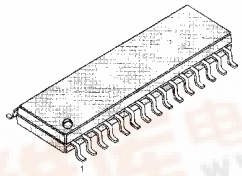
KA7302D CDS, AGC, GAMMA CORRECTION

GENERAL DISCRIPTION

The KA7302D is a bipolar monolithic integrated circuit for CCD Color Video Camera, and then it provides functions of Correlated Double Sampling, Automatic Gain Control and Gamma Correction.

30-SSOP-375



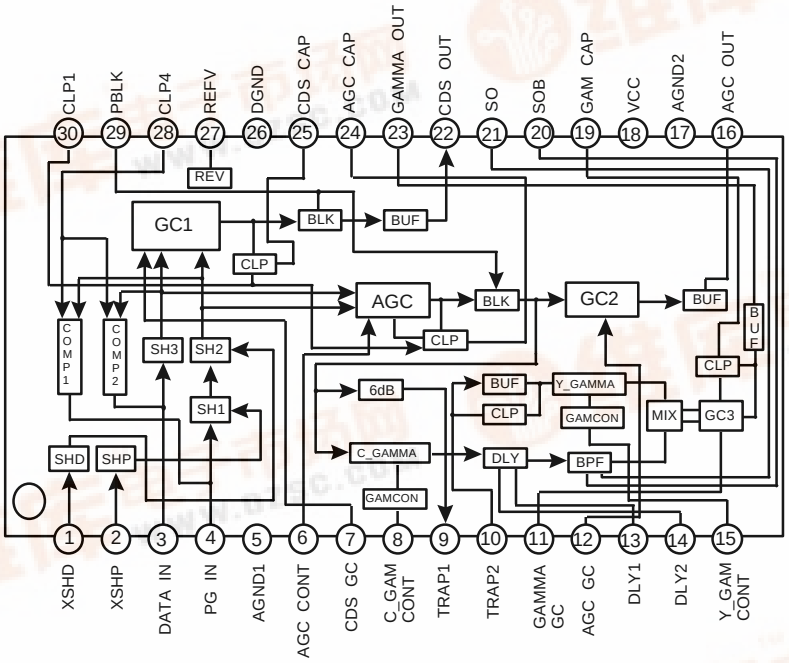
FEATURES

- CDS (Correlated Double Sampling)
- AGC (Automatic Gain Control)
- Gamma Compensation
- +5V Single Power Supply
- Low Power < 400 mW
- Dual Power Down Mode
  - AGC Part stand by mode (AGC OUT : GND)
- Maxmum Operational Frequency > 20 MHz

ORDERING INFORMATION

Device	Package	Operating Temperature
KA7302D	30-SSOP-375	-20°C ~ +75 °C

BLOCK DIAGRAM



SAMSUNG ELECTRONICS

PIN DESCRIPTION

No	Symbol	I/O	Description	Active
1	XSHD	I	Sample & Hold DATA Pulse	LOW
2	XSHP	I	Sample & Hold Pre - Charge Pulse	LOW
3	DATA IN	I	CCD Signal Input	
4	PG IN	I	CCD Signal Input	
5	AGND1	-	Analog Ground	
6	AGC CONT	I	AGC Gain Control	
7	CDS GC1	I	CDS Gain Control	
8	C γ CONT	I	C _ Gamma Control	
9	TRAP1	O	A Luminance trap filter is tied between this pin & Trap2	
10	TRAP2	I	Y _ Gamma Control	
11	γ GC3	I	GC3 Gain Control	
12	AGC GC2	I	GC2 Gain Control	
13	DLY1	I	Output for Delay (Chroma Signal)	
14	DLY2	O	Input for Delay (Chroma Signal)	
15	Y γ CONT	I	Y Gamma Curve Control	
16	AGC OUT	O	AGC Signal Output	
17	AGND2	-	Analog Ground	
18	VCC	-	Power Supply	
19	γ CAP	O	Gamma Clamp Capacitor	
20	SOB	O	Connected to BPF	
21	SO	O	Connected to BPF	
22	CDS OUT	O	CDS Signal Output	
23	γ OUT	O	Gamma Signal Output	
24	AGC CAP	O	AGC Clamp Capacitor	
25	CDS CAP	O	CDS Clamp Capacitor	
26	DGND	-	Digital Ground	
27	REFV	O	Reference Voltage Output	HIGH
28	CLP4	I	Clamp Pulse 4 Input	
29	PBLK	I	Pre - Blarking Pulse Input	LOW
30	CLP1	I	Clamp Pulse 1 Input	HIGH

