

LG Innotek Co., Ltd.

DOCUMENT NO : 03(A)EB-101
DATE : 2003.11.21
TO(CUSTOMER) : LG DAV
SUBJECT :

We would like to request you to recognize above proposal.
We are submitting 5 copies. Please send back 2 copy with your
approval sign for us after your examination and complete check,
Since we submit following information herewith.

CUST.MODEL NO : 6700NFNL05A

LGP MODEL NO : TADM-H202F

1. RECORD OF REVISION
2. SPECIFICATION
3. CIRCUIT DIAGRAM
4. ASSEMBLY DRAWING
5. INSULATION MATERIAL PARTS LIST

YOUR VERY FAITHFULLY
TUNER DEVELOPMENT OF
HIGH FREQUENCY COMPONENTS
DIVISION

CUSTOM APPROVAL SECTION

A P P D	2003.11.21 G.S PARK
C H K D	
D S G D	2003.11.21 H.R LEE

RECORD OF REVISION

NO	DATE	TITLE	CONTENTS	LETTER NO	NOTE
1	2003.11.21	NEW APPROVAL SHEET	A NEW	03(A)EB-101	

					LG Innotek Co., Ltd.					
					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F		
					2003.11.21 G.S PARK		2003.11.21 H.R LEE	TITLE:		
										SPECIFICATION
SYMB	NO	APPD	CHKD	DSGD						DOCUMENT NO: BR 40512 (1/1)

S P E C I F I C A T I O N

LG Innotek Co., Ltd.

A P P D.	C H K D.	D S G D.	MODEL NO	T A D M - H 2 0 2 F
2003.08.21 G.S Park		2003.08.21 H.R Lee	DOCUMENT NO	B C 4 0 4 4 0

S P E C I F I C A T I O N									
I n d e x									
Item no		Item						Page	
1		Common						3p	
1- 1		Application						3p	
1- 2		Structure						3p	
1- 3		Circuit						3p	
2		General specifications						3p	
2- 1		Applicable broadcasting system						3p	
2- 2		Receiving system						3p	
2- 3		Intermediate frequency						3p	
2- 4		Receiving channel						3p	
2- 5		Output channel of modulator						3p - 4p	
2- 6		Input / output condition						4p	
2- 7		Operating temperature range						4p	
2- 8		Storage temperature range						4p	
2- 9		Guarantee voltage for operation						4p	
2-10		Maximum ratings						5p	
2-11		Current consumption						5p	
2-12		PLL data format						5p - 7p	
2-13		Test condition						7p	
2-14		Measuring instruments						8p	
					A P P D .	C H K D .	D S G D .	MODEL NO: TADM-H202F	
								TITLE:	
								SPECIFICATION	
								DOCUMENT NO:	
SYMB	NO	APPD	CHKD	DSGD				BC 40440 (1/23)	

3	Electrical characteristics	9p
3- 1	RF-modulator section	9p - 12p
3- 2	ANT SW section	13p - 14p
3- 3	Tuner section	15p - 17p
3- 4	IF section	17p - 19p
4	Environmental tests	20p
4 -1	Heat load test	20p
4- 2	Humidity load test	20p
4- 3	Cold test	20p
4- 4	Operating life test	20p
4- 5	High voltage test	20p
4- 6	Vibration test	20p
4- 7	Impact test	20p
5	Mechanical characteristics	21p
5- 1	Outline view assembly appearance	21p
5- 2	Appearance structure	22p
6	Others	22p
6- 1	Ant jack load test	22p
7	Test circuit	23p

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE: SPECIFICATION
								DOCUMENT NO: BC 40440 (2/23)
SYMB	NO	APPD	CHKD	DSGD				

1. Common
- 1- 1. Application
- This specification applies to TMI type (RF Front-End system) for TV, VCR
- 1- 2. Structure
- Refer to the attached assembly drawing.
- 1- 3. Circuit
- Refer to the attached circuit diagram.
2. General specifications.
- 2- 1. Applicable broadcasting system
- M NTSC / US CH
- 2- 2. Receiving system
- Upper Heterodyne
- 2- 3. Intermediate frequency
- Picture intermediate frequency : 45.75 MHz
- Sound intermediate frequency : 41.25 MHz
- 2- 4. Receiving channel
- VHF LOW : 2 ~ B Ch
- VHF HIGH : C ~ W+11 Ch
- UHF : W+12 ~ 69 Ch
- 2- 5. Output channel of modulator
- US 3 / 4 Ch

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE: SPECIFICATION
								DOCUMENT NO: BC 40440 (3/23)
SYMB	NO	APPD	CHKD	DSGD				

	Terminal NO. 2
3 Ch	OPEN
4 Ch	GND

2- 6. Input / Output condition

ANT nominal impedance

ANT IN : 75Ω unbalance

ANT OUT : 75Ω unbalance

Video in impedance : 0.7kΩ ~ 1.3kΩ (typ. 1kΩ)

Audio in impedance : 10kΩ min.

Control impedance : 30kΩ min. (typ. 100kΩ)

Video out load : 10kΩ

Audio out load : 100kΩ

2- 7. Operating temperature range

Temperature: -10 ~ +60
(Normally Air Temperature)

Humidity : less than 65%RH

2- 8. Storage temperature range

Temperature : -10 ~ +70
(Normally Air Temperature)

Humidity : less than 70%RH

2-9. Guarantee voltage for operation

Terminal		Supply voltage			
		min.	typ.	max.	unit
+B		4.8	5.0	5.2	Vdc
TU		29.0	32.0	34.0	
CONTROL	VCR Mode	4.8	5.0	5.2	
	TV Mode	-	-	0.5	

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE:
								SPECIFICATION
								DOCUMENT NO:
SYMB	NO	APPD	CHKD	DSGD				BC 40440 (4/23)

2-10. Maximum ratings

Terminal	Supply voltage	Unit
+B	6.0	Vdc
TU	35.0	
CONTROL (MD:ON)	6.0	

(Note) Within “+B” supply voltage at SCL,SDA,terminal.

