SILICON PLANAR NPN

BC 107
BC 108
BC 109

LOW NOISE GENERAL PURPOSE AUDIO AMPLIFIERS

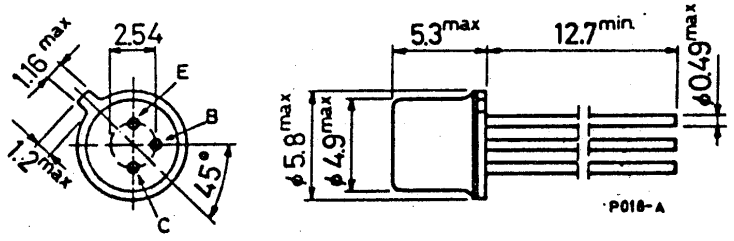
The BC 107, BC 108 and BC 109 are silicon planar epitaxial NPN transistors in TO-18 metal case. They are suitable for use in driver stages, low noise input stages and signal processing circuits of television receivers.
The complementary PNP types are respectively the BC 177, BC 178 and BC 179.

ABSOLUTE MAXIMUM RATINGS

		BC 107	BC 108	BC 109
V_{CBO}	Collector-base voltage ($I_E = 0$)	50 V	30 V	30 V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	45 V	20 V	20 V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	6 V	5 V	5 V
I_C	Collector current	100 mA		
P_{tot}	Total power dissipation at $T_{amb} \leq 25$ °C	0.3 W		
	at $T_{case} \leq 25$ °C	0.75 W		
T_{stg}	Storage temperature	-55 to 175 °C		
T_j	Junction temperature	175 °C		

MECHANICAL DATA

Dimensions in mm



(sim. to TO-18)

BC 107
BC 108
BC 109

THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal resistance junction-case	max	200	°C/W
$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	500	°C/W

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C unless otherwise specified)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cutoff current (I_E = 0)	for BC 107				
		V_{CB} = 40 V			15	nA
		V_{CB} = 40 V T_{amb} = 150 °C			15	µA
		for BC 108 - BC 109				
		V_{CB} = 20 V			15	nA
		V_{CB} = 20 V T_{amb} = 150 °C			15	µA
$V_{(BR)CBO}$	Collector-base breakdown voltage (I_E = 0)	I_C = 10 µA				
		for BC 107	50			V
		for BC 108	30			V
		for BC 109	30			V
$V_{(BR)CEO}$*	Collector-emitter breakdown voltage (I_B = 0)	I_C = 10 mA				
		for BC 107	45			V
		for BC 108	20			V
		for BC 109	20			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = 10 µA				
		for BC 107	6			V
		for BC 108	5			V
		for BC 109	5			V
$V_{CE(sat)}$*	Collector-emitter saturation voltage	I_C = 10 mA I_B = 0.5 mA		70	250	mV
		I_C = 100 mA I_B = 5 mA		200	600	mV
V_{BE}*	Base-emitter voltage	I_C = 2 mA V_{CE} = 5 V	550	650	700	mV
		I_C = 10 mA V_{CE} = 5 V		700	770	mV
$V_{BE(sat)}$*	Base-emitter saturation voltage	I_C = 10 mA I_B = 0.5 mA		750		mV
		I_C = 100 mA I_B = 5 mA		900		mV