* HIGH(H): 4.0V↑, LOW(L): 4.0V↓

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Value	Unit
Power Source Voltage	Vcc	7	V
Power Dissipation	Pd	900	mW
Operating Temperature	Topr	-20 ~ 75	°C
Storage Temperature	Tstg	-65 ~ 150	°C

RECOMMANDED OPERATING CONDITIONS (Ta = 25°C)

Characteristic	Symbol	Value	Unit
Supply Voltage	Vcc	4.5 ~ 5.5	V

ELECTRICAL CHARACTERISTICS

(Vcc = 4.5 ~ 5.5 V , Ta = 25 °C)

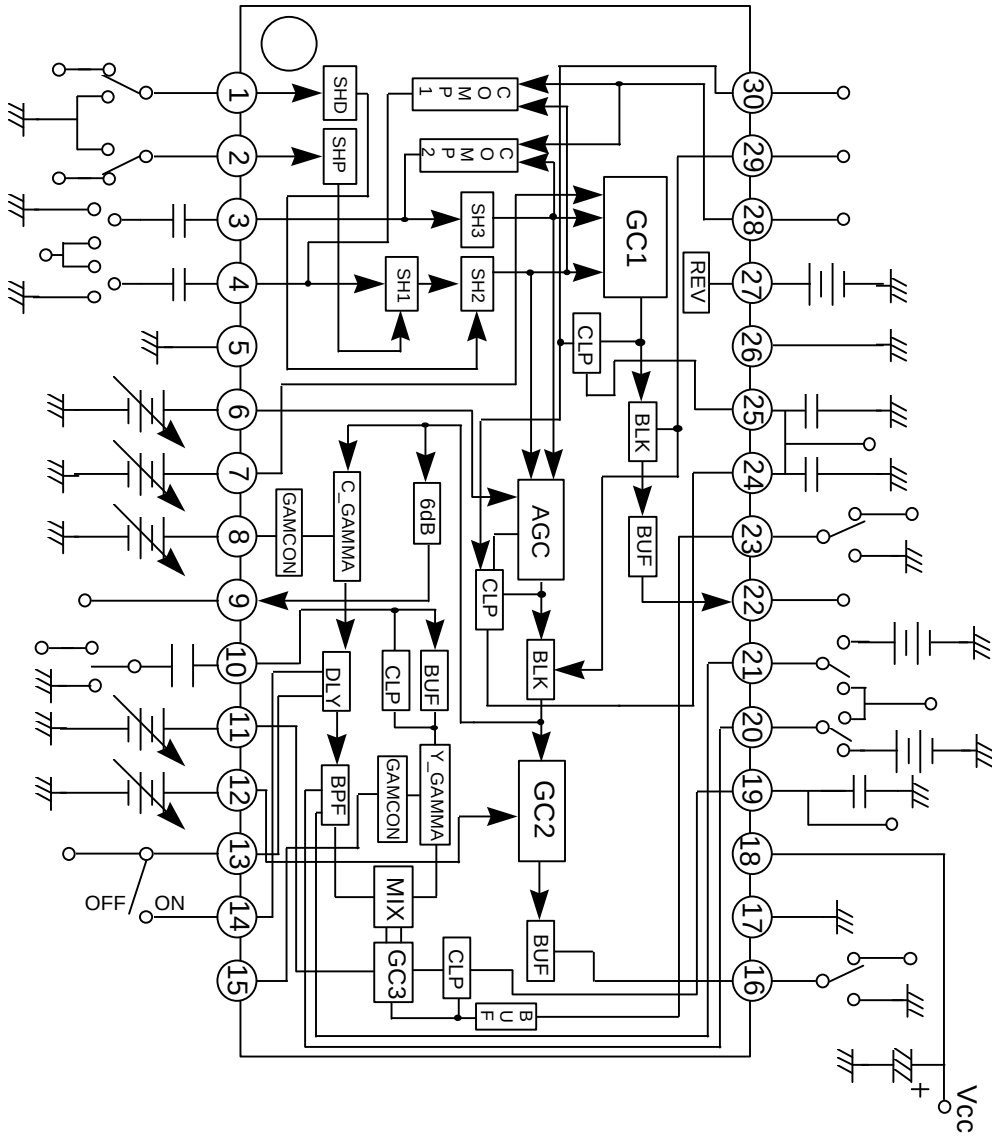
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
SUPPLY CURRENT	ICCR1	AGC OUT & GAM OUT → OPEN V_{CC}=5V	61	73	88	mA
	ICC1	AGC OUT → GND V_{CC}=5V	55	64	78	mA
GC1 CONT.Min	GC1A Min	CDS OUT/DATA IN CDS GC=1.5V	-	-6	-4	dB
