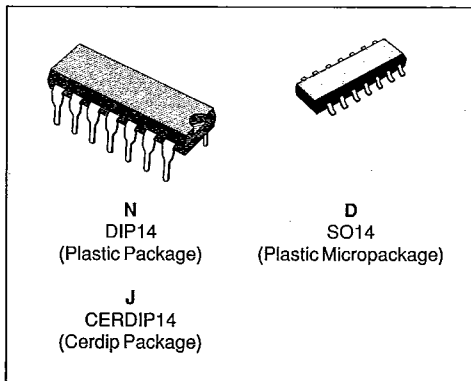


LOW POWER QUAD CMOS OP-AMPS

- EXCELLENT PHASE MARGIN ON CAPACITIVE LOADS
- SYMMETRICAL OUTPUT CURRENTS
- LOW OUTPUT DYNAMIC IMPEDANCE
- THE TRANSFER FUNCTION IS LINEAR
- PIN TO PIN COMPATIBLE WITH STANDARD QUAD OP-AMPS (TL084 -LM324)
- STABLE AND LOW OFFSET VOLTAGE
- INTERNAL ELECTROSTATIC DISCHARGE (ESD) PROTECTION CIRCUITS
- THREE INPUT OFFSET VOLTAGE SELECTIONS : STANDARD (10mV), A (5mV), B (2mV)



ORDER CODES

Part Number	Temperature Range	Package		
		N	J	D
TS27M4C/AC/BC	0°C to + 70°C	●	●	●
TS27M4I/AI/BI	- 40°C to + 105°C	●	●	●
TS27M4M/AM/BM	- 55°C to + 125°C	●	●	●

Example : TS27M4ACN

DESCRIPTION

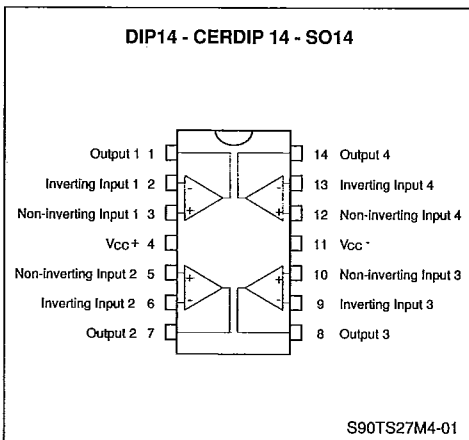
The TS274 series are low cost, low power quad operational amplifiers designed to operate with single or dual supplies. These operational amplifiers use the SGS-THOMSON silicon gate LIN MOS process giving them an excellent consumption-speed ratio. These series are ideally suited for low consumption applications.

Three power consumptions are available allowing to have always the best consumption-speed ratio :

- $I_{CC} = 10\mu A/amp.$: TS27L4 (very low power)
- $I_{CC} = 150\mu A/amp.$: TS27M4 (low power)
- $I_{CC} = 1mA/amp.$: TS274 (high speed)

The input impedance is similar to the J-FET input impedance : very high input impedance and extremely low input offset and bias currents. They allow to minimize the static errors in low impedance applications.

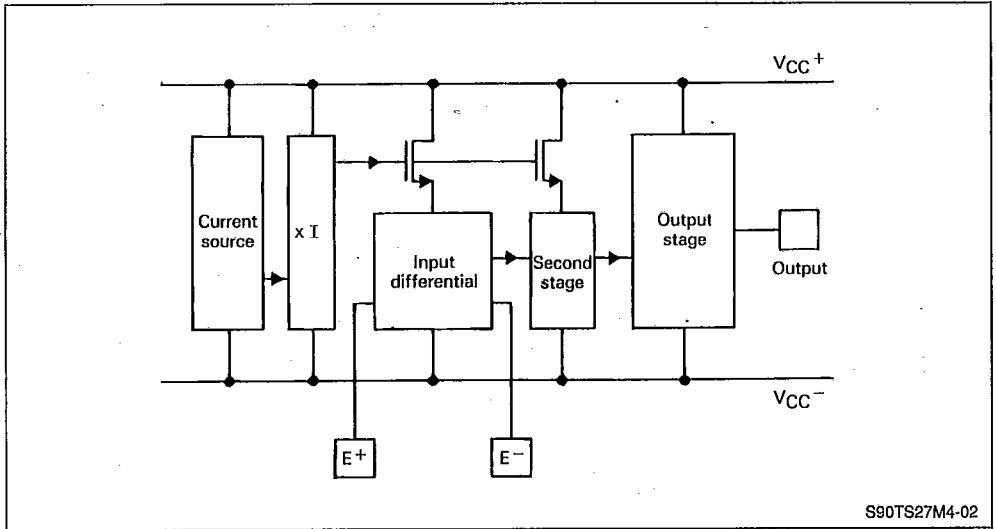
PIN CONNECTIONS (Top view)



