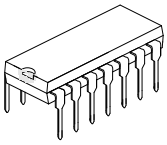
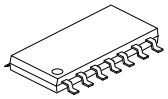
PC POWER SUPPLY SUPERVISORS



DIP-14



SOP-14

■ DESCRIPTION

The UTC **3512** is specially designed for switching power supply system. It provides over-voltage protection, over-current protection, under-voltage protection, on/off control and power good signal generating.

OVP/UVP (Over/Under-Voltage Protection) monitors 3.3V, 5V and double 12V to protect our power supply and PC, FPO goes to high when one of these supply voltages exceeds their normal operation voltage range.

OCP (Over Current Protection) monitors IS33, IS5, IS12 input current. The voltage difference across external current shunt is used for OCP functions. An external resistor which is connected between the RI pin and the GND pin can be used to adjust protection threshold. To achieve better immunity for lighting surge glitch and to prevent accidental power shut down during dynamic loading condition, the de-bounce time for UVP/OCP is 73us respectively. The deglitch time for OVP is 73uS for better noise immunity.

The power supply is turned on after 38mS de-bounce time when PSON signal is set from high to low. To turn off power supply, PSON signal is set from low to high and the de-bounce time is 115mS. When PGI input voltage level is lower than the internal 1.15V reference voltage, after 73uS de-bounce time, the PGO signal is pulled low.

■ FEATURES

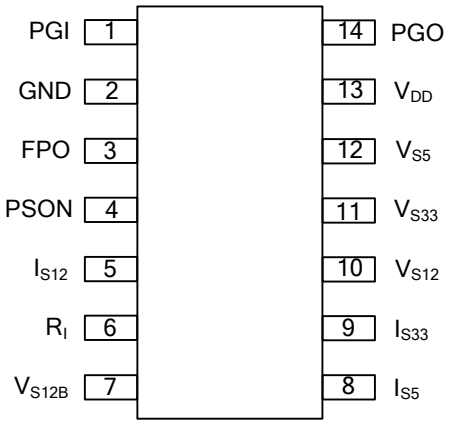
* Over/Under-voltage protection for 3.3V, 5V, and two 12V
* Over-current protection for 3.3V, 5V, and two 12V
* PGO and FPO pins with open drain output stage
* 300mS power good delay from PGI to PGO
* 75mS delay for 3.3V, 5V and 12V power turn on
* 2.8mS delay for PSON control to FPO turn off
* 38mS / 115mS PSON on/off de-bounce time
* 73uS width noise deglitches
* 73uS de-bounce time for UVP and OCP
* Wide supply voltage range

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
3512L-D14-T	3512G-D14-T	DIP-14	Tube
3512L-S14-R	3512G-S14-R	SOP-14	Tape Reel
3512L-S14-T	3512G-S14-T	SOP-14	Tube

3512L-D14-T (1)Packing Type (2)Package Type (3)Lead Free	(1) R: Tape Reel, T: Tube (2) D14: DIP-14, S14: SOP-14 (3) G: Halogen Free, L: Lead Free

