic laser power control (APC)
- Focus error amplifier
- Tracking error amplifier
- Track jump amplifier
- Focus servo preamplifier
- Tracking servo preamplifier
- Spindle servo preamplifier
- Sled servo preamplifier
- RF detector
- HF level detector
- Defect detector
- Shock detector
- Focus switch
- Tracking servo gain switch
- Tracking error slice comparator

FEATURES

- Minimum of external components required
- Normal and double-speed VCO
- 5 V supply, single-ended 5 V and 7 V supplies or dual ±5 V supply
- 80-pin QIP

PINOUT

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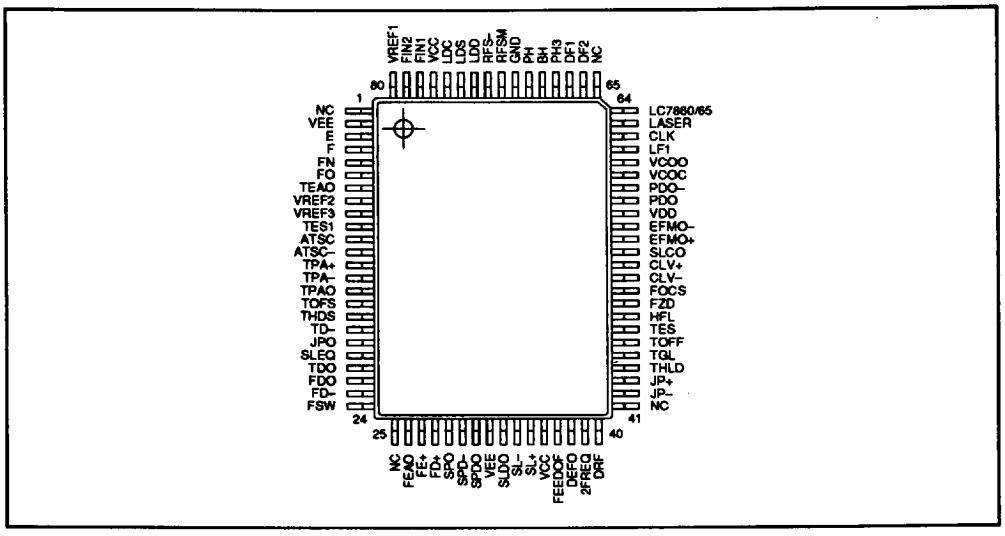
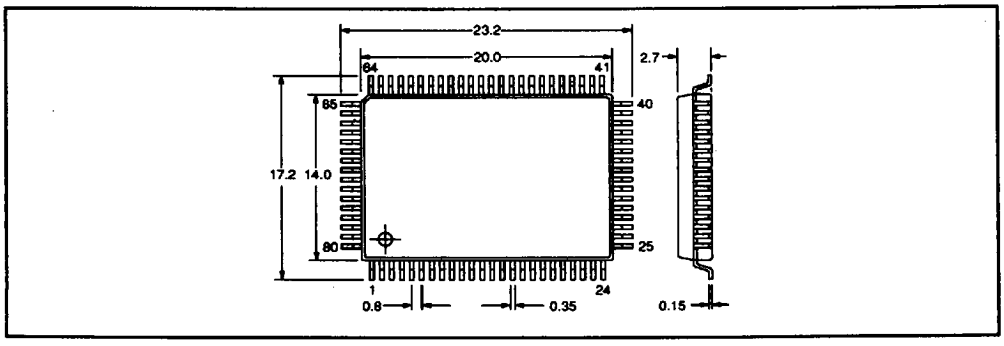


