STRUCTURE Silicon Monolithic Integrated Circuit

TYPE Bipolar System Power Supply

PRODUCT SERIES BA4911−V4

FEATURES
- Terminal for micro controller power supply hold
- 5ch Regulator Outputs
- 2ch High Side Switches

○ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Supply Voltage | VCC | 36 | V |
| Power Dissipation | Pd | 3400 | mW |
| Operating Temperature Range | Topr | -30～+85 | ℃ |
| Storage Temperature Range | Tstg | -55～+150 | ℃ |
| Maximum Junction Temperature | Tjmax | 150 | ℃ |
| Peak Supply Voltage | VCC PEAK | 50 (*1) | V |

(*1) tr≧1msec Bias voltage less than 200msec

○RECOMMENDED OPERATING RANGES(Ta=25℃)

| Parameter | Limits | Unit | Comment |
|---|---|---|---|
| Recommended Supply Voltage 1 | 10～18 | V | Except VDD and ILM output |
| Recommended Supply Voltage 2 | 8.2～18 | V | VDD output |
| Recommended Supply Voltage 3 | 11.4～18 | V | ILM output |

*This product is not designed for protection against radioactive rays.

*The product described in this specification is a strategic product (and/or service) subject to COCOM regulations. It should not be exported without authorization from the appropriate government.

*Status of this document
The Japanese version of this document is the formal specification.
A customer may use this translation version only for a reference to help reading the formal version.
If there are any differences in translation version of this document, formal version takes priority.

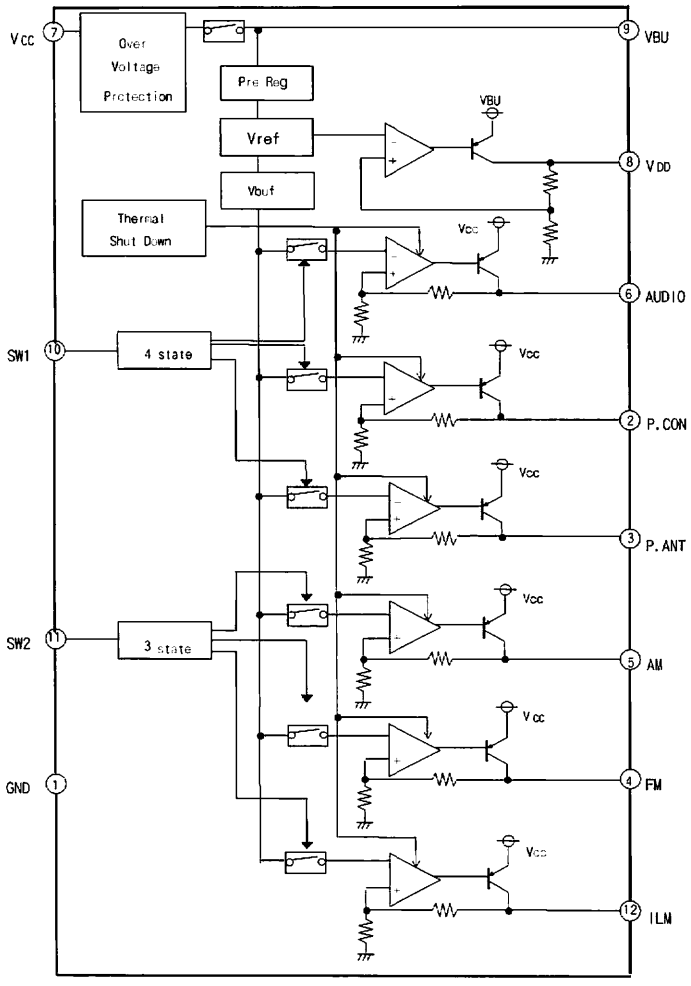
○ELECTRICAL CHARACTERISTICS(Unless otherwise specified Ta=25℃, VCC= 14.4V)

