

COLOR TELEVISION

SERVICE MANUAL

MODEL NO. PF29GA18A

CHASSIS NO. ETA-1D

Please read this manual carefully before service.

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SAFETY INSTRUCTIONS AND MAINTENANCE

WARNING: BEFORE SERVICING THIS CHASSIS, READ THE "X-RAY RADIATION PRECAUTION", "SAFETY PRECAUTION" AND "PRODUCT SAFETY NOTICE INSTRUCTION BELOW.

X-RAY RADIATION PRECAUTION

1. The EHT must be checked every time the TV is serviced to ensure that the CRT does not emit X-ray radiation as result of excessive EHT voltage. The maximum EHT voltage permissible in any operating circumstances must not exceed the rated value. When checking the EHT, use the High Voltage Check procedure in this manual using an accurate EHT voltmeter.
2. The only source of X-RAY radiation in this TV is the CRT. The TV minimizes X-RAY radiation, which ensures safety during normal operation. To prevent X-ray radiation, the replacement CRT must be identical to the original fitted as specified in the parts list.
3. Some components used in this TV have safety related characteristics preventing the CRT from emitting X-ray radiation. For continued safety, replacement component should be made after referring the PRODUCT SAFETY NOTICE below.
4. Service and adjustment of the TV may result in changes in the nominal EHT voltage of the CRT anode. So ensure that the maximum EHT voltage does not exceed the rated value after service and adjustment.

SAFETY PRECAUTION

WARNING: REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

1. The TV has a nominal working EHT voltage. Extreme caution should be exercised when working on the TV with the back removed.
 - 1.1 Do not attempt to service this TV if you are not conversant with the precautions and procedures for working on high voltage equipment.
 - 1.2 When handling or working on the CRT, always discharge the anode to the TV chassis before removing the anode cap in case of electric shock.
 - 1.3 The CRT, if broken, will violently expel glass fragments. Use shatterproof goggles and take extreme care while handling.
 - 1.4 Do not hold the CRT by the neck as this is a very dangerous practice.
2. It is essential that to maintain the safety of the customer all power cord forms be replaced exactly as supplied from factory.
3. Voltage exists between the hot and cold ground when the TV is in operation. Install a suitable isolating transformer of beyond rated overall power when servicing or connecting any test equipment for the sake of safety.

4. When replacing ICs, use specific tools or a static-proof electric iron with small power (below 35W).
5. Do not use a magnetized screwdriver when tightening or loosening the deflection yoke assembly to avoid electronic gun magnetization and decrement in convergence of the CRT.
6. When remounting the TV chassis, ensure that all guard devices, such as nonmetal control buttons, switch, insulating sleeve, shielding cover, isolating resistors and capacitors, are installed on the original place.
7. Replace blown fuses within the TV with the fuse specified in the parts list.
8. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols on the circuit diagram and parts list, it must be the company-approved type and must be mounted as the original.
9. Keep wires away from high temperature components.

PRODUCT SAFETY NOTICE

CAUTION: FOR YOUR PROTECTION, THE FOLLOWING PRODUCT SAFETY NOTICE SHOULD BE READ CAREFULLY BEFORE OPERATING AND SERVICING THIS TV SET.

1. Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols on the circuit diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.
2. Do not slap or beat the cabinet or CRT, since this may result in fire or explosion.
3. Never allow the TV sharing a plug or socket with other large-power equipment. Doing so may result in too large load, causing fire.
4. Do not allow anything to rest on or roll over the power cord. Protect the power cord from being walked on, modified, cut or pinched, particularly at plugs.
5. Do not place any objects, especially heavy objects and lightings, on top of the TV set. Do not install the TV near any heat sources such as radiators, heat registers, stove, or other apparatus that produce heat.
6. Service personnel should observe the SAFETY INSTRUCTIONS in this manual during use and servicing of this TV set. Otherwise, the resulted damage is not protected by the manufacturer.

SAFETY SYMBOL DESCRIPTION



The lightning symbol in the triangle tells you that the voltage inside this product may be strong enough to cause an electric shock. Extreme caution should be exercised when working on the TV with the back removed.



This is an international hazard symbol, telling you that the components identified by the symbol have special safety-related characteristics.



FDA

This symbol tells you that the critical components identified by the FDA marking have special safety-related characteristics.

UL

This symbol tells you that the critical components identified by the UL marking have special safety-related characteristics.

C UL

This symbol tells you that the critical components identified by the C-UL marking have been evaluated to the UL and C-UL standards and have special safety-related characteristics.

VDE

This symbol tells you that the critical components identified by the VDE marking have special safety-related characteristics.

MAINTENANCE

1. Place the TV set on a stable stand or base that is of adequate size and strength to prevent it from being accidentally tipped over, pushed off, or pulled off. Do not place the set near or over a radiator or heat register, or where it is exposed to direct sunlight.
2. Do not install the TV set in a place exposed to rain, water, excessive dust, mechanical vibrations or impacts.
3. Allow enough space (at least 10cm) between the TV and wall or enclosures for proper ventilation.
4. Slots and openings in the cabinet should never be blocked by clothes or other objects.
5. Please power off the TV set and disconnect it from the wall immediately if any abnormal condition are met, such as bad smell, belching smoke, sparkling, abnormal sound, no picture/sound/raster. Hold the plug firmly when disconnecting the power cord.
6. Unplug the TV set from the wall outlet before cleaning or polishing it. Use a dry soft cloth for cleaning the exterior of the TV set or CRT screen. Do not use liquid cleaners or aerosol cleaners.

ADJUSTMENTS

SET-UP ADJUSTMENTS

The following adjustments should be made when a complete realignment is required or a new picture tube is installed.

Perform the adjustments in the following order:

1. Color purity
2. Convergence
3. White balance

Notes:

The purity/convergence magnet assembly and rubber wedges need mechanical positioning.

For some picture tubes, purity/ convergence adjustments are not required.

1. **Color Purity Adjustment**

Preparation:

Before starting this adjustment, adjust the vertical sync, horizontal sync, vertical amplitude and focus.

- 1.1 Face the TV set north or south.
- 1.2 Connect the power plug into the wall outlet and turn on the main power switch of the TV set.
- 1.3 Operate the TV for at least 15 minutes.
- 1.4 Degauss the TV set using a specific degaussing coil.
- 1.5 Set the brightness and contrast to maximum.
- 1.6 Counter clockwise rotate the R /B low brightness potentiometers to the end and rotate the green low brightness potentiometer to center.
- 1.7 Receive green raster pattern signals.
- 1.8 Loosen the clamp screw holding the deflection yoke assembly and slide it forward or backward to display a vertical green zone on the screen. Rotate and spread the tabs of the purity magnet around the neck of the CRT until the green zone is located vertically at the center of the screen.
- 1.9 Slowly move the deflection yoke assembly forward or backward until a uniform green screen is obtained.
- 1.10 Tighten the clamp screw of the assembly temporarily. Check purity of the red raster and blue raster until purities of the three rasters meet the requirement.

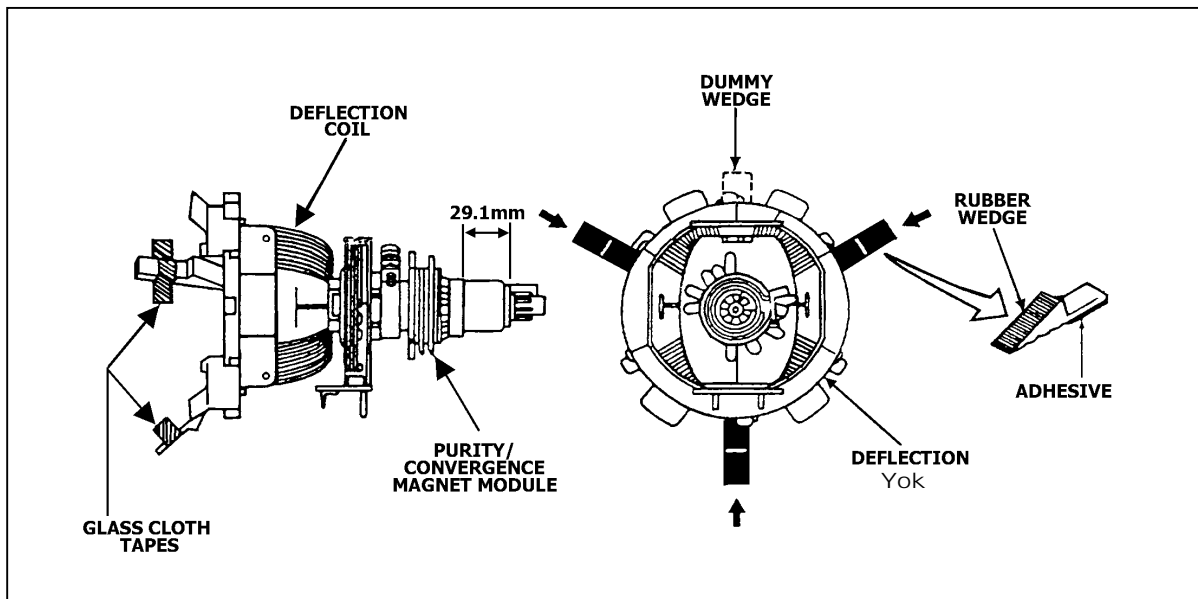


Fig. 1

2. Convergence Adjustment

Preparation:

Before attempting any convergence adjustment, the TV should be operated for at least 15 minutes.

2.1 Center convergence adjustment

2.1.1 Receive dot pattern.

2.1.2 Adjust the brightness/contrast controls to obtain a sharp picture.

2.1.3 Adjust two tabs of the 4-pole magnet to change the angle between them and red and blue vertical lines are superimposed each other on the center of the screen.

2.1.4 Turn both tabs at the same time keeping the angle constant to superimpose red and blue horizontal on the center of the screen.

