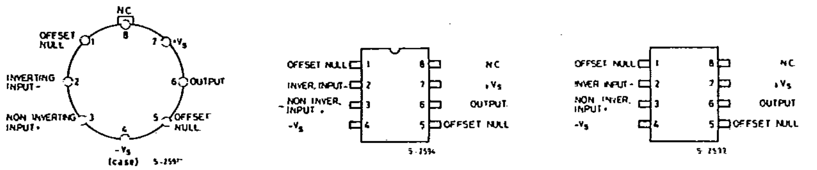
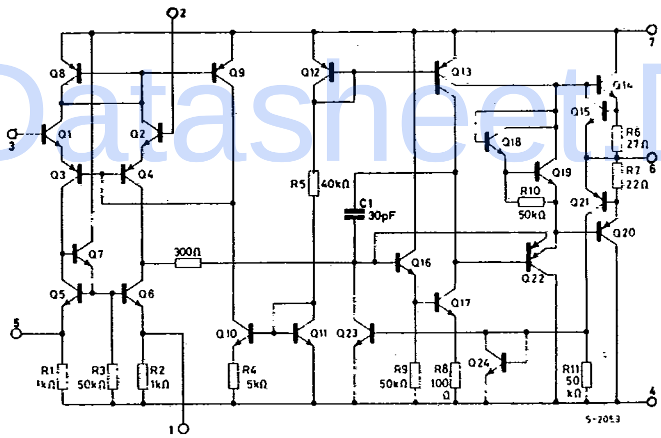
LS141
LS141A
LS141C

CONNECTION DIAGRAMS AND ORDERING NUMBERS



Type	TO-99	Minidip	SO-8
LS 141	LS 141 TB	–	–
LS 141A	LS 141 ATB	–	–
LS 141C	LS 141 CTB	LS 141 CB	LS 141 CM
LS 8141	–	–	LS 8141M
LS 8141A	–	–	LS 8141 AM
LS 8141C	–	–	LS 8141 CM

SCHEMATIC DIAGRAM



THERMAL DATA

			TO-99	Minidip	SO-8
$R_{th\ j\text{-}amb}$	Thermal resistance junction ambient	max	155 °C/W	120 °C/W	200* °C/W

* Measured with the device mounted on a ceramic substrate (25 x 16 x 0.6 mm)

ELECTRICAL CHARACTERISTICS (see note)

Parameter		Test conditions	LS 141 Min.	LS 141 Typ.	LS 141 Max.	LS 141A Min.	LS 141A Typ.	LS 141A Max.	LS 141C Min.	LS 141C Typ.	LS 141C Max.	Unit
V_{os}	Input offset voltage	T_{amb}= 25°C, $R_g \leq 10\ k\Omega$		1	5					2	6	mV
		$R_g \leq 50\ \Omega$					0.8	3				mV
		T_{amb}= T_{min} to T_{max}, $R_g \leq 10\ k\Omega$			6						7.5	mV
		$R_g \leq 50\ \Omega$						4				mV
ΔV_{os}	Input offset voltage adjust. range	V_s= ± 20V				±10						mV
		V_s= ± 15V T_{amb}= 25°C		±15						±15		mV
$\frac{\Delta V_{os}}{\Delta T}$	Average input offset voltage drift							15				µV/°C
I_{os}	Input offset current	T_{amb}= 25°C		20	200		3	30		20	200	nA
		T_{amb}= T_{min} to T_{max}		85	500			70			300	nA
$\frac{\Delta I_{os}}{\Delta T}$	Average input offset current drift							0.5				nA/°C
I_b	Input bias current	T_{amb}= 25°C		80	500		30	80		80	500	nA
		T_{amb}= T_{min} to T_{max}			1.5			0.21			0.8	µA
R_i	Input resistance	T_{amb}= 25°C	0.3	2		1	6		0.3	2		MΩ
		T_{amb}= T_{min} to T_{max}				0.5						MΩ
V_i	Input voltage range	T_{amb}= T_{min} to T_{max}	±12	±13		±12	±13		±12	±13		V
G_v	Large signal voltage gain	T_{amb}= 25°C $R_L \geq 2\ k\Omega$, V_s= ±15V V_o= ±10V	94	106		94			86	106		dB
		T_{amb}= T_{min} to T_{max}, $R_L \geq 2\ k\Omega$, V_s= ±15V V_o= ±10V	88			90			84			dB
		V_s= ±5V V_o= ±2V				80						
V_o	Output voltage swing	V_s= ±15V, $R_L \geq 10\ k\Omega$	±12	±14		±12	±14		±12	±14		V
		$R_L \geq 2\ k\Omega$	±10	±13		±10	±13		±10	±13		V
I_{sc}	Output short circuit current	T_{amb}= 25°C		25		10	25	35		25		mA
		T_{amb}= T_{min} to T_{max}				10		40				mA
CMR	Common mode rejection	V_s = ±20V, $R_g \leq 10\ k\Omega$ V_{CM}=±12V	70	90		80	95		70	90		dB
SVR	Supply voltage rejection	$R_g \leq 50\Omega$ V_s=±5 to ±20V				86	96					dB
		$R_g \leq 10k\Omega$ V_s=±5 to ±15V	77	96					77	96		dB