BLOCK DIAGRAM

S G S-THOMSON

30E D



S90TS27M4-02

MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{cc}^+	Supply Voltage (Note 1)	18	V
V_{id}	Differential Input Voltage (Note 2)	± 18	V
V_i	Input Voltage (Note 3)	- 0.3 to 18	V
I_o	Output Current for $V_{cc}^+ \geq 15V$	± 30	mA
T_{oper}	Operating Free-Air Temperature Range	TS27M4C/AC/BC 0 to + 70 TS27M4I/AI/BI - 40 to + 105 TS27M4M/AM/BM - 55 to + 125	$^{\circ}C$
T_{stg}	Storage Temperature Range	- 65 to + 150	$^{\circ}C$

- Notes :
1. All voltage values, except differential voltage, are with respect to network ground terminal.
 2. Differential voltages are the non-inverting input terminal with respect to the inverting input terminal.
 3. The magnitude of the input and the output voltages must never exceed the magnitude of the positive supply voltage.

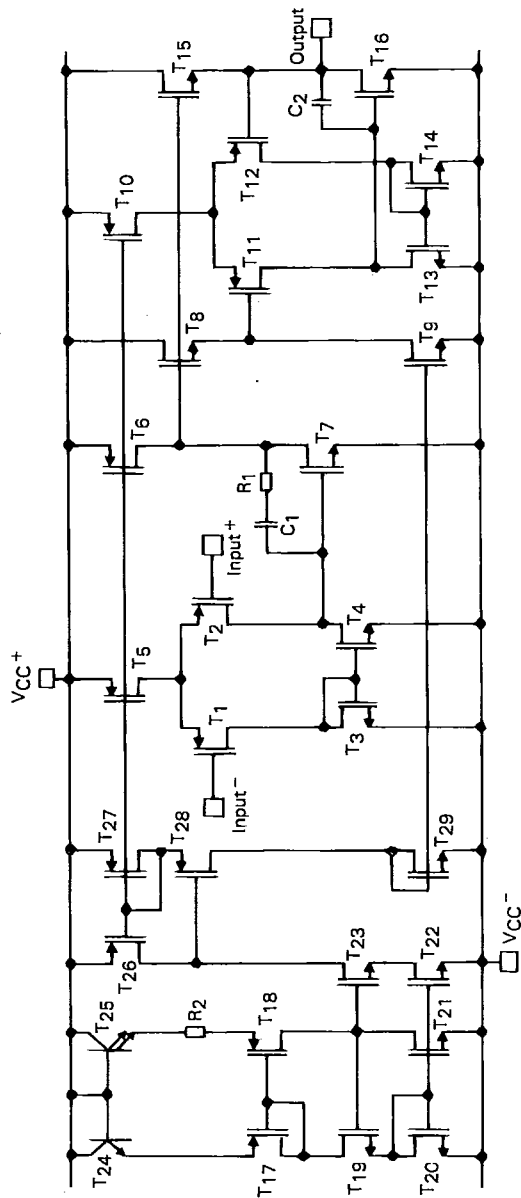
OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{cc}^+	Supply Voltage	3* to 16	V
V_{ic}	Common Mode Input Voltage Range	0 to $V_{cc}^+ - 1.5$	V

* Selected devices only.

