



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

### 25V/35V, 2A Low-Frequency Power Amplifier Applications

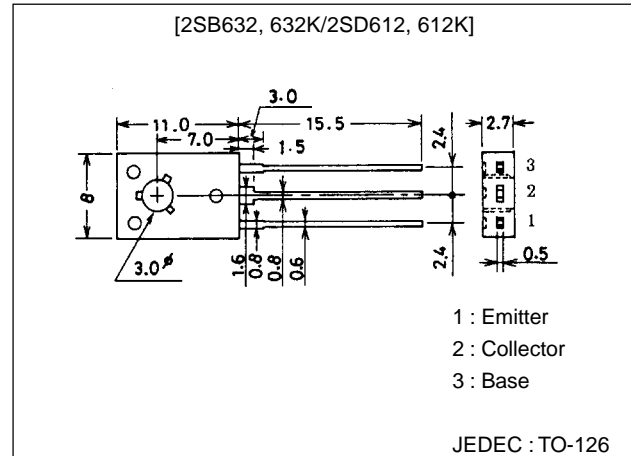
#### Features

- High collector dissipation and wide ASO.

#### Package Dimensions

unit:mm

2009B



() : 2SB632, 632K

#### Specifications

##### Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	2SB632, D612	2SB632K, D612K	Unit
Collector-to-Base Voltage	$V_{CB0}$		(-25	(-35	V
Collector-to-Emitter Voltage	$V_{CE0}$		(-25	(-35	V
Emitter-to-Base Voltage	$V_{EBO}$			(-5	V
Collector Current	$I_C$			(-2	A
Collector Current (Pulse)	$I_{CP}$			(-3	A
Collector Dissipation	$P_C$			1	W
		$T_c=25^\circ\text{C}$		10	W
Junction Temperature	$T_j$			150	°C
Storage Temperature	$T_{stg}$			-55 to +150	°C

##### Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)10\mu\text{A}, I_E=0$	B632, D612	(-25		V
			B632K, D612K	(-35		V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1\text{mA}, R_{BE}=\infty$	B632, D612	(-25		V
			B632K, D612K	(-35		V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)10\mu\text{A}, I_C=0$		(-5		V
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=(-)20\text{V}, I_E=0$			(-1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=(-)4\text{V}, I_C=0$			(-1	$\mu\text{A}$

\* : The 2SB632/2SD612 are classified by 500mA  $h_{FE}$  as follows :

60	D	120	100	E	200	160	F	320
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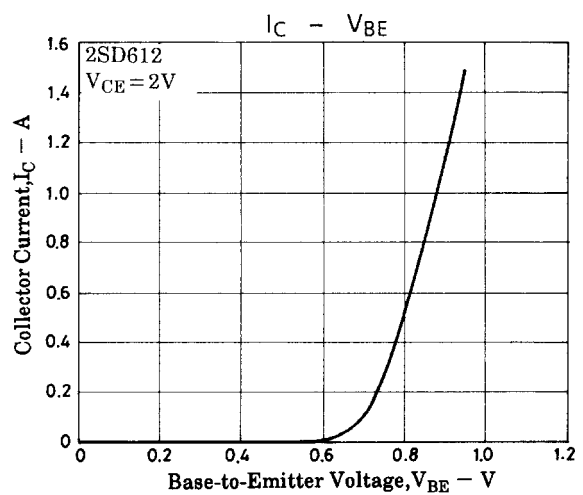
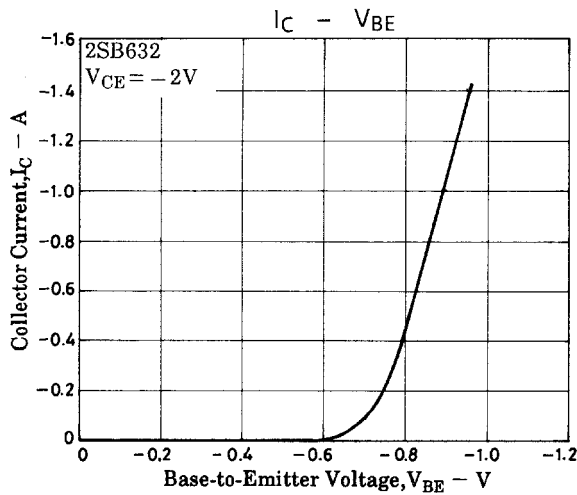
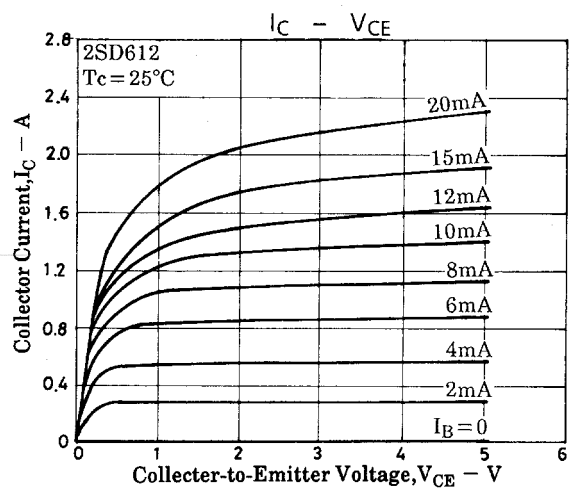
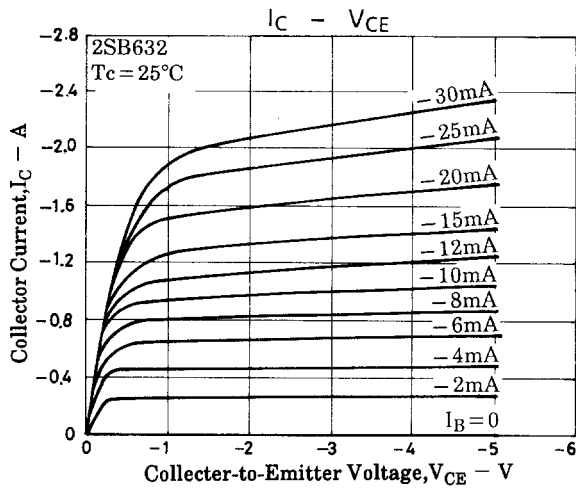
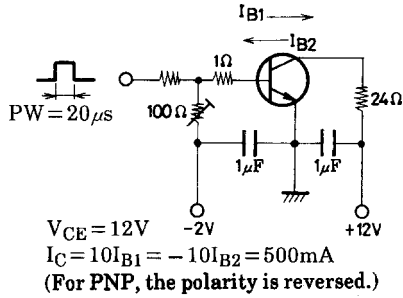
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