2-11. Current consumption

Terminal	Current consumption			
	min.	typ.	max.	unit
+B	-	170	200	mA
TU	-	1.5	5.0	
CONTROL (MD:ON)	-	47.0	173	μA

2-12. PLL characteristics of tuner section

2-12-1. I2C data format

	MSB							LSB	
Address byte	1	1	0	0	0	MA1	MA0	0	A
Divider byte 1	0	N14	N13	N12	N11	N10	N9	N8	A
Divider byte 2	N7	N6	N5	N4	N3	N2	N1	N0	A
Control byte	1	CP	0	0	0	R1	R0	0	A
BAND SW byte	0	0	0	0	BS3	BS2	BS1	BS0	A

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F	
								TITLE: SPECIFICATION	
								DOCUMENT NO: BC 40440 (5/23)	
SYMB	NO	APPD	CHKD	DSGD					

Where:

- A : Acknowledge bit
- Address Selection

“ADSW”	MA1	MA0
0 ⁻ 0.1 × +B	0	0
OPEN	0	1
0.4 × +B ⁻ 0.6 × +B	1	0
0.9 × +B ⁻ +B	1	1

- CP : Charge pump current (CP = 0 = 50μA, CP = 1 = 200μA)
- N14⁻ NO : Programmable divider byte
$$N = N14 \times 2^{14} + N13 \times 2^{13} + \dots + N1 \times 2^1 + N0$$
- Band switching byte

	BS3	BS2	BS1	BS0
UHF	1	0	0	0
VHF HIGH	0	0	1	0
VHF LOW	0	0	0	1

2-12-2. Oscillator frequency calculation

$$F_{osc} = F_{ref} \times 8 \times N$$

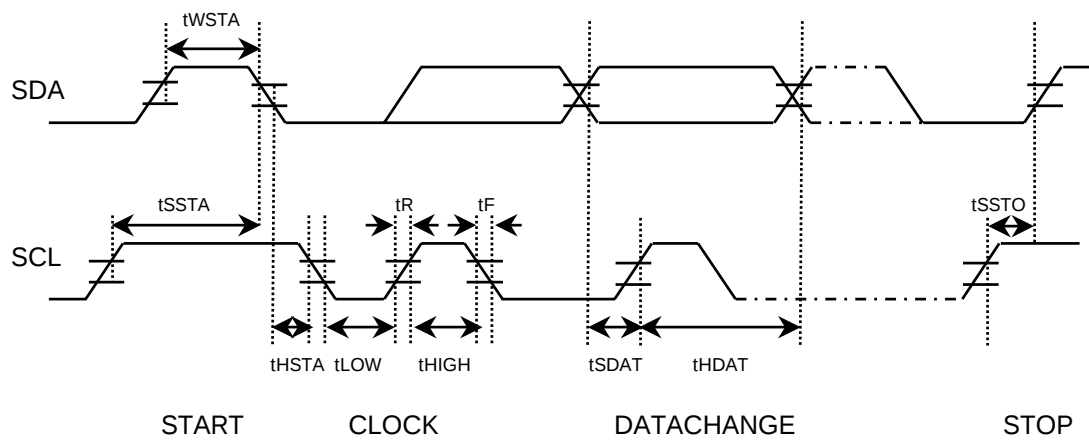
- Fosc : Locked oscillator frequency
- Fref : 4MHz/512 = 7.8125kHz
- N : Oscillator frequency data

2-12-3. Input Signal Level (SCL, SDA)

INPUT Signal level	MIN	MAX	Unit
High level	3.0	5.5	V
Low level	-	1.5	

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE: SPECIFICATION
								DOCUMENT NO: BC 40440 (6/23)
SYMB	NO	APPD	CHKD	DSGD				

2-12-4 I²C BUS Time



		MIN	TYP	MAX	
fSCL	SCL clock frequency	0		400	kHz
tWSTA	Start waiting time	1300			nsec
tHSTA	Start hold time	600			"
tLOW	Low clock pulse width	1300			"
tHIGH	High clock pulse width	600			"
tSSTA	Start set-up time	600			"
tHDAT	Data hold time	1300			"
tSDAT	Data set-up time	600			"
tR	Rise time			300	"
tF	Fall time			300	"
tSSTO	Stop set-up time	600			"

2-13. Test condition

Terminal	Supply voltage	Unit	Remarks
+B	5 ± 0.1	Vdc	Ripple:10mVp-p max.
TU	32 ± 2	Vdc	
CONTROL	5 ± 0.1	Vdc	
Ambient temperature	25 ± 5		
Relative humidity	65 ± 10	%RH	

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE:
								SPECIFICATION
								DOCUMENT NO:
SYMB	NO	APPD	CHKD	DSGD				BC 40440 (7/23)

2-14. Measuring instruments

2-14-1. RF-modulator section

Audio analyzer	: 8903B	HP
Television demodulator	: 5126A	NIHON TSUSHINKI
Spectrum analyzer	: 8568B	HP
Network analyzer	: 8753C	HP
TV pattern generator	: TSG120	TEKTRONIX
	3900N	NIHON TSUSHINKI
Video Measurement	: VM700A	TEKTRONIX

2-14-2. IF section

TV pattern generator	: TG-7/1	SHIBASOKU
	TG2000	TEKTRONIX
IF modulator	: RM54A	SHIBASOKU
	146F	EIDEN
RF converter	: RC51B	SHIBASOKU
	458C-X	EIDEN
Video Measurement	: VM700A	TEKTRONIX
Audio Analyzer	: 8903B	HP
	AM51A	SHIBASOKU

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE: SPECIFICATION
								DOCUMENT NO: BC 40440 (8/23)
SYMB	NO	APPD	CHKD	DSGD				

3. Electrical characteristics

The unit stated in dBμV is defined the value at 75Ω terminal in this specification. (0 dBm = 109 dBμV)

