

阅读申明

- 1.本站收集的数据手册和产品资料都来自互联网，版权归原作者所有。如读者和版权方有任何异议请及时告之，我们将妥善解决。
- 2.本站提供的中文数据手册是英文数据手册的中文翻译，其目的是协助用户阅读，该译文无法自动跟随原稿更新，同时也可能存在翻译上的不当。建议读者以英文原稿为参考以便获得更精准的信息。
- 3.本站提供的产品资料，来自厂商的技术支持或者使用者的心得体会等，其内容可能存在描述上的差异，建议读者做出适当判断。
- 4.如需与我们联系，请发邮件到marketing@iczoom.com，主题请标有“数据手册”字样。

Read Statement

1. The datasheets and other product information on the site are all from network reference or other public materials, and the copyright belongs to the original author and original published source. If readers and copyright owners have any objections, please contact us and we will deal with it in a timely manner.
2. The Chinese datasheets provided on the website is a Chinese translation of the English datasheets. Its purpose is for reader's learning exchange only and do not involve commercial purposes. The translation cannot be automatically updated with the original manuscript, and there may also be improper translations. Readers are advised to use the English manuscript as a reference for more accurate information.
3. All product information provided on the website refer to solutions from manufacturers' technical support or users the contents may have differences in description, and readers are advised to take the original article as the standard.
4. If you have any questions, please contact us at marketing@iczoom.com and mark the subject with "Datasheets".

KA3505

PC SMPS Supervisory IC

Features

- PC Power Supply Output Monitor Circuitry
- Few External Components
- Over Voltage Protection for 3.3V/5V/12V Output
- Under Voltage Protection for 3.3V/5V/12V Output With Delay Time
- Over Current Protection for 3.3V/5V/12V Output With Delay Time
- Fault Protection Output With Open Collector Output
- Power Supply on/off Delay Time Control (PSON)
- Power Good Signal Generator With Hysteresis
- Open Collector PG Output
- 300ms Power Good Delay
- Current Sense Setting Function With RI
- Latch Function Controlled by PSON and Protection Input
- 16-Pin Dual In-line Package

FPO (Fault Protection Output)

Fault Protection Output indicates the fault condition as protection signal. When fault state occurs, the main power is to be turned-off and the PGO signal goes LOW.

NORMAL = "LOW", FAULT = "HIGH"

PGO (Power Good Output)

Power Good Signal Generator is to monitor the voltage level of power supply for safe operation of a microprocessor having some delay time at turn-on. The delay time is programmed by a timing capacitor connected to TPG pin of KA3505. The power good output should be low state before the output voltage is out of regulation at turn-off.

NORMAL = "HIGH", FAULT = "LOW"

Description

The KA3505 is complete output supervisory circuitry intended for use in the secondary side of the switched mode power supply. It provides all the functions necessary to monitor and control the output of the power supply system. Power good signal generator, Remote on and off control, some precision protection features against over-voltage, under-voltage and over-current are implemented. It directly senses all the output rails for OVP and UVP without any external dividers. As for output control, Power Good Output (PGO) and Fault Protection Output (FPO) are also included. Utilizing a minimum number of external components, the KA3505 offers a simple and cost effective solution, greatly reducing PCB board space for power supply system.

OCP (Over Current Protection)

It has precision OCP functions for +3.3V, +5V, +12V outputs. The block is made up of three comparators with current source setting function. Two inputs of each OCP comparator are connected to both sides of output inductor that is located in the secondary output of SMPS.

OVP (Over Voltage Protection)

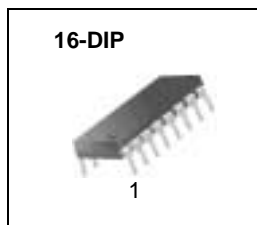
It has OVP functions for +3.3V, +5V, +12V outputs. The circuit is made up of a comparator with three detecting inputs.

UVP (Under Voltage Protection)