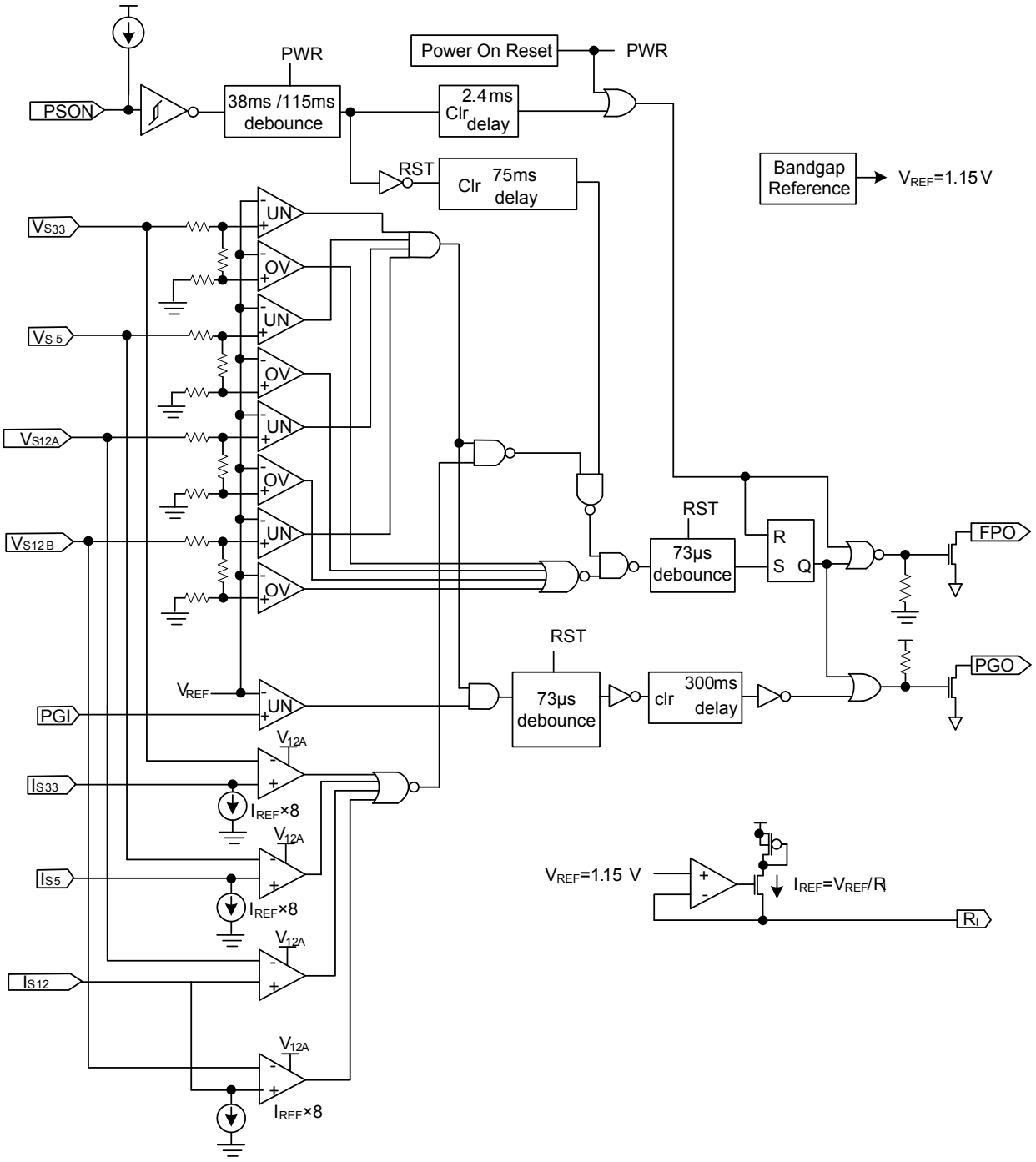
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO	PIN NAME	TYPE	DESCRIPTION
1	PGI	I	Power good input.
3	FPO	O	Fault protection output, open drain output stage.
4	PSON	I	Power on/off control signal sends from CPU or main-board. The power supply will be turned on/off after 38mS/115mS respectively.
8	I_{S5}	I	5V over current protection.
9	I_{S33}	I	3.3V over current protection.
5	I_{S12}	I	12V over current protection. Regarding typical application, this pin is connected to the positive end of a current shunt through one resistor. When the voltage on IS12 is higher than that of VS12 by 5mV, OCP will be enabled. One current sink, 8 x I_{REF}, is used to determine the voltage drop between the positive end of the current shunt and VS12. Adjusting the value of the external resistor can adjust the threshold for OCP accordingly. The operation for IS5 or IS33 is the same.
6	RI	I	Current sense setting. An external resistor Ri is connected between RI pin and GND pin will adjust a reference current, I_{REF} = 1.15/Ri, for OCP function.
12	V_{S5}	I	5V over/under-voltage protection.
7	V_{S12B}	I	Second 12V over/under-voltage protection.
10	V_{S12}	I	12V over/under-voltage protection.
11	V_{S33}	I	3.3V over/under-voltage protection.
13	V_{DD}	power	Supply voltage. 4V ~ 15V.
14	PGO	O	Power good logic output, open drain output stage. The power good delay is 300mS from PGI to PGO.
2	GND	power	Ground.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER			SYMBOL	RATINGS	UNIT
DC Supply Voltage			V_{DD}	-0.3 ~ 16	V
Input Voltage	PSON, V_{S33}, V_{S5}, PGI		V_{IN}	-0.3 ~ 8	V
Output Voltage		FPO	V_{OUT}	-0.3 ~ 16	V
		PGO		-0.3 ~ 8	
Power Dissipation			P_D	400	mW
Operating Temperature			T_{OPR}	-40 ~ +85	℃
Storage Temperature			T_{STG}	-55 ~ +150	℃

