AN8882SB

Head amplifier IC for CD-ROM drive (for 32 times speed or more)

■ Overview

The AN8882SB is a head amplifier IC for digital servo. It can configure an efficient CD-ROM system in combination with the MN662754, and allows a full-automatic adjustment of tracking balance-gain-offset and focus balance-gain-offset with fewer external parts.

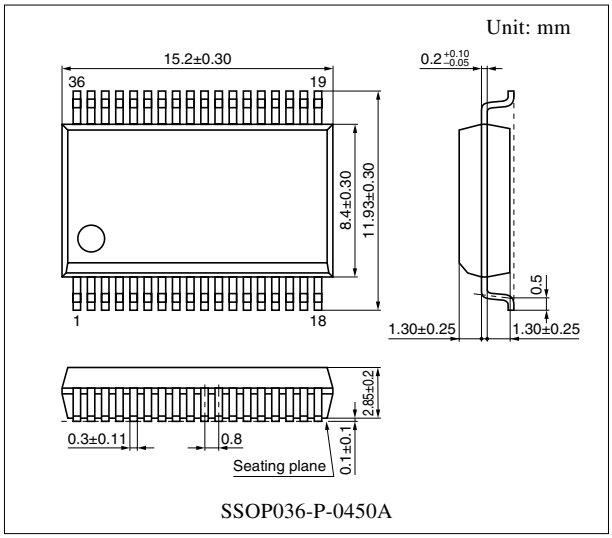
Built-in functions are a variable equalizer, wide band RF amp. and AGC which meet CAV playback with 32 times speed or more.

■ Features

- Variable equalizer which meets CAV playback with 32 times speed or more.
  (6-step changeover)
- Wide band RF amp. and AGC (f_C = 30 MHz or more (−3 dB))
- Balance adjustment function built-in
  Focus error amp./tracking error amp.
- CD-RW playback compatible.
  Variable gain
  Focus error amp./tracking error amp.
  (to +12 dB)
- OFTR/BDO detection
- APC amp. (LD reference voltage changeover for CD-RW playback)