3- 1. RF-modulator section

Item					Specification				Note		
					min.	typ.	max.	unit			
3-1- 1. Video modulation					74	80	86	%	Input signal : 1.0Vp-p white Measure at the output of the standard demodulator.		
3-1- 2. Video limit modulation					87	93	99	%	Input signal : 1.5Vp-p stair-steps or ramp. Measure at the output of the standard demodulator.		
3-1- 3. V/S ratio					10:3.8	10:4.0	10:4.1	-	Input signal :1.0Vp-p white V : S = 10 : 4 Measure at the output of the standard demodulator.		
3-1- 4. Video amplitude frequency characteristics					-3.0	-0.5	+3.0	dB	Measure range : 0.1MHz ~ 4.2MHz Based on 1MHz		
3-1- 5. Differential Gain (DG)					-	2	7	%	Input signal : 1.0Vp-p stair-steps Chrominance : 20 IRE Luminance : 0 ~ 90 %		
3-1- 6. Differential Phase (DP)					-	2	7	deg	Input signal : 1.0Vp-p stair-steps Chrominance : 20 IRE Luminance : 0 ~ 90 %		
3-1- 7. Video S/N					45	47	-	dB	Compensation of spectral luminance efficacy. RF output should be amped 12dB. (LGEC control method Measurement conditions. Measure at the out of the Standard demodulator. (5126A - NIHON TSUSHINKI)		
					A P P D.		C H K D.		D S G D.		MODEL NO: TADM-H202F
											TITLE: SPECIFICATION
											DOCUMENT NO: BC 40440 (9/23)
SYMB	NO	APPD	CHKD	DSGD							

Item					Specification				Note
					min.	typ.	max.	unit	
									Video Measurement : VM700A (TEKTRONIX) HPF : 100kHz, LPF : 4.2MHz SC TRAP : ON, WEIGHT : OFF Input signals : Video : 100% white signal Audio : none Video band : 0.1MHz ~ 4.2MHz
3-1- 8. Chroma beat (920kHz P.C.S. beat)					55	65	-	dB	Input signal : 0.4Vp-p 3.58MHz sine wave Use spectrum analyzer to measure the level of Fp + 0.92MHz The value is relative to the level of Fp without video modulation.
3-1- 9. Audio modulation (deviation)					32 (64)	40 (80)	48 (96)	kHz dev (%)	Input signal : -6.5dBs, (1.04Vp-p) 1kHz sine wave (100 % modulation = ± 25kHz dev.)
3-1-10. Audio maximum modulation					150 (300)	220 (440)	-	kHz dev (%)	Input signal : 1kHz sine wave The input should be adjusted to the level just before the saturation of the modulation.
3-1-11. Audio amplitude frequency characteristics					-3	+0.2 -0.6	+3	dB	Input signal : -6.5dBs, (1.04Vp-p) Measure range : 50Hz ~ 10kHz Based on 1kHz
3-1-12. Audio distortion					-	0.5	2.0	%	Input signals : Audio : -6.5dBs (1.04Vp-p), 1kHz sine wave Video : 1Vp-p color bar De-emphasis is on.(75μsec)
					A P P D.		C H K D.	D S G D.	MODEL NO: TADM-H202F
									TITLE:
									SPECIFICATION
SYMB	NO	APPD	CHKD	DSGD					DOCUMENT NO:
									BC 40440 (10/23)

Item					Specification				Note
					min.	typ.	max.	unit	
3-1-13. Audio S/N					48	54	-	dB	Input signals : Audio : -6.5dBs (1.04Vp-p), 1kHz sine wave Video : All black (sync. only) Use standard demodulator of inter-carrier system. De-emphasis is on. (75μsec)
3-1-14. Audio buzz					45	55	-	dB	Video input signal : 1Vp-p color bar Other conditions : same as item 3-1-13.
3-1-15. Video carrier output level					63	66.0	69	dBμV	Video input signal : 1Vp-p 100% white signal.
3-1-16. P/S ratio (sound carrier level)					-12.5	-14.5	-17	dB	Audio input signal : none Other conditions : same as item 3-1-15.
3-1-17. Video carrier frequency					-150	-	+150	kHz	Video input signal : none
3-1-18. Sound carrier frequency					4493	4500	4507	kHz	Audio input signal : none The measurements are taken after 1 min. from the power on.
3-1-19. Out-band spurious					-	-	39.5	dBμV	Video input signal : 1Vp-p color bar Measure range : 0 ~ 1GHz Except the range from Fp-4.6MHz to Fp+7.4MHz.
3-1-20. In-band spurious					60	-	-	dB	Input signals : Video : none Audio : none Measure range : Fp~Fp+4.5MHz.
3-1-21. Terminal leakage					-	-	54	dBμV	Measure range : 0 ~ 1GHz except GND.
					A P P D.		C H K D.	D S G D.	MODEL NO: TADM-H202F
									TITLE: SPECIFICATION
									DOCUMENT NO: BC 40440 (11/23)
SYMB	NO	APPD	CHKD	DSGD					

3-1-22. Stability

- 3-1-22-1. Video carrier frequency rise up time.
The time to approach the set value $\pm 50\text{kHz}$: within 3 seconds
- 3-1-22-2. Audio carrier frequency rise up time.
The time to approach the set value $\pm 5\text{kHz}$: within 10 seconds
- 3-1-22-3. Video carrier frequency shift by supply voltage drift.
Within $\pm 10\text{kHz}$ by $\pm 0.3\text{V}$ shift of the supply voltage.
- 3-1-22-4. Audio carrier frequency shift by supply voltage drift.
Within $\pm 2\text{kHz}$ by $\pm 0.3\text{V}$ shift of the supply voltage.

3-1-23. Thermal Stability

- 3-1-23-1. Thermal stability of video modulation.
Within $\pm 8\%$ based on the temperature of 25 .

Unless otherwise specified, thermal stability tests shell be performed under the following conditions.

