

# HA118059, HA118099

T-77-07-05

## 3-circuit, 2-point Video Switch

HA118099/HA118099FP are 3-circuit, 2-point switches designed to prevent HA118059/HA118059FP switching noise. They are recommended for use in applications that require high-speed switching.

### Ordering Information

Type No.	Package
HA118059	300mil 16-pin plastic DIP
HA118059FP	300mil 16-pin plastic SOP
HA118099	300mil 16-pin plastic DIP
HA118099FP	300mil 16-pin plastic SOP

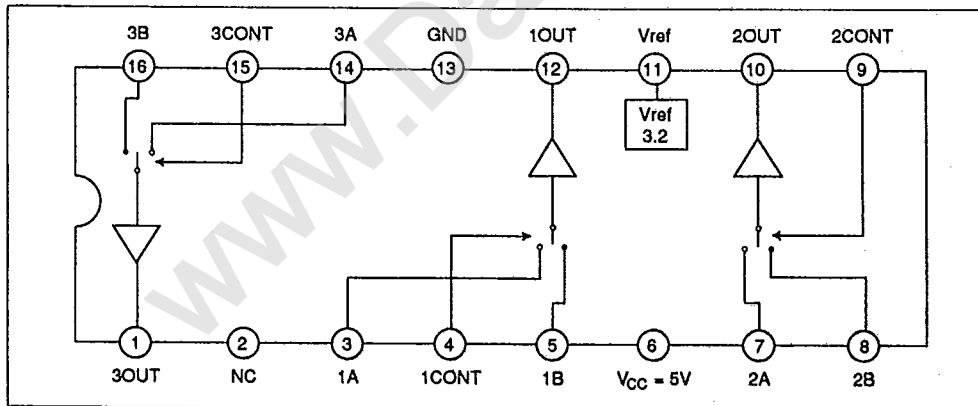
### Features

- 5V single supply operation
- Applicable as a 75Ω driver
- Wide output dynamic range (2Vpp/150Ω)
- Frequency characteristics for application as an S-VHS switch
- High-speed switching for application in line phase switching, etc.
- Circuit configuration results in small I/O DC offset
- Low power consumption (90mW Typ)
- Reference voltage circuit (Vref) with bandgap circuit

### Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	HA118059	HA118059FP	Unit
		HA118099	HA118099FP	
Supply Voltage	V <sub>CC</sub>	7.0	7.0	V
Input Terminal Voltage	V <sub>in</sub>	0 to V <sub>CC</sub>	0 to V <sub>CC</sub>	V
Power Dissipation*	P <sub>T</sub>	555	400	mW
Operating Temperature	T <sub>opr</sub>	-10 to +75	-10 to +75	°C
Storage Temperature	T <sub>stg</sub>	-40 to +125	-40 to +125	°C
Recommended Operating Voltage	V <sub>opr</sub>	4.7 to 5.3	4.7 to 5.3	V

\* Value at Ta = 75°C.

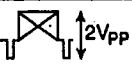
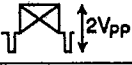
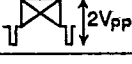
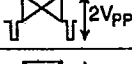
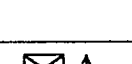
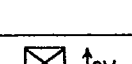
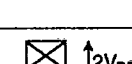




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Pin Functions

Pin No.	Function Name	Standard DC Voltage	Signal Type	Signal Level	I/O Format (Impedance $\Omega$ )
1	OUT3	2.5	Audio, video signal	 2V <sub>PP</sub>	Push-pull output
2	NC				
3	A1	2.5	Audio, video signal	 2V <sub>PP</sub>	20k $\Omega$
4	CONT1	5.0/0	Input switch signal		20k $\Omega$ (10k $\Omega$ )*1
5	B1	2.5	Audio, video signal	 2V <sub>PP</sub>	20k $\Omega$
6	V <sub>CC</sub>	5.0			
7	A2	2.5	Audio, video signal	 2V <sub>PP</sub>	20k $\Omega$
8	B2	2.5	Audio, video signal	 2V <sub>PP</sub>	20k $\Omega$
9	CONT2	5.0/0	Input switch signal		20k $\Omega$ (10k $\Omega$ )*1
10	OUT2	2.5	Audio, video signal	 2V <sub>PP</sub>	Push-pull output
11	V <sub>ref</sub>	3.2	DC		
12	OUT1	2.5	Audio, video signal	 2V <sub>PP</sub>	Push-pull output
13	GND	0			
14	A3	2.5	Audio, video signal	 2V <sub>PP</sub>	20k $\Omega$
15	CONT3	5.0/0	Input switch signal		20k $\Omega$ (10k $\Omega$ )*1
16	B3	2.5	Audio, video signal	 2V <sub>PP</sub>	20k $\Omega$

Note: The values given in this table are for reference only, and are not guaranteed.

