

|              |         |  |
|--------------|---------|--|
| <b>SANYO</b> | No.341G | <b>2SB632, 632K/2SD612, 612K</b>   |
|              |         | PNP/NPN Epitaxial Planar Silicon Transistors<br>25V/35V, 2A Low-Frequency Power Amp Applications |

**Features**

- High collector dissipation and wide ASO.

( ): 2SB632, 632K

| Absolute Maximum Ratings at Ta = 25°C |                  | 2SB632, D612 | 2SB632K, D612K | unit |
|---------------------------------------|------------------|--------------|----------------|------|
| Collector-to-Base Voltage             | V <sub>CB0</sub> | (-)25        | (-)35          | V    |
| Collector-to-Emitter Voltage          | V <sub>CEO</sub> | (-)25        | (-)35          | V    |
| Emitter-to-Base Voltage               | V <sub>EBO</sub> |              | (-)5           | V    |
| Collector Current                     | I <sub>C</sub>   | (-)2         |                | A    |
| Collector Current (Pulse)             | I <sub>CP</sub>  | (-)3         |                | A    |
| Collector Dissipation                 | P <sub>C</sub>   |              | 1              | W    |
|                                       |                  |              | 10             | W    |
| Junction Temperature                  | T <sub>j</sub>   |              | 150            | °C   |
| Storage Temperature                   | T <sub>stg</sub> |              | -55 to +150    | °C   |

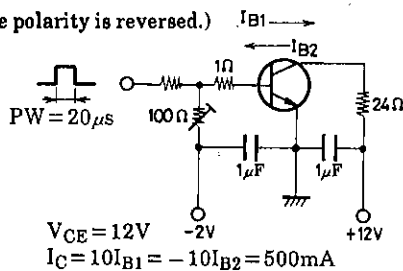
| Electrical Characteristics at Ta = 25°C |                      |   | min                | typ          | max  | unit |
|---|----------------------|---|--------------------|--------------|------|------|
| C-B Breakdown Voltage                   | V <sub>(BR)CBO</sub> | I <sub>C</sub> = (-)10μA, I <sub>E</sub> = 0        | B632, D612 (-)25   |              |      | V    |
|   |                      |   | B632K, D612K (-)35 |              |      | V    |
| C-E Breakdown Voltage                   | V <sub>(BR)CEO</sub> | I <sub>C</sub> = (-)1mA, R <sub>BE</sub> = ∞        | B632, D612 (-)25   |              |      | V    |
|   |                      |   | B632K, D612K (-)35 |              |      | V    |
| E-B Breakdown Voltage                   | V <sub>(BR)EBO</sub> | I <sub>E</sub> = (-)10μA, I <sub>C</sub> = 0        | (-)5               |              |      | V    |
| Collector Cutoff Current                | I <sub>CBO</sub>     | V <sub>CB</sub> = (-)20V, I <sub>E</sub> = 0        |                    |              | (-)1 | μA   |
| Emitter Cutoff Current                  | I <sub>EBO</sub>     | V <sub>EB</sub> = (-)4V, I <sub>C</sub> = 0         |                    |              | (-)1 | μA   |
| DC Current Gain                         | h <sub>FE</sub> (1)  | V <sub>CE</sub> = (-)2V, I <sub>C</sub> = (-)500mA  | 60※                |              | 320※ |      |
|   | h <sub>FE</sub> (2)  | V <sub>CE</sub> = (-)2V, I <sub>C</sub> = (-)1.5A   | 30                 |              |      |      |
| Gain-Bandwidth Product                  | f <sub>T</sub>       | V <sub>CE</sub> = (-)10V, I <sub>C</sub> = (-)50mA  |                    | 100          |      | MHz  |
| Output Capacitance                      | C <sub>ob</sub>      | V <sub>CB</sub> = (-)10V, f = 1MHz                  |                    | (45)30       |      | pF   |
| C-E Saturation Voltage                  | V <sub>CE(sat)</sub> | I <sub>C</sub> = (-)1.5A, I <sub>B</sub> = (-)0.15A |                    | (-0.4)(-0.9) |      | V    |
|   |                      |   |                    | 0.3          | 0.8  |      |
| B-E Saturation Voltage                  | V <sub>BE(sat)</sub> | I <sub>C</sub> = (-)1.5A, I <sub>B</sub> = (-)0.15A |                    | (-)1.1(-)1.5 |      | V    |
| Turn-ON Time                            | t <sub>on</sub>      | See specified Test Circuit.                         |                    | (60)50       |      | ns   |
| Fall Time                               | t <sub>f</sub>       | "   |                    | (80)100      |      | ns   |
| Storage Time                            | t <sub>stg</sub>     | "   |                    | 400          |      | ns   |

※ : The 2SB632/2SD612 are classified by 500mA h<sub>FE</sub> as follows.

|    |   |     |     |   |     |     |   |     |
|----|---|-----|-----|---|-----|-----|---|-----|
| 60 | D | 120 | 100 | E | 200 | 160 | F | 320 |
|----|---|-----|-----|---|-----|-----|---|-----|

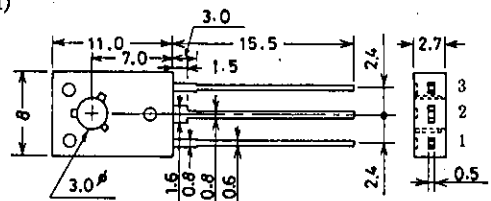
**Switching Time Test Circuit**

(For PNP, the polarity is reversed.)



