AN3266FAP

Video luminance signal recording/playback processing IC

■ Overview

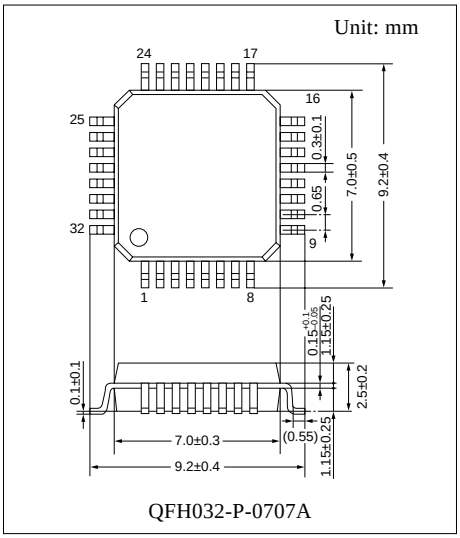
The AN3266FAP is a single chip IC in which the main signal processing part of VHS VCR luminance signal is integrated.

■ Features

- 5 V single power supply
- T2FP package

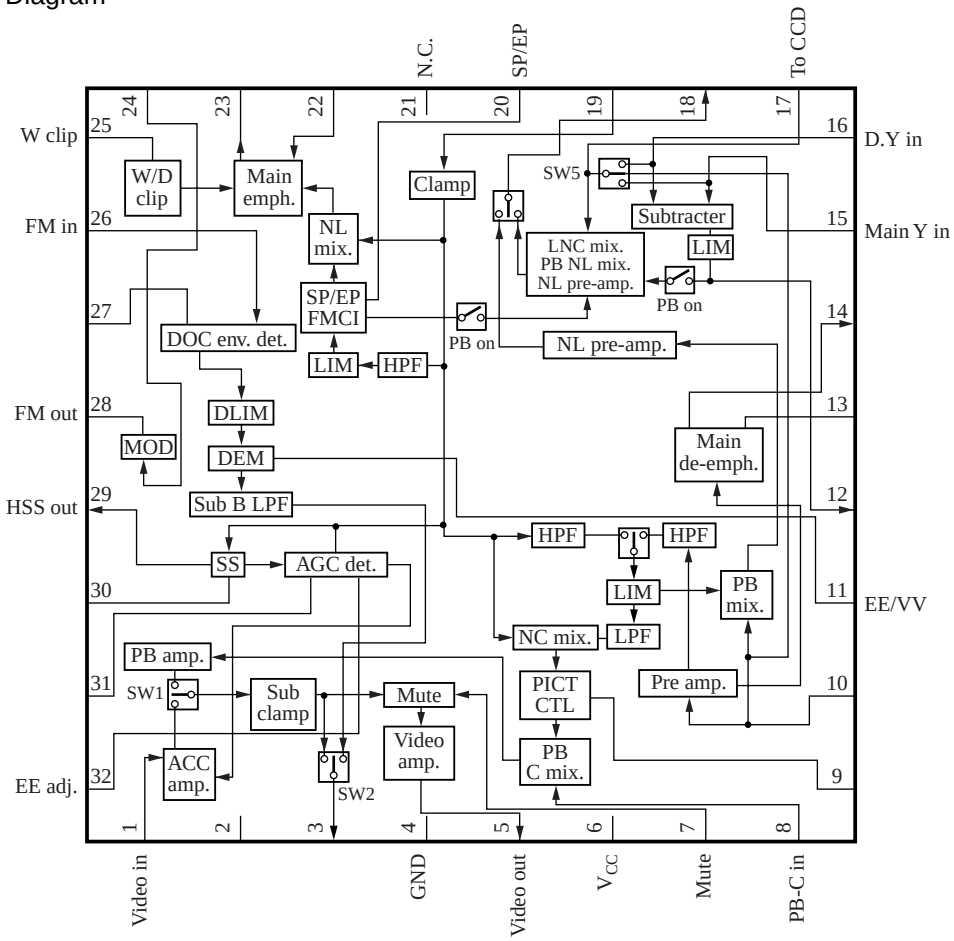
■ Applications

- VHS VCR, VHS video camera



QFH032-P-0707A

■ Block Diagram



■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	Video in	17	To CCD out
2	Sub clamp det.	18	NL pre-emph. out
3	Sub clamp out (REC), Sub LPF out (PB)	19	Clamp in
4	GND	20	SP/EP select, FMCI CTL
5	Video out	21	N.C.
6	V_{CC}	22	NF input for main emph.
7	Mute CTL	23	Main emph. out
8	PB chroma in / DE off CTL	24	FM current in
9	Picture CTL	25	W clip CTL / LNC stop CTL
10	Signal input for main LPF	26	PB RF in
11	VV level adjust., EE / VV select.	27	Env. det.
12	LNC LIM out	28	REC FM out
13	Main de-emphasis	29	Sync. sepa. out
14	Main de-emphasis (out)	30	Sync. sepa. det.
15	Main Y sig. in	31	AGC det.
16	Delayed Y sig. in	32	EE adjust / NC off CTL

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	6	V
Supply current	I_{CC}	68	mA
Power dissipation *2	P_D	208	mW
Operating ambient temperature *1	T_{opr}	–20 to +70	°C
Storage temperature *1	T_{stg}	–55 to +125	°C

Note) ∗1: Except for the operating ambient temperature and storage temperature, all ratings are for T_a = 25°C.

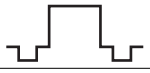
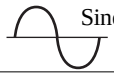
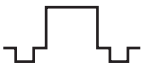
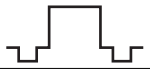
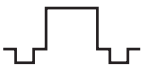
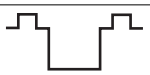
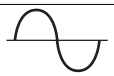
∗2: The power dissipation shown is for the IC package in free air at T_a = 70°C.

P_D = 417 mW (T_a = 70°C) on mounting on a glass epoxy resin substrate of 50 × 50 × t0.8 mm^3.

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	V_{CC}	4.5 to 5.5	V

