

RDS FILTER

ADVANCE DATA

- HIGH PERFORMANCE, STABLE 57KHz FILTER
- HIGH SELECTIVITY
- FLAT GROUP DELAY
- HIGH PERFORMANCE LIMITER
- VERY FEW EXTERNAL COMPONENTS
- 4.332MHz CLOCK OSCILLATOR (8.664MHz OPTIONAL)

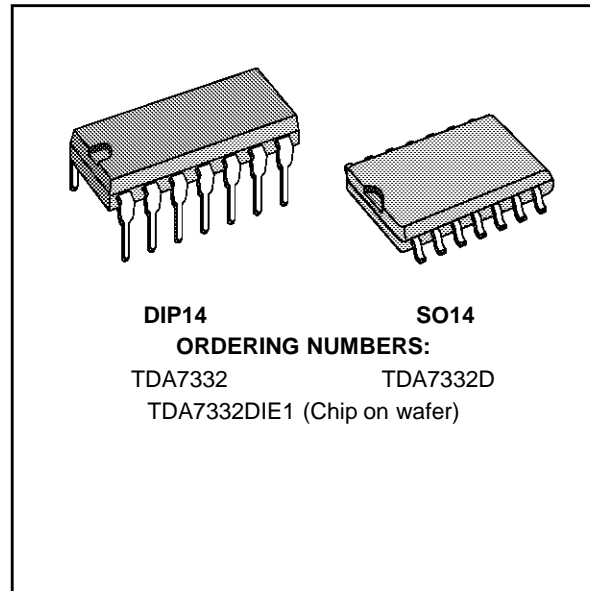
DESCRIPTION

The TDA7332 is an RDS filter, realized in switched capacitor technique.

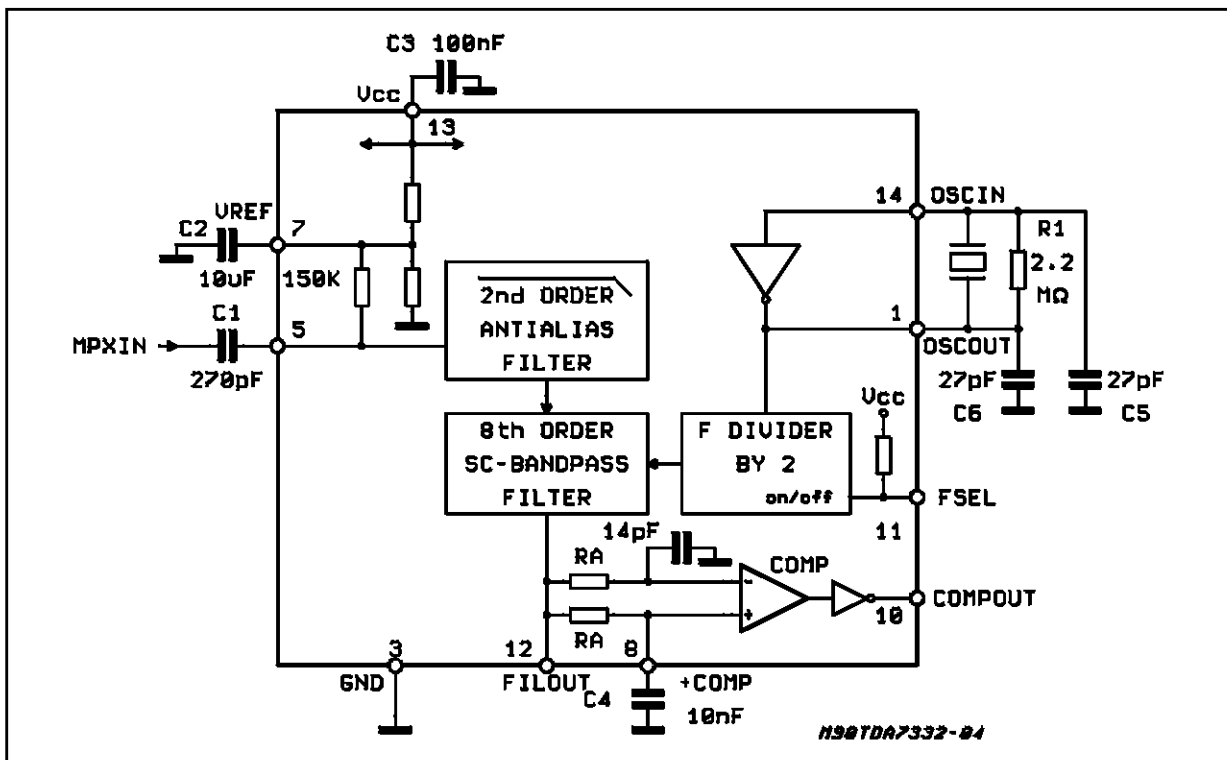
The 4 biquad stage architecture is working with 4.332MHz clock.

