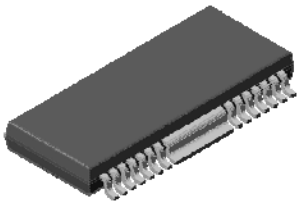
KODENSHI AUK

Semiconductor

http:// www.auk.co.kr

4CH BTL Motor Drive IC S3045



SSOPH-28N

With Heat-sink

ORDERING INFORMATION

Product	Marking	Package
S3045	S3045	SSOPH-28N

▲ Marking Detail Information

① Device Code

② Year & Week Code

Description

The S3045 is a four-channels BTL motor driver for driving the actuators and motors for products of DVD-P/R/RW.

It embrace a two channels of current feed-back BTL drivers.

those use current feed-back process to minimize the current phase shift from the load inductance of actuators

It supports various applications with pb free and heat-sink package.

Application

◈ CD-ROM

◈ CD-RW

◈ DVD-PLAYER

◈ DVD-ROM

◈ DVD-RW

Features and Benefits

◈ 2 Channel are current feedback motor driver for actuators

◈ 2 Channels are voltage-type BTL drivers for sled and loading motors.

◈ Separating power of SVcc and PVcc1,PVcc2 are to improve power efficiency.

◈ Built in Level shift circuit.

◈ Built in Thermal shut down circuit.

◈ Built in Standby mode.

◈ **Dual Actuator drivers [Current Feedback]**

The current feedback technique can reduce the current phase shift caused By the load inductance of actuators

◈ **Sled motor driver**

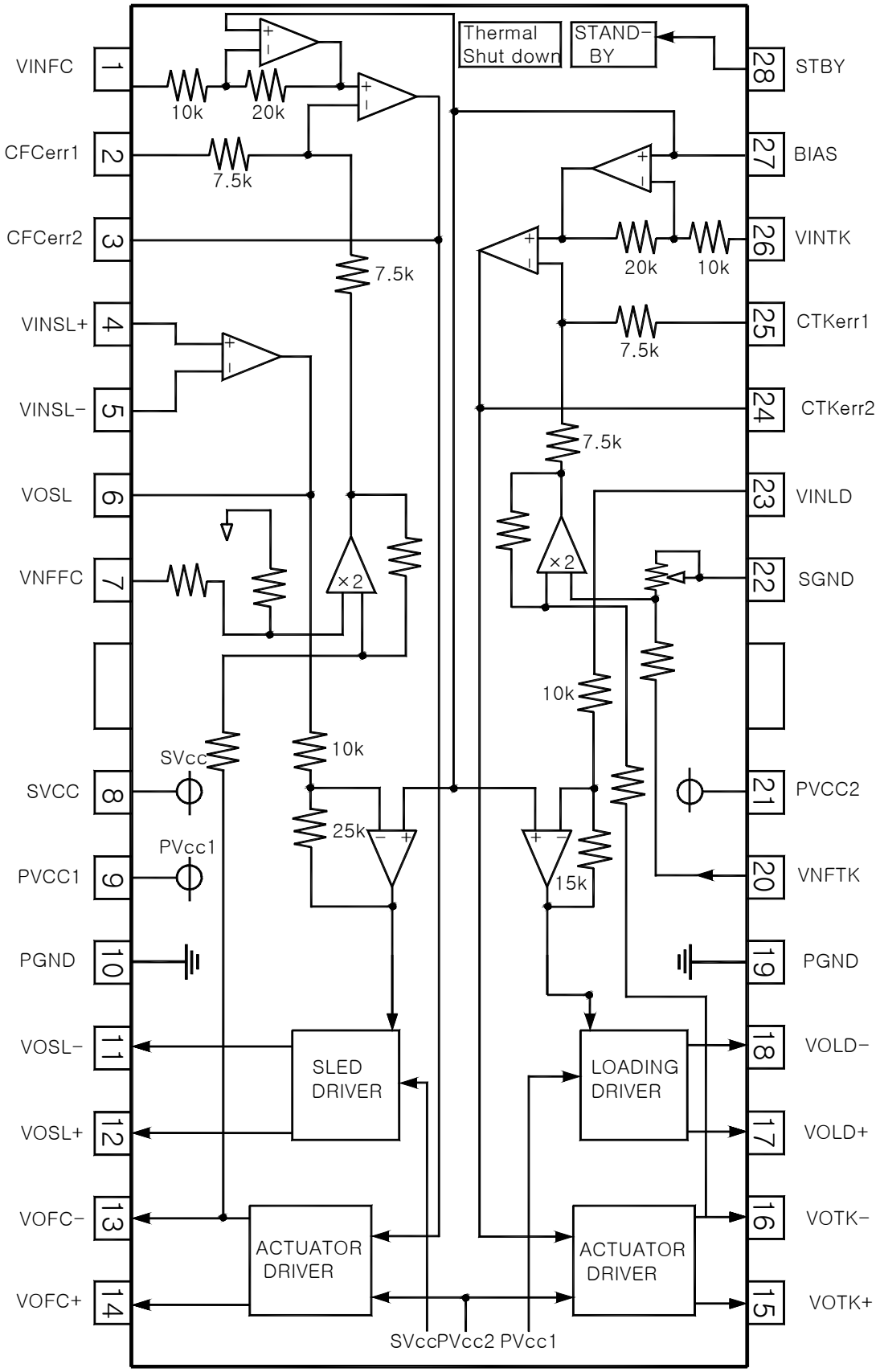
A general OP-AMP connected to the input terminal helps compute additions of differential inputs or signals.

◈ **Loading motor driver**

Single input linear BTL driver. The output structure are two power OP-AMPS in bridge configuration.

