

Model	HNA-12MM54T	Rev.① 05-Mar-2012
Application	AUDIO	
Color of Illumination #6)	Cd-free YELLOWISH ORANGE (Cd-free Ysh.O. : x=0.50, y=0.47) Cd-free WHITE(Cd-free W. : x=0.31, y=0.38) Cd-free REDDISH ORANGE (Cd-free Rsh.O. : x=0.62, y=0.37) DEEP GREEN (D.G. : x=0.105, y=0.720)	

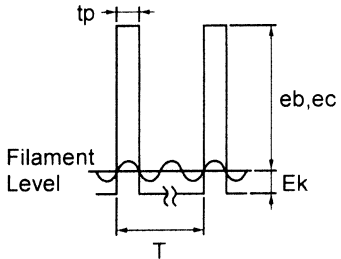
ABSOLUTE MAXIMUM RATINGS #4)

Item	Symbol	Min.	Max.	Unit	Condition
Filament Voltage #2)	Ef	3.28	4.92	Vac	eb,ec = Typ.
Anode Voltage	eb	—	36.0	Vp-p	Ef=Typ.
Grid Voltage	ec	—	36.0	Vp-p	
Operating Temperature	Topr	-40	+85	°C	—

RECOMMENDED OPERATING CONDITION #5)

Item	Symbol	Min.	Typ.	Max.	Unit
Filament Voltage #2)	Ef	3.69	4.1	4.51	Vac
Peak Anode Voltage	eb	27.0	30.0	33.0	Vp-p
Peak Grid Voltage	ec	27.0	30.0	33.0	Vp-p
Cut-Off Bias Voltage	Ek	5.9	—	8.8	Vdc
Duty Factor	Du	—	1/13	—	—
Pulse Width	tp	—	100	—	μs
Operating Temperature	Topr	-20	—	+70	°C
Storage Temperature	Tstg	-55	—	+85	°C

ELECTRICAL CHARACTERISTICS

Item	Test Condition	Symbol	Min.	Typ.	Max.	Unit	
Filament Current	Ef= 4.1 Vac ,eb=ec=0	If	158	175	193	mAac	
Anode Current #1)	Ef= 4.1 Vac eb= 30.0 Vp-p ec= 30.0 Vp-p	ib	2G~11G	—	5.5	11.0	mAp-p
			1G	—	20.0	40.0	
			12G	—	23.0	46.0	
Grid Current #1)	Duty= 1/13 tp= 100 μs tb= 0 μs	ic	2G~11G	—	5.5	11.0	mAp-p
			1G,12G	—	21.0	42.0	
Brightness		Cd-free White	37	73	—	ft-L	
		Cd-free Ysh.O.	20	41	—		
		Cd-free Rsh.O.	20	41	—		
		D.G.	20	41	—		
Brightness Ratio Between Digits	(All Segs are lit)	L(Max.) / L(Min.)	—	—	2		
Grid Cut-Off Voltage #3)	Ef= 4.1 Vac Eb= 30.0 Vdc, Ec=Vary	Ecco	(-5.9)	—	—	Vdc	
Anode Cut-Off Voltage #3)	Ef= 4.1 Vac, Du= 1/13 ec= 30.0 Vp-p, Eb= Vary	Ebco	(-5.9)	—	—	Vdc	

#1. Unless otherwise specified, the anode and the grid current should be measured for each grid when all anodes turn on

#2. AC 50~60Hz Effective Values.

#3. The cut-off voltage should be measured under the condition of the center-tab ground.

