Agamem Microelectronics Inc. **AA87222**

CCD VERTICAL DRIVER

■ DESCRIPTION

The AA87222 is a vertical driver with 3 levels of output voltage processed in a standard CMOS.
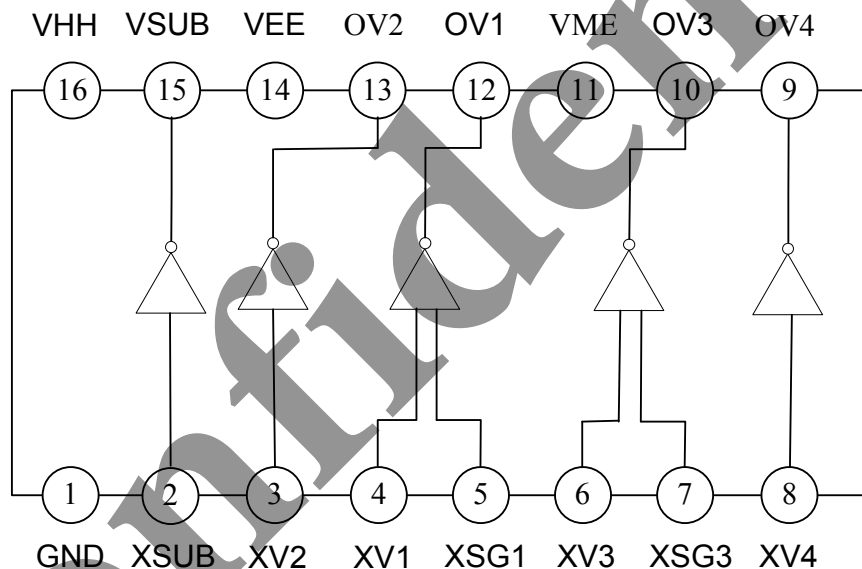
■ FEATURES

• 3 Levels of Output Voltage, 15V, 0V and -8.5V

• 3.3V / 5V Input Voltage

■ APPLICATIONS

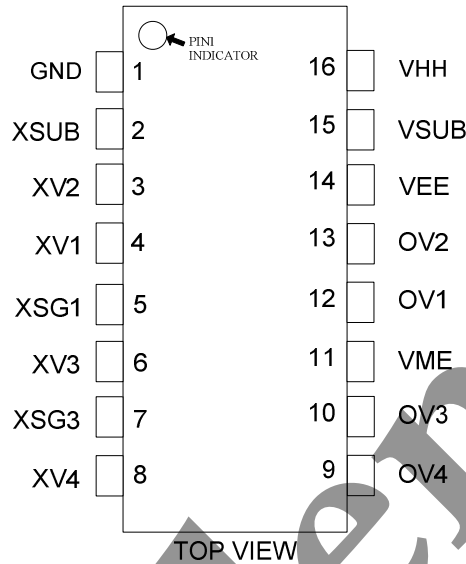• CCD Image Sensors

■ BLOCK DIAGRAM

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■ **REVISION HISTORY**

Rev.	Description	Page No.	Date	Remark
1.0	Spec. release		2009/02/17	
2.0	Delete "Preliminary"	All	2010/02/04	

■ **PIN DESCRIPTION**

GND	1	16 VHH
XSUB	2	15 VSUB
XV2	3	14 VEE
XV1	4	13 OV2
XSG1	5	12 OV1
XV3	6	11 VME
XSG3	7	10 OV3
XV4	8	9 OV4

PIN1 INDICATOR

TOP VIEW

PIN NO.	PIN NAME	FUNCTION
POWER		
16	VHH	+15V Power Supply
1	GND	Power Supply Ground
14	VEE	-8.5V Power Supply
11	VME	0V Power Supply
INPUT SIGNAL		
2	XSUB	Input Signal --Control VSUB
4	XV1	Input Signal --Control OV1
3	XV2	Input Signal --Control OV2
6	XV3	Input Signal --Control OV3
8	XV4	Input Signal --Control OV4
5	XSG1	Input Signal --Control OV1
7	XSG3	Input Signal --Control OV3