ELECTRICAL CHARACTERISTICS (continued)

Parameter		Test conditions	LS 141			LS 141A			LS 141C			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
	Transient respon. (unity gain) Rise time Overshoot	T_{amb} = 25°C		0.3 5			0.25 6	0.8 20		0.3 5		µs %
B	Bandwidth	T_{amb} = 25°C				0.437	1.5					MHz
SR	Slew rate	T_{amb} = 25°C		0.5		0.3	0.7			0.5		V/µs
I_s	Supply current	T_{amb} = 25°C		1.7	2.8					1.7	2.8	mA
P_{tot}	Power consumption	T_{amb} = 25°C V_s = ±20V V_s = ±15V		 50	 85		80	150		 50	 85	mW mW
		V_s = ±20V T_{amb} = T_{min} T_{amb} = T_{max}						165 135				mW mW
		V_s = ±15V T_{amb} = T_{min} T_{amb} = T_{max}		60 45	100 75							mW mW

Note: These specifications, unless otherwise specified, apply for V_s = ±15V and T_{amb} = -55 to 125°C for LS 141 and LS 141A. For the LS 141C these specifications apply for T_{amb} = 0 to 70°C

Fig. 1 - Open loop voltage gain vs. supply voltage

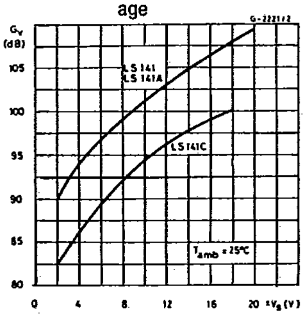


Fig. 2 - Output voltage swing vs. supply voltage

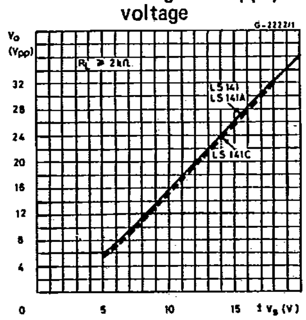


Fig. 3 - Power consumption vs. supply voltage

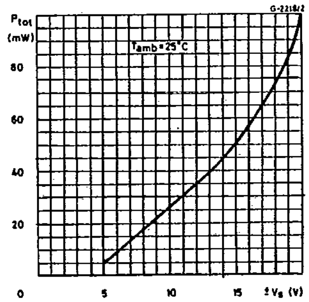


Fig. 4 - Open loop voltage gain vs. frequency

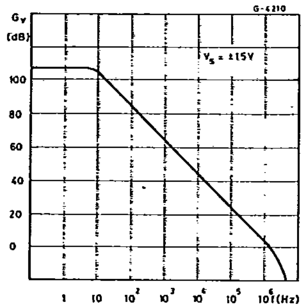


Fig. 5 - Open loop phase response vs. frequency

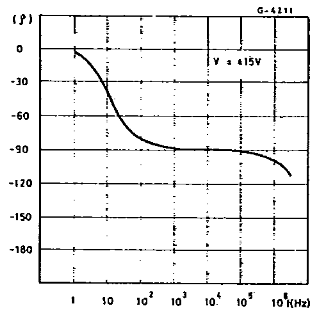


Fig. 6 - Input offset current vs. supply voltage (for LS 141 and LS 141C)

