# THOMSON SEMICONDUCTORS

**TEA2024**

T-74-05-01

ADVANCE INFORMATION

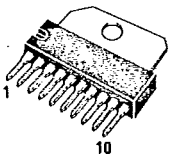
## STEREO AF AMPLIFIER

The TEA2024 is an A.F. stereo amplifier in plastic package of 10 passages which is especially adapted for use in radio-cassette and low cost car-radio.
It has the capacity to supply an output power of 3.5 W per channel in the following conditions : $V_{CC}$ = 12 V, THD = 10 %, $R_L$ = 4 Ω.

- Low idle current
- Internal thermal protection
- Protection against short-circuit
- Single-in-line package
- Very few external components
- Excellent ripple rejection.

STEREO AF AMPLIFIER

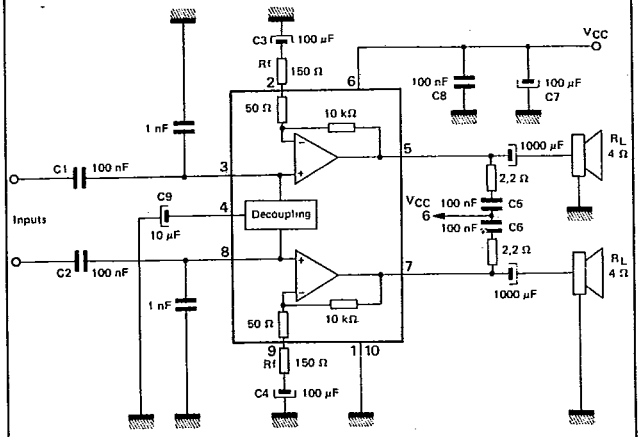
CASE CB-313



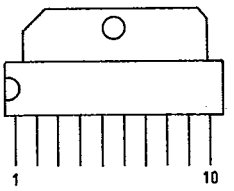

SP SUFFIX
PLASTIC PACKAGE

TYPICAL APPLICATION

DUAL MODE




PIN ASSIGNMENT




1. Ground (1)
2. Feedback (1)
3. Positive Input (1)
4. Decoupling
5. Output (1)
6. $V_{CC}$ (1)
7. Output (2)
8. Positive Input (2)
9. Feedback (2)
10. Ground (2)