SEPT., 2010 REV. 02

◈ Internal Block Diagram & Pin Assignment



◈ Pin Description

NO	SYMBOL	I/O	DESCRIPTION
1	VINFC	I	Input for focus driver
2	CFCerr1	I	Connect with capacitor for error amplifier.
3	CFCerr2	I	Connect with capacitor for error amplifier.
4	VINSL+	I	Op amp input (+) for the sled driver
5	VINSL-	I	Op amp input (-) for the sled driver
6	VOSL	O	Op amp output for the sled driver
7	VNFFC	-	Focus driver feedback pin
8	SV_{CC}	PWR	Supply voltage for pre-driver block and power block of sled
9	PVcc1	PWR	Supply voltage for power block of loading
10	PGND	-	GND for power block
11	VOSL-	O	Sled driver output (-)
12	VOSL+	O	Sled driver output (+)
13	VOFC-	O	Focus driver output (-)
14	VOFC+	O	Focus driver output (+)
15	VOTK+	O	Tracking driver output (+)
16	VOTK-	O	Tracking driver output (-)
17	VOLD+	O	Loading driver output (+)
18	VOLD-	O	Loading driver output (-)
19	PGND	-	GND for power block
20	VNFTK	I	Feedback for tracking driver
21	PVcc2	PWR	Supply voltage for power block of actuator
22	SGND	-	GND for pre-driver block
23	VINLD	I	Input for loading driver
24	CTKerr2	I	Connect with capacitor for error amplifier.
25	CTkerr1	I	Connect with capacitor for error amplifier.
26	VINTK	I	Input for tracking driver
27	BIAS	I	Input for reference voltage
28	STBY	I	Input for standby control

Symbol of + and – [output of drives] means polarity to input pin.
For example : if voltage level of pin1 is high, pin14 is high

◈ Absolute Maximum Ratings (Ta = 25℃)

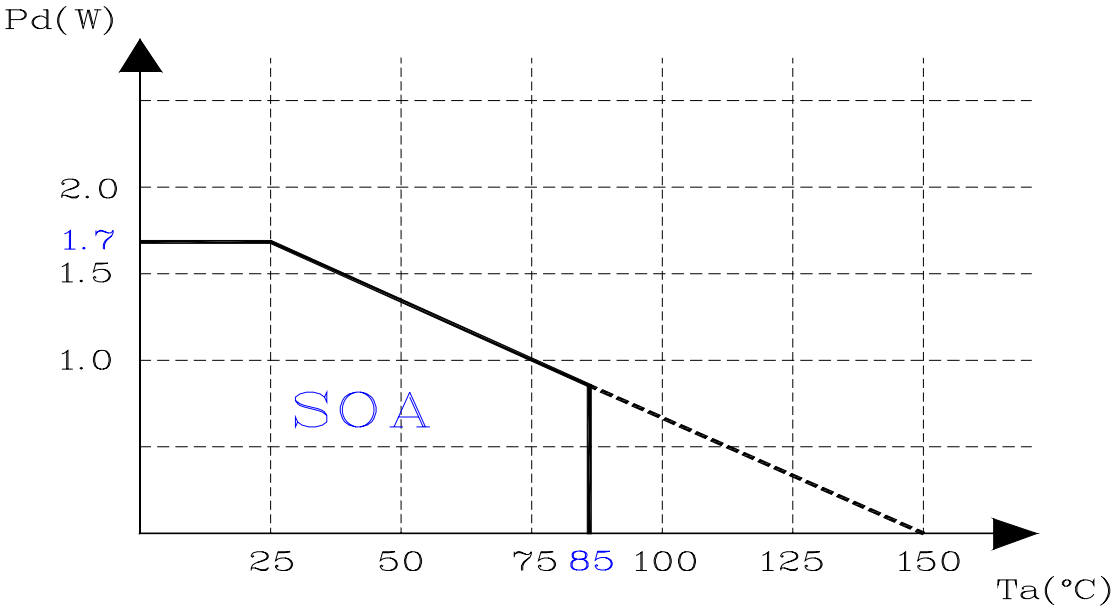
Parameter	Symbol	Limits	Unit
Supply Voltage	SV_{CC}/PV_{CC}	15	V
Power Dissipation	P_d	1.7	W
Operate Temperature Range	T_{opr}	-35 ~ +85	℃
Storage Temperature Range	T_{stg}	-55 ~ +150	℃

[Note] 1) When mounted on a 50mm×50mm×1mm PCB
2) Power dissipation reduces 20mW/℃ for using above T_a=25℃
3) Do not exceed pd and SOA

◈ Guaranteed Operating Conditions (Ta = 25℃)

Parameter	Symbol	Limits	Unit
Power Supply Voltage	SV_{CC}	4.5 ~ 13.2	V
	PV_{CC1}/ PV_{CC2}	4.5 ~ SV_{CC}	V

◈ Power Dissipation Curve [Pd]



◈ 50mm×50mm×1mm PCB
◈ Power dissipation reduces 20mW/℃ for using above T_a=25℃

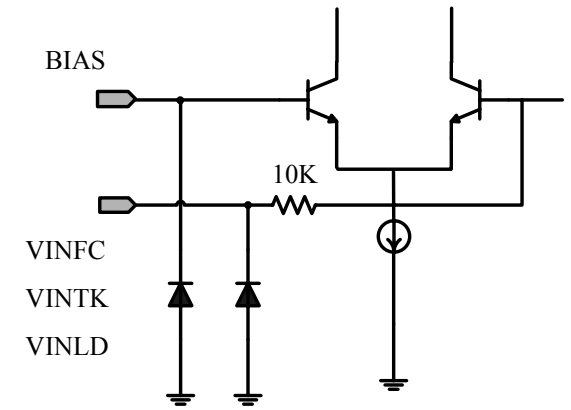
◈ Electrical characteristics

(Unless otherwise specified Ta=25℃, SVcc=12V, PVcc1= PVcc2=5V, BIAS=2.5V,
$R_{L1}=R_{L2}=R_{L3}=R_{L4}=12\Omega$, $R_D=0.5\Omega$, $C_{FC}=C_{TK}=100pF$)

