



## 3521

CMOS IC

### PWM CONTROLLER WITH SUPERVISORY CIRCUIT FOR SWITCHING POWER SUPPLY

#### DESCRIPTION

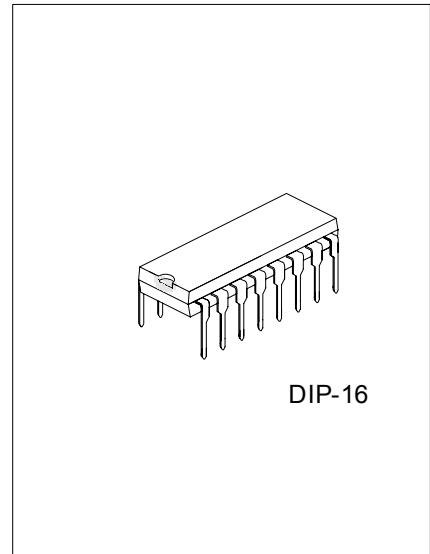
UTC 3521 PWM controller is designed for switching mode power supply for PCs etc. It provides all the functions similar to combinations of industrial 494 plus UTC 3510 circuits.

#### FEATURES

- \* Over-voltage protection for 3.3V, 5V and 12V with delay
- \* Under-voltage detection for 3.3V, 5V and 12V with delay
- \* Remote ON/OFF function
- \* Power good circuitry for PCs.

#### ORDERING INFORMATION

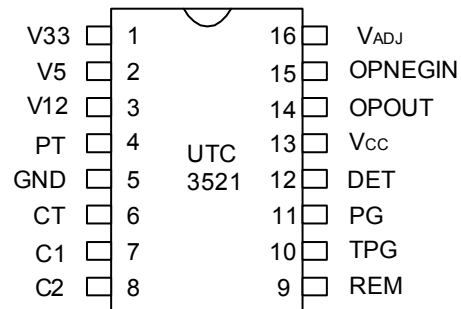
Order Number		Package	Packing
Normal	Lead Free Plating		
3521-D16-T	3521L-D16-T	DIP-16	Tube



\*Pb-free plating product number: 3521L

<p>3521L-D16-T</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Lead Plating</li> </ul>	<ul style="list-style-type: none"> <li>(1) T: Tube</li> <li>(2) D16: DIP-16</li> <li>(3) L: Lead Free Plating, Blank: Pb/Sn</li> </ul>
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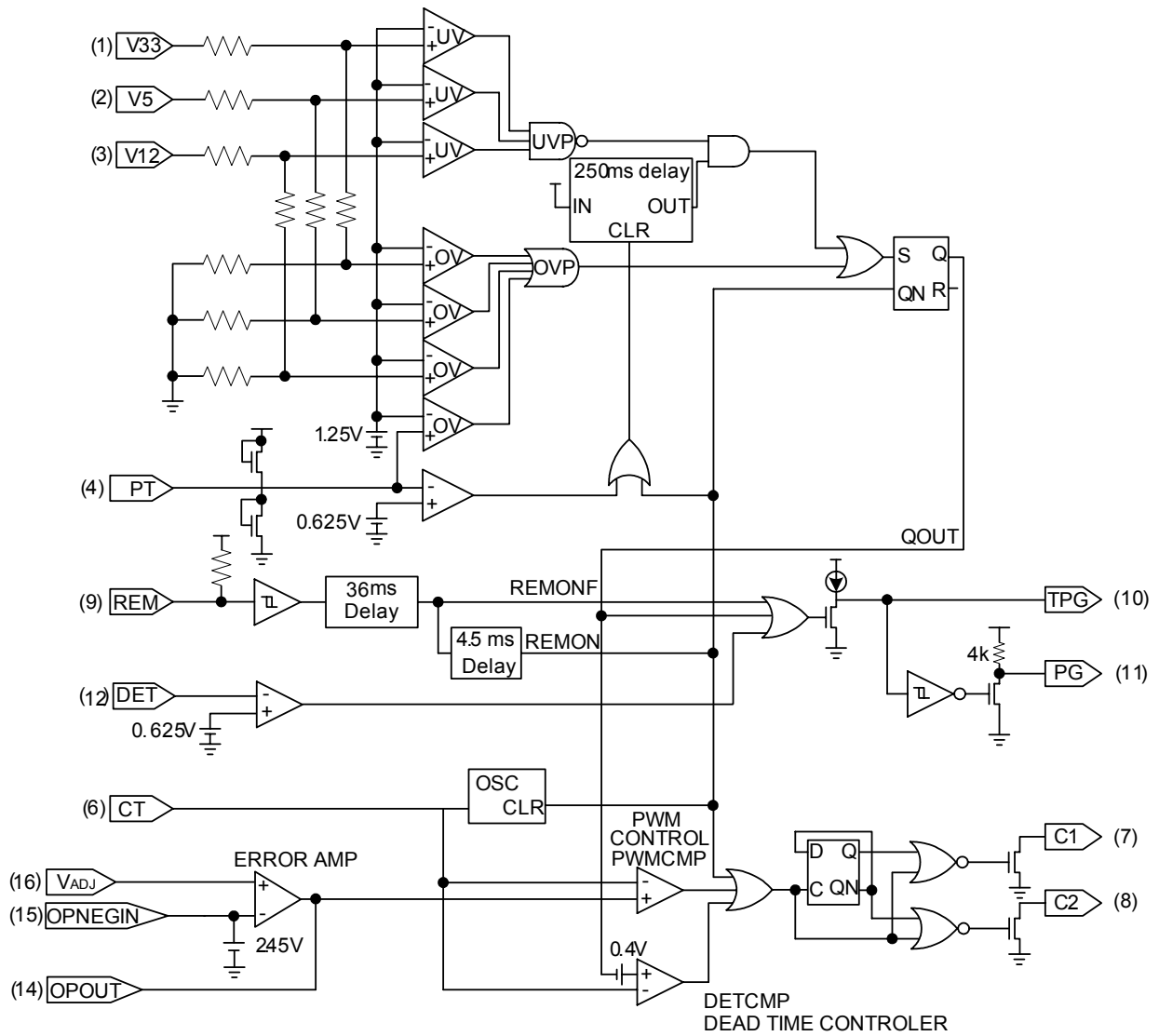
## ■ PIN CONFIGURATION