SP8236-A

**THOMSON SEMICONDUCTORS**
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THOMSON COMPONENTS

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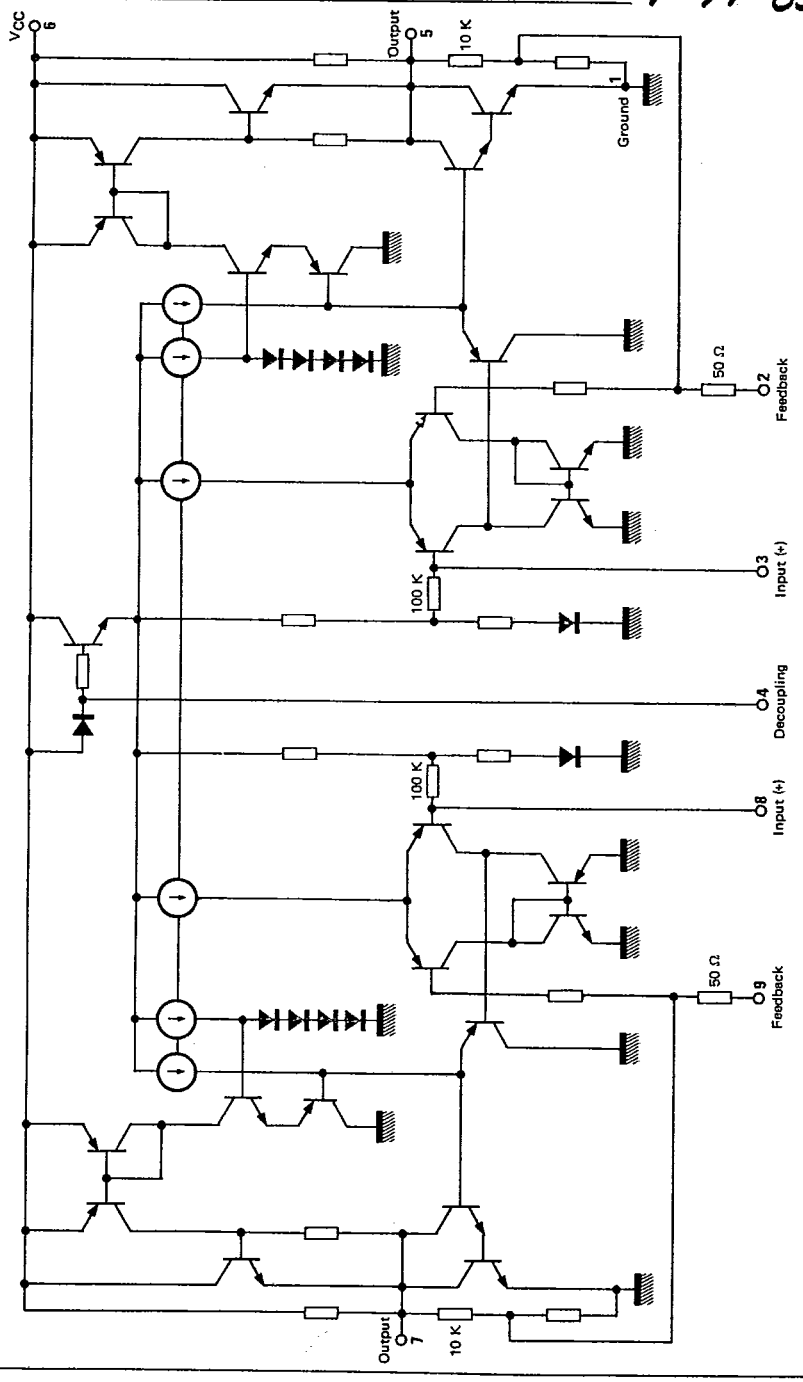
## ELECTRICAL DIAGRAM



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## MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Supply voltage | $V_{CC}$ | 20 | V |
| Operating supply voltage | $V_{CC}$ | 18 | V |
| Power dissipation | $P_{tot}$ | See graphs | |
| Maximum output current | $I_O$ | 2.5 | A |
| Storage or junction temperature | $T_{stg}$, $T_j$ | - 40, + 150 | °C |

## THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Junction-ambient thermal resistance | $R_{th(j-a)}$ | 60 | °C/W |
| Junction-case thermal resistance | $R_{th(j-c)}$ | 9 | °C/W |

## ELECTRICAL CHARACTERISTICS

$V_{CC}$ = 12 V, $T_{amb}$ = + 25°C, $R_L$ = 4 Ω, $A_V$ = 46 dB, Dual mode (unless otherwise specified)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Supply voltage range | $V_{CC}$ | 6 | – | 18 | V |
| Supply current ($V_E$ = 0) | $I_{CC}$ | – | 35 | 60 | mA |
| D.C. output voltage ($V_{CC}$ = 12 V) | $V_{out}$ | 5.4 | 6.0 | 6.6 | V |
| Output power (f = 1 KHz ; d = 10 % ; $R_L$ = 4 Ω) | $P_{out}$ | | | | W |
| Dual mode - per channel | | | | | |
| $V_{CC}$ = 12 V | | 3 | 3.5 | – | |
| $V_{CC}$ = 9 V | | – | 1.75 | – | |
| $V_{CC}$ = 6 V | | – | 0.60 | – | |
| $V_{CC}$ = 14.4 V | | – | 5 | – | |
| BTL mode - $V_{CC}$ = 12 V | | – | 10 | – | |
| Voltage gain without external resistance | | | | | dB |
| $R_f$ = 150 Ω | $A_{V1}$ | 31 | 34 | 37 | |
| $R_f$ = 0 Ω | $A_{V2}$ | – | 46 | – | |
| Distortion (f = 1 KHz ; $V_{CC}$ = 12 V ; $R_L$ = 4 Ω ; $P_{out}$ 0.5 to 2 W) | d | – | 0.3 | 1.5 | % |
| Input noise voltage ($R_G$ = 0 ; B = 20 KHz) | | – | 2 | – | μV |
| Supply voltage ripple rejection | SVR | | - | | dB |
| Fripple= 100 Hz ; Vripple= 0.5 $V_{RMS}$ ; $R_G$ = 0 | | 40 | 50 | – | |
| Crosstalk (f = 1 KHz ; $R_G$ = 10 K) | $C_T$ | 40 | 52 | – | dB |
| Frequency response (3 dB) - ($P_{out}$ = 1 W ; $R_L$ = 4 Ω) | B | – | 0.015 - 40 | – | KHz |
| Open loop gain | | – | 80 | – | dB |

