1.Description

The accuracy of the chip +5.1V reference voltage is 1%. Because the reference voltage is within the input common- mode range of the error amplifier, there is no need for an external resistor. The UMW 3525 can work in master- slave mode and can also be synchronized with external clock. The dead time can be adjusted by the resistance between CT and discharge terminal. Other functional circuits inside the chip also include: soft start circuit, turn- off circuit and under- voltage circuit.

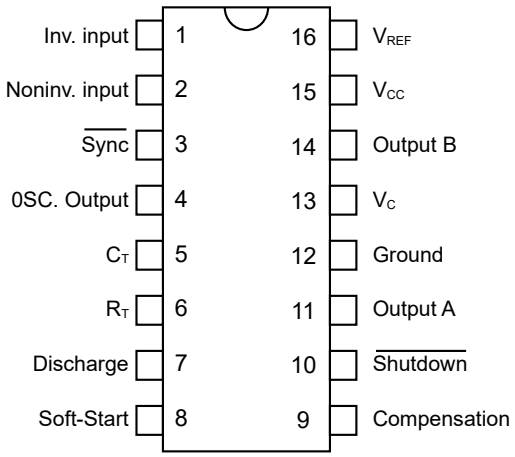
The output stage of the control chip is a high- power totem- pole output, and its source current and sink current exceed 150mA, which gives a logic level of "NOR" and a low level when it is in the "off" state.

trait

2.Features

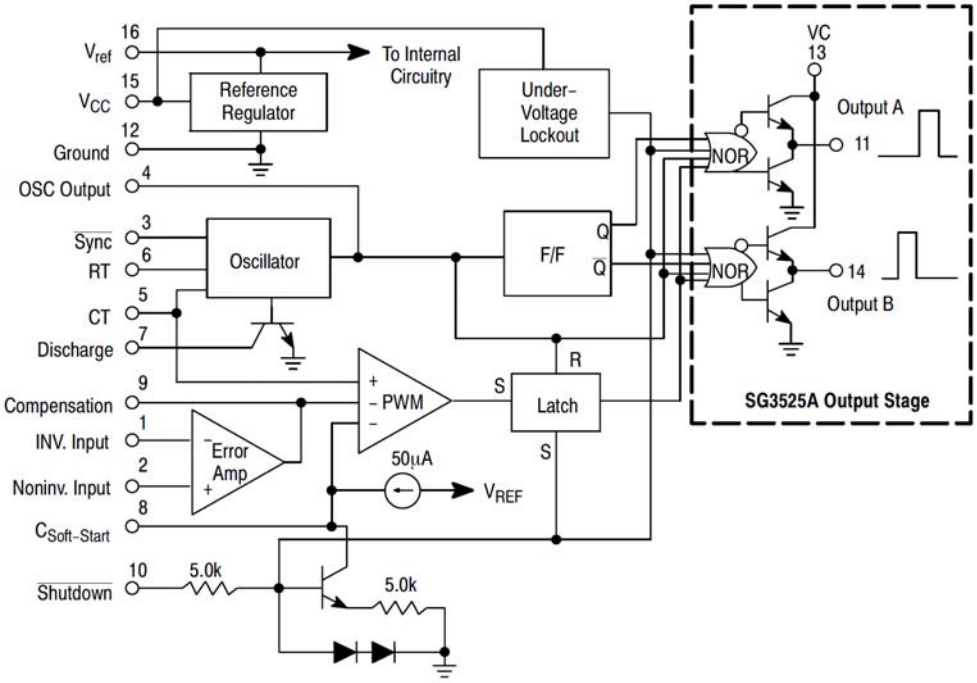
- The working voltage range is 8~35V
- 5.1V reference voltage with accuracy of 1%
- The oscillation frequency range is 100Hz~500KHz
- The oscillator synchronization signal input end
- Dead time is adjustable
- Built- in soft start circuit
- Step- by- step pulse shutdown
- Input undervoltage locking with hysteresis voltage
- PWM locking function, prohibiting multi- pulse

3.Pinning Information



SOP-16

4.Internal Block Diagram



5.Limit Operating Parameters

Parameter	Symbol	Value	Units
Power supply voltage	V_I	40	V
Collector supply voltage	V_C	40	V
Oscillator charging current	I_{OSC}	5	mA
Output source current	I_O	500	mA
Reference output current	I_R	50	mA
Power consumption Tamb=70°C	P_{tot}	1000	mW
Working temperature	T_{OP}	0 to 70	°C
Junction temperature range	T_J	-55 to 150	°C
Storage temperature range	T_{STG}	-65 to 150	°C