PACKAGE DIMENSIONS

Unit: mm

3174-QIP80E



SCHEMATIC DIAGRAM

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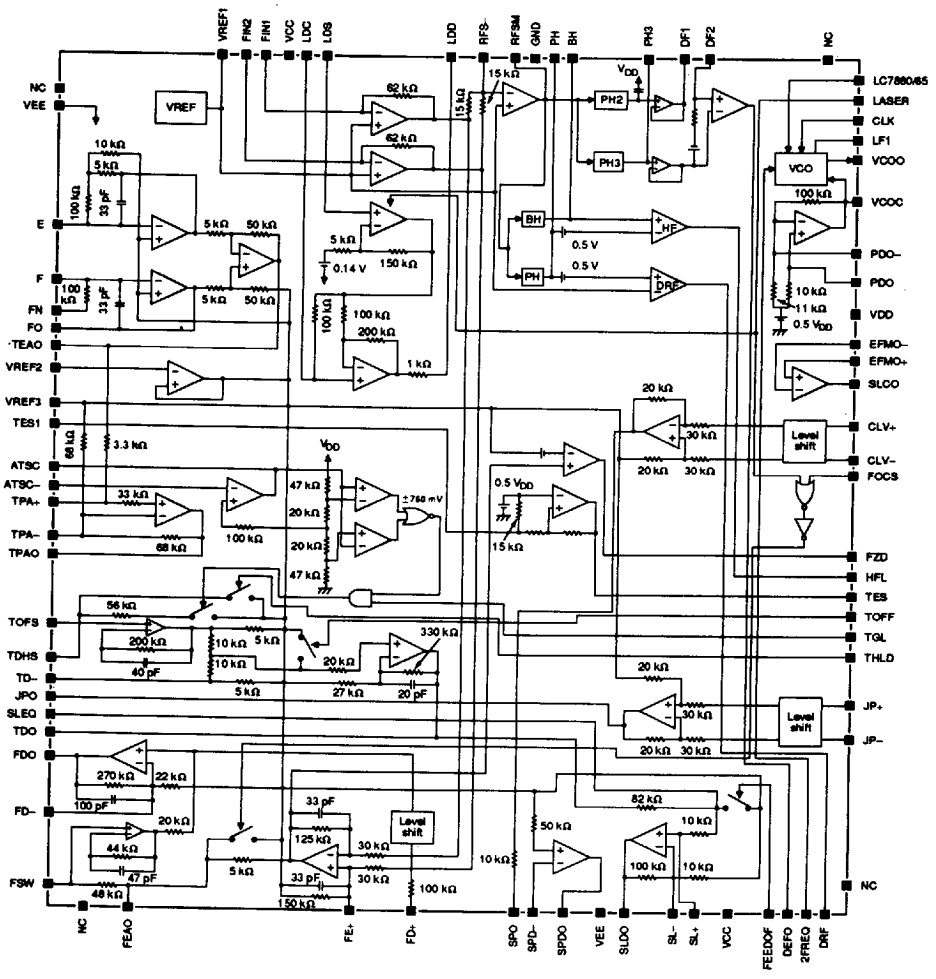

SPECIFICATIONS

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Single-ended supply voltage. See note 1.	V_{CC}	10	V
	V_{DD}	7	
Dual supply voltage. See note 2.	$V_{CC} - V_{EE}$	13	V
	V_{DD}	7	
TDO, FDO, SFDO and SLDO input current	I_I	1	mA
TDO, FDO, SFDO and SLDO output current	I_O	1	mA
Power dissipation	P_D	480 ($T_a \leq 60$ °C)	mW
Operating temperature range	T_{opg}	–25 to 75	°C
Storage temperature range	T_{stg}	–40 to 150	°C

Notes

1. VEE connected to ground, $V_{CC} \geq V_{DD}$
2. VREF1, VREF2 and VREF3 connected to ground, $V_{CC} \geq V_{DD}$

Recommended Operating Conditions

T_a = 25 °C

Parameter	Symbol	Rating	Unit
Dual supply voltage	V_{CC}	5	V
	V_{DD}	5	
	V_{EE}	–5	
Single-ended supply voltage ranges. See note 1.	V_{CC}	4.2 to 8.0	V
	V_{DD}	4.2 to 6.0	
Dual supply voltage ranges. See note 2.	V_{CC}	4.2 to 6.0	V
	V_{DD}	4.2 to 6.0	
	V_{EE}	–6.0 to –4.2	

Notes

1. VEE connected to ground
2. VREF1, VREF2 and VREF3 connected to ground

Electrical Characteristics

Supply current

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = –5 V, T_a = 25 °C, $V_{REF1} = V_{REF2} = V_{REF3}$ = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Supply current	I_{CC}		9	18	27	mA
	I_{DD}		10	15	20	
	I_{EE}		–28	–19	–10	

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RF amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
RF offset voltage	$V_{RF(off)}$	FIN1 and FIN2 open, measured at RFSM	−0.65	−0.3	0.05	V
FIN1 and FIN2 RF voltage gain	G_{VRF}	R_g = 1 MΩ, R_L = 33 kΩ, f = 200 kHz	−12.5	−11.0	−9.5	dB