91098HA (KT)/90595MO (KOTO)/4017K1/D174MW, TS/E108, 8-2176 No.341-1/9

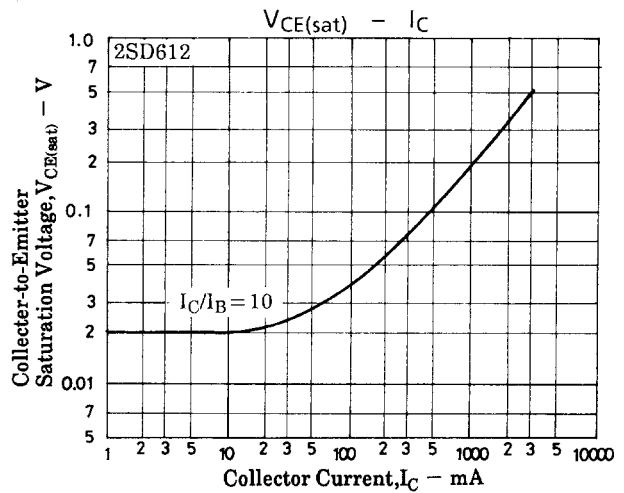
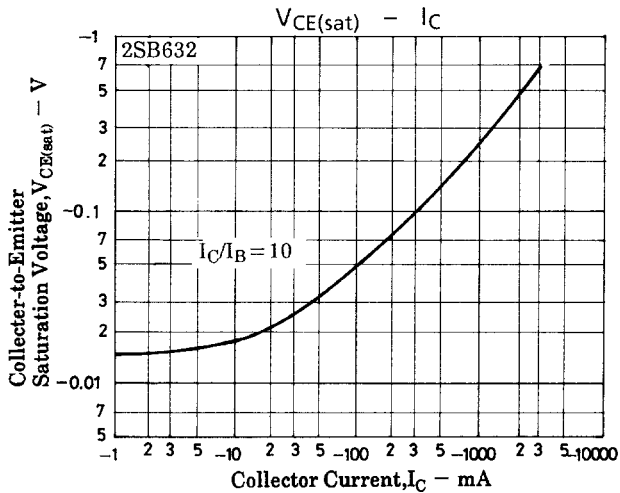
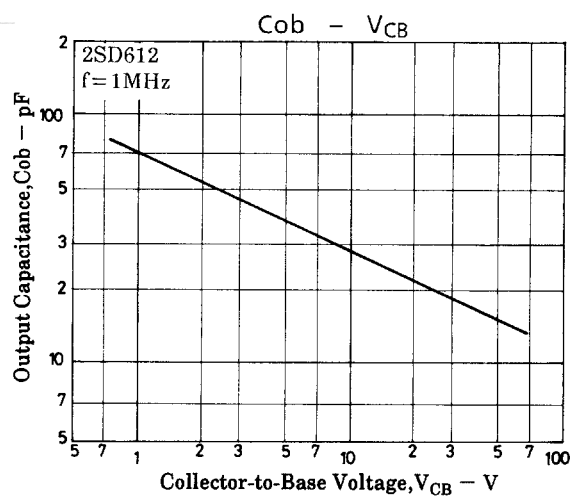