Optionally a 8.664MHz xtal can be used.

The filter has a center frequency of 57KHz and a bandwidth of 3KHz. Input 2nd order antialiasing filter and output smoothing filter are provided.



TEST CIRCUIT



TDA7332

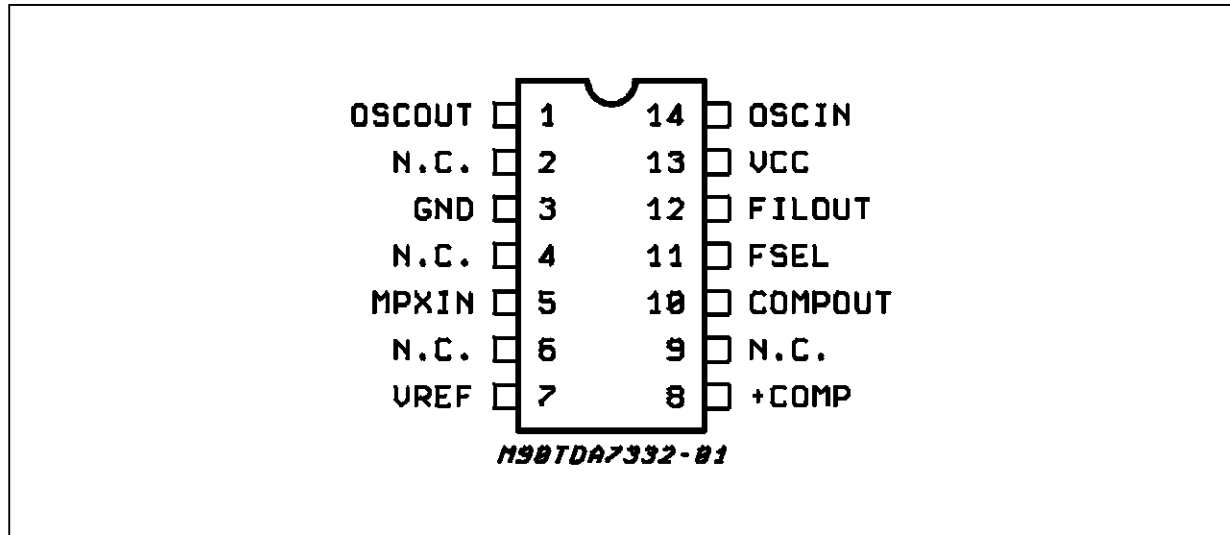
ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|------------------|-----------------------------|------------|------|
| V _s | Supply Voltage | 7 | V |
| T _{op} | Operating Temperature Range | -40 to 85 | °C |
| T _{stg} | Storage Temperature | -40 to 150 | °C |