2.1.5 Adjust two tabs of the 6-pole magnet to superimpose red/blue line and green line.

2.1.6 Remember red and blue movement. Repeat steps 2.1.3 ~ 2.1.5 until optimal convergence is obtained.

2.2 Circumference convergence adjustment

2.2.1 Loosen the clamp screw holding the deflection yoke assembly and allow it tilting.

2.2.2 Temporarily put the first wedge between the picture tube and deflection yoke assembly. Move front of the deflection yoke up or down to obtain better convergence in circumference. Push the mounted wedge in to fix the yoke temporarily.

2.2.3 Put the second wedge into bottom.

2.2.4 Move front of the deflection yoke to the left or right to obtain better convergence in circumference.

2.2.5 Fix the deflection yoke position and put the third wedge in either upper space. Fasten the

deflection yoke assembly on the picture tube.

- 2.2.6 Detach the temporarily mounted wedge and put it in either upper space. Fasten the deflection yoke assembly on the picture tube.
- 2.2.7 After fastening the three wedges, recheck overall convergence and ensure to get optimal convergence. Tighten the lamp screw holding the deflection yoke assembly.

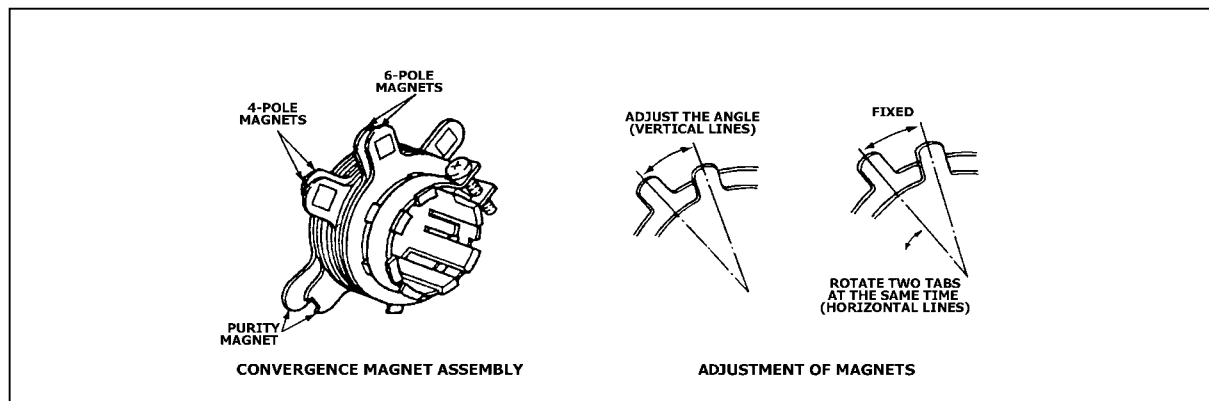


Fig. 2

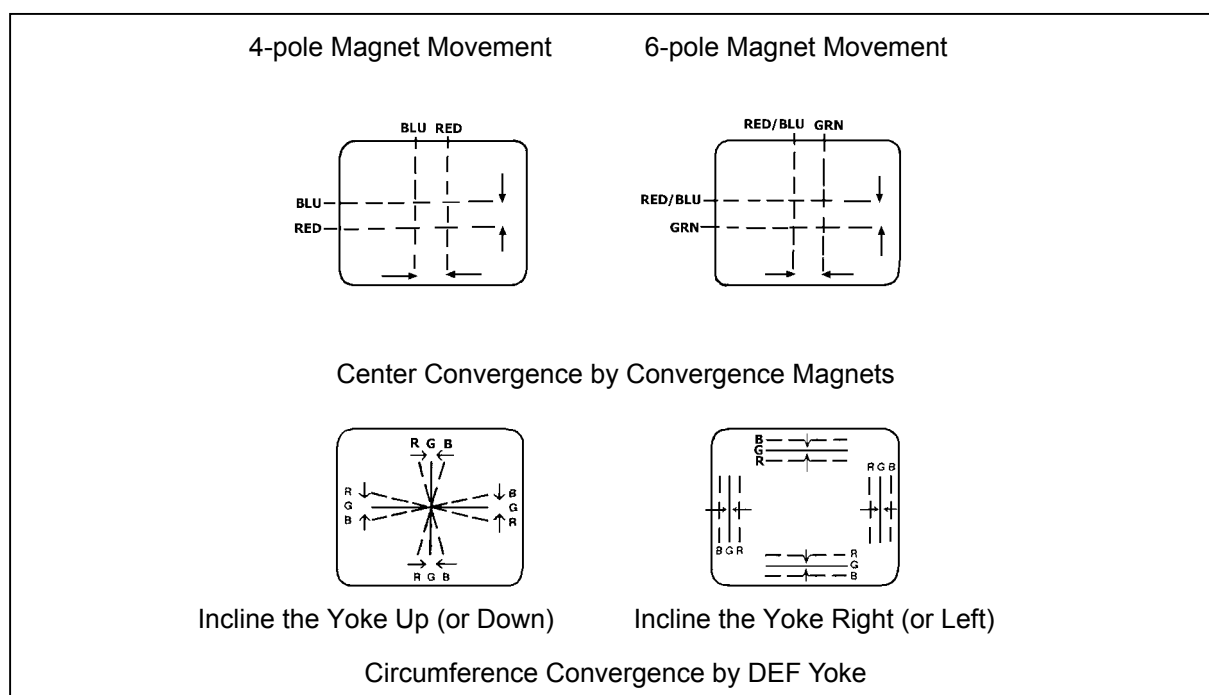


Fig.3

3. White Balance Adjustment

Generally, white balance adjustment is made with professional equipment. It's not practical to get good white balance only through manual adjustment. For TVs with I²C bus control, change the bus data to adjust white balance.

CIRCUIT ADJUSTMENTS

Preparation:

Circuit adjustments should be made only after completion of set-up adjustments.

Circuit adjustments can be performed using the adjustable components inside the TV set. For TVs with I²C bus control, first change the bus data.

1. Degaussing

A degaussing coil is built inside the TV set. Each time the TV is powered on, the degaussing coil will automatically degauss the TV. If the TV is magnetized by external strong magnetic field, causing color spot on the screen, use a specific degausser to demagnetize the TV in the following ways. Otherwise, color distortion will be shown on the screen.

- 1.1 Power on the TV set and operate it for at least 15 minutes.
- 1.2 Receive red full-field pattern.
- 1.3 Power on the specific degausser and face it to the TV screen.
- 1.4 Turn on the degausser. Slowly move it around the screen and slowly take it away from the TV.
- 1.5 Repeat the above steps until the TV is degaussed completely.

2. Confirmation and Adjustment for Voltage

Caution: +B voltage has close relation to high voltage. To prevent X-ray radiation, set +B voltage to the rated value.

- 2.1 Make sure that the supply voltage is within the range of the rated value.
- 2.2 Connect a digital voltmeter to the voltage output terminal of the main PCB. Power on the TV and set the brightness and sub-brightness to minimum. Ensure that the voltage from the main PCB reads as follows.
- 2.3 Regulate voltage adjustment components on the power section until the +B the voltage reaches the rated value.

Table 1

Test Point	Voltage (V)	Test Point	Voltage (V)
TP-130V (C821)	135V ± 1.5V	TP-18V (C824)	16V ± 1V
TP-17V (C822)	15V ± 1V	TP-5V-2 (C827)	5V ± 0.3V
TP-5V-1 (C828)	5V ± 0.3V	TP-8V (C826)	8V ± 0.5V
TP-11V (C823)	10.5V ± 0.5V	TP-26V (C461)	30V ± 3V
TP-200V (C463)	195V ± 5V		

Note:

It's impossible to check the power part separately from the main chassis board as the part is mounted on the main chassis board. The power components, etc. should be checked for burnout when power-on. If burned out, do not power on the TV again until the cause is found out.

3. High Voltage Inspection

Measure voltages of test points on the main PCB with the digital voltmeter. Measure the CRT high voltage with the high-voltage testing equipment and heater voltage with the high-frequency effective voltmeter. The rated values are shown as below.

Table 2

Test Point	Voltage (V)
Negative of VD461	$29 \pm 3V$
Negative of VD485	$195 \pm 5V$
CRT anode	$29.5 \pm 1.5KV$
Heater	$6.3 \pm 0.3V_{rms}$

4. Focus Adjustment

Caution: Dangerously high voltages are present inside the TV. Extreme caution should be exercised when working on the TV with the back removed.

4.1 After removing the back cover, look for the FBT on the main PCB. There should be a FCB on the FBT.

4.2 Power on the TV and preheat it for 15 min.

4.3 Receive a normal TV signal. Rotate knob of the FCB until you get a sharp picture.

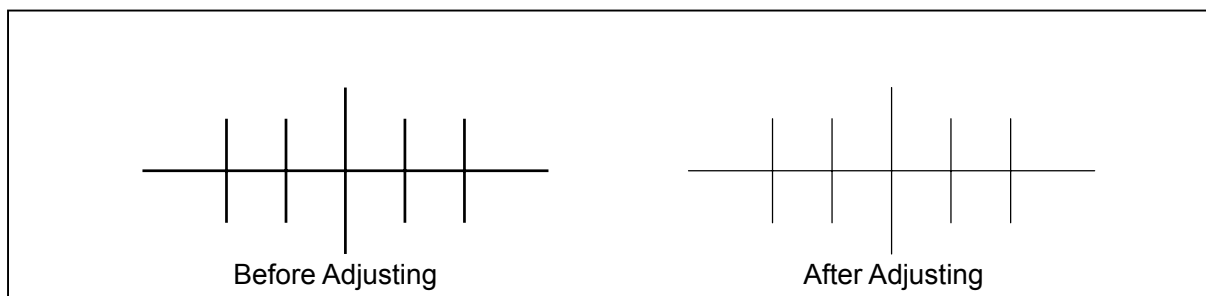


Fig. 4

5. Safety Inspection

5.1 Inspection for insulation and voltage-resistant

Perform safety test for all naked metal of the TV. Supply high voltage of 3000V AC, 50Hz (limit current of 10mA) between all naked metal and cold ground. Test every point for 3 sec. and ensure no arcing and sparking.