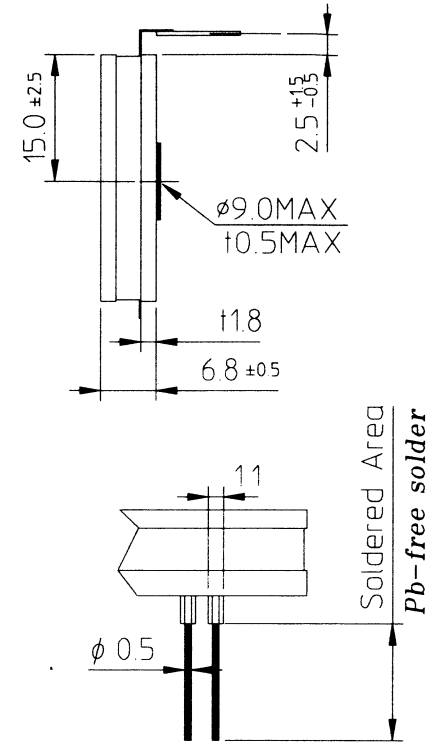
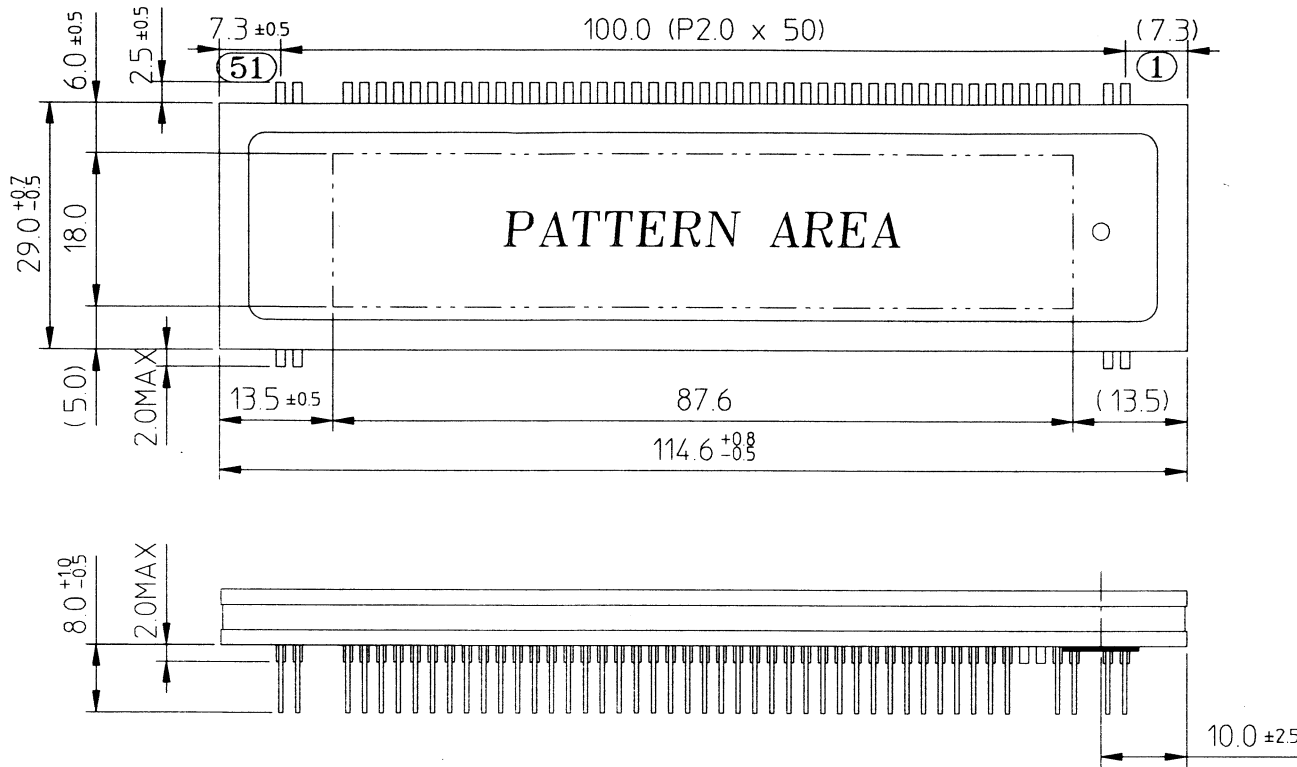
#4. Absolute Maximum Ratings : The value should not be exceeded in any conditions.

