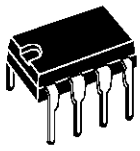
SGS-THOMSON MICROELECTRONICS

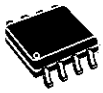
TS5532

LOW NOISE DUAL OPERATIONAL AMPLIFIERS

- LOW VOLTAGE NOISE : **4.5nV/$\sqrt{Hz}$**
- HIGH GAIN BANDWIDTH PRODUCT : **15MHz**
- HIGH SLEW RATE : **7V/µs**
- LOW DISTORTION : 0.002%
- LARGE OUTPUT VOLTAGE SWING : +14.3V/-14.6V
- LOW INPUT OFFSET VOLTAGE
- EXCELLENT FREQUENCY STABILITY
- ESD PROTECTION 2kV



N
DIP8
(Plastic Package)



D
SO8
(Plastic Micropackage)

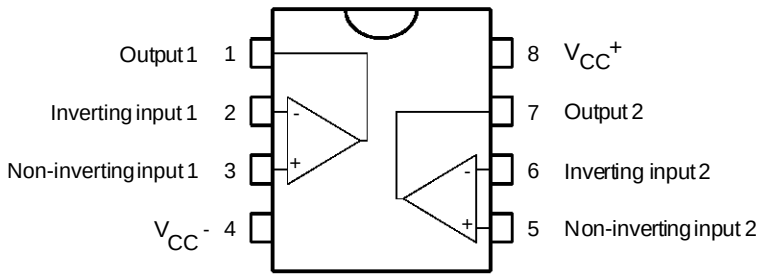
DESCRIPTION

The TS5532 is a monolithic dual operational amplifier dedicated to audio applications. TheTS5532 offers low voltage noise (4.5nV/$\sqrt{Hz}$) and high frequency performances (15MHz gain bandwidth product, 7V/µs slew rate).
In addition the TS5532 has a very low distortion (0.002%) and excellent phase/gain margins.
The output stage allows a large output voltage swing and symmetrical source and sink currents.