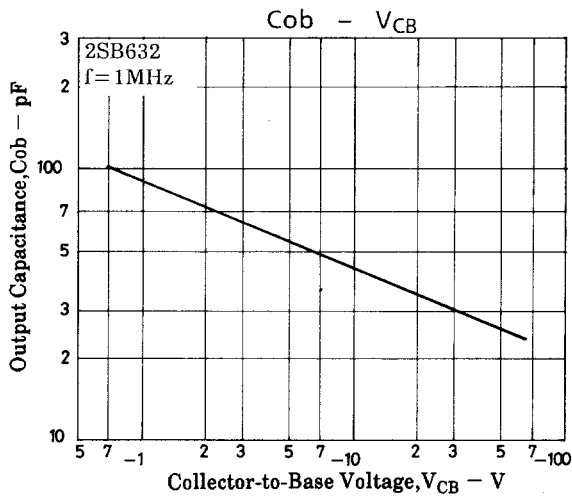
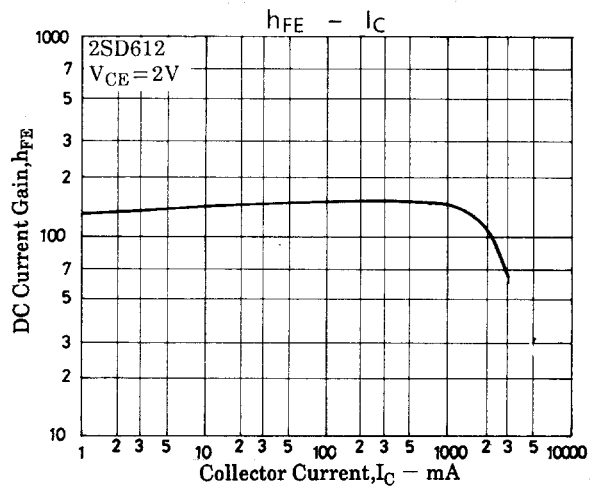
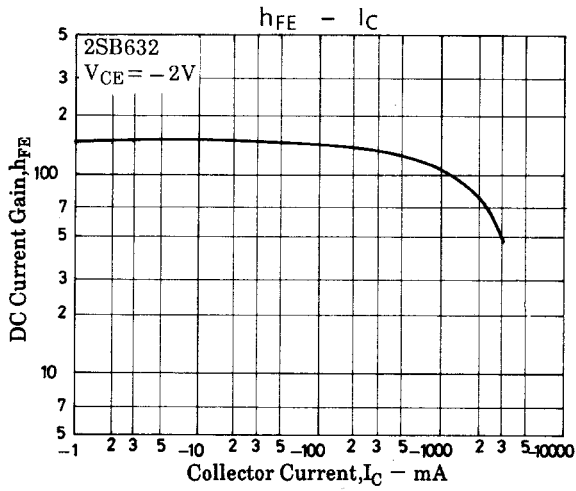
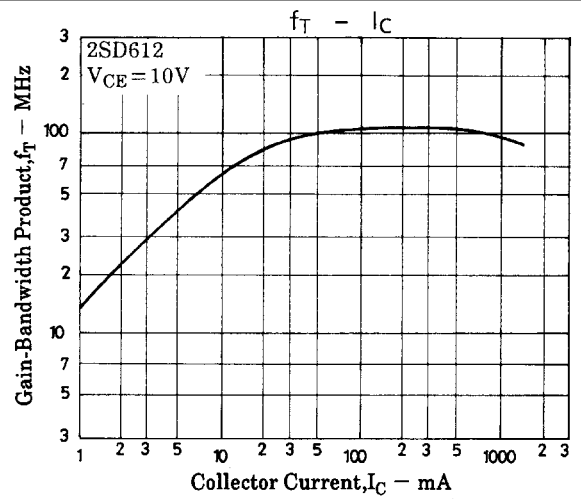
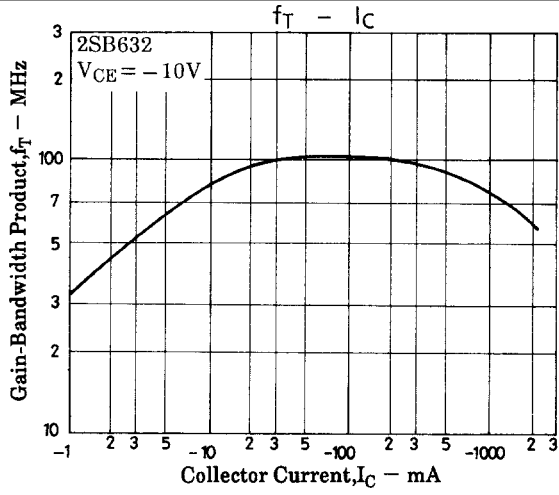
## 2SB632, 632K/2SD612, 612K

