



2SB632, 632K/2SD612, 612K

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

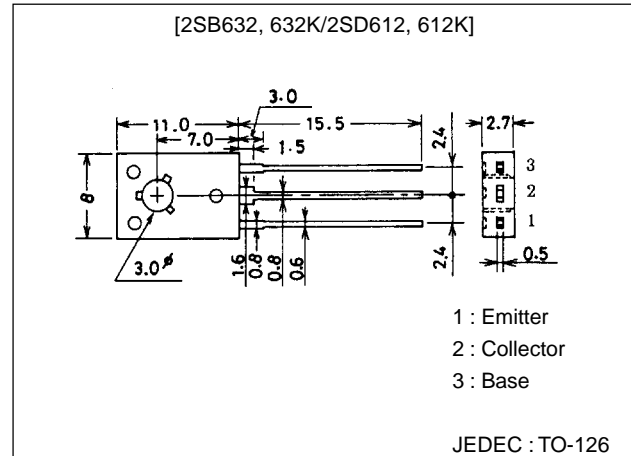
Features

- 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_{CEO}		(-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	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=(-)4\text{V}, I_C=0$			(-1	μA

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

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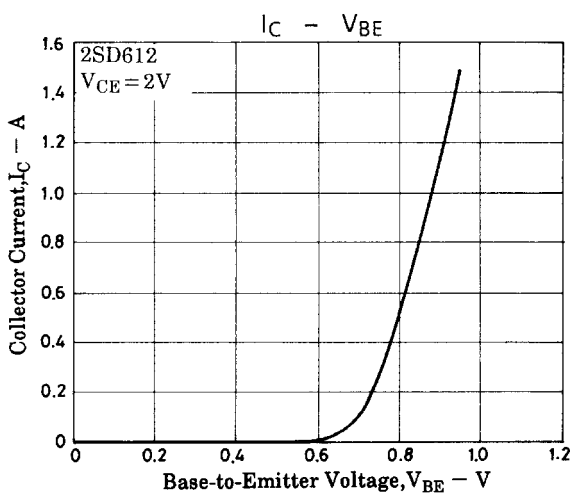
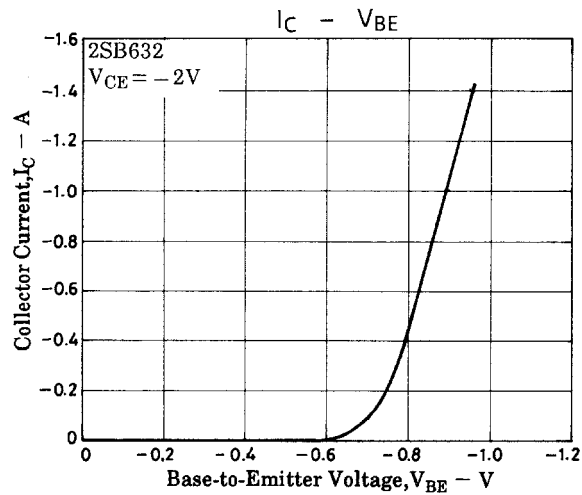
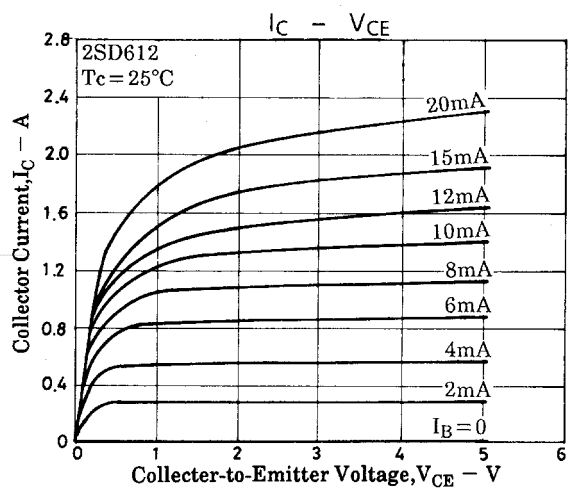
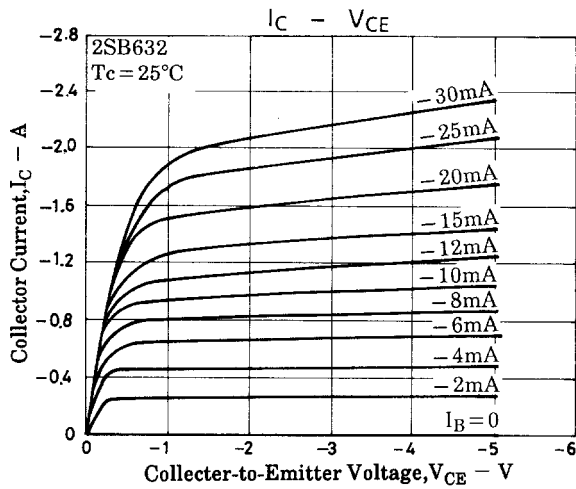
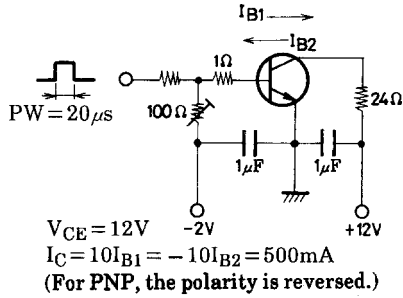
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