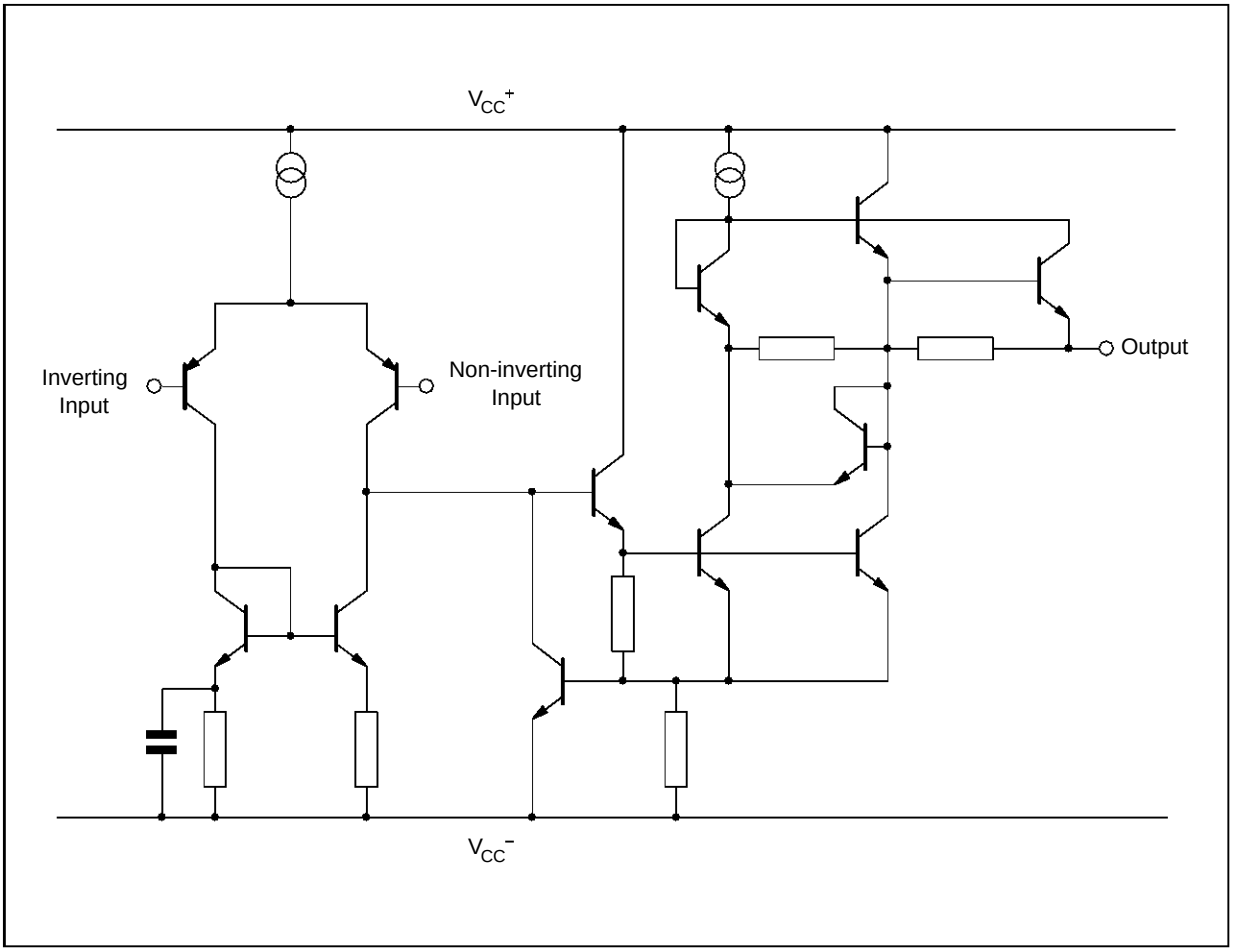
ORDER CODES

Part Number	Temperature Range	Package	
		N	D
TS5532	-40, +125°C	•	•

PIN CONNECTIONS (top view)



SCHEMATIC DIAGRAM (1/2 TS5532)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	±18 or +36	V
V_{id}	Differential Input Voltage - (note 1)	±30	V
V_i	Input Voltage - (note 1)	±15	V
	Output Short-Circuit Duration - (note 2)	Infinite	
T_{oper}	Operating Free-air Temperature Range	-40 to +105	°C
T_j	Maximum Junction Temperature	+150	°C
T_{stg}	Storage Temperature	-65 to +150	°C
P_{tot}	Maximum Power Dissipation - (note 2)	500	mW

Notes : 1. Either or both input voltages must not exceed the magnitude of V_{CC}^+ or V_{CC}^-
2. Power dissipation must be considered to ensure maximum junction temperature (T_j) is not exceeded

OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	±2.5 to ±15	V

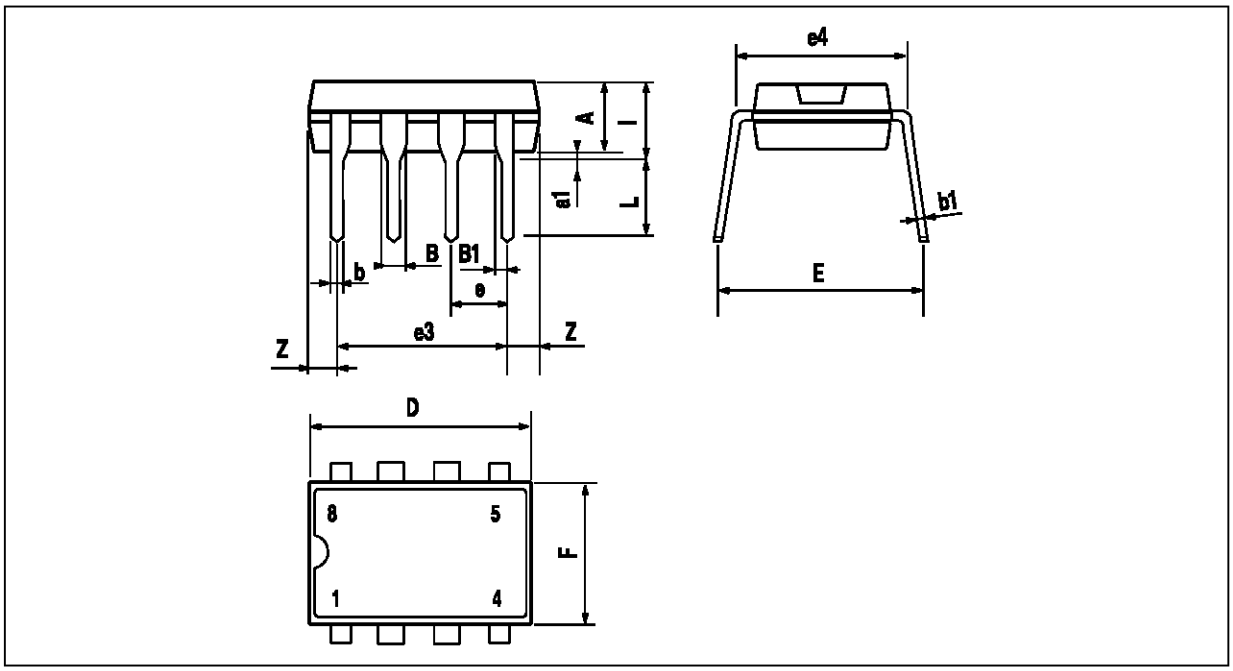
ELECTRICAL CHARACTERISTICS

V_{CC}^+ = +15V, V_{CC}^- = -15V, T_{amb} = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{io}	Input Offset Voltage (V_o = 0V, V_{ic} = 0V) T_{amb} = +25°C $T_{min.} \le T_{amb} \le T_{max.}$		0.15	2 3	mV
DV_{io}	Input Offset Voltage Drift V_{ic} = 0V, V_o = 0V, $T_{min.} \le T_{amb} \le T_{max.}$		2		µV/°C
I_{io}	Input Offset Current (V_{ic} = 0V, V_O = 0V) T_{amb} = +25°C $T_{min.} \le T_{amb} \le T_{max.}$		10	150 175	nA
I_{ib}	Input Bias Current (V_{ic} = 0V, V_O = 0V) T_{amb} = +25°C $T_{min.} \le T_{amb} \le T_{max.}$		250	750 800	nA
V_{icm}	Common Mode Input Voltage Range (ΔV_{IO} = 5mV, V_O = 0V)	±13	±14		V
A_{vd}	Large Signal Voltage Gain (R_L = 2kΩ, V_O = ±10V) T_{amb} = +25°C $T_{min.} \le T_{amb} \le T_{max.}$	 90 85	 100		dB
$\pm V_{opp}$	Output Voltage Swing (V_{id} = ±1V) R_L = 600Ω R_L = 600Ω R_L = 2.0kΩ R_L = 2.0kΩ R_L = 10kΩ R_L = 10kΩ	 13.2 13.5 	 12.2 -12.7 14 -14.2 14.3 -14.6	 -13.2 -14	V
CMR	Common Mode Rejection Ratio (V_{ic} = ±13V)	80	100		dB
SVR	Supply Voltage Rejection Ratio V_{CC}^+ / V_{CC}^- = +15V / -15V to +5V / -5V	 80	 105		dB
I_o	Output Short Circuit Current (V_{id} = ±1V, Output to Ground) Source Sink	 15 20	 29 37		mA
I_{CC}	Supply current (V_O = 0V, All Amplifiers) T_{amb} = +25°C $T_{min.} \le T_{amb} \le T_{max.}$		4	5 5.5	mA
SR	Slew Rate V_i = -10V to +10V, R_L = 2kΩ, C_L = 100pF, A_V = +1	 5	 7		V/µs
GBP	Gain Bandwidth Product (f = 100kHz, R_L = 2kΩ, C_L = 100pF)	10	15		MHz
B	Unity Gain Bandwidth (Open loop)		9		MHz
A_m	Gain Margin (R_L = 2kΩ) C_L = 0pF C_L = 100pF		-11 -6		dB
∅m	Phase Margin (R_L = 2kΩ) C_L = 0pF C_L = 100pF		55 30		Degrees
e_n	Equivalent Input Noise Voltage (R_S = 100Ω, f = 1kHz)		4.5		$\frac{nV}{\sqrt{Hz}}$
i_n	Equivalent Input Noise current (f = 1kHz)		0.5		$\frac{pA}{\sqrt{Hz}}$
THD	Total Harmonic Distortion R_L = 2kΩ, f = 20Hz to 20kHz, V_O = $3V_{rms}$, A_V = +1		0.002		%
V_{O1}/V_{O2}	Channel Separation (f = 20Hz to 20kHz)		120		dB
FPB	Full Power Bandwidth (V_O = $27V_{pp}$, R_L = 2kΩ, THD ≤ 1%)		120		kHz
Z_o	Output Impedance (V_O = 0V, f = 9MHz)		37		Ω
R_i	Input Resistance (V_{ic} = 0V)		175		kΩ
C_i	Input Capacitance (V_{ic} = 0V)		12		pF