■ Applications

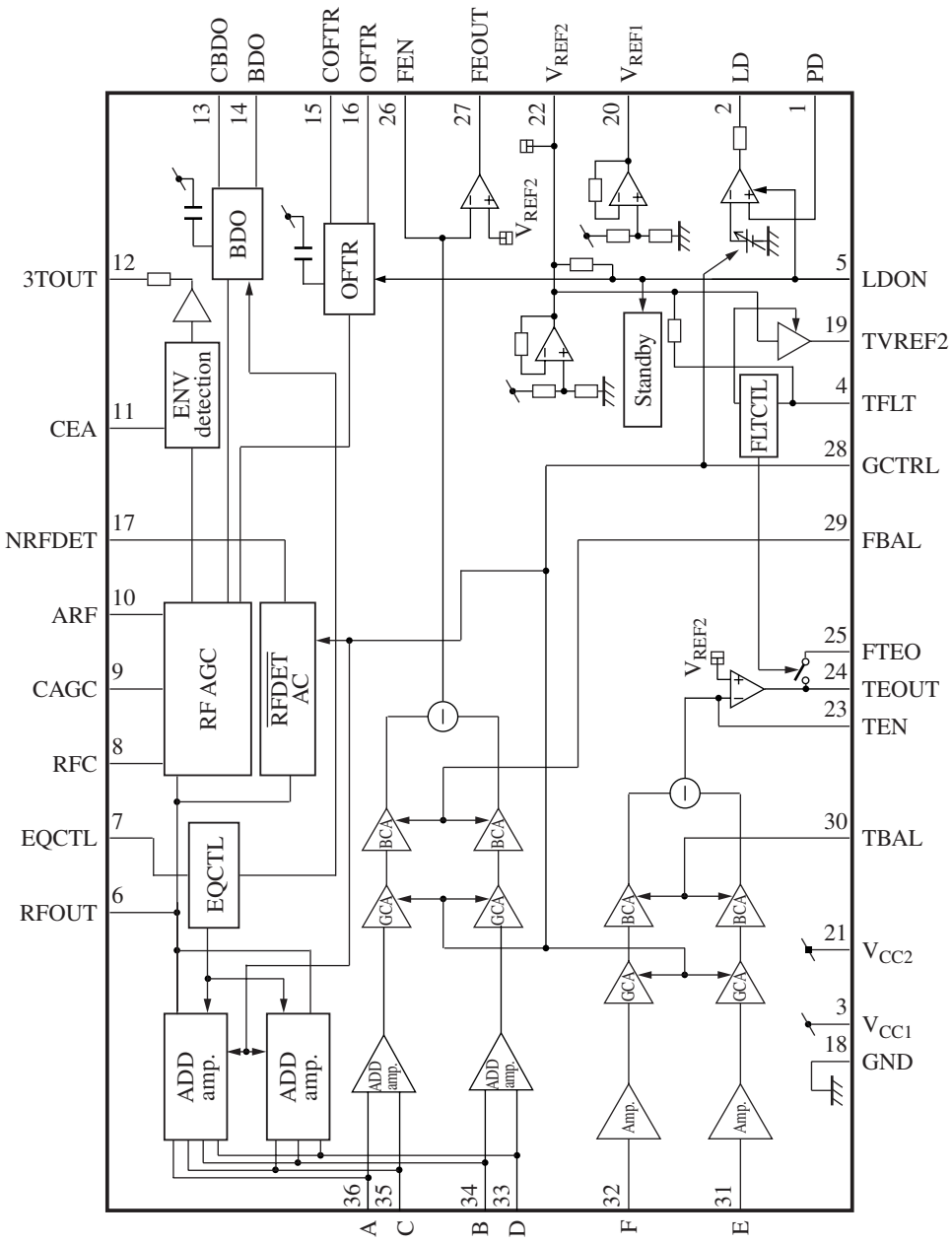
- CD/CD-ROM drive



SSOP036-P-0450A

Note) The package of this product will be changed to lead-free type (SSOP036-P-0450C). See the new package dimensions section later of this datasheet.

■ Block Diagram



■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	APC amp. input pin	18	GND pin
2	APC amp. output pin	19	V_{REF2} buffer output pin
3	Power supply pin 1	20	V_{REF1} output pin
4	TE amp. analog SW & V_{REF2} buffer control pin	21	Power supply pin 2
		22	V_{REF2} output pin
5	APC & standby control pin	23	TE amp. inverted input pin
6	RF addition amp. output pin	24	TE amp. output pin
7	EQ characteristics control pin	25	TE amp. analog SW output pin
8	Capacitor connection pin for HPF of AGC input	26	FE amp. inverted input pin
9	AGC loop filter connection pin	27	FE amp. output pin
10	AGC output pin	28	GCTL pin
11	Capacitor connection pin for HPF amp.	29	FBAL control pin
12	3TENV output pin	30	TBAL control pin
13	Capacitor connection pin for RF dark-side envelope detection	31	Tracking signal input pin 1
		32	Tracking signal input pin 2
14	BDO output pin	33	Focus signal input pin 4
15	Capacitor connection pin for RF right-side envelope detection	34	Focus signal input pin 2
		35	Focus signal input pin 3
16	OFTR output pin	36	Focus signal input pin 1
17	NRFDET output pin		

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage 1	V_{CC1}	5.8	V
Supply voltage 2	V_{CC2}	5.8	V
Supply current 1	I_{CC1}	55.3	mA
Supply current 2	I_{CC2}	3.4	mA
Power dissipation	P_D	340.46	mW
Operating ambient temperature	T_{opr}	−20 to +75	°C
Storage temperature	T_{stg}	−55 to +125	°C

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

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage 1	V_{CC1}	4.5 to 5.5	V
Supply voltage 2	V_{CC2}	3.0 to 5.5	V