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
DC Current Gain	$h_{FE1}$	$V_{CE}=(-)2V, I_C=(-)500mA$	60*		320*	
	$h_{FE2}$	$V_{CE}=(-)2V, I_C=(-)1.5A$	30			
Gain-Bandwidth Product	$f_T$	$V_{CE}=(-)10V, I_C=(-)50mA$		100		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=(-)10V, f=1MHz$		(45)30		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)1.5A, I_B=(-)0.15A$		(-0.4)	(-0.9)	V
				0.3	0.8	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=(-)1.5A, I_B=(-)0.15A$		(-1.1)	(-1.5)	V
Turn-ON Time	$t_{on}$	See specified Test Circuit		(60)50		ns
Fall Time	$t_f$	See specified Test Circuit		(80)		ns
				100		ns
Storage Time	$t_{stg}$	See specified Test Circuit		400		ns

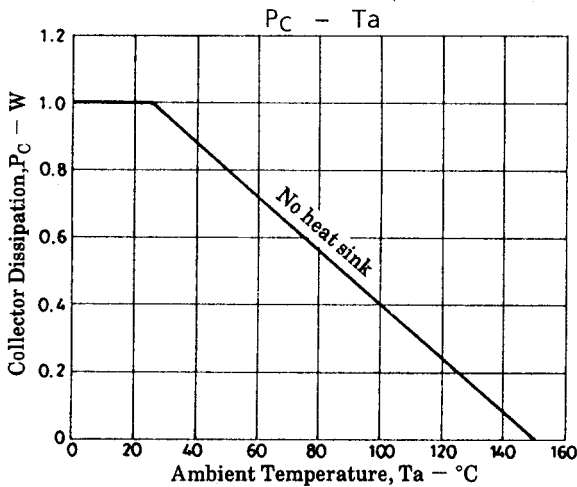
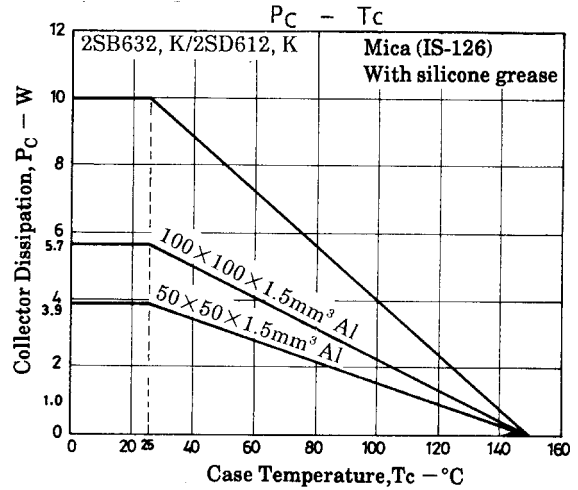
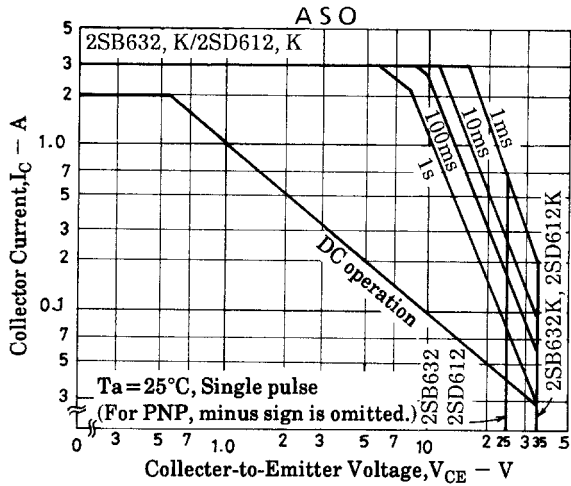
### Switching Time Test Circuit



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



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



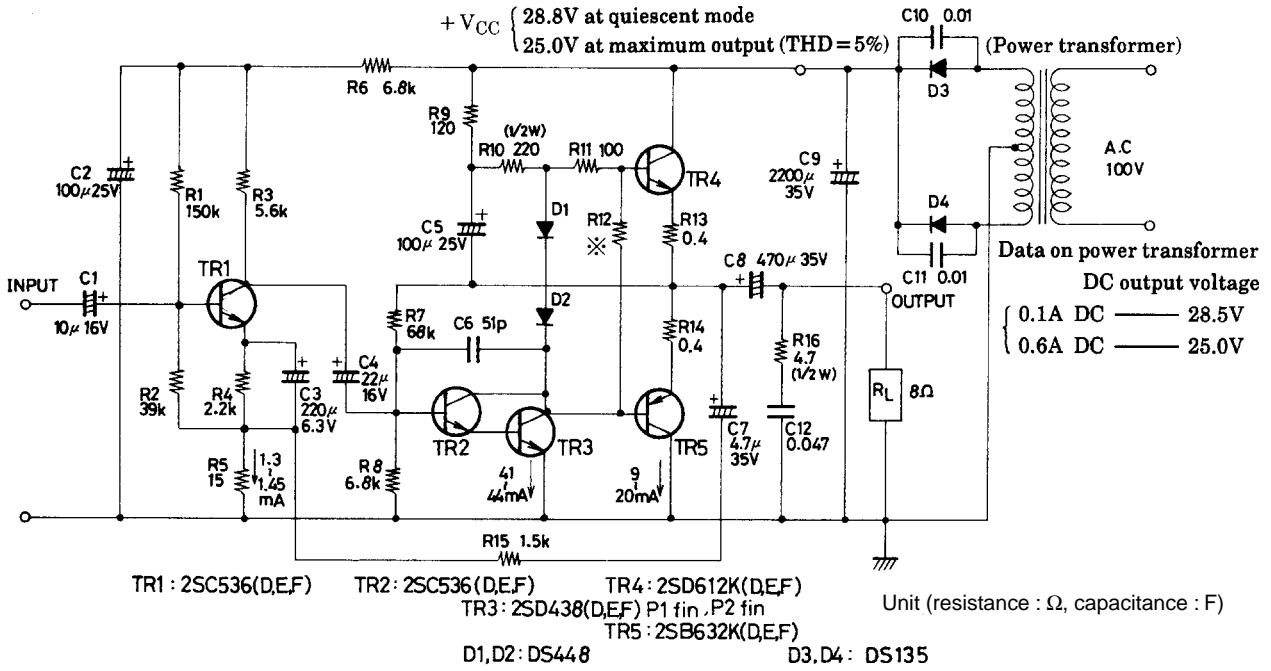
### Sample Application Circuit 1 : 8W pure complementary amplifier using the 2SB632K/2SD612K

[Specifications] Power supply : 100V AC supply transformer with no signal=28.8V.

Maximum output=(THD=5%)=25V,  $f=1\text{kHz}$ ,  $R_L=8\Omega$ ,  $R_g=600\Omega$ .

