TITLE SPECIFICATIONS	PAGE 1/8
NAME PhotoMOS	AQV258HAX C88

1. TYPE ; HE 1 Form A SMD type

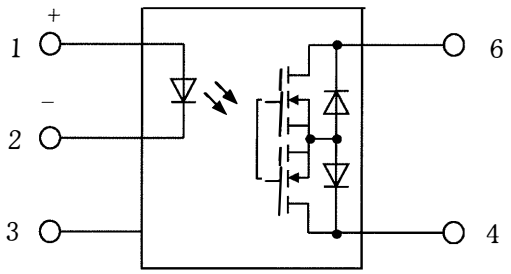
2. PART NO. ; AQV258HAX C88

3. DRAWING NO. ; AQV258HAX C88

4. USAGE ; BMS voltage monitoring and insulation detection
(Spec Review No. PM20210426a-3)

5. CHARACTERISTICS

5- 1 Equivalent circuit



5- 2 Absolute maximum ratings (Ta=25 ℃)

Item		Symbol	Value	Unit
Input	LED forward current	I_F	50	mA
	LED reverse voltage	V_R	5	V
	Peak forward current *1	I_{FP}	1	A
	Power dissipation	P_{in}	75	mW
Output	Load voltage (Peak AC)	V_L	1500	V
	Continuous load current *2	I_L	20	mA
	Peak load current *3	I_{peak}	60	mA
	Power dissipation	P_{out}	360	mW
Total power dissipation		P_T	410	mW
I/O isolation voltage		V_{iso}	5000	V rms
Ambient temperature	Operating *4	T_{opr}	-40 to 85	℃
	Storage	T_{stg}	-40 to 100	℃

*1 f=100 Hz, Duty factor=0.1 %
*2 Peak AC/DC
*3 100 ms (1 shot), V_L=DC
*4 Non-icing at low temperatures

	DATE: Jun. 9, 2021
Panasonic Corporation	DESIGNED
	CHECKED
	ENACTED

5- 3 Recommended operating conditions (Ta=25 ℃)

Item	Symbol	Min.	Typ.	Max.	Unit
LED forward current	I_F	5	10	20	mA
Load voltage (Peak AC)	V_L	—	—	900	V
Continuous load current	I_L	—	—	10	mA

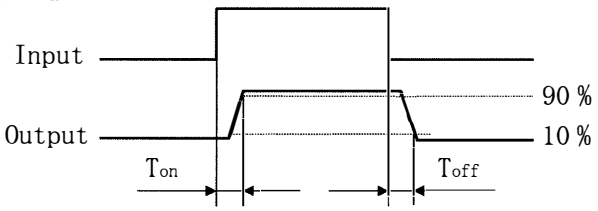
Please use under recommended operating conditions to obtain expected performance. Additionally, please check the other conditions in this specification sheet because they are affected by the actual usage.

5- 4 Electrical characteristics (Ta=25 ℃)

Item			Symbol	Test conditions	Min.	Typ.	Max.	Unit
Input	LED operate current		I_{Fon}	I_L=Max.	—	0.8	3	mA
	LED turn off current		I_{Foff}	I_L=Max.	0.2	0.7	—	mA
	LED dropout voltage *1		V_F	I_F=50 mA	—	1.35	1.5	V
Output	On resistance		R_{on}	I_F=10 mA, I_L=Max. Within 1 s	—	305	500	Ω
	Off state leakage current		I_{Leak}	I_F=0 mA, V_L=Max.	—	—	10	μA
Transfer characteristics	Switching speed	Turn on time *2	T_{on}	I_F=10 mA, I_L=Max.	—	0.14	1	ms
		Turn off time *2	T_{off}	I_F=10 mA, I_L=Max.	—	0.1	0.5	ms
	I/O capacitance		C_{iso}	f=1 MHz, V_B=0 V	—	0.8	1.5	pF
	Initial I/O isolation resistance		R_{iso}	500 V DC	1000	—	—	MΩ