GC1 CONT.Max	GC1A Max	CDS OUT/DATA IN CDS GC=4.5V	14	18	-	dB
CDS OUT Maximum Voltage Swing	CDR1	DATA IN = 400mV (Peak to Peak)	2.0	-	-	V
GC1 AMP CMPR	CMR1	15.75KHz	-	-4.0	-36	dB
GC1 AMP Bandwidth	FC1A	10MHz	-3	-	-	dB
AGC CONT.Min	AGC1 Min	TRAP1 OUT/DATA IN AGC CONT =1.5V Cal :AGC Gain -6dB	4.0	6.0	8.0	dB
AGC CONT.Max	AGC1 Max	TRAP1 OUT/DATA IN AGC CONT = 4.5V Cal: AGC Gain -6dB	30	32	-	dB
AGC AMP CMRR	CMRA	15.75KHz	-	-40	-36	dB
AGC AMP Bandwidth	FCA1	20MHz	-3	-	-	dB
GC3 AMP CMRR	CMR3	15.75KHz	-	-40	-36	dB
AGC AMP Bandwidth	FC3A	10MHz	-3	-	-	dB
GC3 CONT.Min	GC3A Min	ϒ OUT/SO ϒ GC=1.5V	-	-6	-4	dB
GC3 CONT.Max	GC3A Max	ϒ OUT/SO ϒ GC=4.5V	14	18	-	dB
ϒ OUT Maximum Voltage Swing	GDR1	SO Input = 400mV (Peak to Peak)	2.0	-	-	V