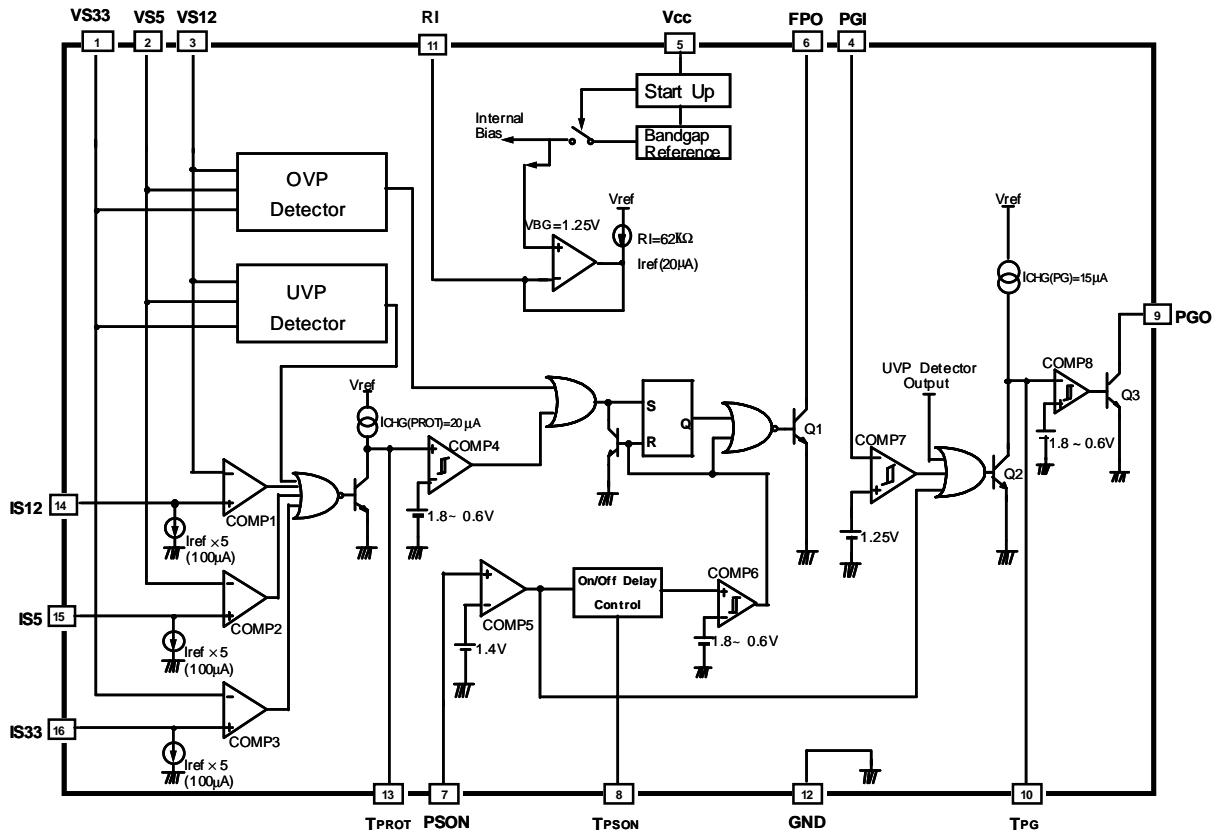
It also has UVP functions for +3.3V, +5V, +12V outputs. The block is made up of a comparator with three detecting inputs.

Remote ON/OFF

Remote on/off section is used to control SMPS externally. If a high signal is supplied to the remote on/off input, FPO signal becomes a high state and all secondary outputs are grounded. The remote on/off signal is transferred with some on-delay and off-delay time of 8ms, 24ms respectively with 0.1μF external capacitor.



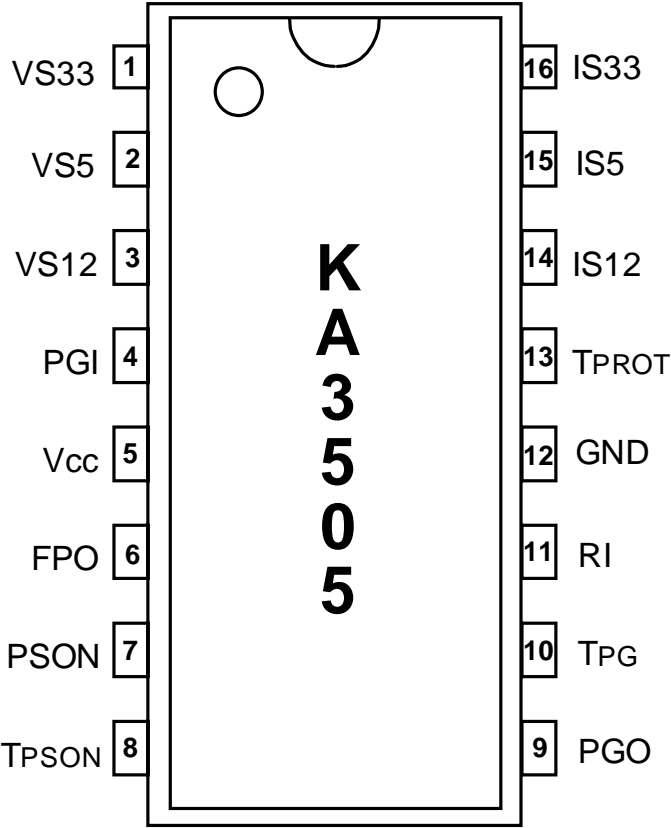
Internal Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	VCC	15 ~ 30	V
Input Voltage	Vinput	30	V
FPO Voltage	VFPO	30	V
FPO Maximum Current	IFPO	20	mA
Operating Temperature	Topr	-25 ~ +85	°C
Storage Temperature Range	Tstg	-65 ~ +150	°C
Power Dissipation	PD	1	W