*1 Typ. 1.17 V at I_F=10 mA

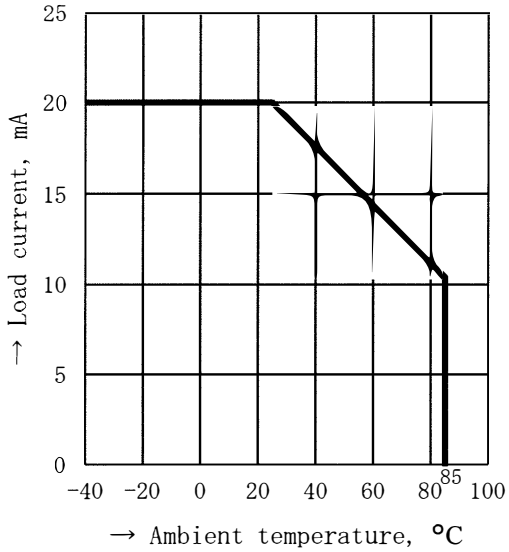
*2 Turn on/Turn off time



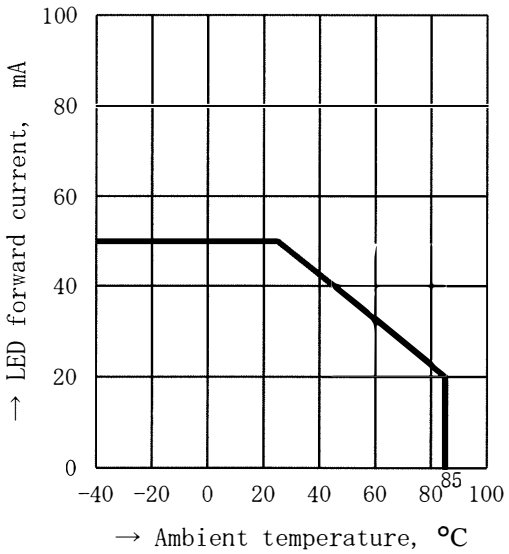
5- 5 The terminal leads receive solder plating.

6. MAXIMUM CURRENT VS. AMBIENT TEMPERATURE CHARACTERISTICS

6- 1 Continuous load current vs. Ambient temperature characteristics

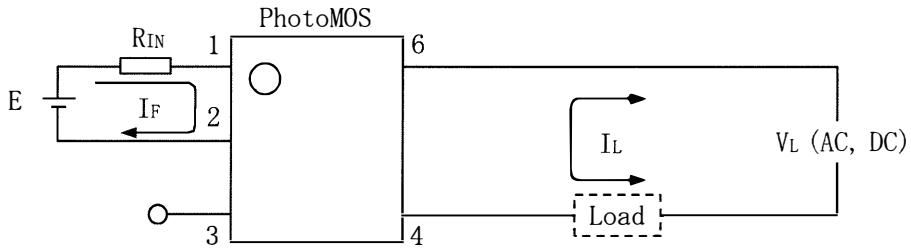


6- 2 LED forward current vs. Ambient temperature characteristics



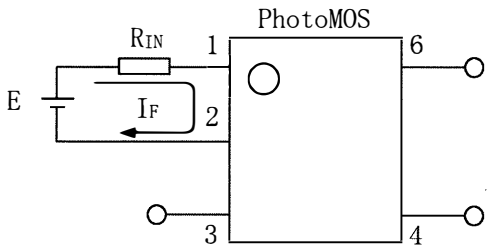
7. USING METHODS

7- 1 Wiring diagram



E : Power source at input side
I_F : LED forward current
V_L : Load voltage
I_L : Load current
R_{IN}: Current limit resistor

7- 2 Examples of each input power supply and the current limit resistor (I_F=10 mA)



E	R_{IN}
5 V	Approx. 350 Ω
15 V	Approx. 1.4 kΩ
24 V	Approx. 2.3 kΩ

When the I_F is not 10 mA, please decide the appropriate value of the current limit resistor (R_{IN}) in consideration of the LED dropout voltage (V_F).

8. CAUTIONS FOR USE

Please use our products in the conditions described in our specification sheet.
Panasonic Corporation does not guarantee any failure caused by the usage in the conditions beyond the specifications.
Additionally, please evaluate the device in the worst condition of your actual usage to ensure the reliability.

8- 1 Regarding cautions for use and explanation of technical terms, please refer to our web site.

8- 2 About derating design

To apply derating for reliable design is significant because it is a factor affects product life. Even if the product is used in the absolute maximum ratings of temperature, current, voltage, etc., reliability may be lowered remarkably when continuously used in high load conditions (high temperature, high humidity, high current, high voltage, etc.). Therefore, please derate sufficiently in the absolute maximum ratings and evaluate the device in the actual condition.