ELECTRICAL CHARACTERISTICS

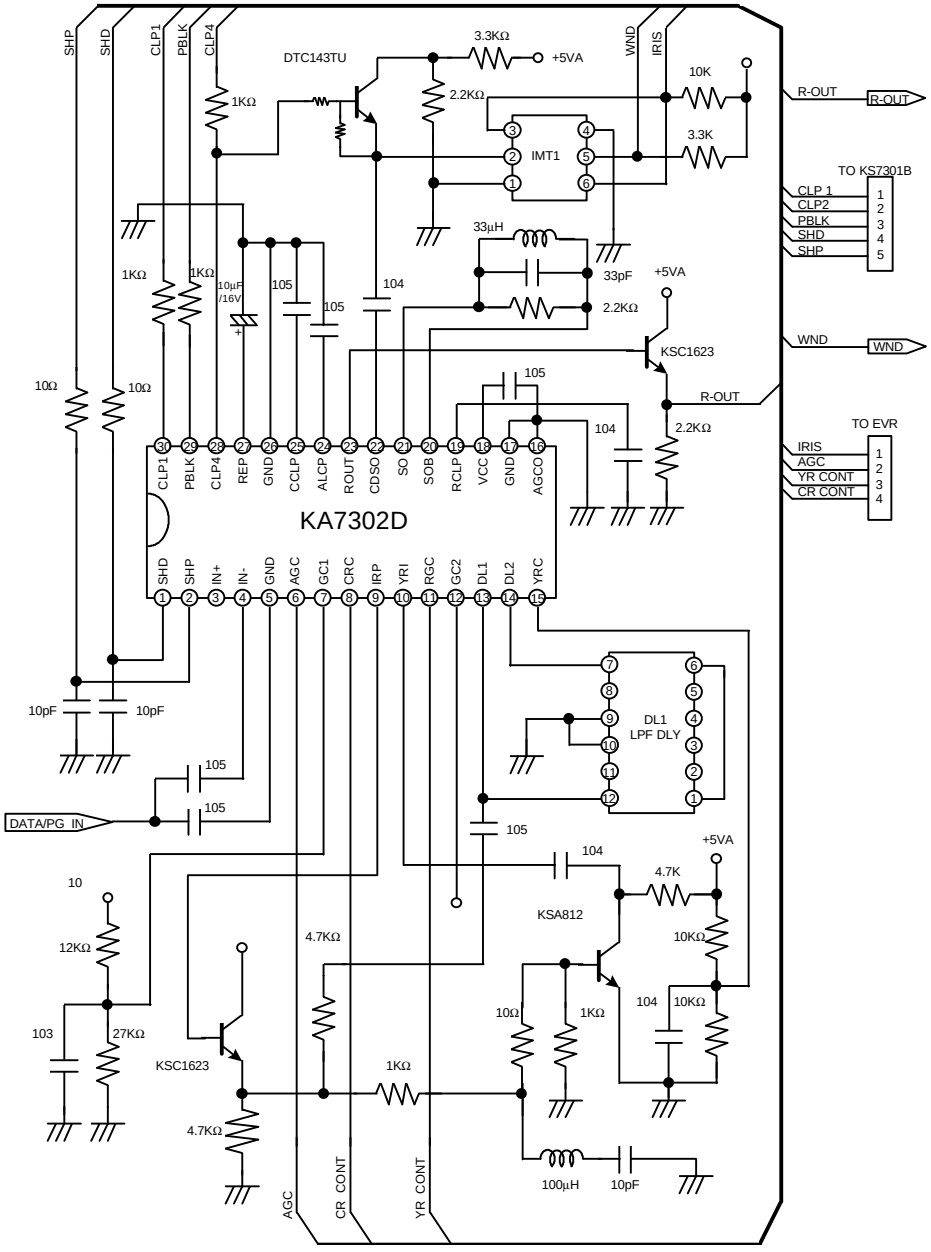
(Vcc = 4.5 ~ 5.5 V , Ta = 25 °C)