\*1 HA118059/HA118059FP only



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Electrical Characteristics ( $V_{CC} = 5V, T_a = 25^{\circ}C$ )

Item	Symbol	Min	Typ	Max	Unit	Test Condition	Applicable Terminal
Supply Current	$I_{cc}$	10	17	22	mA	No signal input Pins (4),(9), and (15) OPEN	6
Reference Voltage	$V_{ref}$	2.95	3.15	3.35	V	OPEN terminal voltage	11
CONT 1 Input Voltage L Level	$V_{1L}$	-	-	2.0	V		12
CONT 1 Input Voltage H Level	$V_{1H}$	3.0	-	-	V		12
SW1 A Input Voltage Gain 1	$G_v$ 1A1	-1	0	+1	dB	$V(3) = 7MHz, 2V_{pp}$ $V(4) = H$ $R_L = \infty$	12
SW1 A Input Voltage Gain 2	$G_v$ 1A2	-1.2	-0.2	+0.8	dB	$V(3) = 7MHz, 2V_{pp}$ $V(4) = H$ $R_L = 150\Omega$	12
SW1 B Input Voltage Gain 1	$G_v$ 1B1	-1	0	+1	dB	$V(5) = 7MHz, 2V_{pp}$ $V(4) = L$ $R_L = \infty$	12
SW1 B Input Voltage Gain 2	$G_v$ 1B2	-1.2	-0.2	+0.8	dB	$V(5) = 7MHz, 2V_{pp}$ $V(4) = L$ $R_L = 150\Omega$	12
SW1 1A → 1B Crosstalk	CR 1A → 1B	40	60	-	dB	$V(3) = 3.58MHz,$ $2V_{pp}$ $V(4) = L R_L = \infty$	12
SW1 1B → 1A Crosstalk	CR 1B → 1A	40	60	-	dB	$V(5) = 3.58MHz,$ $2V_{pp}$ $V(4) = H R_L = \infty$	12



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Item	Symbol	Min	Typ	Max	Unit	Test Condition	Applicable Terminal
Input 1A		-	0.1	0.5	%	V(3) = 1kHz, 2V <sub>pp</sub>	12
Total Harmonic Distortion	THD 1A					V(4) = H R <sub>L</sub> = ∞	
Input 1B		-	0.1	0.5	%	V(5) = 1kHz, 2V <sub>pp</sub>	12
Total Harmonic Distortion	THD 1B					V(4) = L R <sub>L</sub> = ∞	
CONT 1							
Switching Speed	SS <sub>1</sub>	-	50	150	ns		12
1A → 1B	1A → 1B		(40) <sup>*1</sup>	(100) <sup>*1</sup>			
CONT 1							
Switching Speed	SS <sub>1</sub>	-	50	150	ns		12
1B → 1A	1B → 1A		(40) <sup>*1</sup>	(100) <sup>*1</sup>			
CONT 2							
Input Voltage	V <sub>2L</sub>	-	-	2.0	V		10
L Level							
CONT 2							
Input Voltage	V <sub>2H</sub>	3.0	-	-	V		10
H Level							
SW2 A						V(7) = 7MHz,	
Input	G <sub>v</sub>	-1	0	+1	dB	2V <sub>pp</sub>	10
Voltage Gain 1	2A1					V(9) = H R <sub>L</sub> = ∞	
SW2 A						V(7) = 7MHz,	
Input	G <sub>v</sub>	-1.2	-0.2	+0.8	dB	2V <sub>pp</sub>	10
Voltage Gain 2	2A2					V(9) = H R <sub>L</sub> = 150Ω	
SW2 B						V(8) = 7MHz,	
Input	G <sub>v</sub>	-1	0	+1	dB	2V <sub>pp</sub>	10
Voltage Gain 1	2B1					V(9) = L R <sub>L</sub> = ∞	
SW2 B						V(8) = 7MHz,	
Input	G <sub>v</sub>	-1.2	-0.2	+0.8	dB	2V <sub>pp</sub>	10
Voltage Gain 2	2B2					V(9) = L R <sub>L</sub> = 150Ω	

