

# KA7552A/KA7553A

## SMPS Controller

### Features

- Built-in drive circuits for direct connection power MOSFET ( $I_O = \pm 1.5A$ )
- Wide operating frequency range (5kHz ~ 600kHz)
- Pulse by pulse over current limiting
- Over load protection
- On/off control by external trigger
- Internal UVLO
- Low standby current (typ. 90uA)
- Soft start circuit

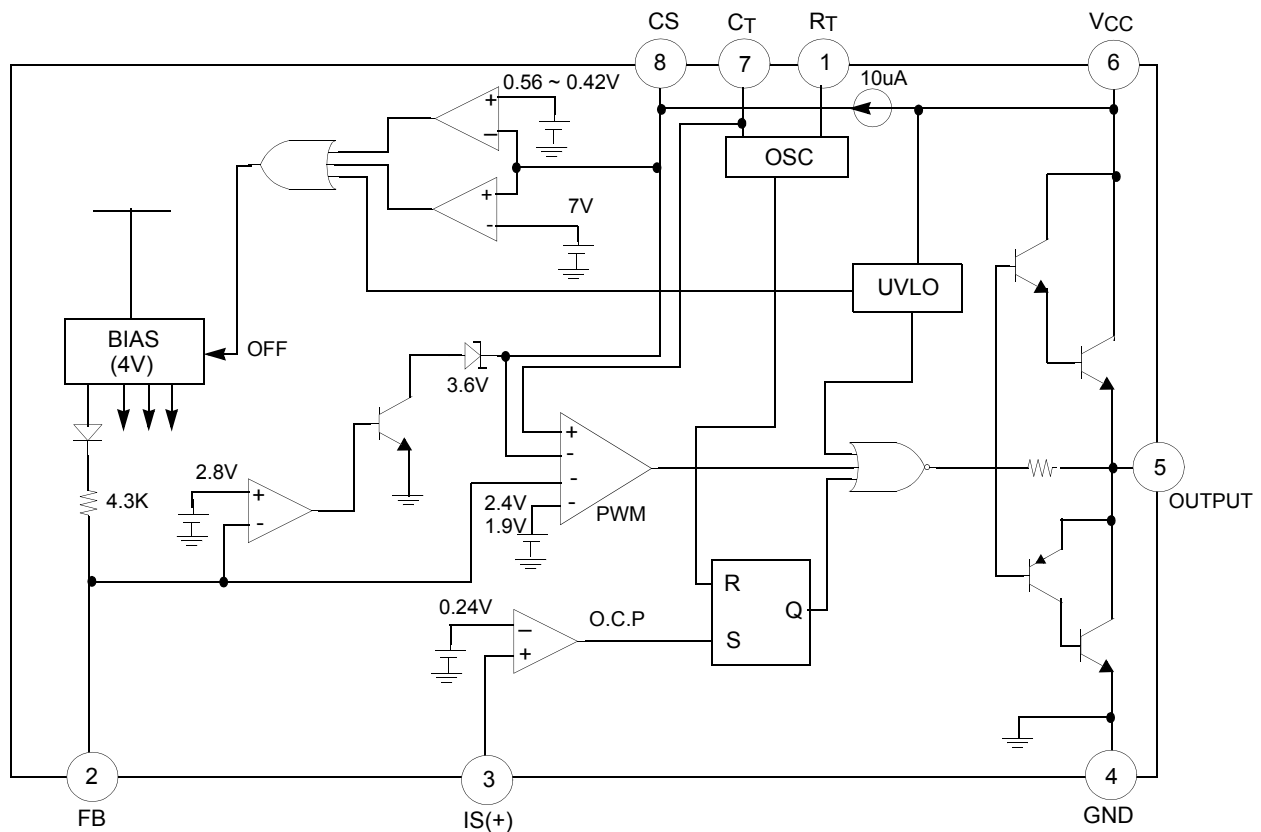
### Description

The KA7552A/KA7553A are switching power control IC for wide operating frequency range. The internal circuits include pulse by pulse current limiting, protection, on/off control by external trigger, low standby current, soft start, and high current totempole output for driving a POWER MOSFET. Maximum duty of the KA7552A is 70% and the KA7553A is 46%. When duty is maximum, the input threshold voltage of pin2 & pin8 are not same in KA7552A and KA7553A.