SCHEMATIC DIAGRAM (for 1/4 TS27M4)

T-79-08



S90TS27M4-03

ELECTRICAL CHARACTERISTICS S G S-THOMSON

30E D

 $V_{CC}^+ = +10V$, $V_{CC}^- = 0V$, $T_{AMB} = 25^{\circ}C$ (unless otherwise specified)

Symbol	Parameter	TS27M4C/AC/BC			TS27M4I/AI/BI TS27M4M/AM/BM			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
V_{io}	Input Offset Voltage $V_o = 1.4V$, $V_i = 0V$ TS27M4C/I/M TS27M4AC/AI/AM TS27M4BC/BI/BM $T_{MIN} \leq T_{AMB} \leq T_{MAX}$ TS27M4C/I/M TS27M4AC/AI/AM TS27M4BC/BI/BM		1.1 0.9 0.25	10 5 2 12 6.5 3		1.1 0.9 0.25	10 5 2 12 6.5 3.5	mV
DV_{io}	Input Offset Voltage Drift		2			2		$\mu V/^{\circ}C$
I_{io}	Input Offset Current $V_i = 5V$, $V_o = 5V$ $T_{MIN} \leq T_{AMB} \leq T_{MAX}$		1	100		1	200	pA
I_{ib}	Input Bias Current $V_i = 5V$, $V_o = 5V$ $T_{MIN} \leq T_{AMB} \leq T_{MAX}$		1	150		1	300	pA
V_{OH}	High Level Output Voltage $V_i = 10mV$, $R_L = 100k\Omega$ $T_{MIN} \leq T_{AMB} \leq T_{MAX}$	8.7 8.6	8.9		8.7 8.5	8.9		V
V_{OL}	Low Level Output Voltage $V_i = -10mV$			50			50	mV
A_{vd}	Large Signal Voltage Gain $V_o = 1V$ to $6V$, $R_L = 100k\Omega$, $V_i = 5V$ $T_{MIN} \leq T_{AMB} \leq T_{MAX}$	30 20	50		30 10	50		V/mV
GBP	Gain Bandwidth Product $A_v = 40dB$, $R_L = 100k\Omega$, $C_L = 100pF$ $f_{in} = 100kHz$		1			1		MHz
CMR	Common Mode Rejection Ratio $V_o = 1.4V$, $V_i = 1V$ to $7.4V$	65	80		65	80		dB
SVR	Supply Voltage Rejection Ratio $V_{CC}^+ = 5V$ to $10V$, $V_o = 1.4V$	60	80		60	80		dB
I_{CC}	Supply Current (per amplifier) $A_v = 1$, no load, $V_o = 5V$ $T_{MIN} \leq T_{AMB} \leq T_{MAX}$		150	200 250		150	200 300	μA
I_o	Output Short Circuit Current $V_i = 10mV$, $V_o = 0V$	45	60	85	45	60	85	mA
I_{sink}	Output Sink Current $V_i = -10mV$, $V_o = V_{CC}$	35	45	65	35	45	65	mA
S_{vo}	Slew-Rate at Unity Gain $R_L = 100k\Omega$, $C_L = 100pF$		0.6			0.6		V/ μs
ϕ_m	Phase Margin at Unity Gain $A_v = 40dB$, $R_L = 100k\Omega$, $C_L = 100pF$		45			45		degrees
K_{ov}	Overshoot Factor		30			30		%
V_n	Equivalent Input Noise Voltage $f = 1kHz$, $R_S = 10\Omega$		38			38		nV/ \sqrt{Hz}
V_{O1}/V_{O2}	Cross Talk Attenuation		120			120		dB

TYPICAL CHARACTERISTICS

SGS-THOMSON

30E D

Figure 1 : Supply Current (each amplifier) versus Supply Voltage.

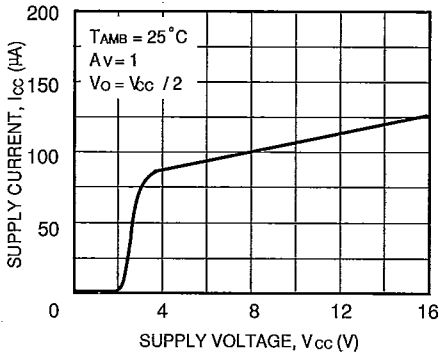


Figure 2 : Input Bias Current versus Free Air Temperature.