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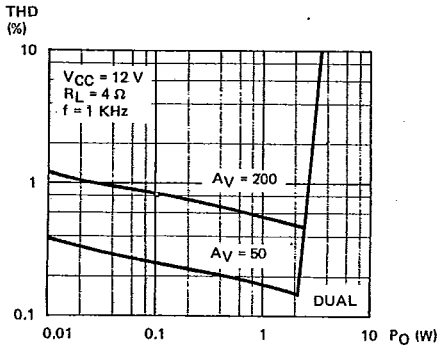
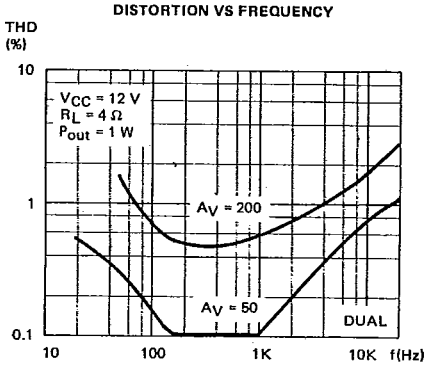
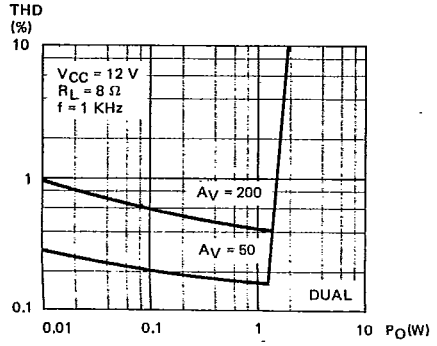
DISTORTION VS OUTPUT POWER