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

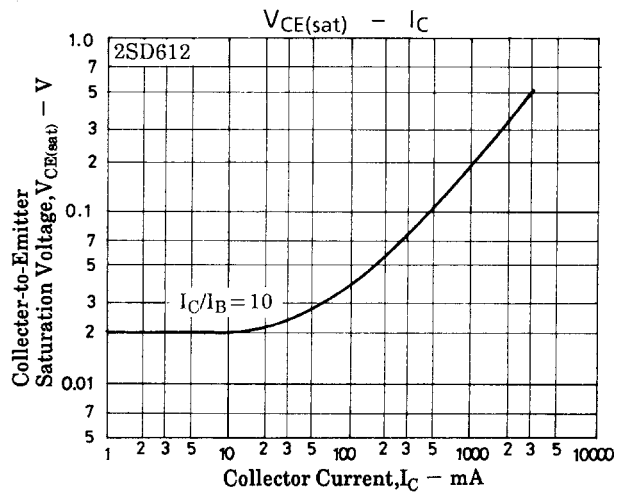
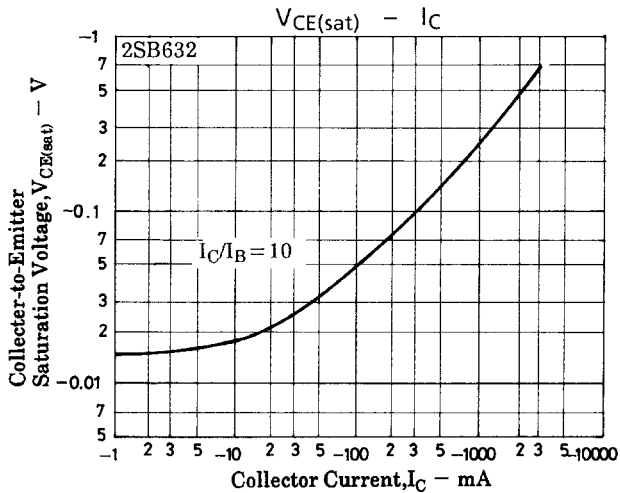
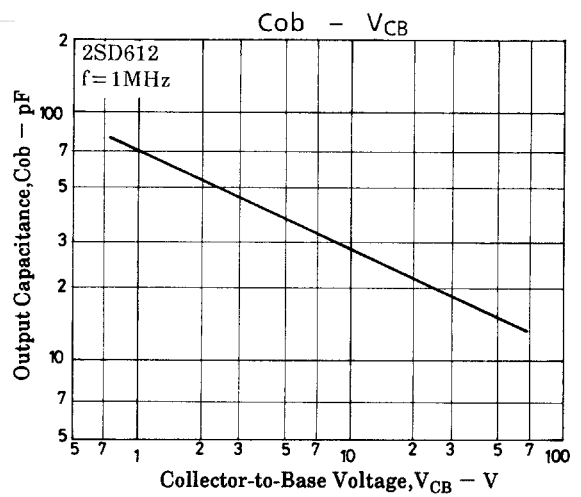
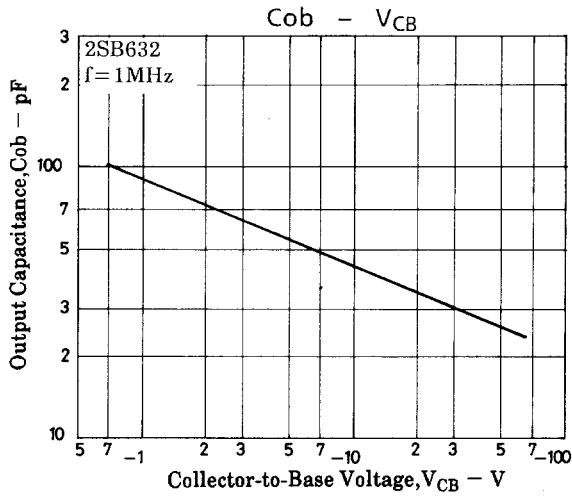
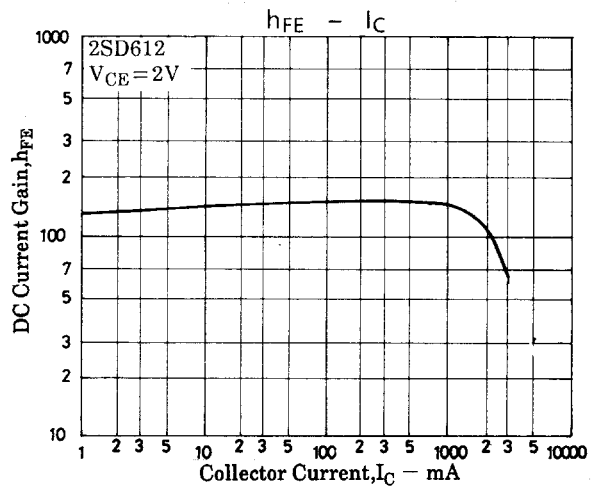
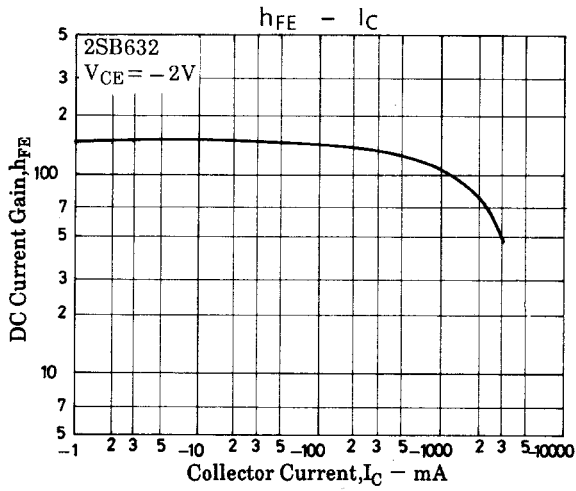
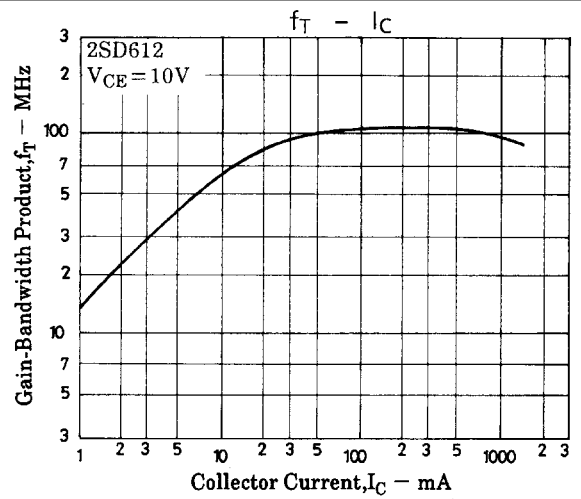