ELECTRICAL CHARACTERISTICS (continued)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
h_{FE}*	DC current gain	I_C = 2 mA V_{CE} = 5 V				
		for BC 107	110	230	450	—
		for BC 107 Gr. A	110	180	220	—
		for BC 107 Gr. B	200	290	450	—
		for BC 108	110	350	800	—
		for BC 108 Gr. A	110	180	220	—
		for BC 108 Gr. B	200	290	450	—
		for BC 108 Gr. C	420	520	800	—
		for BC 109	200	350	800	—
		for BC 109 Gr. B	200	290	450	—
		for BC 109 Gr. C	420	520	800	—
		I_C = 10 µA V_{CE} = 5 V				
		for BC 107		120		—
		for BC 107 Gr. A		90		—
		for BC 107 Gr. B	40	150		—
		for BC 108		120		—
		for BC 108 Gr. A		90		—
		for BC 108 Gr. B	40	150		—
		for BC 108 Gr. C	100	270		—
		for BC 109	70	210		—
		for BC 109 Gr. B	40	150		—
		for BC 109 Gr. C	100	270		—
h_{fe}	Small signal current gain	I_C = 2 mA V_{CE} = 5 V f = 1 kHz				
		for BC 107		250		—
		for BC 107 Gr. A		190		—
		for BC 107 Gr. B		300		—
		for BC 108		370		—
		for BC 108 Gr. A		190		—
		for BC 108 Gr. B		300		—
		for BC 108 Gr. C		500		—
		for BC 109		370		—
		for BC 109 Gr. B		300		—
		for BC 109 Gr. C		550		—
		I_C = 10 mA V_{CE} = 10 V f = 100 MHz		2		—
C_{CBO}	Collector-base capacitance	I_E = 0 V_{CB} = 10 V f = 1 MHz		4	6	pF

* Pulsed: pulse duration = 300 µs, duty factor = 1%.

ELECTRICAL CHARACTERISTICS (continued)

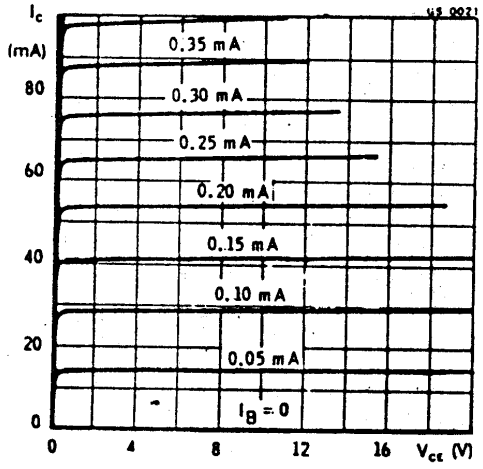
Parameter		Test conditions	Min.	Typ.	Max.	Unit
C_{EBO}	Emitter-base capacitance	$I_C = 0$ $V_{EB} = 0.5$ V $f = 1$ MHz		11.5		pF
NF	Noise figure	$I_C = 0.2$ mA $V_{CE} = 5$ V $R_g = 2$ kΩ $f = 1$ kHz $B = 200$ Hz				
		for BC 107		2	10	dB
		for BC 108		2	10	dB
		for BC 109		1.5	4	dB
		$I_C = 0.2$ mA $V_{CE} = 5$ V $R_g = 2$ kΩ $f = 10$ Hz to 10 kHz $B = 15.7$ kHz				
		for BC 109		1.5	4	dB
h_{ie}	Input impedance	$I_C = 2$ mA $V_{CE} = 5$ V $f = 1$ kHz				
		for BC 107		4		kΩ
		for BC 107 Gr. A		3		kΩ
		for BC 107 Gr. B		4.8		kΩ
		for BC 108		5.5		kΩ
		for BC 108 Gr. A		3		kΩ
		for BC 108 Gr. B		4.8		kΩ
		for BC 108 Gr. C		7		kΩ
		for BC 109		5.5		kΩ
		for BC 109 Gr. B		4.8		kΩ
		for BC 109 Gr. C		7		kΩ
h_{re}	Reverse voltage ratio	$I_C = 2$ mA $V_{CE} = 5$ V $f = 1$ kHz				
		for BC 107		2.2×10^{-4}		—
		for BC 107 Gr. A		1.7×10^{-4}		—
		for BC 107 Gr. B		2.7×10^{-4}		—
		for BC 108		3.1×10^{-4}		—
		for BC 108 Gr. A		1.7×10^{-4}		—
		for BC 108 Gr. B		2.7×10^{-4}		—
		for BC 108 Gr. C		3.8×10^{-4}		—
		for BC 109		3.1×10^{-4}		—
		for BC 109 Gr. B		2.7×10^{-4}		—
		for BC 109 Gr. C		3.8×10^{-4}		—

ELECTRICAL CHARACTERISTICS (continued)

