
Piezoelectric Transformer LCD CCFL Controller

Features:

- 6V~20V Operation Voltage
- Full Bridge & Half Bridge Fixed Frequency
- Resonance ZVS Control
- Boost SYNC Control
- 1 Bit change 0V~3V, 3V~0V Dimming
- Built-in ADC For Digital Burst Model Dimming
- Open lamp & short circuit protection
- Low power CMOS process
- TSSOP 24 pin packaging

Application:

- Video Phone/Door Phone
- Digital Camera
- Cold Cathode Fluorescent Lamps system
- Notebook or Pocket PC
- Navigation Devices (GPS Equipment)
- Notebook Computer
- LCD Monitor
- Personal Digital Assistants

Description:

The AL699 is the highest performance with digital and analog control design circuit for driving Piezoelectric transformer product applications. The device is particularly suitable for use in products such as CCFL applications. The AL699 contains 8 bits ADC, short circuit protections. It can autotrace calibrate Piezoelectric Transformer frequency changes. The device also supports power saving capacity.

Absolute Maximum Ratings

VCC ----- 18V

Operating Junction Temperature---- 150°C

Storage Temperature----- -55°C to 150°C

Recommended Operating Conditions

Input Voltage VCC ----- 6V to 18V

Brightness Voltage ----- 0V to 3.0V

Enable ----- 0V or 3V

CPU Operating Temperature ----- -20°C to +85°C

CPU Operating Frequency ----- 8MHz

Electrical Characteristics (TA=25°C , Vcc=18°C)

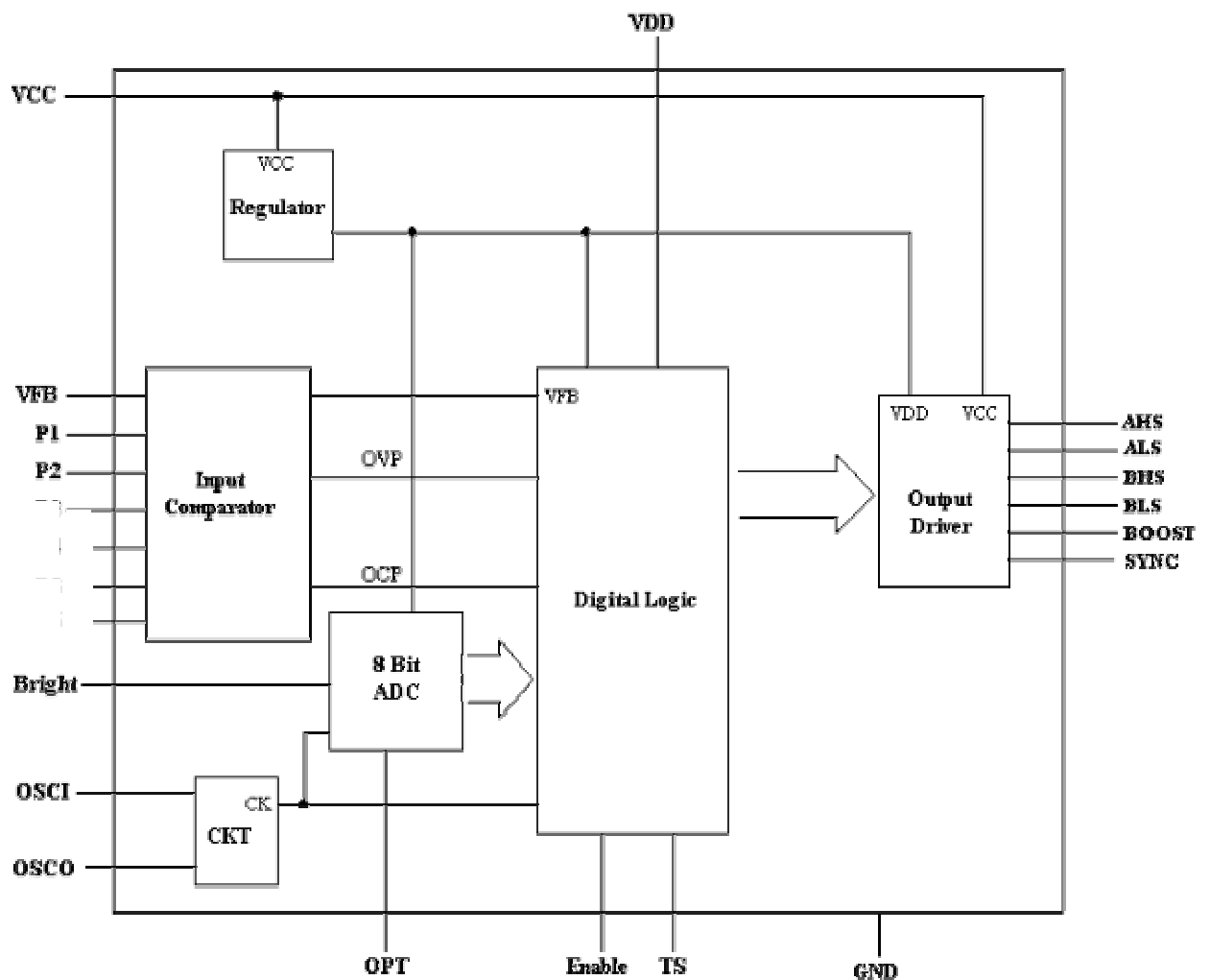
Parameter	SYM	Conditions	MIN .	TYP.	MAX.	UNIT.
Operating Voltage	VCC		6		20	V
Operating Current	IOP	Enable = VDD		3		MA
Output Drive Current (AHS,BHS,SYNC) (ALS,BLS,BOOST)	IOH	Vo = GND		25		MA
	IOL	Vo = 18V		25		MA
Operating Frequency	FOSC			8		MHz
Reference Voltage	VDD	VCC ≥ 6V		3		V
Standby Current	ISB	Enable = GND VCC = 18V		15		UA