Pin Assignments : KA3505



Pin Definitions

Pin No.	Name	Pin Function Description
1	V33	Over and Under Voltage Protection Input for the 3.3V. It directly senses the 3.3V rail without any external divider.
2	V5	Over and Under Voltage Protection Input for the 5V. It directly senses the 5V rail without any external divider.
3	V12	Over and Under Voltage Protection Input for the 12V. It directly senses the 12V rail without any external divider.
4	PGI	Power Good Signal Generator Input. It should be supplied from a bulk dependent voltage in order to detect power on and off state.
5	VCC	Supply voltage. Its recommended operating voltage is ranged from 15V to 30V.
6	FPO	Fault Protection Output (Open Collector Output). This pin indicates the fault condition. When fault state occurs, the PGO signal goes Low. Normal = "Low", Fault = "High".
7	PSON	Remote on/off input. It does TTL operation and its threshold voltage is 1.4V. In case of open circuit, the voltage at this pin is High (5.0V). If PSON = "Low", then FPO = "Low". It means the main SMPS is working. When PSON = "High or Open", then FPO = "High" and the main SMPS stops to work.
8	TPSON	Timing pin for PSON delay. Ton/Toff=8ms/24ms (Typ.) with Cpson=0.1μF externally. PSON On Delay Time (Ton) is measured as PSON input goes Low to High. PSON Off Delay Time (Toff) can be measured reversely.
9	PGO	Power Good Output Signal (Open Collector). PGO = "High" means "Power Good" for operation and PGO = "Low" means "Power Fail".
10	TPG	Timing pin for PGO delay. TPG = 270ms (Typ.) with CPG = 2.2μF externally. The high/low threshold voltages are 1.8V/0.6V and the voltage of pin10 would be charged up to 2.9V for noise margin.
11	RI	OCP current sense setting pin. The reference voltage at this pin is set to 1.25V internally. You can fix the OCP reference current by using RI resistor.
12	GND	Ground
13	TPROT	Timing pin for under voltage protection and over current protection blank-out time. Its threshold voltage is 1.8V and clamped at 2.9V after full charging. Target of delay time is 38ms and it is realized through external capacitor (C=0.47μF).
14	IS12	Current sense input for +12V. This pin is connected to the current sensing resistor or inductor. You can define OCP offset voltage for +12V by using RI resistor externally. If you connected RI resistor of 62kΩ at Pin11 to ground, the reference current(Iref) should be 20μA. After that, you can make a constant OCP offset voltage ($V_{OFFSET} = R_O \times 5 \times I_{ref}$). In case the voltage drop ($=I_{O.12} \times R_S$) of the sense resistor or inductor is larger than offset voltage, FPO becomes "High" after some delay time and the main SMPS is turned-off. So the over current level is determined by following equation. ($I_{O.12} = V_{OFFSET} / R_S$) * See application note for details.
15	IS5	Current sense input for +5V. You can make the +5V OCP function as previous method in IS12 (Pin14).
16	IS33	Current sense input for +3.3V. You can also make the +3.3V OCP function as previous method in IS12 (Pin14).

Electrical Characteristics

(VCC = 20V, -25°C ≤ Ta ≤ 85°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
PROTECTION SECTION						
Over Voltage Protection for 3.3V	VOVP33	VPSON = 0V	3.9	4.1	4.3	V
Over Voltage Protection for 5V	VOVP5	VPSON = 0V	5.7	6.1	6.5	V
Over Voltage Protection for 12V	VOVP12	VPSON = 0V	13.6	14.3	15.0	V
Under Voltage Protection for 3.3V	VUVP33	VPSON = 0V	2.69	2.83	2.97	V
Under Voltage Protection for 5V	VUVP5	VPSON = 0V	4.1	4.3	4.5	V
Under Voltage Protection for 12V	VUVP12	VPSON = 0V	9.8	10.3	10.8	V
Offset Voltage of OCP Comparator	Voffset	VPSON = 0V	-3	-	3	mV
Charging Current for OCP, UVP Delay	ICHG(PROT)	-	-15	-21	-30	μA
3.3, 5, 12V Over Current Delay Time	TD(OCP)	C = 0.47μF	24	38	57	msec
3.3, 5, 12V Under Voltage Delay Time	TD(UVP)	C = 0.47μF	24	38	57	msec
POWER SUPPLY ON/OFF SECTION (PSON) ^{Note}						
PSON Input Threshold Voltage	VTH(PSON)	PSON: "H" → "L"	1	1.4	1.8	V
PSON Open Voltage	VOPEN(PSON)	PSON: Open	4	-	5.25	V
PSON Input Low Current	ILOW(PSON)	VPSON = 0V	-	-	-1.6	mA
ON Delay Time	TON(PSON)	C = 0.1μF	4	8	14	msec
OFF Delay Time	TOFF(PSON)	C = 0.1μF	16	24	34	msec
FPO SECTION						
FPO Saturation Voltage	VSAT(FPO)	IFPO = 10mA	-	0.2	0.4	V
FPO Leakage Current	VLKG(FPO)	VFPO = 20V	-	0.01	1	μA

Electrical Characteristics (Continued)