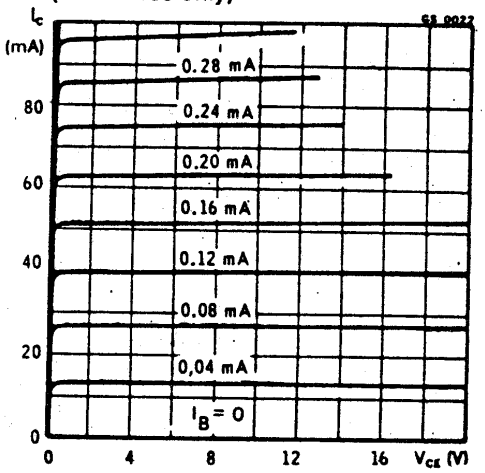
Parameter	Test conditions	Min.	Typ.	Max.	Unit
h_{oe} Output admittance	I_C = 2 mA V_{CE} = 5 V f = 1 kHz				
	for **BC 107**		20		µS
	for **BC 107** Gr. A		13		µS
	for **BC 107** Gr. B		26		µS
	for **BC 108**		30		µS
	for **BC 108** Gr. A		13		µS
	for **BC 108** Gr. B		26		µS
	for **BC 108** Gr. C		34		µS
	for **BC 109**		30		µS
	for **BC 109** Gr. B		26		µS
	for **BC 109** Gr. C		34		µS

32 K

Typical output characteristics
(for BC 107 only)



Typical output characteristics
(for BC 108 only)



BC 107
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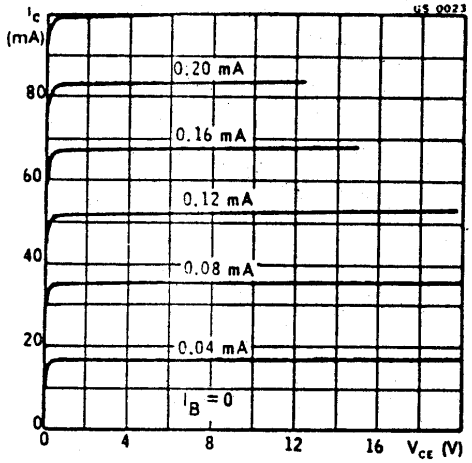
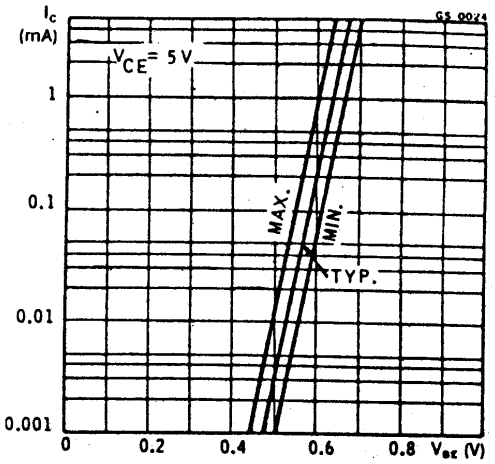
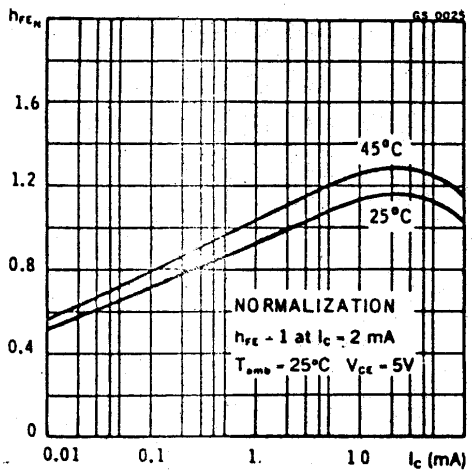
Typical output characteristics
(for BC 109 only)