If a user don't keep this condition, then VFD may be permanently damaged.

#5. Recommended Operating: Quality can be assured within this condition. Typical rating is optimized value on life time

#6. All phosphor is Cd-free phosphor.

OUTER DIMENSIONS



LEAD DETAILS

PIN CONNECTION

PIN NO.	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
CONNECTION	F2	F2	NP	NP	P30	P29	P28	P27	P26	P25	P24	P23	P22	P21	P20	P19	P18	P17	P16	P15	P14	P13	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1	12G	11G	10G	9G	8G	7G	6G

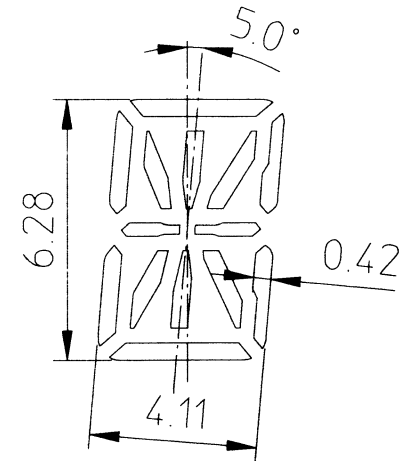
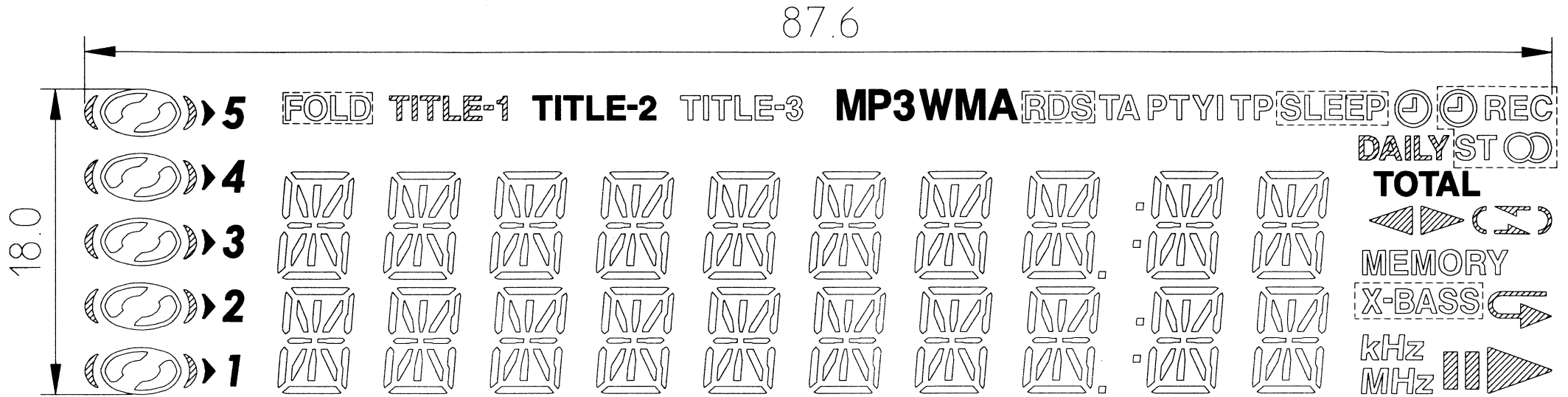
Note

- Fn : Filament pin
- nG : Grid pin
- Pn : Anode pin
- NP : No pin
- NX : No extended pin

10	9	8	7	6	5	4	3	2	1
5G	4G	3G	NX	NX	2G	1G	NP	F1	F1

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 OUTER DIMENSIONS
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PATTERN DETAILS