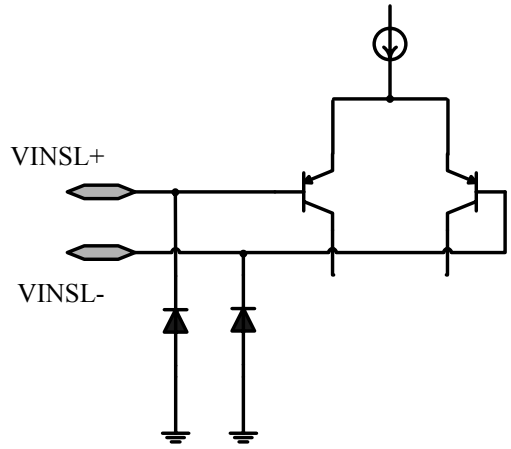
NO	Characteristics	Symbol	Condition	Specification			Unit
				MIN.	TYP.	MAX.	
1	Quiescent Current	I_{QC}		-	15	27	mA
2	Standby Circuit Current	I_{ST}		-	-	0.5	mA
3	Standby ON Voltage	V_{STON}		0	-	0.5	V
4	Standby OFF Voltage	V_{STOFF}		2.0	-	-	V
< Actuator Driver: Focus, Tracking >							
5	Output Offset Current	I_{OO}		-15	-	15	mA
6	Maximum Output Voltage	V_{OM}		3.6	4	-	V
7	Transmission Gain	Gm	VIN=BIAS+0.1Vpp ac @1khz	1.3	1.5	1.7	dB
< Sled Motor Driver / Pre Op Amp >							
8	OP AMP Input Common Mode Voltage Range	V_{ICM}		-0.3	-	11.0	V
9	OP AMP Input Bias Current	I_{BOP}			30	300	nA
10	OP AMP Low Saturation Voltage	V_{OLOP}		-	0.1	0.3	V
11	Maximum Output Source Current	I_{SO}		0.3	0.5	-	mA
12	Maximum Output Sink Current	I_{SI}		1	-	-	mA
< Sled Motor driver >							
13	Output Offset Voltage	V_{OOFSL}	SV_{CC}=5V	-100	-	100	mV
14	Maximum Output Voltage	V_{OMSL}		7.5	9.0	-	V
15	Closed-loop Voltage Gain	G_{VSL}	VIN=BIAS+0.1Vpp ac @1khz	18.0	20.0	22.0	dB
< Loading Motor Driver>							
16	Output Offset Voltage	V_{OOFLD}		-50	0	50	mV
17	Maximum Output Voltage	V_{OMLD}		3.6	4.0	-	V
18	Closed-loop Voltage Gain	G_{VLD}	VIN=BIAS+0.1Vpp ac @1khz	13.5	15.5	17.5	dB
19	Gain Error by Polarity	ΔG_{VLD}	VIN=BIAS+0.1Vpp ac @1khz	0	1	2	dB

