



Features

- Single-Supply Operation from +1.4V ~ +5.5V
- Rail-to-Rail Input / Output
- Gain-Bandwidth Product: 14.5KHz (Typ)
- Low Input Bias Current: 1pA (Typ)
- Low Offset Voltage: 3mV (Max)
- Quiescent Current: 600nA per Amplifier (Typ)
- Chip Select with 6543NH(active High) and 6543NL(active Low)
- Operating Temperature: -40°C ~ +125°C
- Embedded RF Anti-EMI Filter
- Small Package:
 - 6541 Available in SOT23-5 and SC70-5 Packages
 - 6542 Available in SOP-8 and MSOP-8 Packages
 - 6543H Available in SOT23-6 and SC70-6 Packages
 - 6543NL Available in SOT23-6 and SC70-6 Packages

General Description

The 654X family has a high gain-bandwidth product of 14.5KHz, a slew rate of 6V/ms, and a quiescent current of 600nA/amplifier at 5V. The 654X family is designed to provide optimal performance in low voltage and low noise systems. They provide rail-to-rail output swing into heavy loads. The input common mode voltage range includes ground, and the maximum input offset voltage is 3mV for 654X family. They are specified over the extended industrial temperature range (-40°C to +125°C). The operating range is from 1.4V to 5.5V. The 6541 single is available in Green SC70-5 and SOT23-5 packages. The 6542 Dual is available in Green SOP-8 and MSOP-8 packages. The 6543 single is available in Green SC70-6 and SOT23-6 packages.

Applications

- ASIC Input or Output Amplifier
- Sensor Interface
- Medical Communication
- Smoke Detectors
- Audio Output
- Piezoelectric Transducer Amplifier
- Medical Instrumentation
- Portable Systems