Measurement temperature range : $-10 \sim 60$

Humidity range : $45\%RH \sim 85\%RH$

Test measurement order and time :
25 → -10 (2H) → 10 (1H) → 25 (1H) → 45 (1H) → 60 (2H)

- 3-1-23-2. Thermal stability of video carrier frequency.
Within $\pm 150\text{kHz}$ based on the temperature of 25 .
- 3-1-23-3. Thermal stability of video carrier output level.
Within $\pm 4\text{dB}$ based on the temperature of 25 .
- 3-1-23-4. Thermal stability of audio modulation.
Within $\pm 16\%$ on the temperature of 25 .
- 3-1-23-5. Thermal stability of audio carrier frequency.
Within $\pm 20\text{kHz}$ on the temperature of 25 .
- 3-1-23-6. Thermal stability of P/S ratio
Within $\pm 3.0 \text{ dB}$ based on the temperature of 25 , but the P/S ratio itself should not be less than 13 dB.

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE: SPECIFICATION
								DOCUMENT NO: BC 40440 (12/23)
SYMB	NO	APPD	CHKD	DSGD				

3- 2. ANT SW section

Unless otherwise specified, measurement range shall be 54MHz ~ 810MHz, and unused RF terminals shall be terminated by rated impedance Terminator.

Item	Specification				Note		
	min.	typ.	max.	unit			
3-2-1. Insertion loss	-	5	6	dB	ANT IN to ANT OUT mode : TV (at MD OFF)		
3-2-2. VSWR	-	5.5	7		ANT IN Terminal mode : TV (at MD OFF) 54MHz ~ 810MHz		
3-2-3. VSWR	-	2	4		ANT OUT terminal mode : TV (at MD OFF) 54MHz ~ 810MHz		
	-	2	3		mode : VCR (at MD ON) 61MHz ~ 72MHz		
3-2-4. Isolation	60	65	-	dB	Isolation from ANT OUT to ANT IN mode : VCR (at MD ON) 61MHz ~ 72MHz		
3-2-5. ANT IN leakage - MD	-	-	9.5	dB μ V	mode : VCR (at MD ON) RF-modulator section :		
- TU OSC	-	-	52	dB μ V	none input signal Tuner OSC leakage.		
3-2-6. 2nd Harmonics inter modulation	55	64	-	dB	f1/(f1+f2) ratio mode : TV (at MD OFF)		
					item	freq(MHz)	level(dB) μ V
					f1	91.25	100
					f2	103.25	100
					Both f1 and f2 are not modulated.		

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE: SPECIFICATION
								DOCUMENT NO: BC 40440 (13/23)
SYMB	NO	APPD	CHKD	DSGD				

Item					Specification				Note		
					min.	typ.	max.	unit			
3-2-7. Cross modulation					55	62	-	dB	Then take the smallest ratio from the sideband to f2 as cross modulation value.		
									item	freq(MHz)	level(dB) μ V
									f1	91.25	105
									f2	193.25	80
									f1 is 40% AM modulated by 15.75KHz sine wave. f2 is not modulated.		

					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F		
								TITLE: SPECIFICATION		
								DOCUMENT NO: BC 40440 (14/23)		
SYMB	NO	APPD	CHKD	DSGD						

3- 3. Tuner section										
When the test characteristics, test point is pin no.15/if output terminal.										
Item					Specification				Note	
					min.	typ.	max.	unit		
3-3-1. IF Rejection									75Ω terminated	
		UHF			60	80	-	dB		ANT INPUT level 65dBμV
VHF	HIGH			60	80	-				
	LOW			45	60	-				
		UHF			40	60	-	dB		ANT INPUT level 95dBμV
VHF	HIGH			40	65	-				
	LOW			40	60	-				
3-3-2. Image Rejection										75Ω terminated
		UHF			45	60	-	dB	ANT INPUT level 65dBμV	
VHF	CATV			45	70	-				
	13 ~ 7			60	75	-				
	6 ~ 2			60	75	-				
		UHF			40	55	-	dB	ANT INPUT level 95dBμV	
VHF	CATV			40	60	-				
	13 ~ 7			40	60	-				
	6 ~ 2			40	60	-				
3-3-3. 920kHz Color Beat Rejection									ANT INPUT level p:60dBμV (75Ω terminated) c:44dBμV (75Ω terminated) s:54dBμV (75Ω terminated)	
		UHF			50	80	-	dB		
		VHF			50	80	-			
					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F		
								TITLE: SPECIFICATION		
								DOCUMENT NO: BC 40440 (15/23)		
SYMB	NO	APPD	CHKD	DSGD						

Item					Specification				Note			
					min.	typ.	max.	unit				
3-3-4. CH 6 beat					45	60	-	dB	ANT INPUT level desire : 60dB μ V (75 Ω terminated) undesire : 54dB μ V (75 Ω terminated)			
3-3-5. CH A-5 beat					45	60	-	dB	ANT INPUT level desire : 60dB μ V (75 Ω terminated)			
3-3-6. CB rejection.					0.535 MHz ~ 30 MHz -7dBm min				desire : 55.25MHz ~ 83.25MHz (Ch.2 ~ Ch.6) -66dBm			
3-3-7. 1% Cross modulation					(dB μV) desire input signal Un-desire signal (dBμV)							
					CH				A(dB μ V)		B(dB μ V)	
					UHF				64		84	
					VHF		W+11 ~ J		64		84	
							13 ~ 2		64		84	
					Cross modulation value should be within hantched area. Tuner should be measured for 1% cross modulation with ± 2 channel undesired signal.							
3-3-8. +B shift					CH	min.	typ.	max.	unit.	note		
					UHF	-	-	250	kHz	+ B $\pm$ 10% PLL "ON"		
					VHF HIGH	-	-	250				
					A P P D.		C H K D.		D S G D.		MODEL NO: TADM-H202F	
											TITLE: SPECIFICATION	
											DOCUMENT NO: BC 40440 (16/23)	
SYMB	NO	APPD	CHKD	DSGD								

3-3-9. Over range	CH	Vtu		min.	typ.	max.	unit.
	UHF	28.0 V		2.0	-	-	MHz
		0.5 V		2.0	-	-	
	VHF	28.0 V		2.0	-	-	
		0.5 V		2.0	-	-	
3-3-10. Noise Figure	CH	min.	typ.	max.	unit.	note	
	UHF	-	9.0	14.0	dB		
	VHF HIGH	-	8.0	14.0			
	VHF LOW	-	8.0	13.0			
3-3-11. Power gain deviation	UHF	-	6	12	dB		
	VHF HIGH	-	6	12			
	VHF LOW	-	6	12			
3-3-12. Temperature shift	W+12 ° 69	-	-	3000	kHz	25 ± 25	
	W+11 ° J	-	-	3000			
	13 ° 2	-	-	2000			

3-4. IF section

When the test electrical characteristics when there are no instruction.
fp input level is 70 dBμV and p/s ratio is -7 dB.