Equivalent Circuits

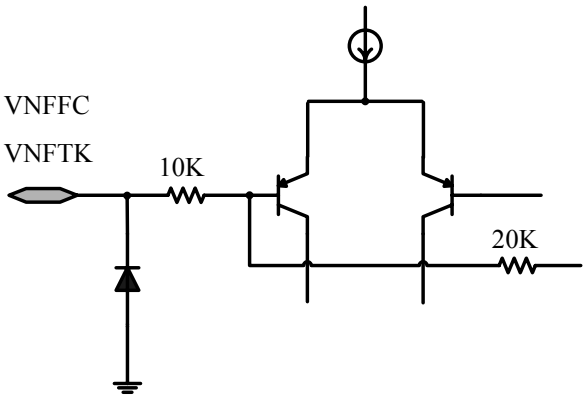
▣ **Signal Input Stage**



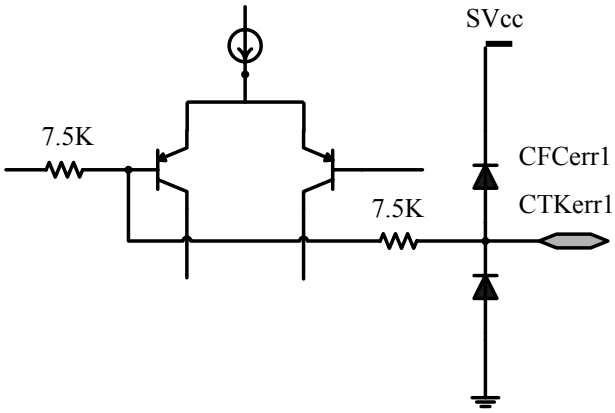
▣ **OP-AMP Input Stage**



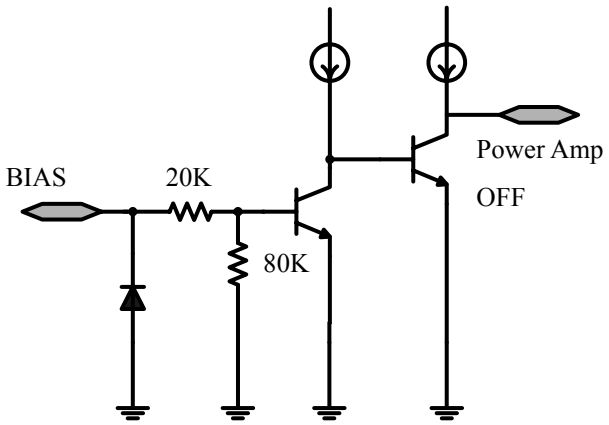
▣ **Sense AMP Input Stage**



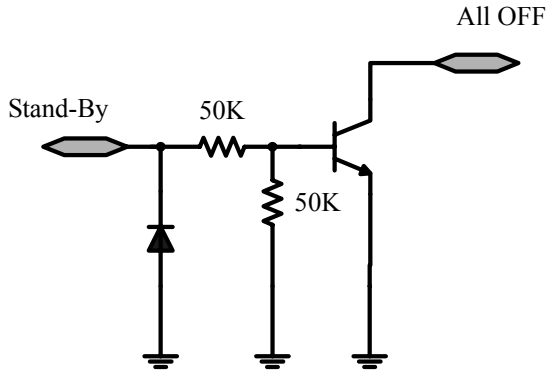
▣ **Error AMP Input Stage**



▣ **BIAS Input Stage**

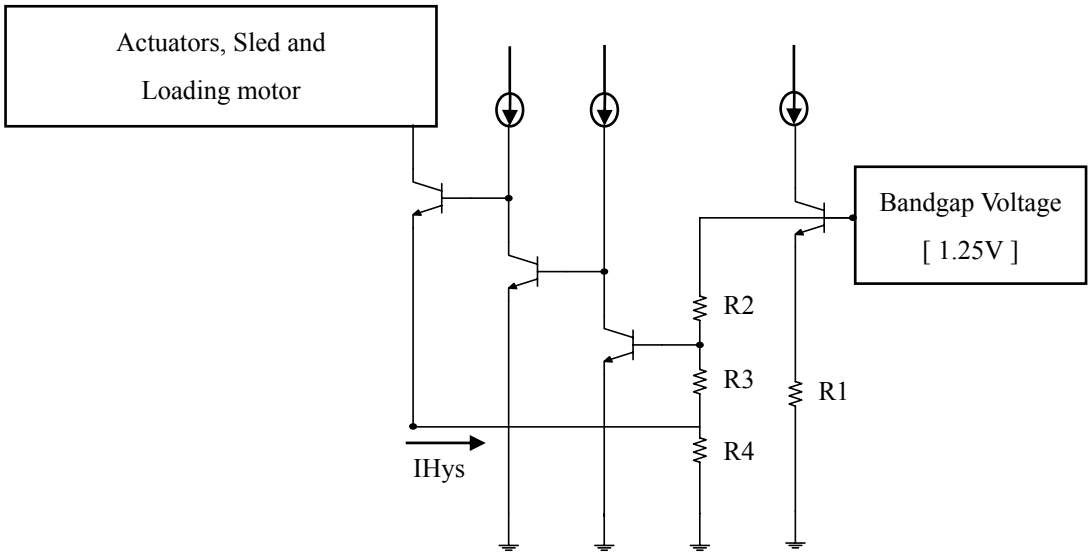


▣ **Stand-by Input Stage**



Application Information

1. Thermal Shut Down Circuit



The built-in thermal shutdown circuit mutes turn off the output current when the chip temperature reaches 175℃ (typ.). The hysteresis is set to 25℃ (typ.) by IHys,
so the circuit will start up again when the chip temperature falling down to 150℃ (typ.)

2. Reference Input & Stand-by Function

•Reference input [BIAS PIN : PIN 27]

The applied voltage at the reference input pin must be between 0.8V and 6.5V
(when SVcc=8.5V)

•Standby input [PIN28]

The following input conditions must be satisfied for the standby function

Stand-by input voltage	OPERATION
Below 0.5V [or Open]	The stand-by function is activated so the bias block and power block are disabled
Above 2.0V	Recover the normal operation

3. Separation of Power Supply

■ SV_{CC}

SV_{CC} supplies power to the sled motor driver and the signal logic part ($SV_{CC} \geq PV_{CC1}/PV_{CC2}$)

■ PV_{CC1}

PV_{CC1} is the power supply for the loading motor driver.

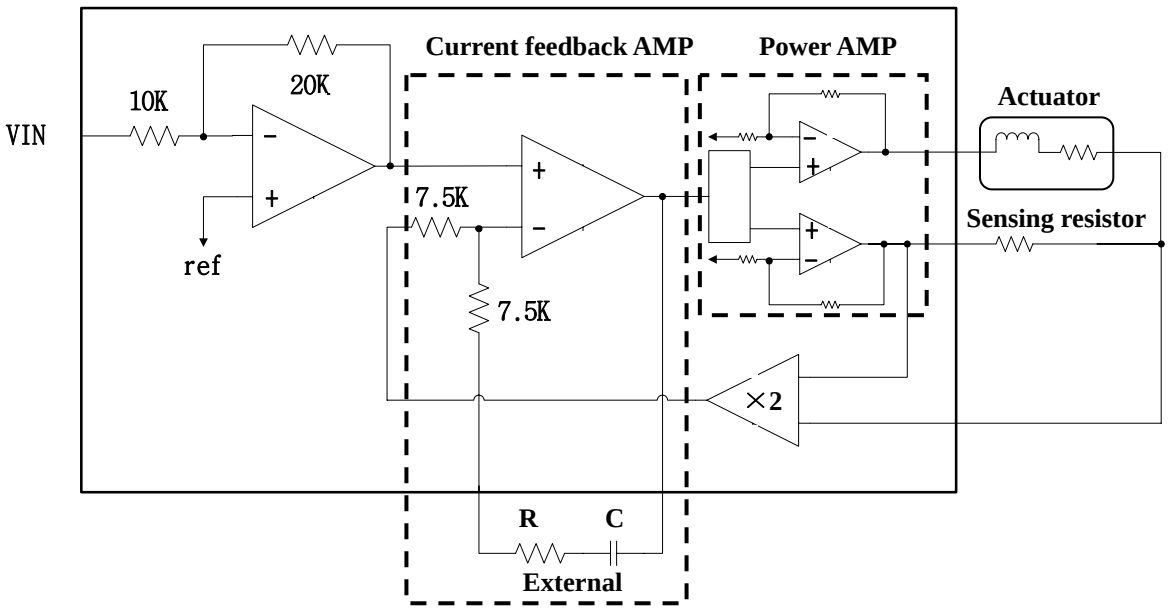
The recommend operating voltage range is between 4.3V~13.2V

■ PV_{CC2}

PV_{CC2} is the power supply for the actuators that include focus and tracking motor drivers