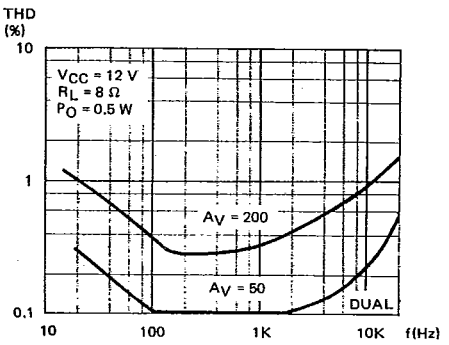

DISTORTION VS FREQUENCY



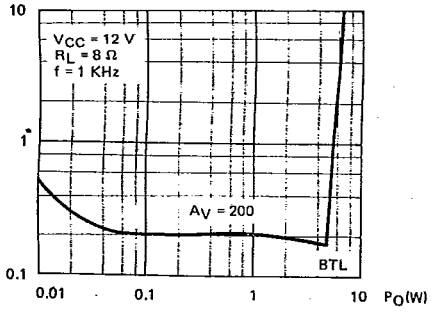

DISTORTION VS OUTPUT POWER



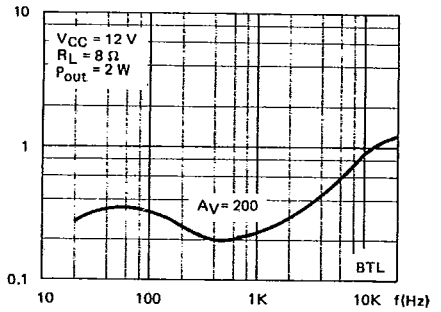

DISTORTION VS FREQUENCY




DISTORTION VS OUTPUT POWER




DISTORTION VS FREQUENCY



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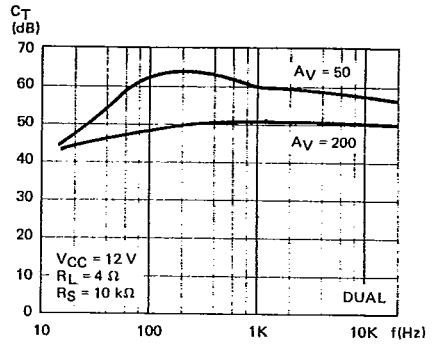
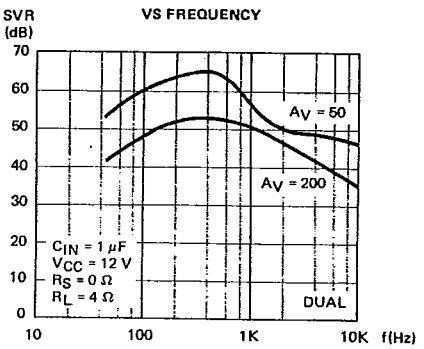
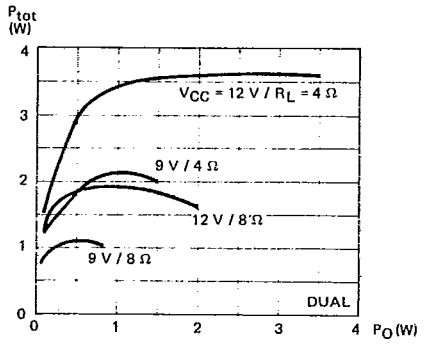
CROSSTALK VS FREQUENCY