■ Electrical Characteristics at $T_a = 25°C$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Current consumption with no load 1	I_{TOTAL1}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{EQCTL} = V_{REF2} - 0.3$ V	28.1	40.1	52.1	mA
Current consumption with no load 2	I_{TOTAL2}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{EQCTL} = V_{REF2} - 0.3$ V	1.80	2.57	3.34	mA
V_{REF1} output voltage	V_{REF1}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V	2.27	2.50	2.73	V
V_{REF2} output voltage	V_{REF2}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V	1.50	1.65	1.80	V
Focus error amp.						
Focus error amp. output offset voltage	V_{FO-OF}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V	–90	0	90	mV
Focus error amp. V-V conversion gain	G_{FO}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{GC} = V_{REF2} - 0.3$ V	14.3	16.4	18.5	dB
Focus error amp. balance output 1	B_{FO1-H}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{FB} = V_{REF2} + 0.5$ V	11.3	13.4	15.5	dB
Focus error amp. balance relative output 2	B_{FOH}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{FB} = V_{REF2} - 0.5$ V	–3.0	0	3.0	dB
Focus error amp. frequency characteristics	G_{FOF}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V f = 3 kHz, 60 kHz	–4.5	–3.0	–1.5	dB
Focus error amp. GCTRL gain ratio	B_{FO4}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{GC} = V_{REF2} + 0.3$ V	3.0	4.0	5.0	—
Tracking error amp.						
Tracking error amp. output offset voltage	V_{TR-OF}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V	–70	0	70	mV
Tracking error amp. V–V conversion gain	G_{TR}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{GC} = V_{REF2} - 0.3$ V	14.5	16.6	18.7	dB
Tracking error amp. balance output 1	B_{TR1-H}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{TB} = V_{REF2} + 0.5$ V	11.3	13.4	15.5	—
Tracking error amp. balance relative output 2	B_{TRH}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{TB} = V_{REF2} - 0.5$ V	–3.0	0	3.0	dB
Tracking error amp. frequency characteristics	G_{TRF}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V f = 30 kHz, 510 kHz	–5.1	—	– 0.6	dB
Tracking error amp. GCTRL gain ratio	B_{TR4}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{GC} = V_{REF2} + 0.3$ V	3.0	4.0	5.0	—
RF addition amp.						
RF addition amp. full-addition gain 1	G_{RADA1}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{EQCTL} = V_{REF2} - 0.5$ V	10.5	12.0	13.5	dB
RF addition amp. full-addition gain 2	G_{RADA2}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{EQCTL} = V_{REF2} - 0.3$ V	10.5	12.0	13.5	dB

■ Electrical Characteristics at $T_a = 25°C$ (continude)

