

# MITSUBISHI LINEAR ICs

## M5221/M5T082P

### DUAL J-FET INPUT OPERATIONAL AMPLIFIERS

#### DESCRIPTION

The M5221/M5T082P are a semiconductor integrated circuit designed as a high-performance dual operational amplifier which adopts J-FETs in the input stage.

The device comes in an 8-pin SIL or DIL package and it contains two circuits for yielding a high input impedance, high slew rate, low bias current and other excellent characteristics. It can be widely used as a general-purpose operational amplifier in stereo equipment, tape decks, digital audio disc players and other similar products as well as in VTRs, video disc players and video-related players.

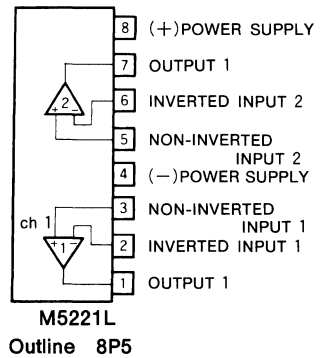
#### FEATURES

- High input impedance due to J-FET input  
.....  $R_i = 1000\text{Mohms}(\text{typ.})$
- High slew rate .....  $SR = 13\text{V}/\mu\text{s}(\text{typ.})$
- High gain and low distortion  
.....  $GV_o = 100\text{dB}$ ,  $THD = 0.002\%(\text{typ.})$
- High load current and allowable power  
.....  $I_{LP} = \pm 50\text{mA}$ ,  $P_d = 800\text{mW}(\text{SIL})$ ,  $625\text{mW}(\text{DIL})$

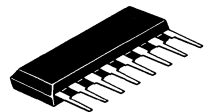
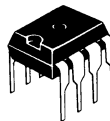
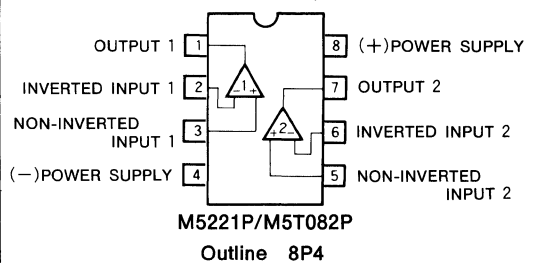
#### APPLICATION

General-purpose operational amplifiers in stereo equipment, tape decks, digital audio disc players, VTRs and video disc players.

