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ON Semiconductor®

# KA7552A/KA7553A

## SMPS Controller

### Features

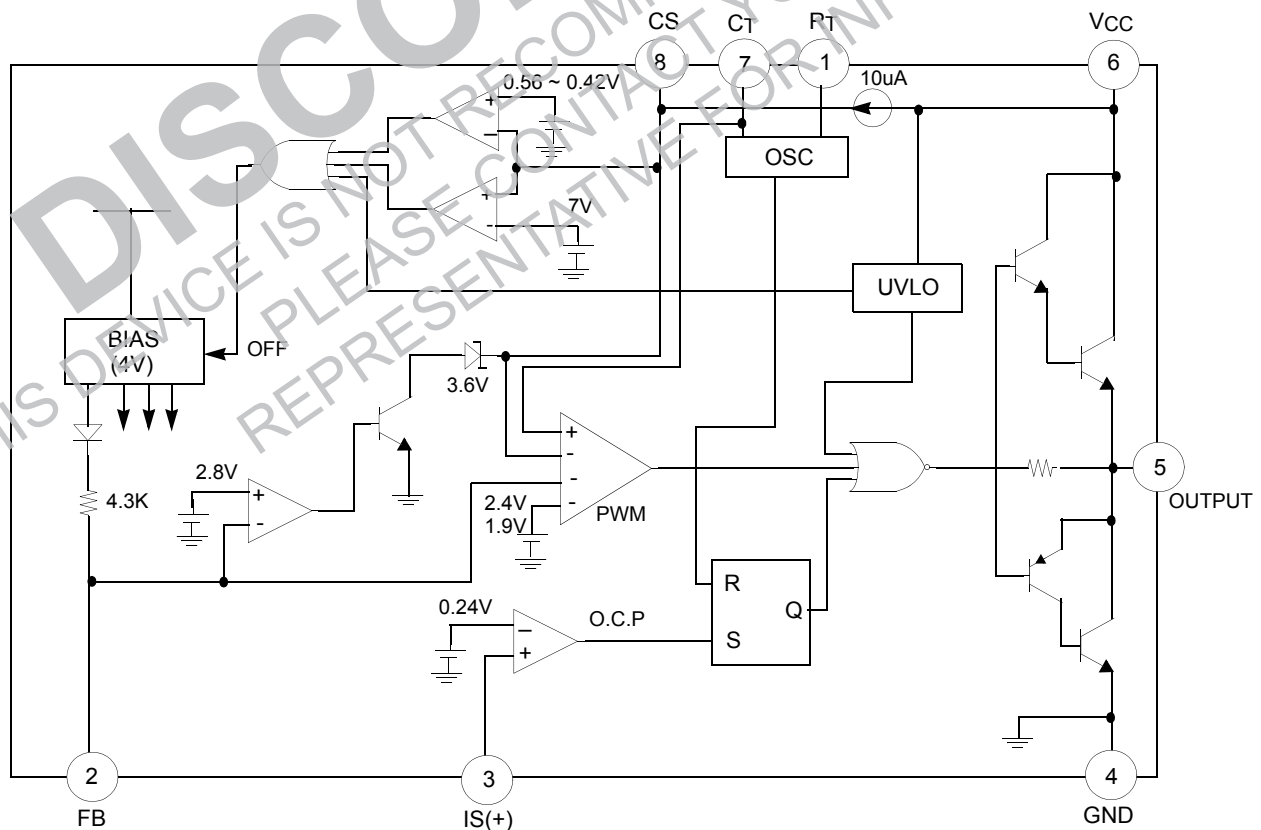
- Built-in drive circuits for direct connection power MOSFET ( $I_O = \pm 1.5A$ )
- Wide operating frequency range (5kHz ~ 600kHz)
- Pulse by pulse over current limiting
- Over load protection
- On/off control by external trigger
- Internal UVLO
- Low standby current (typ. 90uA)
- Soft start circuit

### 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.



### Internal Block Diagram



## 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
	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
Delay 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 :**