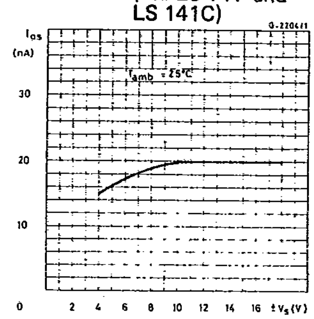


Fig. 7 - Input resistance and capacitance vs. frequency (for LS 141 and LS 141C)

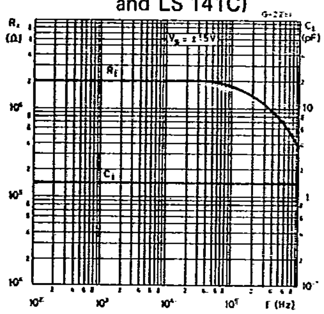


Fig. 8 - Output resistance vs. frequency

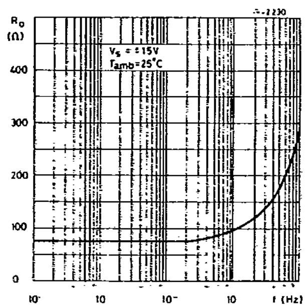


Fig. 9 - Output voltage swing vs. load resistance

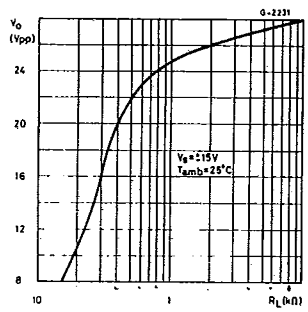


Fig. 10 - Output voltage swing vs. frequency

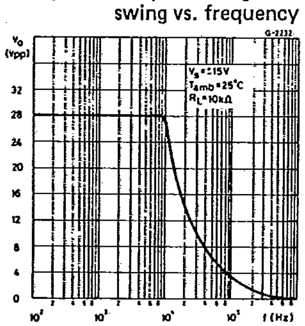


Fig. 11 - Input noise voltage vs. frequency

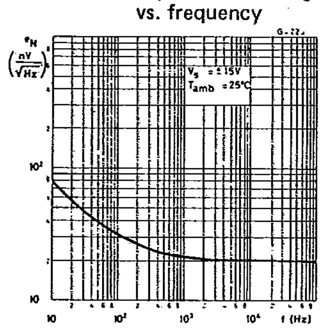


Fig. 12 - Input noise current vs. frequency

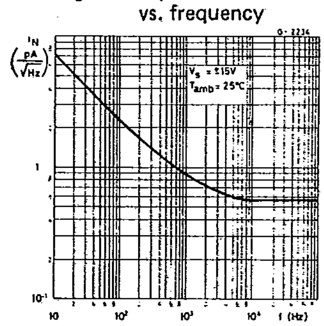


Fig. 13 - Transient response

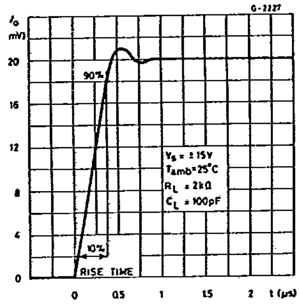


Fig. 14 - Common mode rejection ratio vs. frequency

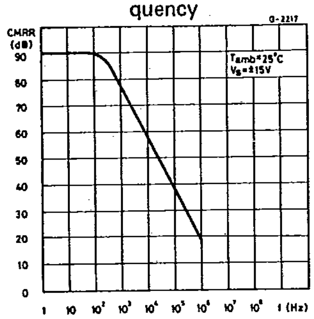
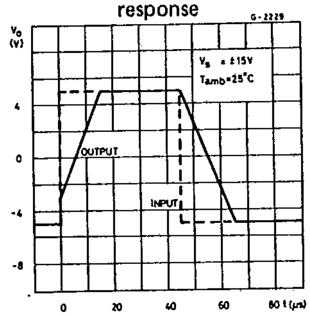


