

# M51593FP PREAMPLIFIER FOR OPTICAL PICKUP

## DESCRIPTION

The M51593FP is a semiconductor integrated circuit developed as an optical pickup preamplifier for CD players. In a microminiature 20-pin flat package, it contains four I-V amplifiers that convert current signals gained by optical pickup photodetectors into voltage signals and also has FE (focus error), TE (tracking error), and RF amplifier, as well as an APC. The IC can be mounted on an optical pickup main assembly.

## FEATURES

- Supports 3-laser system.
- Capable of being driven by either single or dual power supply.
- Built-in LPF for TE and FE amplifiers. (to remove unwanted high-frequency components)
- Focus error balance control pin (pin ⑮)
- Built-in housed in microminiature 20-pin flat package. (0.65mm lead pitch)
- Built-in auto power controller (APC)

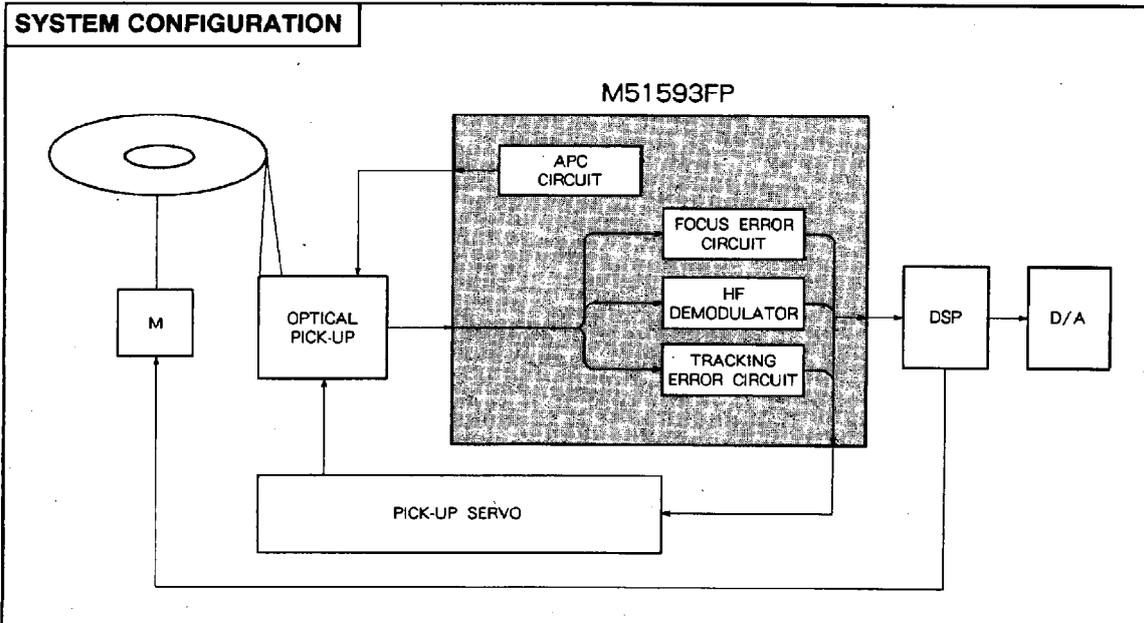


Outline 20P2E-A

0.65mm pitch 225mil SSOP  
(4.4mm x 6.5mm x 1.15mm)