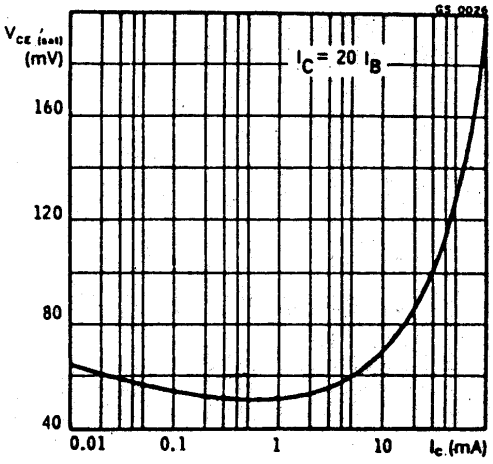
DC transconductance



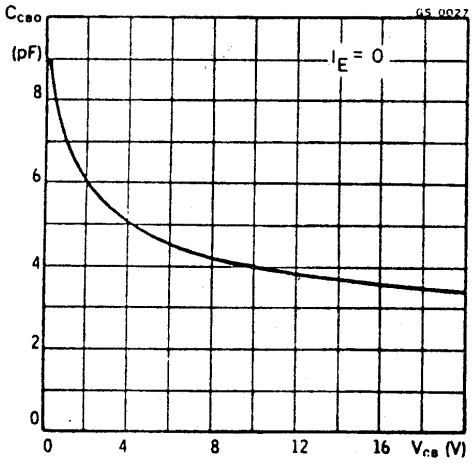
DC normalized current gain



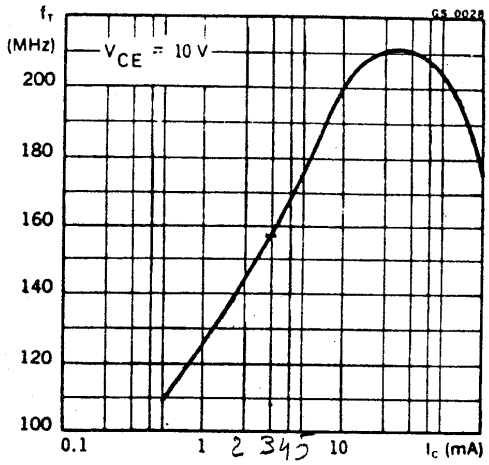
Collector-emitter saturation voltage



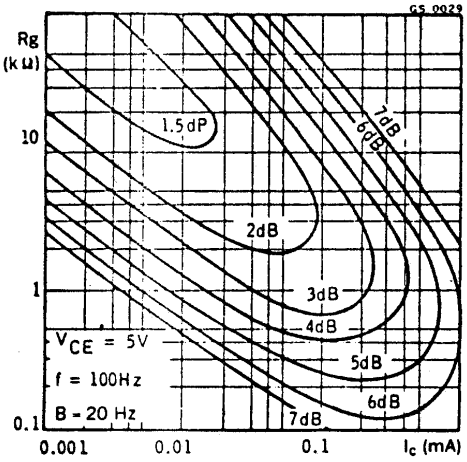
Collector-base capacitance



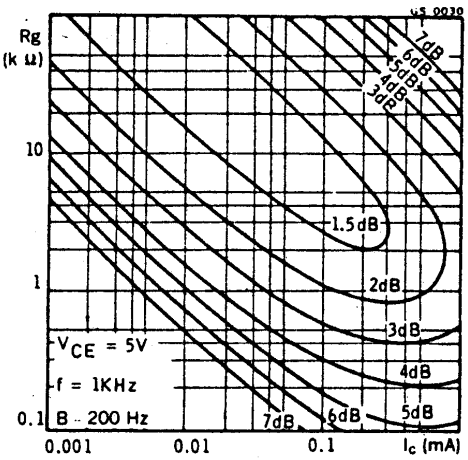
Transition frequency



Noise figure (for **BC 109** only)



Noise figure (for **BC 109** only)