■ Electrical Characteristics at T_a = 25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Circuit current (REC)	I_{CCR}	REC mode	30	42	54	mA
Circuit current (PB)	I_{CCP}	PB mode	38	50	62	mA
EE mode hold voltage	V_{EE}	V_6 = Variable	0	—	1.25	V
VV mode hold voltage	V_{VV}	V_6 = Variable	2.25	—	5	V
SP mode hold voltage	V_{SP}	V_8 = Variable	0	—	1.25	V
EP mode hold voltage	V_{EP}	V_8 = Variable	2.25	—	5	V
FMCI off mode hold voltage	V_{FM1}	V_A = Variable	2.25	—	3.25	V
FMCI on mode hold voltage	V_{FM2}	V_A = Variable	4.25	—	5	V
EDIT mode hold voltage at PB	V_{EDPB}	V_1 = Variable	0	—	1.25	V
Mute CTL Through mode hold voltage	$V_{THRU(PB)}$	V_1 = Variable	0	—	1	V
Mute CTL Quasi H mode hold voltage	V_{GRAY}	V_B = Variable	2	—	3	V
Mute CTL Quasi V mode hold voltage	V_{MUTE}	V_3 = Variable	4	—	5	V
EDIT mode hold voltage at REC	V_{EDREC}	V_4 = Variable	0	—	1.25	V
Off mode hold voltage at LNC	V_{LNC}	V_9 = Variable	0	—	1.25	V
Through mode hold voltage at EE	V_{THRU}	V_3 = Variable	0	—	1	V
Quasi H gray level offset	ΔV_5	PB mode	1.1	1.5	1.9	V
AGC output amplitude	V_{1-5}	 White 100% V_{IN} = 1 V[p-p]	1.3	2.0	2.7	V[p-p]
AGC control sensitivity	ΔV_{1-5}	 White 100% V_{IN} = 1 V[p-p]	0	0.3	1.2	dB
Video amp. frequency characteristics	f_{1-5}	 Sine wave 5 MHz / 100 kHz V_{IN} = 250 mV[p-p]	–1.2	– 0.5	0.5	dB
Main emphasis output level	V_{1-23}	 White 100% V_{IN} = 1 V[p-p]	260	300	340	mV[p-p]
D-clip level	DV_{1-23}	—	45	55	65	%
Keyed pulse width	t_{W31}	 Sync. sig. V_{IN} = 287 mV[p-p]	4.6	5.8	7.0	µs
SS minimum input sensitivity	S_{19}	 White 100% V_{IN} variable	—	—	450	mV[p-p]
SS pulse delay	t_{F29}	 V_{IN} = 1 V[p-p]	460	660	860	ns
Over all gain for PB system	G_{10-5}	 White 100% V_{IN} = 100 mV[p-p]	24	26	30	dB
Quasi V insertion step	ΔV_5	 White 100% V_{IN} = 100 mV[p-p]	20	70	120	mV
Chroma amp. gain	G_{8-5}	 Sine wave V_{IN} = 200 mV[p-p]	7.6	9.1	10.6	dB