**Package Dimensions 2009B**

(unit : mm)



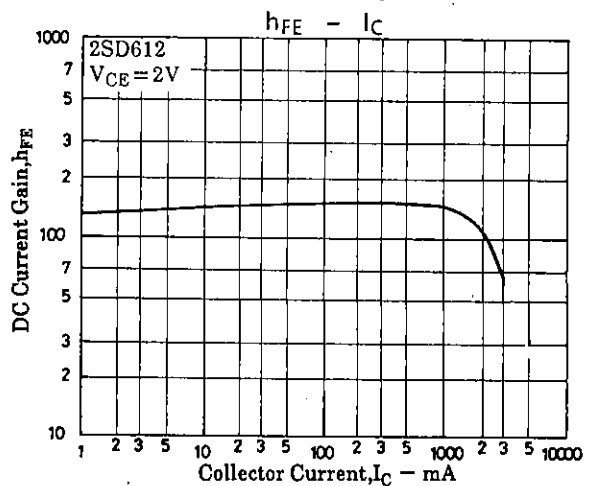
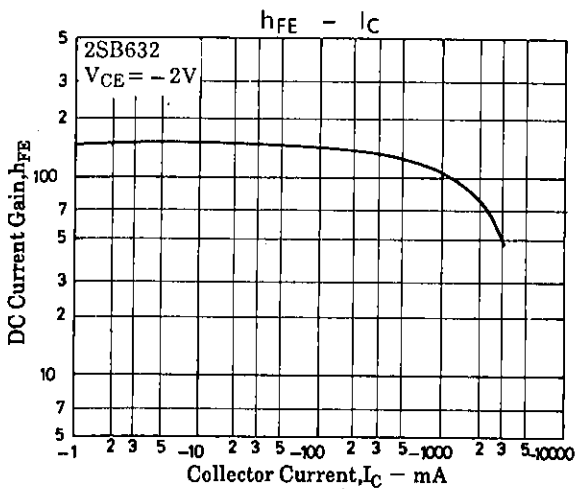
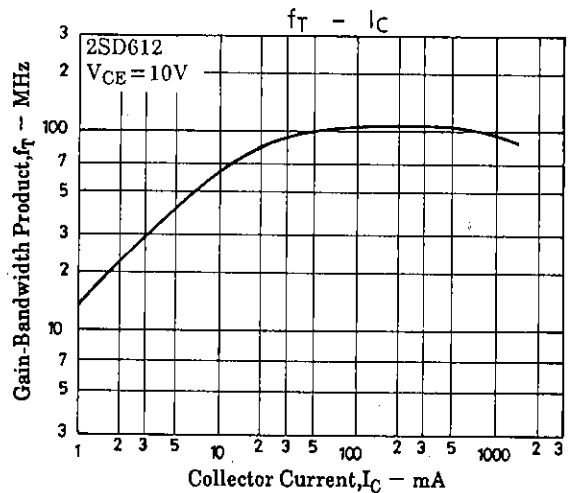
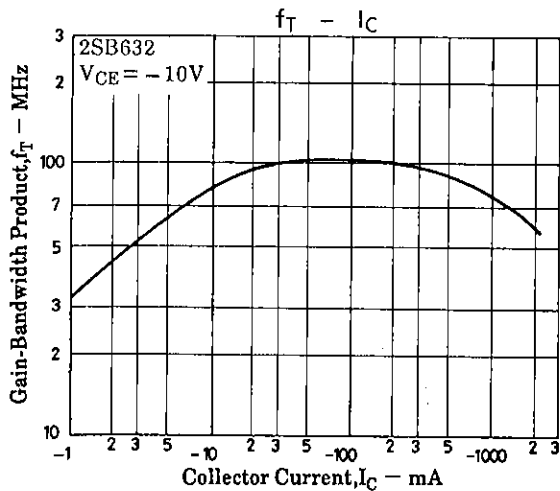
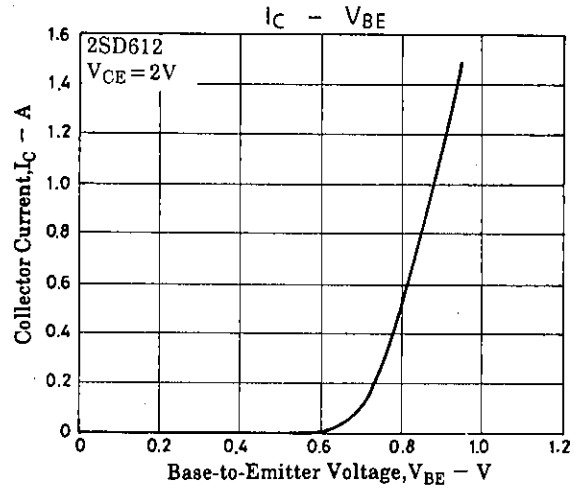
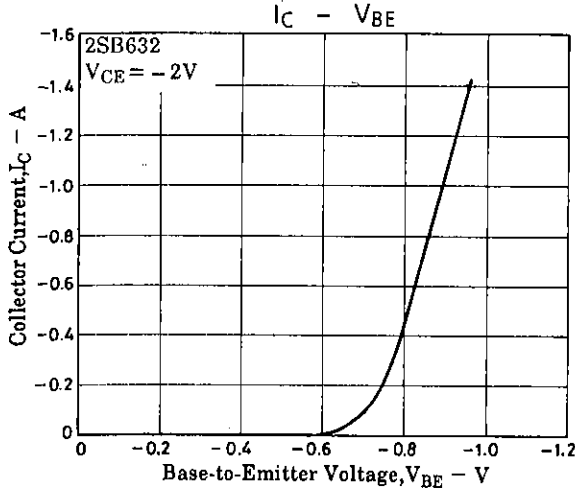
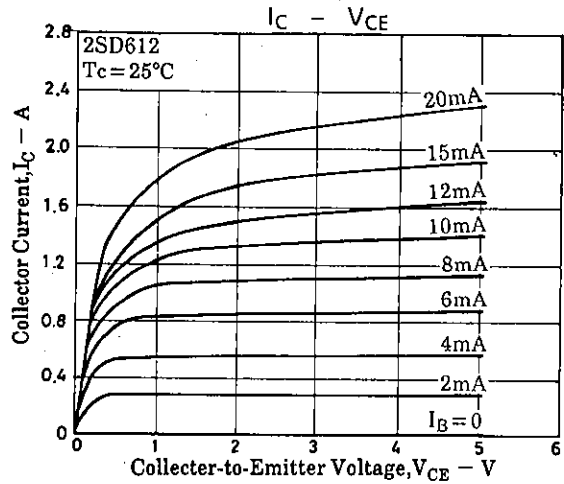
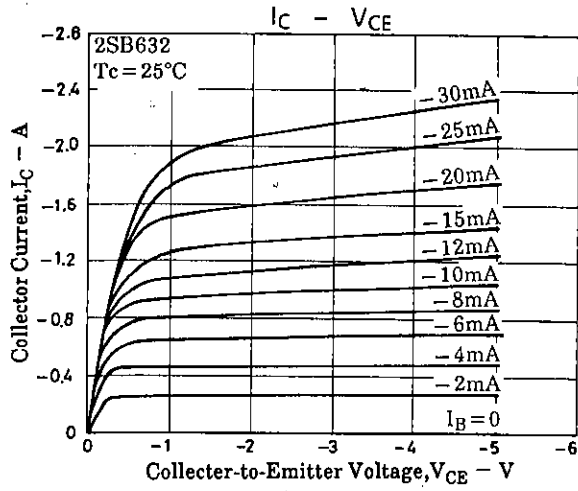
JEDEC: TO-126