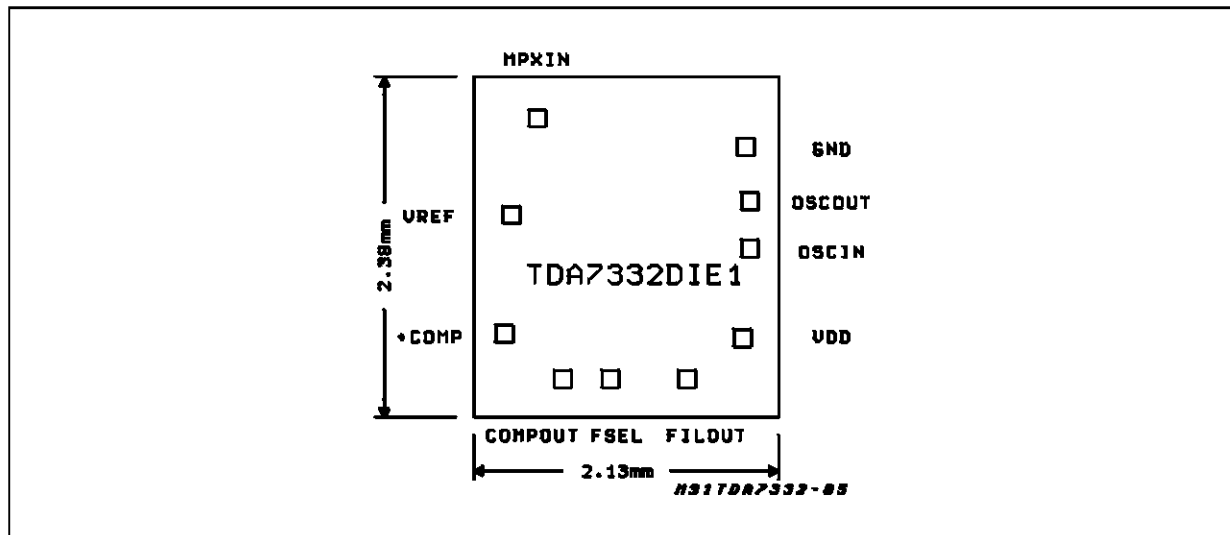
THERMAL DATA

| Symbol | Description | DIP14 | SO14 | Unit |
|------------------------|----------------------------------|----------|------|------|
| R _{th j-case} | Thermal Resistance Junction-case | Typ. 100 | 200 | °C/W |

PIN CONNECTION (Top view)



BONDING PAD LOCATIONS (Top view)



ELECTRICAL CHARACTERISTICS ($V_{CC} = 5V$, $T_{amb} = 25^{\circ}C$; $f_{osc} = 4.332MHz$; $V_{IN} = 20mV_{rms}$ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|--------|-----------|----------------|------|------|------|------|
|--------|-----------|----------------|------|------|------|------|

SUPPLY SECTION

| | | | | | | |
|----------|----------------|--|-----|---|-----|----|
| V_{CC} | Supply Voltage | | 4.5 | 5 | 5.5 | V |
| I_S | Supply Current | | 6 | 9 | 14 | mA |

FILTER

| | | | | | | |
|-------------|-----------------------|---|----------------|----------------|----------------|-------------------|
| F_C | Center Frequency | | 56.5 | 57 | 57.5 | KHz |
| BW | 3dB Bandwidth | | 2.5 | 3 | 3.5 | KHz |
| G | Gain | $f = 57KHz$ | 18 | 20 | 22 | dB |
| A | Attenuation | $\Delta f = \pm 4KHz$ $f = 38KHz$; $V_i = 500mV_{rms}$ $f = 67KHz$; $V_i = 250mV_{rms}$ | 18 50 35 | 22 80 50 | | dB dB dB |
| ΔPh | Phase non linearity | A (see note1) B (see note1) C (see note1) | | 0.5 1 2 | 5 7.5 10 | DEG DEG DEG |
| R_i | Input Impedance | | 100 | 160 | 200 | K Ω |
| S/N | Signal to Noise Ratio | $V_i = 3mV_{rms}$ | 30 | 40 | | dB |
| V_i | Input Signal | $f = 19KHz$; $T_3 \leq -40dB$ (see note2) $f = 57KHz$ (RDS + ARI) | | | 1 50 | Vrms mVrms |
| R_L | Load Impedance | Pin 12 | 100 | | | K Ω |

LIMITER

| | | | | | | |
|----------|---------------------|-------------------|----|----|----|------------|
| RA | Resistance pin 8-12 | | 15 | 21 | 28 | K Ω |
| V_{OL} | Comp. Output LOW | $I_O = +0.5mA$ | | | 1 | V |
| V_{OH} | Comp. Output HIGH | $I_O = -0.5mA$ | 4 | | | V |
| | Duty Cycle | $V_i = 1mV_{rms}$ | | 50 | | % |

OSCILLATOR

| | | | | | | |
|-----------|------------------------|--|---|----------------|---|------------|
| F_{OSC} | Oscillator Frequency | $F_{SEL} = \text{Open}$ $F_{SEL} = \text{Closed to Ground}$ | | 4.332 8.664 | | MHz MHz |
| | Output Amplitude | | | 5 | | V_{PP} |
| V_{CLL} | Clock Input Level LOW | | | | 1 | V |
| V_{OLH} | Clock Input Level HIGH | | 4 | | | V |

CRYSTAL TYPE = EURO QUARTZ

Note (1):