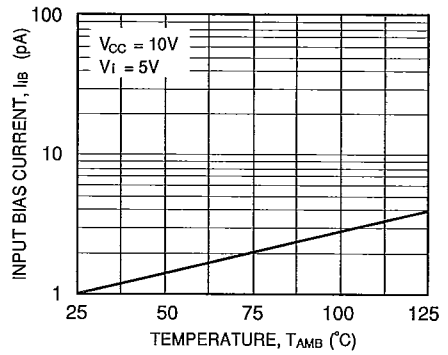


Figure 3a : High Level Output Voltage versus High Level Output Current.

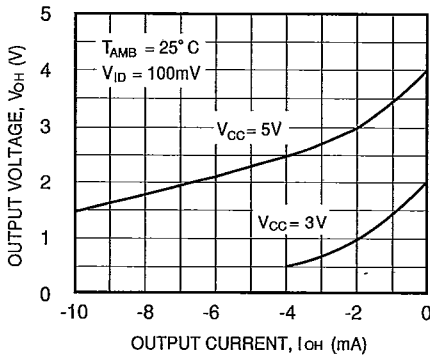


Figure 3b : High Level Output Voltage versus High Level Output Current.

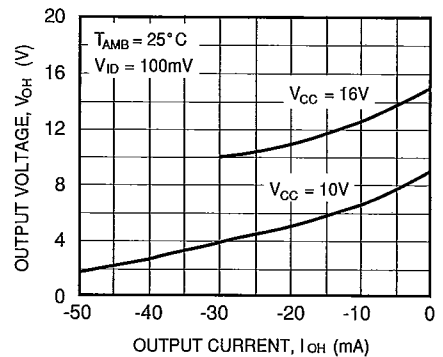


Figure 4a : Low Level Output Voltage versus Low Level Output Current.

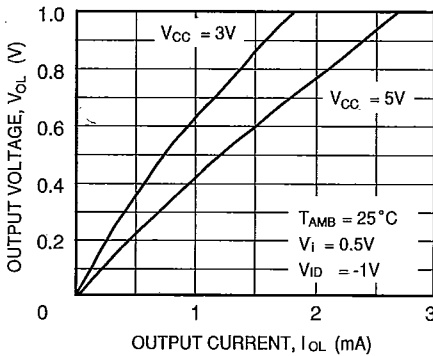
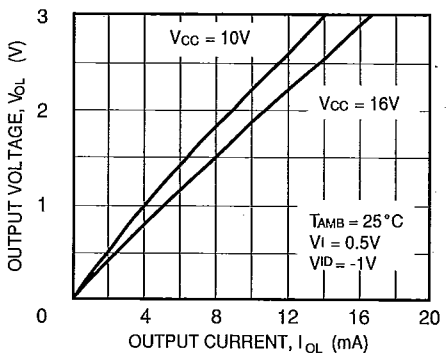


Figure 4b : Low Level Output Voltage versus Low Level Output Current.



TYPICAL CHARACTERISTICS (continued)

Figure 5 : Open Loop Frequency Response and Phase Shift.

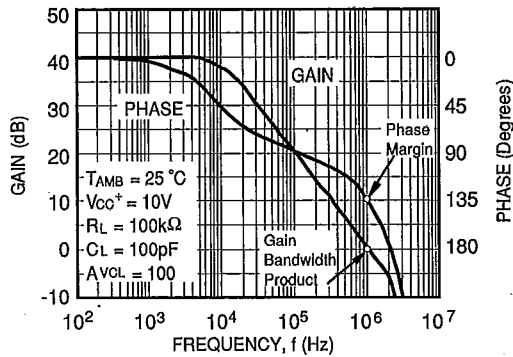


Figure 6 : Gain Bandwidth Product versus Supply Voltage.

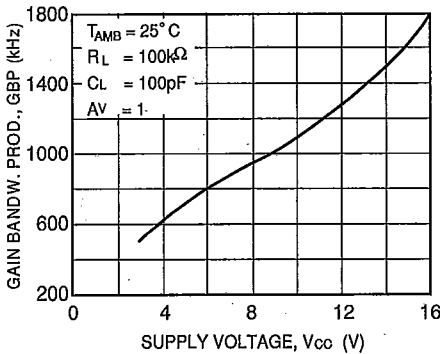


Figure 7 : Phase Margin versus Supply Voltage.