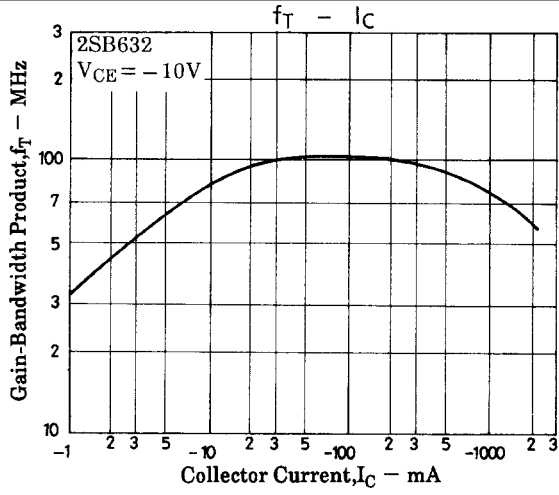
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
DC Current Gain	h_{FE1}	$V_{CE}=(-)2V, I_C=(-)500mA$	60*		320*	
	h_{FE2}	$V_{CE}=(-)2V, I_C=(-)1.5A$	30			
Gain-Bandwidth Product	f_T	$V_{CE}=(-)10V, I_C=(-)50mA$		100		MHz
Output Capacitance	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

