

M5109P

DUAL DIFFERENTIAL AMPLIFIER

DESCRIPTION

The M5109P is a semiconductor integrated circuit consisting of two differential amplifiers, fabricated by making use of complementary symmetry.

Since the two differential amplifiers are part of the same structure and have closely matched characteristics, this device is convenient for use in applications requiring such matched characteristics. A bias diode has been built into the device as a convenience.

The high reliability of this device makes it useful in applications such as audio equipment, communications equipment and control equipment.

FEATURES

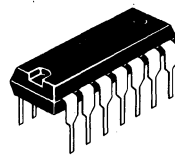
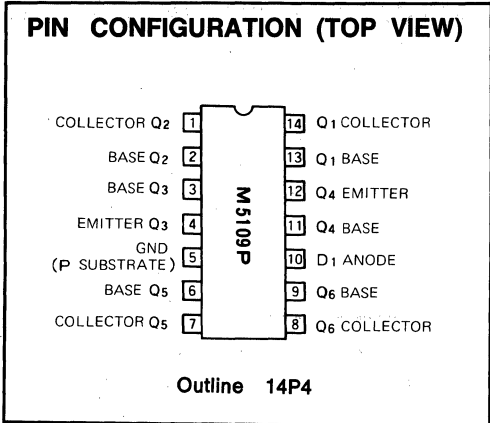
- Two differential amplifiers with closely matched characteristics.
- Small input offset voltage 5mV (max.)
- Small input offset current 2μA (max.)
- Built-in bias diode

APPLICATION

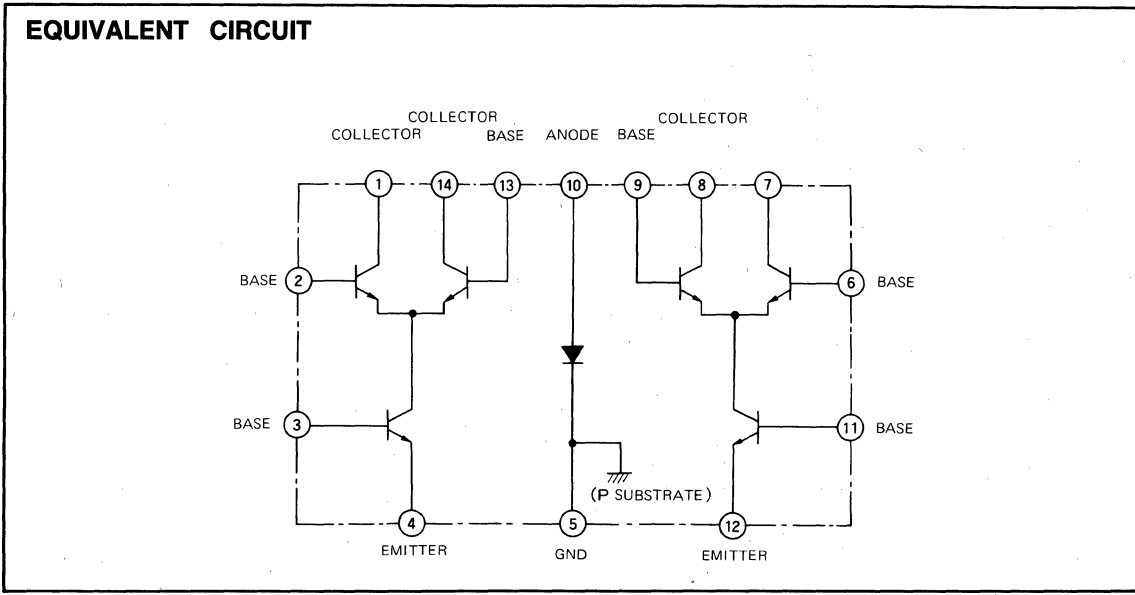
RF/IF amplifiers, frequency mixers, voltage comparators, balanced dual differential amplifiers, and detectors.

RECOMMENDED OPERATING CONDITIONS

Supply voltage range 2 ~ 15V
 Rated supply voltage 12V



14-pin molded plastic DIL



DUAL DIFFERENTIAL AMPLIFIER

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$, unless otherwise noted)

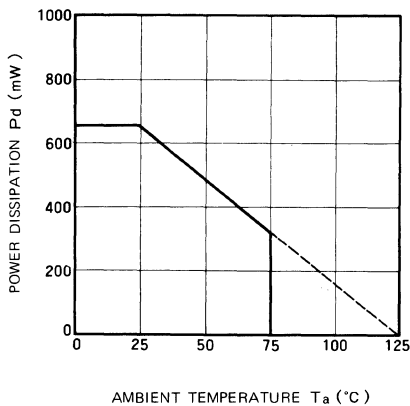
Symbol	Parameter	Conditions	Limits	Unit
V_{CE0}	Collector-emitter voltage		15	V
V_{CB0}	Collector-base voltage		20	V
V_{EB0}	Emitter-base voltage		5	V
I_C	Collector current		50	mA
P_d	Power dissipation		650	mW
K_θ	Derating	$T_a \geq 25^\circ\text{C}$	6.5	mW/°C
T_{opr}	Operating temperature		-20 ~ +75	°C
T_{stg}	Storage temperature		-40 ~ +125	°C

ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_{IO}	Input offset voltage	$V_{CE}=3\text{V}, I_E=2\text{mA}$			5	mV
I_{IO}	Input offset current				2	μA
I_{IB}	Input bias current				24	μA
$\frac{I_{C(Q1)}}{I_{C(Q2)}} \text{ or } \frac{I_{C(Q5)}}{I_{C(Q6)}}$	Differential stage current ratio			1.0	—	
I_{CB0}	Collector cutoff current	$V_{CB}=18\text{V}, I_E=0$			1	μA

TYPICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, unless otherwise noted)

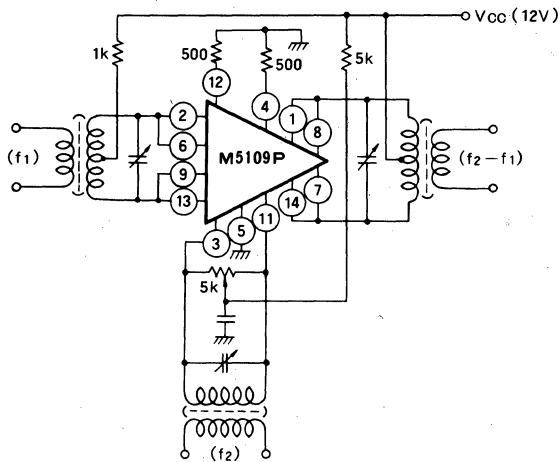
**THERMAL DERATING
(MAXIMUM RATING)**



DUAL DIFFERENTIAL AMPLIFIER

APPLICATION EXAMPLES

(1) Frequency mixer



Units Resistance: Ω
Capacitance: F

(2) FM Stereo demodulator