5.2 Requirements for insulation resistance

Measure resistance between naked metal of the TV and feed end of the power cord to be infinity with a DC-500 high resistance meter and insulation resistance between the naked metal and

degaussing coil to be over 20M Ω .

6. SERVICE mode

6.1 To enter the DESIGN/SERVICE mode

Set the volume to 0. Then press and hold the MUTE button on the remote control, and press the MENU button on the TV to enter the SERVICE mode. In this case, blue “D” is displayed on the upper center of the screen. To exit from the D mode, turn off the TV set by the POWER button on the remote control.

Caution: The user service mode adjustment can be changed only when service personnel adjust the whole set data during servicing. As the control data have dramatic effects on functions and performance of the TV, service personnel should not tell user how to enter the SERVICE mode to avoid improper data settings.

6.2 Adjustments and bus data (GDET0104-03)

Table 3 Function Description for Bus Data

	Symbol	Description	Data
PAGE1	OSD	OSD Horizontal Position	63
	OPT	Optional Setting	B7
	RCUT	R CUT OFF	OPT
	GCUT	G CUT OFF	OPT
	BCUT	B CUT OFF	OPT
	GDRV	G DRIVE	OPT
	BDRV	B DRIVE	OPT
	SCNT	SUB CONTRAST	08
PAGE2	CNTN	CONTRAST MIN	0A
	CNTC	CONTRAST CENTER	3B
	CNTX	CONTRAST MAX	66
	CNTD	CONTRAST MAX IN DVD	F7
	BRTN	BRIGHT MIN.(difference from center)	35
	BRTC	BRIGHT CENTER	35
	BRTX	BRIGHT MAX.(difference from center)	15
	BRTS	SUB BRIGHT	OPT
PAGE3	COLC	COLOR CENTER NTSC	33
	COLP	COLOR CENTER PAL(difference from COLC)	05
	COLD	COLOR CENTER DVD	05
	COLN	COLOR MIN.	0D
	COLX	COLOR MAX.(difference from center)	5D
	TNTN	TINT MIN.(difference from center)	28
	TNTC	TINT CENTER	40
	TNTX	TINT MAX.(difference from center)	28
PAGE4	ST3	SHARP CENTER 3.58NTSC TV	15
	ST4	SHARP CENTER OTHER TV	15
	SV3	SHARP CENTER 3.58NTSC VIDEO	15
	SV4	SHARP CENTER OTHER VIDEO	15
	SVD	SHARP CENTER DVD	15
	ASSH	ASYMMETRY-SHARPNESS	05

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	SHPN	SHARP MIN(difference from center)	0A
	SHPX	SHARP MAX(difference from center)	0A
PAGE5	ABCL	ABL date in detail	0F
	DCBS	A part of Video date in detail	15
	CLTB	The date when TV mode & SOUND SYS = B/G	60
	CLTD	The date when TV mode & SOUND SYS = D/K	88
	CLTM	The date when TV mode & SOUND SYS = M	AC
	CLVO	The date when YUV mode & SOUND SYS != M	AD
	CLVD	The date when YUV mode & SOUND SYS = M	88
	OSDA	OSD ABL and OSD CONTRAST	01
PAGE6	HPOS	Horizontal Position	OPT
	HPS	Horizontal Position 60Hz(difference from HPOS)	OPT
	VP50	Vertical Position 50Hz	OPT
	VP60	Vertical Position 60Hz	OPT
	HIT	Hight 50Hz	OPT
	HITS	Hight 60Hz(difference from HIT)	OPT
	VLIN	V Linearity 50Hz	OPT
	VLIS	V Linearity 60Hz(difference from VLIN)	OPT
PAGE7	VSC	VS Correction 50Hz	OPT
	VSS	VS Correction 60Hz	OPT
	HBOW		OPT
	HPARA		OPT
	UBLACK		08
	VBLACK		08
	AGC	RF AGC	30
	HAFC	AFC GAIN	86
PAGE8	NOIS		0F
	NDTC	Noise detection count test	1F
	MUTT	Y-MUTE FOR SOFT START	00
	STAT	CONTRAST UP FOR SOFT START	00
	VL1	ALC off volume control level	09
	VL25	No use	30
	VL50	No use	40
	VLX	No use	5A
PAGE9	VA1	volume level when ALC on(IC VER1.2_old)	10
	VA12	No use	25
	VA25	No use	3D
	VA50	No use	57
	VAX	No use	7F
	SVM	MON/SVM CO MAX SVM DL SVM GAIN	10
	VBLK	V BLK start V BLK stop	00
	VCEN	V CENTERING	13
PAGE10	VB1	volume level when ALC on(IC VER1.2_new)	09
	VB25	No use	30
	VB50	No use	4A
	VBX	No use	60
	FLG0	FLAGS for IF	44
	FLG1	FLAGS	02
	UCOM	Miciom control	00

(continued)

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	OSDF	OSD PLL DATE	7F
PAGE11	TB_COL	Menu top OSD area plane color set	88
	BB_COL	Menu itmes OSD area plane color set	88
	CL_COL1	Calendar OSD color	01
	CL_COL2	Calendar OSD color	56
	PYNX	Normal H.SYNC max	15
	PYNN	Normal H.SYNC min	11
	PYXS	Search H.SYNC max	22
	PYNS	Search H.SYNC min	12
PAGE12	RCUTS	R cut offset in DVD	00
	GCUTS	G cut offset in DVD	00
	BCUTS	B cut offset in DVD	00
	GDRVS		00
	BDRVS		00
	AUSTP		04
	BBCT		06
PAGE13	STBG	S TRAP B/G	06
	STI	S TRAP I	08
	STDK	S TRAP D/K	08
	STM	S TRAP M	05
	SSBG	S TRAP HP/LP B/G	08
	SSI	S TRAP HP/LP I	08
	SSDK	S TRAP HP/LP D/K	08
	SSM	S TRAP HP/LP M	10
PAGE14	SYNC		00
	SYBBN	BB judgement	44
	SYBBF	BB judgement	40
	SYSR	Set WIN Pulse and HLOCK Pulse	4C
	VCD0		00
	VCD1		00
	BL25	Balance 25	1E
	BL49	Balance 49	50
PAGE15	MODE0		29
	MODE1		0F
	OV50		00
	OV60		00
	HOTEL		00
	FM RADIO		01
	SOUND M		01
	SCR SAV		01
PAGE16	ENGLISH		01
	FRENCH		01
	GERMAN		01
	RUSSIAN		01
	INDONESIAN		01
	MALAY		01
	ARABIC		01
	FARSI		01
PAGE17	INITIAL		00
	LOCK MENU		01
	CALENDAR		01
	SEC-COL		02
	DEMOKEY		01
	SVIDEO		01
	DVDVIDEO		01
	LOGO		00

(continued)

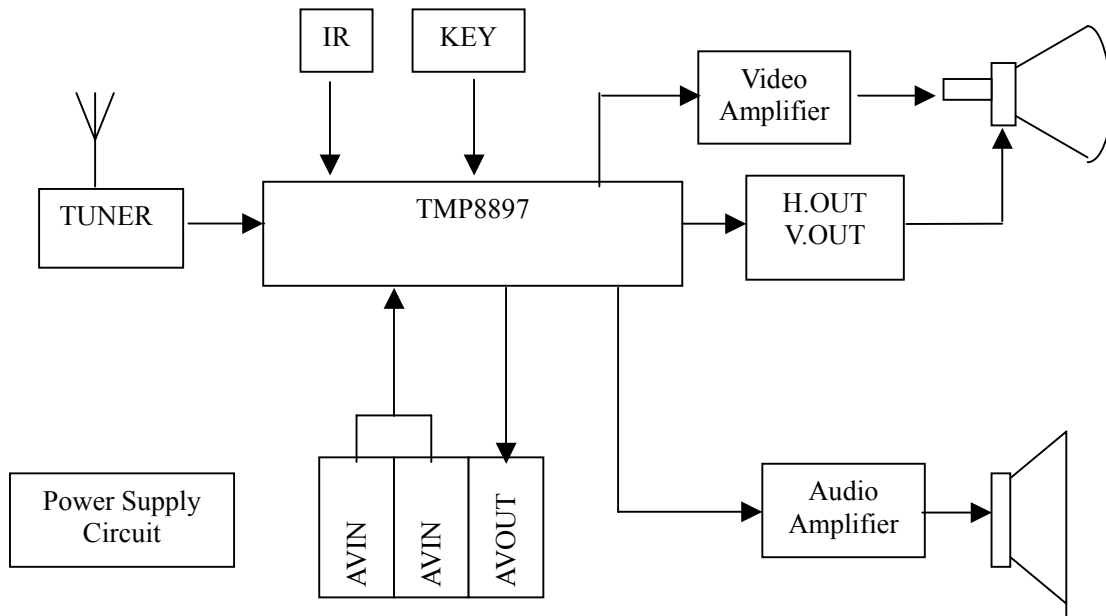
PAGE18	LOGO1COLOR		OPT
	LOGO2COLOR		OPT
	LOGO1LINE		OPT
	LOGO2LINE		OPT
	LOGO1SIZE		OPT
	LOGO2SIZE		OPT
	LG1		OPT
	LG2		OPT
PAGE19	WID		OPT
	WIDS		OPT
	DPC		OPT
	DPCS		OPT
	KEY		OPT
	KEYS		OPT
	ECCT		OPT
	ECCB		OPT
PAGE20	HEHT		04
	DPC69		OPT
	HIT69		OPT
	TREC		30
	TREX		60
	VEHT		00
	SBY		08
	SRY		08
PAGE21	SECD		10
	SEC29		00
	BASC		40
	BASX		70
	MODE3		01
	BALC		40
	FVOL		13
	NVOL		5F

Notes:

- ① The data sheet may differ dependent on different models.
- ② The data sheet may differ dependent on different CRTs for the same model.