- 1: Emitter
- 2: Collector
- 3: Base

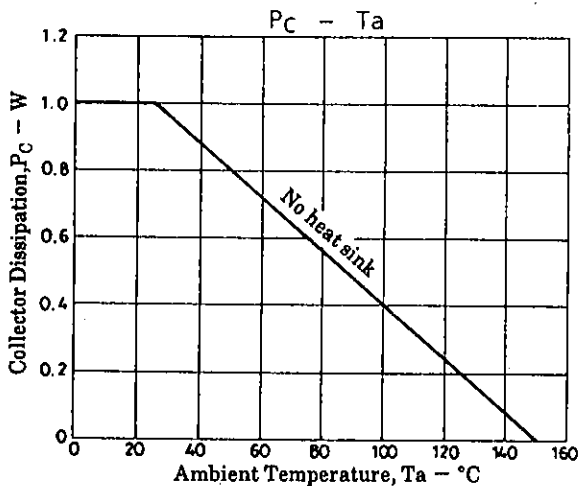
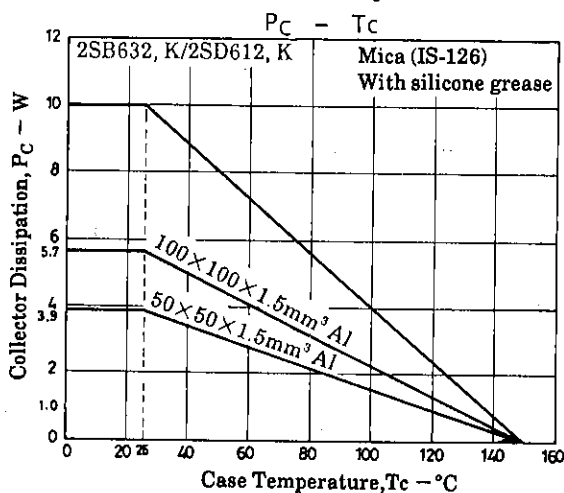
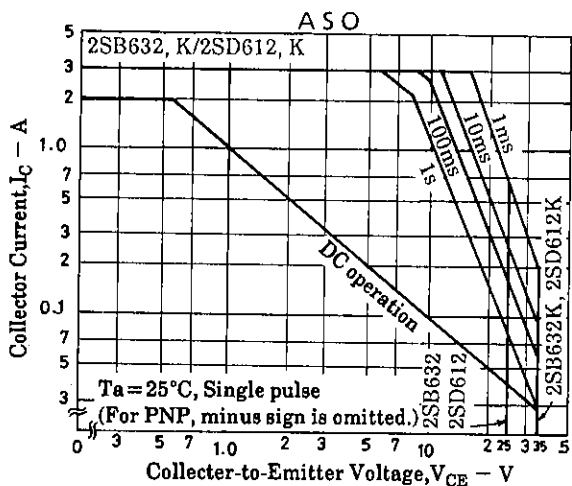
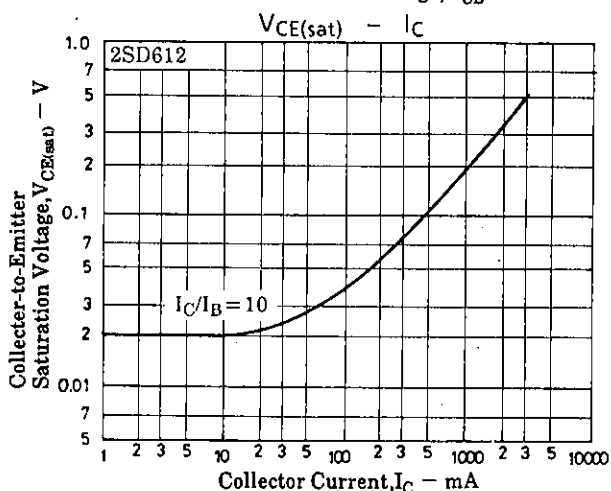
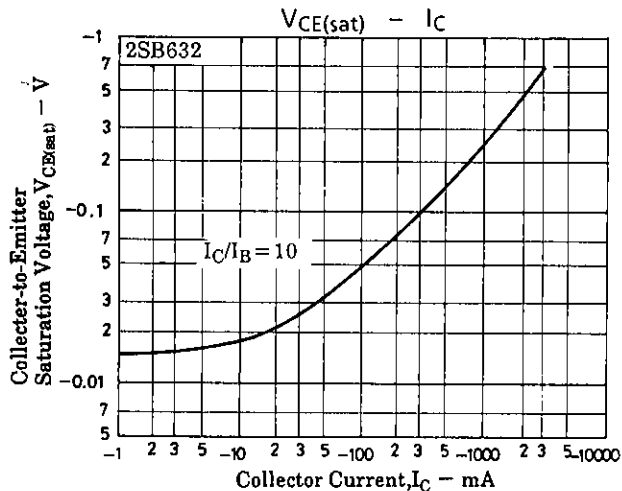
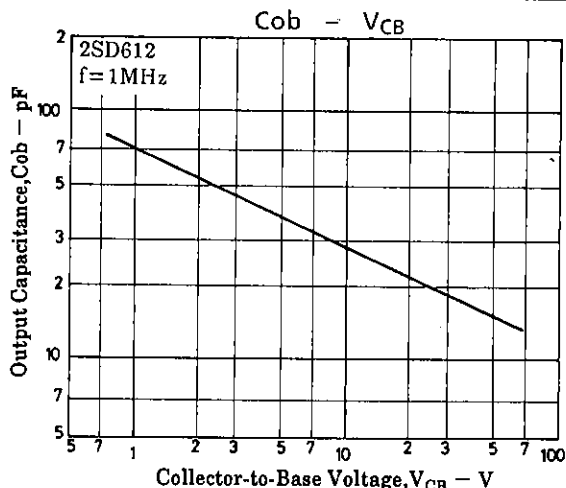
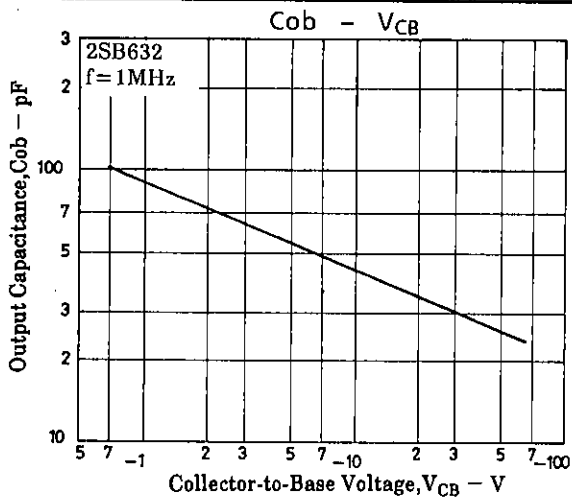
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2SB632, 632K/2SD612, 612K



