

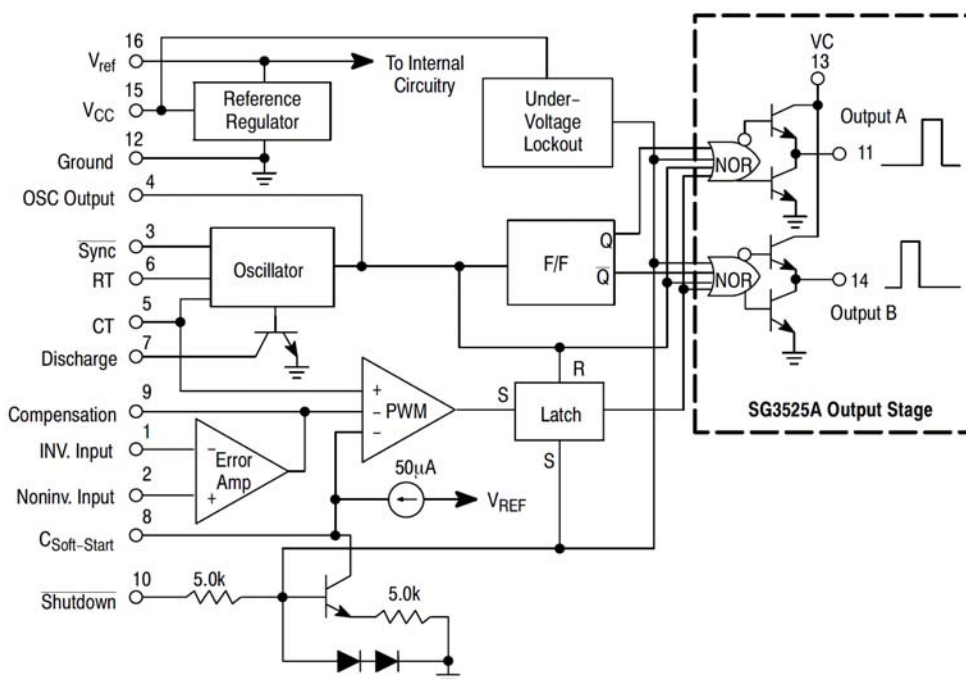
**description**

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. 3525 can work in masterslave 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, turnoff circuit and under- voltage circuit.

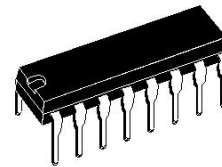
3525 The output stage of the control chip is a high- power totem- pole output, and its source current and sink current exceed 150mA, which gives a logic level of "NOR" and a low level when it is in the "off" state. trait

- 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;