| Parameter | Symbol | Limits | | | Unit | Conditon |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Standby Circuit Current 1 | Ist1 | - | 100 | 150 | μA | VCC=13.2V |
| Standby Circuit Current 2 | Ist2 | - | 100 | 150 | μA | |
| | | | | | | |
| Output Voltage (VDD) 1 | V01 | 4.80 | 5.00 | 5.20 | V | IO=300mA VCC=10～18V |
| Dropout Voltage 1 | △V01 | - | 0.4 | 0.7 | V | IO=300mA, VBU-V01 |
| Dropout Voltage 2 | △V01' | - | 2.5 | 3.0 | V | IO=300mA, VCC-V01 |
| Peak Output Current | I01 | 300 | - | - | mA | V01≧4.8V |
| Ripple Rejection | R.R1 | - | 55 | - | dB | f=100Hz, VRR=-10dBV |
| Low Vcc Output Voltage | V01' | 3.7 | 4.0 | - | V | VCC=5V, IO=10mA |
| | | | | | | |
| Output Voltage (AUDIO) 2 | V02 | 7.8 | 8.12 | 8.3 | V | IO2=200mA, VCC=10～18V, -30℃～80℃ *1 |
| Dropout Voltage 3 | △V02 | - | 0.4 | 0.7 | V | IO2=200mA, VCC-V02 |
| Peak Output Current | I02 | 200 | - | - | mA | VO 2≧7.8V |
| Ripple Rejection | R.R2 | - | 55 | - | dB | f=100Hz, VRR=-10dBV |
| | | | | | | |
| Dropout Voltage (P.CON) 3 | △V03 | - | 0.4 | 0.7 | V | IO3=200mA |
| Peak Output Current | I03 | 300 | - | - | mA | V03≧13.7V |
| | | | | | | |
| Dropout Voltage (P.ANT) 4 | △V04 | - | 0.4 | 0.7 | V | IO4=200mA |
| Peak Output Current | I04 | 300 | - | - | mA | V04≧13.7V |
| | | | | | | |
| Output Voltage (AM) 5 | V05 | 7.5 | 7.9 | 8.3 | V | IO5=50mA, VCC=10～18V, -30℃～80℃ *1 |
| Dropout Voltage | △V05 | - | 0.4 | 0.7 | V | IO5=50mA |
| Peak Output Current | I05 | 50 | - | - | mA | V05≧7.5V |
| Ripple Rejection | R.R5 | - | 55 | - | dB | f=100Hz, VRR=-10dBV |
| | | | | | | |
| Output Voltage (FM) 6 | V06 | 7.8 | 8.12 | 8.3 | V | IO6=50mA, VCC=10～18V, -30℃～80℃ *1 |
| Dropout Voltage | △V06 | - | 0.4 | 0.7 | V | IO6=50mA, VCC-V06 |
| Peak Output Current | I06 | 50 | - | - | mA | V06≧7.8V |
| Ripple Rejection | R.R6 | - | 55 | - | dB | f=100Hz, VRR=-10dBV |
| | | | | | | |
| Output Voltage (ILM) 7 | V07 | 9.9 | 10.3 | 10.7 | V | IO7=250mA, VCC=10～18V |
| Dropout Voltage | △V07 | - | 0.4 | 0.7 | V | IO7=250mA, VCC-V07 |
| Peak Output Current | I07 | 250 | - | - | mA | V07≧9.9V |
| Ripple Rejection | R.R7 | - | 50 | - | dB | f=100Hz, VRR=-10dBV |
| | | | | | | |
| Input Pin (SW1) | | | | | | |
| Standby Input Voltage | Vth1-1 | - | - | 1.0 | V | |
| AUDIO ON | Vth1-2 | 1.5 | - | 3.0 | V | |
| AUDIO, P-CON ON | Vth1-3 | 3.5 | - | 5.0 | V | |
| AUDIO, P-CON, P-ANT ON | Vth1-4 | 7.0 | - | VCC | V | |
| SW1 Input Impedance | Rin1 | 100 | - | - | kΩ | |
| | | | | | | |
| Input Pin (SW2) | | | | | | |
| Standby Input Voltage | Vth2-1 | - | - | 1.0 | V | |
| ILM, FM ON | Vth2-2 | 2.0 | - | 3.0 | V | |
| ILM, AM ON | Vth2-3 | 4.0 | - | VCC | V | |
| SW2 Input Impedance | Rin2 | 100 | - | - | kΩ | |

*1 Design Guarantee (Output Inspection is not done on al products)

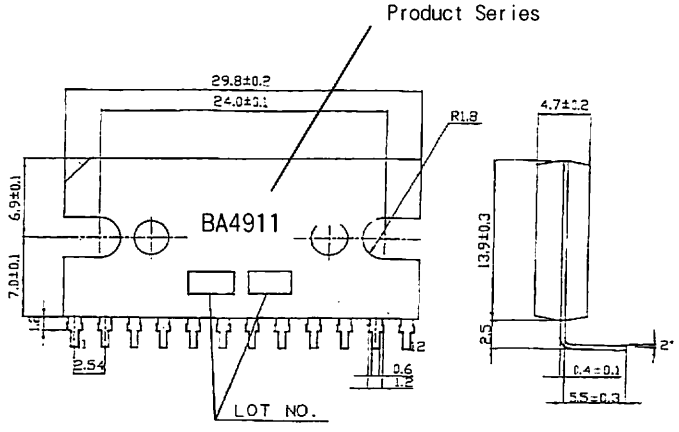
- Use Peak Output Current less than Limits Min. values.