Characteristics		Symbol	Test Condition	Min	Typ	Max	Unit
γ Y	γ Y1.0(Typ)	γ Y T.1	TRAP2 input=0.4V_{PP} Gamma GC=2.6V Measure : Gamma Output	400	525	650	mV
	γ Y2.0/γ Y1.0	γ Y 2.0A	TRAP2 input =0.8Vpp Gamma GC = 2.6V Cal.:Gamma Output /γ YT1	1.2	1.4	1.6	-
	γ Y3.0/γ Y1.0	γ Y 3.0A	TRAP2 input =1.2Vpp Gamma GC = 2.6V Cal.:Gamma Output /γ YT1	1.4	1.6	1.8	-
	γ Y0.5/γ Y1.0	γ Y 0.5A	TRAP2 input =0.2Vpp Gamma GC = 2.6V Cal.:Gamma Output /γ YT1	0.68	0.74	0.80	-
	γ Y0.5(Max)	γ Y Max	TRAP2 input =0.2/0.4Vpp Gamma GC = 2.6V Y_Gamcont = 1.8V Cal.:Gamma Output (0.2 Vpp / 0.4 Vpp)	0.78	0.85	0.92	-
	γ Y 0.5 (Min)	γ Y Min	TRAP2 input =0.2/0.4Vpp Gamma GC = 2.6V Y_Gamcont = 5.0V Cal.:Gamma Output (0.2 Vpp / 0.4 Vpp)	0.55	0.62	0.70	-
γ C	γ C 1.0 (Typ)	γ CT1 Typ.	TRAP1 output =0.8Vpp C_GAMCONT = 0.0V Measure, : DL1 Output	270	310	350	mV
	γ C 1.0 (Max)	γ CT1 Max	TRAP1 output =0.8Vpp C_GAMCONT = 1.8V Measure, : DL1 Output	300	340	380	mV
	γ C 1.0 (Min)	γ CT1 Min	TRAP1 output =0.8Vpp C_GAMCONT = 5.0V Measure, : DL1 Output	240	275	310	mV
	γ C 0.5/γ C 1.0	γ C 0.5 A	TRAP1 output =0.4Vpp C_GAMCONT = 0.0V Measure, : DL1 Output CAL. : DL1 output /γ CT1 Typ.	0.5	0.6	0.7	-
	γ C 2.0 /γ C 1.0	γ C 2.0 A	TRAP1 output =1.6Vpp C_GAMCONT = 0.0V Measure, : DL1 Output CAL. : DL1 output /γ CT1 Typ.	1.38	1.55	1.72	-