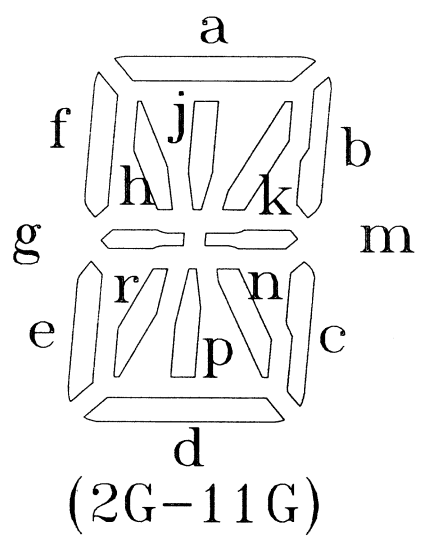
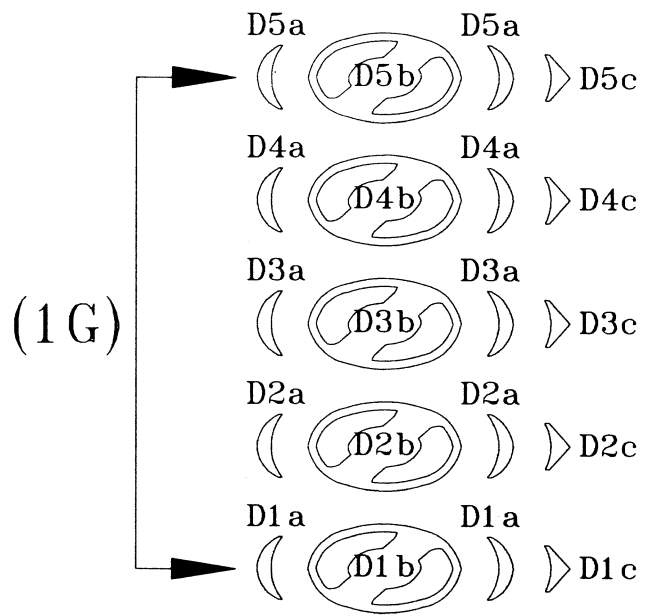
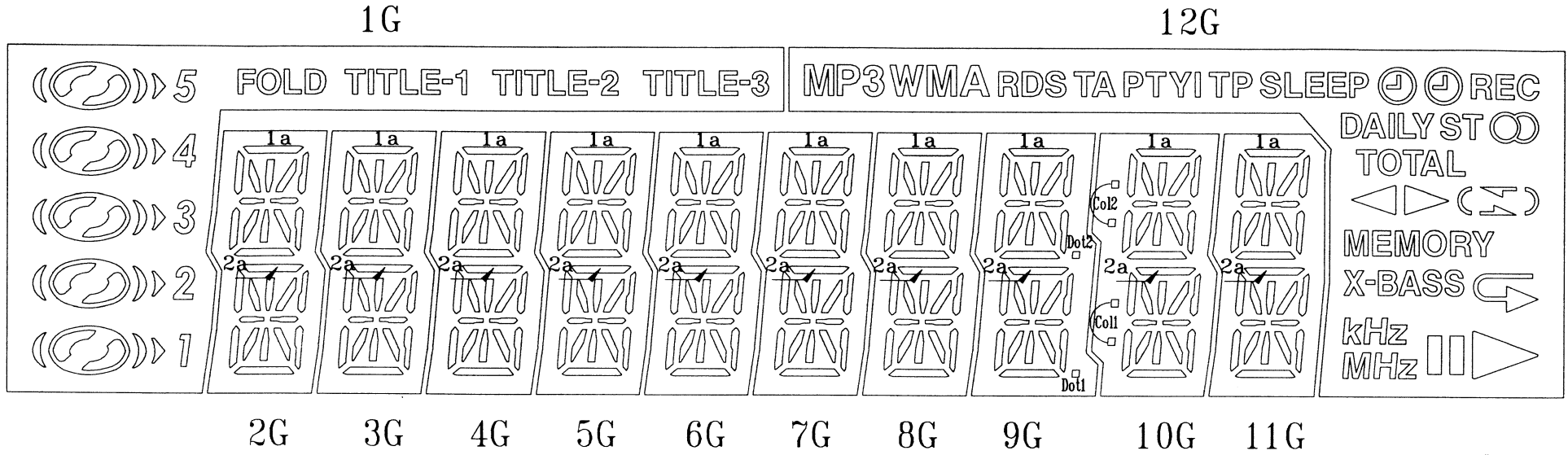