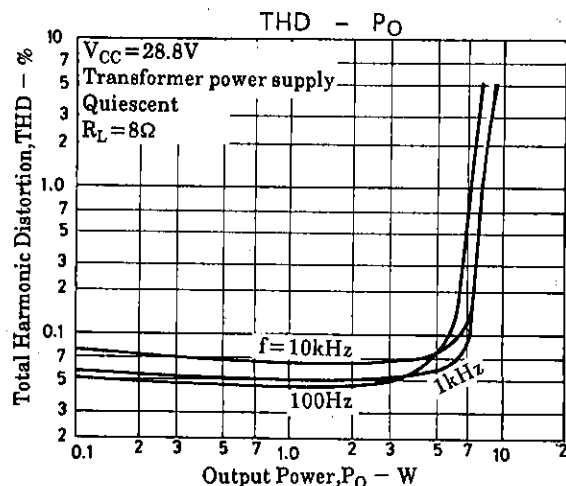
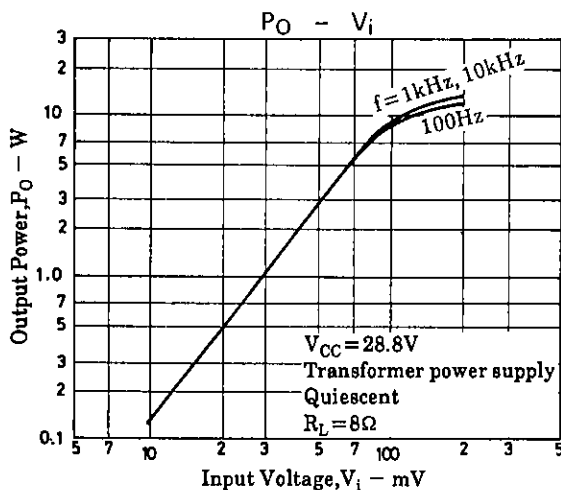
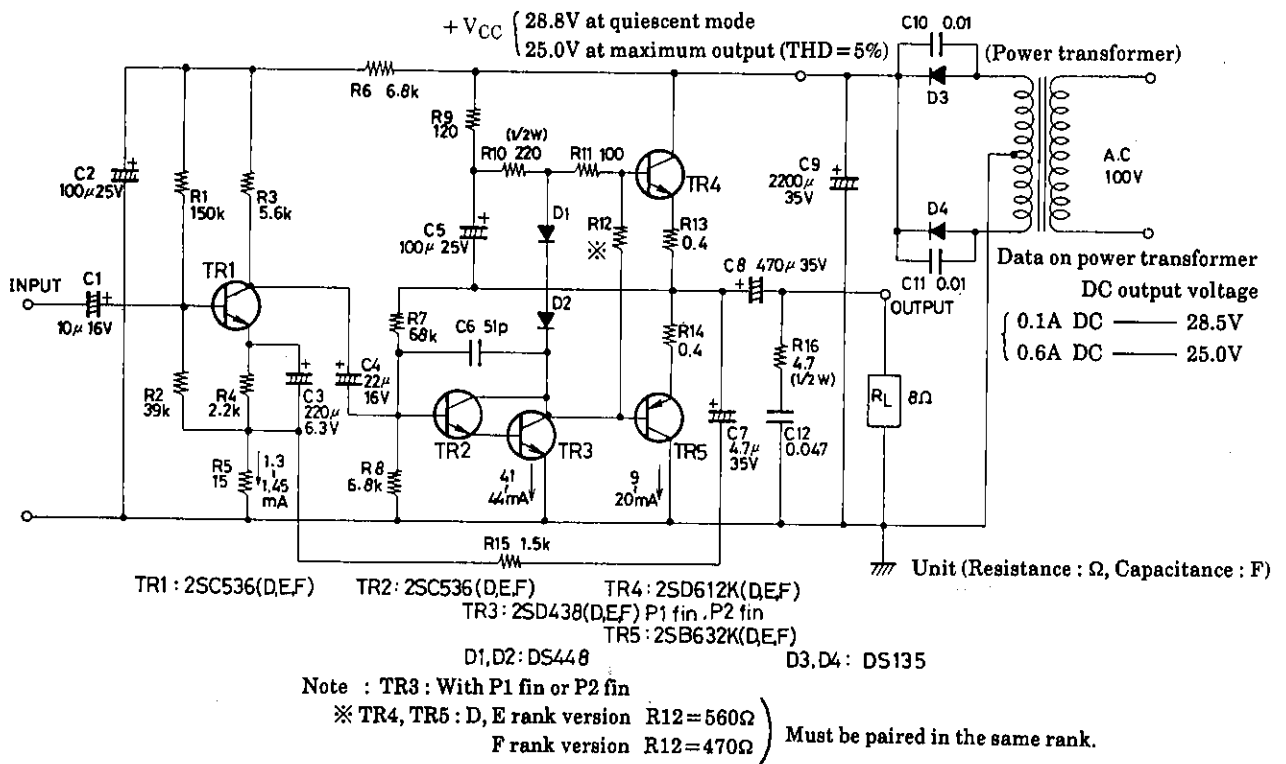
2SB632, 632K/2SD612, 612K