Fig. 15 - Voltage follower large signal pulse response



Typical performance curves for LS 141 and LS 141A

Fig. 16 - Input bias current vs. ambient temperature

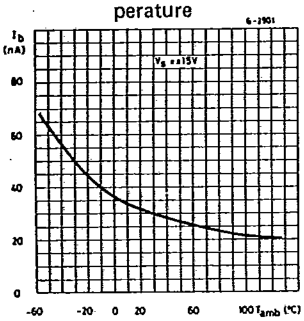


Fig. 17 - Input resistance vs. ambient temperature

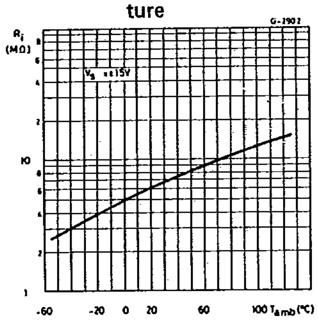


Fig. 18 - Input offset current vs. ambient temperature

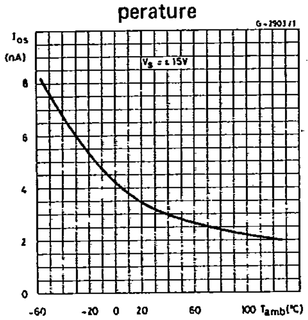


Fig. 19 - Output short-circuit current vs. ambient temperature

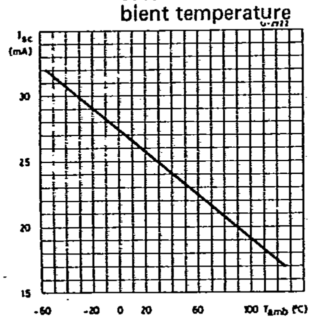


Fig. 20 - Power consumption vs. ambient temperature

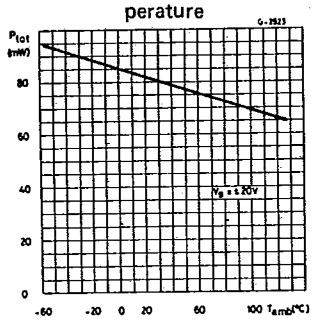
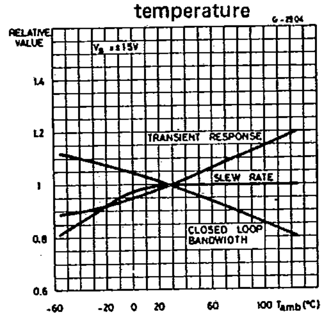


Fig. 21 - Frequency characteristics vs. ambient temperature



Typical performance curves for LS 141C

Fig. 22 - Input bias current vs. ambient temperature

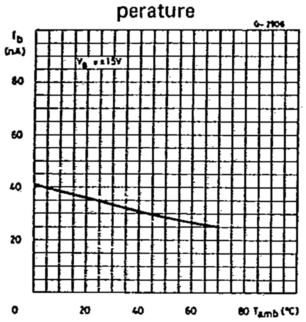


Fig. 23 - Input resistance vs. ambient temperature

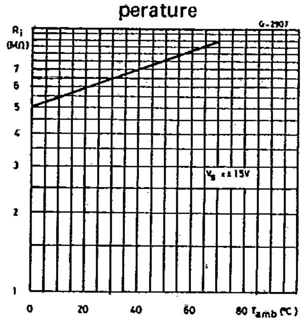


Fig. 24 - Input offset current vs. ambient temperature

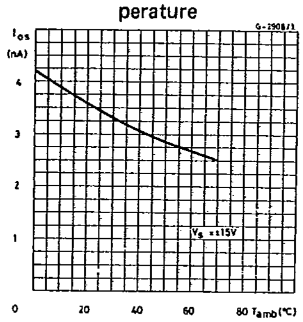


Fig. 25 - Output short circuit current vs. ambient temperature

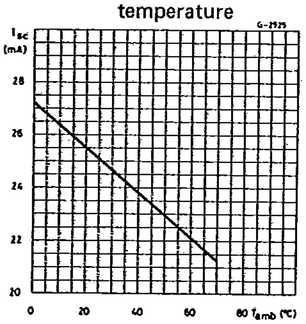


Fig. 26 - Power consumption vs. ambient temperature

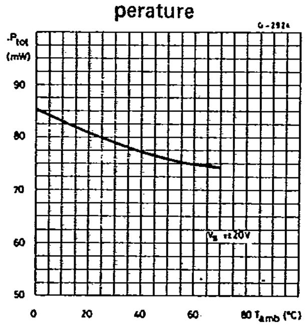
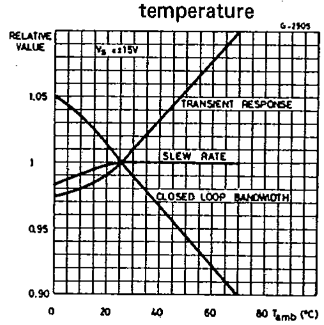