## RECOMMENDED OPERATING CONDITIONS

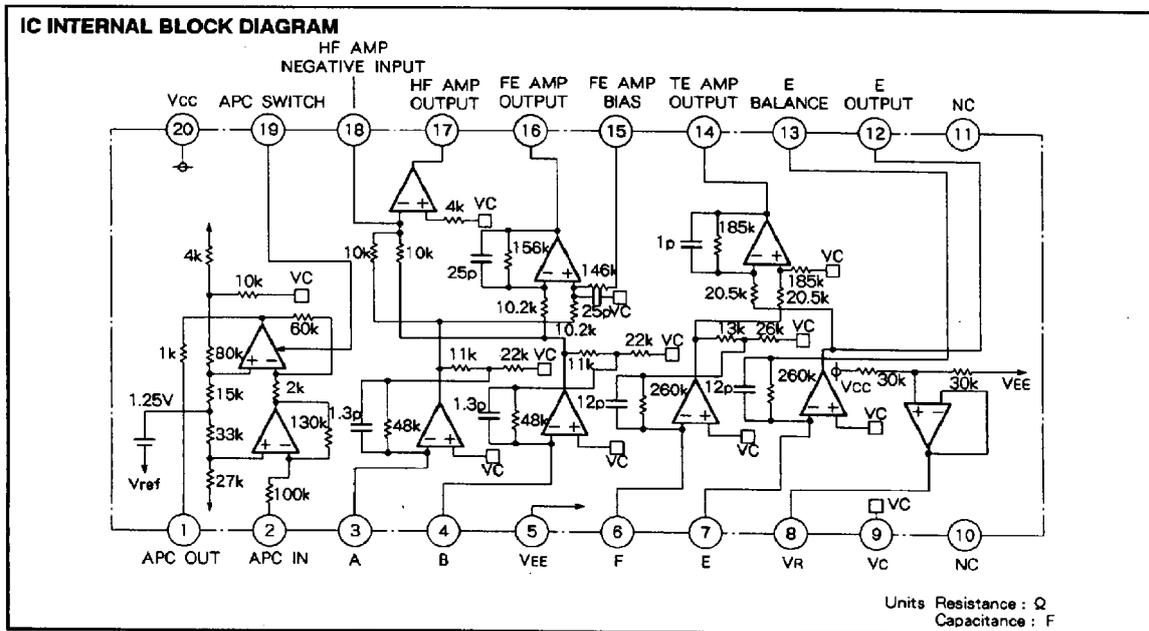
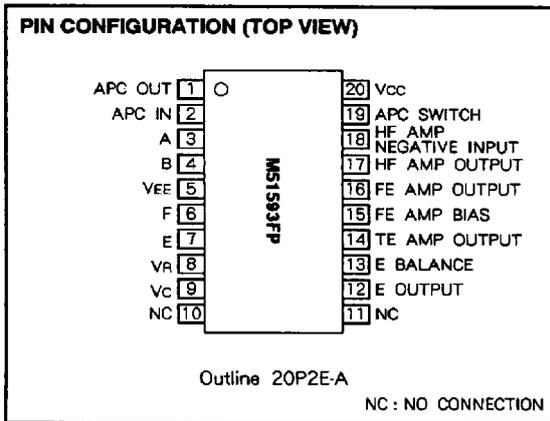
Supply voltage range.....  $V_{CC}, V_{EE} = \pm 5V$   
(2 split supply voltage)  
or  $V_{CC} = +5V$  (single supply voltage)  
Rated supply voltage.....  $V_{CC}, V_{EE} = \pm 4.75$  to  $\pm 5.25V$   
or  $V_{CC} = 4.75$  to  $5.25V$   
Rated power dissipation..... 60mW



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

Symbol	Parameter	Ratings	Unit
$V_{CC}$	Supply voltage	+ 6.5	V
$V_{EE}$		- 6.5	V
$I_{CC}$	Circuit current	40	mA
$V_i$	Input voltage	$V_{CC} - 0.3$	V
$V_o$	Output voltage	$V_{CC} - 0.3$	V
$P_d$	Power dissipation	360	mW/ $^\circ\text{C}$
$T_{opr}$	Operating temperature	- 20 to + 75	$^\circ\text{C}$
$T_{stg}$	Storage temperature	- 40 to + 125	$^\circ\text{C}$

**ELECTRICAL CHARACTERISTICS** ( $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$ ,  $V_{EE} = -5\text{V}$ )

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$I_{CC}$	Circuit current	$V_{CC} = 5\text{V}$ , $V_{EE} = -5\text{V}$	-	12	20	mA
$I_{EE}$		$V_C = 0\text{V}$	- 20	- 12	-	mA
VHF-1	Output voltage	No signal	- 80	0	+ 80	mV
VHF-2	Voltage gain	$V_i = 2\text{kHz}$ , 40mV <sub>P-P</sub>	26.2	31.2	34.2	dB
f <sub>CHF</sub>	Frequency characteristics	3dB down	1.5	2.3	-	MHz
VHF-3	Maximum output amplitude high		3.5	4.5	-	V
VHF-4	Maximum output amplitude low		-	- 2.2	- 0.3	V
VFE-1	Output voltage		- 120	0	+ 120	mV
VFE-2	Voltage gain 1	$V_i = 1\text{kHz}$ , 32mV <sub>P-P</sub>	39.1	42.1	45.1	dB
VFE-3	Voltage gain 2		39.1	42.1	45.1	dB
VFE-4	Voltage gain balance	$V_4 = V_2 - V_3$	- 3	0	3	dB
f <sub>CFE</sub>	Frequency characteristics	3dB down	28	40	52	kHz
VFE-5	Maximum output amplitude high		4.2	4.5	-	V
VFE-6	Maximum output amplitude low		-	- 4.5	- 2.2	V
VTE-1	Output voltage		- 120	0	+ 120	mV
VTE-2	Voltage gain 1	$V_i = 1\text{kHz}$ , 300mV <sub>P-P</sub>	16.4	19.4	22.4	dB
VTE-3	Voltage gain 2		16.4	19.4	22.4	dB
VTE-4	Voltage gain balance	$V_4 = V_2 - V_3$	- 3	0	3	dB
f <sub>CTE</sub>	Frequency characteristics	3dB down	28	40	52	kHz
VTE-5	Maximum output amplitude high		4.2	4.5	-	V
VTE-6	Maximum output amplitude low		-	- 4.5	- 2.2	V
VAPC1	Output voltage 1		-	- 1.7	- 0.4	V
VAPC2	Output voltage 2		- 1.0	0.3	1.6	V
VAPC3	Output voltage 3		1.0	2.3	-	V
VAPC4	Output voltage 4		4.6	4.8	-	V
VAPC5	Output voltage 5	$I_i = 0.8\text{mA}$	-	- 3.0	2.0	V
VR1	Output voltage 1		- 100	0	100	mV