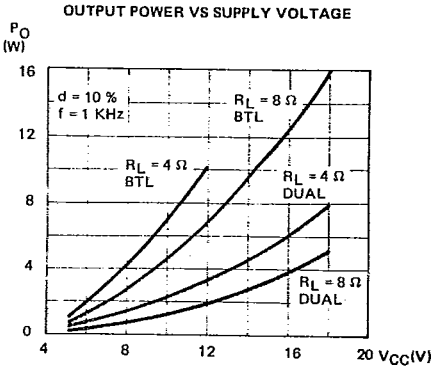

SUPPLY VOLTAGE RIPPLE REJECTION VS FREQUENCY



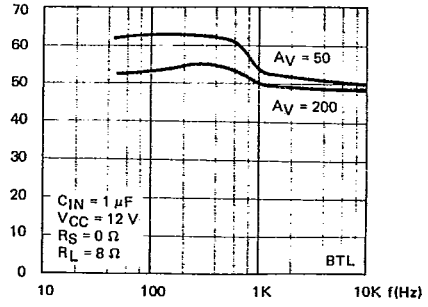

TOTAL DISSIPATED POWER VS OUTPUT POWER



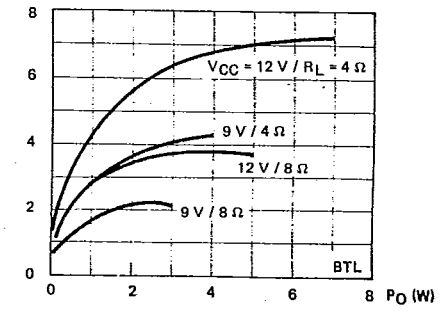

OUTPUT POWER VS SUPPLY VOLTAGE




SUPPLY VOLTAGE RIPPLE REJECTION VS FREQUENCY




TOTAL DISSIPATED POWER VS OUTPUT POWER



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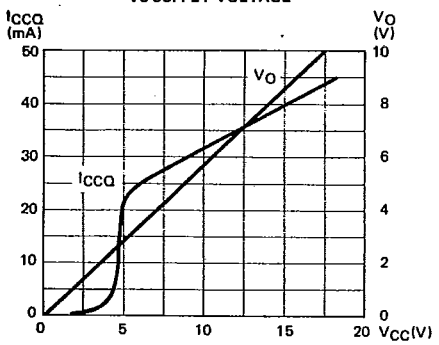
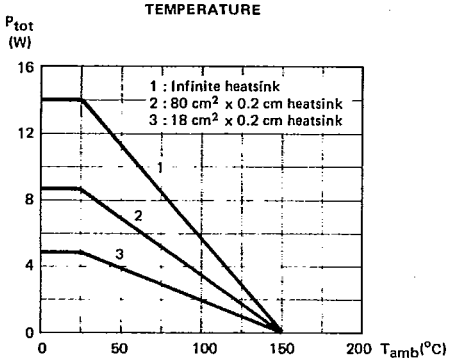
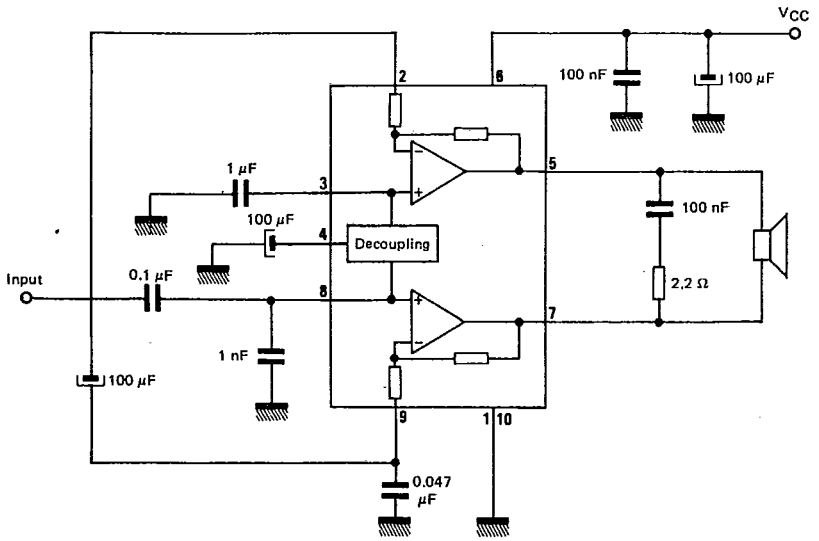
QUIESCENT CURRENT/D.C. OUTPUT VOLTAGE VS SUPPLY VOLTAGE




MAX DISSIPATED POWER VS AMBIENT TEMPERATURE




BRIDGE MODE



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## APPLICATION INFORMATION

### GROUND CONNECTION

Two ground pins are provided and must be connected together on the PC board. The GND connections for power - return from the load and negative supply - must be kept separated from the signal and feed-back ground. Inappropriate ground connections will cause parasitic oscillation, distortion and cross-talk.

### VOLTAGE GAIN

The voltage gain is determined by the ratio of internal feedback resistors and external resistor $R_f$.

$G_V = 34$ dB for $R_f = 150\ \Omega$

$G_V = 46$ dB for $R_f = 0\ \Omega$

### CAPACITORS C5 AND C6

These capacitors must be connected close to the I.C. connections. Low temp-coefficient type will give the best results to prevent oscillations.

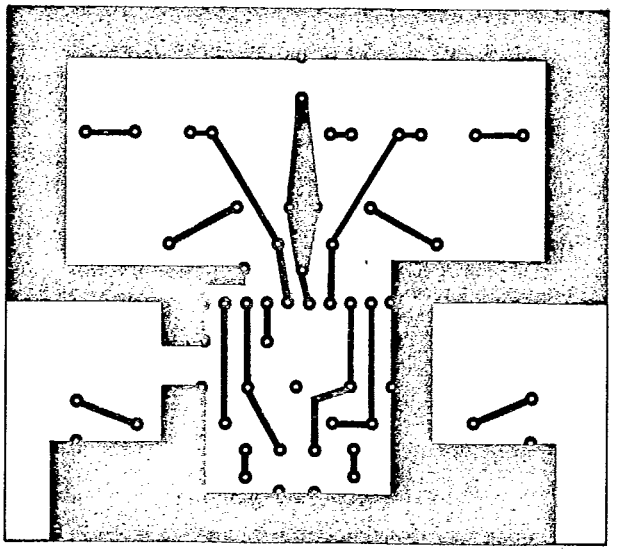
1 nF ceramic capacitors bypassing inputs to ground will help prevent high oscillations or radio interference.