PIN NO.	PIN NAME	FUNCTION
OUTPUT SIGNAL		
15	VSUB	Output Signal–2 Level, VEE & VHH
12	OV1	Output Signal—3 Level, VEE, VHH & VME
13	OV2	Output Signal –2 Level, VEE & VME
10	OV3	Output Signal—3 Level, VEE, VHH & VME
9	OV4	Output Signal –2 Level, VEE & VME

■   ELECTRICAL PERFORMANCE
ABSOLUTE MAXIMUM RATINGS

Ta=25℃

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	TYP	MAX	
V_{EE}	Supply Voltage	-10		0	V
V_{HH}		-0.3		VEE+30	V
V_{ME}		VEE-0.3		3	V
V_I	Input Voltage	-0.3		VHH+0.3	V
OV1, OV3, VSUB	Output Voltage	VEE-0.3		VHH+0.3	V
OV2, OV4		VEE-0.3		VME+0.3	V
T_A	Operating Ambient Temperature	-25		85	℃
T_S	Storage Temperature	-45		125	℃

NOTE: Stress above those listed under "Absolute Maximum Rating" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for the extended periods of time may affect device reliability.

■ **LOGIC TRUTH TABLE**

INPUT				OUTPUT		
XV1, 3	XSG1, 3	XV2, 4	XSUB	OV1, 3	OV2, 4	VSUB
L	L	X	X	VHH	X	X
H	L	X	X	Z	X	X
L	H	X	X	VME	X	X
H	H	X	X	VEE	X	X
X	X	L	X	X	VME	X
X	X	H	X	X	VEE	X
X	X	X	L	X	X	VHH
X	X	X	H	X	X	VEE

■ **DC CHARACTERISTICS**

Ta = 25℃ ,VHH=15, VME=GND, VEE=-8.5V

SYMBOL	PARAMETER	TEST CONDITION	LIMITS			UNIT
			MIN	TYP	MAX	
V_{HH}	Power Supply		14.5	15	15.5	V
V_{EE}			-9.5	-8.5	-7.5	V
I_{HH}	Supply Current	(*1)		2.4	6	mA
I_{EE}			-8	-4.2		mA
I_{ME}				0.6	2.5	mA
V_{IH}	Input Voltage		2.3			V
V_{IL}					1.3	V
I_I	Input Current	VIN=0~5V (*2)	-1	0	1	uA
I_{OL}	Output Current	OV1~4=-8.0V	24	30		mA
I_{OM1}		OV1~4=-0.5V		-18	-25	mA
I_{OM2}		OV1,3=0.5V		18	25	mA
I_{OH}		OV1,3=14.5V		-15	-25	mA
I_{OSL}		VSUB=-8.0V		21	30	mA
I_{OSH}		VSUB=14.5V		-10	-30	mA

NOTE
1.Refer the measurement circuit. Shutter speed: 1/40us
2.XV1~ 4, XSG1, 3, XSUB pins