Order Information

TA	PD	TSSOP			
		24 pin			
0°C to 70 °C		AL699PD			

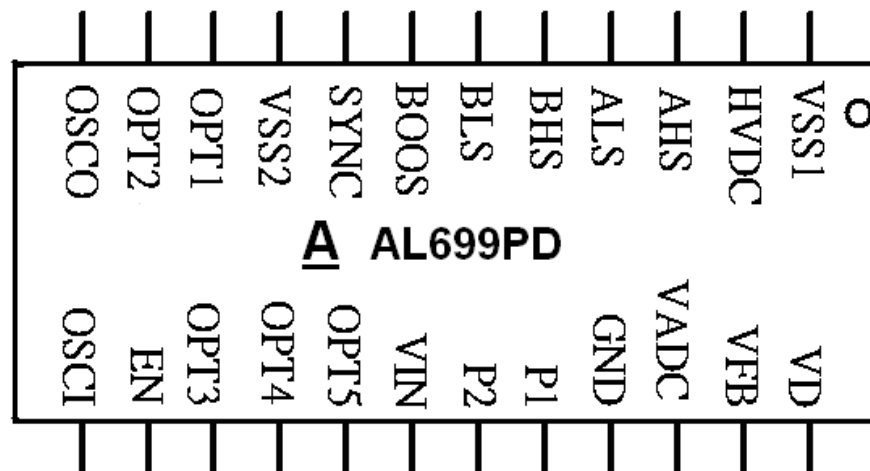
..The PD package is available taped and reeled. to order quantities of 1000 devices per reel.