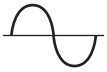
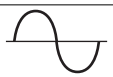
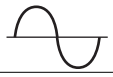
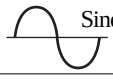
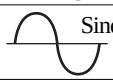
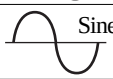
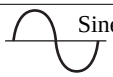
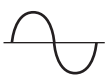
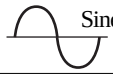
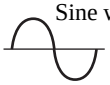
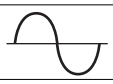
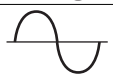
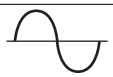
■ Electrical Characteristics at T_a = 25°C (continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
DE frequency characteristics 1 (0 dB)	$\Delta f_{10\text{-}18(1)}$	Sine wave 500 kHz / 10 kHz V_{IN} = 300 mV[p-p]	– 0.5	0	1.0	dB
DE frequency characteristics 2 (0 dB)	$\Delta f_{10\text{-}18(2)}$	Sine wave 2 MHz / 10 kHz V_{IN} = 300 mV[p-p]	– 0.5	0.15	1.15	dB
DE frequency characteristics 3 (–10 dB)	$\Delta f_{10\text{-}18(3)}$	Sine wave 500 kHz / 10 kHz V_{IN} = 94.9 mV[p-p]	– 0.5	0.17	1.17	dB
DE frequency characteristics 4 (–10 dB)	$\Delta f_{10\text{-}18(4)}$	Sine wave 2 MHz / 10 kHz V_{IN} = 94.9 mV[p-p]	– 0.5	0.45	1.45	dB
DE frequency characteristics 5 (–20 dB)	$\Delta f_{10\text{-}18(5)}$	Sine wave 500 kHz / 10 kHz V_{IN} = 30 mV[p-p]	– 0.5	0.5	1.5	dB
DE frequency characteristics 6 (–20 dB)	$\Delta f_{10\text{-}18(6)}$	Sine wave 2 MHz / 10 kHz V_{IN} = 30 mV[p-p]	0.3	1.3	2.3	dB
DE frequency characteristics 7 (–30 dB)	$\Delta f_{10\text{-}18(7)}$	Sine wave 500 kHz / 10 kHz V_{IN} = 9.5 mV[p-p]	0	1.0	2.0	dB
DE frequency characteristics 8 (–30 dB)	$\Delta f_{10\text{-}18(8)}$	Sine wave 2 MHz / 10 kHz V_{IN} = 9.5 mV[p-p]	2.2	3.2	4.2	dB
DE off mode (–30 dB)	$\Delta G_{10\text{-}18}$	Sine wave 2 MHz V_{IN} = 9.5 mV[p-p]	–4.2	–3.2	–2.2	dB
REC NL frequency characteristics 1 (0 dB)	$\Delta f_{19\text{-}23(1)}$	Sine wave V_{IN} = 1 V[p-p] SP 500 kHz / 10 kHz	– 0.5	0.5	1.5	dB
REC NL frequency characteristics 2 (0 dB)	$\Delta f_{19\text{-}23(2)}$	Sine wave V_{IN} = 1 V[p-p] SP 1.5 MHz / 10 kHz	0	1.0	2.0	dB
REC NL frequency characteristics 3 (–10 dB)	$\Delta f_{19\text{-}23(3)}$	Sine wave V_{IN} = 316 mV[p-p] SP 500 kHz / 10 kHz	0	1.0	2.0	dB
REC NL frequency characteristics 4 (–10 dB)	$\Delta f_{19\text{-}23(4)}$	Sine wave V_{IN} = 316 mV[p-p] SP 1.5 MHz / 10 kHz	1.3	2.3	3.3	dB
REC NL frequency characteristics 5 (–20 dB)	$\Delta f_{19\text{-}23(5)}$	Sine wave V_{IN} = 100 mV[p-p] SP 500 kHz / 10 kHz	0.1	1.1	2.1	dB
REC NL frequency characteristics 6 (–20 dB)	$\Delta f_{19\text{-}23(6)}$	Sine wave V_{IN} = 100 mV[p-p] SP 1.5 MHz / 10 kHz	2.1	3.1	4.1	dB
REC NL frequency characteristics 7 (0 dB)	$\Delta f_{19\text{-}23(7)}$	Sine wave V_{IN} = 1 V[p-p] EP 500 kHz / 10 kHz	0.3	1.3	2.3	dB
REC NL frequency characteristics 8 (0 dB)	$\Delta f_{19\text{-}23(8)}$	Sine wave V_{IN} = 1 V[p-p] EP 1.5 MHz / 10 kHz	1.3	2.3	3.3	dB
REC NL frequency characteristics 9 (–10 dB)	$\Delta f_{19\text{-}23(3)}$	Sine wave V_{IN} = 316 mV[p-p] EP 500 kHz / 10 kHz	1.3	2.3	3.3	dB
REC NL frequency characteristics 10 (–10 dB)	$\Delta f_{19\text{-}23(10)}$	Sine wave V_{IN} = 316 mV[p-p] EP 1.5 MHz / 10 kHz	3.3	4.3	5.3	dB
REC NL frequency characteristics 11 (–20 dB)	$\Delta f_{19\text{-}23(11)}$	Sine wave V_{IN} = 100 mV[p-p] EP 500 kHz / 10 kHz	1.6	2.6	3.6	dB
REC NL frequency characteristics 12 (–20 dB)	$\Delta f_{19\text{-}23(12)}$	Sine wave V_{IN} = 100 mV[p-p] EP 1.5 MHz / 10 kHz	5.6	6.0	7.0	dB