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Item	Symbol	Min	Typ	Max	Unit	Test Condition	Applicable Terminal
SW2 2A →2B Crosstalk	CR 2A →2B	40	60	-	dB	V7 = 3.58MHz, 2V <sub>pp</sub> V9 = L R <sub>L</sub> = ∞	10
SW2 2B →2A Crosstalk	CR 2B →2A	40	60	-	dB	V8 = 3.58MHz, 2V <sub>pp</sub> V9 = H R <sub>L</sub> = ∞	10
Input 2A Total Harmonic Distortion	THD 2A	-	0.1	0.5	%	V7 = 1kHz, 2V <sub>pp</sub> V9 = H R <sub>L</sub> = ∞	10
Input 2B Total Harmonic Distortion	THD 2B	-	0.1	0.5	%	V8 = 1kHz, 2V <sub>pp</sub> V9 = L R <sub>L</sub> = ∞	10
CONT 2 Switching Speed 2A →2B	SS <sub>2</sub> 2A →2B	-	50 (40)*1	150 (100)*1	ns		10
CONT 2 Switching Speed 2B →2A	SS <sub>2</sub> 2B →2A	-	50 (40)*1	150 (100)*1	ns		10
CONT 3 Input Voltage L Level	V <sub>3L</sub>	-	-	2.0	V		1
CONT 3 Input Voltage H Level	V <sub>3H</sub>	3.0	-	-	V		1
SW3A Input Voltage Gain 1	G <sub>v</sub> 3A1	-1	0	+1	dB	V14 = 7MHz, 2V <sub>pp</sub> V15 = H R <sub>L</sub> = ∞	1
SW3A Input Voltage Gain 2	G <sub>v</sub> 3A2	-1.2	-0.2	+0.8	dB	V14 = 7MHz, 2V <sub>pp</sub> V15 = H R <sub>L</sub> = 150Ω	1

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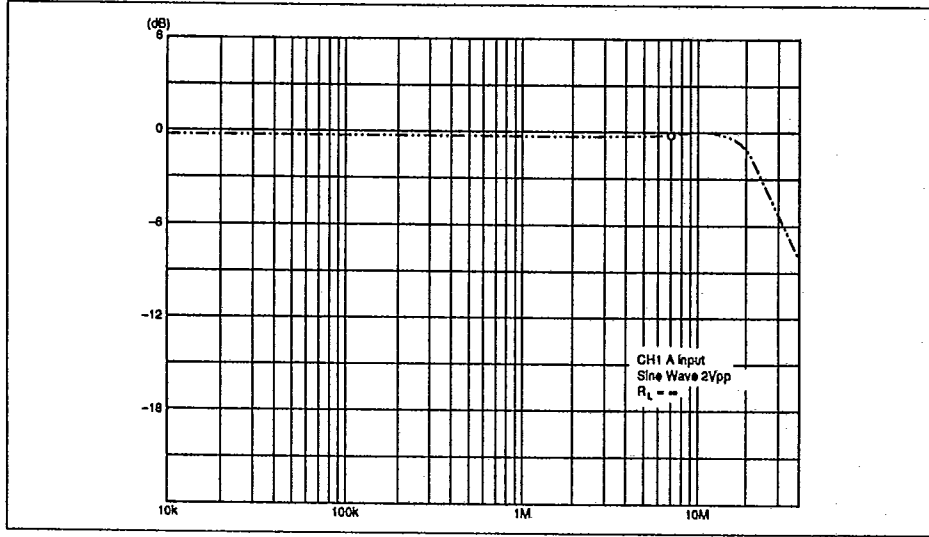