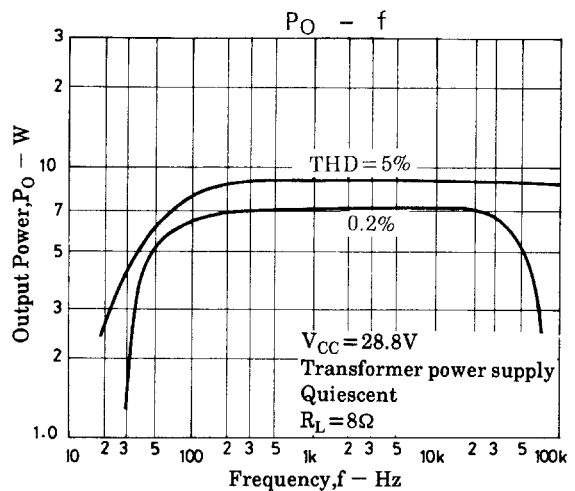
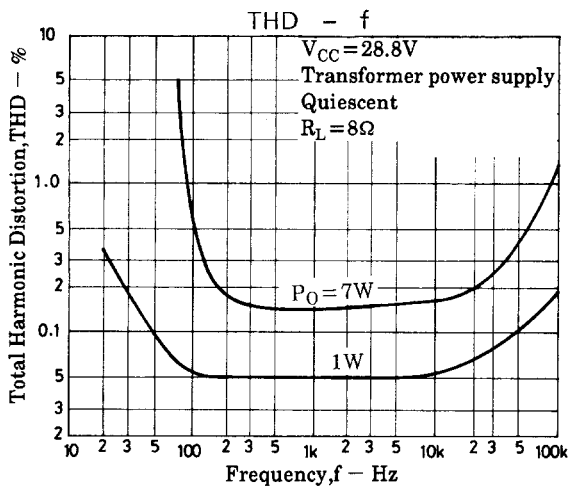
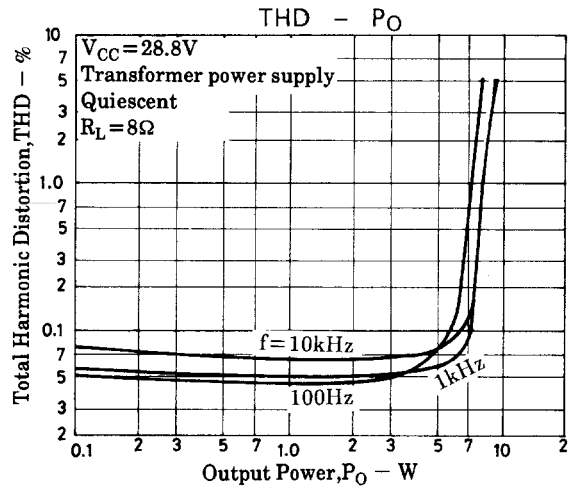
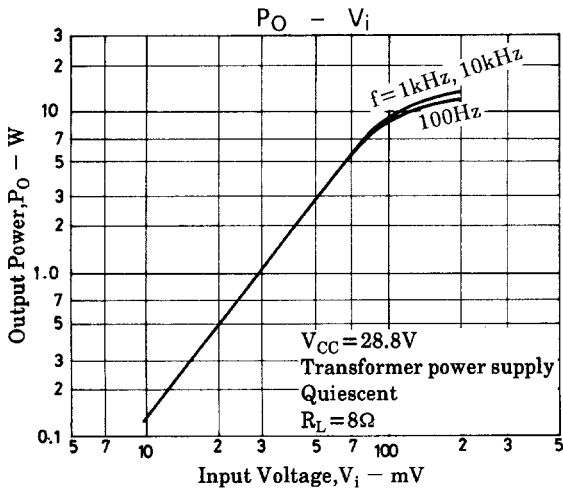
Parameter	Symbol	Conditions	typ	Unit
Quiescent Current (Collector Current)	$I_{CCO}$	Output stage	14.0	mA
	$I_D$	Drive stage	42.0	mA
	$I_C$	First stage	1.4	mA
Voltage Gain	$V_G$	Without NFB	75	dB
	$V_G$	With NFB	40	dB
Output Power	$P_O$	THD=5%	8.7	W
Total Harmonic Distortion	THD	$P_O=1\text{W}$	0.05	%