8- 3 Unused terminals

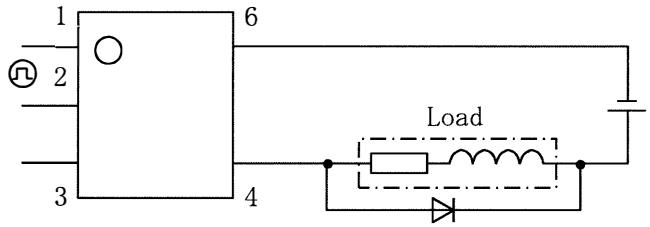
Do not use terminal No. 3, because it is no connection terminal.

8- 4 Circuit connections

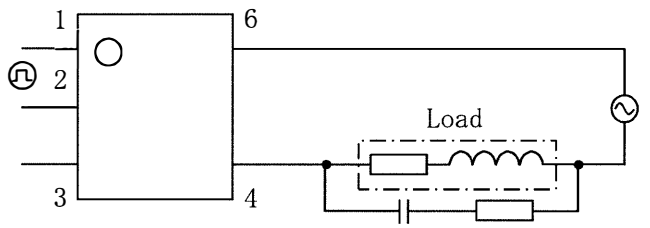
Please check the wiring diagram in the catalog or the specification sheet, and connect the terminals correctly. If this device is energized with short-circuit or any wrong connection, that may cause inner parts destruction, unexpected malfunction, abnormal heat, fire, and so on.

8- 5 Output spike voltages

1) If an inductive load generates spike voltages which exceed the absolute maximum rating, the spike voltage shall be limited. Circuit examples are shown below.



Clamp diode is connected in parallel with the load



CR Snubber is connected in parallel with the load

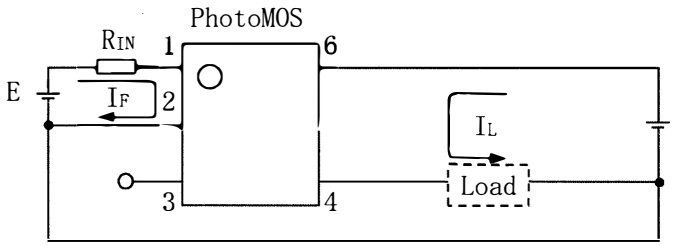
2) Clamp diode or CR Snubber can limit spike voltages from the load. However, the inductance increases by long wiring and it may cause spike voltages. Please keep the wire as short as possible to minimize inductance.

8- 6 Continual DC bias

In cases in which a continual DC bias is applied between the input and output, the output-side MOSFET may deteriorate due to the voltage.

Therefore, please avoid to use under such the conditions.

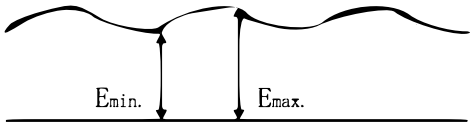
An example of a circuit that might undergo MOSFET deterioration due to voltage is given below.



8- 7 Ripple in the LED forward current

If ripple is present in the input power supply, observe the following:

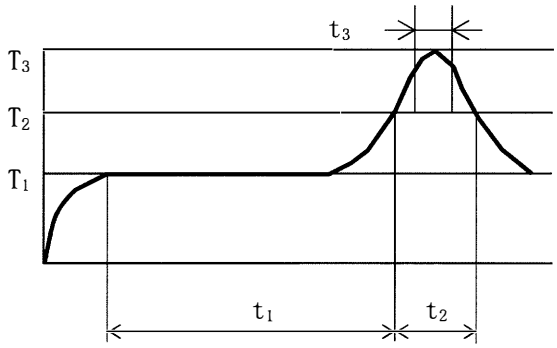
1) For LED forward current, please maintain min. 5 mA at $E_{min.}$.
2) Please make sure the LED forward current is no higher than 50 mA at $E_{max.}$.



8- 8 Soldering condition

1) IR (Infrared reflow) soldering method

In case of automatic soldering, following conditions should be observed.
(recommended condition reflow: Max. 2 times, measurement point: soldering lead)



T_1=150 ℃ to 180 ℃
T_2=230 ℃
T_3=240 ℃ to 250 ℃
t_1=60 s to 120 s
t_2=Within 30 s
t_3=Within 10 s

2) Other soldering methods

Other soldering methods (VPS, hot-air, hot plate, laser heating, pulse heater, etc.) except for above affect the PhotoMOS characteristics differently. Please evaluate the device under the actual usage.