Function Diagram

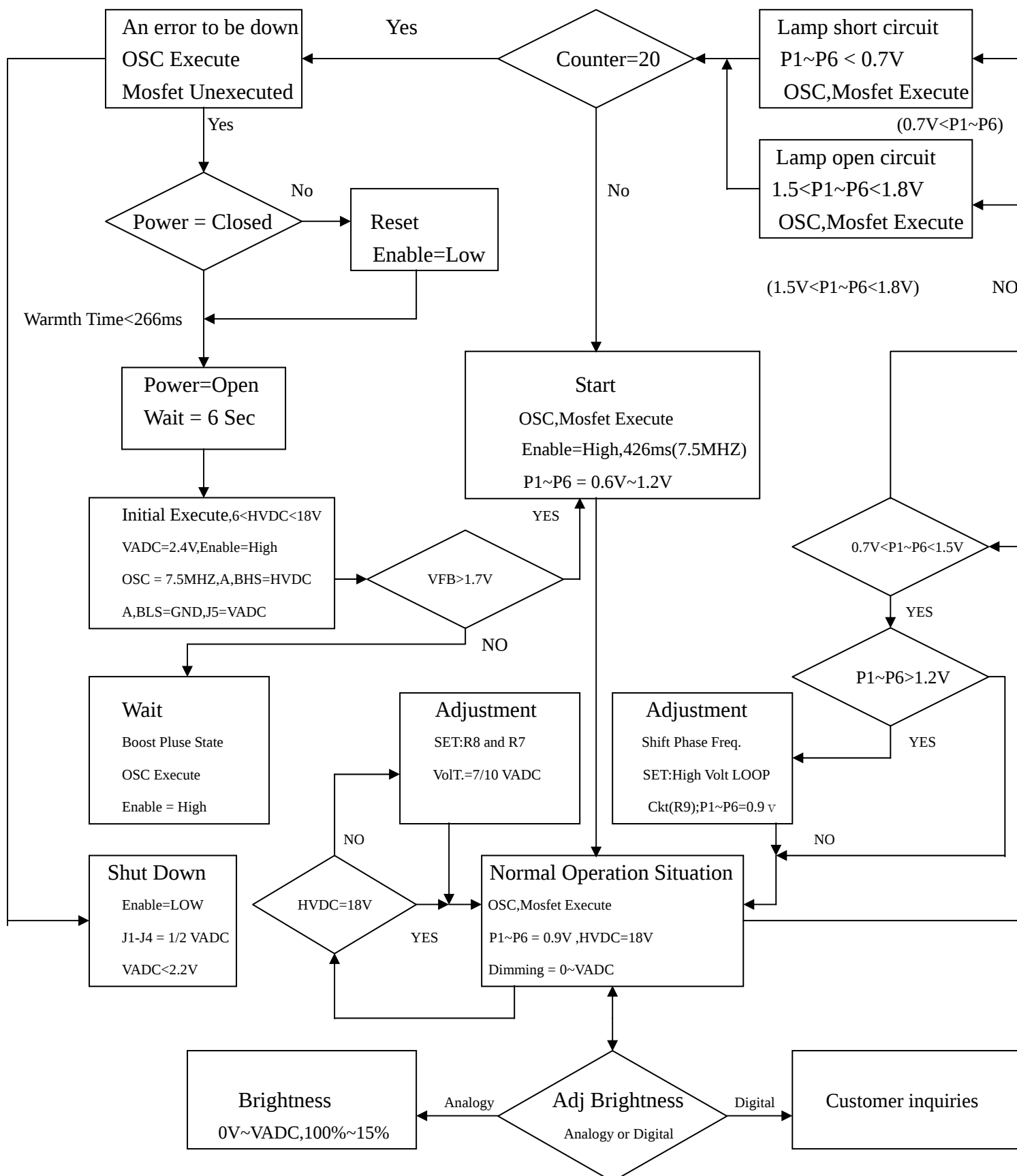


TSSOP:PIN Description:

NO.	Symbol	I/O	Description
1	VSS1	GND	Ground
2	HVDC	PWR	Supply voltage input +6V~ 20V.
3	AHS	O	Gate driver output for power MOSFET.
4	ALS	O	
5	BHS	O	
6	BLS	O	
7	BOOS	O	
8	SYNC	O	
9	VSS2	GND	Ground.
10	OPT1	I	Reference frequency for PZT.
11	OPT2	I	Reference frequency for PZT.
12	OSCO	I	Crystal (Resonant) Oscillator output
13	OSCI	O	Crystal (Resonant) Oscillator input.
14	EN	I	The enable will turn the chip ON/OFF
15	OPT3	I	Reference frequency for PZT.
16	OPT4	I	Reference frequency for PZT.
17	OPT5	I	Dimmer control option.
			OPT5 Short=VDD Open=GND
			Control 3V~0V(Light) 0V~3V(Light)
18	BRIGHT	I	Dimmer control input
19	P2	I	Over voltage protection & Over Current protection
20	P1	I	Over voltage protection & Over Current protection
21	GND	GND	GND
22	VADC	PWR	8 bit ADC output
23	VFB	I	Voltage feedback sense input
24	VD	I	VDD ref adj (Match for A/D board control level).