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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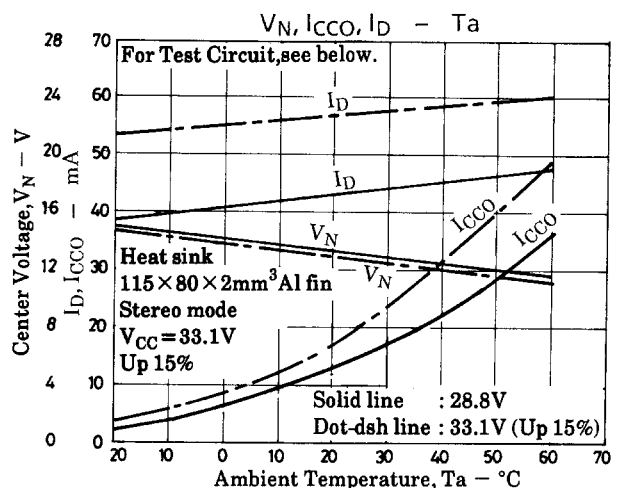
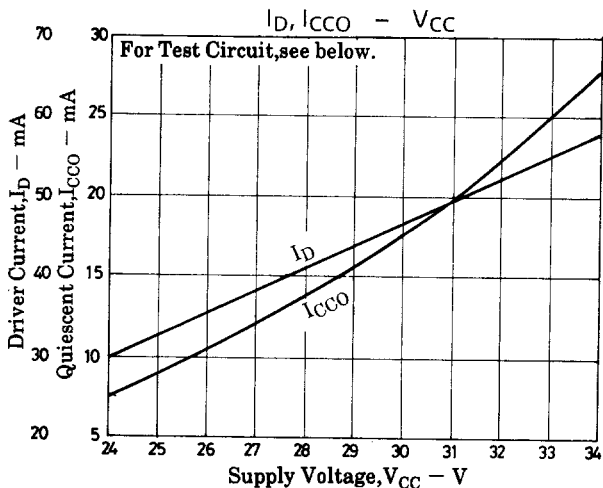
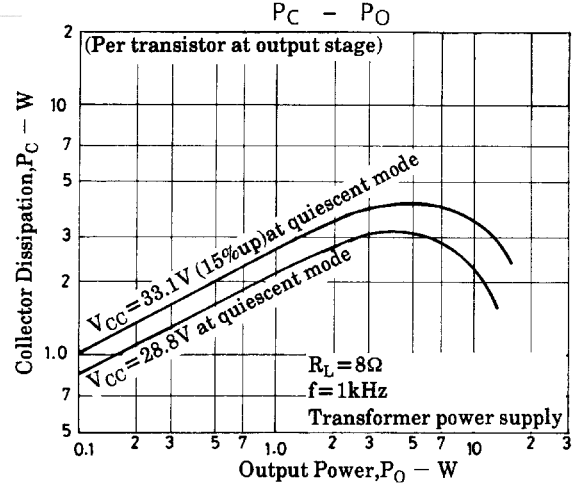
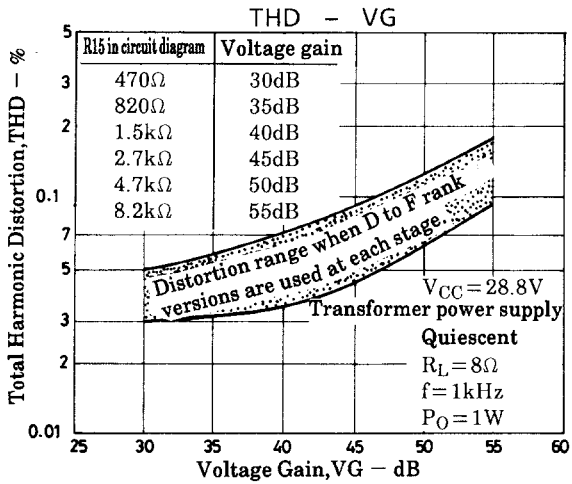
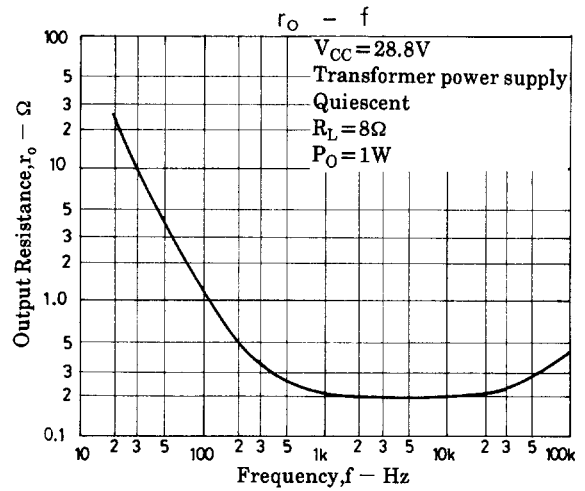
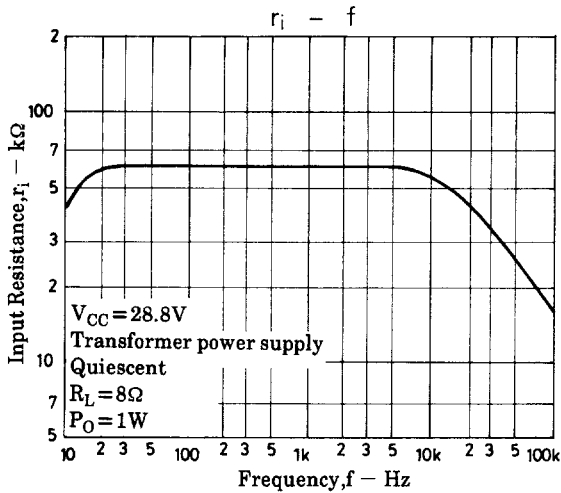
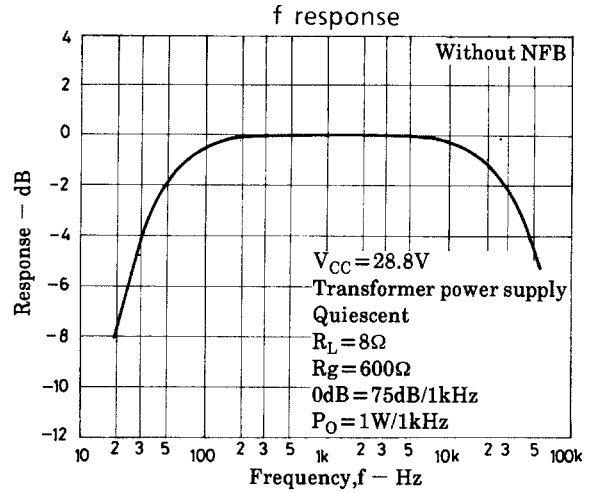
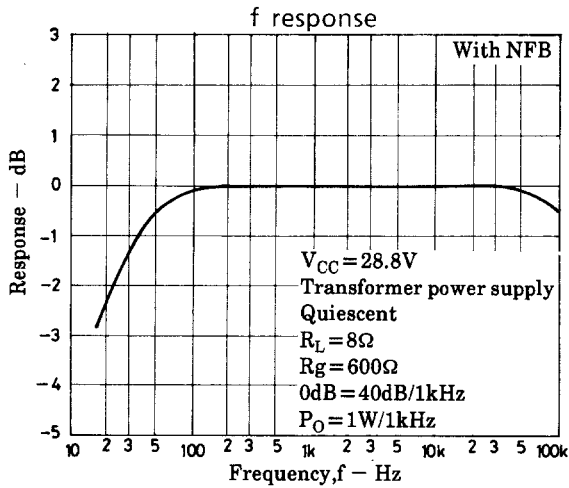