6.Recommended Operating Conditions (1)

Parameter	Value
Input Voltage (V_i)	8 to 35V
Collector Supply Voltage (V_C)	4.5 to 35V
Sink/Source Load Current (steady state)	0 to 100mA
Sink/Source Load Current (peak)	0 to 400mA
Reference Load Current	0 to 20mA
Oscillator Frequency Range	100Hz to 400KHz
Oscillator Timing Resistor	2KΩ to 150KΩ
Oscillator Timing Capacitor	0.001μF to 0.1μF
Dead Time Resistor Range	0 to 500 Ω

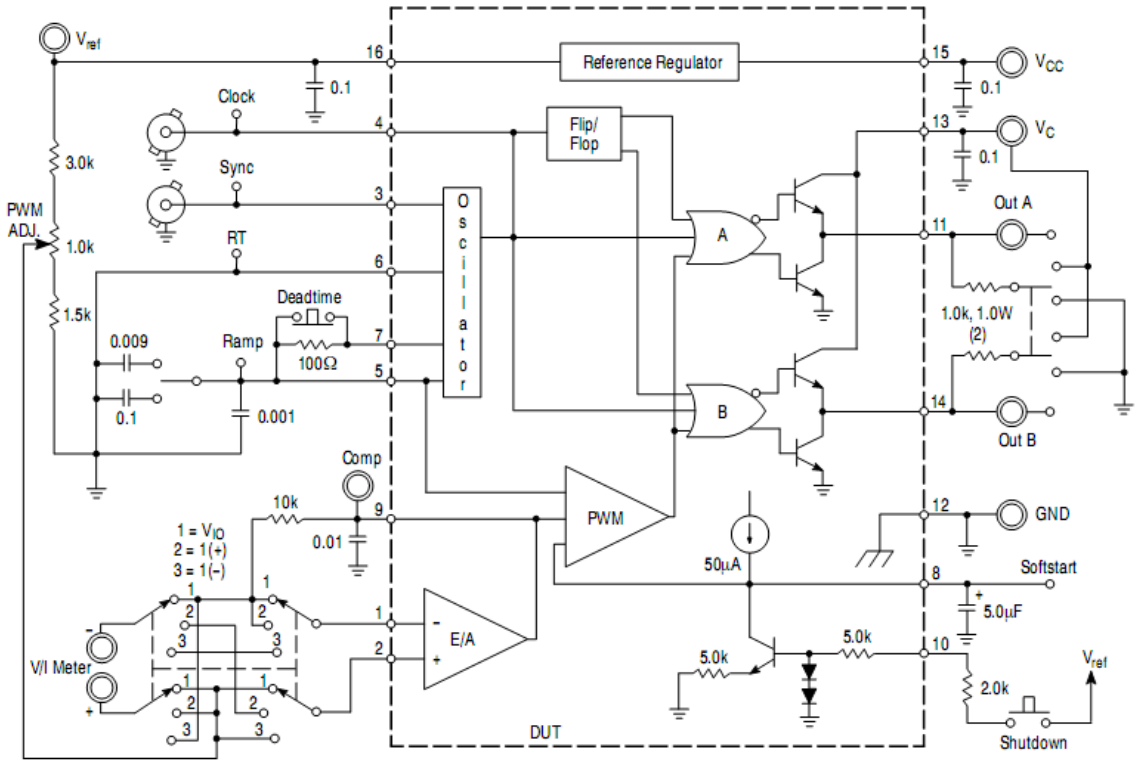
(1) Range over which the device is functional and parameter limits are guaranteed.