BC 107
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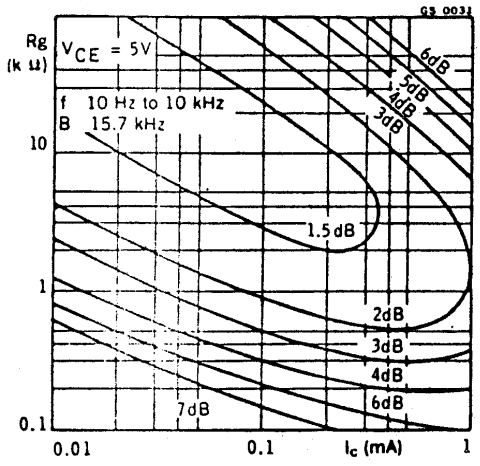
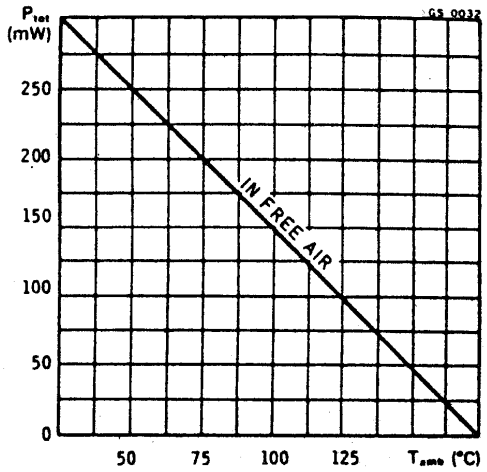
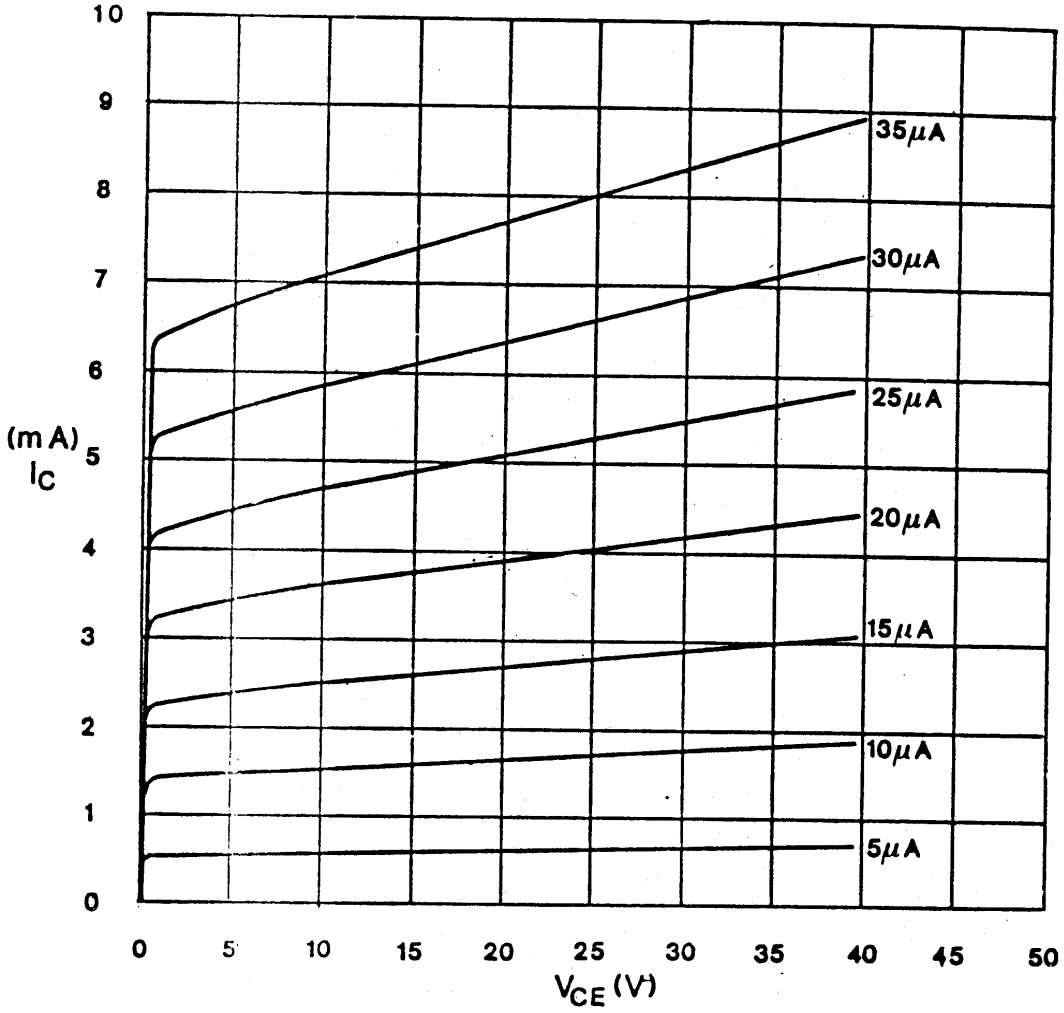
Noise figure (for **BC 109** only)