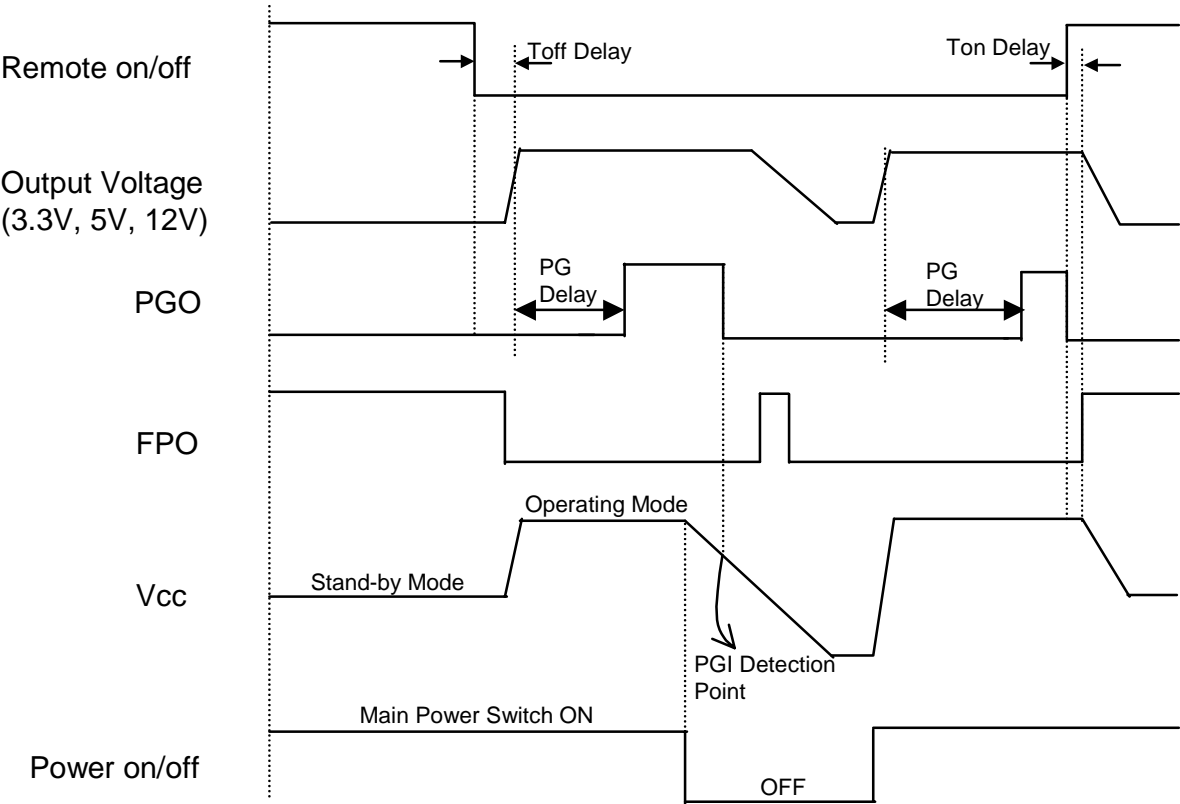
(VCC = 20V, -25°C ≤ Ta ≤ 85°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
POWER GOOD SECTION						
PG Input Threshold Voltage	VIN(PG1)	PG: "H" → "L"	1.20	1.25	1.30	V
Hysteresis Voltage 1	HY1	COMP7	10	40	80	mV
Hysteresis Voltage 2	HY2	COMP4, 6, 8	0.6	1.2	-	V
Charging Current for PG Delay	ICHG(PG)	-	-9	-14	-22	μA
PG Delay Time	TD(PG)	C = 2.2μF	150	270	450	msec
PG Output Saturation Voltage	VSAT(PG)	IPG = 10mA	-	0.2	0.4	V
TOTAL DEVICE						
Stand-by Supply Current	ICC	-	-	5	10	mA

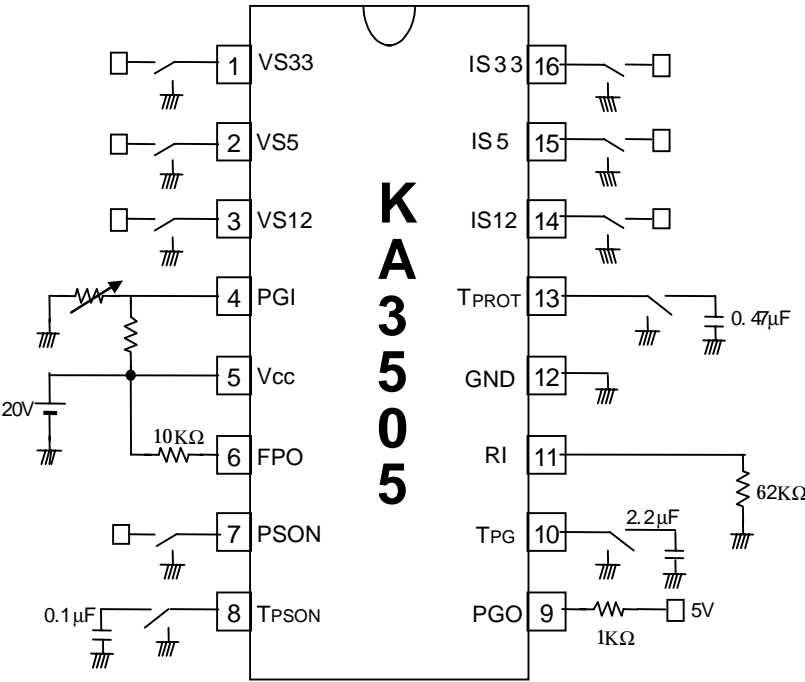
Note:

1. It does TTL operation and its threshold voltage is 1.4V.
2. Power Supply ON Delay Time (Ton) is measured as PSON input goes "Low" to "High".
3. Power Supply OFF Delay Time (Toff) is measured as PSON input goes "High" to "Low".