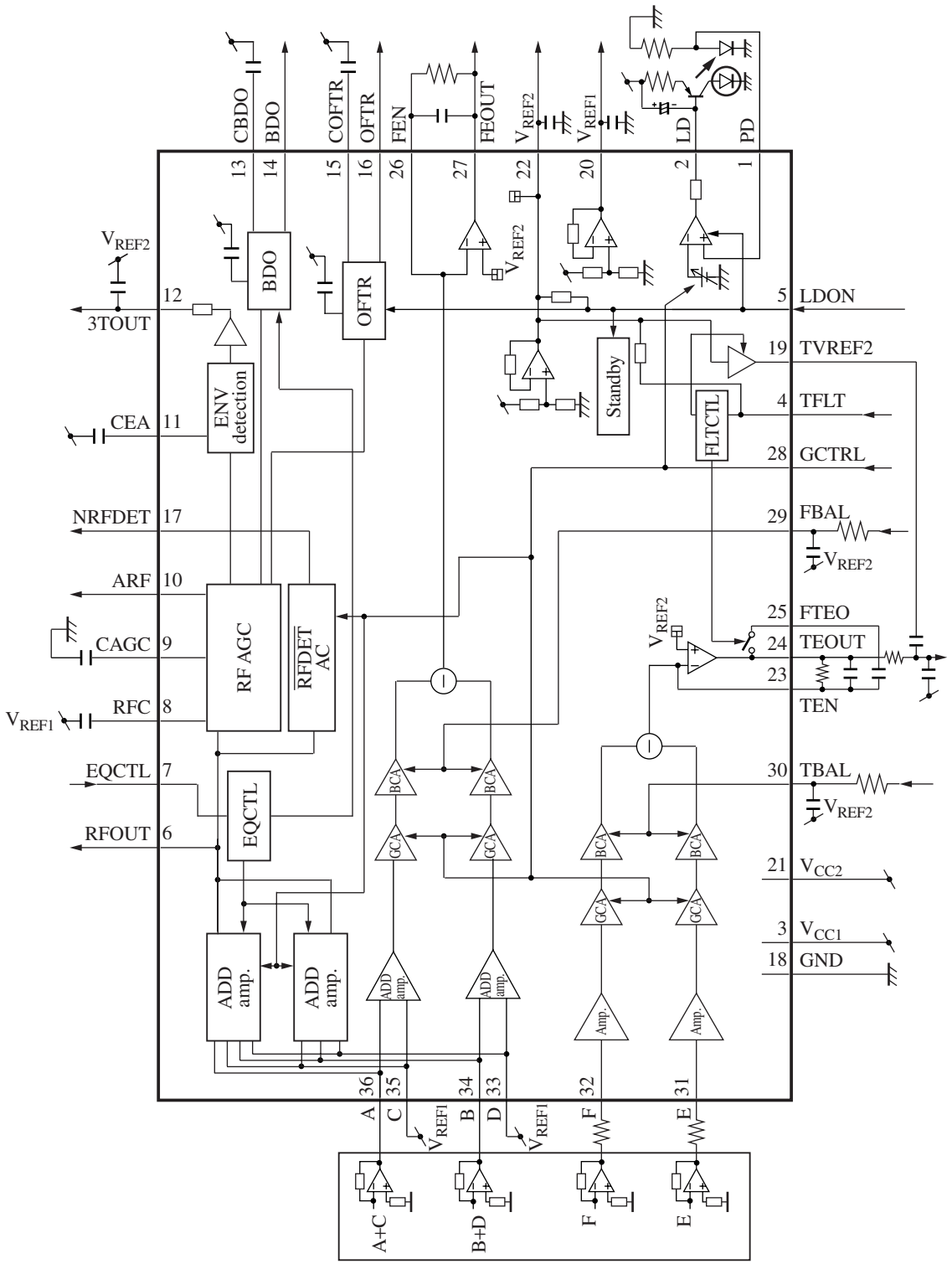
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Variable EQ characteristics						
EQ characteristics 1 *	G_{EQ1}	f = 10 kHz, 720 kHz $V_{EQCTL} = V_{REF2} - 0.5$ V	– 0.8	1.2	3.2	dB
EQ characteristics 2 *	G_{EQ2}	f = 6.5 MHz $V_{EQCTL} = V_{REF2} - 0.3$ V	2.7	4.7	6.7	dB
EQ characteristics 3 *	G_{EQ3}	f = 6.5 MHz, $V_{EQCTL} = V_{REF2} - 0.1$ V	0.9	2.9	4.9	dB
EQ characteristics 4 *	G_{EQ4}	f = 6.5 MHz, $V_{EQCTL} = V_{REF2} + 0.1$ V	– 0.1	1.9	3.9	dB
EQ characteristics 5 *	G_{EQ5}	f = 6.5 MHz, $V_{EQCTL} = V_{REF2} + 0.3$ V	– 0.7	1.3	3.3	dB
EQ characteristics 6 *	G_{EQ6}	f = 23 MHz, $V_{EQCTL} = V_{REF2} + 0.5$ V	2.2	4.2	6.2	dB
AGC						
AGC max. gain	G_{MAGC}	f = 500 kHz, V_{IN} = 20 mV[p-p]	17.0	20.0	23.0	dB
AGC operating gain	G_{AGC}	f = 500 kHz, V_{IN} = 500 mV[p-p]	3.0	6.0	9.0	dB
NRFDET						
NRFDET detection level	V_{RDA1}	f = 500 kHz, $V_{GC} = V_{REF2} - 0.3$ V	65	105	145	mV[p-p]
NRFDET high-level output voltage	V_{RDAH}	f = 500 kHz, $V_{GC} = V_{REF2} - 0.3$ V	4.2	—	—	V
NRFDET low-level output voltage	V_{RDAL}	f = 500 kHz, $V_{GC} = V_{REF2} - 0.3$ V	—	—	0.8	V
BDO						
CBDO detection current	I_{CBDO}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{EQCTL} = V_{REF2} - 0.5$ V	0.48	0.78	1.08	µA
CBDO detection current ratio	B_{IBD10}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{EQCTL} = V_{REF2} + 0.5$ V	8.7	9.7	10.7	—
BDO high-level output voltage	V_{BDOH}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V f = 5 kHz, rectangular wave	2.5	—	—	V
BDO low-level output voltage	V_{BDOL}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V f = 5 kHz, rectangular wave	—	—	0.8	V
OFTR						
COFTR detection current	I_{COFTR}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{LDON} = V_{REF2}$	0.48	0.78	1.08	µA
COFTR detection current ratio	B_{COFTR}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{LDON} = V_{REF2} + 0.75$ V	3.1	3.9	4.7	—
OFTR high-level outpit voltage	V_{OFTRH}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V f = 5 kHz, rectangular wave	2.5	—	—	V
OFTR low-level output voltage	V_{OFTRL}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V f = 5 kHz, rectangular wave	—	—	0.8	V
OFTR sensitivity 1	V_{OFT-S1}	f = 470 kHz, sin wave $V_{LDON} = V_{REF2} + 0.75$V	0	—	1.2	V
OFTR sensitivity 2	V_{OFT-S2}	f = 130 kHz, sin wave, $V_{LDON} = V_{REF2}$	0	—	0.4	V