PACKAGE MECHANICAL DATA

8 PINS - PLASTIC DIP



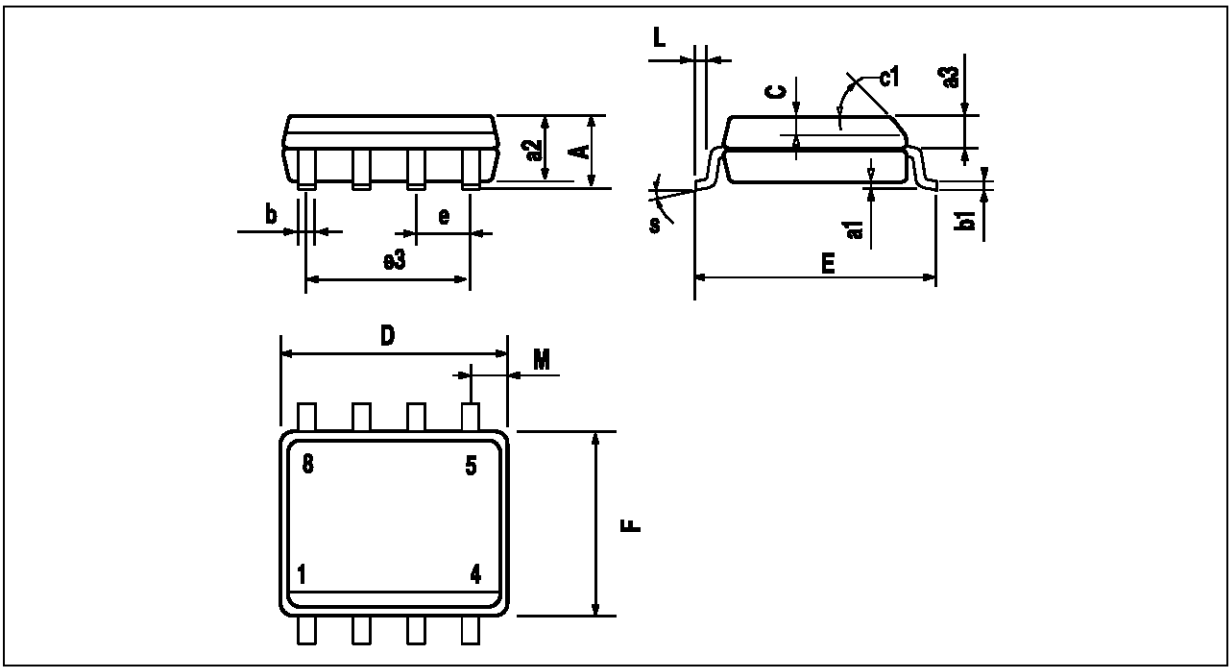
PM-DIP8.EPS

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

DIP8.TBL

PACKAGE MECHANICAL DATA

8 PINS - PLASTIC MICROPACKAGE (SO)



PM-SO8.EPS

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.150		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max.)					

SO8.TBL

ORDER CODE :