Timing / Housekeeping / Control



Test Circuit



Typical Characteristics

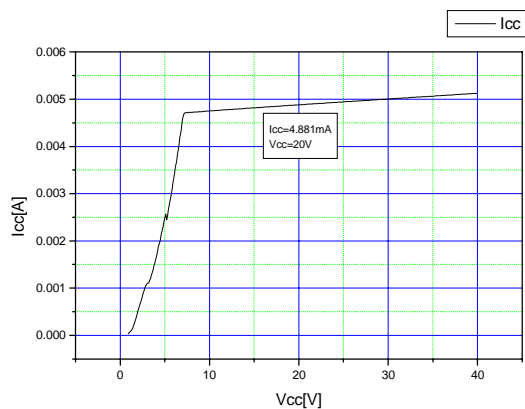


Figure 1. V_{CC} - I_{CC}

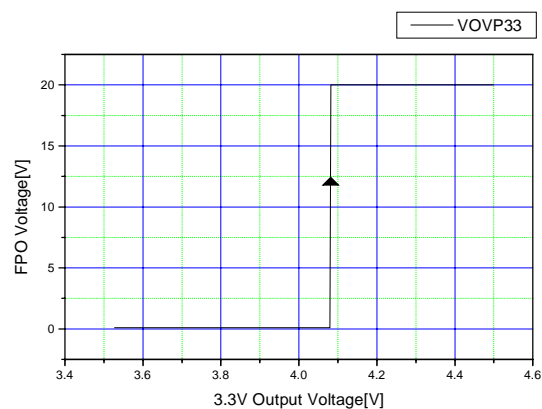


Figure 2. Over Voltage Protection for 3.3V

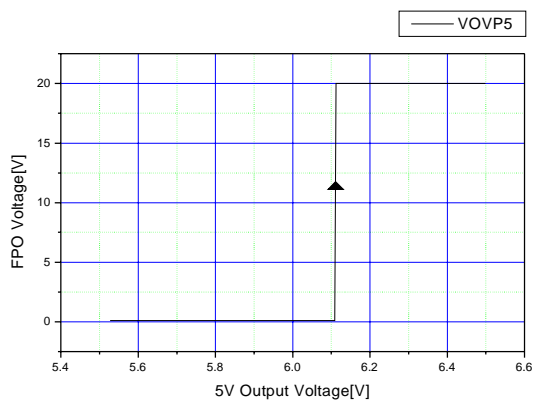


Figure 3. Over Voltage Protection for +5V

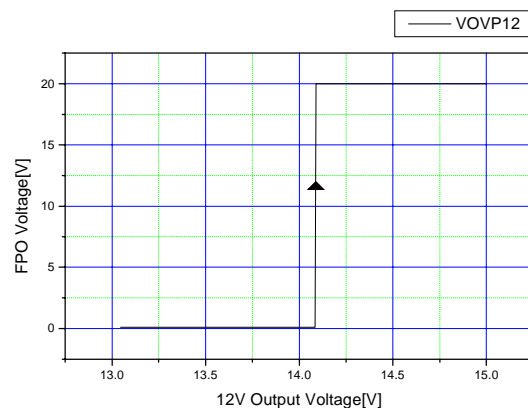


Figure 4. Over Voltage Protection for +12V

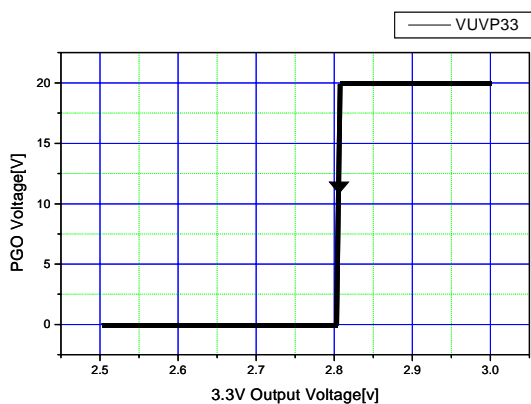


Figure 5. Under Voltage Protection for +3.3V

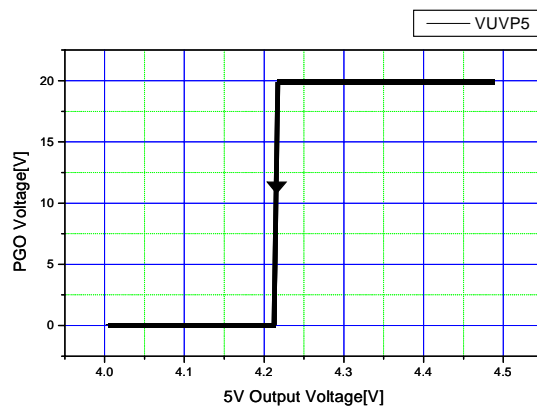


Figure 6. Under Voltage Protection for +5V

Typical Characteristics (Continued)