Fig. 27 - Frequency characteristics vs. ambient temperature



TYPICAL APPLICATIONS

Fig. 28 - Clipping amplifier

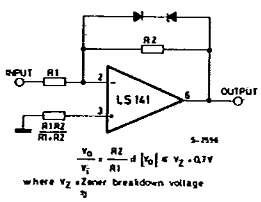


Fig. 29 - Simple integrator

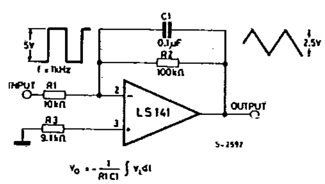
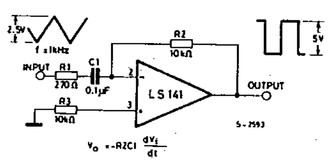


Fig. 30 - Simple differentiator



LS148
LS148A
LS148C

LINEAR INTEGRATED CIRCUITS

OPERATIONAL AMPLIFIERS

- SHORT CIRCUIT PROTECTION
- OFFSET VOLTAGE NULL CAPABILITY
- LARGE COMMON MODE AND DIFFERENTIAL VOLTAGE RANGE
- NO LATCH-UP
- SLEW-RATE = 5.5V/μs (G_v = 10, C_C = 3.5 pF)

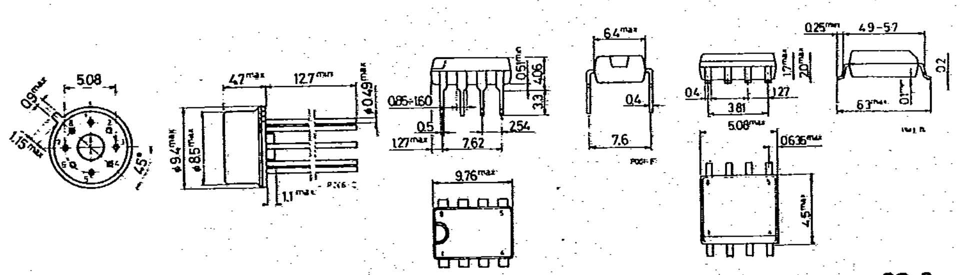
The LS 148 series consists of general purpose operational amplifiers, intended for a wide range of analog applications where tailoring of frequency characteristics is desirable. High common mode voltage range and absence of "Latch-up" tendencies make the LS 148 series ideal for use as a voltage follower. The high gain and wide range of operating voltage provide superior performance in integrators, summing amplifiers and general feedback applications. Unity gain frequency compensation is achieved by means of a single 30 pF capacitor. The LS 148 series is available with hermetic gold chip (8000 series). This is particularly suitable for professional and telecom applications, wherever very high MTBF are required.

ABSOLUTE MAXIMUM RATINGS		TO-99	Minidip	μpackage
V_s	Supply voltage		± 22V	
V_i (1)	Input voltage		± 15V	
ΔV_i	Differential input voltage		± 30V	
T_{op}	Operating temperature for **LS 148/LS 148A**		-55 to 125 °C	
	for **LS 148C**		0 to 70 °C	
	Output short circuit duration (2)		indefinite	
P_{tot}	Power dissipation at T_{amb} = 70°C	520 mW	665 mW	400 mW
T_{stg}	Storage temperature	-65 to 150 °C	-55 to 150 °C	-55 to 150 °C

1) For supply voltage less than ± 15V, input voltage is equal to the supply voltage
2) The short circuit duration is limited by thermal dissipation.

MECHANICAL DATA

Dimensions in mm



TO-99 Minidip SO-8