3) Manual soldering method

Temperature: 350 ℃ to 400 ℃
Wattage : 30 W to 60 W
Time : Within 3 s

8- 9 Notes for mounting

1) When different kinds of packages are mounted on PCB, temperature rise at the soldering lead is highly dependent on package size. Therefore, please set the lower temperature than above soldering condition (8-8), and confirm the temperature condition of actual usage before soldering.
2) When soldering condition exceeds our recommendation, it may cause package crack or bonding wire breaking because of thermal expansion unconformity and resin strength reduction. Please contact us about the propriety of the condition.
3) Please confirm the heat stress to the product by using actual board because it may be changed by board condition or manufacturing process condition
4) The change of soldering condition or the soldering material may affect soldering characteristics such as wicking property, wettability, or strength. Therefore, please check the adequacy under the actual production condition.
5) Please apply coating after the device returns to a room temperature.

8-10 Cleaning solder flux

The immersion washing with an organic solvent is recommended to clean the solder flux. If you have to use ultrasonic cleaning, please adopt the following conditions and check that there are no problems in the actual usage.

- Frequency : 27 kHz to 29 kHz
- Ultrasonic output: No greater than 0.25 W/cm^2 *
- Cleaning time : 30 s or less
- Others : Float PCB and the device in the cleaning solvent without contacting the ultrasonic vibrator.

* Note; Applies to unit area ultrasonic output for ultrasonic baths

9. TRANSPORTATION AND STORAGE

9- 1 Extreme vibration during transport may deform the lead or damage the PhotoMOS. Please handle the outer and inner boxes with care.

9- 2 Inadequate storage condition may degrade soldering, appearance, and characteristics. The following storage conditions are recommended:

- Temperature: 0 ℃ to 45 ℃
- Humidity : Max. 70 % RH
- Atmosphere : No harmful gasses such as sulfurous acid gas, minimal dust.

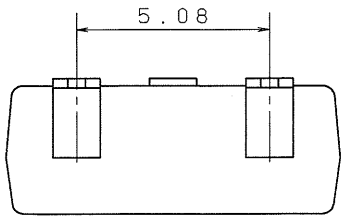
10. WATER CONDENSATION

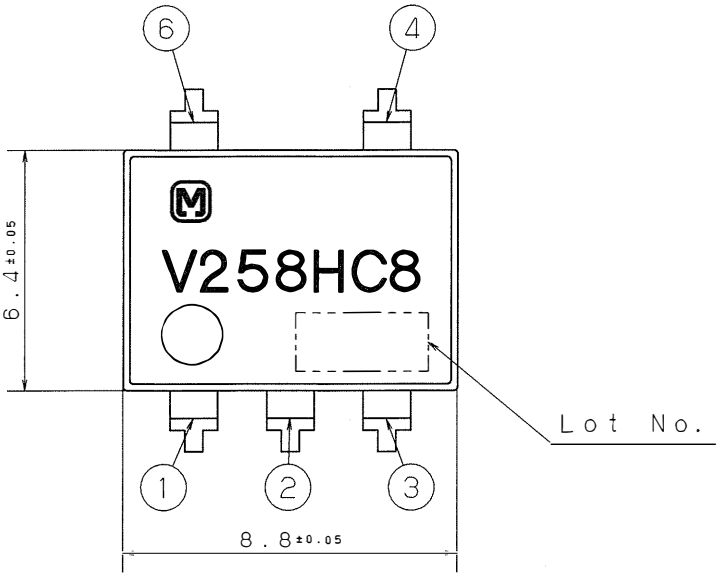
Water condensation occurs when the ambient temperature changes suddenly from a high temperature to low temperature at high humidity, or the device is suddenly transferred from a low ambient temperature to a high temperature and humidity. Condensation causes the failures such as insulation deterioration. Panasonic Corporation does not guarantee the failures caused by water condensation. The heat conduction by the equipment in which the PhotoMOS is installed may accelerate the water condensation. Please confirm that there is no condensation in the worst condition of the actual usage.
(Special attention should be paid when high temperature heating parts are close to the PhotoMOS.)