7.Electrical Characteristics (V_{CC}=20V)

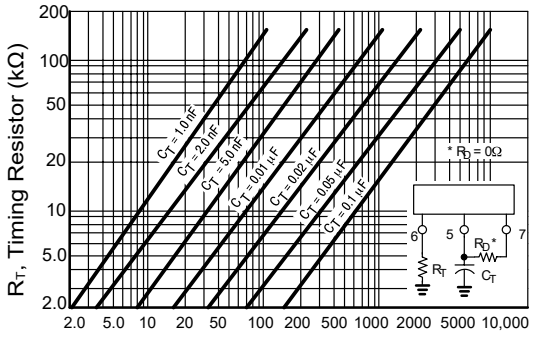
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Reference source						
Reference output voltage	V_{REF}	T_J=25°C	5	5.1	5.2	V
Line rule	ΔV_{REF}	V_{CC}=8 to 35V		9	20	mV
Load regulation	ΔV_{REF}	I_{REF}=0 to 20mA		20	50	mV
Short circuit output current	I_{SC}	V_{REF}=0, T_J=25°C		80	100	mA
Total output change	ΔV_{REF}	Line, load and temperature	4.95		5.25	V
Temp.stability	$\Delta V_{REF}/\Delta T$*			20	50	mV
Long term stability	ΔV_{REF}*	T_J=125°C, 1 KHRS		20	50	mV
Oscillating part						
Initial accuracy	ACCUR	T_J=25°C		±3	±6	%
Voltage stability	$\Delta f/\Delta V_{CC}$	V_{CC}=8 to 35V		±0.8	±2	%
Highest frequency	$f_{(MAX)}$	R_T=2KΩ, C_T=470pF	400	430		KHz
Lowest frequency	$f_{(MIN)}$	R_T=200KΩ, C_T=0.1μF		60	120	Hz
Clock amplitude	$V_{(CLK)}$		3	4		V
Clock width	$t_{W(CLK)}$	T_J=25°C	0.3	0.6	1	μs
Synchronization threshold	$V_{TH(SYNC)}$		1.2	2	2.8	V
Synchronous input current	$I_{I(SYNC)}$	S_{ync}=3.5V		1.3	2.5	mA
Error amplifier section (V_{CM}=5.1V)						
Input offset voltage	V_{OS}			1.5	10	mV
Input bias current	I_B			1	10	μA
Input offset current	I_{OS}			0.1	1	μA
Open loop voltage gain	G_{VO}	R_L≥10MΩ	60	75		dB
Common mode rejection ratio	CMRR	V_{CM}=1.5 to 5.2V	60	75		dB
Power supply rejectionratio	PSRR	V_{CC}=8 to 3.5V	50	60		dB

Parameter	Symbol	Conditions	Min	Typ	Max	Units
PWM comparator part						
Minimum duty cycle	$D_{(MIN)}$				0	%
Maximum duty cycle	$D_{(MAX)}$		45	49		%
Input threshold voltage	V_{TH1}	Zero duty cycle	0.7	0.9		V
Input threshold voltage	V_{TH2}	Maximum duty cycle		3.2	3.6	V
Input Bias Current	I_{IB}			0.05	1	μA
Soft start part						
Soft start current	I_{SOFT}	V_{SD}=0V, V_{SS}=0V	25	51	80	μA
Soft start low voltage	V_{SL}	V_{SD}=25V		0.3	0.7	V
Turn off threshold voltage	$V_{TH(SD)}$		0.6	0.8	1	V
Turn off the input current	$I_{N(SD)}$	V_{SD}=2.5V		0.3	1	mA
Output part						
Low output voltage I	V_{OLI}	I_{SINK}=20mA		0.1	0.4	V
Low output voltage II	V_{OLII}	I_{SINK}=100mA		0.05	2	V
High output voltage I	V_{OHI}	I_{SOURCE}=20mA	18	19		V
High output voltage II	V_{OHII}	I_{SOURCE}=100mA	17	18		V
Under voltage lock out	V_{UV}	V8 and V9 = High	6	7	8	V
Collector leakage current	I_{LKG}	V_{CC}=35V		80	200	μA
Risetime	t_R	C_L=1μF, T_J=25°C		80	600	ns
Descending time	t_F	C_L=1μF, T_J=25°C		70	300	ns
Standby current						
Supply current	I_{CC}	V_{CC}=35V		12	20	mA

