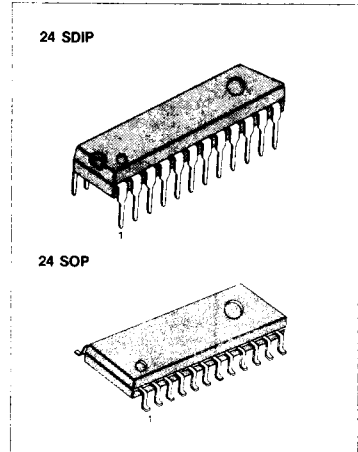


FM/AM TUNER + MPX

The KA2293 is a monolithic integrated circuit which consists of a one chip tuner and no adjustment FM multiplex for AM/FM radios and headphone radios.

FEATURES

- One-chip tuner with built-in FM multiplex.
- No adjustment for FM detector and VCO.
- No AM detect coil, IF coupling capacitor, FM IF bypass capacitor needed.
- Built-in AM/FM selection switch.
- Minimum number of external parts required.
- Wide operating voltage range: $V_{cc} = 1.8V \sim 7V$
- Low distortion
(FM IF: 0.4%, AM IF: 1%, MPX: 0.2% (Typ)).



ORDERING INFORMATION

| Device | Package | Operating Temperature |
|---------|---------|-----------------------|
| KA2293 | 24 SDIP | - 20°C - + 75°C |
| KA2293D | 24 SOP | |

BLOCK DIAGRAM

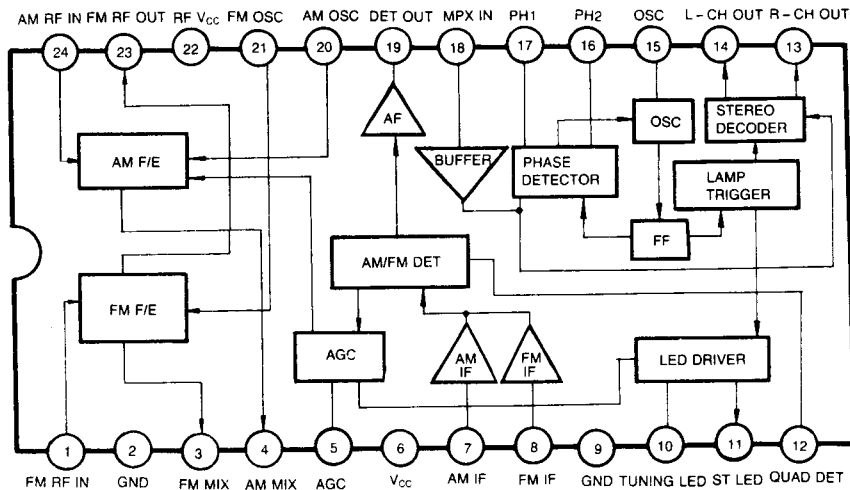


Fig. 1

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

| Characteristic | Symbol | Value | Unit |
|-----------------------|------------------|------------|------|
| Supply Voltage | V _{CC} | 8 | V |
| Power Dissipation | P _D | 1200 | mW |
| Operating Temperature | T _{OPR} | -20 ~ +75 | °C |
| Storage Temperature | T _{STG} | -55 ~ +150 | °C |
| LED Drive Voltage | V _{DR} | 10 | V |
| LED Drive Current | I _{DR} | 10 | mA |

ELECTRICAL CHARACTERISTICS

(Ta = 25°C, V_{CC} = 3V, unless otherwise specified)