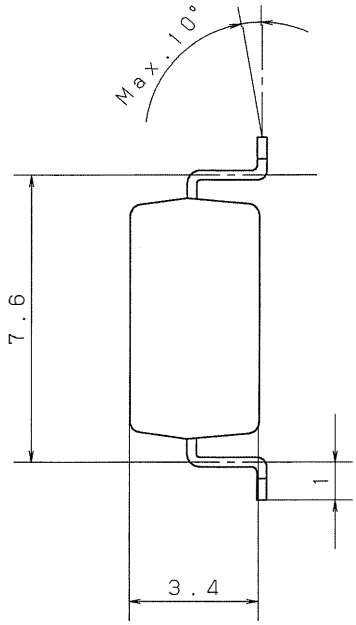
11. WARRANTY

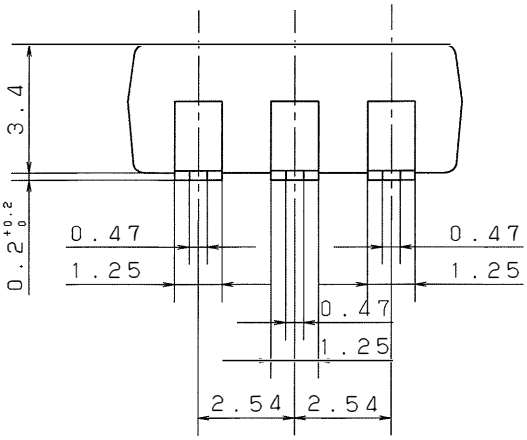
Panasonic Corporation will do our utmost to keep our product to be free from defects. However;

1) To avoid uses of the product not in accordance with its specifications, Panasonic Corporation asks the purchaser to present the purchaser's specification, the final destination, application of the final product and the method of installation of the product.
2) Please adopt the dual circuit (protection or redundant circuit) and conduct safety test when the PhotoMOS is used under the following condition.
   -When the significant damage to life and property are expected.
   -When the PhotoMOS is used in instruments required high safety.
3) Panasonic Corporation will either repair or replace any product or part after mutual consultation if it is proven to be defective against only the items written in this specification within one year from the date of products acceptance at the site of delivery unless another contract defined each other.
   The following are excluded from the warranty conditions:
   i) Any consequential damage or loss of profit is resulted from malfunctions or defects of the product.
   ii) The products are affected by the situation out of the specification at handling, the storage and the transport, etc. after the delivery.
   iii) An unforeseen situation arises which was unable to be predicted technically at the time of shipment.
   iv) A natural or man-made disaster which is beyond Panasonic Corporation's control occurs such as earthquake, flood, fire or social strife.