PZT 6~18V INVERTER CIRCUIT STATE DIAGRAM

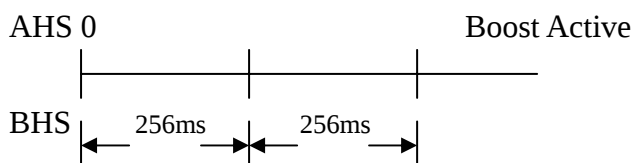


Characteristic:

- Digital phase modulation control CCFL lamps.
- Steady frequency & Accurate driver circuit.

Application circuit characterization:

- (1) Power ON, OSC resonance, OPT1~OPT5=High ; VIN=Low, Mode=Low,
P1~P6=1.5, TS=30HZ, VFB=Low, Output Single Diagram



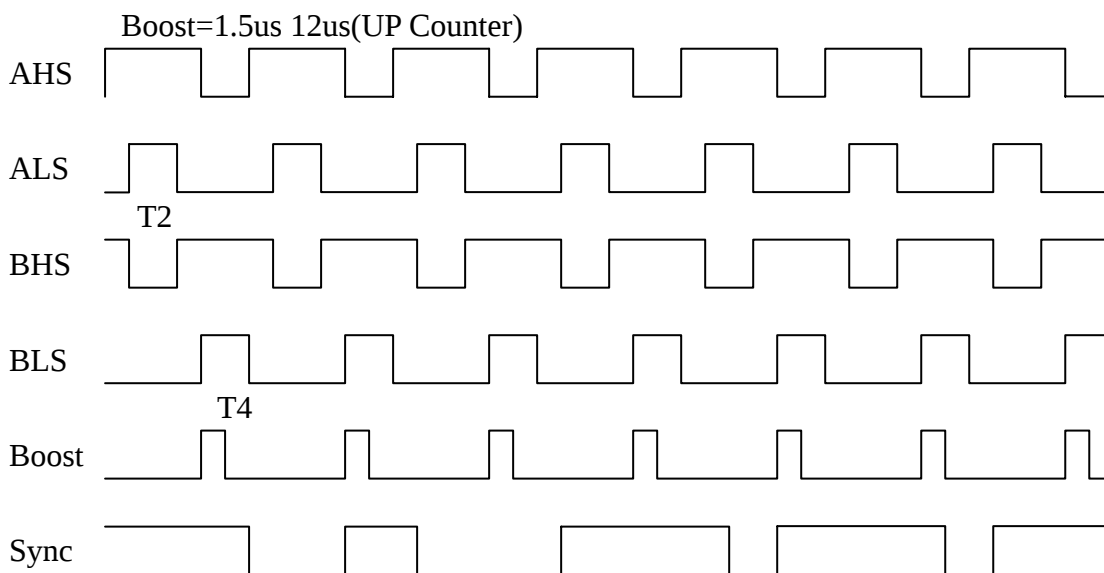
- (1) Power ON delay time = 256ms
(2) EN=0 → EN=1 delay time = 256ms
(3) (1)+(2) = 512ms