8.Test Line

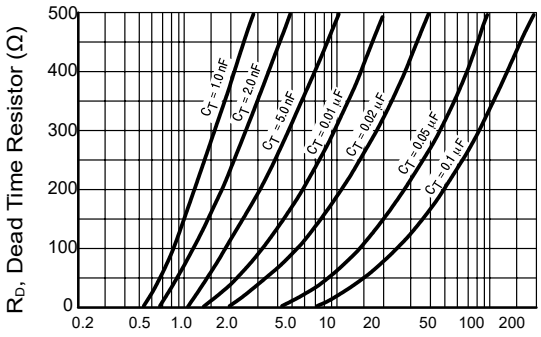

Vref
16
Reference Regulator
15
VCC
0.1
Clock
4
Flip/
Flop
13
VC
0.1
3.0k
Sync
3
Oscillator
A
Out A
PWM
ADJ.
1.0k
RT
6
11
1.5k
Deadtime
1.0k, 1.0W
(2)
0.009
Ramp
7
100Ω
5
B
14
Out B
0.1
0.001
Comp
10k
9
PWM
12
GND
1 = VIO
2 = 1(+)
3 = 1(-)
0.01
50µA
8
Softstart
5.0µF
E/A
V/I Meter
5.0k
5.0k
10
Vref
2.0k
DUT
Shutdown

9.Typical Characterisitics



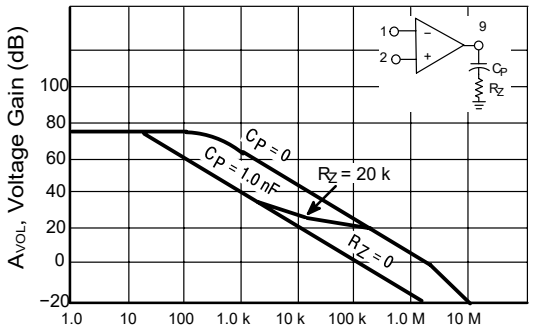
Charge Time (μs)

Figure 1: Oscillator Charge Time versus R_T



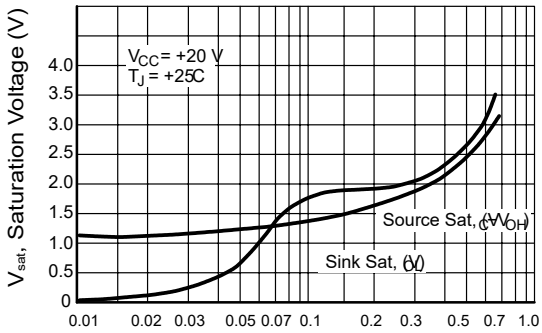
Discharge Time (μs)

Figure 2: Oscillator Discharge Time versus R_D



f, Frequency (Hz)

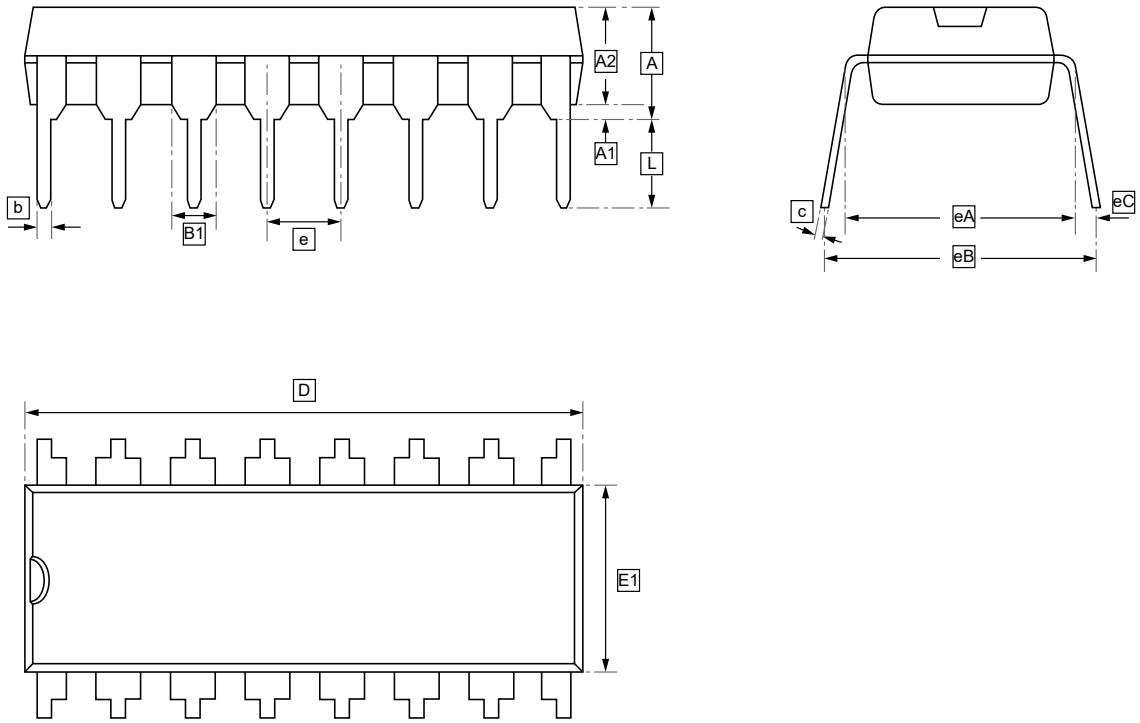
Figure 3: Error Amplifier Open Loop Frequency Response