Focus error amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{FE(off)}$	FIN1 and FIN2 open, measured at FEAO	−50	0	50	mV
FIN1 and FIN2 voltage gain	G_{VFE}	R_g = 1 MΩ, R_L = 33 kΩ, f = 1 kHz	−15.0	−11.5	−8.0	dB
FIN1 and FIN2 voltage gain differential	ΔG_{VFE}	R_g = 1 MΩ, R_L = 33 kΩ	−1.5	0	1.5	dB
Cutoff frequency	$f_{FE(co)}$	Measured at the half power point (−3 dB)	–	30	–	kHz

Focus drive amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{FD(off)}$	FEAO grounded, measured at FDO	−110	0	110	mV
Voltage gain	G_{VFD}	FEAO input	21.0	22.5	24.0	dB
LOW-level search voltage	V_{FSL}	V_{FOCUS} = 5 V, V_{FD+} = 1.5 V	−3.1	−2.0	−0.9	V
HIGH-level search voltage	V_{FSH}	V_{FOCUS} = 5 V, V_{FD+} = 3.5 V	0.9	2.0	3.1	V

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Tracking error amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{TE(off)}$	5 kΩ resistor between FN and FO, 10 kΩ resistor between FN and ground, E and F open, measured at TEAO	−200	0	200	mV
Voltage gain	G_{VTE}	5 kΩ resistor between FN and FO, 10 kΩ resistor between FN and ground, E and F open, f = 1 kHz	1.0	4.5	8.0	dB
Voltage gain differential	ΔG_{VTE}	5 kΩ resistor between FN and FO, 10 kΩ resistor between FN and ground	−1	0	1	dB
Cutoff frequency	$f_{TE(co)}$	Measured at the half-power point (−3 dB)	–	30	–	kHz

Tracking error preamplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{TP(off)}$	5 kΩ resistor between FN and FO, 10 kΩ resistor between FN and ground, measured at TPAO	−350	0	350	mV
Voltage gain	G_{VTP}	5 kΩ resistor between FN and FO, 10 kΩ resistor between FN and ground, TPA+ open, 1 MΩ resistor between E and F, f = 1 kHz	7.0	10.5	14.0	dB

Tracking detector amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{TD(off)}$	200 kΩ resistor between TOFS and ground, measured at TDO	−120	0	120	mV
Voltage gain	G_{VTD}	200 kΩ resistor between TOFS and ground, TOFS input, TD− open	16.5	18.0	19.5	dB

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Peak hold circuit

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{PH(off)}$	I_{FIN1} = I_{FIN2} = 7.3 μA, measured between PH and RFSM	−0.2	−0.1	0.1	V

RF detector

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
LOW-level threshold voltage	$V_{DRFL(TO)}$	The voltage on PH at which DRF goes LOW	–	–	0.5	V
		The voltage between PH and VREF1 at which DRF goes LOW. REF1, REF2 and REF3 open	–	–	0.28	
HIGH-level threshold voltage	$V_{DRFH(TO)}$	The voltage on PH at which DRF goes HIGH	1.15	–	–	V
		The voltage between PH and VREF1 at which DRF goes HIGH. REF1, REF2 and REF3 open	0.72	–	–	
LOW-level output voltage	$V_{DRF(OL)}$		–	0	0.6	V
HIGH-level output voltage	$V_{DRF(OH)}$		4.0	4.1	4.6	V

Focus zero-crossing detector

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
LOW-level threshold voltage	$V_{FZDL(TO)}$	1 MΩ FIN2 input resistor, the voltage on FEAO at which FZD goes LOW	–	–	−0.85	V
HIGH-level threshold voltage	$V_{FZDH(TO)}$	1 MΩ FIN2 input resistor, the voltage on FEAO at which FZD goes HIGH	−0.35	–	–	V
LOW-level output voltage	$V_{FZD(OL)}$		–	0	0.6	V
HIGH-level output voltage	$V_{FZD(OH)}$		4.0	4.1	4.6	V

Bottom hold circuit

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{BH(off)}$	I_{FIN1} = I_{FIN2} = 7.3 µA, measured between BH and RFSM	−0.2	−0.1	0.1	V