Item		Specification				Note
		min.	typ.	max.	unit	
3-4-1. Video S/N	VHF	45	47	-	dB	A figure in parentheses is spec by LGIT measurement system
	UHF	45	47	-		50% white signal. 87.5% modulation. Sub-carrier trap : on HPF : 100 kHz, LPF : 4.2 MHz

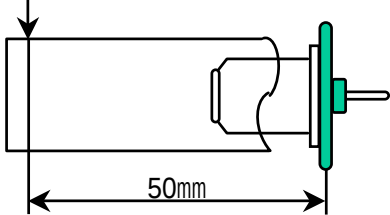
					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE: SPECIFICATION
								DOCUMENT NO:
SYMB	NO	APPD	CHKD	DSGD				BC 40440 (17/23)

Item					Specification				Note	
					min.	typ.	max.	unit		
3-4-2. Noise limiting sensitivity						45	48	dB μ V	A figure in parentheses is spec by LGIT measurement system	
AIR										
CATV									50% white signal. 87.5% modulation. Sub-carrier trap : on HPF : 100kHz, LPF : 4.2MHz Video S/N=30dB	
UHF										
3-4-3. Video output level					0.8	1.0	1.2	Vp-p	Standard color bar:87.5% mod.	
3-4-4. SYNC ratio					25	28.6	30	%	Standard color bar:87.5% mod.	
Burst ratio					17	25	37			
3-4-5. Video amplitude frequency characteristics								dB	Full sweep : 87.5% mod. based on 0.5 MHz	
1.0 MHz										
2.0 MHz										
3.0 MHz										
3.58MHz										
3-4-6. Sin ² 2T pulse response					70	90	-	%	Sin ² 2T pulse & bar:87.5% mod.	
3-4-7. Differential Gain					-	5	10	%	5 stair-steps : 87.5% mod. Set modulation at the peak of 5'th chroma signal	
3-4-8. Differential Phase					-	5	10	deg	5 stair-steps : 87.5% mod. Set modulation at the peak of 5'th chroma signal	
3-4-9. Y/C delay time					-100	0	+100	nsec	0.25 MHz standard Envelope delay meter.	
					A P P D.		C H K D.		D S G D.	
									MODEL NO: TADM-H202F	
									TITLE: SPECIFICATION	
									DOCUMENT NO: BC 40440 (18/23)	
SYMB	NO	APPD	CHKD	DSGD						

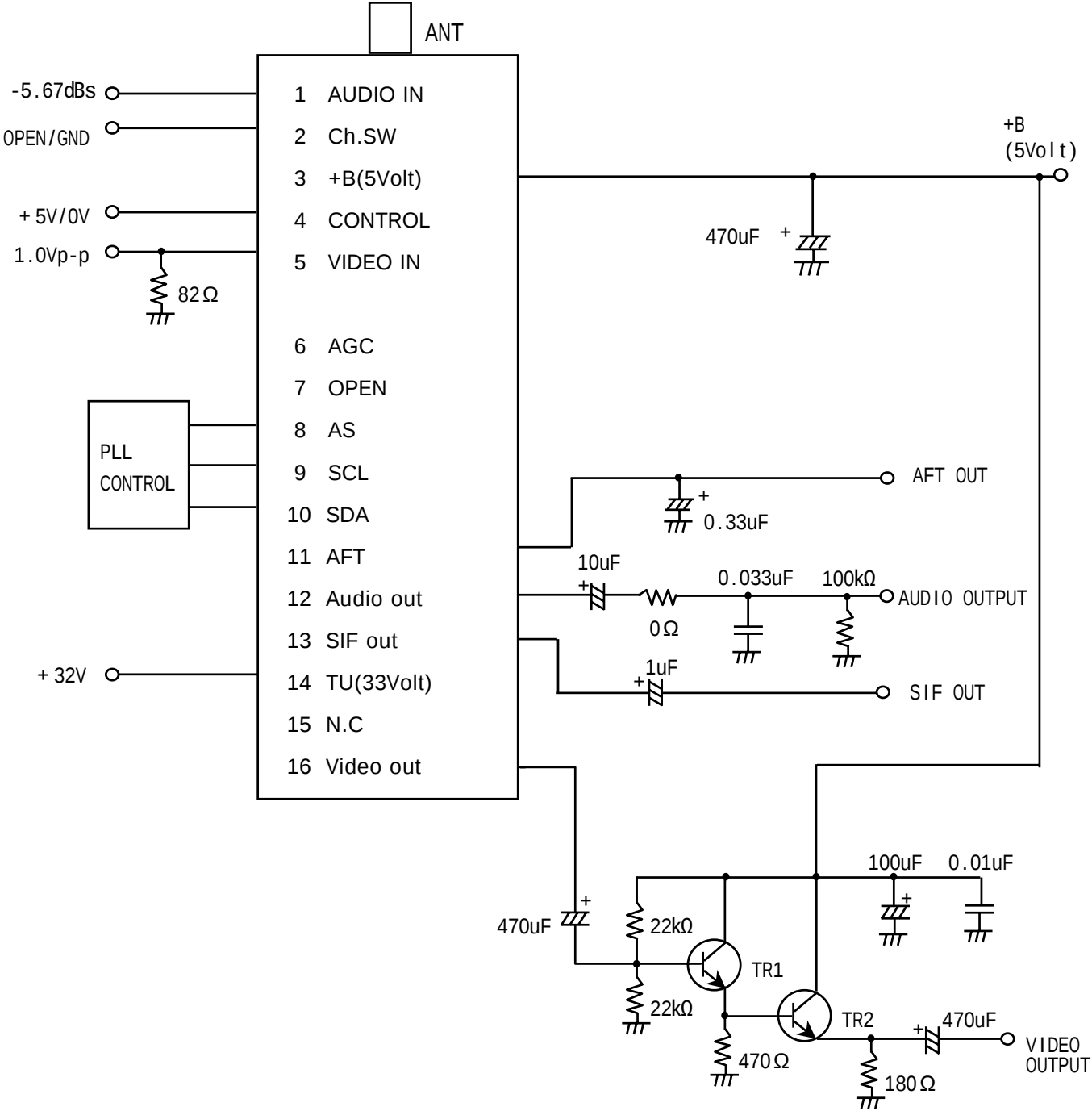
Item					Specification				Note
					min.	typ.	max.	unit	
3-4-10. Audio output level					-7.2	-4.2	-1.2	dBm	1kHz / ±25kHz dev. standard color bar:87.5% mod.
3-4-11. Audio distortion					-	1	2	%	1kHz / ±25kHz dev. standard color bar:87.5% mod.
3-4-12. Audio frequency characteristics									20Hz ~ 12kHz Based on 1kHz / ±7.5kHz dev. standard color bar:87.5% mod. PRE-EMP (75usec) : “ON”
50 Hz					-3	0	+3	dB	
10 kHz					-3	0	+3		
3-4-13. Audio S/N					45	50	-	dB	1kHz / ±25kHz dev. standard color bar:87.5% mod. Use IHF filter.
3-4-14. SYNC buzz					-	50	100	mVp-p	standard color bar:87.5% mod. 400Hz/ ±25kHz dev. P/S=-17dB
3-4-15. AFT alignment accuracy					1.5	2.5	3.5	Vdc	Alignment center : 2.5V IF input level : 90dB μV P/S=-7dB standard color bar:87.5% mod. (25 ±10 & 0 ~ 45% Hum)
3-4-16. SIF Output Level					70	75		dBμV	Video mod. : Color Bar 87.5% mod. RF INPUT Level = 70 dBμV P/S = -6dB Measure peak of 4.5MHz carrier Level using Spectrum Analyzer and 1:10 Probe.
					A P P D.		C H K D.	D S G D.	MODEL NO: TADM-H202F
									TITLE:
									SPECIFICATION
SYMB	NO	APPD	CHKD	DSGD					DOCUMENT NO:
									BC 40440 (19/23)

