To all our customers

Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.

The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

M5297P

AC-DC TOTAL SYSTEM RESET IC

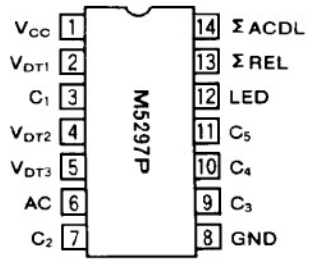
DESCRIPTION

M5297P is a system reset IC designed for Power Supply System at office Automation, Factory Automation equipment, which watches both AC Power Supply and DC Power Supply at the same time.

This IC watches the AC Power Supply, in shutting off the AC Power Supply, that is to say before dropping of the System Power Supply (DC Power Supply), which detects the abnormal state of the System.

After the AC Power Supply shut off, in normal state of the System Power Supply (DC Power Supply), this IC sends the System Reset Output to the CPU and MPU. Continuiously when the trouble of the System Power Supply (DC Power Supply) happen, users have alrkady been able to complete the all emergency measurment.

PIN CONFIGURATION (TOP VIEW)



Outline 14P4

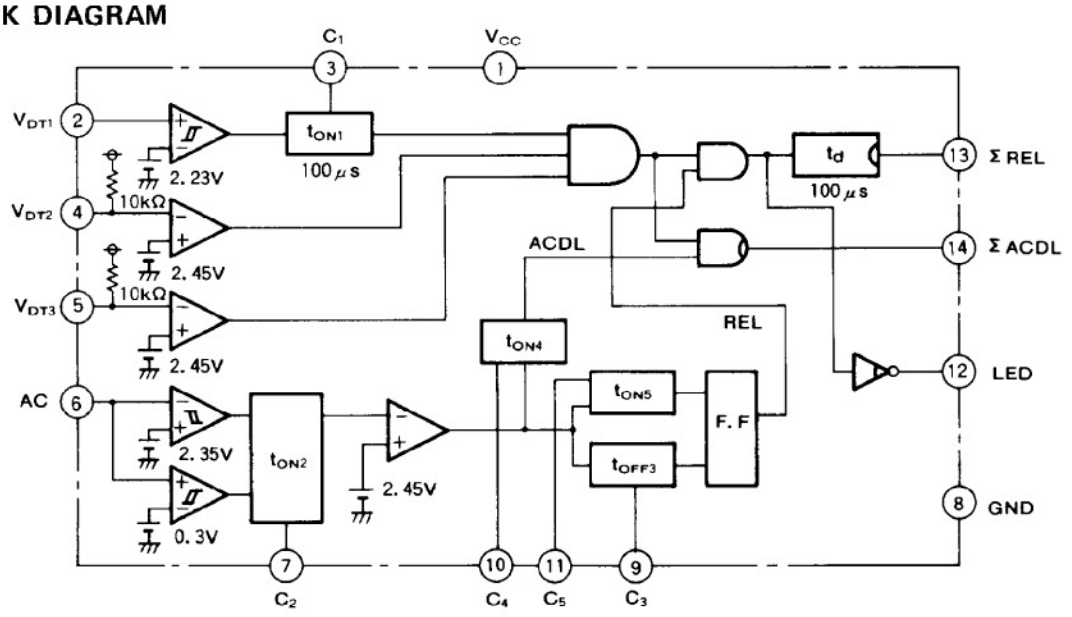
FEATURES

- WATCH AC Power Supply
- WATCH 3 DC Power Supplies
- 3 Reset Output (open collector)
  - Low Reset 2
  - High Reset 1
- Variable delay time for using capacitor and Resistor

APPLICATION

Power Supply System

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (T_a = 25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		7	V
V_O	Applied voltage		20	V
I_O	Output current		10	mA
P_D	Power dissipation		700	mW
K_θ	Thermal derating		7	mW/℃
T_{opr}	Operating temperature		−20 ~ +85	℃
T_{stg}	Storage temperature		−55 ~ +125	℃