Pin Configuration

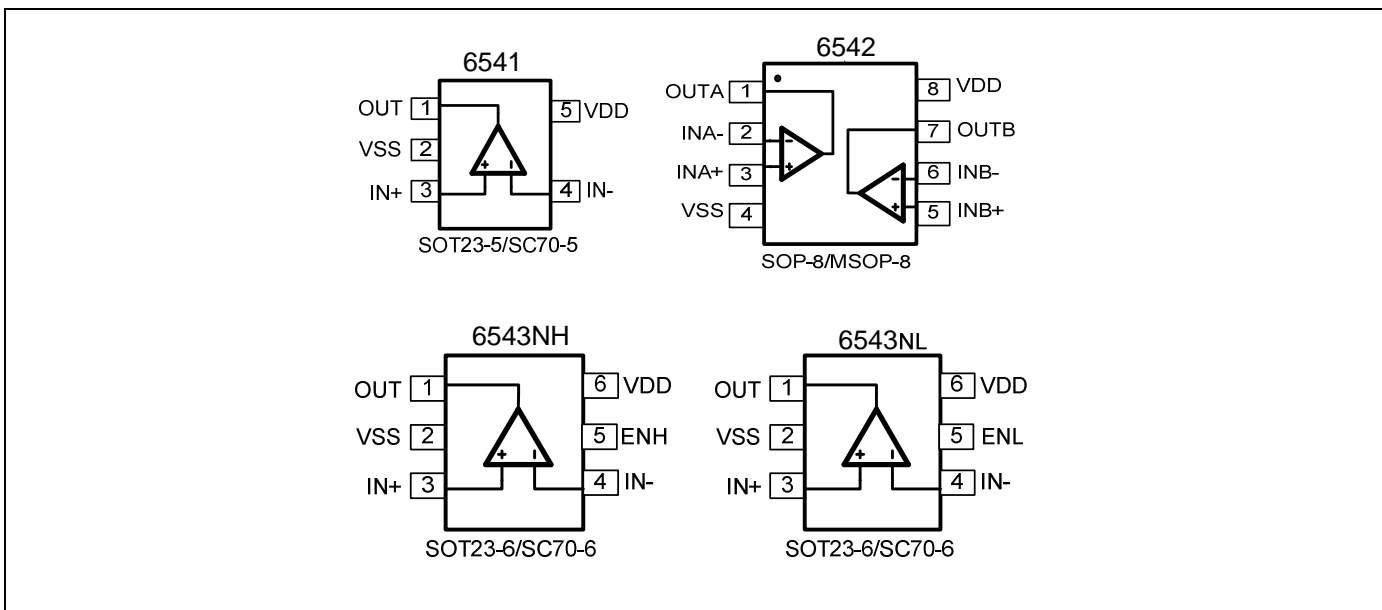


Figure 1. Pin Assignment Diagram

MCP6541/6542/6543

600nA 14.5KHZ CMOS Rail-to-Rail IO Opamp with RF Filter



Absolute Maximum Ratings

Condition	Min	Max
Power Supply Voltage (V_{DD} to V_{SS})	-0.5V	+7.5V
Analog Input Voltage ($IN+$ or $IN-$)	$V_{SS}-0.5V$	$V_{DD}+0.5V$
PDB Input Voltage	$V_{SS}-0.5V$	+7V
Operating Temperature Range	-40°C	+125°C
Junction Temperature	+160°C	
Storage Temperature Range	-55°C	+150°C
Lead Temperature (soldering, 10sec)	+260°C	
Package Thermal Resistance ($T_A=+25^\circ\text{C}$)		
SOP-8, θ_{JA}	125°C/W	
MSOP-8, θ_{JA}	216°C/W	
SOT23-5, θ_{JA}	190°C/W	
SOT23-6, θ_{JA}	190°C/W	
SC70-5, θ_{JA}	333°C/W	
SC70-6, θ_{JA}	333°C/W	
ESD Susceptibility		
HBM	6KV	
MM	300V	

Note: Stress greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions outside those indicated in the operational sections of this specification are not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.



Electrical Characteristics

(At $V_S = +5V$, $R_L = 1M\Omega$ connected to $V_S/2$, and $V_{OUT} = V_S/2$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	6541/6542/6543			
			TYP	MIN	MAX	UNITS
INPUT CHARACTERISTICS						
Input Offset Voltage	V_{OS}	$V_{CM} = V_S/2$	0.4		3	mV
Input Bias Current	I_B		1			pA
Input Offset Current	I_{OS}		1			pA
Common-Mode Voltage Range	V_{CM}	$V_S = 5.5V$	-0.1 to +5.6			V
Common-Mode Rejection Ratio	CMRR	$V_S = 5V, V_{CM} = -0.1V$ to 2.5V	78	66		dB
		$V_S = 5V, V_{CM} = -0.1V$ to 5.1V	84	67		
Open-Loop Voltage Gain	A_{OL}	$V_S = 1.4V, R_L = 50k\Omega, V_O = V_S - 0.1V$	86	75		dB
		$V_S = 5V, R_L = 50k\Omega, V_O = V_S - 0.1V$	93	84		
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$		2.5			$\mu V/^\circ C$
OUTPUT CHARACTERISTICS						
Output Voltage Swing from Rail	V_{OH}	$V_S = 1.4V, R_L = 50k\Omega$	1.395	1.390		V
	V_{OL}		4.5		10	mV
	V_{OH}	$V_S = 5V, R_L = 50k\Omega$	4.997	4.990		V
	V_{OL}		3.5		10	mV
Output Current	I_{SOURCE}	$R_L = 10\Omega$ to $V_S/2$	20			mA
	I_{SINK}		20			
POWER SUPPLY						
Operating Voltage Range			1.4			V
			5.5			V
Power Supply Rejection Ratio	PSRR	$V_S = +1.4V$ to +5.5V, $V_{CM} = +0.5V$	80	77		dB
Quiescent Current / Amplifier	I_Q		600			nA
Shutdown Current / Amplifier	I_{Q_off}	6543NH / 6543NL	54			nA
DYNAMIC PERFORMANCE (CL = 100pF)						
Gain-Bandwidth Product	GBP		14.5			KHz
Slew Rate	SR	G = +1, 2V Output Step	6			V/ms