- (1) After Boost & SYNC = SOFT Start

When EN=0, AHS、BHS、SYNC=0, ALS、BLS、BOOST=1, OSC Unresponsive

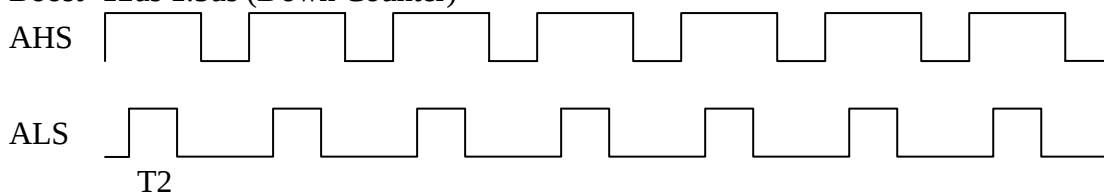
→ Sleeping mode

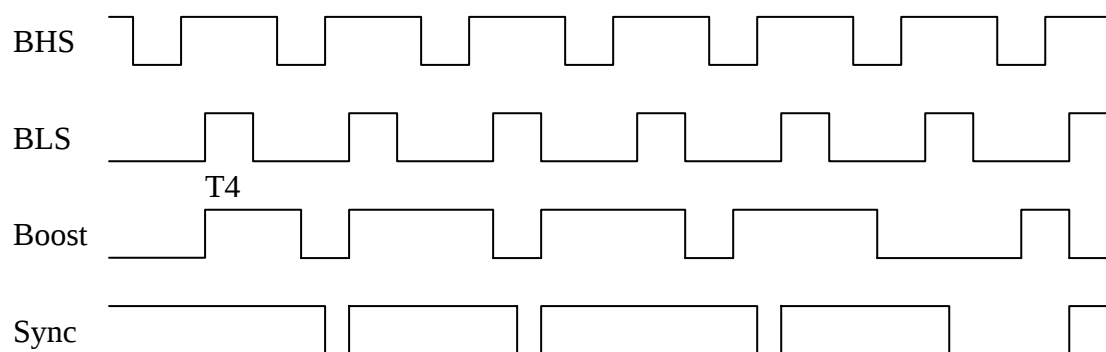
- (a) EN=1、VFB=0



- (b) EN=1、VFB=1

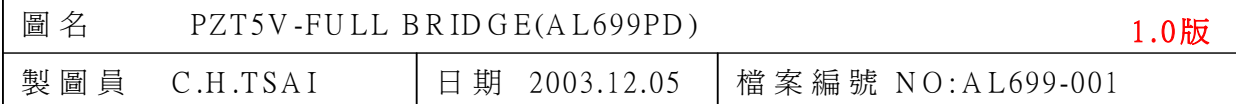
Boost=12us 1.5us (Down Counter)





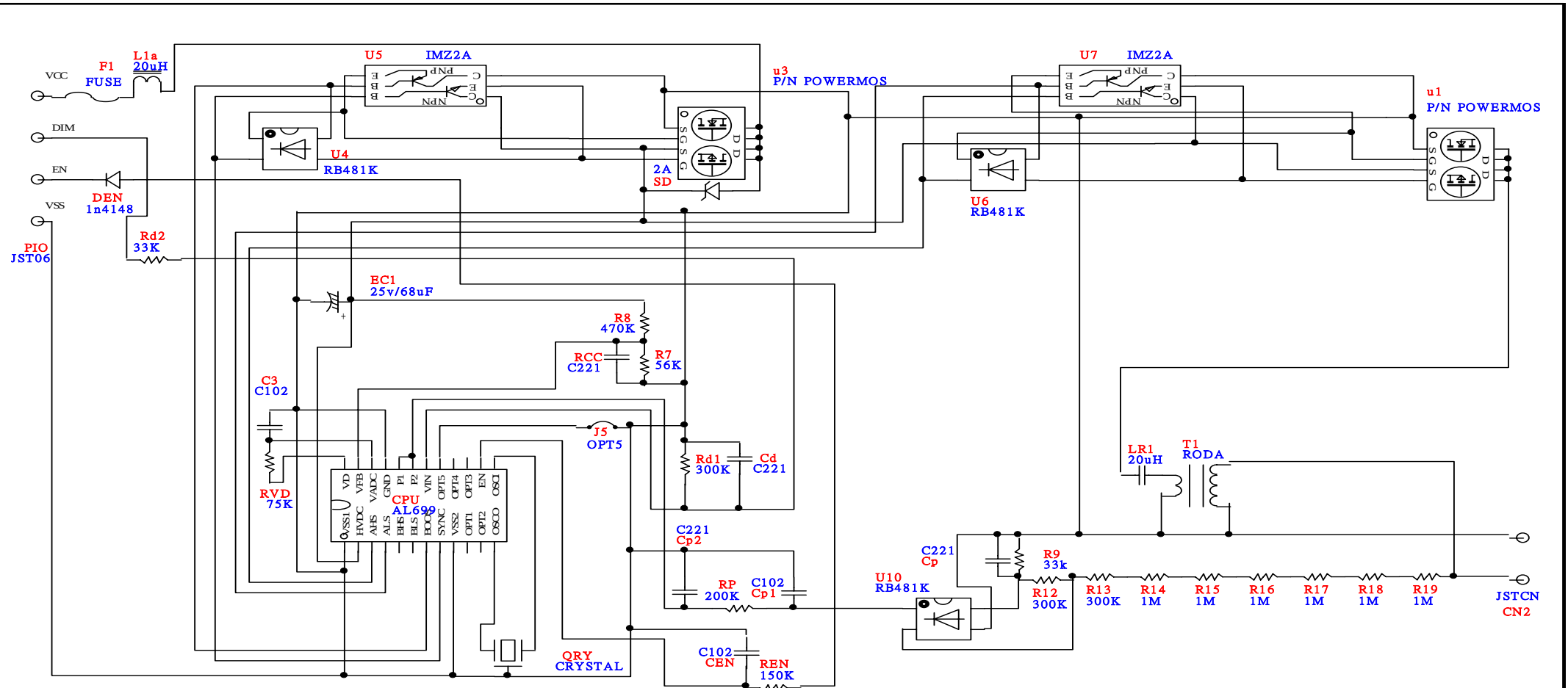
* VBF always = High, Boost=Low, SYNC=High.