Note : TR3 : With P1 fin or P2 fin

※ TR4, TR5 : D, E rank version  $R_{12} = 560\Omega$  ) Must be paired in the same rank.  
F rank version  $R_{12} = 470\Omega$



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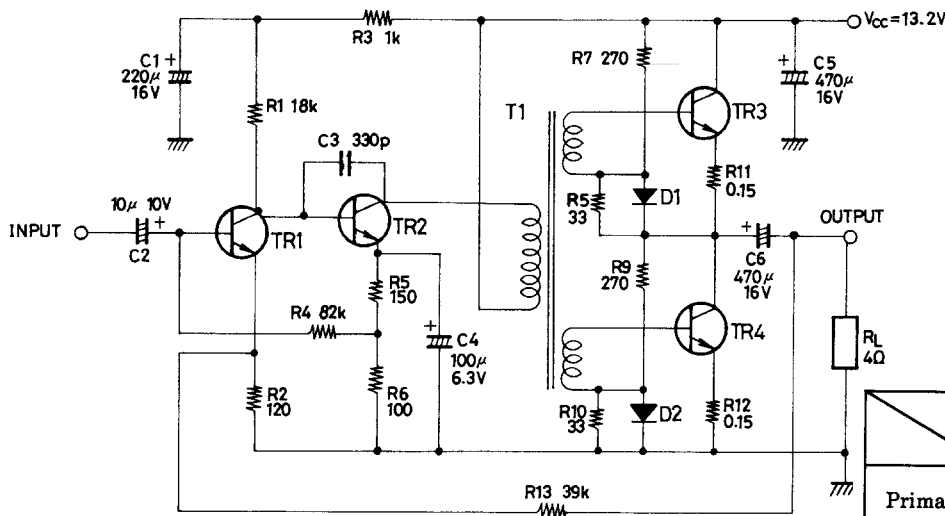
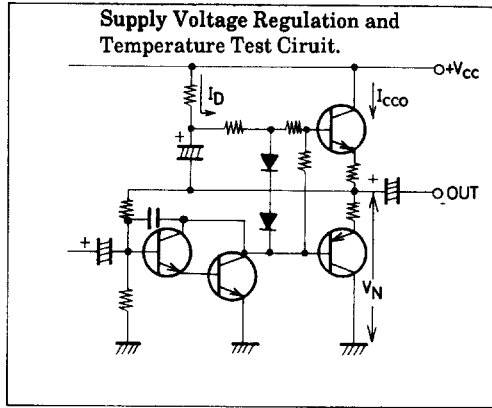
## Sample Application Circuit 2 : 2SD612-Used

4W Input Transformer coupling Amplifier for Car Use.

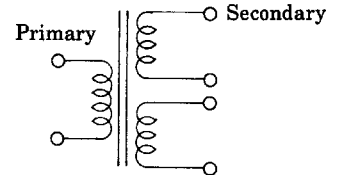
[Specifications]  $V_{CC}=13.2V$ ,  $R_L=4\Omega$ ,  $R_g=600\Omega$ ,  $f=1kHz$ .

Parameter	Symbol	Conditions	typ	Unit
Quiescent Current (Collector Current) Voltage Gain	$I_{CCO}$	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 $\Omega$