4. ENVIRONMENTAL TESTS (規格値 初期値 変化 範囲 表示)										
Item					Specification					Note
					TUNER		MODULATOR		IF	
4-1. Heat load teat					OSC frequency (PLL : ON)		Video modulation ± 8%max		Video S/N ± 6dB	test condition 4-1-1
					UHF : ± 100kHz		Video carrier frequency ± 150kHz max		Video output ± 0.2Vp-p max	
					VHF : ± 100kHz		Video carrier output level ± 4dB max		Noise limiting sensitivity ± 6dB	
							Audio modulation ± 18% max		Audio output ± 30% max	
							Audio carrier frequency ± 20kHz max			
							P/S ratio ± 3dB max			
4-2. Humidity load teat					same as in item 4-1					test condition 4-2-1
4-3. Cold test					same as in item 4-1					test condition 4-3-1
4-4. Operating life test					same as in item 4-1					test condition 4-4-1
4-5. High voltage test					same as in item 4-1					test condition 4-5-1
4-6. Vibration test					same as in item 4-1					test condition 4-6-1
4-7. Impact test					same as in item 4-1					test condition 4-7-1
					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F		
								TITLE: SPECIFICATION		
								DOCUMENT NO: BC 40440 (20/23)		
SYMB	NO	APPD	CHKD	DSGD						

Environmental test condition									
Item					Test condition				
4-1-1 Heat load teat					1. Initial value measure at standard test condition. 2. Leave samples in 70 ± 2 for 96 ± 5 hours, and in standard test condition for 30 minutes, then take measurements within 1 hour. 3. Supply voltage : standard $\pm 10\%$ 4. Supply voltage cycle : 1.5h on, 0.5h off				
4-2-1 Humidity load test					1. Leave samples in 40 ± 5 for 24 ± 2 hours, and in standard test condition for 30 minutes, then take measurements. 2. Leave samples in 40 ± 5 80 ~ 90% rh, for 96 ± 5 hours, and in standard test condition for 30 minutes, then take measurements within 1 hour. 3. Supply voltage : standard $+10\%$ 4. Supply voltage cycle : 1.5h on, 0.5h off				
4-3-1 Cold test					1. Initial value measure at standard test condition. 2. Leave samples in -20 ± 2 for 96 ± 5 hours, and in standard test condition for 2 hours, then take measurements within 1 hour.				
4-4-1 Operating life test					1. Take measurements in standard test condition. 2. Leave samples for 1000 hours, then take measurements. 3. Supply voltage : standard				
4-5-1 High voltage test					Ant. IN : $\pm 15\text{kV}$, 10 times (150pF charged) series R=150Ω				
4-6-1 Vibration test					Vibration test fixture in used to vibrate the tuner with a total amplitude of 1mm and frequency ranging from 10 to 55hz, once per minute consecutively, for 40 minutes in each of three directions, x,y and z.				
4-7-1 Impact test					1. Impact acceleration : 50m/sec ² 2. Impact time : 11msec 3. Impact time & direction : 3 times per each 6 sides				
5. Mechanical characteristics									
5-1 Outline view assembly appearance					No defects of wiring, soldering and assembling. No dirt, rust, corrosion or foreign material.				
					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F	
								TITLE: SPECIFICATION	
								DOCUMENT NO:	
SYMB	NO	APPD	CHKD	DSGD				BC 40440 (21/23)	