8-DIP



### Internal Block Diagram



Rev. 1.0.2

## Absolute Maximum Ratings

| Parameter                                       | Symbol              | Value      | Unit |
|-------------------------------------------------|---------------------|------------|------|
| Supply voltage                                  | V <sub>CC</sub>     | 30         | V    |
| Output current                                  | I <sub>O</sub>      | ±1.5       | A    |
| Input voltage at overcurrent detection pin      | V <sub>IN(IS)</sub> | -0.3 to 4  | V    |
| Input voltage at FB pin                         | V <sub>IN(FB)</sub> | 4          | V    |
| Input current at CS pin                         | I <sub>IN(CS)</sub> | 2          | mA   |
| Total power dissipation (T <sub>a</sub> = 25°C) | P <sub>D</sub>      | 800        | mW   |
| Operating temperature                           | T <sub>OPR</sub>    | -25 to 85  | °C   |
| Storage temperature range                       | T <sub>STG</sub>    | -65 to 150 | °C   |
| Junction temperature                            | T <sub>j</sub>      | +125       | °C   |

## Electrical Characteristics

(V<sub>CC</sub> = 18V, F<sub>OSC</sub> = 135kHz, T<sub>A</sub> = 25°C, unless otherwise specified)

| Parameter                                        | Symbol                        | Conditions                                     | Min. | Typ. | Max. | Unit |
|--------------------------------------------------|-------------------------------|------------------------------------------------|------|------|------|------|
| <b>OSCILLATOR SECTION</b>                        |                               |                                                |      |      |      |      |
| Initial accuracy                                 | F <sub>OSC</sub>              | C <sub>T</sub> = 360pF, T <sub>J</sub> = 25°C  | 125  | 135  | 145  | kHz  |
| Frequency variation 1                            | ΔF/ΔV                         | V <sub>CC</sub> = 10V to 30V                   | -    | ±1   | ±3   | %    |
| Frequency variation 2 <sup>(Note1)</sup>         | ΔF/ΔV                         | T <sub>A</sub> = 25°C to 85°C                  | -    | ±1.5 | -    | %    |
| Ramp high voltage                                | V <sub>RH</sub>               | C <sub>T</sub> = 360pF, T <sub>J</sub> = 25°C  | 2.80 | 3.08 | 3.30 | V    |
| Ramp low voltage                                 | V <sub>RL</sub>               | C <sub>T</sub> = 360pF, T <sub>J</sub> = 25°C  | 0.6  | 0.9  | 1.2  | V    |
| Amplitude                                        | V <sub>OSC</sub>              | V <sub>PIN7</sub> , peak to peak               | 1.80 | 2.18 | 2.50 | V    |
| <b>PULSE WIDTH MODULATION SECTION</b>            |                               |                                                |      |      |      |      |
| Input threshold voltage(pin2)                    | V <sub>TH(FBD)</sub>          | Duty cycle = 0%                                | 0.6  | 0.75 | 0.95 | V    |
| Input threshold voltage(pin2) <sup>(Note1)</sup> | V <sub>TH(FB1)</sub> (KA7552) | Duty cycle = D <sub>max</sub> 1                | 2.1  | 2.3  | 2.6  | V    |
|                                                  | V <sub>TH(FB2)</sub> (KA7553) | Duty cycle = D <sub>max</sub> 2                | 1.6  | 1.8  | 2.1  | V    |
| Max. duty cycle                                  | D <sub>(Max1)</sub> (KA7552)  | -                                              | 66   | 70   | 74   | %    |
|                                                  | D <sub>(Max2)</sub> (KA7553)  | -                                              | 43   | 46   | 49   | %    |
| Source current(pin2)                             | I <sub>SOURCE(FB)</sub>       | V <sub>PIN2</sub> = 0V                         | -660 | -800 | -960 | uA   |
| <b>OVERCURRENT LIMIT SECTION</b>                 |                               |                                                |      |      |      |      |
| Input threshold voltage                          | V <sub>TH(IS)</sub>           | -                                              | 0.21 | 0.24 | 0.27 | V    |
| Source current(pin3)                             | I <sub>SOURCE(IS)</sub>       | V <sub>PIN3</sub> = 0V                         | -300 | -200 | -100 | uA   |
| Deley time <sup>(Note1)</sup>                    | T <sub>D</sub>                | -                                              | -    | 150  | -    | ns   |
| <b>SOFT START SECTION</b>                        |                               |                                                |      |      |      |      |
| Charging current                                 | I <sub>CHG</sub>              | V <sub>PIN8</sub> = 0V                         | -15  | -10  | -5   | uA   |
| Input threshold voltage(pin8)                    | V <sub>TH(CSO)</sub>          | -                                              | 0.7  | 0.9  | 1.1  | V    |
| Input threshold voltage(pin8) <sup>(Note1)</sup> | V <sub>TH(CS1)</sub> (KA7552) | Duty cycle = D <sub>max</sub> 1                | 2.2  | 2.4  | 2.6  | V    |
|                                                  | V <sub>TH(CS2)</sub> (KA7553) | Duty cycle = D <sub>max</sub> 2                | 1.7  | 1.9  | 2.1  | V    |
| <b>LATCH MODE SHUTDOWN CIRCUIT SECTION</b>       |                               |                                                |      |      |      |      |
| Sink current(pin8)                               | I <sub>SINK(CS)</sub>         | V <sub>PIN8</sub> = 6V, V <sub>PIN2</sub> = 1V | 25   | 45   | 65   | uA   |
| Shutdown threshold voltage                       | V <sub>TH(SD,CS)</sub>        | -                                              | 6.7  | 7.2  | 7.7  | V    |
| <b>OVERLOAD SHUTDOWN SECTION</b>                 |                               |                                                |      |      |      |      |
| Shutdown threshold voltage                       | V <sub>TH(SD,FB)</sub>        | -                                              | 2.6  | 2.8  | 3.1  | V    |