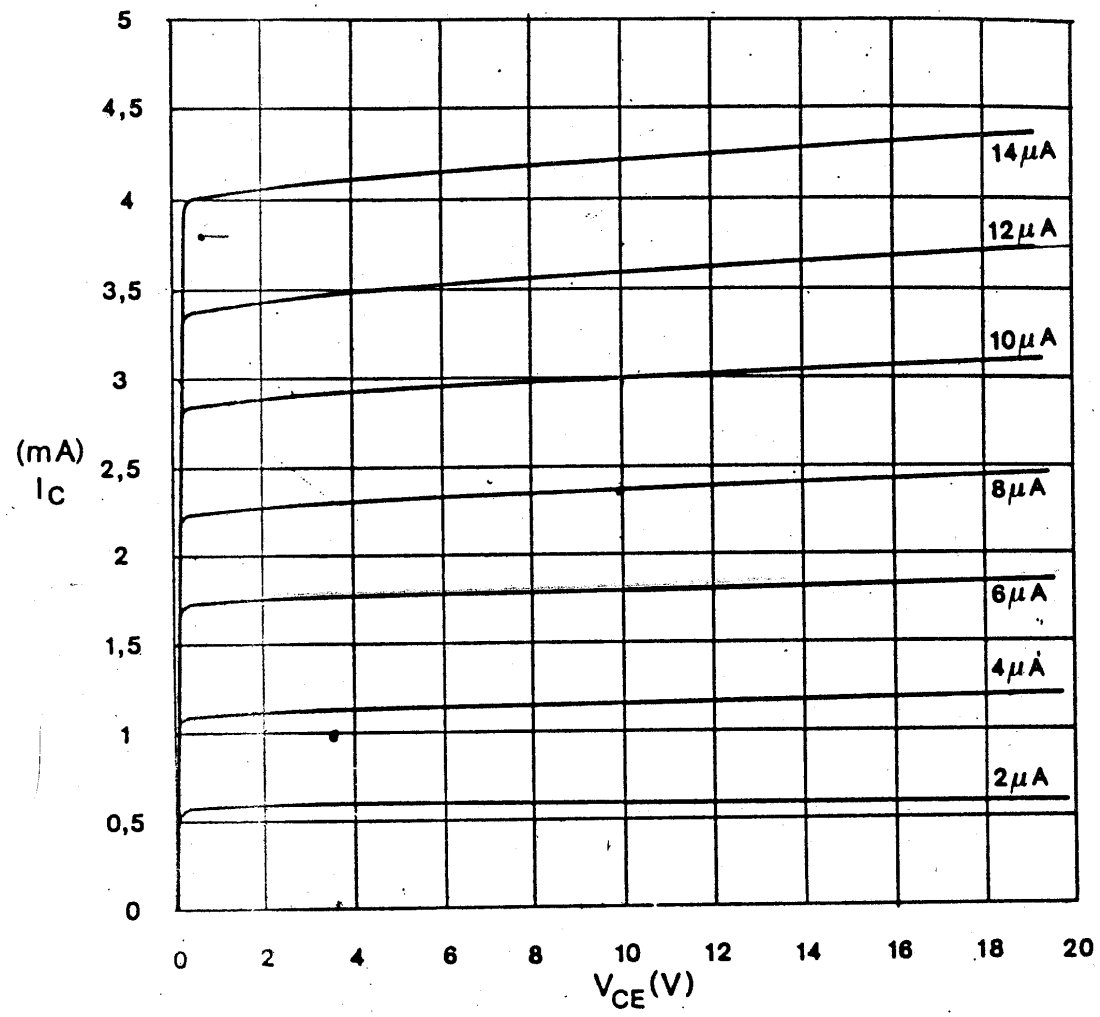


Power rating chart





BC 107 (Caratteristiche rilevate presso l'Istituto di Elettronica)



BC 109 (Caratteristiche rilevate presso l'Istituto di Elettronica) -