◎ Color of Illumination ◎

- Cd-free Yellowish Orange (Cd-free Ysh.0. $x=0.50, y=0.47$) ----- Hatched patterns.
- Cd-free Reddish Orange (Cd-free Rsh.0. $x=0.62, y=0.37$) ----- Patterns within the dotted line.
- Deep Green (D.G. $x=0.105, y=0.720$) ----- Hatched patterns.
- Cd-free White (Cd-free W. $x=0.31, y=0.38$) ----- Others.

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 PATTERN DETAILS
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GRID ASSIGNMENT



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ANODE CONNECTION

	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G
P1	FOLD	1a	1a	1a	1a	1a	1a	1a	1a	1a	1a	
P2	TITLE-1	1b	1b	1b	1b	1b	1b	1b	1b	1b	1b	
P3	TITLE-2	1k	1k	1k	1k	1k	1k	1k	1k	1k	1k	TOTAL
P4	TITLE-3	1j	1j	1j	1j	1j	1j	1j	1j	1j	1j	RDS
P5	5	1h	1h	1h	1h	1h	1h	1h	1h	1h	1h	TA
P6	D5a	1f	1f	1f	1f	1f	1f	1f	1f	1f	1f	WMA
P7	D5b	1m	1m	1m	1m	1m	1m	1m	1m	1m	1m	PTYI
P8	D5c	1d	1d	1d	1d	1d	1d	1d	1d	1d	1d	TP
P9	4	1g	1g	1g	1g	1g	1g	1g	1g	1g	1g	SLEEP
P10	D4a	1p	1p	1p	1p	1p	1p	1p	1p	1p	1p	DAILY
P11	D4b	1e	1e	1e	1e	1e	1e	1e	1e	1e	1e	Ⓞ(L)
P12	D4c	1n	1n	1n	1n	1n	1n	1n	1n	1n	1n	Ⓞ(R)
P13	3	1r	1r	1r	1r	1r	1r	1r	1r	1r	1r	REC
P14	D3a	1c	1c	1c	1c	1c	1c	1c	1c	1c	1c	ST
P15	D3b	2a	2a	2a	2a	2a	2a	2a	2a	2a	2a	◁
P16	D3c	2b	2b	2b	2b	2b	2b	2b	2b	2b	2b	▷
P17	2	2k	2k	2k	2k	2k	2k	2k	2k	2k	2k	∞
P18	D2a	2j	2j	2j	2j	2j	2j	2j	2j	2j	2j	⌒
P19	D2b	2h	2h	2h	2h	2h	2h	2h	2h	2h	2h	↕
P20	D2c	2f	2f	2f	2f	2f	2f	2f	2f	2f	2f	⌋
P21	1	2m	2m	2m	2m	2m	2m	2m	2m	2m	2m	MEMORY
P22	D1a	2d	2d	2d	2d	2d	2d	2d	2d	2d	2d	↶
P23	D1b	2g	2g	2g	2g	2g	2g	2g	2g	2g	2g	▷(∞)
P24	D1c	2p	2p	2p	2p	2p	2p	2p	2p	2p	2p	kHz
P25		2e	2e	2e	2e	2e	2e	2e	2e	2e	2e	MHz
P26		2n	2n	2n	2n	2n	2n	2n	2n	2n	2n	∥
P27		2r	2r	2r	2r	2r	2r	2r	2r	2r	2r	MP3
P28		2c	2c	2c	2c	2c	2c	2c	2c	2c	2c	X-BASS
P29									Dot1	Col1		
P30									Dot2	Col2		

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