

Model	HNA-09SS91	Rev.① 09-Nov-2012
Application	AUDIO	
Color of Illumination #6)	GREEN (G. :x=0.250,y=0.439) Cd-free ORANGE (Cd-free O. :x=0.56,y=0.42)	

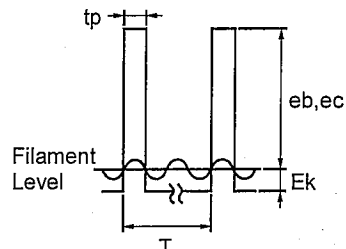
ABSOLUTE MAXIMUM RATINGS #4)

Item	Symbol	Min.	Max.	Unit	Condition
Filament Voltage #2)	Ef	—	3.12	Vac	eb,ec = Typ.
Anode Voltage	eb	—	33.0	Vp-p	Ef=Typ.
Grid Voltage	ec	—	33.0	Vp-p	
Operating Temperature	Topr	-40	+85	°C	—

RECOMMENDED OPERATING CONDITION #5)

Item	Symbol	Min.	Typ.	Max.	Unit
Filament Voltage #2)	Ef	2.34	2.60	2.86	Vac
Peak Anode Voltage	eb	25.0	28.0	31.0	Vp-p
Peak Grid Voltage	ec	25.0	28.0	31.0	Vp-p
Cut-Off Bias Voltage	Ek	3.8	—	5.8	Vdc
Duty Factor	Du	—	1/10	—	—
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= 2.6 Vac ,eb=ec=0	If	90	100	110	mAac	
Anode Current #1)	Ef= 2.6 Vac eb= 28.0 Vp-p ec= 28.0 Vp-p	ib	1G~9G	—	3.0	6.0	mAp-p
Grid Current #1)	Duty= 1/10 tp= 100 μs tb= 0 μs	ic	1G~9G	—	5.0	10.0	mAp-p
Brightness		GREEN	102	204	—	ft-L (cd/m²)	
		Cd-free ORANGE	11	22	—		
			35	70	—		
Brightness Ratio Between Digits	(All Segs are lit)	L(Max.) / L(Min.)	—	—	2		
Grid Cut-Off Voltage #3)	Ef= 2.6 Vac, Eb= 28.0 Vdc, Ec=Vary	Ecco	(-3.8)	—	—	Vdc	
Anode Cut-Off Voltage #3)	Ef= 2.6 Vac, Du= 1/10 ec= 28.0 Vp-p, Eb= Vary	Ebco	(-3.8)	—	—	Vdc	

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

#2. Based on common application of AC power source, switched frequency placed on 50Hz-60Hz would be acceptable.

However, considering nature characteristic of filament, 10KHz or above would be strongly recommended.

#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 condition.