## ■ PIN DESCRIPTION

PIN NO.	PIN NAME	TYPE	FUNCTIONS
1	V33	I	OVP/UVIP INPUT FOR 3.3V
2	V5	I	OVP/UVIP INPUT FOR 5V
3	V12	I	OVP/UVIP INPUT FOR 12V
4	PT	I	ADDITIONAL OVP PROTECTION
5	GND	P	GROUND
6	CT		CAP FOR OSCILLATION FREQUENCY
7	C1	O	OUTPUT 1
8	C2	O	OUTPUT 2
9	REM	I	REMOTE ON/OFF PIN.
10	TPG		POWER GOOD DELAY TIME SETTING
11	PG	O	POWER GOOD SIGNAL OUT.
12	DET	I	POWER GOOD SIGNAL DETECTION INPUT
13	V <sub>CC</sub>	P	SUPPLY VOLTAGE FOR IC
14	OPOUT	O	OP AMP OUTPUT
15	OPNEGIN	I	OP AMP NEGATIVE INPUT
16	V <sub>ADJ</sub>	I	VOLTAGE ADJUST PIN

■ BLOCK DIAGRAM



■ **ABSOLUTE MAXIMUM RATINGS** ( $V_{CC}=5.5V$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	5.5	V
Drain Output Voltage	$V_{CC1}, V_{CC2}$	5.5	V
Drain Output Current	$I_{CC1}, I_{CC2}$	200	mA
Power Dissipation	$P_D$	200	mW
Operating Temperature	$T_{OPR}$	-10 ~ +70	°C
Storage Temperature	$T_{STG}$	-65 ~ +150	°C

Note 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.

■ **ELECTRICAL CHARACTERISTICS** ( $T_a=25^{\circ}C$ ,  $V_{CC}=5V$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>DEAD TIME CONTROL SECTION</b>						
Input Threshold Voltage	$V_{I(THR)}$	ZERO DUTY CYCLE		3.0	3.3	V
		MAX. DUTY CYCLE		0.1		
<b>ERROR AMP SECTION</b>						
Opneg Bias Voltage		OPNEG OPEN	2.38	2.45	2.52	V
Close Loop Voltage Gain	$G_{VC}$	0.5V ~ 3.5V		65		dB
Cross Over Point		0dB		320		KHz
<b>OUTPUT SECTION</b>						
Output Saturation Voltage	$V_{DSSAT}$	$I_D=200mA$		1.1	1.3	V
Drain Off-State Current	$I_{D(OFF)}$	$V_{CC}=V_D=V_S=0V$		2	10	$\mu A$
Rising Time	$t_R$			100	200	ns
Falling Time	$t_F$			50	200	ns
<b>PROTECTION SECTION</b>						
Over Voltage Protection (OVP)	V33		3.8	4.1	4.3	V
	V5		5.8	6.2	6.6	
	V12		4.41	4.64	4.90	
	$P_T$		1.2	1.25	1.3	
Under Voltage Protection (UVP)	V33		1.78	1.98	2.18	V
	V5		2.70	3.00	3.30	
	V12		2.11	2.37	2.63	
UVP Disable Voltage	$P_T$		0.55	0.62	0.68	V
UVP Delay Time	$t_{DLY}$		100	250	500	ms
<b>REMOTE ON/OFF SECTION</b>						
REM High Input Voltage	$V_{IH}$		2.0			V
REM Low Input Voltage	$V_{IL}$				0.8	V
REM Pull High Voltage	$V_{H(PULL)}$		2.0		5.25	V
REM Delay Time	$t_{DLY}$		30	36	42	ms
REM Off Delay Time	$t_{DLY(OFF)}$		3.5	4.5	5.5	ms
<b>POWER GOOD SECTION</b>						
Detecting Input Voltage	$V_{I(DET)}$		0.55	0.62	0.68	V
Output Saturation Voltage	$V_{O(SAT)}$	$I_{PG}=10mA$		0.2	0.4	V
Charging Current For TPG	$I_{CHAR}$			30		$\mu A$
PG Output Pull-up Resistor	$R_{O(PULL-UP)}$			4		K $\Omega$
PG Output Load Resistor	$R_{O(LOAD)}$		0.5	1	2	K $\Omega$
PG Delay Time	$t_{DLY}$	$C=2.2\mu F$	100	250	500	ms
<b>TOTAL DEVICE</b>						
Standby Supply Current	$I_{CC}$			10	20	mA
<b>OSCILLATION SECTION</b>						
Oscillation Frequency	$F_{OSC}$	$C_T=2200P$	50		60	KHz
Frequency Change With TEMP.	$F_{OSC/T}$	$C_T=2200P$		2		%

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