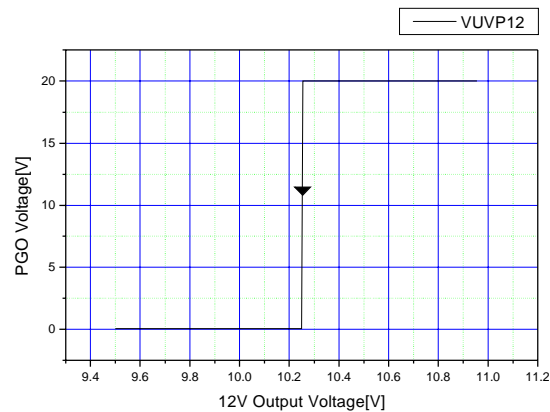


Figure 7. Under Voltage Protection for +12V

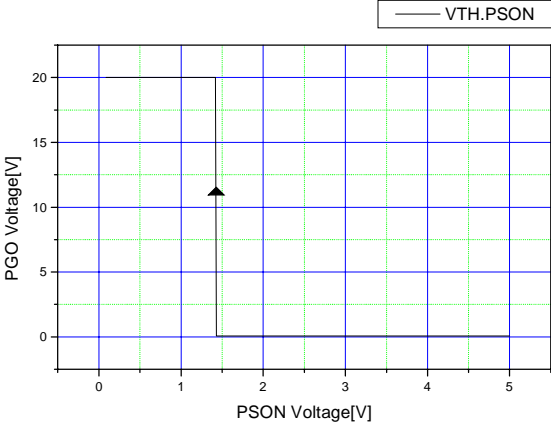


Figure 8. PSN Input Threshold Voltage

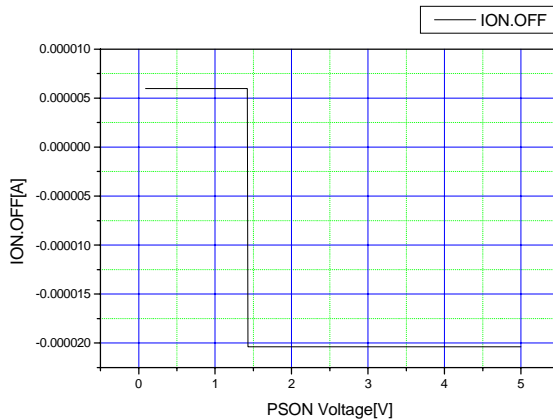


Figure 9. PS On/Off Delay Current