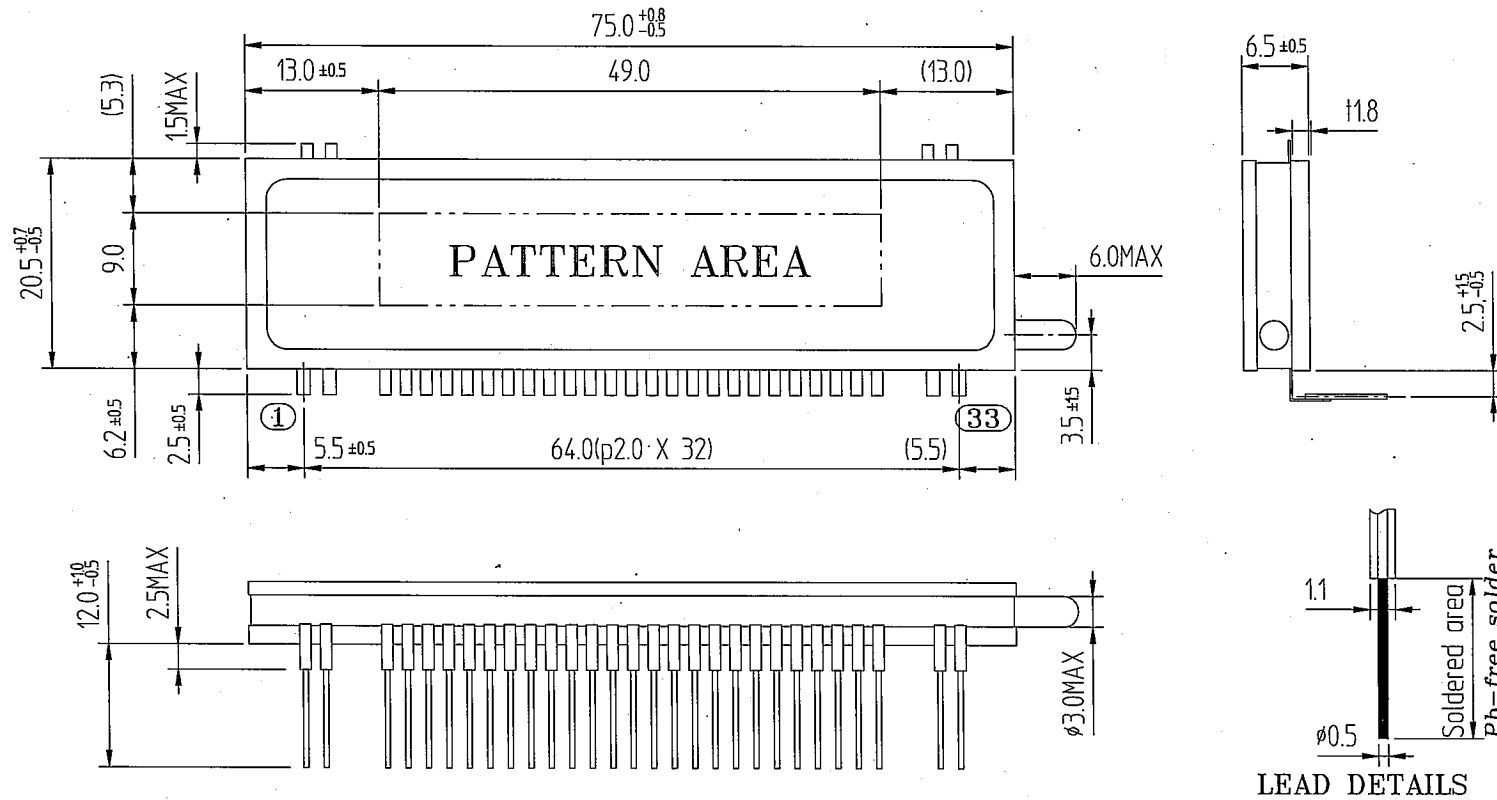
The value is not allowed to be longtime used, or else the VFD may be permanently damaged.

#5. Recommended Operating Condition : Quality can be assured within this condition.

Typical rating is the most optimized value on the life time

#6. All phosphor is Cd-free phosphor.