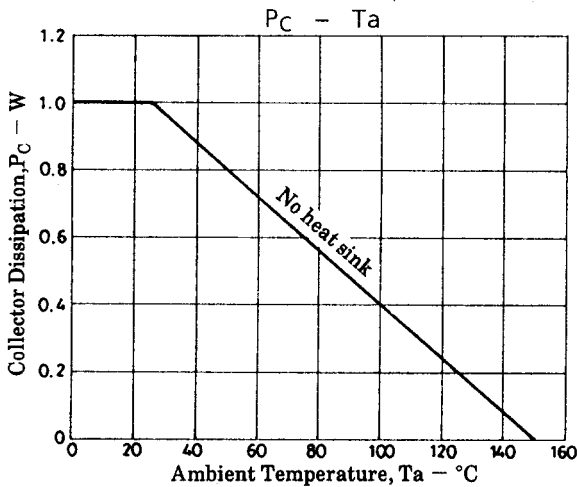
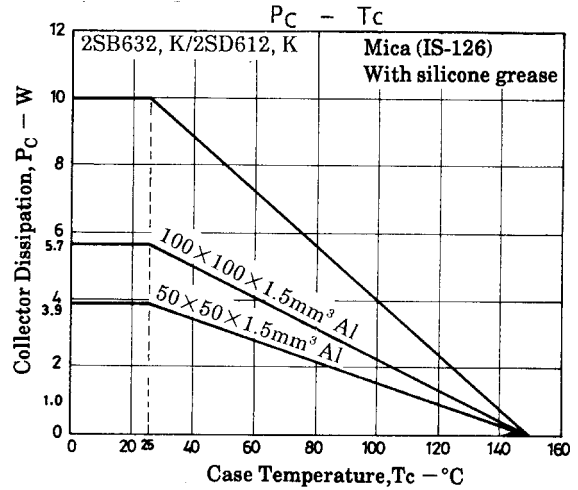
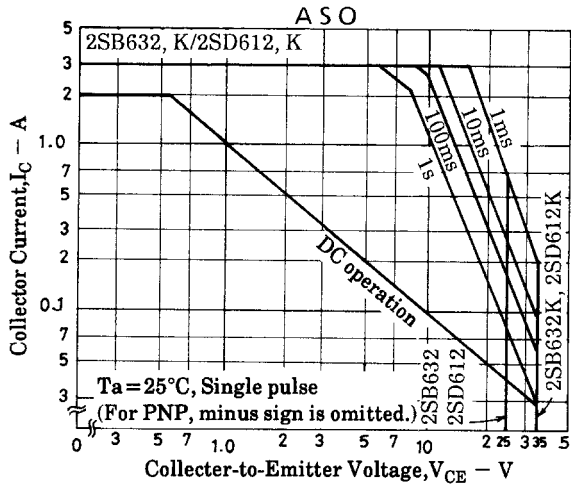
Switching Time Test Circuit