High-frequency level comparator

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
LOW-level threshold voltage	$V_{HFL(TO)}$	V_{PH} = 0 V, the voltage on BH at which HFL goes LOW	–	–	−0.7	V
HIGH-level threshold voltage	$V_{HFH(TO)}$	V_{PH} = 0 V, the voltage on BH at which HFL goes HIGH	−0.3	–	–	V
LOW-level output voltage	$V_{HF(OL)}$		–	0	0.6	V
HIGH-level output voltage	$V_{HF(OH)}$		4.0	4.1	4.6	V

Tracking error slice comparator

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
LOW-level threshold voltage	$V_{TESL(TO)}$	100 kΩ TES1 input resistor, the voltage on TES1 at which TES goes LOW	1.0	1.7	2.5	V
HIGH-level threshold voltage	$V_{TESH(TO)}$	100 kΩ TES1 input resistor, the voltage on TES1 at which TES goes HIGH	2.5	3.5	4.0	V
LOW-level output voltage	$V_{TES(OL)}$		0	0.2	1.0	V
HIGH-level output voltage	$V_{TES(OH)}$		4.0	4.1	4.6	V

Jump pulse amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{JP(off)}$	Measured at JPO	−20	0	20	mV
LOW-level output voltage	$V_{JP(OL)}$	JP− = 5 V	−3.55	−3.20	−2.85	V
HIGH-level output voltage	$V_{JP(OH)}$	JP+ = 5 V	2.85	3.20	3.55	V

Servo pulse amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{SP(off)}$	Measured at SPO	−20	0	20	mV
LOW-level output voltage	$V_{SP(OL)}$	V_{CLV-} = 5 V	−3.55	−3.20	−2.85	V
HIGH-level output voltage	$V_{SP(OH)}$	V_{CLV+} = 5 V	2.85	3.20	3.55	V

Spindle drive amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{SPD(off)}$	51 kΩ resistor between SPD− and SPDO, measured at SPDO	−110	0	110	mV
Voltage gain	G_{VSPD}	51 kΩ resistor between SPD− and SPDO, 51 kΩ SPD− input resistor	−1.5	0	1.5	dB

Sled amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{SLD(off)}$	SLEQ grounded, measured at SLDO	−60	0	60	mV
Output voltage with gain	$V_{SLD(G)}$	SLEQ grounded, I_{SL+} = 10 μA	1.2	1.9	2.6	V

VCO control amplifier

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Quiescent output voltage	$V_{VCOC(O)}$	Measured at VCOC	2.3	2.5	2.7	V
Output voltage with gain	$V_{VCOC(G)}$	I_{PDO} = 10 μA	3.15	3.50	3.85	V

Slice level comparator amplifier

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V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Output voltage	$V_{SLC(O)}$	10 kΩ resistor between SLCO and EFMO− 10 kΩ resistor between EFMO+ and 2.5 V reference	2.4	2.5	2.6	V

Focus switch

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{FSW(off)}$	V_{FOCS} = 5 V, measured at FEAO	−20	0	20	mV
Focus switch OFF threshold voltage	$V_{FSW1(TO)}$	The voltage on FOCS at which the focus switch turns OFF	−	−	1.0	V
Focus switch ON threshold voltage	$V_{FSW2(TO)}$	The voltage on FOCS at which the focus switch turns ON	4.0	−	−	V

Tracking OFF switch

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{TFS(off)}$	V_{TOFF} = 5 V, 200 kΩ TOFS input resistance, V_{TOFS} = 0.126 V	−20	80	160	mV
Tracking OFF switch OFF threshold voltage	$V_{TFS1(TO)}$	The voltage on TOFF at which the tracking OFF switch turns OFF	−	−	1.0	V
Tracking OFF switch ON threshold voltage	$V_{TFS2(TO)}$	The voltage on TOFF at which the tracking OFF switch turns ON	4.0	−	−	V

Tracking hold switch

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{THS(off)}$	56 kΩ resistor between THDS and 5 V reference, V_{THLD} = 5 V, measured at THDS	−60	0	60	mV
Tracking hold switch OFF threshold voltage	$V_{THS1(TO)}$	The voltage on THLD at which the tracking hold switch turns OFF	–	–	1.0	V
Tracking hold switch ON threshold voltage	$V_{THS2(TO)}$	The voltage on THLD at which the tracking hold switch turns ON	4.0	–	–	V