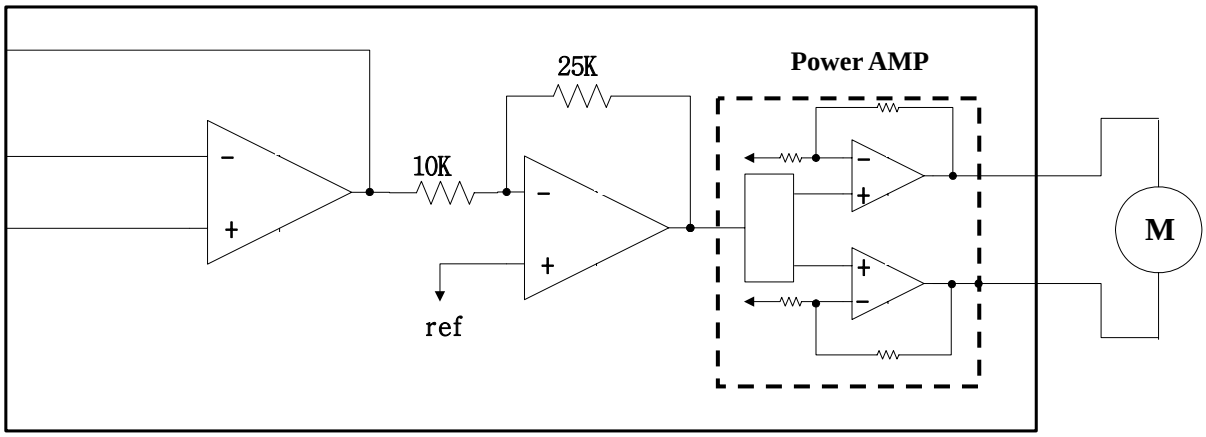
The range is between 4.3V~13.2V

4. Current Feedback Channel [Actuators]



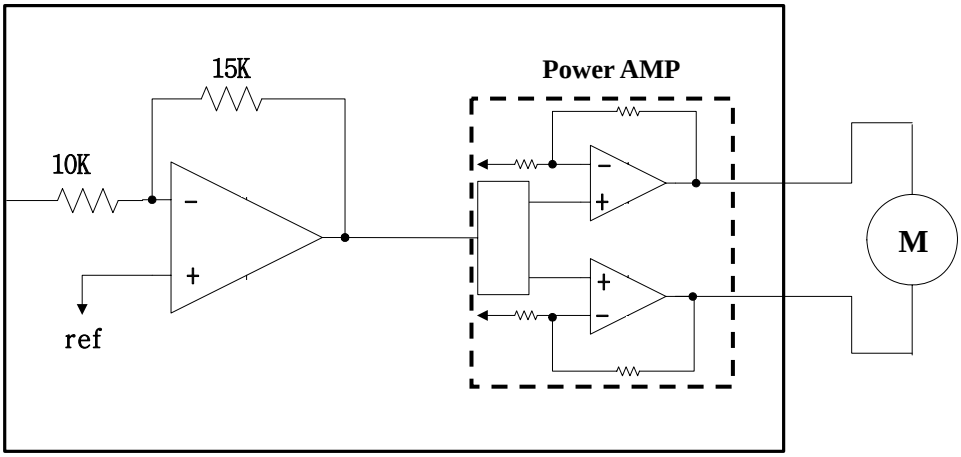
- The reference voltage is supplied externally through pin 27.
- The input OP-AMP output signal is amplified by (20K/10K) times and then fed to the current feedback amplifier.
- The current feedback amplifier compares the output current sensed input and command input and then makes the controlled output to eliminate delay effect of the load.
- The DC gain of current feedback amplifier and power amplifier is unity, which is 1 [A/V]. Users can change the gain by adding external resistor at the command input.

5. Sled Driver Circuits [with input OP AMP]



- The reference voltage is given externally through pin 27.
- The input OP-AMP can be used for several purpose, for example low pass filter, differential input coordinator, gain scaler and so on.

6. Loading Driver Circuits [BTL Motor Driver]



- The reference voltage is given externally through pin 27.
- The input OP-AMP output signal is amplified by (15K/10K) times and then fed to the power Amplifier. The gain of power amplifier is 4; therefore, the total max gain of Loading driver is 6.
- Users must check input command range to use max output voltage because the total gain is relatively smaller than other drivers.