AL-699PD: Oct, 2003



AL699

AL-699PD: Oct, 2003



典亮科技股份有限公司

圖名 數位式 冷陰極管驅動IC 半橋 1 LAMP

1.1版

製圖員 Chang Cheng

日期 2004.2.24

檔案編號 NO: ATBEL06

ATBEL

SUMMARY

BODY WIDTH	LEAD PITCH	LEAD COUNT	VARIATIONS
4.40	0.65	8	AA
		14	AB- 1
		16	AB
		20	AC
		24	AD
		28	AE
	0.50	38	BD- 1
6.10	0.50	48	ED
		56	EE

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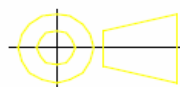
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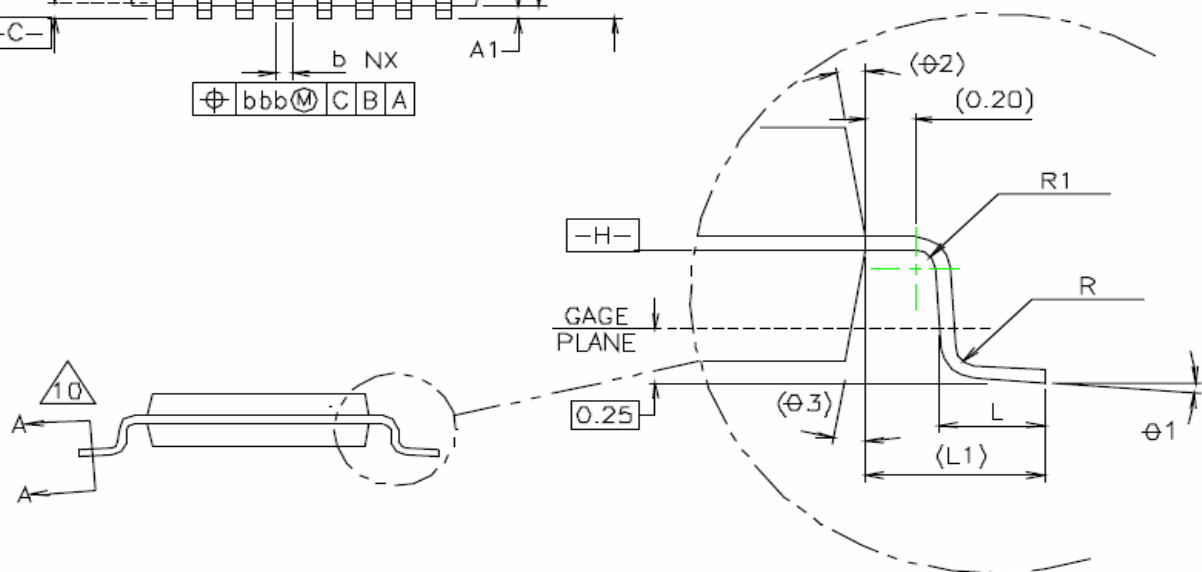
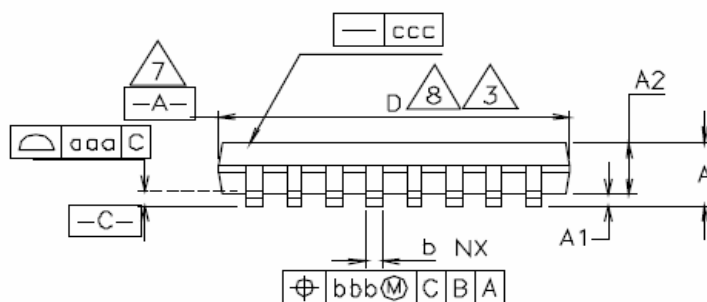
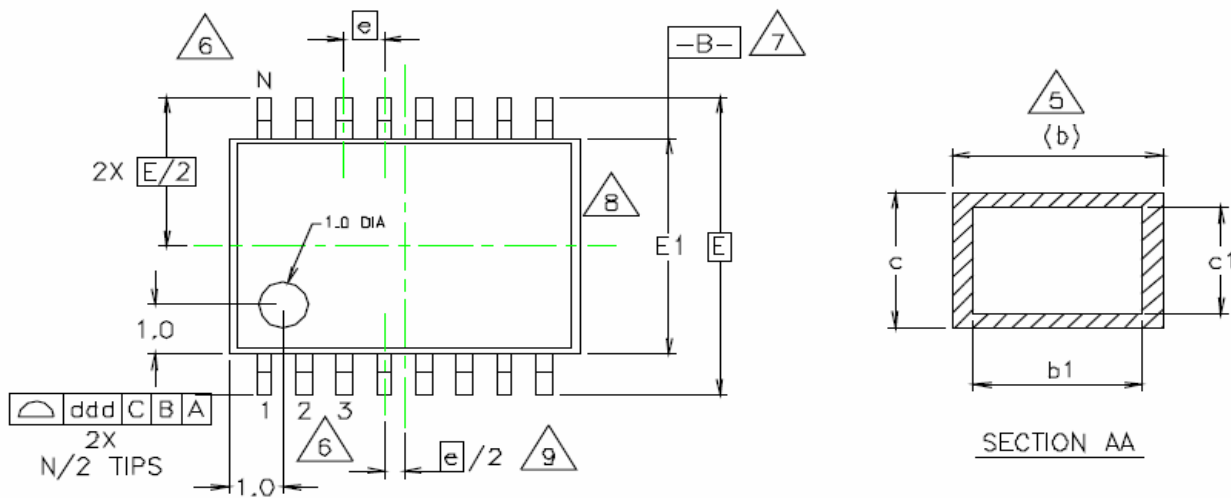
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*TSSOP
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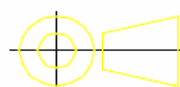
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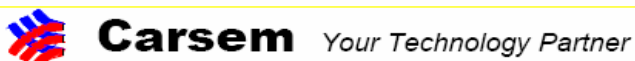