OUTER DIMENSIONS



PIN CONNECTION

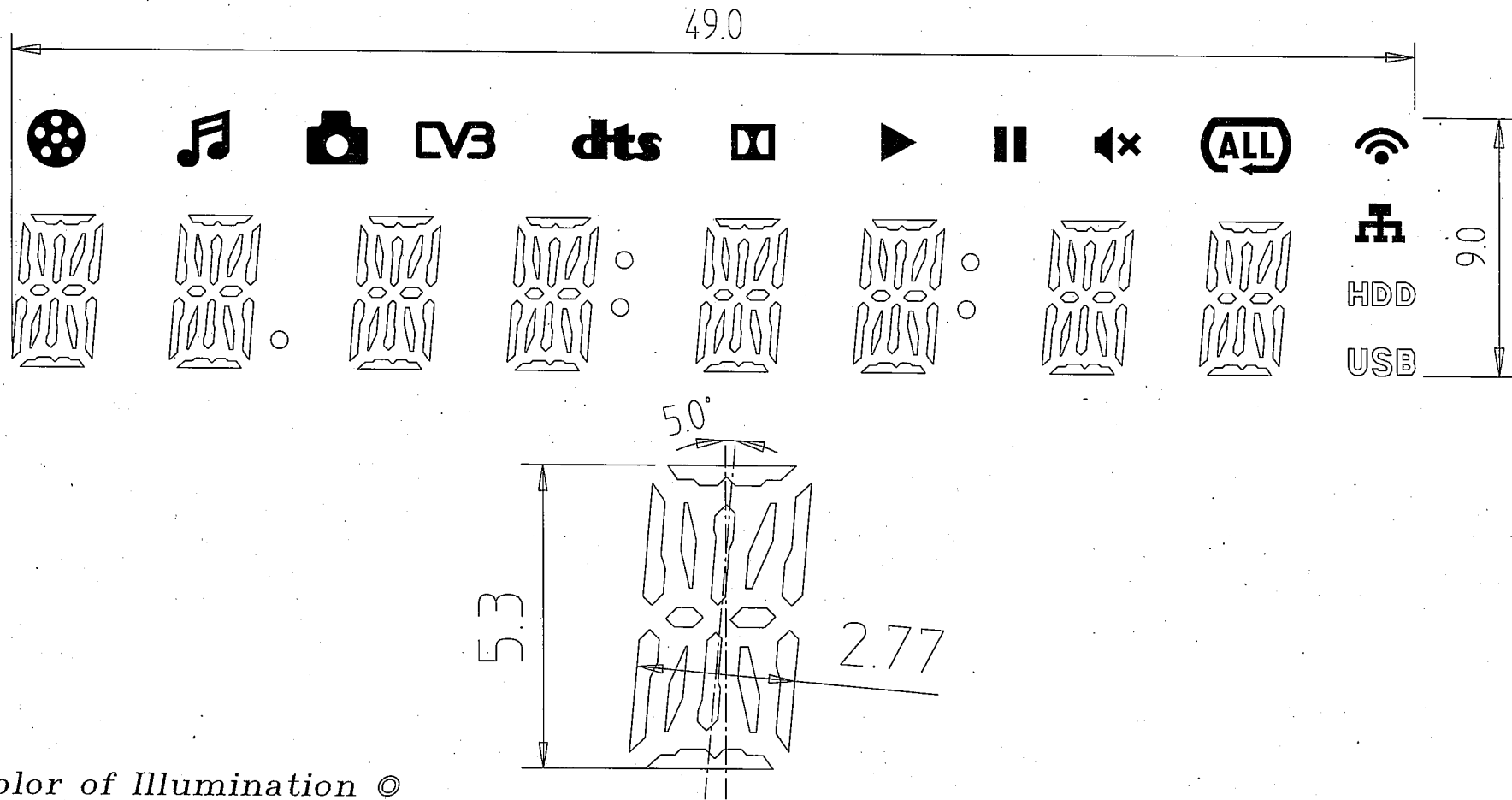
PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
CONNECTION	F1	F1	NP	NP	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	1G	2G	3G	4G	5G	6G	7G	8G	9G	NP	NP	F2	F2