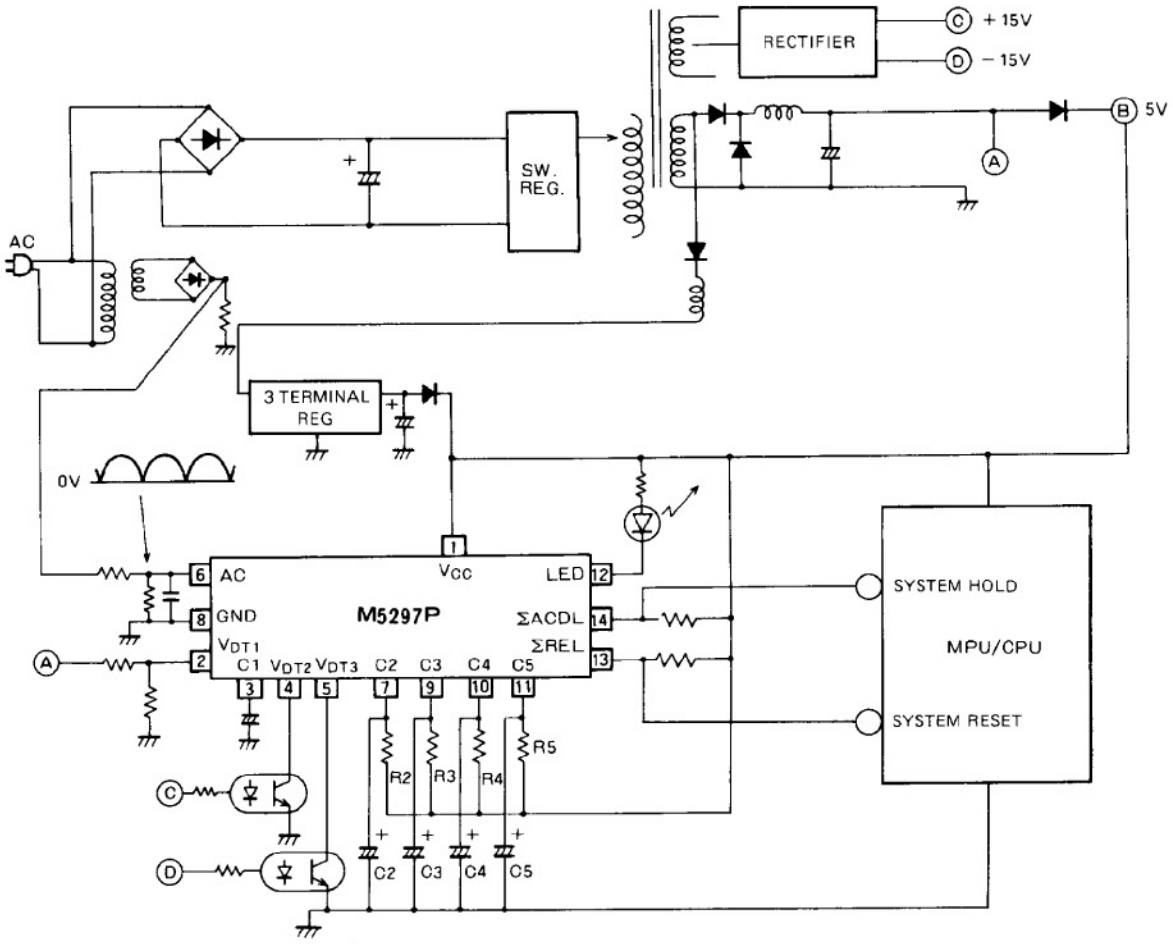
ELECTRICAL CHARACTERISTICS (T_a = 25℃, V_{CC} = 5V, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{CC}	Circuit current			10	15	mA
V_{DT1}	Detect voltagel		2.12	2.23	2.34	V
$\triangle V_{DT1}$	Hysteresis VDT1		0.05	0.1	0.2	V
V_{DT2}	Detect voltage 2		2.0	2.45	2.9	V
V_{DT3}	Detect voltage 3		2.0	2.45	2.9	V
V_{TAC1}	REAC(H) Detect voltage		2.22	2.35	2.46	V
$\triangle V_{AC1}$	Hysteresis VTAC1			0.2		V
V_{TAC2}	REAC(L) Detect voltage		0.15	0.3	0.6	V
$\triangle V_{AC2}$	Hysteresis VTAC2			0.1		V
$V_{REF \cdot TH}$	AC Reset threshold		2.31	2.45	2.57	V
T_1	VDT1 delay time	C1 = 0	0.02	0.1	0.4	ms
T_{ON1}	VDT1 delay time	C1 = 0.22μF	20	50	100	ms
T_{OFF2}	ΣACDL [OFF] time	C2 = 0.47μF, R2 = 18kΩ	2.8	5.6	11.2	ms
T_D	ΣACDL→ΣREL delay time		0.05	0.1	0.4	ms
T_{OFF3}	ΣREL [OFF] time	C3 = 4.7μF, R3 = 20kΩ	13.5	27	54	ms
T_4	ΣACDL [ON] time	C4 = 0μF, R4 = 20kΩ		1		μs
T_{ON4}	ΣACDL [ON] time	C4 = 3.3μF, R4 = 20kΩ	9.5	19	38	ms
T_5	ΣREL [ON] time	C5 = 0μF, R5 = 20kΩ		5		μs
T_{ON5}	ΣREL [ON] time	C5 = 4.7μF, R5 = 20kΩ	13.5	27	54	ms
V_{ACDL}	ΣACDL saturation voltage	I_O = 5mA		0.2	0.5	V
V_{REL}	ΣREL saturation voltage	I_O = 5mA		0.2	0.5	V
V_{LED}	LED saturation voltage	I_O = 5mA		0.2	0.5	V
I_{DT1}	VDT1 sourse current	V_{DT1} = 0V		−0.1		μA
I_{DT2}	VDT2 sourse current	V_{DT2} = 0V		−0.5	−1.5	mA
I_{DT3}	VDT3 sourse current	V_{DT3} = 0V		−0.5	−1.5	mA
I_{AC}	AC sourse current	V_{AC} = 0V		−0.2		μA
I_{ACDL}	ΣACDL leak current	V_{ACDL} = 20V			10	μA
I_{REL}	ΣREL leak current	V_{REL} = 20V			10	μA
I_{LED}	LED leak current	V_{LED} = 20V			10	μA