■ **MEASUREMENT CIRCUIT**

R1 : 27Ω
R2 : 5Ω
C1 : 1500pF
C2 : 3300pF
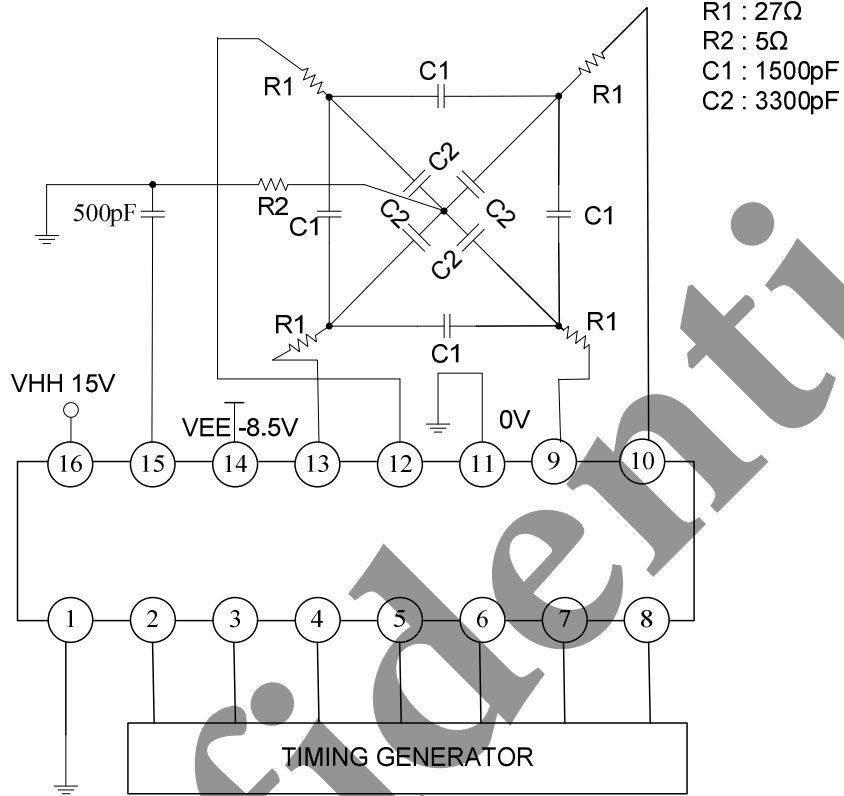
■ **AC CHARACTERISTICS**

Ta = 25℃ ,VHH=15, VME=GND, VEE=-8.5V

| SYMBOL	PARAMETER	TEST CONDITION	LIMITS			UNIT
			MIN	TYP	MAX	
T_{PLM}	Delay Time	No Load (*1)	30	70	100	nS
T_{PMH}			30	70	100	nS
T_{PLH}			30	70	100	nS
T_{PML}			30	70	100	nS
T_{PHM}			30	70	100	nS
T_{PHL}			30	70	100	nS
T_{TLM}	Transition Time	VEE→VME (*1)	170	250	330	nS
T_{TMH}		VME→VHH (*1)	190	240	310	nS
T_{TLH}		VEE→VHH (*1)	100	150	210	nS
T_{TML}		VME→VEE (*1)	100	200	310	nS
T_{THM}		VHH→VME (*1)	60	110	170	nS
T_{THL}		VHH→VEE (*1)	90	140	210	nS
V_{CLH}, V_{CLL} V_{CMH}, V_{CML}	Output Noise Voltage	(*2)			0.5	V