STRUCTURE AND CHISSIS FUNCTION DESCRIPTION

1.STRUCTUE BLOCK DIAGRAM



Structure Block Diagram for ETA-1D Chassis Series

2. CHASSIS DESCRIPTION

General Description

ETA-1D chassis is applied in PF29GA18A series.

By use of Toshiba V/C/D-MCU 2IN1 IC for TV small signal processing and bus control, the chassis enables TV tuning, adjustment, control and picture correction, featuring high-integration, high-performance-to-price ratio and high-reliability and compact circuit with fewer external components. The chassis, widely used in small and medium TVs, provides much more convenience for manufacturing and technical service. It includes:

- 2IN1 IC 8897PSBNG-4VB6 for PAL/NTSC small signal processing and bus control
- EEPROM AT24C16 for data memory
- LA78041 for vertical output power amplifying
- LA42102 for audio power amplifying
- TA1343N for audio processor
- FSCQ1265RTYDTU for power circuit adjustment and control

The following features are available in the chassis:

- Color systems: PAL, NTSC
- Sound systems: D/K B/G I M
- 236 programs preset
- AV stereo
- I²C bus control
- Electronic program table
- Intelligent lock
- Biorhythm
- Calendar inquiry

The chassis mainly uses the following ICs and assemblies.

Table 5 Key ICs and Assemblies

Serial No.	Position	Type	Description
1	N201	AT24C16	EERPOM
2	N202	GDET0104-03 (TMPA8897PSANG)	2IN1 IC (Small signal processor + micro control unit (MCU))
3	N603	LA42102	Audio power amplifier
4	N301	LA78041	Vertical scan output stage circuit
5	N801	FSCQ1265RTYDTU	Switch-mode power supply control
6	A001	TAF5-C4I23	Tuner

SERVICE DATA

TECHNICAL DATA OF KEY ICS

1.MCU and Signal Processor for a PAL/NTSC TV

TMPA8897CMANG /CPANG/CRANG /CSANG

1.General Description

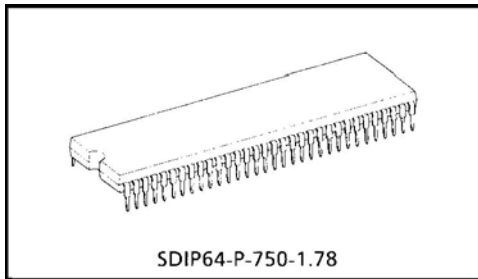
The TMPA8897CPANG is an integrated circuit for a PAL/NTSC TV. A MCU and a TV signal processor are integrated in a 64-pin shrink DIP package. The MCU contains 8-bit CPU, ROM, RAM, I/O ports, timer/counters, A/D converters, an on-screen display controller, remote control interfaces, IIC bus interfaces and the Closed Caption decoder. The TV signal processor contains PIF, SIF, Video, multi-standard chroma, Sync, RGB processors.

Mask ROM: TMPA8897CPBNG (ROM size: 48k)

Mask ROM: TMPA8897CRBNG (ROM size: 56k)

Mask ROM: TMPA8897CSBNG (ROM size: 64k)

OTP ROM: TMPA8897PSBNG (ROM size: 64k)



Weight: 8.85 g (typ.)

2.Features

MCU

- High speed 8-bit CPU (TLCS-870/X series)
- Instruction execution time: 0.5 μ s (at 8 MHz)
- (TMPA8873CPANG)
- 48-Kbytes ROM, 2-Kbytes RAM
- ROM correction
- 12 I/O ports
- 14-bit PWM output 1 ch for a voltage synthesizer
- 7-bit PWM output 1 channel
- 8-bit A/D converter 3 ch for a touch-key input with key ON wake-up CIRCUIT
- Remote control signal preprocessor
- Two 16-bit internal timer/counter 2 ch
- Two 8-bit internal timer/counter 2 ch
- Time base timer, watchdog timer
- 16 interrupt sources: external 5, internal 11
- IIC bus interface (multi-master)
- STOP and IDLE power saving modes

TV Processor

IF

- Integrated PIF VCO aligned automatically
- Negative demodulation PIF
- Multi-frequency SIF demodulator without external Tank-coil
- SIF BPF built-in
- SIF Trap filter built in

Video

- Integrated chroma traps
- Black stretch
- Y-gamma

Chroma

- Integrated chroma BPFs
- PAL/NTSC demodulation

CCD Decoder

- Digital data slicer for NTSC

OSD

- Clock generation for OSD display
- Clock generation for OSD display
- Font ROM characters: 384 characters
- Characters display: 32 columns \times 12 lines
- Composition: 16 \times 18 dots
- Size of character: 3 (line by line)
- Color of character: 8 (character by character)
- Display position: H 256/V 512 steps
- BOX function
- Fringing, smoothing, Italic, underline function
- Conform to CCD REGULATION
- Jitter elimination

RGB/Base-Band

- Integrated 1 H base-band delay line
- Base-band TINT control
- Internal OSD interface
- Half-tone and transparent for OSD
- External YCbCr interface for DVD
- RGB cut-off/drive controls by bus
- ABCL (ABL and ACL combined)

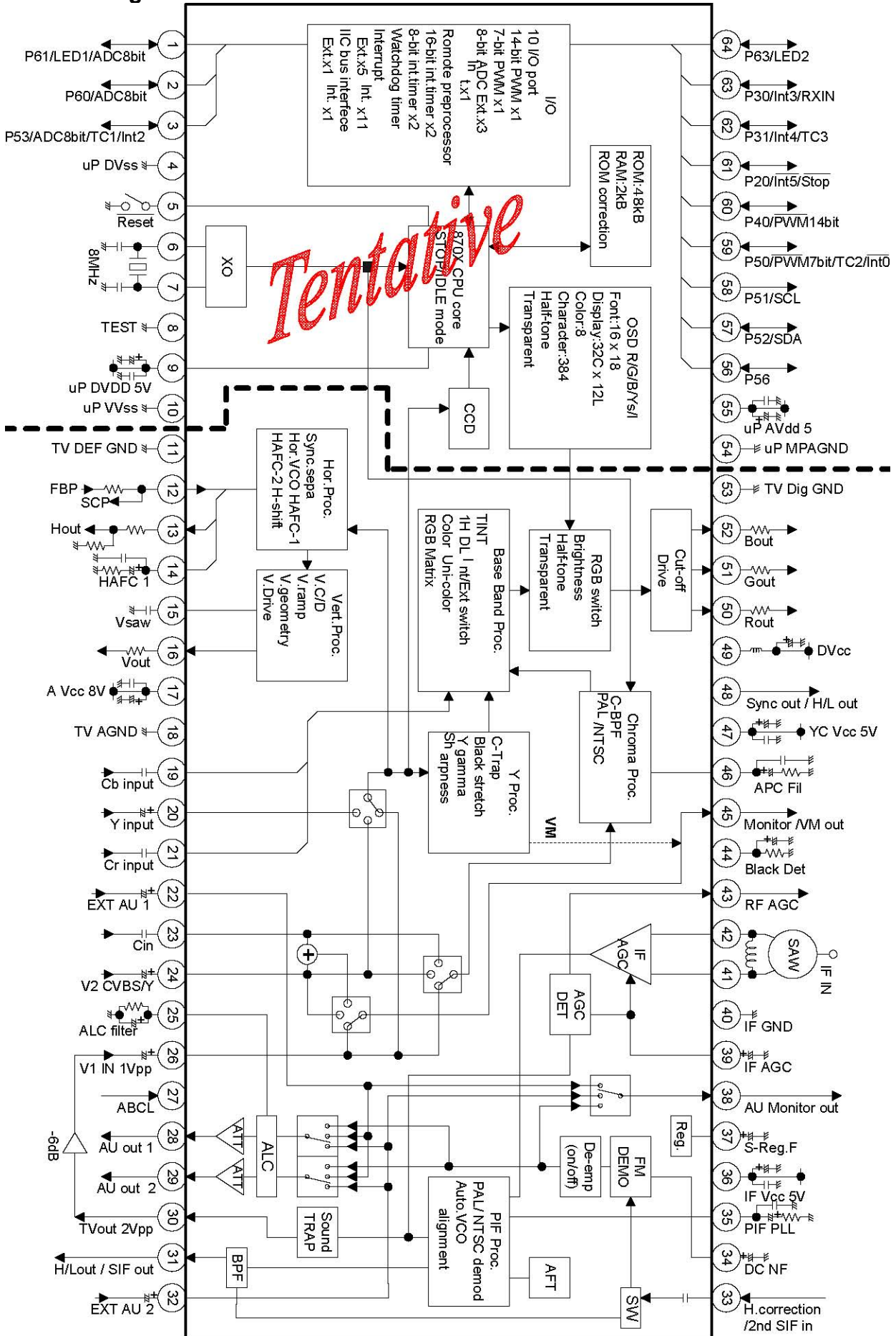
Sync.

- Integrated $f_{H} \times 640$ VCO
- DC coupled vertical ramp output (single)
- Sync output

AV Switch

- 2 for video
- 2 for audio(mono)
- or 1 for audio (Stereo, 2ch ATT), controlled by IIC bus
- ALC (Auto-Audio Level Control)

3. Block Diagram





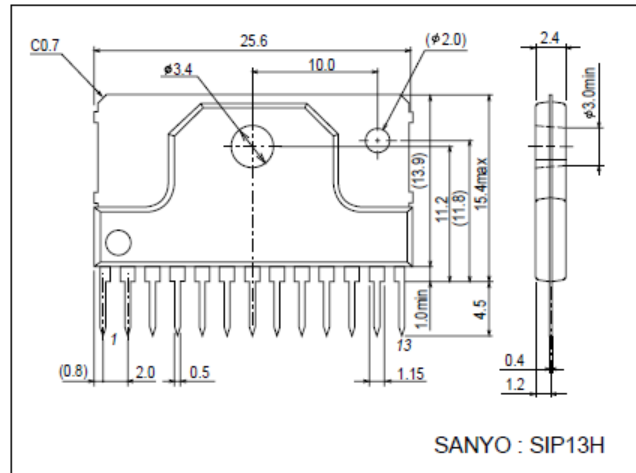
10W 2-Channel BTL Power Amplifier

Tentative

LA42000 series is power IC which made Pin compatible possible altogether in 3 to 20W.
 It enables communization of a set board.
 (mono, stereo, mono with volume function , stereo with volume function.)
 They realized PCB layout communalization of an audio power block of TV.