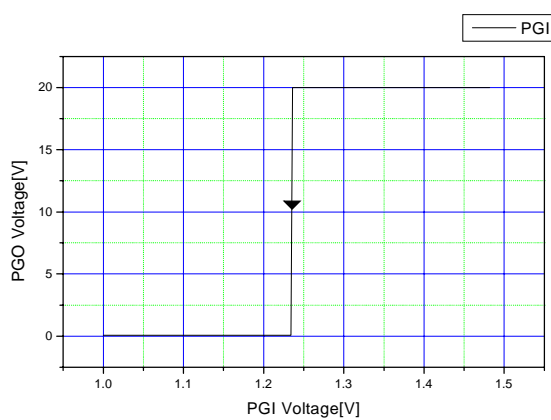


Figure 10. PG Input Threshold Voltage

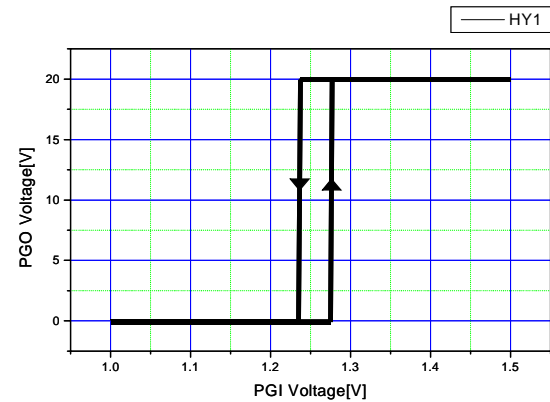


Figure 11. Hysteresis Voltage 1

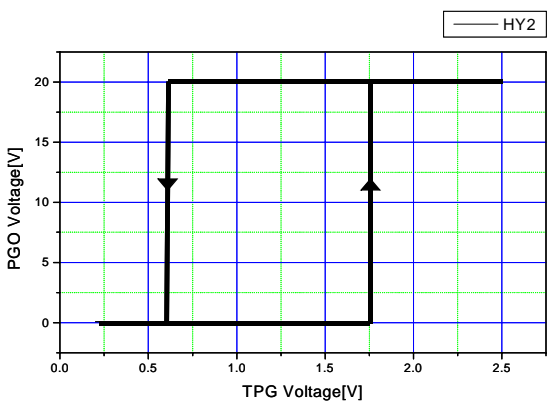
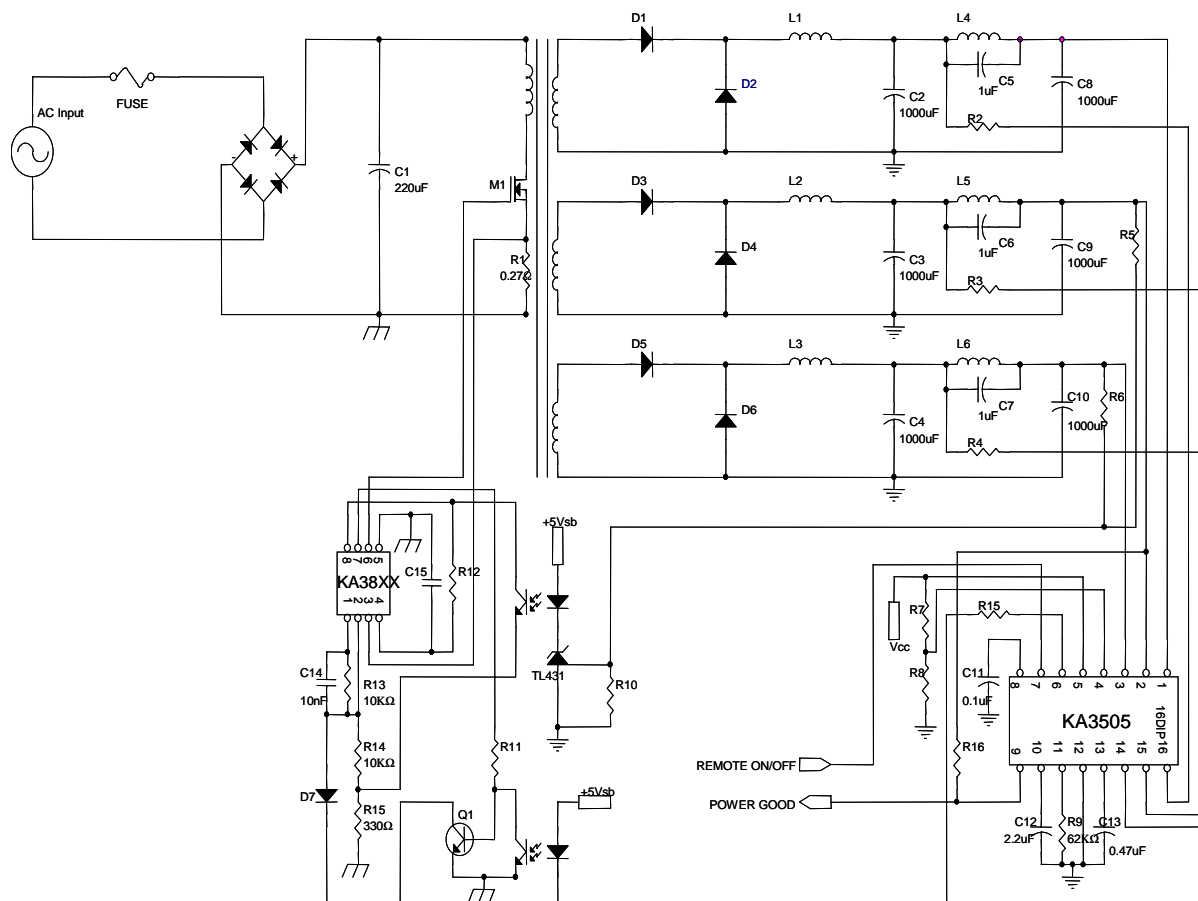
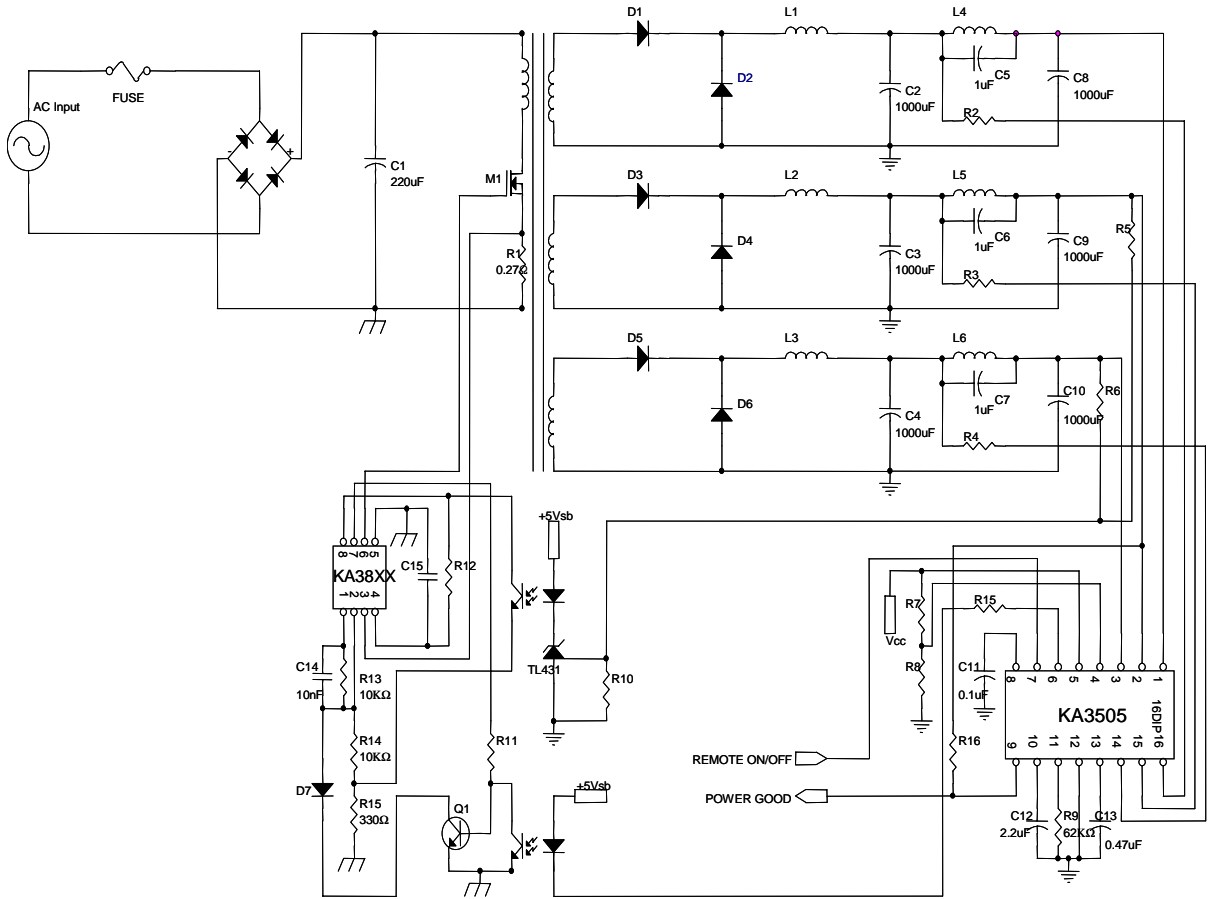