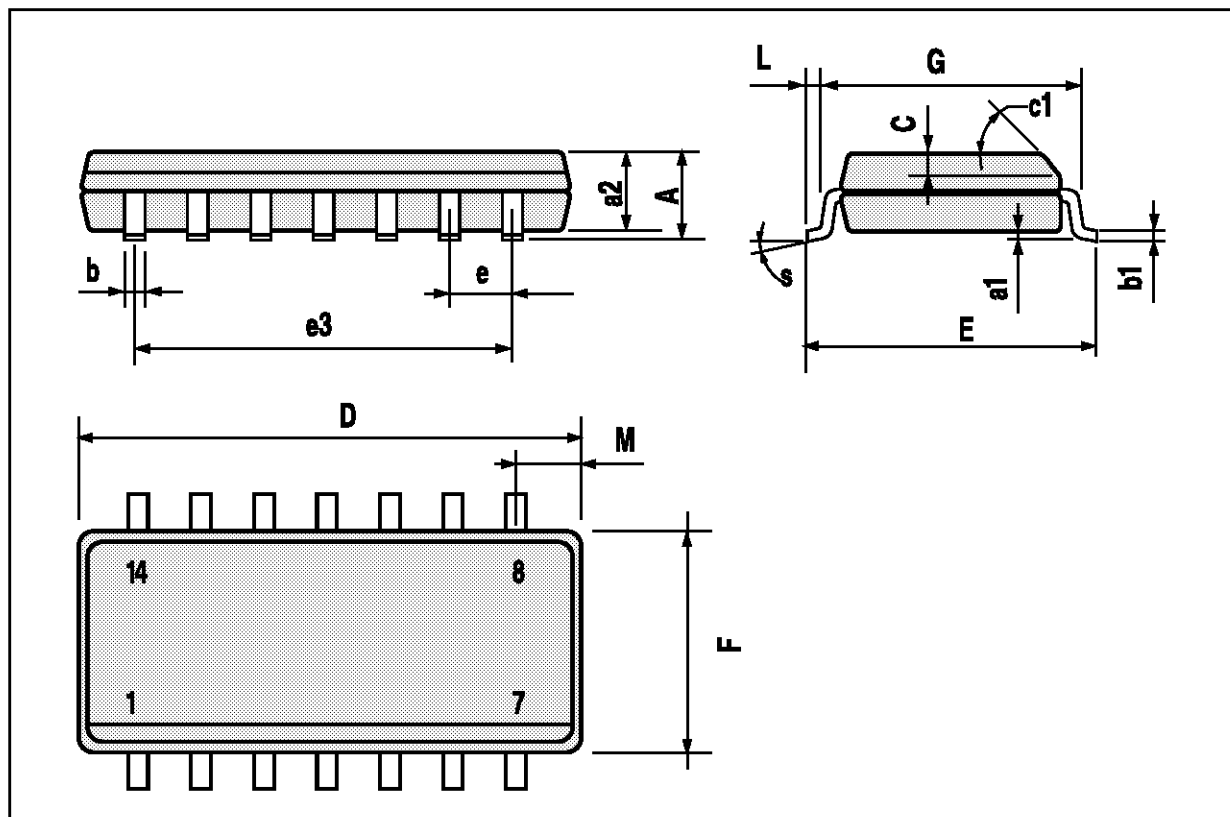
The phase non linearity is defined as: $\Delta Ph = |-2\phi_2 + \phi_1 + \phi_3|$
where ϕ_x is the input-output phase difference at the frequency f_x ($x = 1,2,3$)

| Measure | f1 (KHz) | f2 (KHz) | f3 (KHz) | ΔPh max |
|---------|----------|----------|----------|-----------------|
| A | 56.5 | 57 | 57.5 | $<5^{\circ}$ |
| B | 56 | 57 | 58 | $<7.5^{\circ}$ |
| C | 55.5 | 57 | 58.5 | $<10^{\circ}$ |

Note (2): The 3th harmonic (57KHz) at the output (pin12) must be less than -40dB in respect to the input signal plus gain.