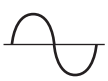
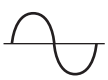
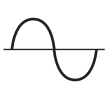
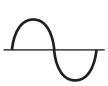
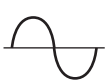
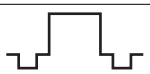
■ Electrical Characteristics at T_a = 25°C (continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
PB NL frequency characteristics 1 (0 dB)	$\Delta f_{15\text{-}18(1)}$	Sine wave V_{IN} = 300 mV[p-p] SP 500 kHz / 10 kHz	−1.6	− 0.6	0.4	dB
PB NL frequency characteristics 2 (0 dB)	$\Delta f_{15\text{-}18(2)}$	Sine wave V_{IN} = 300 mV[p-p] SP 1.5 MHz / 10 kHz	−2.0	−1.0	0	dB
PB NL frequency characteristics 3 (−10 dB)	$\Delta f_{15\text{-}18(3)}$	Sine wave V_{IN} = 94.9 mV[p-p] SP 500 kHz / 10 kHz	−2.1	−1.1	− 0.1	dB
PB NL frequency characteristics 4 (−10 dB)	$\Delta f_{15\text{-}18(4)}$	Sine wave V_{IN} = 94.9 mV[p-p] SP 1.5 MHz / 10 kHz	−3.5	−2.5	−1.5	dB
PB NL frequency characteristics 5 (−20 dB)	$\Delta f_{15\text{-}18(5)}$	Sine wave V_{IN} = 30 mV[p-p] SP 500 kHz / 10 kHz	−2.2	−1.2	− 0.2	dB
PB NL frequency characteristics 6 (−20 dB)	$\Delta f_{15\text{-}18(6)}$	Sine wave V_{IN} = 30 mV[p-p] SP 1.5 MHz / 10 kHz	−4.2	−3.2	−2.2	dB
PB NL frequency characteristics 7 (0 dB)	$\Delta f_{15\text{-}18(7)}$	Sine wave V_{IN} = 300 mV[p-p] EP 500 kHz / 10 kHz	−2.3	−1.3	− 0.3	dB
PB NL frequency characteristics 8 (0 dB)	$\Delta f_{15\text{-}18(8)}$	Sine wave V_{IN} = 300 mV[p-p] EP 1.5 MHz / 10 kHz	−3.3	−2.3	−1.2	dB
PB NL frequency characteristics 9 (−10 dB)	$\Delta f_{15\text{-}18(9)}$	Sine wave V_{IN} = 94.9 mV[p-p] EP 500 kHz / 10 kHz	−3.3	−2.3	−1.3	dB
PB NL frequency characteristics 10 (−10 dB)	$\Delta f_{15\text{-}18(10)}$	Sine wave V_{IN} = 94.9 mV[p-p] EP 1.5 MHz / 10 kHz	−6.0	−5.0	−4.0	dB
PB NL frequency characteristics 11 (−20 dB)	$\Delta f_{15\text{-}18(11)}$	Sine wave V_{IN} = 30 mV[p-p] EP 500 kHz / 10 kHz	−3.5	−2.5	−1.5	dB
PB NL frequency characteristics 12 (−20 dB)	$\Delta f_{15\text{-}18(12)}$	Sine wave V_{IN} = 30 mV[p-p] EP 1.5 MHz / 10 kHz	−6.7	−5.7	−4.7	dB
NC frequency characteristics 1 (0 dB)	$\Delta f_{19\text{-}5(1)}$	Sine wave V_{IN} = 1 V[p-p] 1 MHz / 10 kHz	−1.4	− 0.4	0.6	dB
NC frequency characteristics 2 (0 dB)	$\Delta f_{19\text{-}5(2)}$	Sine wave V_{IN} = 1 V[p-p] 2 MHz / 1 MHz	−1.1	− 0.1	0.9	dB
NC frequency characteristics 3 (−10 dB)	$\Delta f_{19\text{-}5(3)}$	Sine wave V_{IN} = 316 mV[p-p] 1 MHz / 10 kHz	−2.0	−1.0	0	dB
NC frequency characteristics 4 (−10 dB)	$\Delta f_{19\text{-}5(4)}$	Sine wave V_{IN} = 316 mV[p-p] 2 MHz / 1 MHz	− 0.8	0.2	1.2	dB
NC frequency characteristics 5 (−20 dB)	$\Delta f_{19\text{-}5(5)}$	Sine wave V_{IN} = 100 mV[p-p] 1 MHz / 10 kHz	−3.3	−2.3	−1.3	dB
NC frequency characteristics 6 (−20 dB)	$\Delta f_{19\text{-}5(6)}$	Sine wave V_{IN} = 100 mV[p-p] 2 MHz / 1 MHz	− 0.5	0.5	1.5	dB
NC frequency characteristics 7 (−30 dB)	$\Delta f_{19\text{-}5(7)}$	Sine wave V_{IN} = 31.6 mV[p-p] 1 MHz / 10 kHz	−10	−6.3	−4.3	dB
NC frequency characteristics 8 (−30 dB)	$\Delta f_{19\text{-}5(8)}$	Sine wave V_{IN} = 31.6 mV[p-p] 2 MHz / 1 MHz	0.2	2.2	6.2	dB
NC off mode	$\Delta G_{19\text{-}5}$	Sine wave V_{IN} = 31.6 mV[p-p] 1 MHz	4.3	6.3	10.0	dB