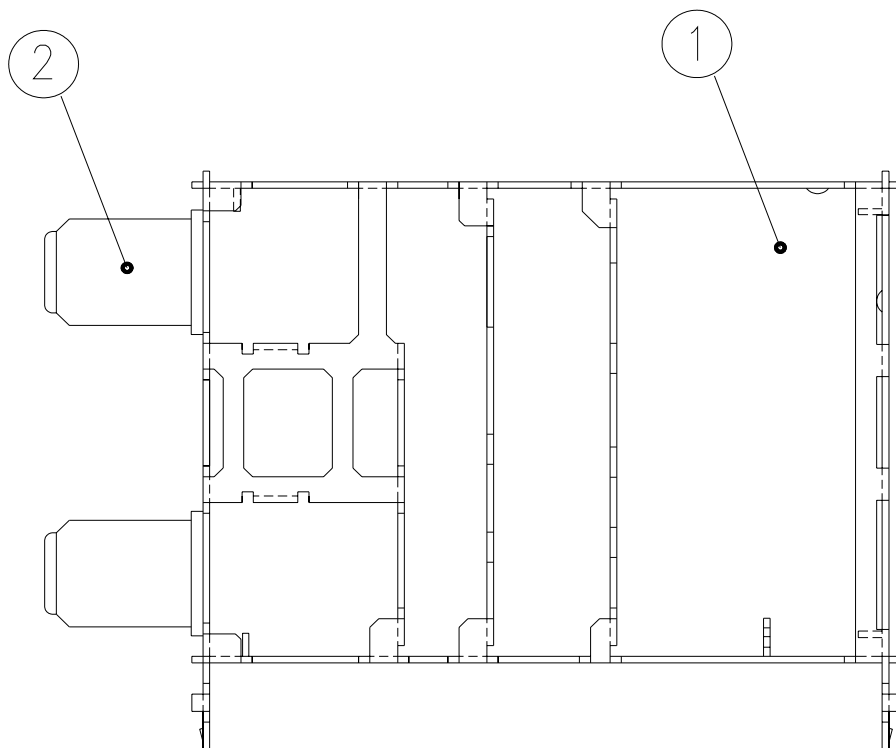
Item					Test condition			
5-2 Appearance structure Dimension Mounting Weight 6. Others 6-1. Ant jack Load Test					As assembly drawing. As assembly drawing. Approximately 60±5g. Crack, defection and shaking should not be existed with 15kg.cm banding moment after caulking. F = 3kg  50mm			
					A P P D.	C H K D.	D S G D.	MODEL NO: TADM-H202F
								TITLE: SPECIFICATION
								DOCUMENT NO: BC 40440 (22/23)
SYMB	NO	APPD	CHKD	DSGD				

7. TEST CIRCUIT



NOTE
TR1, TR2 : 2SC1213 or
EQUIVALENT

					A P P D .	C H K D .	D S G D .	MODEL NO: TADM-H202F
								TITLE: SPECIFICATION
								DOCUMENT NO:
SYMB	NO	APPD	CHKD	DSGD				BC 40440 (23/23)



					LG Innotek CO., Ltd.			
					APPD. '02.10.26 Kim Byoung Yong	CHKD. /	DSGD. '02.10.26 Lee Kap Soul	NOTE TADM-TYPE
								TITLE INSULATION MATERIAL LIST
								DOCUMENT NO. BN40044(1/10)
SYMB	NO	APPD	CHKD	DSGD				

INSULATING MATERIALS TABLE

(2 / 10)

[illegible]

(NOTE) THE MATERIALS MARKED *IN CATEGORY NUMBER ARE CURRENT USE
AND OTHERS CAN BE USED IN THE FUTURE.

NO	DESCRIPTION	BASE MATERIALS								PRINTED WIRING BOARD			NOTE
		GENERIC I.D	MANUFACTURER	CAT. NO. OR GRADE	FLAME CLASS	HM1 PL3	HA1 PL3	GT1 PL3	UL FILE NO	UL MARK	MANUFACTURER	FLAME CLASS	
1	PRINTED WIRING BOARD	PHENOLIC RESIN OF COPPER CLAD LAMINATES	HITACHI CHEMICAL CO., LTD	MSL-487F	84V-0	800+	200+	-	EB014B	▲ 8VH-284V-0 ▲ 6MK-77X P10A ▲ OR 88EP-2110A ▲  K8-15 ▲ H.8.140H1 ▲	SANYOH CO., LTD (E52558) 6MK 60RP CO., LTD (E41888) GOLDSTAR TELECOMMUNICATION CO., LTD (E71042) KOREA CIRCUIT CO., LTD (E55881) PT. HITACHI CHEMICAL INDONESIA (E41480)	84V-0	
			MATSUBITA ELECTRIC WORK LTD	R-8700	84V-0	120+	200+	500	EB1888		GRAND CIRCUIT INDUSTRY SDN BHD (E182082)	84V-0	
										H.8.140CM ▲	PT. HITACHI CHEMICAL INDONESIA (E41480)	84V-0	

NO	DESCRIPTION	BASE MATERIALS								PRINTED WIRING BOARD			NOTE
		GENERIC I.D	MANUFACTURER	CAT. NO. OR GRADE	FLAME CLASS	HM1 PL3	HA1 PL3	GT1 PL3	UL FILE NO	UL MARK	MANUFACTURER	FLAME CLASS	
			OAK INDUSTRIES KOREA LTD	AD8-1107(A)	84V-0	258	200+	-	E88288	▲ 8H-4458 ▲ 88EP-2112  K8-15 ▲  5-V0 H.8.140D8 ▲	SAM HAN ELECTRIC CO. (E94018) GOLDSTAR TELECOMMUNICATION CO., LTD (E71042) KOREA CIRCUIT CO., LTD (E55881) SEONG MIN ELECTRONICS CO., LTD (E172888) PT. HITACHI CHEMICAL INDONESIA (E41480)	84V-0	
				OAK-FR2-1	84V-0	800+	200+	-	E88288	▲ 88EP-2108 ▲ 8H-4458	GOLDSTAR TELECOMMUNICATION CO., LTD (E71042) SAM HAN ELECTRIC CO. (E94018)	84V-0	