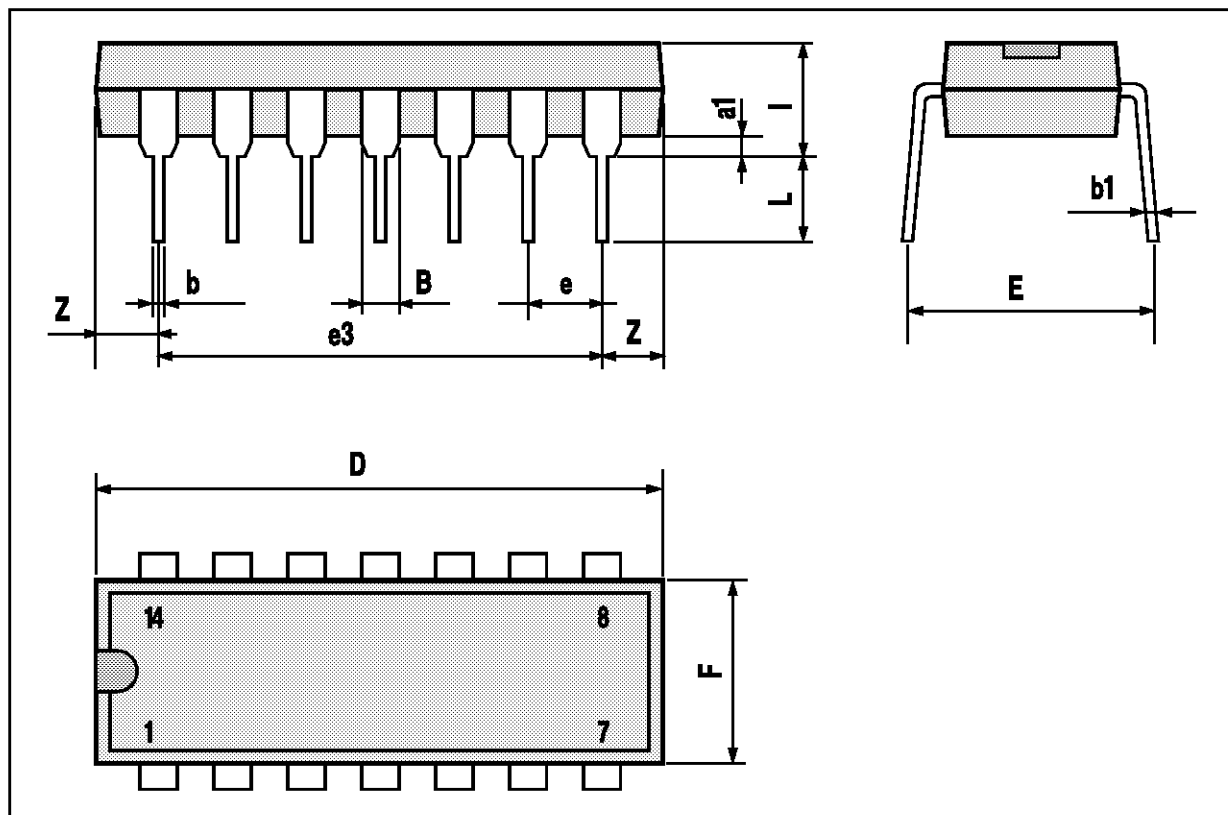
SO14 PACKAGE MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-----------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.75 | | | 0.069 |
| a1 | 0.1 | | 0.25 | 0.004 | | 0.009 |
| a2 | | | 1.6 | | | 0.063 |
| b | 0.35 | | 0.46 | 0.014 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | | 0.5 | | | 0.020 | |
| c1 | 45 (typ.) | | | | | |
| D | 8.55 | | 8.75 | 0.336 | | 0.344 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 7.62 | | | 0.300 | |
| F | 3.8 | | 4.0 | 0.15 | | 0.157 |
| L | 0.4 | | 1.27 | 0.016 | | 0.050 |
| M | | | 0.68 | | | 0.027 |
| S | 8 (max.) | | | | | |



DIP14 PACKAGE MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|------|-------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| a1 | 0.51 | | | 0.020 | | |
| B | 1.39 | | 1.65 | 0.055 | | 0.065 |
| b | | 0.5 | | | 0.020 | |
| b1 | | 0.25 | | | 0.010 | |
| D | | | 20 | | | 0.787 |
| E | | 8.5 | | | 0.335 | |
| e | | 2.54 | | | 0.100 | |
| e3 | | 15.24 | | | 0.600 | |
| F | | | 7.1 | | | 0.280 |
| I | | | 5.1 | | | 0.201 |
| L | | 3.3 | | | 0.130 | |
| Z | 1.27 | | 2.54 | 0.050 | | 0.100 |



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