■ Electrical Characteristics at T_a = 25°C (continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
LNC attenuation level 1	$\Delta G_{15\text{-}18(1)}$	$\frac{\text{(19 input off)}}{\text{(19 input on)}}$  Sine wave 10 kHz	–12.3	–9.3	–5	dB
LNC attenuation level 2	$\Delta G_{15\text{-}18(2)}$	$\frac{\text{(19 input off)}}{\text{(19 input on)}}$  Sine wave 3 kHz	–8.1	–6.1	–3.1	dB
LNC off mode	$\Delta V_{15\text{-}18}$	 Sine wave V_9 1.35 V 2.15 V 10 kHz	–1	0	1	dB
LNC LIM output amplitude	V_{LNC}	 Sine wave V_{IN} = 300 mV[p-p] 100 kHz	34	44	58	mV[p-p]
LNC LIM gain	G_{LNC}	 Sine wave V_{IN} = 9.5 mV[p-p] 100 kHz	3.7	6.7	8.7	mV[p-p]
Pic. cont. frequency characteristics 1 (forced)	$\Delta f_{19\text{-}5(1)}$	 Sine wave V_{IN} = 500 mV[p-p] 3 MHz / 100 kHz	4.9	5.9	7.4	dB
Pic. cont. frequency characteristics 2 (attenuated)	$\Delta f_{19\text{-}5(2)}$	 Sine wave V_{IN} = 1 V[p-p] 3 MHz / 100 kHz	–14	–11	–8	dB
FM oscillation output amplitude	V_{28}	I_{IN} = 280 µA	0.85	1.0	1.3	V[p-p]
FM oscillation secondary harmonic	$2f_{28}$	I_{IN} = 280 µA	—	—	–33	dB
FM oscillation frequency	f_{28}	I_{IN} = 280 µA	3.1	3.5	3.9	MHz
FM oscillation control sensitivity	β_{28}	$\frac{f\,(500\ \mu A) - f\,(160\ \mu A)}{500\ \mu A - 160\ \mu A}$	11.5	13	15.0	MHz/µA
FM carrier interleave 1	$\Delta V_{20\text{-}23}$	 V_{IN} = 5 V[p-p]	1.35	2.35	3.35	mV[p-p]
DEM demodulation sensitivity 1	$S_{3(1)}$	 Sine wave V_5 = 2.5 V V_{IN} = 350 mV[p-p] f_{IN} = 3 MHz to 5 MHz	40	69	100	mV/MHz
DEM demodulation sensitivity 2	$S_{3(2)}$	 Sine wave V_5 = 3.5 V V_{IN} = 350 mV[p-p] f_{IN} = 3 MHz to 5 MHz	75	105	135	mV/MHz
DEM demodulation limit	$Lf_{26\text{-}3}$	 Sine wave V_{IN} = 350 mV[p-p]	7.5	—	—	MHz
DEM carrier leak	$CL_{26\text{-}3}$	 Sine wave V_{IN} = 350 mV[p-p] f_{IN} = 2 MHz → 2 MHz / 4 MHz	—	—	–25	dB
Sub LPF frequency characteristics	$\Delta f_{26\text{-}3}$	 Sine wave f_{IN} V_{IN} = 350 mV[p-p]	–8	–6.2	–4.5	dB
DOC det. on	S_{26}	 Sine wave f_{IN} = 4 MHz	–20	–16	–11	dB
DOC det. off (hysteresis)	ΔS_{26}	 Sine wave f_{IN} = 4 MHz	0.2	1.5	6	dB
DOC offset	ΔV_{18}	 V_{IN} = 350 mV[p-p] or 0 mV[p-p] f_{IN} = 4 MHz	–15	0	15	mV[p-p]