○BLOCK DIAGRAM




※Refer to the Technical Note about the details of the application.

○PHYSICAL DIMENSIONS・MARKING




SIP-M12(V4) (Unit:mm)

○PIN NO. / PIN NAME

| PIN NO. | PIN NAME. |
|---|---|
| 1 | GND |
| 2 | P.CON |
| 3 | P.ANT |
| 4 | FM |
| 5 | AM |
| 6 | AUDIO |
| 7 | VCC |
| 8 | VDD |
| 9 | VBU |
| 10 | SW1 |
| 11 | SW2 |
| 12 | ILM |

NOTES FOR USE

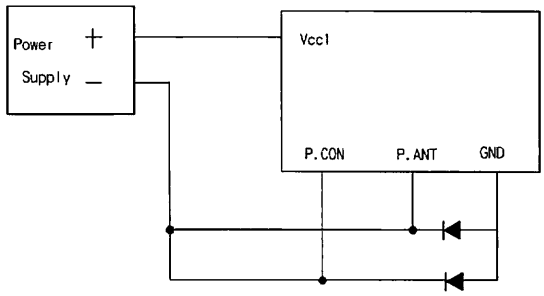
1. Over Voltage Protection Circuit
   The Over Voltage Protection Circuit function is that when the difference voltage of VIN1 and GND exceeds over about 27V (room temperature), the each output turn off. Please be sure of the power supply voltage range you use.

2. The oscillation stopper of output capacitor
   Please use the oscillation stopper between the every output and GND. The capacitor is over 10 $\mu$F and recommended the small temperature change Tantalum Electronic Capacitor.
   In case of the capacitor temperature change is big, it may get characteristic improvement to use the serial 1 $\mu$F ceramic capacitor and 1 $\Omega$ resistor in pararell.

3. Over Current Protection Circuit
   Each output, has the Over Current Protection circuit that is enough for the each output current ability, and it protects the IC destruction against the huge current load.
   The protection circuit is fold back type current limiter and designed not as to occur the Latch Up by the huge current in a moment by the huge capacitor.
   But, these protection circuits are effective for preventing destruction by unexpected accident. Please don' t use in the situation of continuous protection circuit on and off. And for the peak current ability, because this chip has minus characteristic, be careful for the thermal design.

4. Thermal Shut Down Circuit
   The Thermal Shut Down circuit is built in IC to prevent the damage due to over heating. Therefore, all the output except $V_{DD}$ are turned off when it works, and turned on when the temperature goes down to the specified level. But, built-in the IC a temperature control circuit to protect itself. Make sure of the thermal design under 150℃.

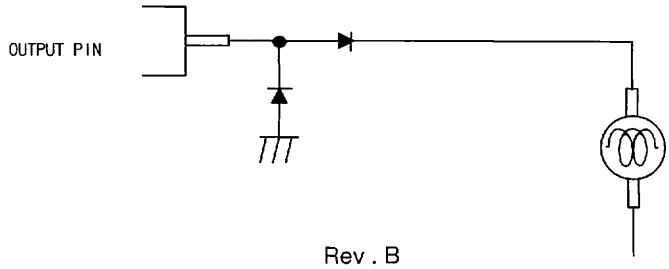
5. P.CON, PANT terminals short to GND
   In case of the P.CON(2pin), P.ANT(3pin) connects to Battery (-) terminal (short to GND) and IC GND (1pin) is Open, The parasitic element occurs in the IC and IC might be destroyed. We recommend to take countermeasure as the using shotteky diode between P.CON, PANT and GND.




6. In the application, in case of the each terminal is lower than GND, it recommend to use the bypass circuit.

7. We recommend using Diode for protection purpose in case of output pin connected with large loads of impedance or reverse current at initial stages or output off stage.

(Example)



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