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S Y M B O L	COMMON DIMENSION(MILLIMETERS)							N O T E
	0.65mm LEAD PITCH			N O T E	0.50mm LEAD PITCH			N O T E
	MIN	NOM	MAX		MIN	NOM	MAX	
A	----	----	1.10	----	----	----	1.10	----
A1	0.05	----	0.15	----	0.05	----	0.15	----
A2	0.85	0.90	0.95	----	0.85	0.90	0.95	----
L	0.50	0.60	0.75	----	0.45	0.60	0.75	----
R	0.09	----	----	----	0.09	----	----	----
R1	0.09	----	----	----	0.09	----	----	----
b	0.19	----	0.30	5	0.17	----	0.27	5
b1	0.19	0.22	0.25	----	0.17	0.20	0.23	----
c	0.09	----	0.20	----	0.09	----	0.20	----
c1	0.09	----	0.16	----	0.09	----	0.16	----
θ1	0°	----	8°	----	0°	----	8°	----
L1	1.0 REF			----	1.0 REF			----
aaa	0.10			----	0.10			----
bbb	0.10			----	0.08			----
ccc	0.05			----	0.05			----
ddd	0.20			----	0.20			----
e	0.65 BSC			----	0.50 BSC			----
θ2	12° REF			----	12° REF			----
θ3	12° REF			----	12° REF			----
NOTE	1,2				1,2			
ISSUE	A				A			