Characteristic Diagrams

Fig. 1 V_{CC} - I_{QC}

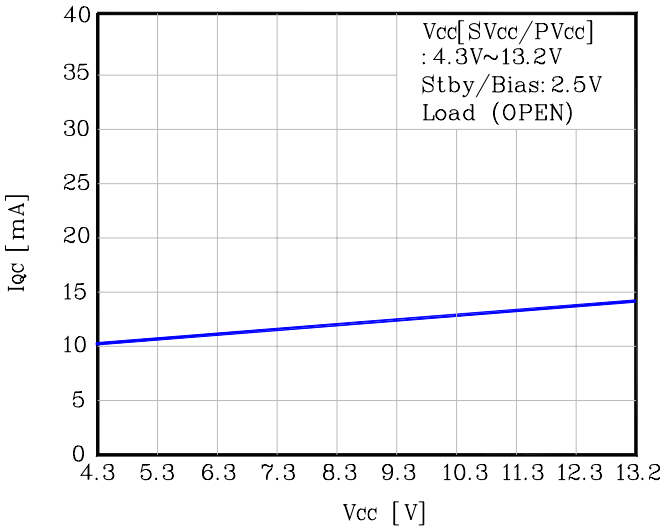


Fig. 2 Temperature - I_{QC}

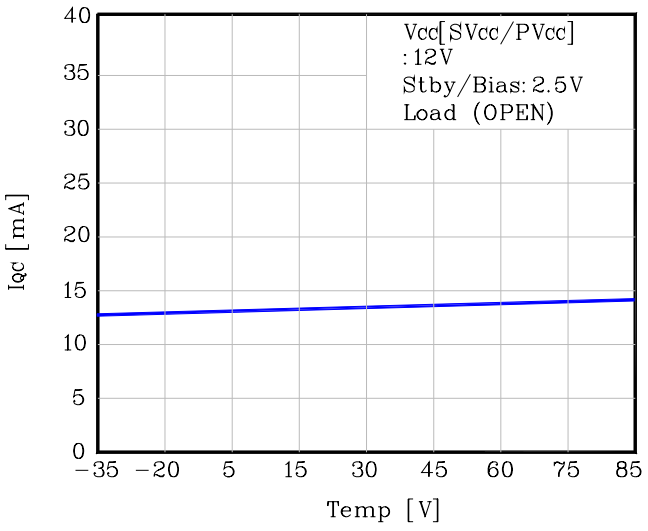


Fig. 3 V_{OM} - I_O 1

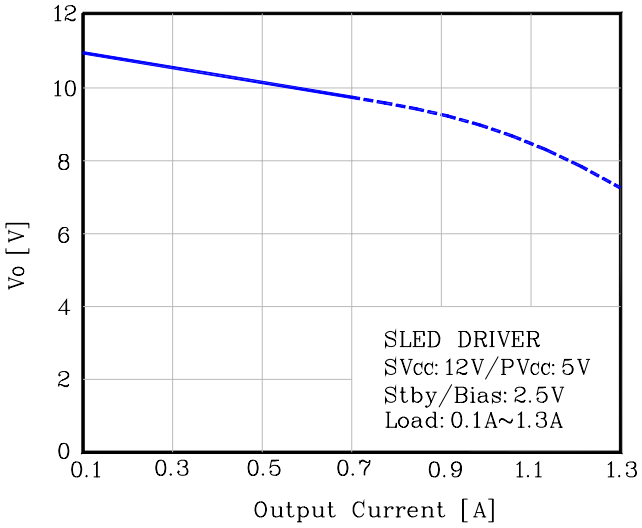


Fig.4 V_{OM} - I_O 2

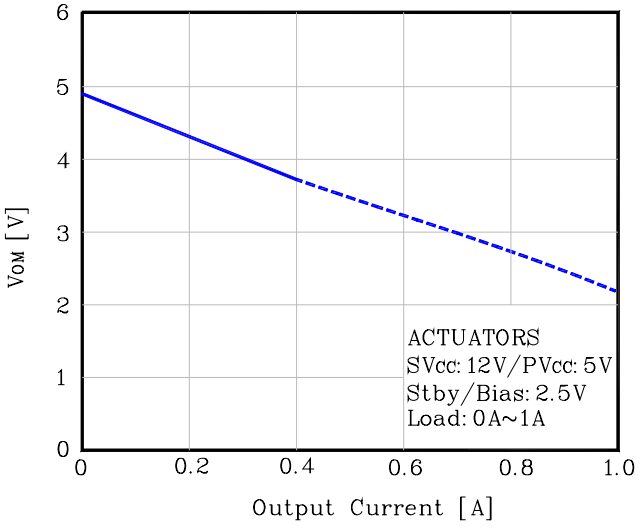


Fig. 5 V_{OM} - I_O 3

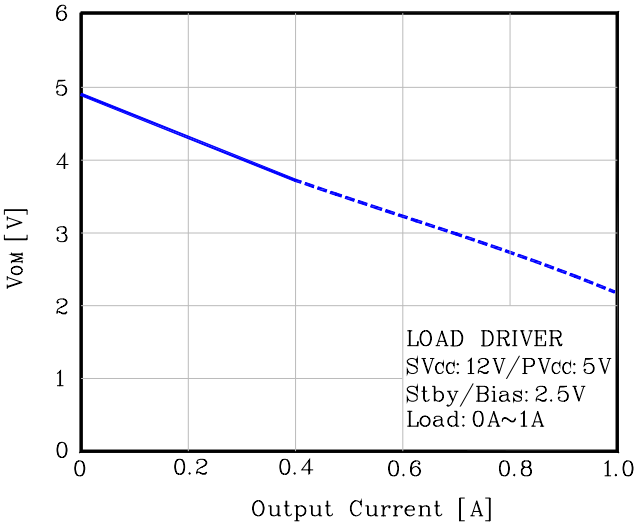
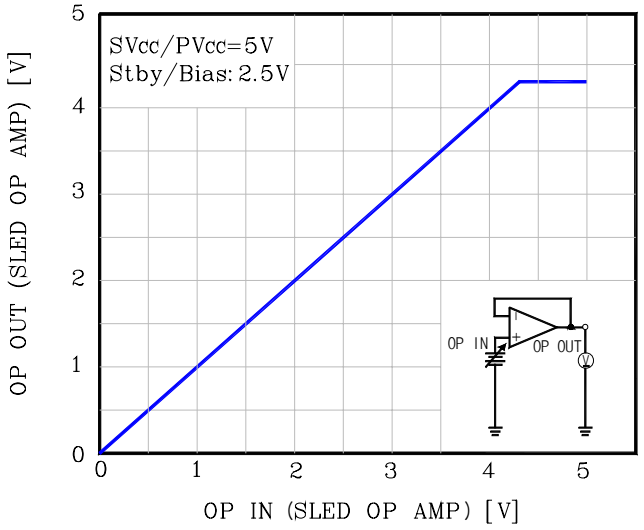
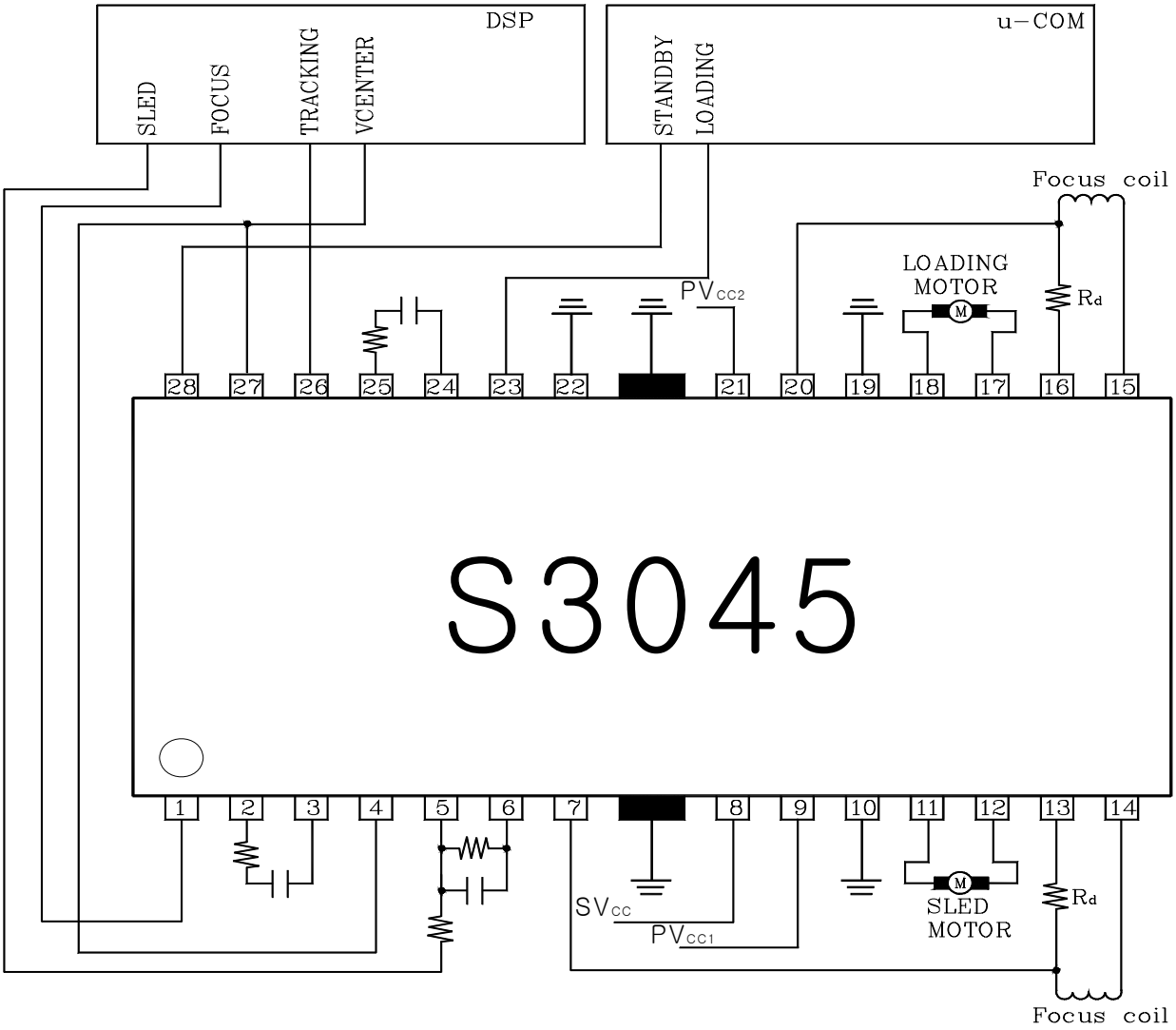