### Test Circuit



#### Data on transformer (T1)



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

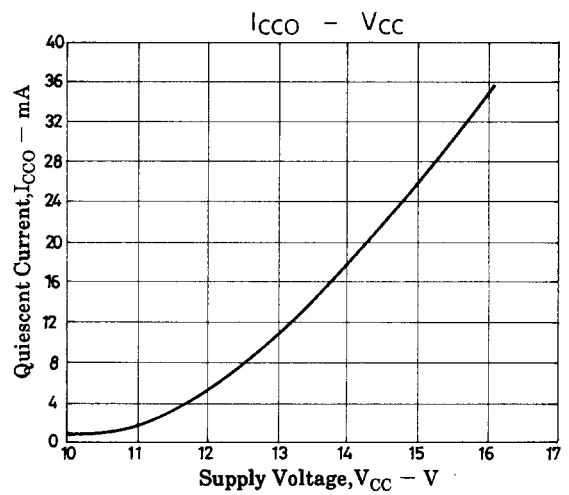
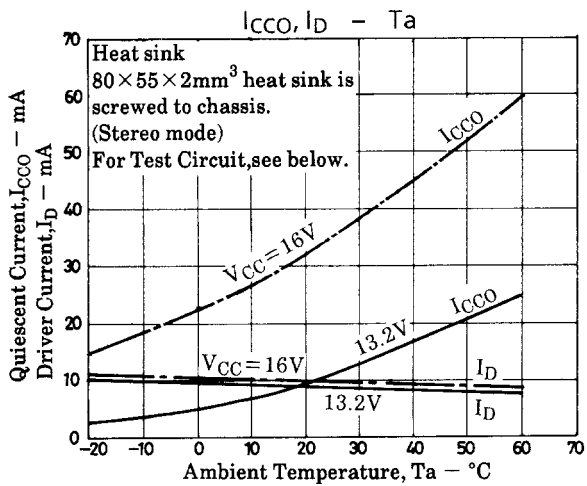
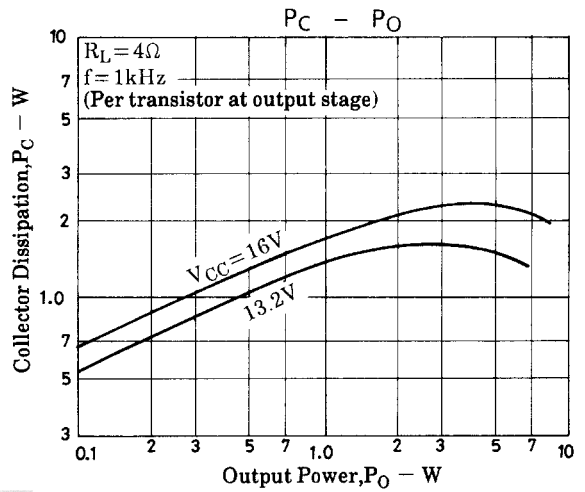
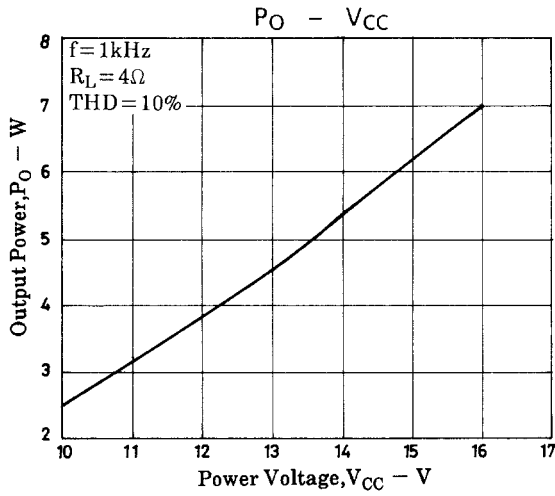
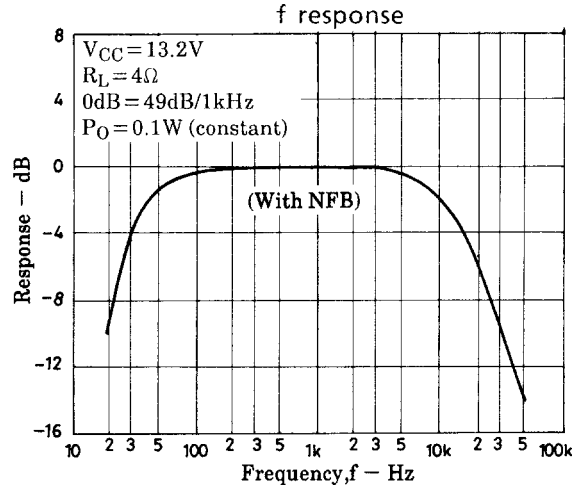
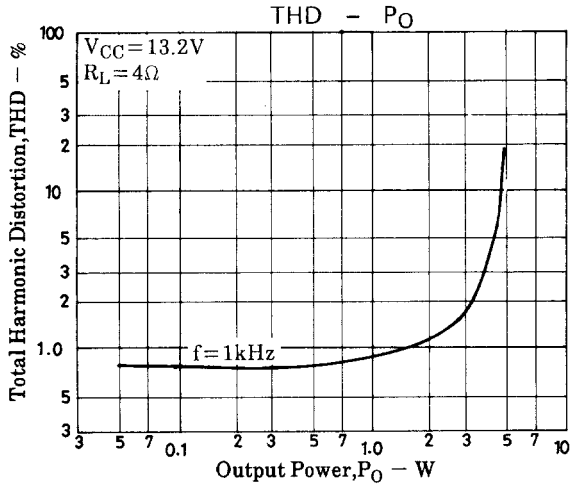
TR1: 2SC536 (E,F)      2SC1175 (E,F)  
TR2

D1, D2: DS442  
TR3, 4: 2SD612 (E,F)

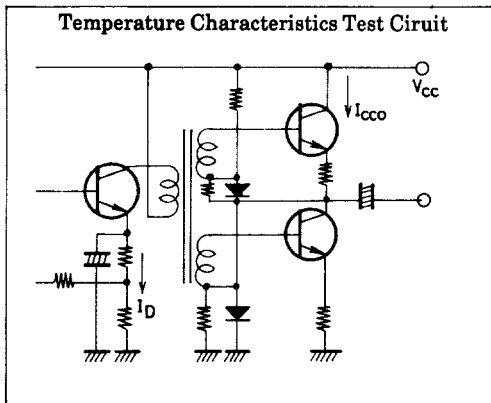
(Must be paired in the same rank).

Unit (resistance :  $\Omega$ , capacitance : F)

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Test Circuit





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