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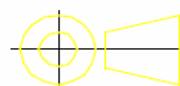
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NOTES:

- 1 ALL DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
- 2 DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
- 3 DIMENSION 'D' DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE.
- 4 DIMENSION 'E1' DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 PER SIDE.
- 5 DIMENSION 'b' DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 MM TOTAL IN EXCESS OF THE 'b' DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT. MINIMUM SPACE BETWEEN PROTRUSION AND ADJACENT LEAD IS 0.07 MM FOR 0.5 MM PITCH PACKAGES.
- 6 TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
- 7 DATUMS $\boxed{-A-}$ AND $\boxed{-B-}$ TO BE DETERMINED AT DATUM PLANE $\boxed{-H-}$
- 8 DIMENSIONS 'D' AND 'E1' ARE TO BE DETERMINED AT DATUM PLANE $\boxed{-H-}$
- 9 THIS DIMENSION APPLIES ONLY TO VARIATIONS WITH AN EVEN NUMBER OF LEADS PER SIDE. FOR VARIATION WITH AN ODD NUMBER OF LEADS PER SIDE, THE "CENTER" LEAD MUST BE COINCIDENT WITH THE PACKAGE CENTERLINE, DATUM A.
- 10 CROSS SECTION A-A TO BE DETERMINED AT 0.10 TO 0.25 MM FROM THE LEAD TIP.
- 11 THIS VARIATION IS NOT REGISTERED WITH JEDEC.

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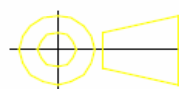
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SYMBOL	VARIATIONS											
	AA			NOTE	AB-1			NOTE	AB			NOTE
	MIN	NOM	MAX		MIN	NOM	MAX		MIN	NOM	MAX	
D	2.90	3.0	3.10	3,8	4.90	5.00	5.10	3,8	4.90	5.00	5.10	3,8
E1	4.30	4.40	4.50	4,8	4.30	4.40	4.50	4,8	4.30	4.40	4.50	4,8
E	6.4 BSC				6.4 BSC				6.4 BSC			
e	0.65 BSC				0.65 BSC				0.65 BSC			
N	8			6	14			6	16			6
NOTE	1,2				1,2				1,2			
ISSUE	A				C				A			

SYMBOL	VARIATIONS											
	AC			NOTE	AD			NOTE	AE			NOTE
	MIN	NOM	MAX		MIN	NOM	MAX		MIN	NOM	MAX	
<i>D</i>	6.40	6.50	6.60	<i>3,8</i>	7.70	7.80	7.90	<i>3,8</i>	9.60	9.70	9.80	<i>3,8</i>
<i>E1</i>	4.30	4.40	4.50	<i>4,8</i>	4.30	4.40	4.50	<i>4,8</i>	4.30	4.40	4.50	<i>4,8</i>
<i>E</i>	6.4 BSC				6.4 BSC				6.4 BSC			
<i>e</i>	0.65 BSC				0.65 BSC				0.65 BSC			
<i>N</i>	20			<i>6</i>	24			<i>6</i>	28			<i>6</i>
NOTE	<i>1,2</i>				<i>1,2</i>				<i>1,2</i>			
ISSUE	<i>A</i>				<i>A</i>				<i>A</i>			

SYMBOL	VARIATIONS											
	BD-1			NOTE	ED			NOTE	EE			NOTE
	MIN	NOM	MAX		MIN	NOM	MAX		MIN	NOM	MAX	
D	9.60	9.70	9.80	3,8	12.40	12.50	12.60	3,8	13.90	14.00	14.10	3,8
E1	4.30	4.40	4.50	4,8	6.00	6.10	6.20	4,8	6.00	6.10	6.20	4,8
E	6.4 BSC				8.1 BSC				8.1 BSC			
e	0.50 BSC				0.50 BSC				0.50 BSC			
N	38			6	48			6	56			6
NOTE	1,2,11				1,2				1,2			
ISSUE	---				A				A			

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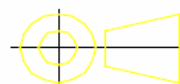
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