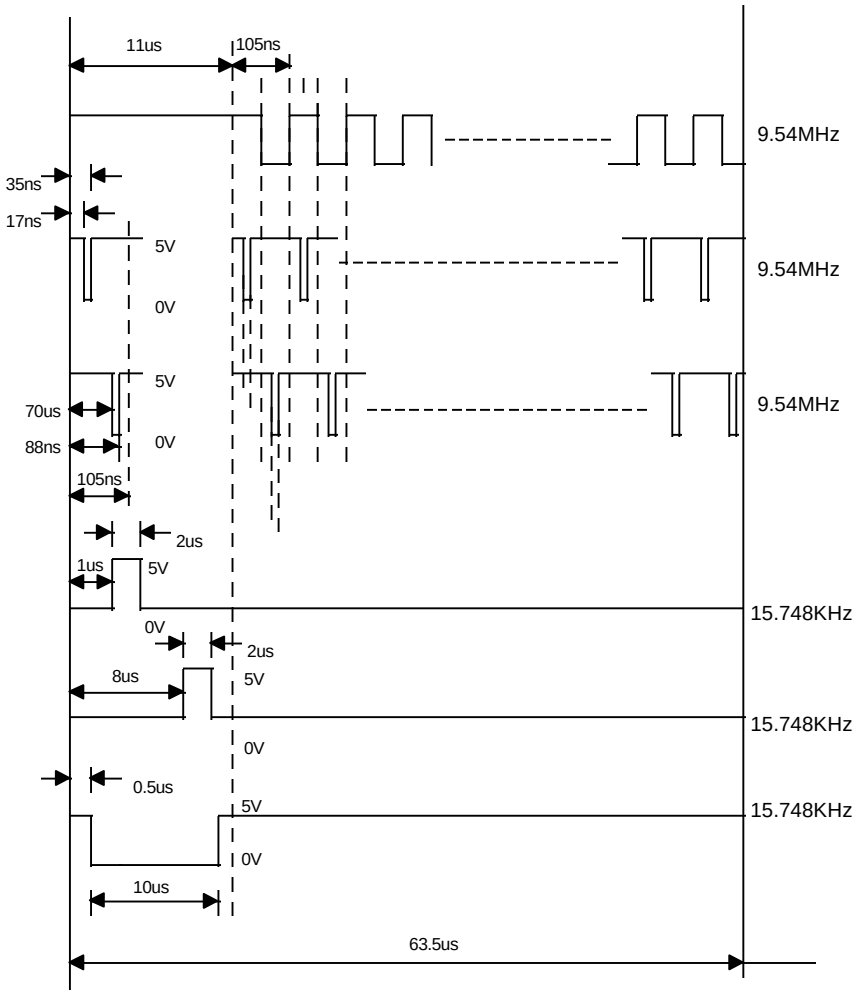
TEST CIRCUIT



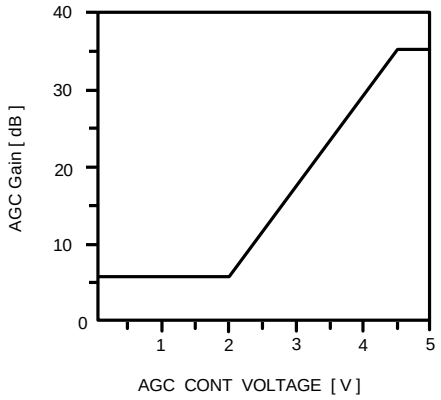
APPLICATION CIRCUIT

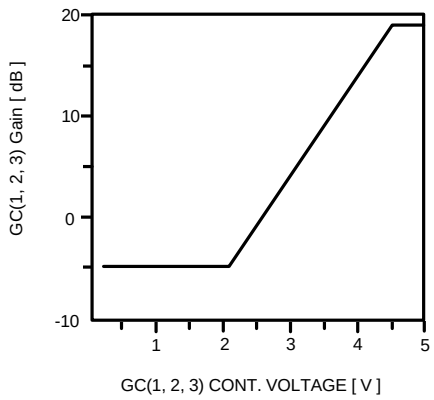


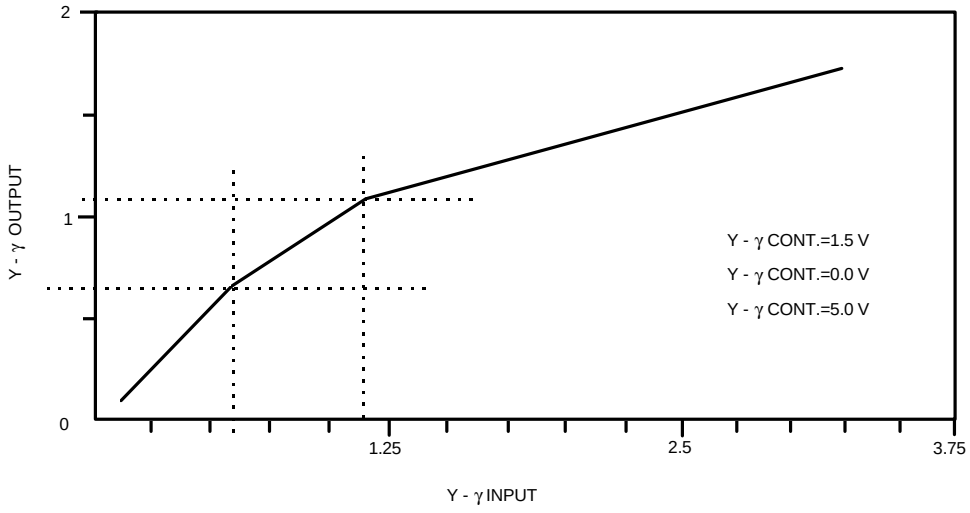
TIMING CHART



AMP CHARACTERISTIC GRAPHS







PACKAGE DIMENSION

30-SSOP-375 unit:mm