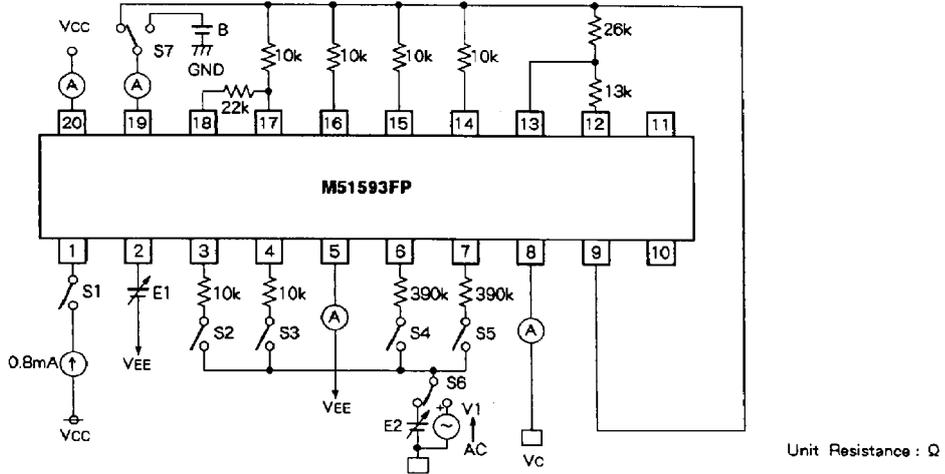
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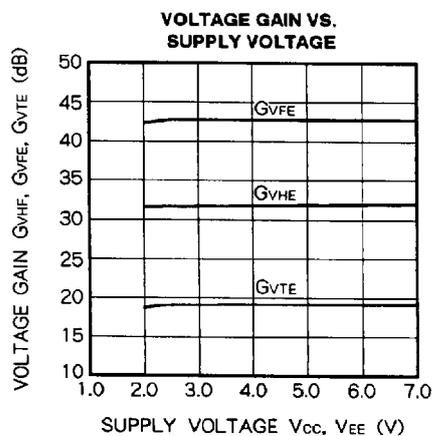
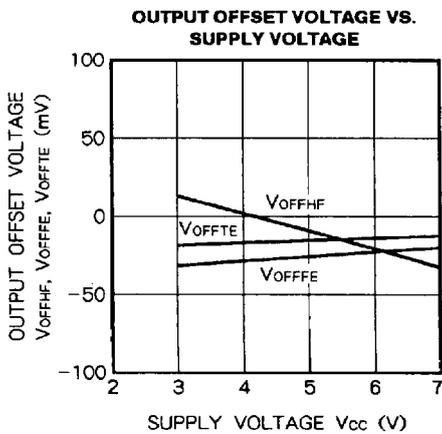
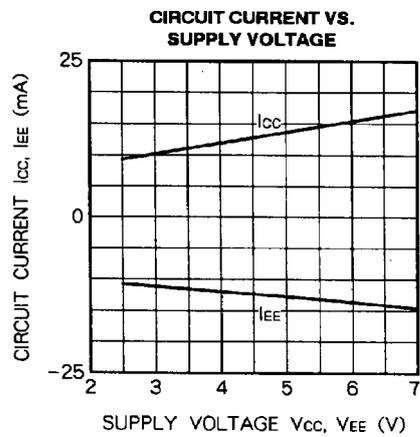
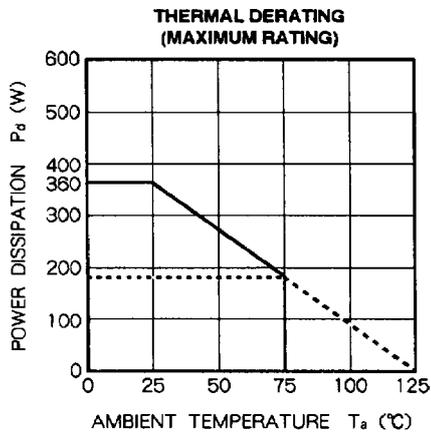
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TEST CIRCUIT



TYPICAL CHARACTERISTICS



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