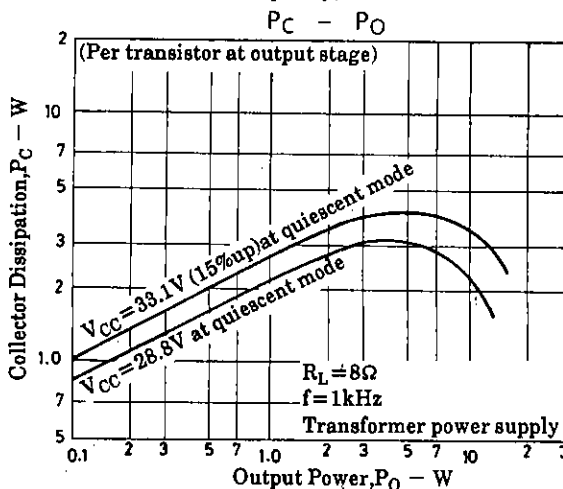
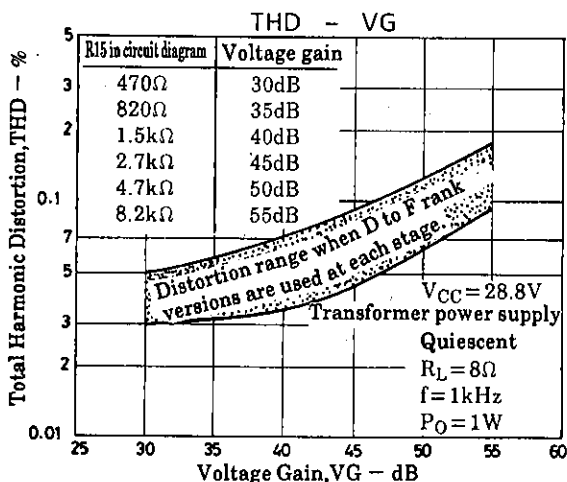
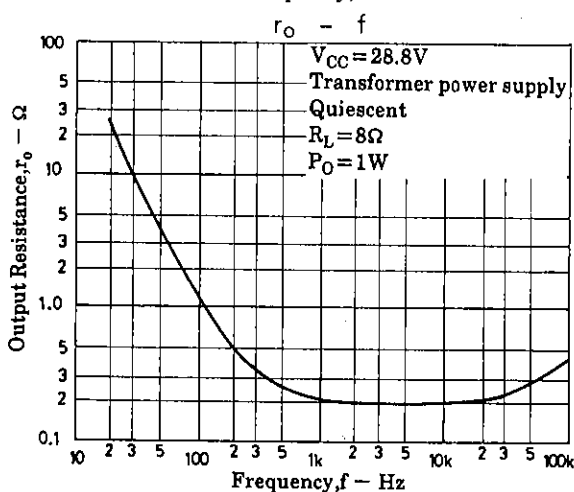
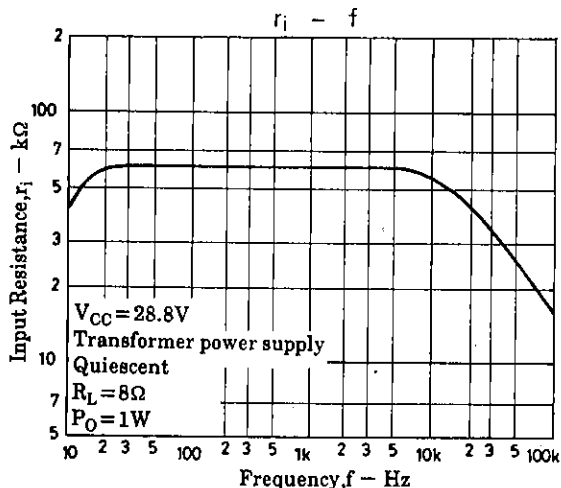
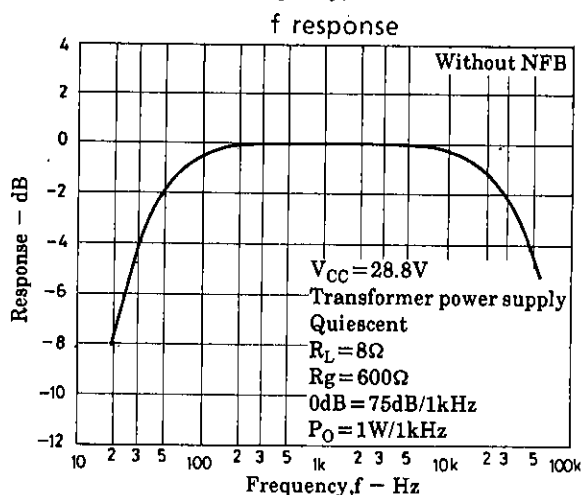
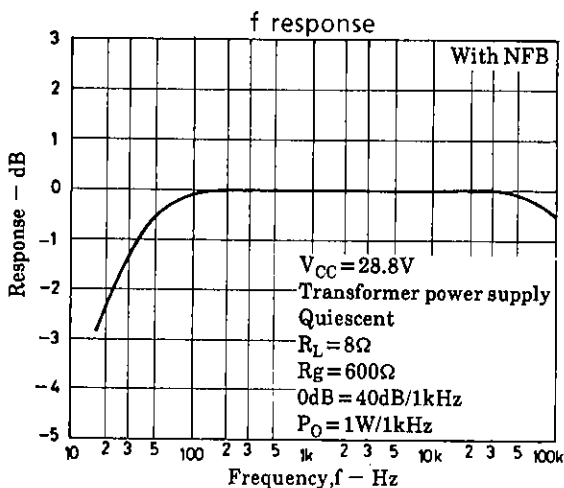
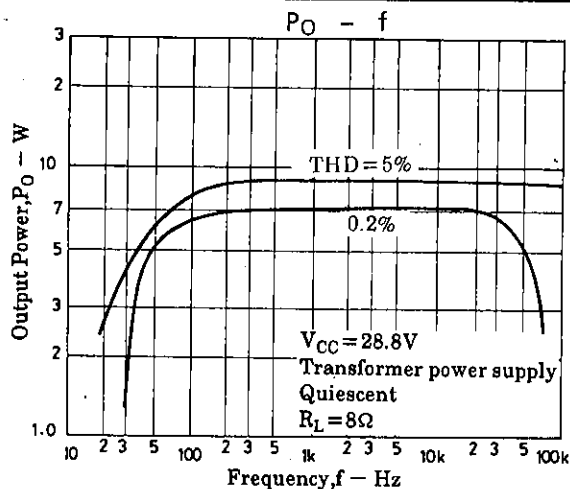
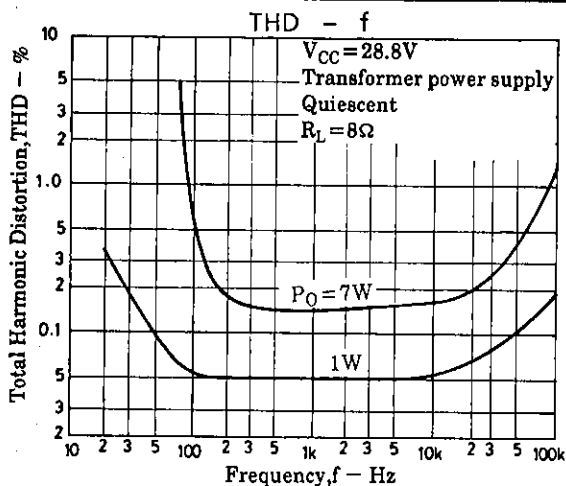
## 2SB632, 632K/2SD612, 612K