Tracking servo gain switch

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Tracking gain LOW-level switch OFF threshold voltage	$V_{TGS1(TO)}$	The voltage on TGL at which the tracking gain LOW-level switch turns OFF	–	–	1.0	V
Tracking gain LOW-level switch ON threshold voltage	$V_{TGS2(TO)}$	The voltage on TGL at which the tracking gain LOW-level switch turns ON	4.0	–	–	V

Sled amplifier OFF switch

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Sled OFF switch OFF threshold voltage	$V_{SFS1(TO)}$	The voltage on FEEDOF at which the sled OFF switch turns OFF	–	–	0.5	V
Sled OFF switch ON threshold voltage	$V_{SFS2(TO)}$	The voltage on FEEDOF at which the sled OFF switch turns ON	2.0	–	–	V

Automatic laser power control circuit

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Start voltage P	$V_{APCP(S)}$	LDC open, V_{LDD} = −3 V, measured on LDS	−4.95	−4.91	−4.87	V
End voltage P	$V_{APCP(E)}$	LDC open, V_{LDD} = 3 V, measured on LDS	−4.85	−4.81	−4.77	V

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Start voltage N	$V_{APCN(S)}$	LDC grounded, V_{LDD} = 3 V, measured on LDS	–4.93	–4.89	–4.85	V
End voltage N	$V_{APCN(E)}$	LDC grounded, V_{LDD} = –3 V, measured on LDS	–4.87	–4.83	–4.79	V
OFF voltage P	$V_{APCP(OFF)}$	LDC open, V_{LASER} = 5 V	4.0	4.6	5.0	V
OFF voltage N	$V_{APCN(OFF)}$	LDC grounded, V_{LASER} = 5 V	–5.0	–4.3	–4.0	V
Automatic power control OFF threshold voltage	V_{APC1}	The voltage on LASER at which the focus switch turns OFF and the automatic power control circuit turns ON	–	–	1.0	V
Automatic power control ON threshold voltage	V_{APC2}	The voltage on LASER at which the focus switch turns ON and the automatic power control circuit turns OFF	4.5	–	–	V

Defect detector circuit

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = –5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Offset voltage	$V_{DF(off)}$	I_{FIN1} = I_{FIN2} = 7.3 µA, 10 kΩ resistor between FEFO and ground	0.2	0.4	0.6	V
LOW-level output voltage	$V_{DF(OL)}$		–	0	0.2	V
HIGH-level output voltage	$V_{DF(OH)}$		4.0	4.8	5.0	V

Shock detector circuit

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = –5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Quiescent voltage	$V_{SH(OFF)}$	Measured on ATSC	2.3	2.5	2.7	V
Detector LOW-level threshold voltage	$V_{SHCL(TO)}$	ATSC– current (between 0 and –15 µA) at which V_{THDS} = 4 V	–9.0	–7.5	–6.0	µA
Detector HIGH-level threshold voltage	$V_{SHCH(TO)}$	ATSC– current (between 0 and –15 µA) at which V_{THDS} = 4 V	6.0	7.5	9.0	µA

Voltage-controlled oscillator

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Free-running frequency	f_{VCO}	LC7860/65 grounded, f_{CLK} = 4.3224 MHz, V_{2FREQ} = 0 V, 160 kΩ resistor between LF1 and 5 V	8.14	8.64	9.14	MHz
		$V_{LC7860/65}$ = 5 V, f_{CLK} = 2.1609 MHz, V_{2FREQ} = 0 V, 160 kΩ resistor between LF1 and 5 V	8.14	8.64	9.14	
Maximum adjustment frequency	Δf_{VCO}	V_{PDO} = 2 V, $V_{LC7860/65}$ = 5 V, f_{CLK} = 2.1609 MHz, V_{2FREQ} = 0 V, 160 kΩ resistor between LF1 and 5 V	0.60	0.95	–	MHz
Minimum adjustment frequency	Δf_{VCO2}	V_{PDO} = 3 V, $V_{LC7860/65}$ = 5 V, f_{CLK} = 2.1609 MHz, V_{2FREQ} = 0 V, 160 kΩ resistor between LF1 and 5 V	–	−0.95	−0.60	MHz
Output voltage	$V_{VCO1(O)}$	$V_{LC7860/65}$ = 5 V, f_{CLK} = 2.1609 MHZ, V_{2FREQ} = 5 V, 160 kΩ resistor between LF1 and 5 V	0.5	2.0	4.0	V_{p-p}
	$V_{VCO2(O)}$	$V_{LC7860/65}$ = 5 V, f_{CLK} = 2.1609 MHz, V_{2FREQ} = 0 V, 160 kΩ resistor between LF1 and 5 V	0.5	2.0	4.0	V_{p-p}