**Electrical Characteristics** (Continued)(V<sub>CC</sub> = 18V, F<sub>OSC</sub> = 135kHz, T<sub>A</sub> = 25°C, unless otherwise specified)

| Parameter                            | Symbol                  | Conditions                                     | Min. | Typ. | Max. | Unit |
|--------------------------------------|-------------------------|------------------------------------------------|------|------|------|------|
| <b>UNDER VOLTAGE LOCKOUT SECTION</b> |                         |                                                |      |      |      |      |
| Start-up threshold voltage           | V <sub>TH(ST)</sub>     | -                                              | 15.5 | 16.0 | 16.5 | V    |
| Minimum operating voltage            | V <sub>OPR(Min)</sub>   | -                                              | 8.20 | 8.70 | 9.20 | V    |
| Hysteresis                           | V <sub>HYS</sub>        | -                                              | 6.40 | 7.30 | 8.20 | V    |
| <b>ON/OFF CONTROL SECTION</b>        |                         |                                                |      |      |      |      |
| Source current(pin8)                 | I <sub>SOURCE(CS)</sub> | V <sub>PIN8</sub> = 0V                         | -15  | -10  | -5   | uA   |
| On threshold voltage                 | V <sub>TH(ON)</sub>     | V <sub>PIN8</sub> : OFF->ON                    | 0.45 | 0.56 | 0.70 | V    |
| Off threshold voltage                | V <sub>TH(OFF)</sub>    | V <sub>PIN8</sub> : ON -> OFF                  | 0.30 | 0.42 | 0.55 | V    |
| <b>OUTPUT SECTION</b>                |                         |                                                |      |      |      |      |
| Low output voltage                   | V <sub>OL</sub>         | I <sub>O</sub> = 100mA, V <sub>CC</sub> = 18V  | -    | 1.3  | 1.8  | V    |
| High output voltage                  | V <sub>OH</sub>         | I <sub>O</sub> = -100mA, V <sub>CC</sub> = 18V | 16.0 | 16.5 | 18.0 | V    |
| Rise time <sup>(Note1)</sup>         | T <sub>R</sub>          | No load                                        | -    | 50   | -    | ns   |
| Fall time <sup>(Note1)</sup>         | T <sub>F</sub>          | No load                                        | -    | 50   | -    | ns   |
| <b>OVERALL</b>                       |                         |                                                |      |      |      |      |
| Stand-by current                     | I <sub>SB</sub>         | V <sub>CC</sub> = 14V                          | -    | 90   | 150  | uA   |
| Operating current                    | I <sub>CC(OPR)</sub>    | V <sub>PIN2</sub> = 0V                         | -    | 9    | 15   | mA   |
| Power supply current off             | I <sub>CC(OFF)</sub>    | V <sub>PIN8</sub> = 0V                         | -    | 1.1  | 1.8  | mA   |
| Power supply current shutdown        | I <sub>CC(SD)</sub>     | V <sub>PIN8</sub> = 7.6V                       | -    | 1.1  | 1.8  | mA   |