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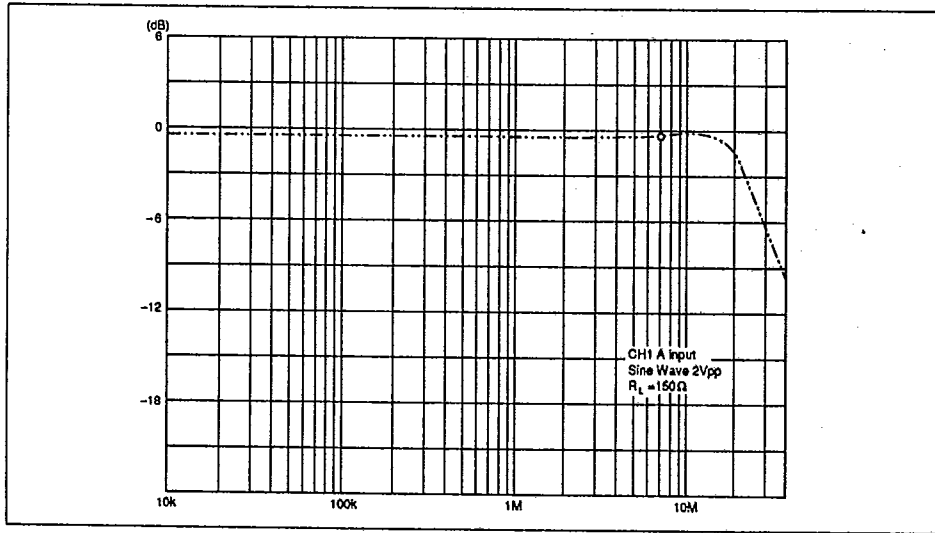
Item	Symbol	Min	Typ	Max	Unit	Test Condition	Applicable Terminal
SW3B						V16 = 7MHz,	<i>T-77-07-05</i>
Input	$G_v$	-1	0	+1	dB	2V <sub>pp</sub>	
Voltage Gain 1	3B1					V15 = L R <sub>L</sub> = ∞	1
SW3B						V16 = 7MHz,	
Input	$G_v$	-1.2	-0.2	+0.8	dB	2V <sub>pp</sub>	1
Voltage Gain 2	3B2					V15 = L R <sub>L</sub> = 150Ω	
SW3						V14 = 3.58MHz,	
3A → 3B	CR	40	60	-	dB	2V <sub>pp</sub>	1
Crosstalk	3A → 3B					V15 = L R <sub>L</sub> = ∞	
SW3						V16 = 3.58MHz,	
3B → 3A	CR	40	60	-	dB	2V <sub>pp</sub>	1
Crosstalk	3B → 3A					V15 = H R <sub>L</sub> = ∞	
Input 3A						V14 = 1kHz, 2V <sub>pp</sub>	1
Total Harmonic Distortion	THD 3A	-	0.1	0.5	%	V15 = H R <sub>L</sub> = ∞	
Input 3B						V16 = 1kHz, 2V <sub>pp</sub>	1
Total Harmonic Distortion	THD 3B	-	0.1	0.5	%	V15 = L R <sub>L</sub> = ∞	
CONT 3							
Switching Speed	SS <sub>3</sub>	-	50	150	ns		1
3A → 3B	3A → 3B		(40) <sup>*1</sup>	(100) <sup>*1</sup>			
CONT 3							
Switching Speed	SS <sub>3</sub>	-	50	150	ns		1
3B → 3A	3B → 3A		(40) <sup>*1</sup>	(100) <sup>*1</sup>			



