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KA7552A/KA7553A

SMPS Controller

Features

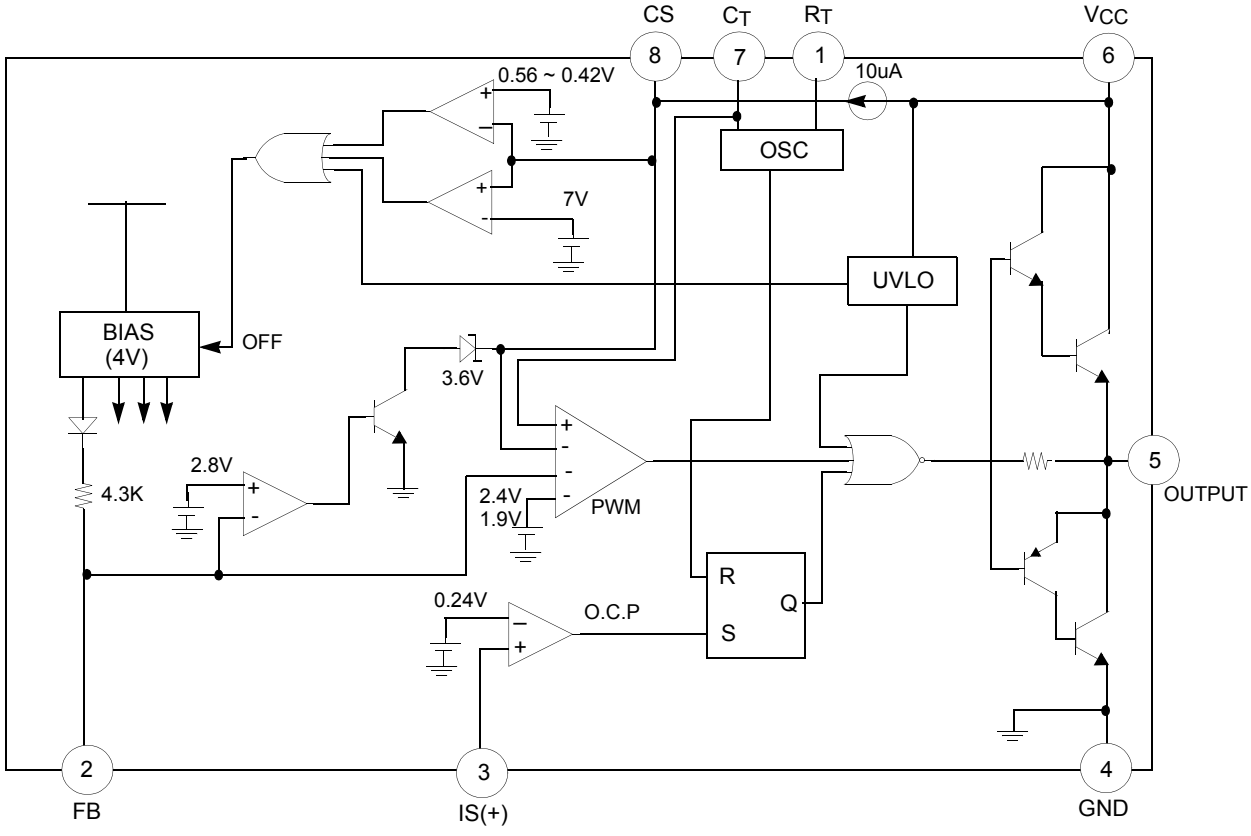
- Built-in drive circuits for direct connection power MOSFET (I_O = ±1.5A)
- Wide operating frequency range (5kHz ~ 600kHz)
- Pulse by pulse over current limiting
- Over load protection
- On/off control by external trigger
- Internal UVLO
- Low standby current (typ. 90uA)
- Soft start circuit

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_{CC}	30	V
Output current	I_O	±1.5	A
Input voltage at overcurrent detection pin	$V_{IN(IS)}$	-0.3 to 4	V
Input voltage at FB pin	$V_{IN(FB)}$	4	V
Input current at CS pin	$I_{IN(CS)}$	2	mA
Total power dissipation (Ta = 25°C)	P_D	800	mW
Operating temperature	T_{OPR}	-25 to 85	°C
Storage temperature range	T_{STG}	-65 to 150	°C
Junction temperature	T_j	+125	°C

Electrical Characteristics

(V_{CC} = 18V, F_{OSC} = 135kHz, T_A = 25°C, unless otherwise specified)

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

Electrical Characteristics (Continued)