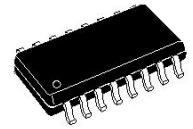
**Internal block diagram**



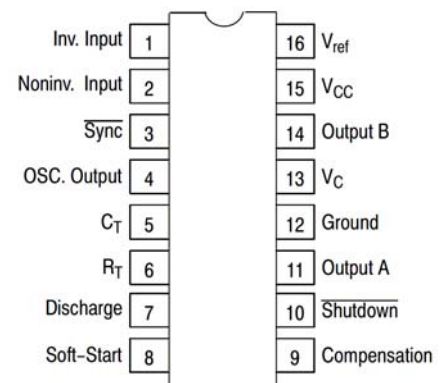
**Package**



DIP16



SOP16



**Limit operating parameters**

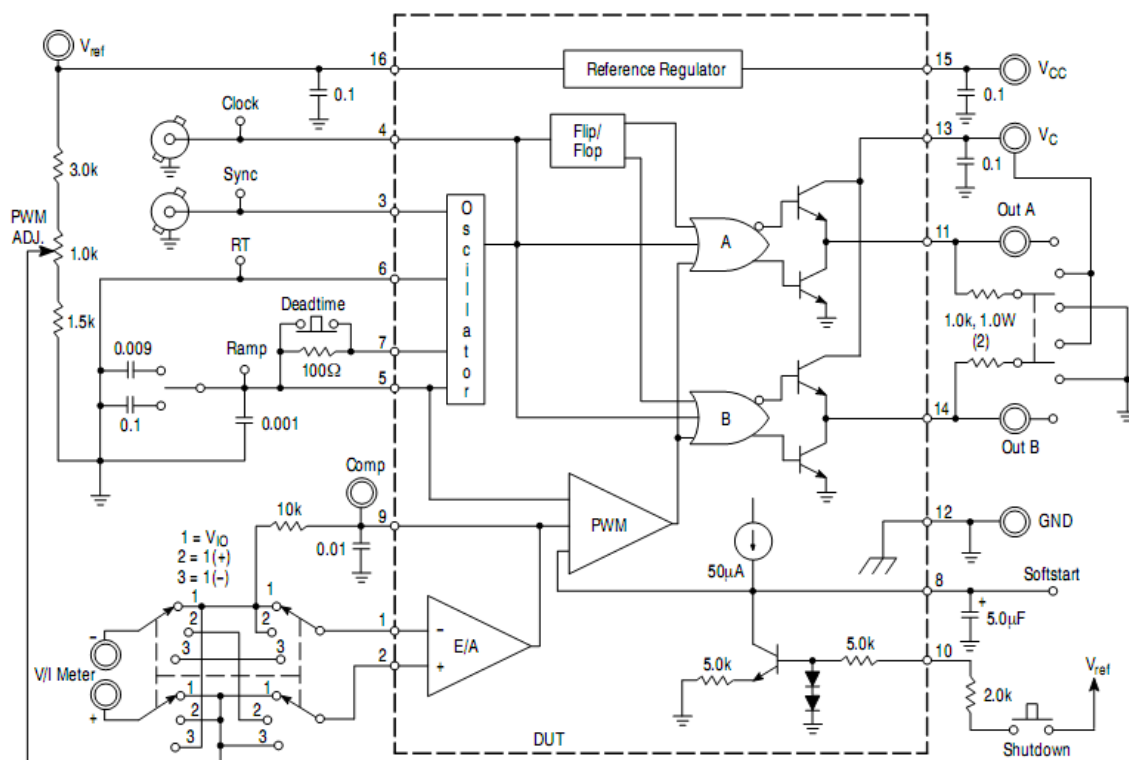
| symbol | parameter                    | value       | unit |
|--------|------------------------------|-------------|------|
| $V_i$  | Power supply voltage         | 40          | V    |
| $V_C$  | Collector supply voltage     | 40          | V    |
| IOSC   | Oscillator charging current  | 5           | mA   |
| $I_o$  | Output source current,       | 400         | mA   |
| IR     | Reference output current     | 50          | mA   |
| Ptot   | Power consumption Tamb= 70°C | 1000        | mW   |
| Top    | Working temperature          | 0 to 70     | °C   |
| Tj     | Junction temperature range   | - 55 to 150 | °C   |
| Tstg   | Storage temperature range    | - 65 to 150 | °C   |