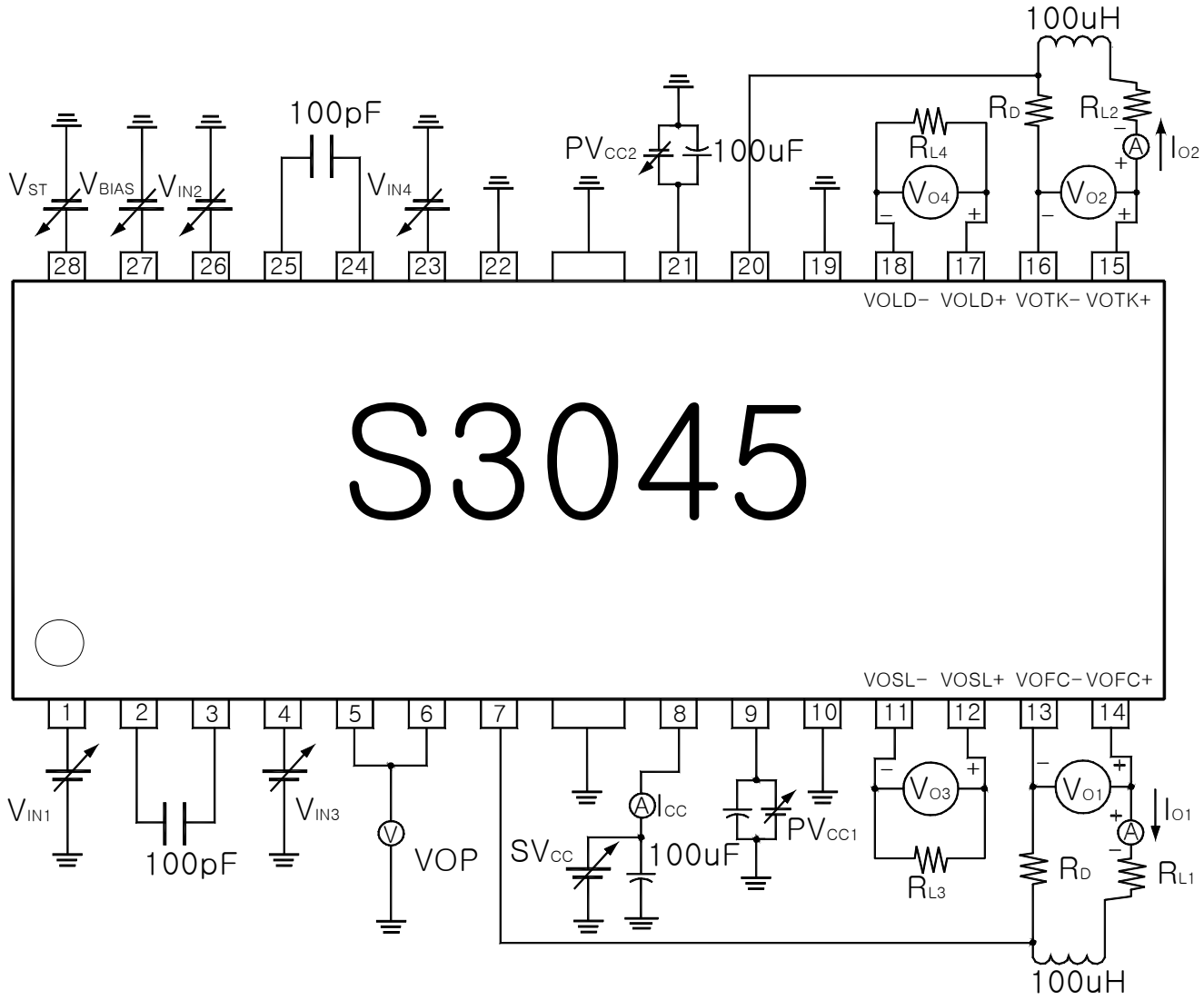
Fig.6 OP V_{IN} – OP V_O (Buffer)