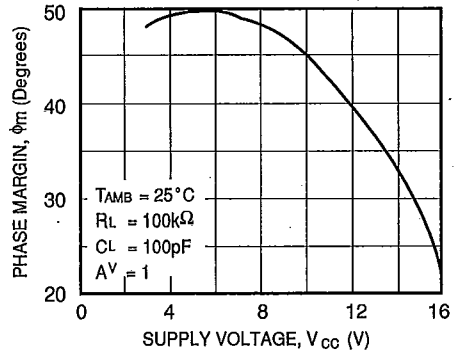


Figure 8 : Phase Margin versus Capacitive Load.

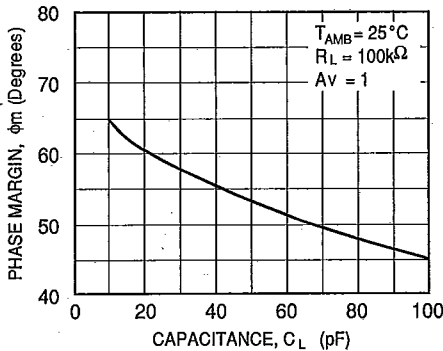
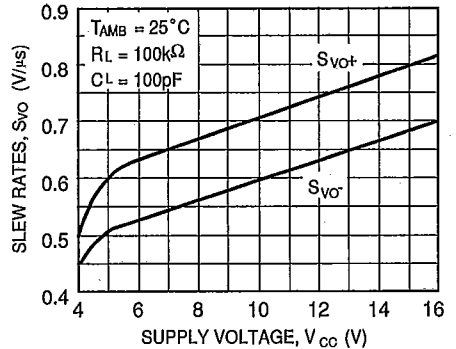


Figure 9 : Slew Rates versus Supply Voltage.

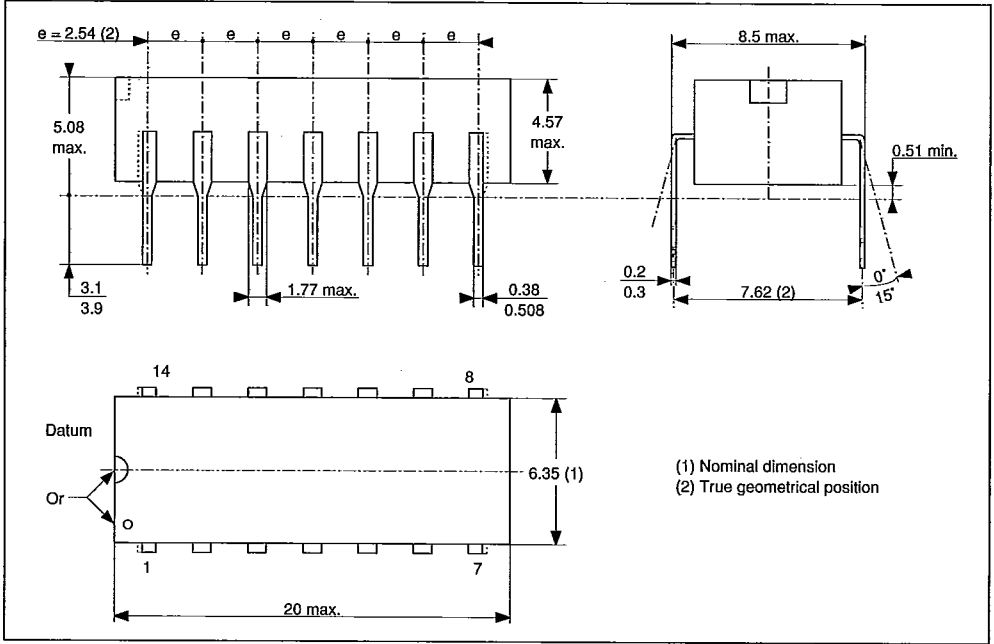


PACKAGE MECHANICAL DATA

SGS-THOMSON

30E D

14 PINS - PLASTIC DIP OR CERDIP



14 PINS - PLASTIC MICROPACKAGE (SO)