(1) INPUT:DC+

(2) INPUT:DC−

(3) NO CONNECTION

(4) OUTPUT:AC/DC

(6) OUTPUT:AC/DC

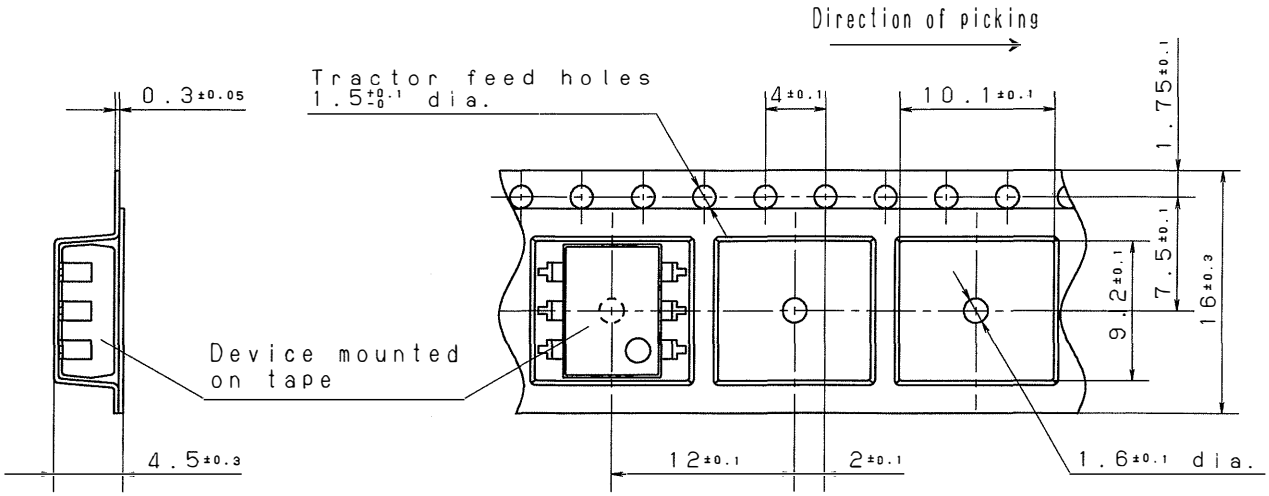
t=0.25

Instruction outside the tolerance: ±0.1

Catalog No. AQV258HAX C88		Drawing Name DIMENSIONS	
Name PhotoMOS		Drawing No. AQV258HAX C88	
		Scale 5:1	Unit: mm	Date Jun. 9, 2021
Drawn K. Kubo	Checked N. Uchiyama	Panasonic Corporation	
Designed S. Nagano	Enacted T. Arita		

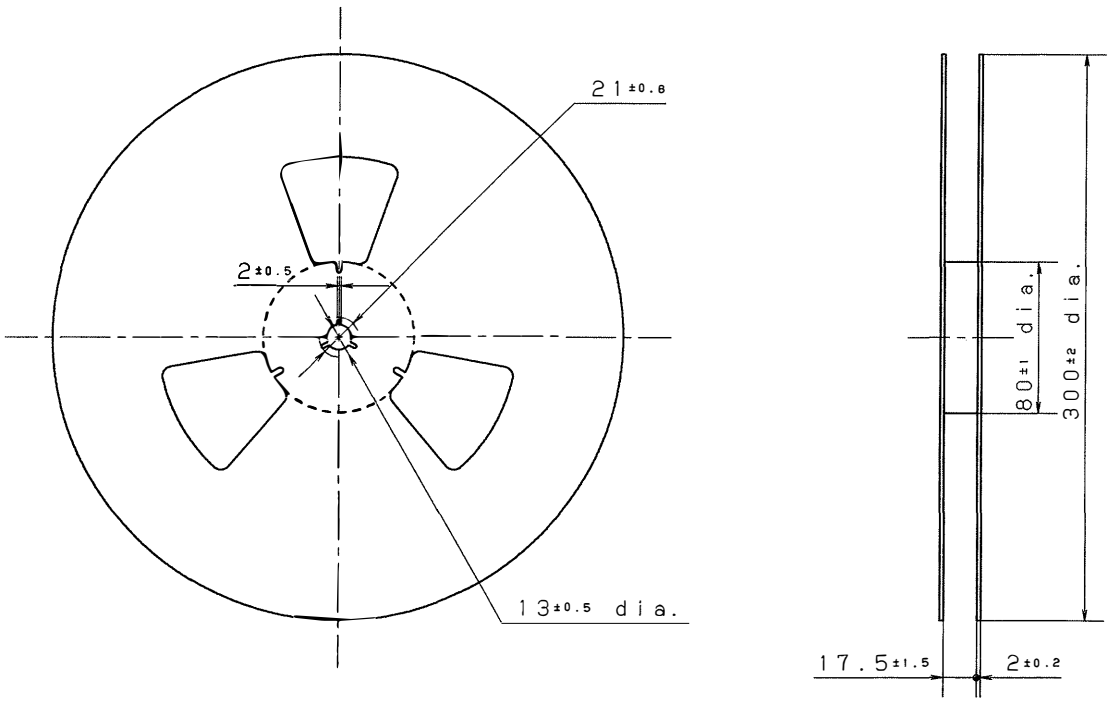
(3rd Angle System)

(1) Tape dimensions



Note) Direction of picking: 1, 2, 3-pin side.

(2) Reel dimensions



Tape and reel: 1000pcs/reel

Instruction outside the tolerance: ±0.1

Catalog No. AQV***AX		Drawing Name	TAPE AND REEL DIMENSIONS
Name PhotoMOS		Drawing No.	AQV***AX
		Scale —— / Unit: mm	Date Sep. 6, 1993
Drawn K. Kubo	Checked S. Z	Panasonic Corporation	
Designed D. Kadowa			
	Enacted T. Aoki		

(3rd Angle System)