● Notes ●

- 1) Fn: Filament pin
- 2) nG : Grid pin
- 3) Pn : Anode pin
- 4) NP : No pin

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PATTERN DETAILS

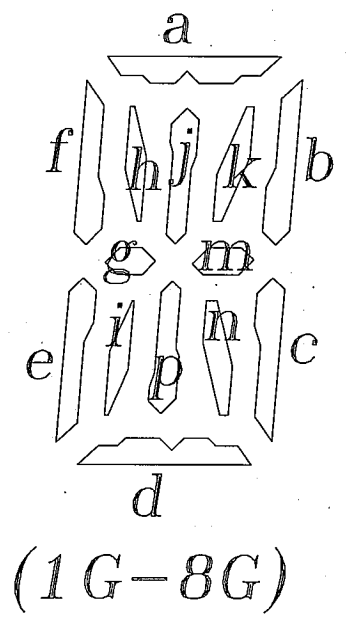
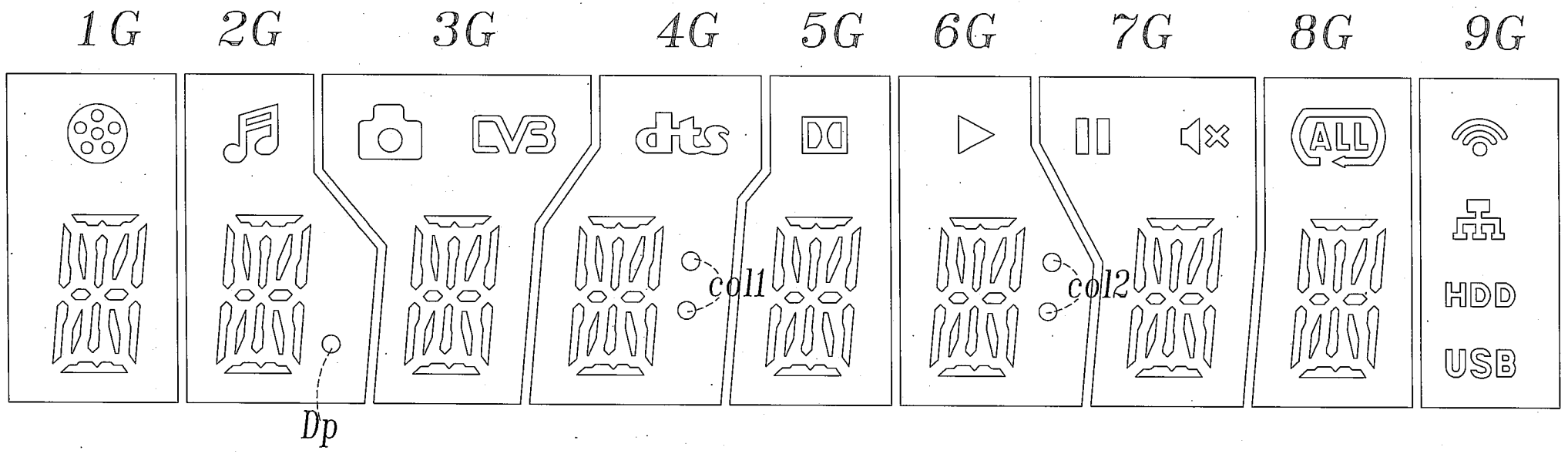


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- Cd free Orange (Cd-free 0. $x=0.56, y=0.42$) --- Hatched patterns.
- Green (G. $x=0.250, y=0.439$) --- Other Patterns.

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GRID ASSIGNMENT



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ANODE CONNECTION

	1G	2G	3G	4G	5G	6G	7G	8G	9G
P1	m	m	m	m	m	m	m	m	
P2	g	g	g	g	g	g	g	g	
P3	e	e	e	e	e	e	e	e	
P4	i	i	i	i	i	i	i	i	
P5	p	p	p	p	p	p	p	p	
P6	n	n	n	n	n	n	n	n	
P7	c	c	c	c	c	c	c	c	
P8	d	d	d	d	d	d	d	d	
P9	k	k	k	k	k	k	k	k	
P10	j	j	j	j	j	j	j	j	
P11	h	h	h	h	h	h	h	h	
P12	f	f	f	f	f	f	f	f	
P13	b	b	b	b	b	b	b	b	USB
P14	a	a	a	a	a	a	a	a	HDD
P15		Dp	LV3	coll		col2	⊞		⊞
P16	⊞	🎵	📷	dts	⊞	▶	⏸	(ALL)	📶

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