NO	DESCRIPTION	BASE MATERIALS								PRINTED WIRING BOARD			NOTE
		GENERIC I.D	MANUFACTURER	CAT. NO. OR GRADE	FLAME CLASS	HM1 PL6	HA1 PL6	GT1 PL6	UL FILE NO	UL MARK	MANUFACTURER	FLAME CLASS	
		PAPER EPOXY	HITACHI	M6L-E-47	94V-0	600+	200+	600+	EB0148	▲ A1	SANYOH CO., LTD	94V-1	
		RESIN LAMINATES	CHEMICAL								(E62668)		
			CO., LTD										
										▲ 6MK-8Y	6MK CORP CO., LTD	94V-1	
											(E41888)		
										▲ 6SEP-2118	GOLDSTAR		
											TELECOMMUNICATION		
											CO., LTD		
											(E71042)		
										▲ 8HI	SAM HAN		
											ELECTRIC CO., LTD		
											(E94018)		
										Ⓚ K8-B	KOREA CIRCUIT		
											CO., LTD		
											(E56881)		
										H.O.I 7B ▲	PT. HITACHI	94V-0	
											CHEMICAL INDONESIA		
											(E41480)		

LG 이노텍(주)

NO	DESCRIPTION	BASE MATERIALS								PRINTED WIRING BOARD			NOTE
		GENERIC I.D	MANUFACTURER	CAT. NO. OR GRADE	FLAME CLASS	HM1 PL6	HA1 PL6	GT1 PL6	UL FILE NO	UL MARK	MANUFACTURER	FLAME CLASS	
	PRINTED WIRING	GLASS FIBER	MATSUBITA	R-17B1	94V-0	120+	200+	600	EB1888	▲ 6 KX	6MK CORP	94V-0	
	BOARD	REINFORCED EPOXY	ELECTRIC								(E41888)		
		RESIN COPPER	WORK LTD										
		GLAD LAMINATES								▲ NE 28	NIPPON ELE	94V-0	
											CO., LTD		
											(E41188)		
										Σ TO ▲	SANYOH	94V-0	
											CO., LTD		
											(E62668)		
										E4A ▲ OR	GOLD STAR	94V-0	
										6SEP-2804A ▲	TELECOMMUNI-		
											CATION CO., LTD		
											(E71042)		
										Ⓛ 5 ▲	LIANG DAR	94V-0	
											TECHNOLOGY		
											CO., LTD		
											(E188182)		
										H.O.I 118	PT. HITACHI	94V-0	
											CHEMICAL INDONESIA		
											(E41480)		

LG 이노텍(주)

NO	DESCRIPTION	BASE MATERIALS								PRINTED WIRING BOARD			NOTE
		GENERIC I.D	MANUFACTURER	CAT. NO. OR GRADE	FLAME CLASS	HM1 PL3	HA1 PL3	GT1 PL3	UL FILE NO	UL MARK	MANUFACTURER	FLAME CLASS	
		GLASSFIBER	MATSUBITA	R-17B1	94V-0	120+	200+	500	EB1886	H.88 94V-0 ▲	SAM HAN	94V-0	
		REINFORCED EPOXY	ELECTRIC								ELECTRIC CO.,LTD		
		RESIN COPPER	WORK LTD								(E84018)		
		GLAD LAMINATES											
										▲ 8.11 B-V0	SEONG MIN	94V-0	
											ELECTRONICS CO.,LTD		
											(E172888)		
			HITACHI	M8L-E-887	94V-0	800+	200+	800+	EB0148	B8 ▲ CR	HITACHI CHEM.	94V-0	
			CHEMICAL							M8L-E-887 ▲	CO., LTD		
			CO., LTD							(FA8.ID:K8H)	(E41480)		
										Ⓚ K8-7B ▲	KOREA CIRCUIT	94V-0	
											CO., LTD		
											(E55881)		
										Ⓚ A K8-7B ▲	K8A ELECTRONICS, INC	94V-0	
											(E55881)		
										H.8.1 B8A	PT.HITACHI	94V-0	
											CHEMICAL INDONESIA		
											(E41480)		

LG 이노텍(주)

NO	DESCRIPTION	BASE MATERIALS								PRINTED WIRING BOARD			NOTE
		GENERIC I.D	MANUFACTURER	CAT. NO. OR GRADE	FLAME CLASS	HM1 PL3	HA1 PL3	GT1 PL3	UL FILE NO	UL MARK	MANUFACTURER	FLAME CLASS	
		EPOXY RESIN OF	DOOSAN	OAK-810	94V-0	800	28	-	E87002	88EP-2804A ▲	GOLD STAR	94V-0	
		COPPER GLAD	ELECTRO-								TELECOMMUNI-		
		LAMINATED SHEETS	MATERIALS								ATION CO., LTD		
			CO., LTD								(E71042)		
										Ⓚ K8-7A ▲	KOREA CIRCUIT	94V-0	
											CO., LTD		
											(E55881)		
				OAK-FR-400	94V-0	800	15	-	E88288	▲ 88EP-2802	GOLD STAR	94V-0	
											TELECOMMUNI-		
											ATION CO., LTD		
											(E71042)		
				AD8-7208	94V-0	800	28	-	E87002	88EP-2804A ▲	GOLD STAR	94V-0	
											TELECOMMUNI-		
											ATION CO., LTD		
											(E71042)		
										Ⓚ K8-7A ▲	KOREA CIRCUIT	94V-0	
											CO., LTD		
											(E55881)		
										▲ Ⓚ 8.11 B-V0	SEONG MIN	94V-0	
											ELECTRONICS CO.,LTD		
											(E172888)		
										H.8.1 5808	PT.HITACHI	94V-0	
											CHEMICAL INDONESIA		
											(E41480)		

LG 이노텍(주)

이노텍(주)이노텍(주)