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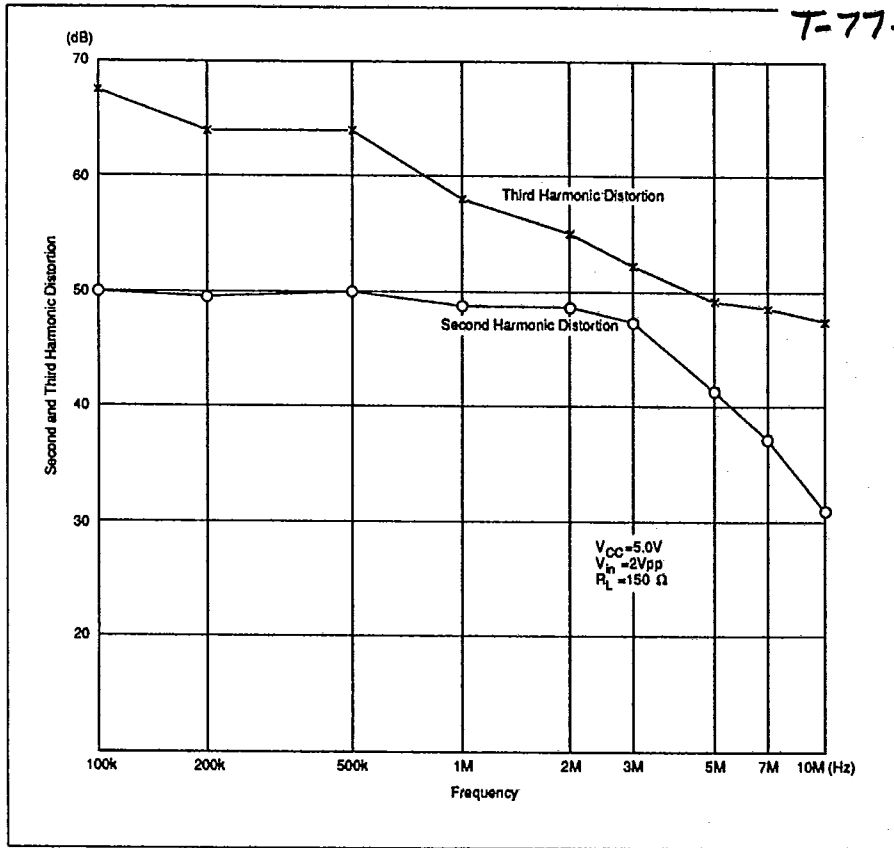
Frequency Characteristics ( $R_L = \infty$ )



Frequency Characteristics ( $R_L = 150$ )



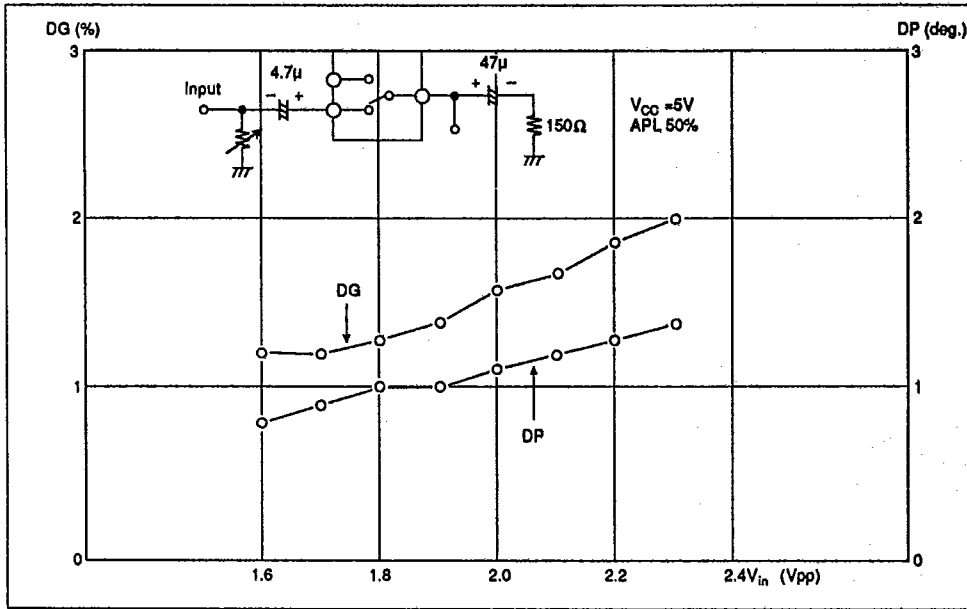
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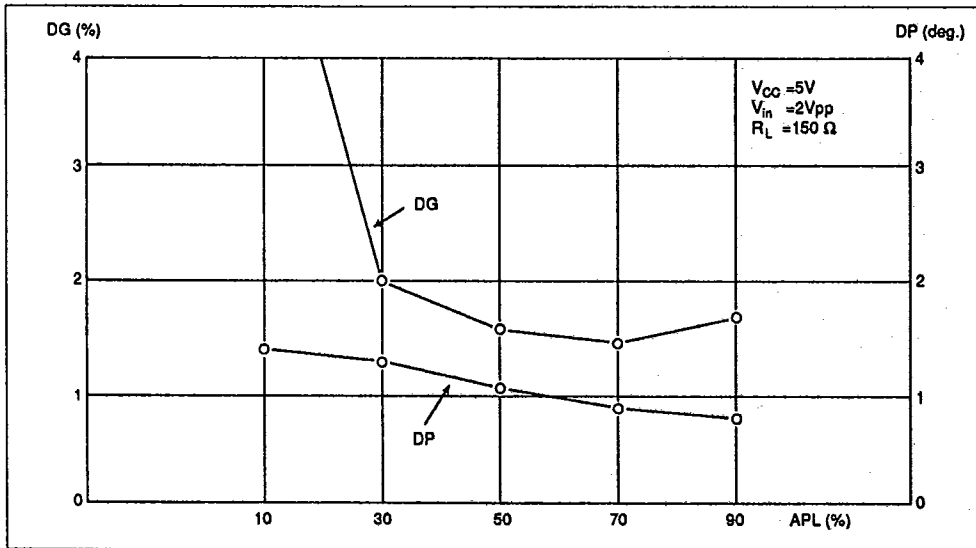
Second and Third Harmonic Distortion