Note 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Stresses above those listed may cause permanent damage to the device.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER			SYMBOL	MIN	MAX	UNIT
DC Supply Voltage			V_{DD}	4	15	V
Input Voltage	PSON, V_{S33}, V_{S5}, I_{S33}, I_{S5}, PGI		V_{IN}		7	V
Input Voltage	V_{S12},V_{S12B}, I_{S12}				15	
Output Voltage		FPO	V_{OUT}		15	V
		PGO			7	
Output Sink Current		FPO	$I_{O(SINK)}$		20	mA
		PGO			10	
Supply Voltage Rising Time		See Note	t_R	1		mS
Output Current RI			I_{RI}	12.5	62.5	μA

Note V_{DD} rising and falling slew rate must be less than 14V/mS.

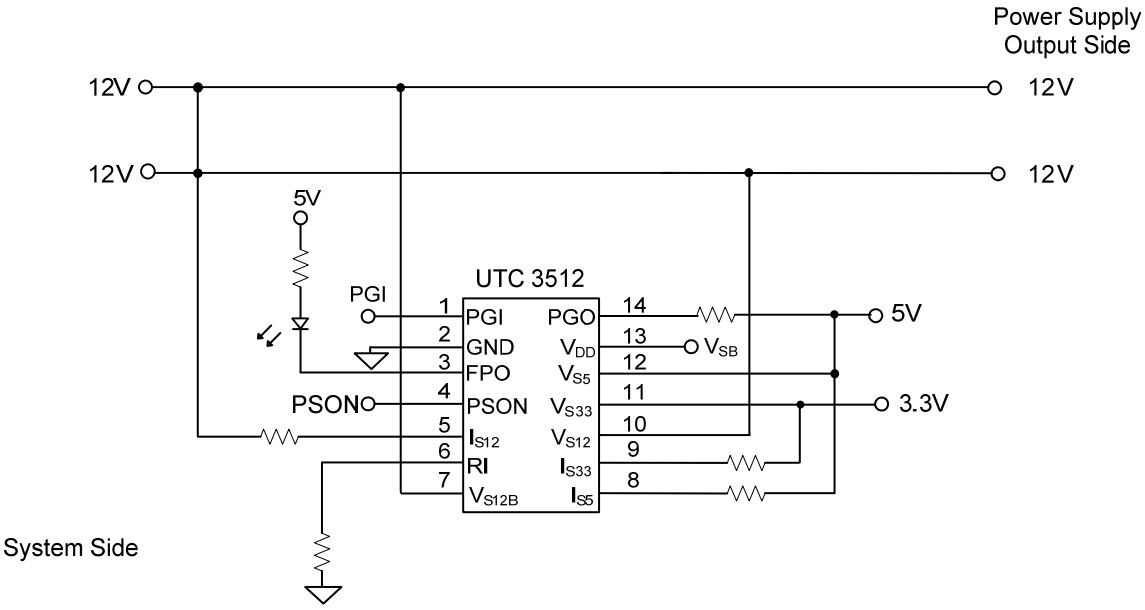
■ ELECTRICAL CHARACTERISTICS (V_{DD}=12V, T_A=25℃)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
UNDER-VOLTAGE AND PGI, PGO							
Input Threshold Voltage PGI		V_{PGI}		1.1	1.15	1.2	V
Under-voltage protect V_{S33}		V_{UVp}		2.6	2.8	3.0	V
Under-voltage protect V_{S5}				4.0	4.2	4.4	
Under-voltage protect V_{S12}, V_{S12B}				9.4	9.9	10.4	
Low Level Output Voltage (PGO)		V_{OL}	V_{DD} = 12V I_{SINK} =10mA			0.7	V
Leakage Current (PGO)		I_{LEAK}	PGO = 5V			5	μA
Under-voltage Enable Delay Time				49	75	114	mS
Timing PG Delay	PGI to PGO	t_{PG}		200	300	450	mS
Noise Deglitch Time	PGI to PGO			150	250	350	μS
Timing UVP to Protection (FPO)		T_{UVP}	V_{S33},V_{S5}, V_{S12},V_{S12B}		73		μS
OVER-VOLTAGE AND OVER-CURRENT PROTECTION							
Over-Voltage Protection	V_{S33}	V_{OVP}		3.7	3.9	4.1	V
Over-Voltage Protection	V_{S5}			5.7	6.1	6.5	
Over-Voltage Protection	V_{S12}, V_{S12B}			13.2	13.8	14.4	
Ratio of Current Sense Sink Current to Current Sense Setting Pin (RI) Source Current		I_{REF}	RI = 30 KΩ, 0.1% Resistor	7.6	8	8.4	
Current Source Reference Voltage		V_{REF}		1.1	1.15	1.2	V
OCP Comparator Input Offset Voltage		$V_{I(OFF)}$		-5		5	mV
Low Level Output Voltage (FPO)		V_{OL}	I_{SINK} =20mA			0.7	V
Leakage Current (FPO)		I_{LEAK}	$V_{(FPO)}$ = 5V			5	μA
Timing OVP to Protection		T_{OVP}			73		μS
Timing OCP to Protection		T_{OCP}			73		μS