**Sample Application Circuit 1 : 8W pure complementary amplifier using the 2SB632K/2SD612K**  
 [Specifications] Power supply : 100V AC supply transformer with no signal = 28.8V,  
 Maximum output = (THD = 5%) = 25V,  $f = 1\text{kHz}$ ,  $R_L = 8\Omega$ ,  $R_g = 600\Omega$

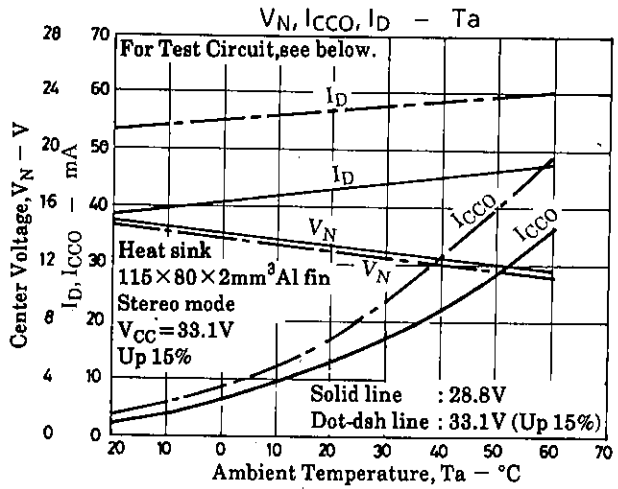
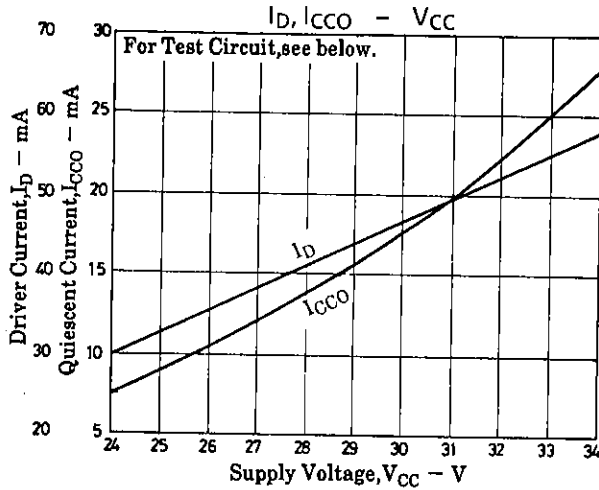
|  |           |                   | typ  | uint       |
|--|-----------|-------------------|------|------------|
| Quiescent Current<br>(Collector Current) | $I_{CC0}$ | Output stage      | 14.0 | mA         |
|  | $I_D$     | Drive stage       | 42.0 | mA         |
|  | $I_C$     | First stage       | 1.4  | mA         |
| Voltage Gain                             | VG        | Without NFB       | 75   | dB         |
|  | VG        | With NFB          | 40   | dB         |
| Output Power                             | $P_O$     | THD = 5%          | 8.7  | W          |
| Total Harmonic Distortion                | THD       | $P_O = 1\text{W}$ | 0.05 | %          |
| Input Resistance                         | $r_i$     | $P_O = 1\text{W}$ | 60   | k $\Omega$ |
| Output Resistance                        | $r_o$     | $P_O = 1\text{W}$ | 0.2  | $\Omega$   |