(V_{CC} = 18V, F_{OSC} = 135kHz, T_A = 25°C, unless otherwise specified)

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

Note :

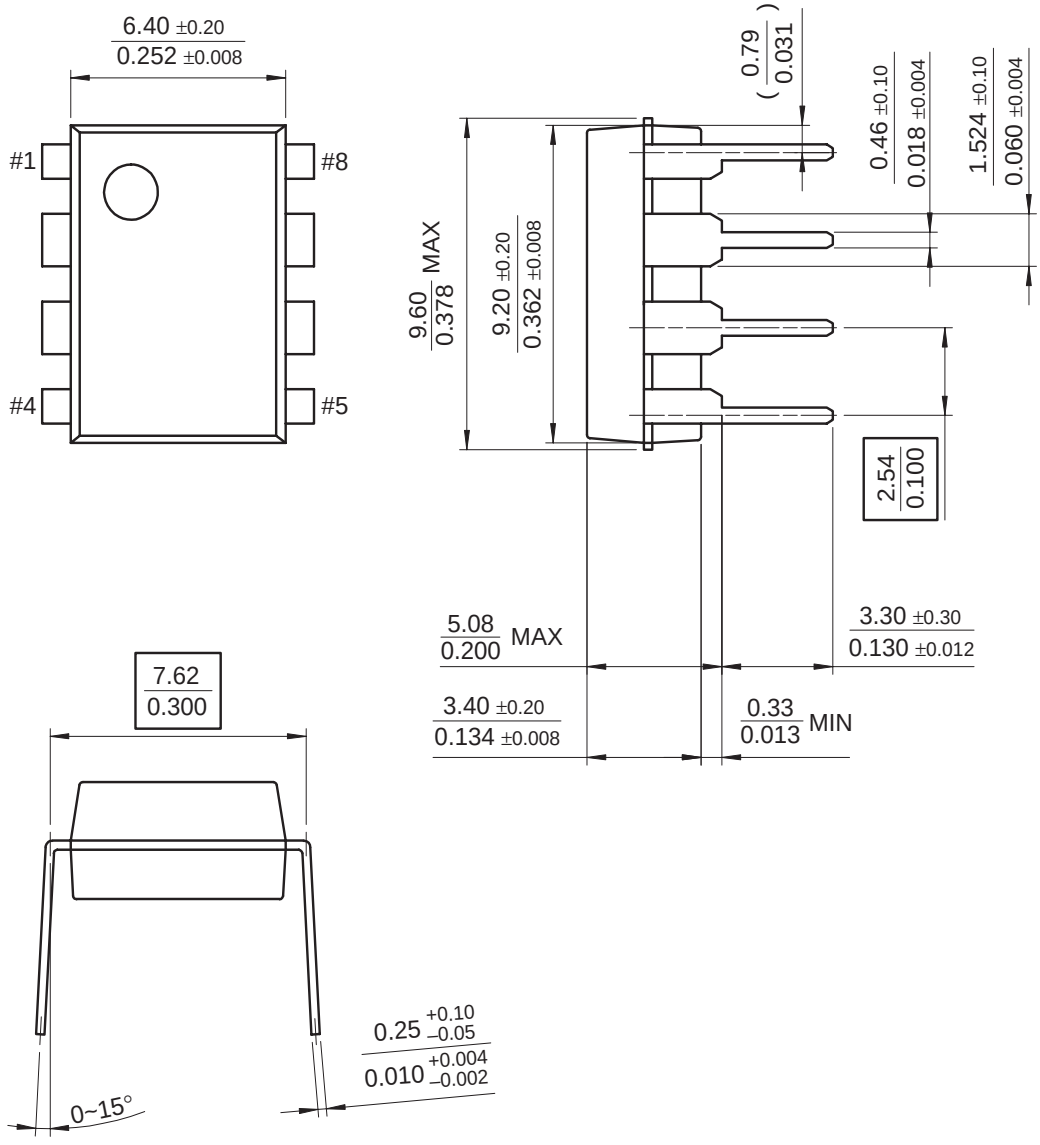
1. These parameters, although guaranteed, are not 100% tested in production.
2. Recommend operating condition :
   - Vcc(min) = 12V
   - R_T = 3.3kΩ ~ 10kΩ
   - Oscillation frequency = 5kHz ~ 600kHz
   - Soft start capacitor(C_S) = 0.1uF ~ 1uF

Mechanical Dimensions

Package

Dimensions in millimeters

8-DIP



Ordering Information

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