■ ELECTRICAL CHARACTERISTICS(Cont.)

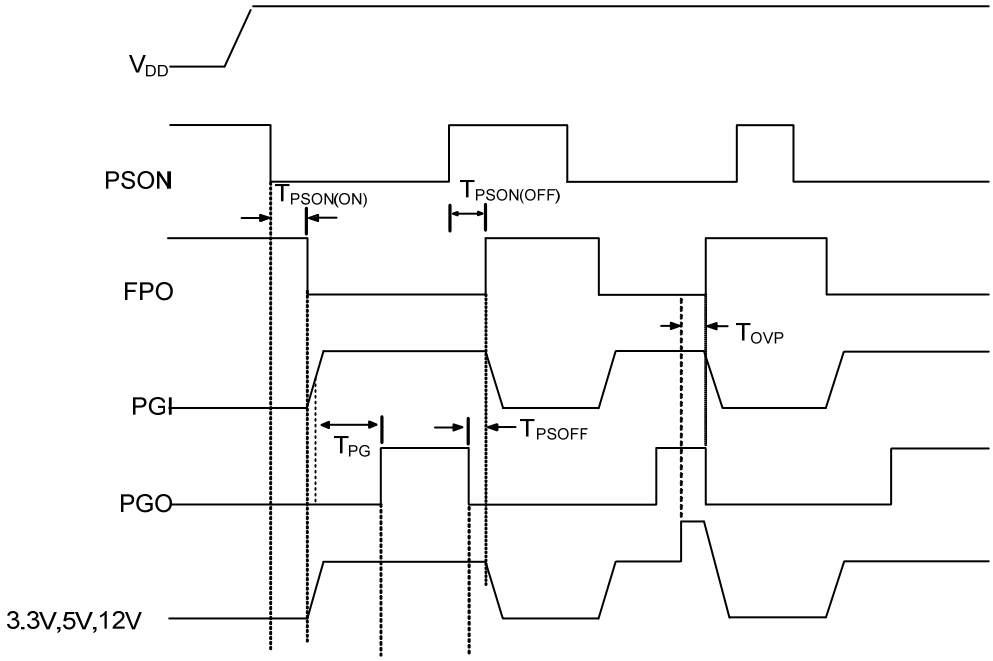
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
PSON CONTROL							
High-Level Input Voltage		V_{IH}		1.9			V
Low-Level Input Voltage		V_{IL}				0.98	V
Timing PGO Low to FPO High		T_{PSOFF}		1.6	2.8	4.0	mS
Timing PSON to On/Off	ON	T_{PSON}		24	38	57	mS
	OFF			24	38	57	mS
Input Pull-up Current		I_{PSON}	PSON = 0V		120		μA
TOTAL DEVICE							
Supply Current		I_{DD}	PSON = 5V, V_{DD} = 5V		1.0	1.8	mA
V_{DD} Start Threshold Voltage		V_{THD}				4.0	V
V_{DD} Min. Operation Voltage After Start-up		V_{MIN}		3.65			V

■ TYPICAL APPLICATION CIRCUIT



■ TIMING DIAGRAM

PSON On/Off and 3.3V, 5V, 12V OVP Function



3.3V, 5V, 12V OVP UVP and OCP Function