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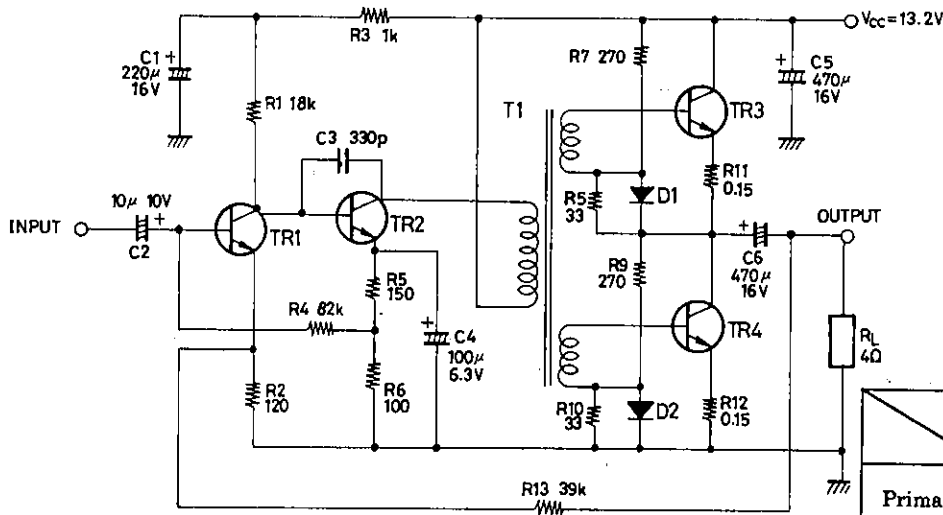
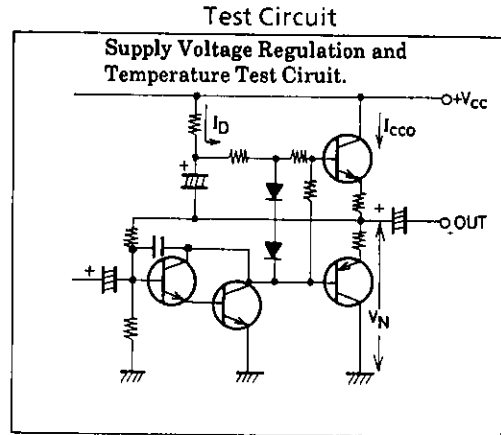
# 2SB632, 632K/2SD612, 612K



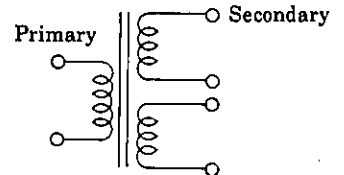
## Sample Application Circuit 2 : 2SD612-Used 4W Input Transformer Coupling Amp for Car Use.

[Specifications]  $V_{CC} = 13.2V$ ,  $R_L = 4\Omega$ ,  $R_g = 600\Omega$ ,  $f = 1kHz$

|                                       |           |              |      |            |
|---------------------------------------|-----------|--------------|------|------------|
| Quiescent Current (Collector Current) | $I_{CCO}$ | Output stage | 12.0 | mA         |
|                                       | $I_D$     | Drive stage  | 9.0  | mA         |
| Voltage Gain                          | $V_G$     | Without NFB  | 66   | dB         |
|                                       | $V_G$     | With NFB     | 49   | dB         |
| Output Power                          | $P_O$     | THD = 10%    | 4.7  | W          |
| Total Harmonic Distortion             | THD       | $P_O = 0.5W$ | 0.8  | %          |
| Input impedance                       | $r_i$     | $P_O = 0.5W$ | 60   | k $\Omega$ |