Package Dimensions

unit : mm
 3236



Functions

- Po 10W x 2ch ($V_{CC}=14V, R_L=8\Omega, THD=10\%$)
- Built-in Standby function.
- Built-in Mute function.
- Full complement of built-in protection circuits
 (Protection from shorting to ground, shorting to V_{CC} ,
 load shorting, and overheating.)

Maximum Ratings at $T_a=25^\circ C$

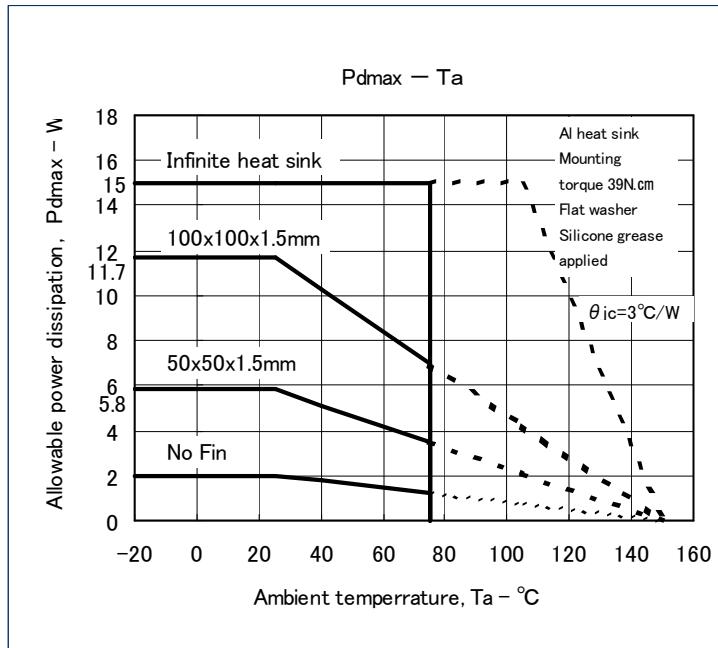
Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$	No signal	22	V
Allowable power dissipation	$Pd\ max$	Infinite heat sink	15	W
Maximum junction temperature	$Tj\ max$		150	$^\circ C$
Thermal resistance	θ_{jc}		3	$^\circ C/W$
Operating temperature	$Topr$		-25 to +75	$^\circ C$
Storage temperature	$Tstg$		-40 to +150	$^\circ C$

Operating Conditions at $T_a=25^\circ C$

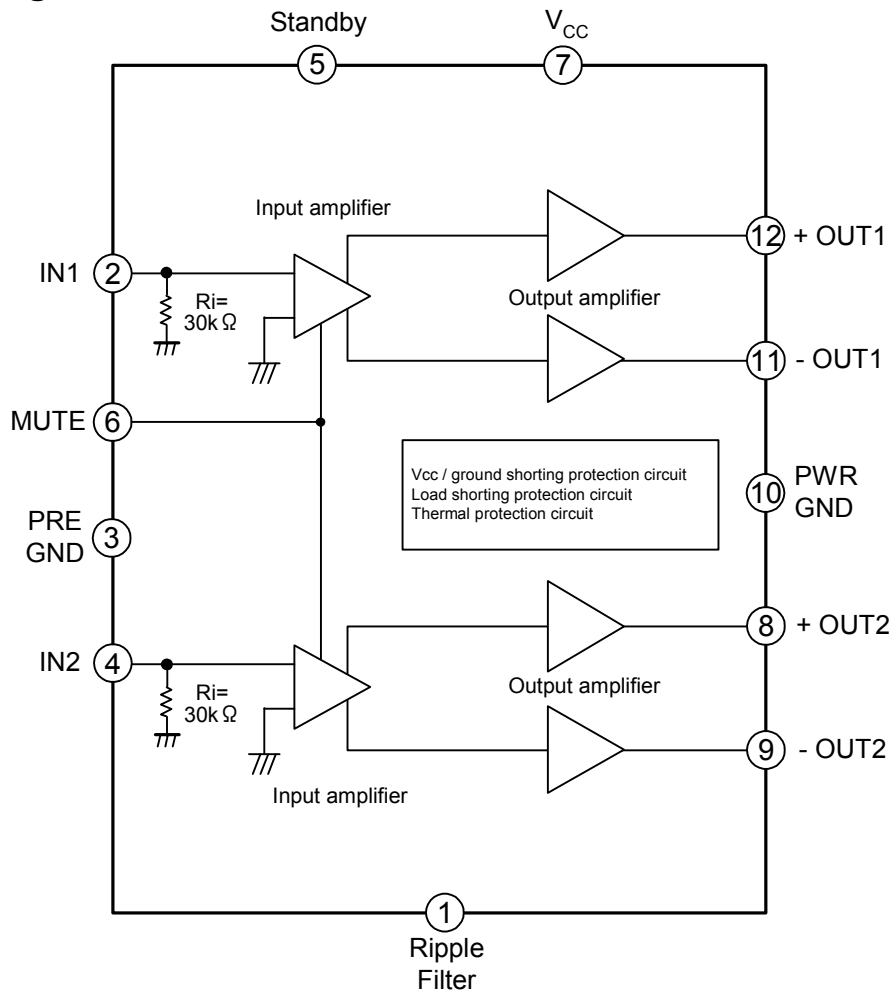
Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		14	V
Recommended load resistance	RL		8	Ω
Allowable operating voltage range	$V_{CC\ op}$		10 to 20	V

Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 14\text{V}$, $R_L = 8\ \Omega$, $f = 1\text{kHz}$, $R_g = 600\ \Omega$

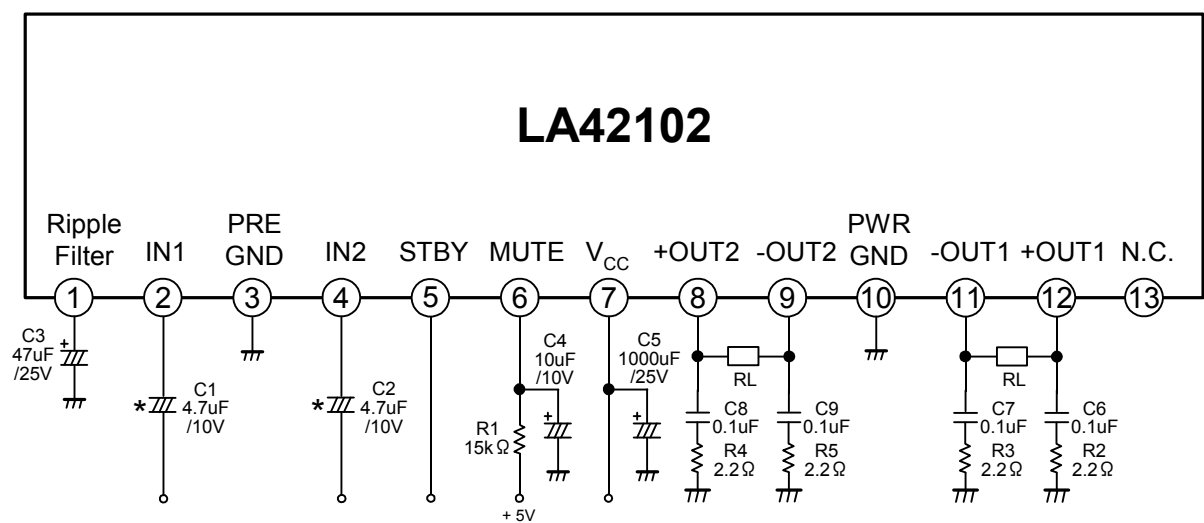
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Standby current	I_{STB}	Amplifier off	-	0	10	μA
Quiescent current	I_{CCO}	$R_g=0$, $R_L=\text{open}$		70		mA
Output power	P_o	THD=10%	8	10	-	W
Total harmonic distortion	THD	$P_o=1\text{W}$	-	0.06	0.2	%
Voltage gain	VG	$V_o=0\text{dBm}$	33	35	37	dB
Output noise voltage	V_{NO}	$R_g=0$, BPF=20Hz to 20kHz	-	0.2	0.4	mVrms
Ripple rejection	SVRR	$R_g=0$, $f_R=100\text{Hz}$, $V_{CCR}=0\text{dBm}$	40	50	-	dB
Channel separation	Sep.	$R_g=10\text{k}\ \Omega$, $V_o=0\text{dBm}$	50	60	-	dB
Muting attenuation	A_{TT}	$V_o=1\text{Vrms}$, BPF=20Hz to 20kHz	80	90	-	dB
Muting control voltage (The Pin 6 voltage)	$V_{MUTE} - H$	Muting on	1.7	-	3.0	V
	$V_{MUTE} - L$	Muting off	0	-	0.5	V
Standby control voltage (The Pin 5 voltage)	$V_{STB} - H$	Amplifier on	2.5	-	20	V
	$V_{STB} - L$	Amplifier off	0	-	0.5	V
Input resistance	R_i		21	30	39	$\text{k}\ \Omega$



Block Diagram



Equivalent Circuit



*The LA42102 uses a zero bias type input circuit, and the input pin potential is about zero volts.(0.01V)
 Determine the polarity orientation of these capacitors based on the DC current from the circuit
 Connected to the LA42102 front end.