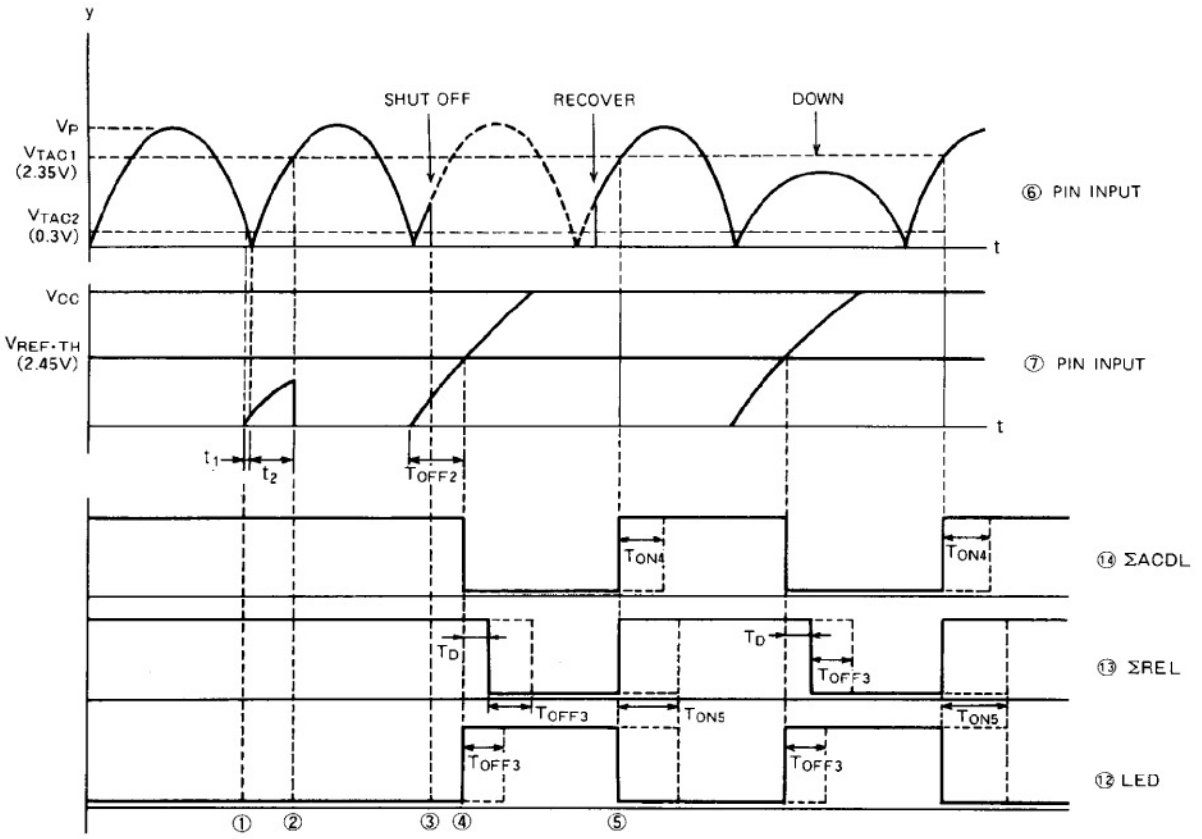
Symbol Explanation

ACDL : AC power supply Down Low
REL : Reset Low
T_{OFF2} : Maximum time for detecting the AC power supply shut off.
T_D : The period from ΣACDL Low Reset output to ΣREL Low Reset output.
T_{OFF3} : The period which subtract previous T_D from the following time, period from ΣACDL Low Reset output to ΣREL Low Reset output.
T_{ON4} : The period from detecting the AC power supply recover to ΣACDL High output.
T_{ON5} : The period from detecting the AC power supply recover to ΣREL High output.

Application for Power Supply System



Timing Chart for detecting AC Power Supply (V_{DT1}, V_{DT2}, V_{DT3}, normal)



Time calculation method

$$t_1 = \frac{1}{360 \cdot f} \sin^{-1} \frac{0.3}{V_P} \quad , \quad t_2 = \frac{1}{360 \cdot f} \sin^{-1} \frac{2.35}{V_P}$$ (f: AC Power Supply frequency)

$$T_{OFF2} = C2 \cdot R2 \ln \frac{V_{CC}}{V_{CC} - 2.45} \quad , \quad T_{OFF3} = C3 \cdot R3 \ln \frac{V_{CC}}{V_{CC} - 1.25}$$

$$T_{ON4} = C4 \cdot R4 \ln \frac{V_{CC}}{V_{CC} - 1.25} \quad , \quad T_{ON5} = C5 \cdot R5 \ln \frac{V_{CC}}{V_{CC} - 1.25}$$