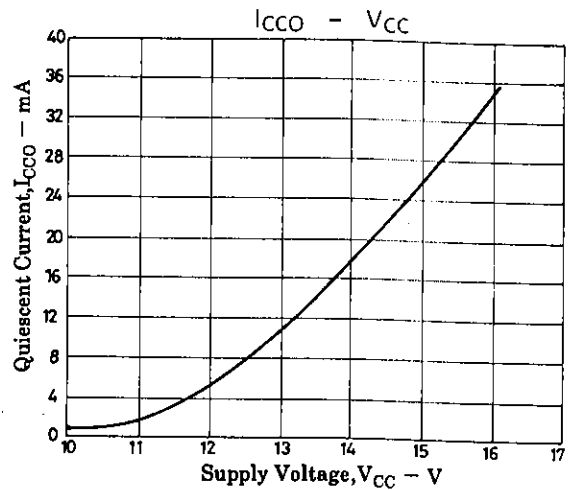
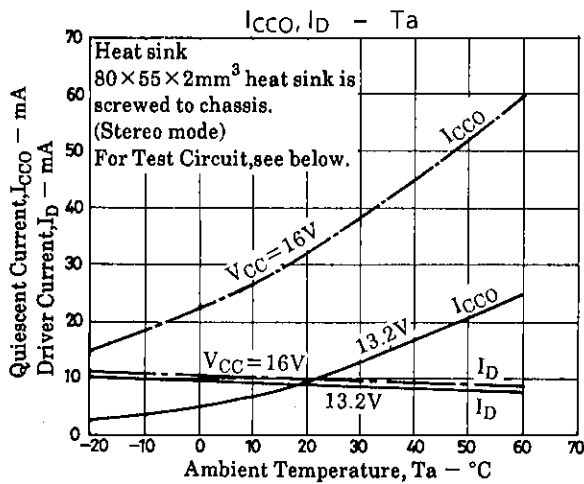
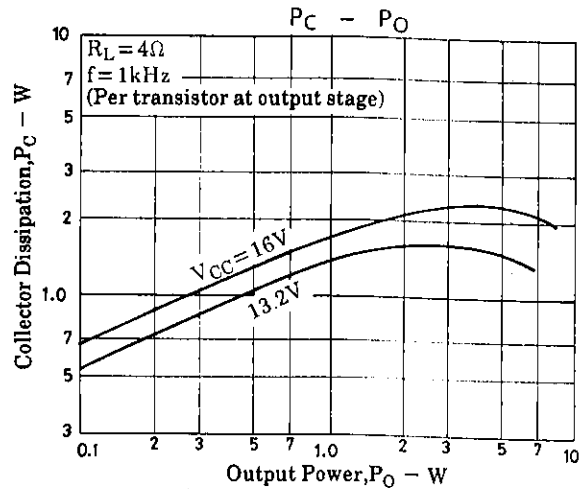
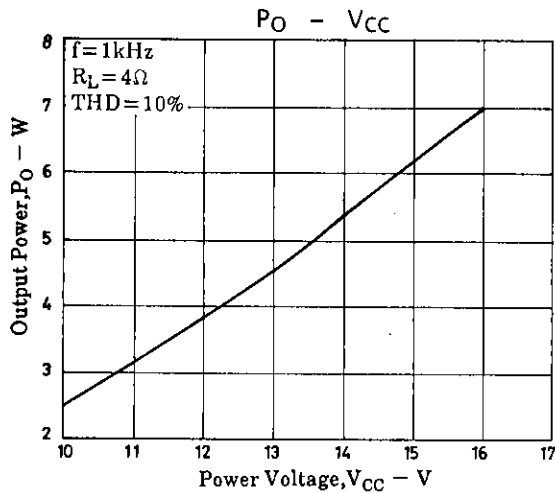
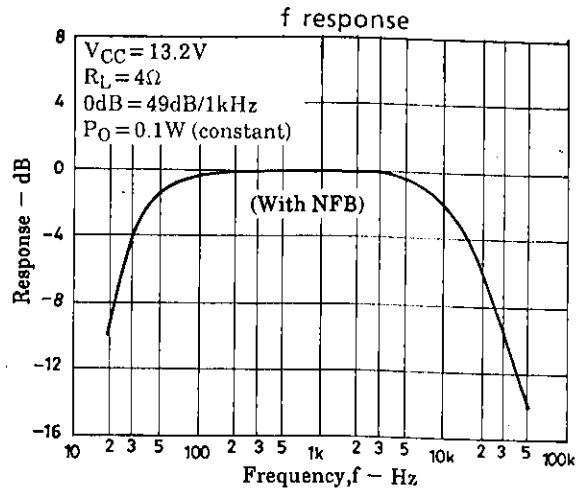
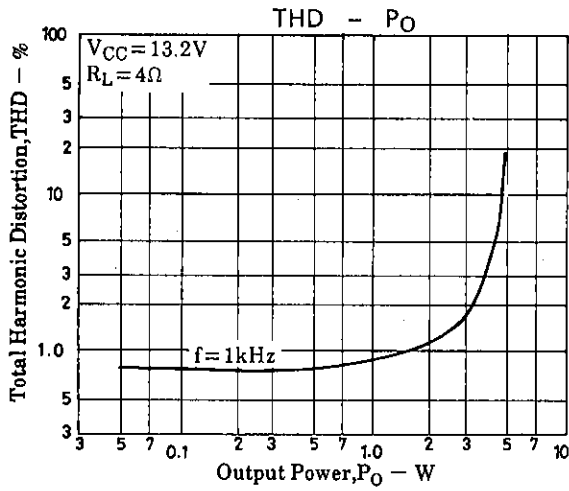
Data on transformer (T1)



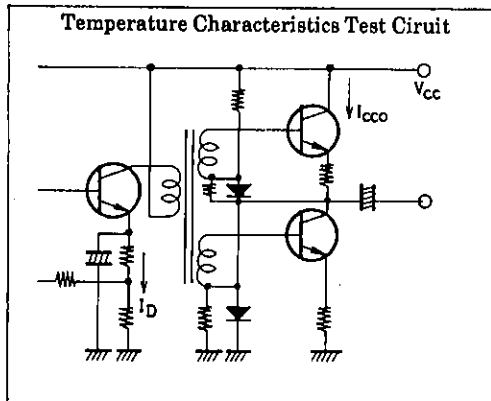
|           | Impedance    | DC resistance |
|-----------|--------------|---------------|
| Primary   | 3k $\Omega$  | 180 $\Omega$  |
| Secondary | 400 $\Omega$ | 18 $\Omega$   |

(Must be paired in the same rank).

Unit (Resistance :  $\Omega$ , Capacitance : F)



**Test Circuit**



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