TA1343N

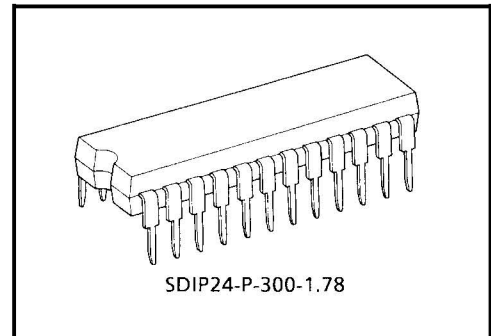
TV Sound Processor

TA1343N is a sound processor controlled by I²C bus. It incorporates the following: 2-channel input, 3-channel output signal processing circuit, phase shift circuit for surround, and LPF for woofer channel.

ALS (Automatic Level Suppressor) circuit which prevents distort the signal in large signal condition for woofer channel is also incorporated

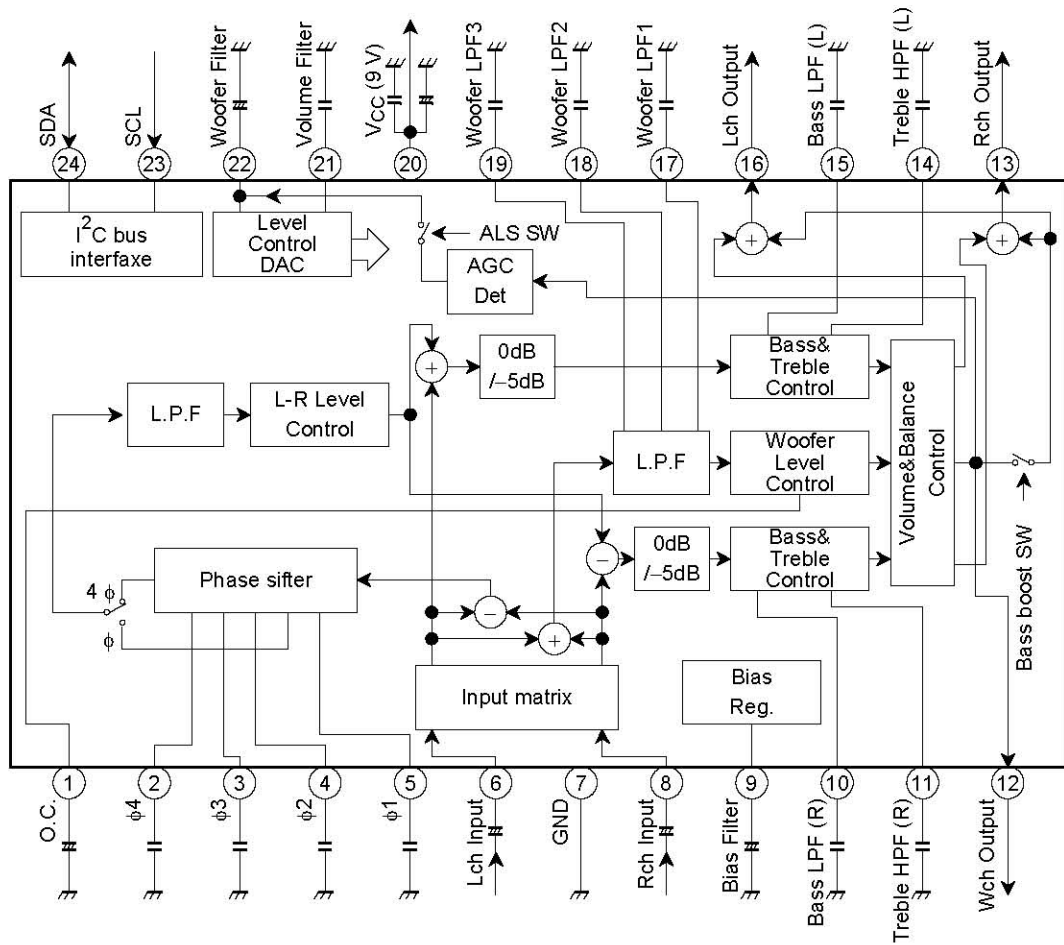
Features

- Sound processing circuit
 - 2 ch inputs (Lch, Rch)
 - 3 ch outputs (Lch, Rch, Wch)
 - Input matrix switch
 - Volume control
 - Bass, treble, and balance adjustment
 - Woofer level and surround effect level adjustment
 - ALS (automatic level suppresser) circuit
 - Built-in LPF for bass boost
- Surround circuit
 - Phase shift surround system
 - 2 modes stereo surround
 - Pseudo stereo mode



Weight: 1.22 g (typ.)

Block Diagram



5. VERTICAL SCAN OUTPUT STAGE CIRCUIT LA78040/LA78041

Both LA78040/LA78041 are vertical scan output stage power amplifiers. But there is a little bit difference between the two amplifiers, that is, LA78040 has supply voltage of 24V and output current of 1.8AP-P while LA78041 has supply voltage of 30V and output current of 2.2AP-P.

LA78040/LA78041 (N602)

Vertical Deflection Output Circuit

1) Features

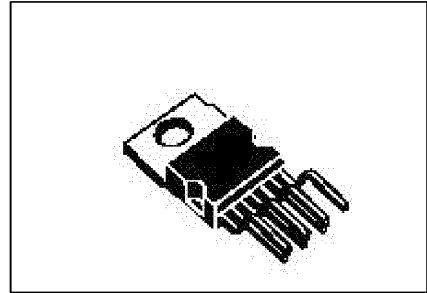
Low power dissipation due to built-in pump-up circuit

Vertical output circuit

Thermal protection circuit built in

Excellent crossover characteristics

DC coupling possible



Package Type:TO-220-7H

Fig.12

2) Block Diagram

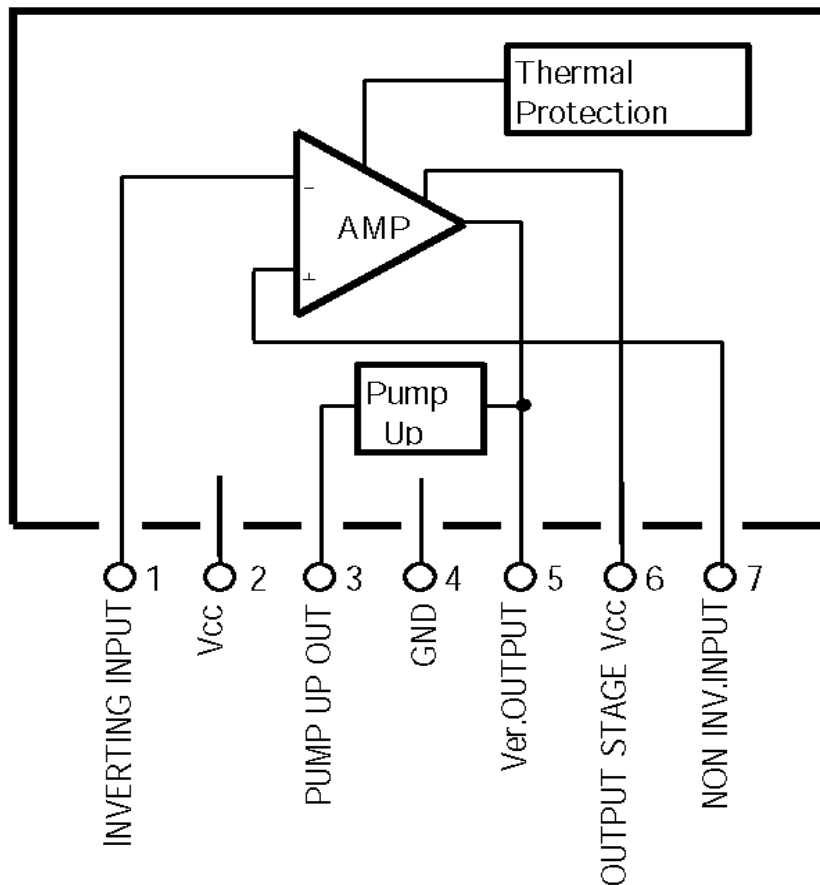


Fig.1 3 Block diagram

6. EEPROM AT24C04/08/16

1) Features

Low-voltage and Standard-voltage Operation

- 2.7 (V_{cc}=2.7V to 5.5V)

- 1.8 (V_{cc}=1.8V to 5.5V)

Internally Organized 128x8(1K), 256x8 (2K), 512x8 (4K),
1024x8 (8K) or 2048x8 (16K)

2-wire Serial Interface

Schmitt Trigger, Filtered Inputs for Noise Suppression

Bi-directional Data Transfer Protocol

100kHz (1.8V, 2.5V, 2.7V) and 400 kHz (5V) Compatibility

Write Protect Pin for Hardware Data Protection

8-byte Page (1K, 2K), 16-byte Page (4K, 8K, 16K) Write Modes

Partial Page Writes are Allowed

Self-timed Write Cycle (10 ms max)

High-reliability

- Endurance: 1 Million Write Cycles

- Data Retention: 100 Years

Automotive Grade and Extended Temperature Devices Available

8-lead PDIP, 8-lead JEDEC SOIC, 8-lead MAP and 8-lead TSSOP Package

2-wire

Serial EEPROM

AT24C01A 1K (128 x 8)

AT24C02 2K (256 x 8)

AT24C04 4K (512 x 8)

AT24C08 8K (1024 x 8)

AT24C16 6K (2048 x 8)

2) Description

The AT24C01A/02/04/08/16 provides 1024/2048/4096/8192/16384 bits of serial electrically erasable and programmable read-only memory (EEPROM) organized as 128/256/512/1024/2048 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low-power and low-voltage operations are essential. The AT24C01A/02/04/08/16 is available in space-saving 8-pin PDIP, 8-lead JEDEC SOIC, 8-lead MAP and 8-lead TSSOP packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 2.7V (2.7V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

3) Pin Configuration

Table 12

Pin Name	Function
A0-A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect

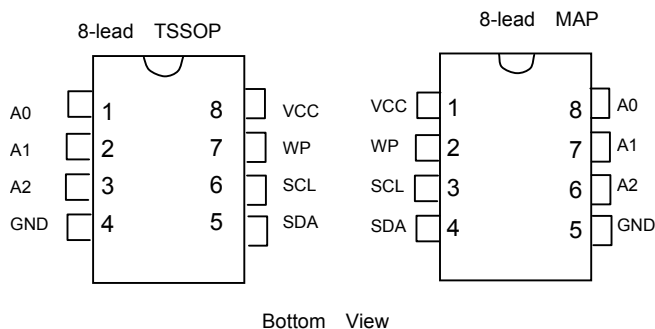


Fig. 14

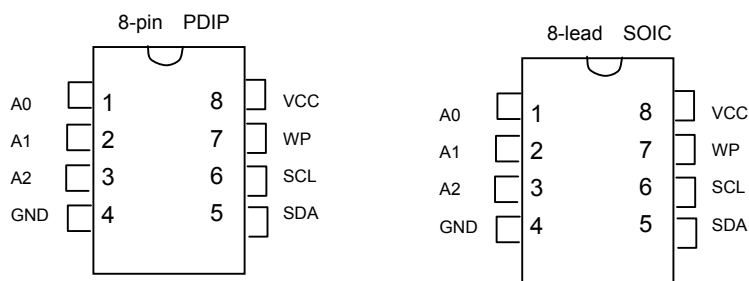


Fig. 15

4) Pin Description

SERIAL CLOCK (SCL): The SCL input is used to positive edge clock data into each EEPROM device and negative edge clock data out of each device.