NOTE

1.Refer Timing Diagram

2.Refer Noise Diagram
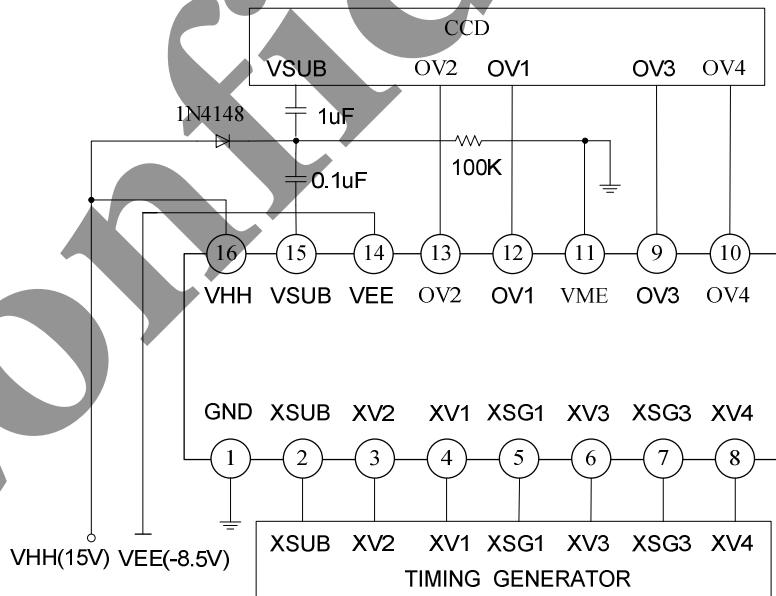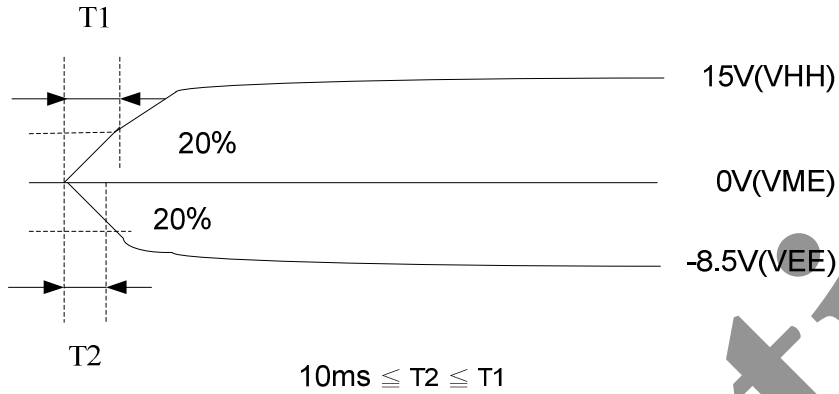
■ **NOISE DIAGRAM**
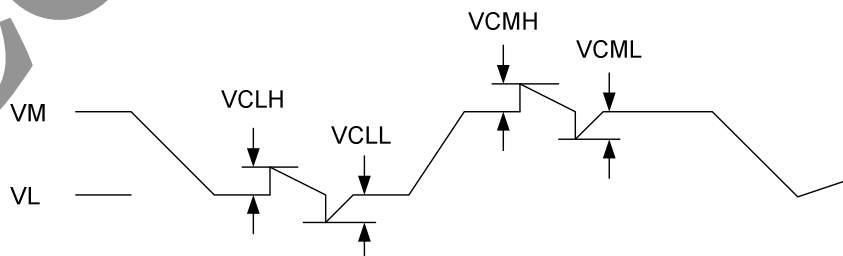
■ **TIMING DIAGRAM**
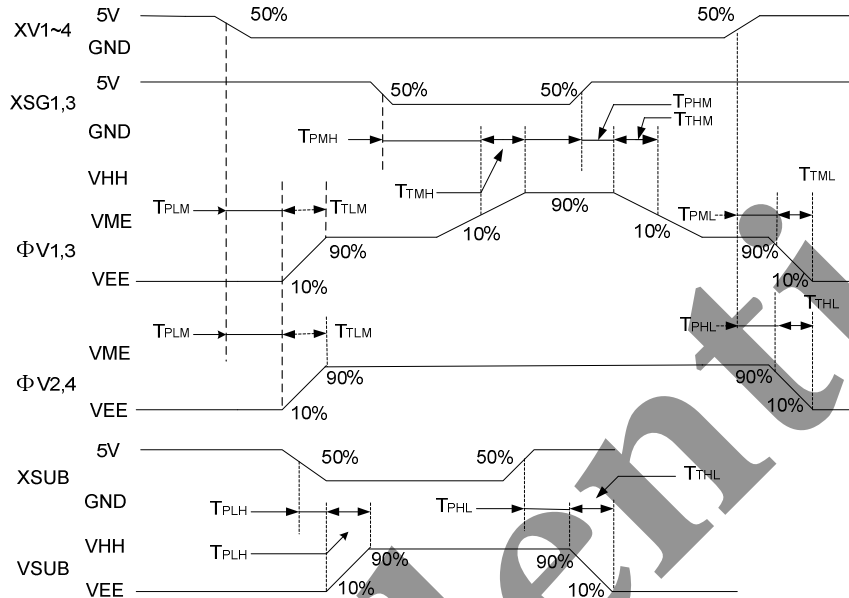
■ **APPLICATION CIRCUIT**