**Electrical parameters (Vcc=20V)**

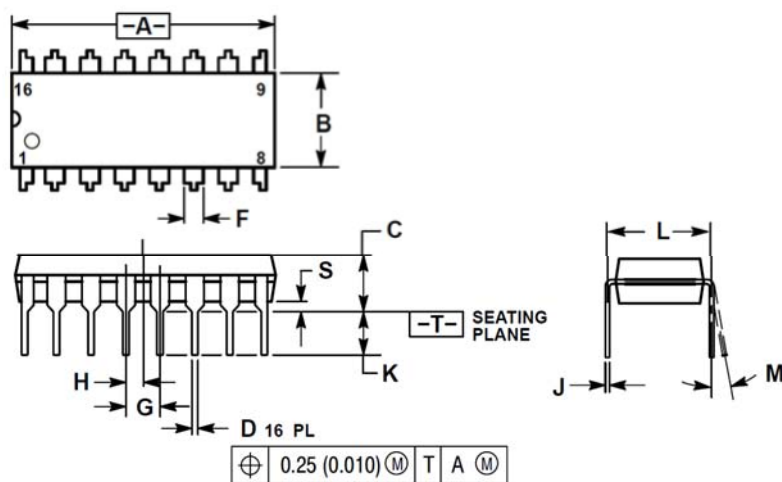
| parameter                                   | symbol                   | condition                             | minimum value | typical value | maximum | unit    |
|---|--------------------------|---------------------------------------|---------------|---------------|---------|---------|
| <b>Reference source</b>                     |                          |                                       |               |               |         |         |
| Reference output voltage                    | VREF                     | TJ = 25°C                             | 5.0           | 5.1           | 5.2     | V       |
| Line rule                                   | $\Delta V_{REF}$         | VCC = 8 to 35V                        | -             | 9             | 20      | mV      |
| Load regulation                             | $\Delta V_{REF}$         | IREF = 0 to 20mA                      | -             | 20            | 50      | mV      |
| Short circuit output current                | ISC                      | VREF = 0, TJ = 25°C                   | -             | 80            | 100     | mA      |
| Total output change                         | $\Delta V_{REF}$         | Line, load and temperature            | 4.95          | -             | 5.25    | V       |
| temperature stability                       | STT                      |                                       | -             | 20            | 50      | mV      |
| long term stability                         | ST                       | TJ = 125°C, 1 KHRS                    | -             | 20            | 50      | mV      |
| <b>Oscillating part</b>                     |                          |                                       |               |               |         |         |
| Initial accuracy                            | ACCUR                    | TJ = 25°C                             | -             | 3             | 6       | %       |
| Frequency varies with voltage               | $\Delta f/\Delta V_{CC}$ | VCC = 8 to 35V                        | -             | 0.8           | 2       | %       |
| highest frequency                           | f (MAX)                  | RT = 2K $\Omega$ , CT = 470pF         | 400           | 430           | -       | KHz     |
| Lowest frequency                            | f (MIN)                  | RT = 200K $\Omega$ , CT = 0.1 $\mu$ F | -             | 60            | 120     | Hz      |
| Clock amplitude                             | V (CLK)                  |                                       | 3             | 4             | -       | V       |
| Clock width                                 | tW (CLK)                 | TJ = 25°C                             | 0.3           | 0.6           | 1       | us      |
| Synchronization threshold                   | VTH (SYNC)               |                                       | 1.2           | 2             | 2.8     | V       |
| Synchronous input current                   | II (SYNC)                | Sync = 3.5V                           | -             | 1.3           | 2.5     | mA      |
| <b>Error amplifier section (VCM = 5.1V)</b> |                          |                                       |               |               |         |         |
| Input offset voltage                        | VIO                      |                                       | -             | 1.5           | 10      | mV      |
| Input bias current                          | I BIAS                   |                                       | -             | 1             | 10      | $\mu$ A |
| Input offset current                        | I IO                     |                                       | -             | 0.1           | 1       | $\mu$ A |
| Open loop voltage gain                      | GVO                      | RL $\geq$ 10M $\Omega$                | 60            | 80            | -       | dB      |
| common mode rejection ratio                 | CMRR                     | VCM = 1.5 to 5.2V                     | 60            | 90            | -       | dB      |
| Power supply rejectionratio                 | PSRR                     | VCC = 8 to 3.5V                       | 50            | 60            | -       | dB      |

| PWM comparator part        |          |                    |               |               |         |      |
|----------------------------|----------|--------------------|---------------|---------------|---------|------|
| Minimum duty cycle         | D(MIN)   |                    | -             | -             | 0       | %    |
| parameter                  | symbol   | condition          | minimum value | typical value | maximum | unit |
| Maximum duty cycle         | D(MAX)   |                    | 45            | 49            | -       | %    |
| Input threshold voltage    | VTH1     | Zero duty cycle    | 0.7           | 0.9           | -       | V    |
| Input threshold voltage    | VTH2     | Maximum duty cycle | -             | 3.2           | 3.6     | V    |
| Soft start part            |          |                    |               |               |         |      |
| Soft start current         | I SOFT   | VSD = 0V, VSS = 0V | 25            | 51            | 80      | μA   |
| Soft start low voltage     | VSL      | VSD = 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)  | VSD = 2.5V         | -             | 0.3           | 1       | mA   |
| Output part                |          |                    |               |               |         |      |
| Low output voltage I       | VOLI     | I SINK = 20mA      | -             | 0.1           | 0.4     | V    |
| Low output voltage II      | VOL II   | I SINK = 100mA     | -             | 0.05          | 2       | V    |
| High output voltage I      | VOHI     | I SOURCE = 20mA    | 18            | 19            | -       | V    |
| High output voltage II     | VOHII    | I SOURCE = 100mA   | 17            | 18            | -       | V    |
| under voltage lock out     | VUV      | V8 and V9 = High   | 6             | 7             | 8       | V    |
| Collector leakage current  | I LKG    | VCC = 35V          | -             | 80            | 200     | μA   |
| risetime                   | t R      | CL = 1uF, Tj = 25  | -             | 80            | 600     | ns   |
| Descending time            | t F      | CL = 1uF, Tj = 25  | -             | 70            | 300     | ns   |
| Standby current            |          |                    |               |               |         |      |
| supply current             | I CC     | VCC = 35V          | -             | 12            | 20      | mA   |