I_O, Output Source or Sink Current (A)

Figure 4: Output Saturation Characteristics

10.1 DIP-16 Package Outline Dimensions

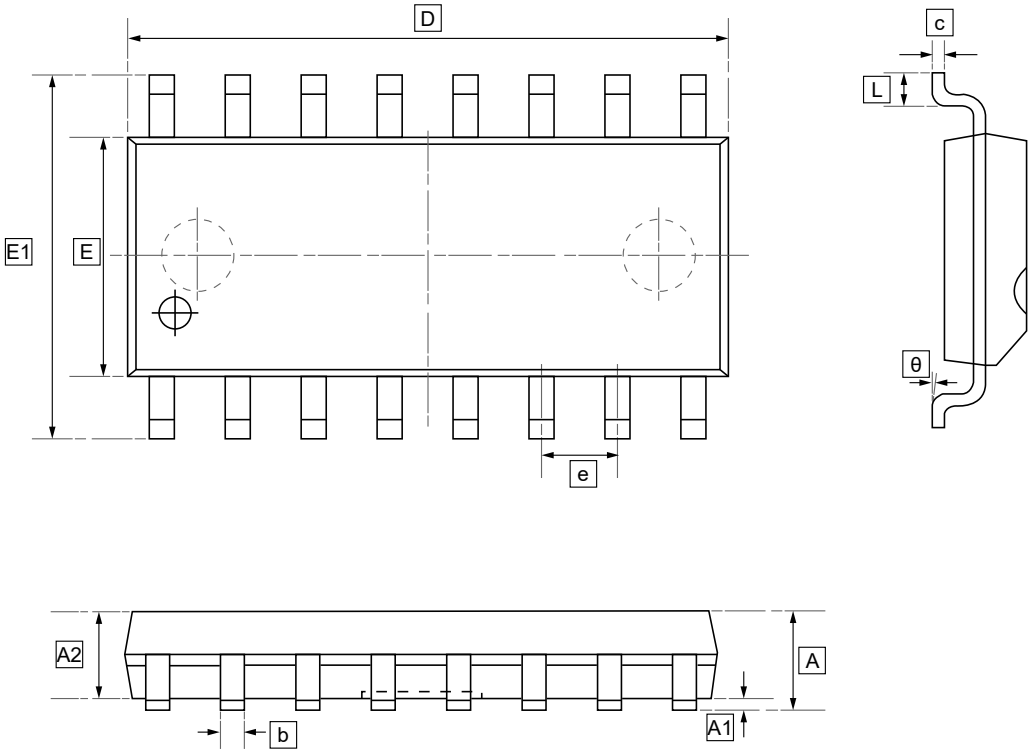


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	B1	c	D	E1	e	eA	eB	eC
Min	-	0.50	3.20	0.38	1.52	0.20	18.90	6.15	2.54	7.62	7.62	0
Max	4.45	-	3.70	0.54	BSC	0.35	19.45	6.60	BSC	BSC	9.30	1.52

Symbol	L
Min	3.00
Max	-

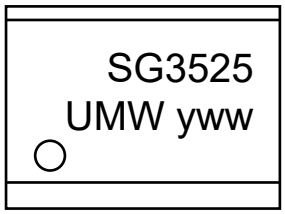
10.2 SOP-16 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0	1.350	0.330	0.170	9.800	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	10.200	4.000	6.200	BSC	1.270	8°

11.Ordering Information



yww: Batch Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW SG3525AP	SG3525	SOP-16	2500	Tape and reel
UMW SG3525AN	SG3525	DIP-16	2500	Tape and reel

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