SERIAL DATA (SDA): The SDA pin is bi-directional for serial data transfer. This pin is open-drain driven and may be wire-ORed with any number of other open-drain or open-collector devices.

DEVICE/PAGE ADDRESSES (A2, A1, A0): The A2, A1 and A0 pins are device address inputs that are hard wired for the AT24C01A and the AT24C02. As many as eight 1K/2K devices may be addressed on a single bus system (device addressing is discussed in detail under the Device Addressing section).

The AT24C04 uses the A2 and A1 inputs for hard wire addressing and a total of four 4K devices may be addressed on a single bus system. The A0 pin is a no connect.

The AT24C08 only uses the A2 input for hardwire addressing and a total of two 8K devices may be addressed on a single bus system. The A0 and A1 pins are no connects.

The AT24C16 does not use the device address pins, which limits the number of devices on a single bus to one. The A0, A1 and A2 pins are no connects.

WRITE PROTECT (WP): The AT24C01A/02/04/16 has a Write Protect pin that provides hardware data

protection. The Write Protect pin allows normal read/write operations when connected to ground (GND). When the Write Protect pin is connected to Vcc, the write protection feature is enabled and operates as shown in table 14.

Table 13

WP Pin Status	Part of the Array Protected				
	24C01A	24C02	24C04	24C08	24C16
At Vcc	Full (1K) Array	Full (2K) Array	Full (4K) Array	Normal Read/Write Operation	Upper Half (8K) Array
At GND	Normal Read/Write Operations				

5) Memory Organization

AT24C01A, 1K SERIAL EEPROM: Internally organized with 16 pages of 8 bytes each, the 1K requires a 7-bit data word address for random word addressing.

AT24C02, 2K SERIAL EEPROM: Internally organized with 32 pages of 8 bytes each, the 2K requires an 8-bit data word address for random word addressing.

AT24C04, 4K SERIAL EEPROM: Internally organized with 32 pages of 16 bytes each, the 4K requires a 9-bit data word address for random word addressing.

AT24C08, 8K SERIAL EEPROM: Internally organized with 64 pages of 16 bytes each, the 8K requires a 10-bit data word address for random word addressing.

AT24C16, 16K SERIAL EEPROM: Internally organized with 128 pages of 16 bytes each, the 16K requires an 11-bit data word address for random word addressing.

6) Block Diagram

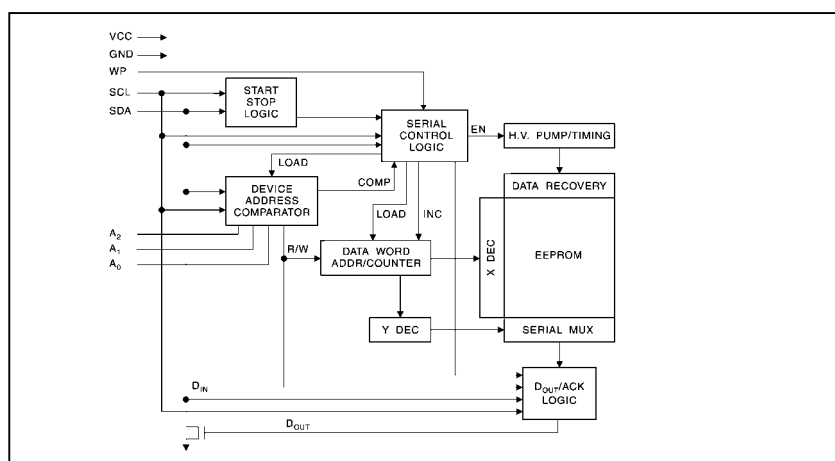


Fig.16

7) Refer to Table 21 about Functions and Data of the IC's Pins.

FSCQ1265RT

Green Mode Fairchild Power Switch (FPS™) for Quasi-Resonant Switching Converter

Features

- Optimized for Quasi-Resonant Converter (QRC)
- Advanced Burst-Mode operation for under 1 W standby power consumption
- Pulse by Pulse Current Limit (7A)
- Over load protection (OLP) - Auto restart
- Over voltage protection (OVP) - Auto restart
- Abnormal Over Current Protection (AOCP) - Latch
- Internal Thermal Shutdown (TSD) - Latch
- Under Voltage Lock Out (UVLO) with hysteresis
- Low Startup Current (typical : 25uA)
- Low Operating Current (typical : 6mA)
- Internal High Voltage SenseFET
- Built-in Soft Start (20ms)
- Extended Quasi-resonant Switching for Wide Load Range

Application

- CTV
- DVD Receiver
- Audio Power Supply

Description

In general, Quasi-Resonant Converter (QRC) shows lower EMI and higher power conversion efficiency compared to the conventional hard switched converter with a fixed switching frequency. Therefore, it is well suited for applications that are sensitive to the noise, such as color TV and audio. The FSCQ1265RT is an integrated Pulse Width Modulation (PWM) controller and Sense FET specifically designed for Quasi-resonant off-line Switch Mode Power Supplies (SMPS) with minimal external components. The PWM controller includes integrated fixed frequency oscillator, under voltage lockout, leading edge blanking (LEB), optimized gate driver, internal soft start, temperature compensated precise current sources for a loop compensation and self protection circuitry. Compared with discrete MOSFET and PWM controller solution, it can reduce total cost, component count, size and weight simultaneously increasing efficiency, productivity, and system reliability. This device is a basic platform well suited for cost effective designs of Quasi resonant switching flyback converters.

OUTPUT POWER TABLE		
PRODUCT	230VAC ±15% ⁽²⁾	85-265VAC
	Open Frame ⁽¹⁾	Open Frame ⁽¹⁾
FSCQ0765RT	100 W	85 W
FSCQ1265RT	170 W	140 W
FSCQ1565RT	210 W	170 W

Table 1. Notes: 1. Maximum practical continuous power in an open frame design at 50°C ambient. 2. 230 VAC or 100/115 VAC with doubler.