Note) ∗: The values mentioned above are subject to change according to the state of a printed circuit board, a socket, etc.

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

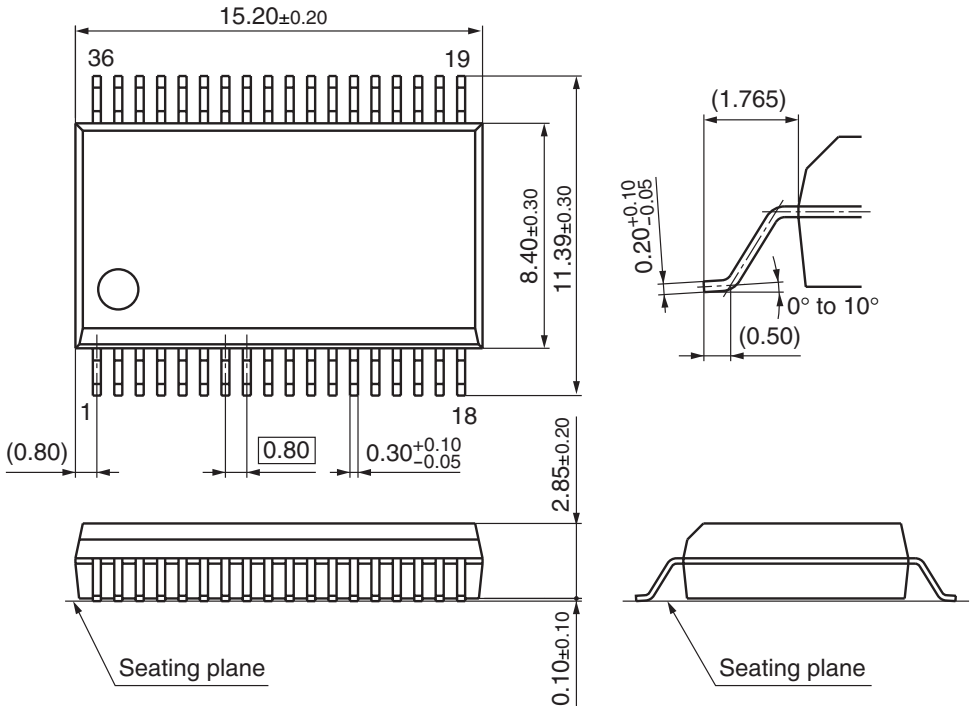
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
3TENV						
ENV amp. offset voltage	V_{ENVOF}	f = 130 kHz, sin wave, $V_{LDON} = V_{REF2}$	−120	0	120	mV
ENV amp. operation	V_{ENV}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V f = 800 kHz, AM modulation	260	470	680	mV[p-p]
LD-APC						
LD operating reference voltage 1	V_{LD1}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{GCTL} = V_{REF2} - 0.3$ V	134	170	206	mV
LD operating reference voltage ratio	B_{LD}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{GCTL} = V_{REF2} + 0.3$ V	1.08	1.15	1.22	—
LDON operating voltage	V_{LDON}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{GCTL} = V_{REF2} - 0.3$ V	—	—	− 0.35	V
Standby						
Current consumption with no load at standby	I_{STBY}	$V_{CC1} = 5$ V, $V_{CC2} = 3.3$ V $V_{LDON} = V_{REF2} - 0.75$ V	3.50	5.00	6.50	mA

■ Application Circuit Example



■ New Package Dimensions (Unit: mm)

• SSOP036-P-0450C (Lead-free package)



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