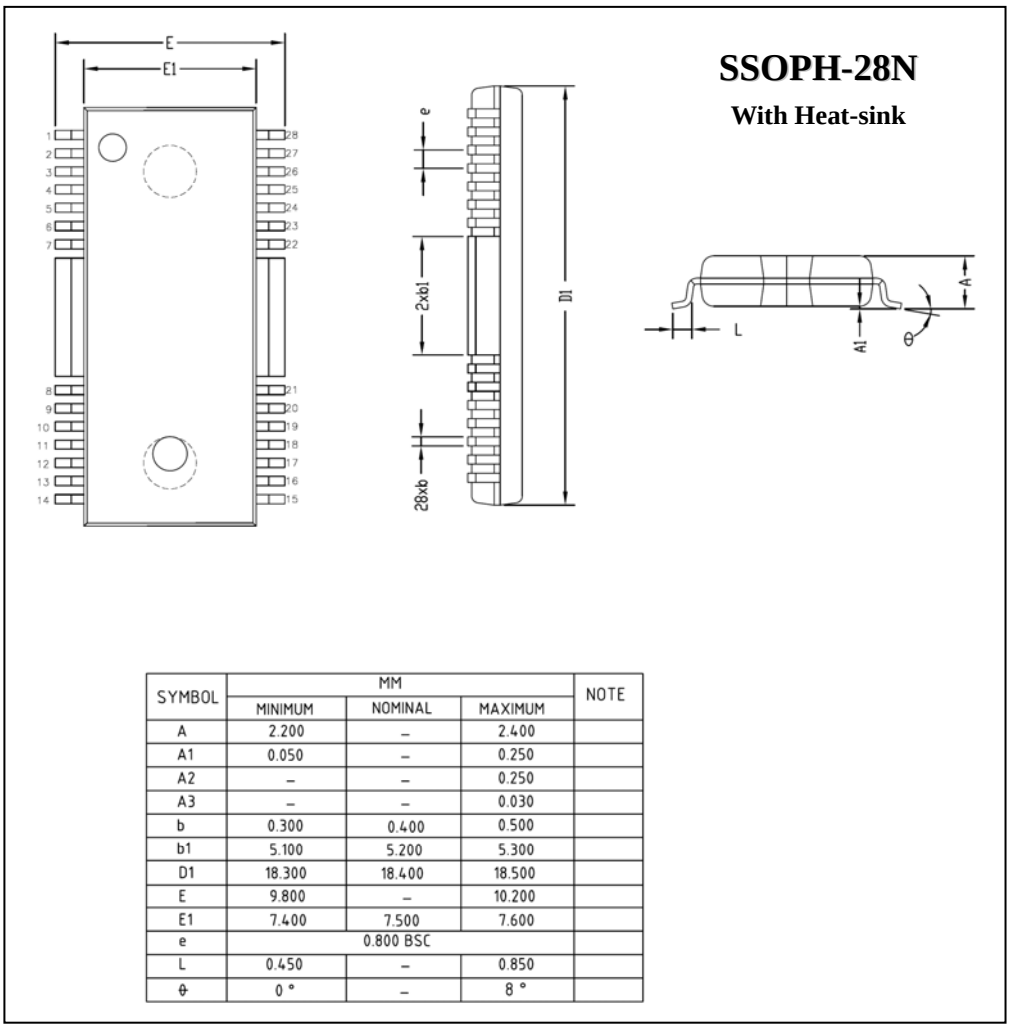
◈ Application Circuit



◈ Testing Circuit

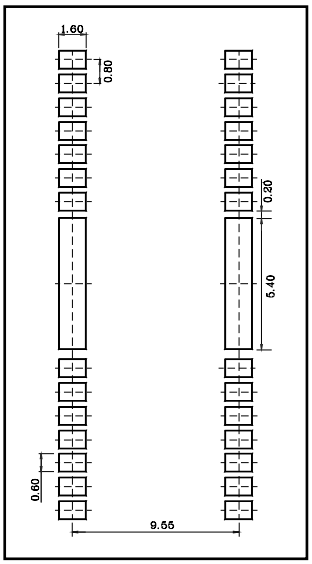


◈ Outline Dimension (Unit : mm)



SYMBOL	MM			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	2.200	–	2.400	
A1	0.050	–	0.250	
A2	–	–	0.250	
A3	–	–	0.030	
b	0.300	0.400	0.500	
b1	5.100	5.200	5.300	
D1	18.300	18.400	18.500	
E	9.800	–	10.200	
E1	7.400	7.500	7.600	
e	0.800 BSC			
L	0.450	–	0.850	
θ	0 °	–	8 °	

※ Recommend PCB solder land (Unit : mm)



The AUK Corp. products are intended for the use as components in general electronic equipment (Office and communication equipment, measuring equipment, home appliance, etc.).

Please make sure that you consult with us before you use these AUK Corp. products in equipments which require high quality and / or reliability, and in equipments which could have major impact to the welfare of human life(atomic energy control, airplane, spaceship, transportation, combustion control, all types of safety device, etc.). AUK Corp. cannot accept liability to any damage which may occur in case these AUK Corp. products were used in the mentioned equipments without prior consultation with AUK Corp..

Specifications mentioned in this publication are subject to change without notice.