Typical Circuit

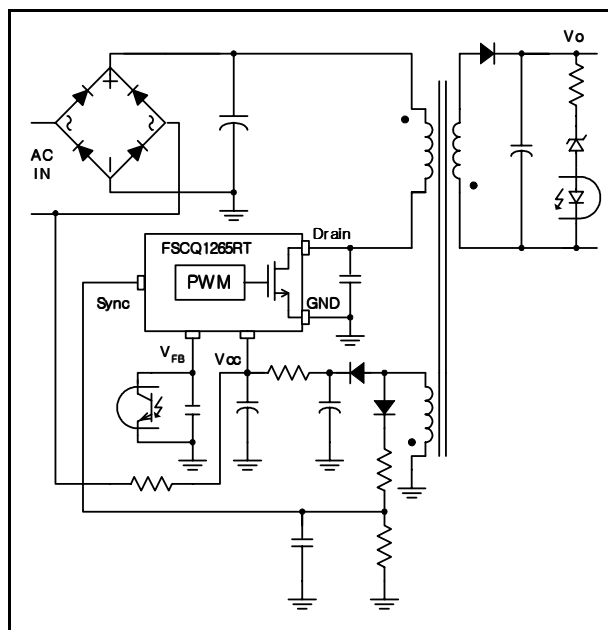


Figure 1. Typical Flyback Application

Internal Block Diagram

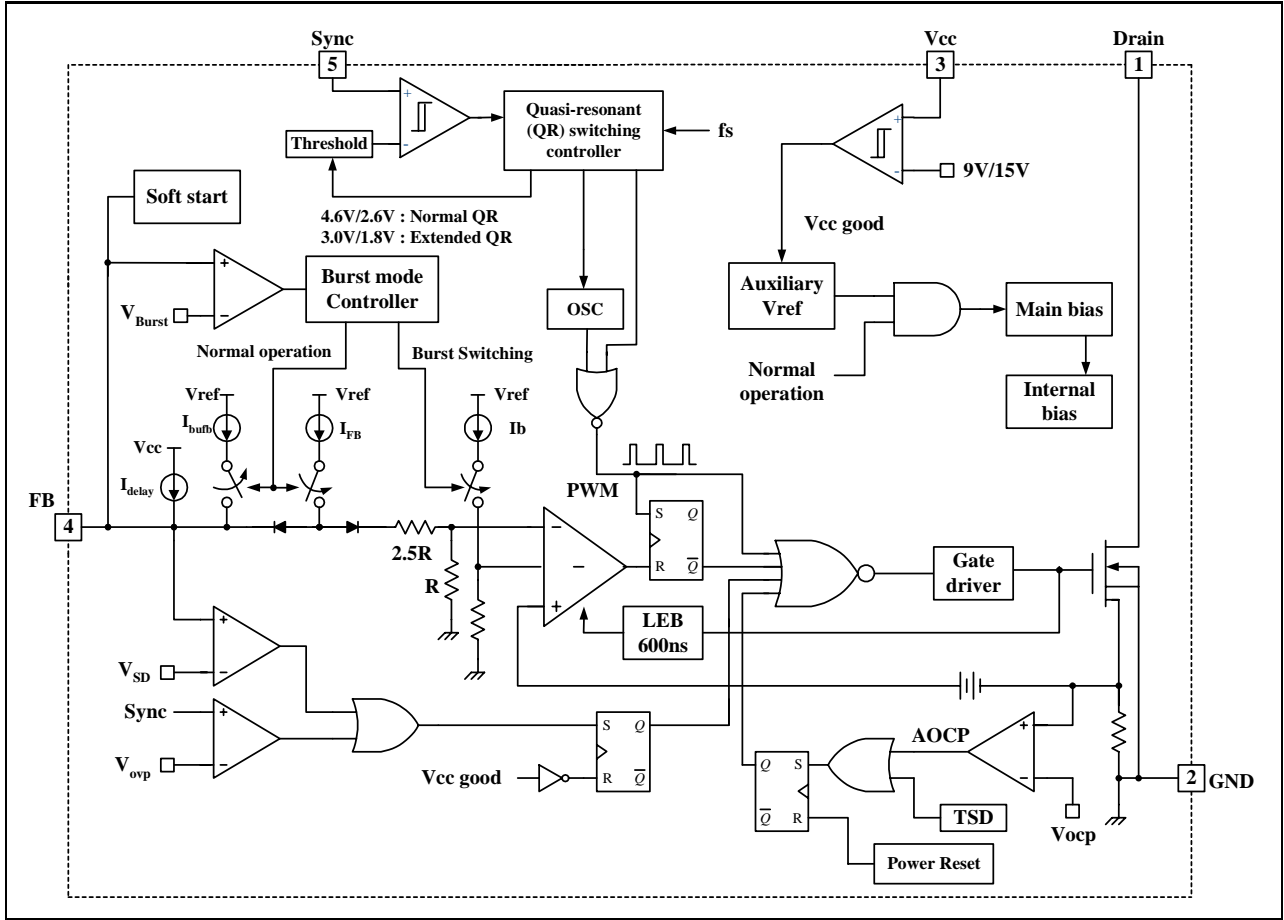


Figure 2. Functional Block Diagram of FSCQ1265RT

Pin Definitions

Pin Number	Pin Name	Pin Function Description
1	Drain	High voltage power SenseFET drain connection.
2	GND	This pin is the control ground and the SenseFET source.
3	Vcc	This pin is the positive supply input. This pin provides internal operating current for both start-up and steady-state operation.
4	Vfb	This pin is internally connected to the inverting input of the PWM comparator. The collector of an opto-coupler is typically tied to this pin. For stable operation, a capacitor should be placed between this pin and GND. If the voltage of this pin reaches 7.5V, the over load protection triggers resulting in shutdown of the FPS.
5	Sync	This pin is internally connected to the sync detect comparator for quasi resonant switching. In normal quasi-resonant operation, the threshold of the sync comparator is 4.6V/2.6V. Meanwhile, the sync threshold is changed to 3.0V/1.8V in extended quasi-resonant operation.

Pin Configuration

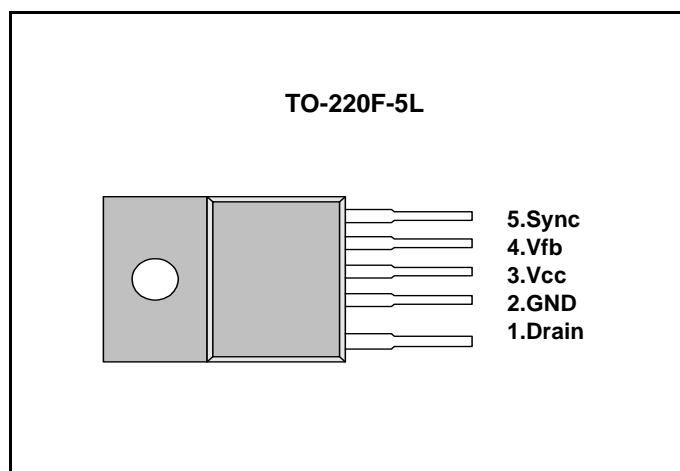


Figure 3. Pin Configuration (Top View)

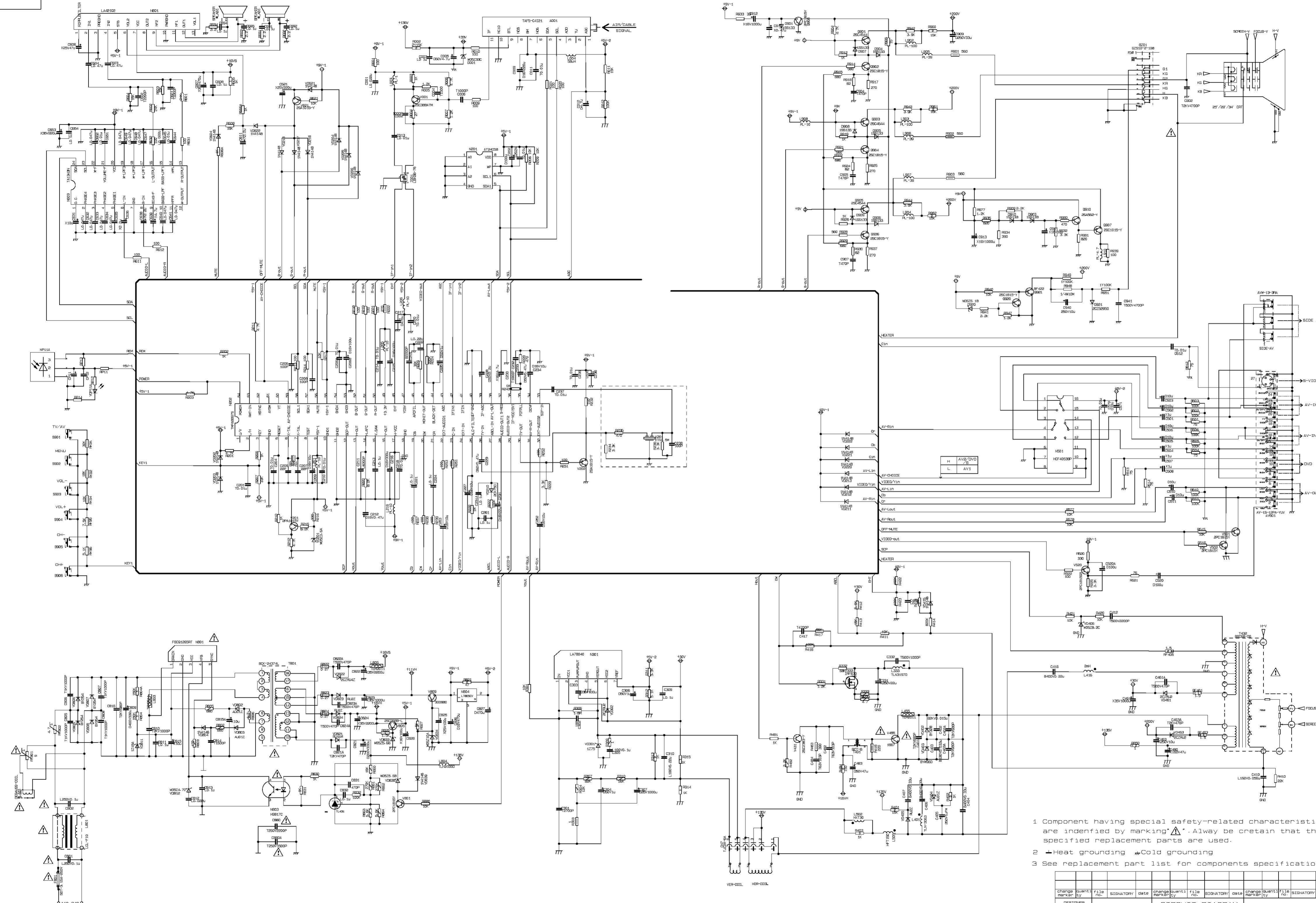
Absolute Maximum Ratings

(Ta=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source (GND) Voltage ⁽¹⁾	V _{DSS}	650	V
Drain-Gate Voltage (R _{GS} =1MΩ)	V _{DGR}	650	V
Gate-Source (GND) Voltage	V _{GS}	±30	V
Drain Current Pulsed ⁽²⁾	I _{DM}	36	ADC
Single Pulsed Avalanche Energy ⁽³⁾	E _{AS}	950	mJ
Continuous Drain Current (T _c = 25°C)	I _D	5.3	ADC
Continuous Drain Current (T _C =100°C)	I _D	3.4	ADC
Supply Voltage	V _{CC}	20	V
Analog Input Voltage Range	V _{sync}	-0.3 to 13V	V
	V _{FB}	-0.3 to V _{CC}	V
Total Power Dissipation	P _D	50	W
Operating Junction Temperature	T _J	+150	°C
Operating Ambient Temperature	T _A	-25 to +85	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C
Thermal Resistance	R _{thjc}	2.5	°C/W

Notes:

1. T_j = 25°C to 150°C
2. Repetitive rating: Pulse width limited by maximum junction temperature
3. L = 21mH, V_{DD} = 50V, R_G = 25Ω, starting T_j = 25°C



- 1 Component having special safety-related characteristics are identified by marking "▲". Always be certain that the specified replacement parts are used.
- 2 ▲Heat grounding ●Cold grounding
- 3 See replacement part list for components specifications.

change mark	by	file no.	SIGNATORY	date	change mark	by	file no.	SIGNATORY	date	change mark	by	file no.	SIGNATORY	file no.
DESIGNER														
AUDITOR														
TECHNOLOGIST														
NORMALIZER														
RATIFIER														

This circuit diagram is only for reference. Specifications are subject to change without notice.