In case of DCOUT ≦ VHH−1.0V, Warning: When voltage is biased, you must keep this flow. If you don't, negative voltage is applied to CCD image sensor's SUB.
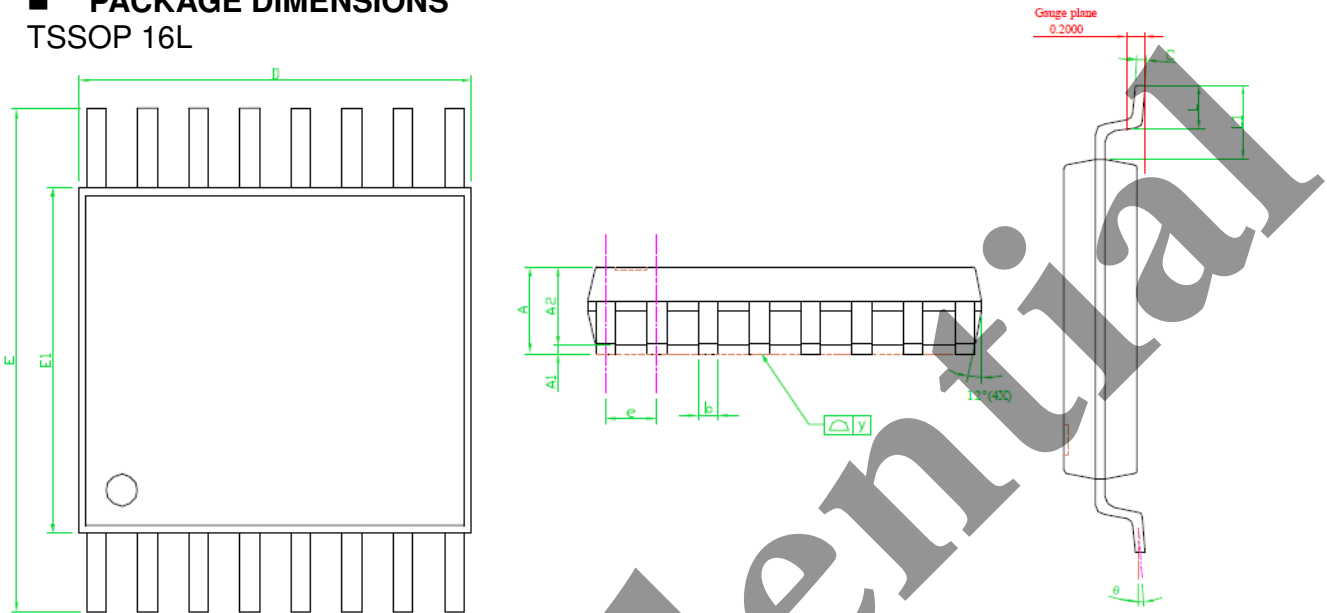
15V(VHH)

20%

0V(VME)

20%

-8.5V(VEE)

T1

T2

$10ms \leqq T2 \leqq T1$

■ **ORDERING INFORMATION**

ORDER NO.	PACKAGE	PACKING	ONE REEL Q'TY	MARK CHART
AA87222A	TSSOP 16L	Tape & Reel	2,500ea	AA87222 XXXX A

■ **PACKAGE DIMENSIONS**

TSSOP 16L

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	- - -	- - -	1.2	- - -	- - -	0.048
A1	0.05	- - -	0.15	0.002	- - -	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19	- - -	0.3	0.007	- - -	0.012
C	0.09	- - -	0.2	0.004	- - -	0.008
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.26
E1	4.3	4.4	4.5	0.169	0.173	0.177
e	- - -	0.65	- - -	- - -	0.026	- - -
L	0.45	0.6	0.75	0.018	0.024	0.03
y	- - -	- - -	0.1	- - -	- - -	0.004
θ	0°	- - -	8°	0°	- - -	8°
L1	0.9	1	1.1	0.035	0.039	0.043

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.
2. TOLERANCE ± 0.1 ㎜ (4 mil) UNLESS OTHERWISE SPECIFIED
3. COPLANARITY: 0.1 mm
4. CONTROLLING DIMENSION IS MILLIMETER CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT

■ NOTES ON USE

• The application circuit examples explain typical applications of the products, and do not guarantee the success of any specific mass-production design.

• Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.

• Take account of common impedance when designing the earth line on a printed wiring board.