**Note :**

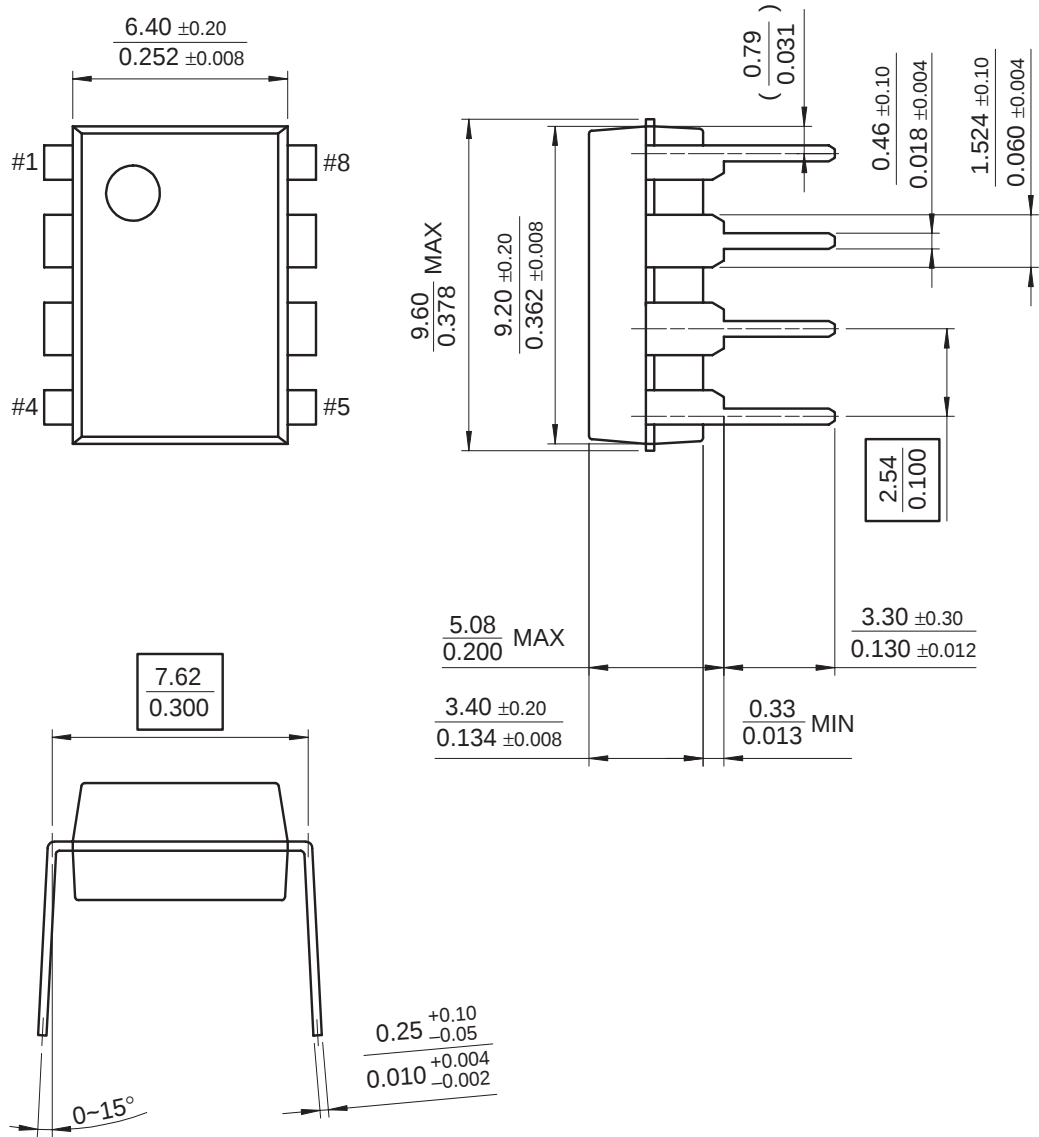
1. These parameters, although guaranteed, are not 100% tested in production.
2. Recommend operating condition :
  - V<sub>CC(min)</sub> = 12V
  - R<sub>T</sub> = 3.3kΩ ~ 10kΩ
  - Oscillation frequency = 5kHz ~ 600kHz
  - Soft start capacitor(C<sub>S</sub>) = 0.1uF ~ 1uF

Mechanical Dimensions

Package

Dimensions in millimeters

8-DIP



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## Ordering Information

| Product Number | Package | Operating Temperature |
|----------------|---------|-----------------------|
| KA7552A        | 8-DIP   | -25 ~ +85°C           |
| KA7553A        |         |                       |

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