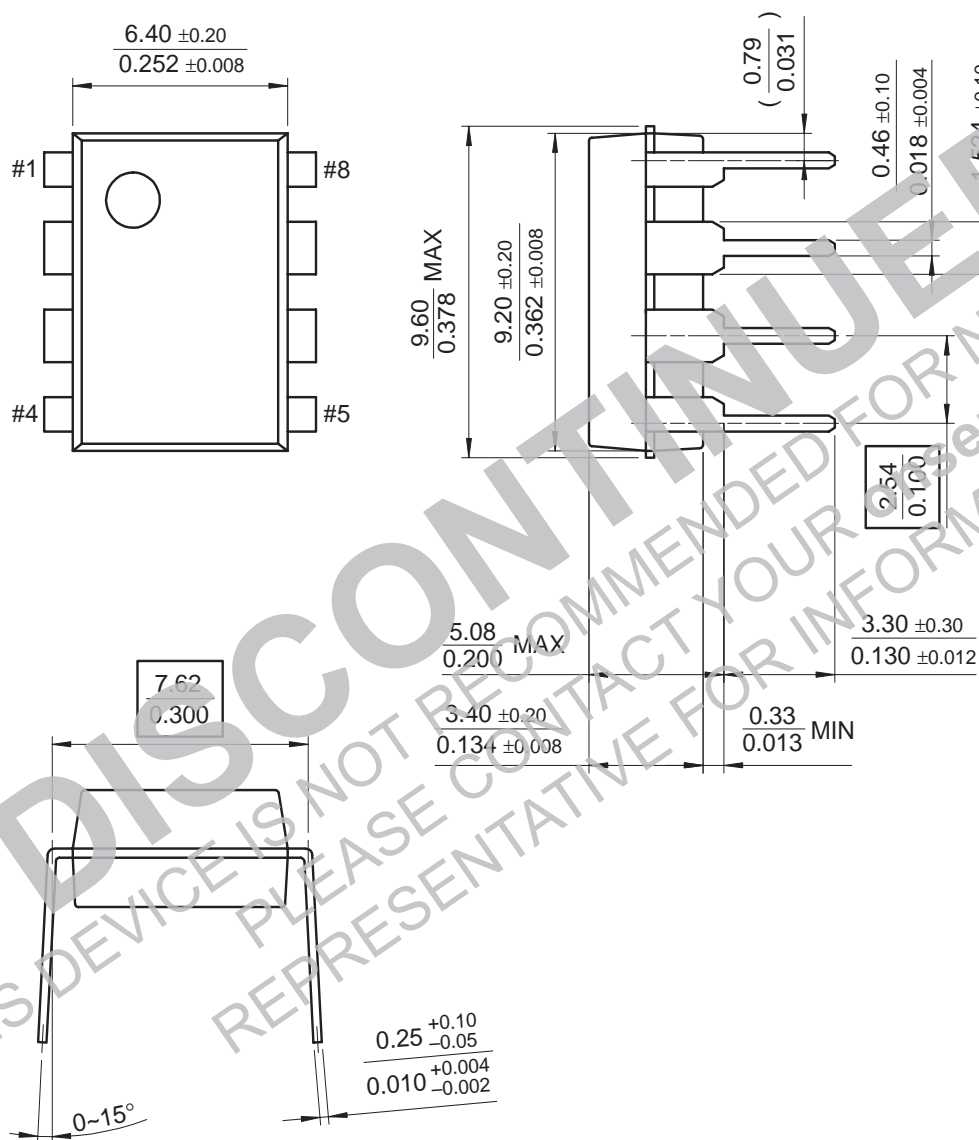
- These parameters, although guaranteed, are not 100% tested in production.
- Recommend operating condition :
  - V<sub>CC(min)</sub> = 12V
  - R<sub>T</sub> = 3.3kΩ ~ 10kΩ
  - Oscillation frequency = 5kHz ~ 500kHz
  - Soft start capacitor(C<sub>S</sub>) = 0.1uF ~ 1uF

## Mechanical Dimensions

### Package

Dimensions in millimeters

### 8-DIP




## Ordering Information

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

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