Figure 12. Hysteresis Voltage 2

Voltage Mode Application Schemata



Current Mode Application Schematic

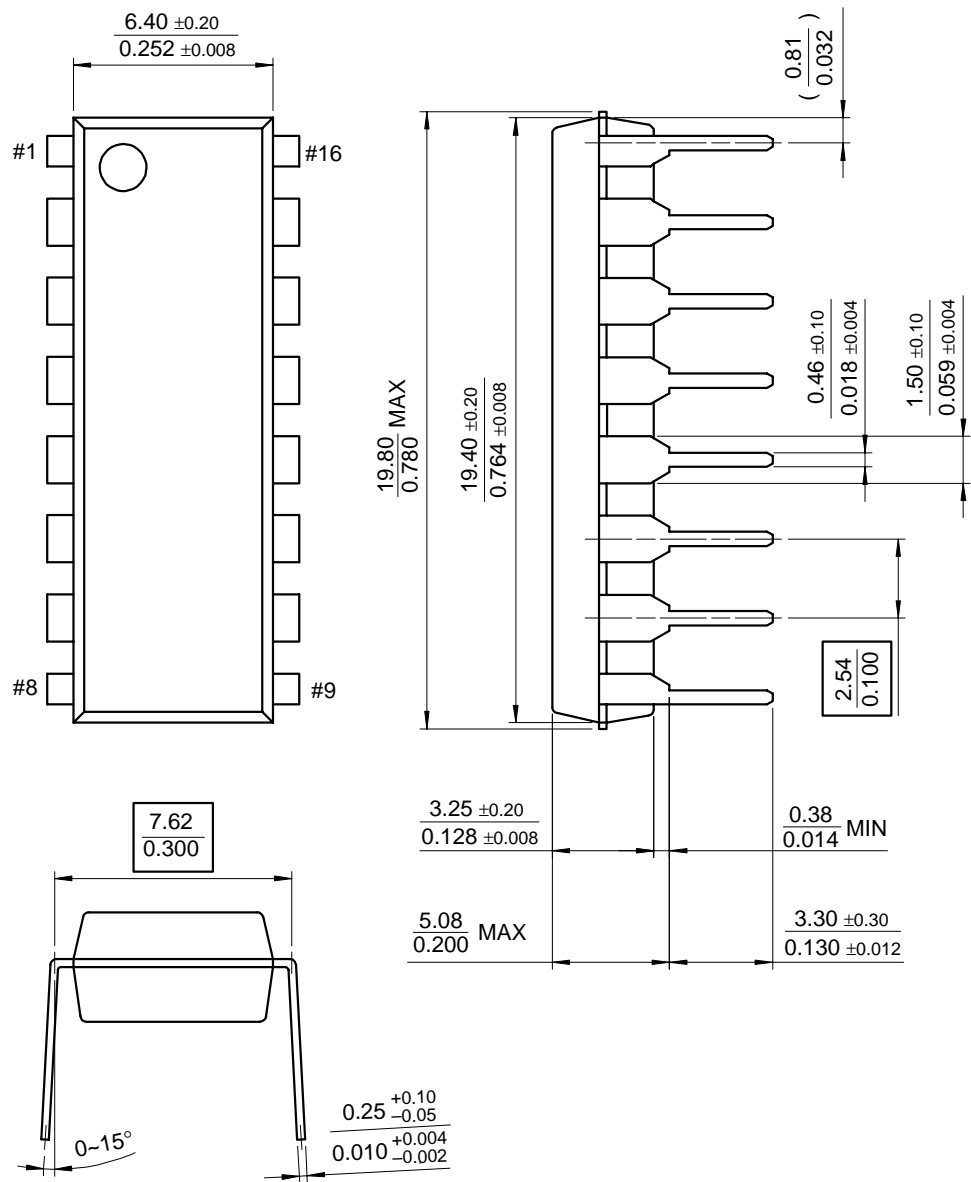


Mechanical Dimensions

Package

Dimensions in millimeters

16-DIP



Ordering Information

Product Number	Package	Operating Temperature
KA3505	16-DIP	-25°C ~ +85°C

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.