Test line

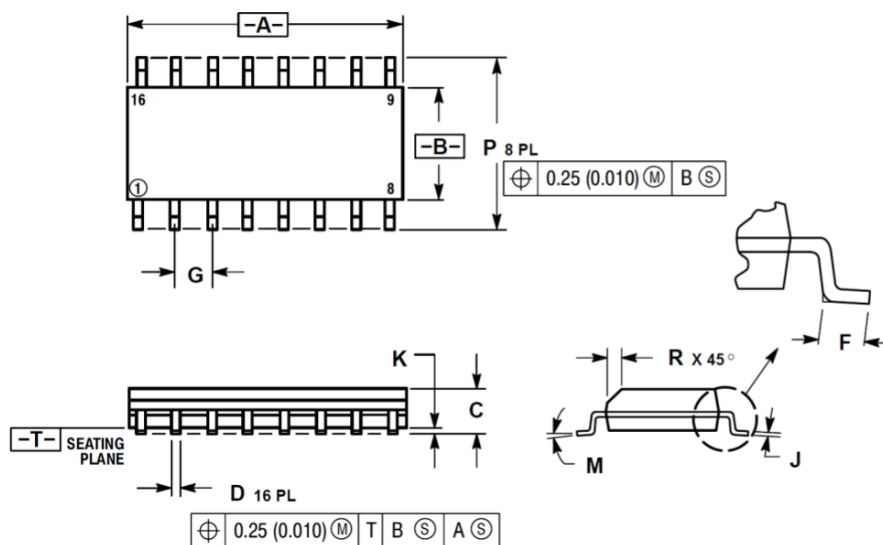


DIP16



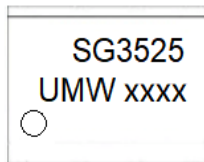
| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.740     | 0.770 | 18.80       | 19.55 |
| B   | 0.250     | 0.270 | 6.35        | 6.85  |
| C   | 0.145     | 0.175 | 3.69        | 4.44  |
| D   | 0.015     | 0.021 | 0.39        | 0.53  |
| F   | 0.040     | 0.70  | 1.02        | 1.77  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| H   | 0.050 BSC |       | 1.27 BSC    |       |
| J   | 0.008     | 0.015 | 0.21        | 0.38  |
| K   | 0.110     | 0.130 | 2.80        | 3.30  |
| L   | 0.295     | 0.305 | 7.50        | 7.74  |
| M   | 0°        | 10°   | 0°          | 10°   |
| S   | 0.020     | 0.040 | 0.51        | 1.01  |

SOP16



| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 9.80        | 10.00 | 0.386     | 0.393 |
| B   | 3.80        | 4.00  | 0.150     | 0.157 |
| C   | 1.35        | 1.75  | 0.054     | 0.068 |
| D   | 0.35        | 0.49  | 0.014     | 0.019 |
| F   | 0.40        | 1.25  | 0.016     | 0.049 |
| G   | 1.27 BSC    |       | 0.050 BSC |       |
| J   | 0.19        | 0.25  | 0.008     | 0.009 |
| K   | 0.10        | 0.25  | 0.004     | 0.009 |
| M   | 0°          | 7°    | 0°        | 7°    |
| P   | 5.80        | 6.20  | 0.229     | 0.244 |
| R   | 0.25        | 0.50  | 0.010     | 0.019 |

**Marking**



**Ordering information**

| Order code   | Package | Baseqty | Deliverymode  |
|--------------|---------|---------|---------------|
| UMW SG3525AP | SOP-16  | 2500    | Tape and reel |
| UMW SG3525AN | DIP -16 | 2500    | Tape and reel |