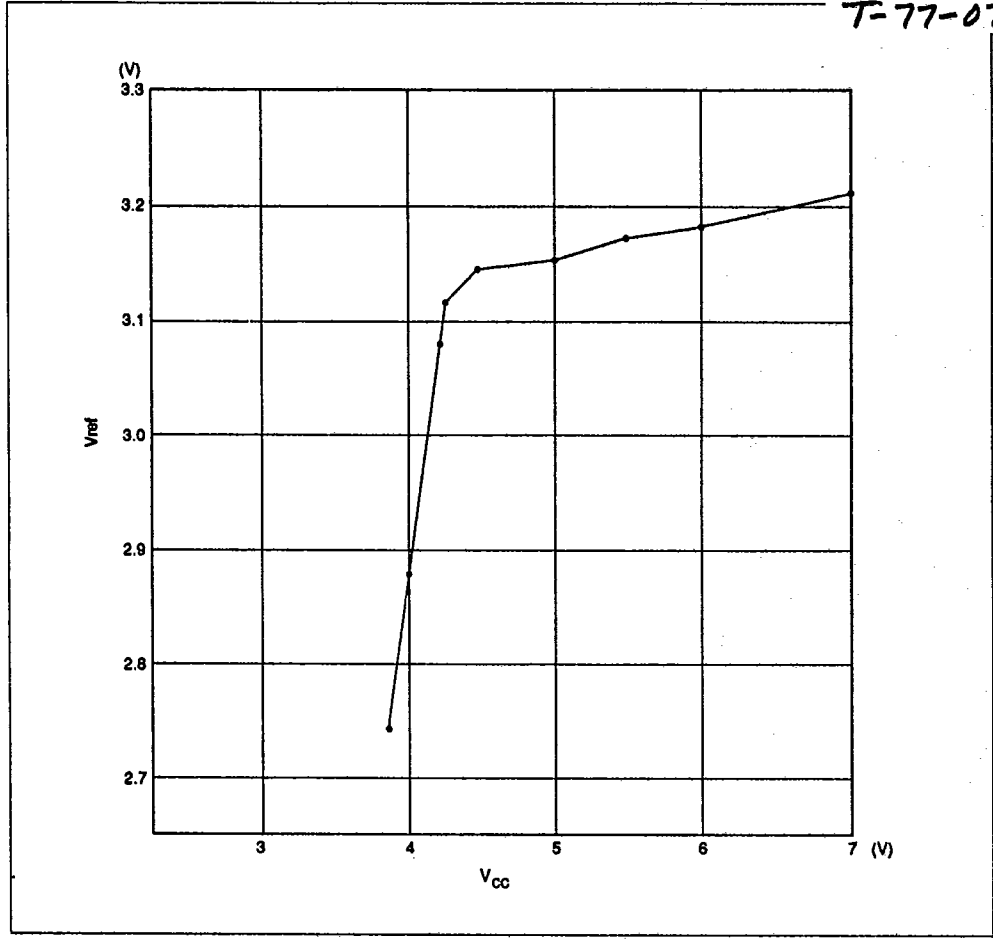
DG and DP for Input Signal Level



DG and DP for Average Picture Level



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Dependence of Reference Voltage on Supply Voltage