#### PIN CONFIGURATION (TOP VIEW)

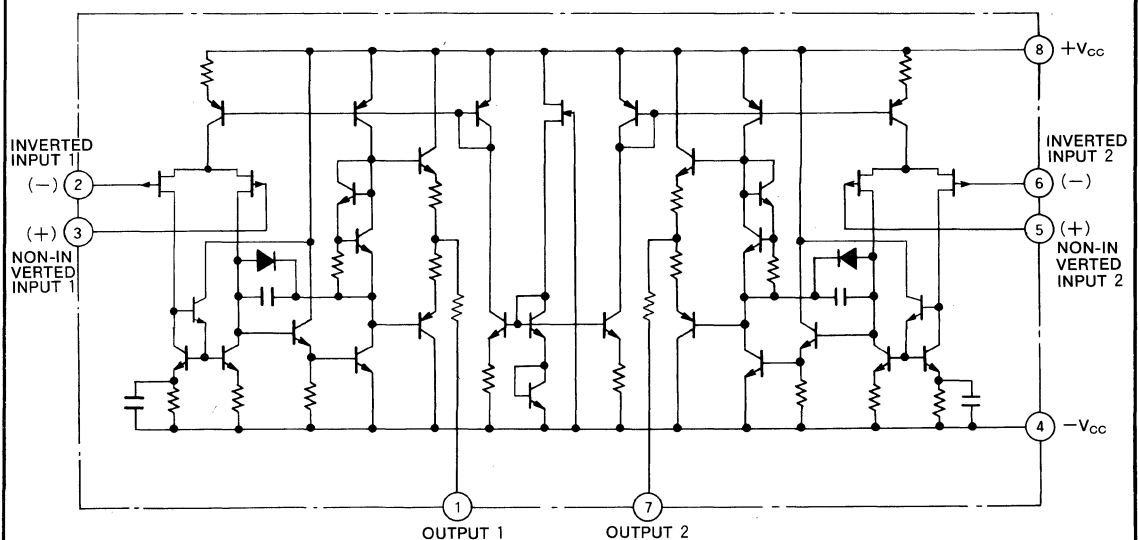


#### PIN CONFIGURATION (TOP VIEW)



8-pin molded plastic DIL    8-pin molded plastic SIL

#### EQUIVALENT CIRCUIT



**DUAL J-FET INPUT OPERATIONAL AMPLIFIERS**

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

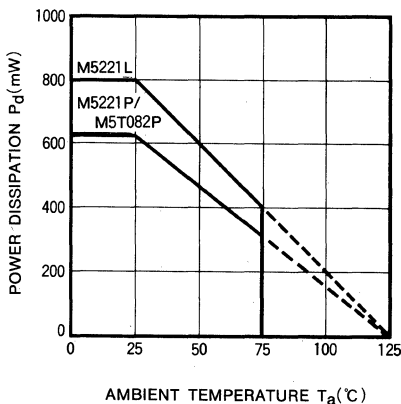
Symbol	Parameter	Conditions	Limits	Unit
$V_{CC}$	Supply voltage		$\pm 18$	V
$I_{LP}$	Load current		$\pm 50$	mA
$V_{ID}$	Differential input voltage		$\pm 30$	V
$V_{IC}$	Common input voltage		$\pm 15$	V
$P_d$	Power dissipation		800(SIL)	mW
			625(DIL)	
$K_\theta$	Thermal derating	$T_a \geq 25^\circ\text{C}$	8(SIL)	mW/°C
			6.25(DIL)	
$T_{opr}$	Ambient temperature		$-20 \sim +75$	°C
$T_{stg}$	Storage temperature		$-55 \sim +125$	°C

**ELECTRICAL CHARACTERISTICS** ( $T_a=25^\circ\text{C}$ ,  $V_{CC}=\pm 15\text{V}$ )

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$I_{CC}$	Circuit current	$V_{IN}=0$	—	3.0	6.0	mA
$V_{IO}$	Input offset voltage	$R_S \leq 10\text{k}\Omega$	—	5.0	15.0	mV
$I_{IO}$	Input offset current		—	5	200	pA
$I_{IB}$	Input bias current		—	30	400	pA
$R_{in}$	Input resistance		—	106	—	M $\Omega$
$G_{VO}$	Open loop voltage gain	$R_L \geq 2\text{k}\Omega$ , $V_O = \pm 10\text{V}$	86	106	—	dB
$V_{OM}$	Maximum output voltage	$R_L \geq 10\text{k}\Omega$	$\pm 12$	$\pm 14$	—	V
		$R_L \leq 2\text{k}\Omega$	$\pm 10$	$\pm 13$	—	V
$V_{CM}$	Common input voltage width		$\pm 12$	$\pm 14$	—	V
CMRR	Common mode rejection ratio	$R_S \leq 10\text{k}\Omega$	70	76	—	dB
SVRR	Supply voltage rejection ratio	$R_S \leq 10\text{k}\Omega$	—	30	150	$\mu\text{V/V}$
$P_d$	Power dissipation		—	90	180	mW
SR	Slew rate	$G_V = 0\text{dB}$ , $R_L = 2\text{k}\Omega$	—	13	—	V/ $\mu\text{s}$
$f_T$	Gain bandwidth product		—	3	—	MHz

**TYPICAL CHARACTERISTICS**

**THERMAL DERATING  
(MAXIMUM RATING)**



**VOLTAGE GAIN VS  
FREQUENCY RESPONSE**