Reference voltage

V_{CC} = 5 V, V_{DD} = 5 V, V_{EE} = −5 V, T_a = 25 °C, V_{REF1} = V_{REF2} = V_{REF3} = 0 V unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
VREF1 reference voltage	V_{REF1}	Measured at VREF1 with VREF1 open	−3.55	−3.30	−3.05	V
VREF3 reference voltage	V_{REF3}	Measured at VREF3 with VREF2 and VREF3 open	−0.15	0	0.15	V

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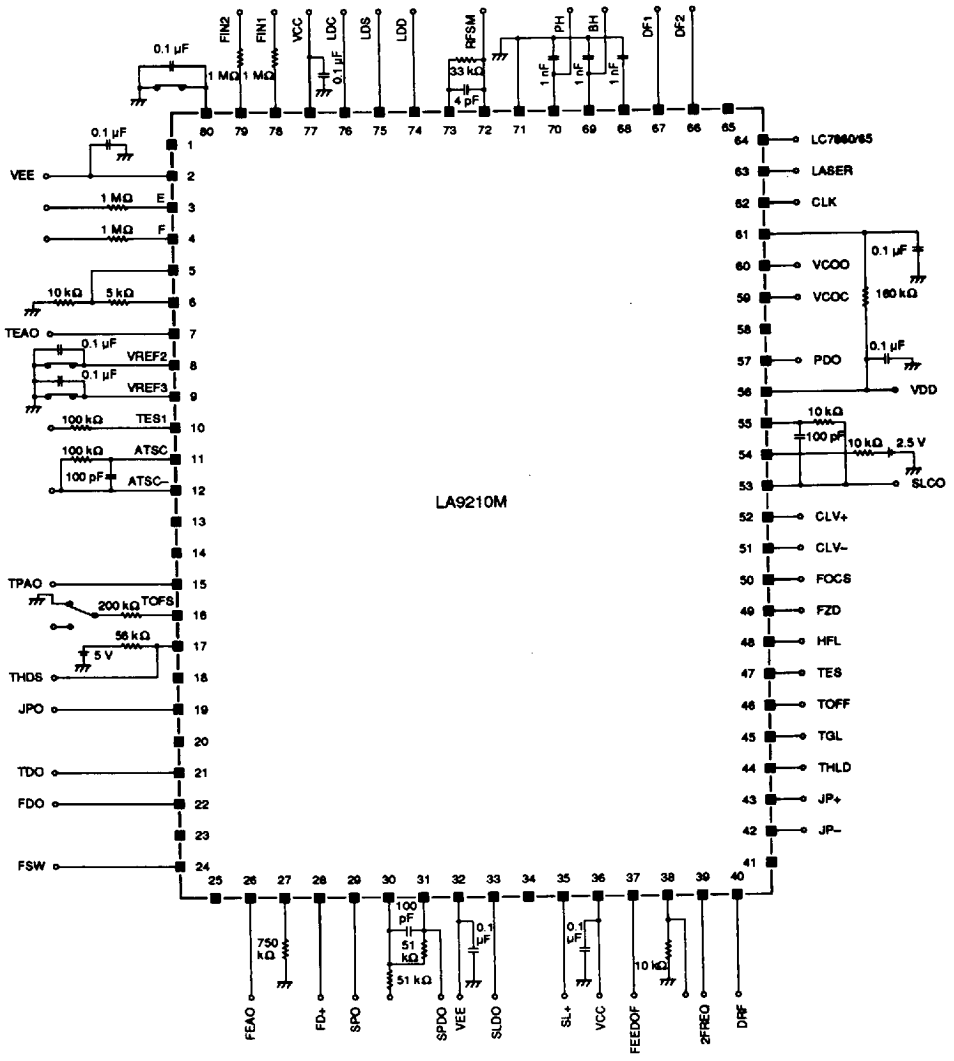
Measurement Circuit



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Typical Performance Characteristics

Power dissipation vs. ambient temperature