OUTPUT POWER TABLE (TYPICAL VALUE)
THD = 10 % ; f = 1 KHz ; $T_{amb}$ = + 25°C

| LOAD \ $V_{CC}$ | | 6 V | 9 V | 12 V | 14.4 V |
|---|---|---|---|---|---|
| DUAL | 8 Ω | – | 1 W/ch | 1.8 W/ch | 3.0 W/ch |
| | 4 Ω | 0.6 W/ch | 1.8 W/ch | 3.5 W/ch | 5 W/ch |
| BTL | 8 Ω | 1.2 W | 3.5 W | 6.7 W | 10.5 W |
| | 4 Ω | 2.0 W | 6.3 W | 10 W | – |

DUAL and BTL MODES

PRINTED CIRCUIT BOARD



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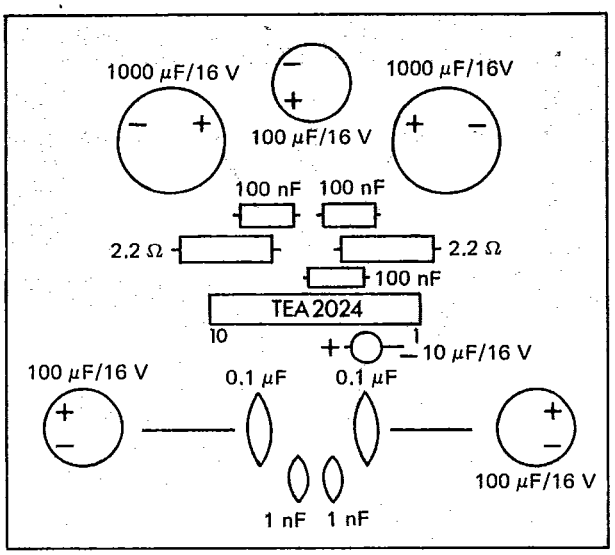
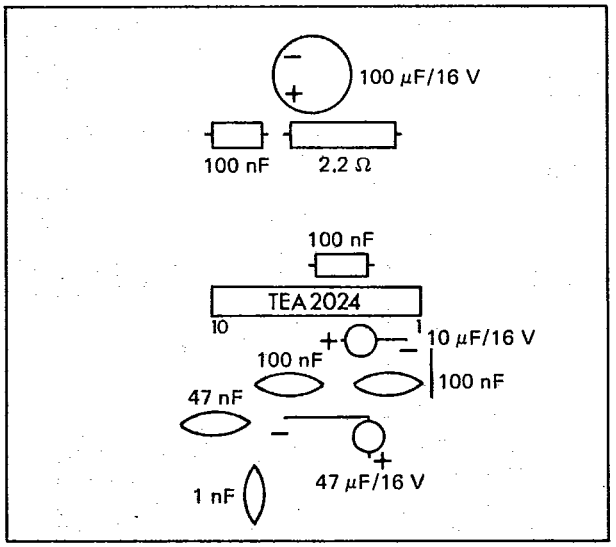
COMPONENT LAYOUT (DUAL MODE)




COMPONENT LAYOUT (BRIDGE MODE)



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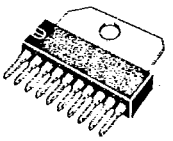
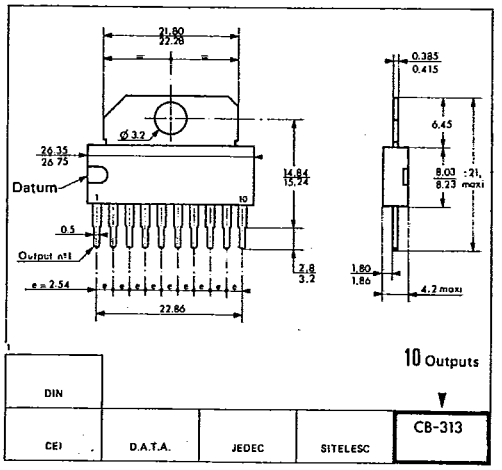
CASE CB-313



SP SUFFIX
PLASTIC PACKAGE




This is advance information and specifications are subject to change without notice.
Please inquire with our sales offices about the availability of the different packages.