■ Electrical Characteristics at T_a = 25°C (continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
DOC pulse width	t_{W18}	 V_{IN} = 350 mV[p-p] or 0 mV[p-p] f_{IN} = 4 MHz	35.5	37.45	39.5	µs
DOC SW crosstalk	CT_{16-17}	 Sine wave DOC off V_{IN} = 300 mV[p-p] f_{IN} = 100 kHz	—	—	–35	dB
Quasi V mute crosstalk	CT_{19-5}	 Sine wave V_{IN} = 1 V[p-p] f_{IN} = 2 MHz	—	—	–35	dB
SW1 crosstalk 1	CT_{19-5}	 Sine wave V_{IN} = 1 V[p-p] f_{IN} = 2 MHz	—	—	–40	dB
SW1 crosstalk 2	CT_{1-5}	 Sine wave V_{IN} = 250 mV[p-p] f_{IN} = 2 MHz	—	—	–40	dB
SW2 crosstalk 1	CT_{26-3}	 Sine wave PB 2 MHz V_{IN} = 350 mV[p-p] REC 4 MHz	—	—	–40	dB
SW2 crosstalk 2	CT_{1-3}	 Sine wave V_{IN} = 250 mV[p-p] f_{IN} = 2 MHz	—	—	–40	dB
SW5 crosstalk 1	CT_{15-18}	 Sine wave V_{IN} = 250 mV[p-p] f_{IN} = 2 MHz	—	—	–40	dB
SW5 crosstalk 2	CT_{17-18}	 Sine wave V_{IN} = 300 mV[p-p] f_{IN} = 2 MHz	—	—	–40	dB
White mute crosstalk	CT_{1-5}	 Sine wave V_{IN} = 300 mV[p-p] f_{IN} = 2 MHz	—	—	–40	mV[p-p]
FM carrier interleave 2	ΔV_{20-18}	 Sine wave V_{IN} = 5 V[0-p] f_{IN} = 2 MHz	4	7.5	1	mV
Pi cont. off mode	ΔG_{19-5}	 Sine wave V_{IN} = 1 V[p-p] f_{IN} = 3 MHz	4.4	5.9	7.4	dB
SS pulse output amplitude	V_{29}	 White 100% V_{IN} = 1 V[p-p]	4.3	—	—	V[p-p]

■ Application Circuit Example