FM F/E : f = 98MHz, fm = 1KHz, Δf = 22.5KHz

FM IF : f = 10, 7MHz, fm = 1KHz, Δf = 22.5KHz

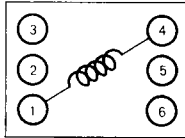
AM : f = 1MHz, fm = 1KHz, 30% Mod

MPX : f = 1KHz, L + R = 90%, P = 10%, V_i = 150mV

| Characteristic | | Symbol | Test Conditions | Min | Typ | Max | Unit | Test Circuit | |
|---------------------------|---------------------------|----------------------|----------------------------|------------------------|-----|-----|------|--------------|---|
| Quiescent Circuit Current | | I _{CCQ1} | FM, V _i = 0 | 10 | 14 | 18 | mA | 1 | |
| | | I _{CCQ2} | AM, V _i = 0 | 3.5 | 6.0 | 9 | mA | 1 | |
| F/E | -3dB Limiting Sensitivity | V _{i(LIM)1} | V _O = -3dB | 10 | 14 | 18 | dBμ | 1 | |
| | Oscillation Voltage | V _{OSC} | f _{OSC} = 72.3MHz | 70 | 105 | 140 | mV | 2 | |
| FM IF | -3dB Limiting Sensitivity | V _{i(LIM)2} | V _O = -3dB | 39 | 44 | 49 | dBμ | 1 | |
| | Detector Output Voltage | V _{O1} | V _i = 80dBμ | 55 | 80 | 110 | mV | 1 | |
| | Signal to Noise Ratio | S/N ₁ | V _i = 80dBμ | 60 | 70 | | dB | 1 | |
| | Total Harmonic Distortion | THD ₁ | V _i = 80dBμ | | 0.4 | 1 | % | 1 | |
| | AM Rejection Ratio | AMR | V _i = 80dBμ | 40 | 50 | | dB | 1 | |
| Tuning Indication Voltage | | V _{L1} | I _{LED} = 1mA | 43 | 48 | 53 | dBμ | 1 | |
| AM IF | Voltage Gain | G _{V1} | V _i = 23dBμ | 20 | 40 | 80 | mV | 1 | |
| | Detector Output Voltage | V _{O(DET)2} | V _i = 60dBμ | 50 | 60 | 100 | mV | 1 | |
| | Signal to Noise Ratio | S/N ₂ | V _i = 60dBμ | 34 | 44 | | dB | 1 | |
| | Total Harmonic Distortion | THD ₂ | V _i = 60dBμ | | 1 | 2 | % | 1 | |
| | Tuning Indication Voltage | | V _{L2} | I _{LED} = 1mA | 19 | 24 | 30 | dBμ | 1 |
| MPX | Maximum Input Voltage | | V _{i(MAX)} | Stereo, THD = 3% | 250 | 350 | mV | 1 | |
| | Channel Separation | | CS ₁ | Stereo, f = 100Hz | 35 | 42 | dB | 1 | |
| | | | CS ₂ | Stereo, f = 1KHz | 35 | 42 | dB | 1 | |
| | | | CS ₃ | Stereo, f = 10KHz | 35 | 42 | dB | 1 | |
| | Total Harmonic Distortion | | THD ₃ | Mono | | 0.2 | 1 | % | 1 |
| | | | THD ₄ | Stereo | | 0.2 | 1 | % | 1 |
| | Voltage Gain | | G _{V2} | Mono | -5 | -3 | -1 | dB | 1 |
| | Channel Balance | | CB | Mono | -2 | 0 | 2 | dB | 1 |
| | Lamp on Level | | V _{L(ON)} | Pilot only | | 8 | 16 | mV | 1 |
| | | | V _{L(OFF)} | Pilot only | 2 | 6 | | mV | 1 |
| | Lamp Hysteresis | | HY | | | 2 | | mV | 1 |
| Capture Range | | CR | Pilot only | | ±3 | | % | 1 | |
| Signal to Noise Ratio | | S/N ₃ | Mono | 60 | 70 | | dB | 1 | |

COIL SPECIFICATION

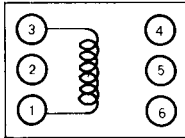
L1 FM RF



| f (MHz) | Qo | TURNS | | |
|------------|-----|-------|--|--|
| | | 1-4 | | |
| 100 | 100 | 2½ | | |

0.5mmφ

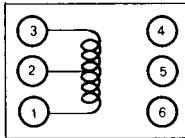
L2 FM OSC



| f (MHz) | Qo | TURNS | | |
|------------|-----|-------|--|--|
| | | 1-3 | | |
| 100 | 100 | 2¾ | | |

0.5mmφ

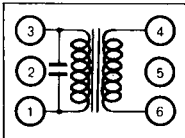
T1 AM OSC



| f (MHz) | Qo | TURNS | | | L (μH) |
|------------|-----|-------|-----|--|-----------|
| | | 1-2 | 2-3 | | |
| 796 | 115 | 13 | 73 | | 288 |

KOREA TOKO
0.08mmφ

T2 AM IFT (MIX OUT)



| Co(pF) | f (KHz) | Qo | TURNS | | |
|--------|------------|-----|-------|-----|--|
| | | | 1-3 | 4-6 | |
| 180 | 455 | 120 | 180 | 15 | |

KOREA TOKO
0.08mmφ



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