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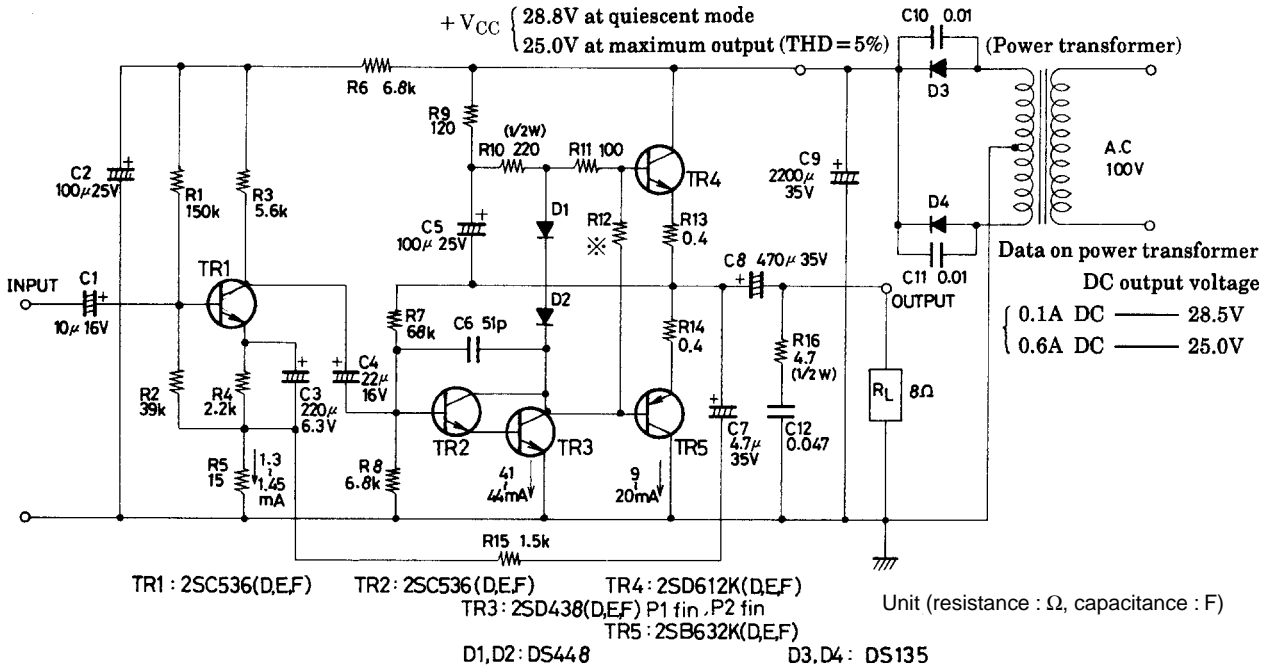
Sample Application Circuit 1 : 8W pure complementary amplifier using the 2SB632K/2SD612K

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

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

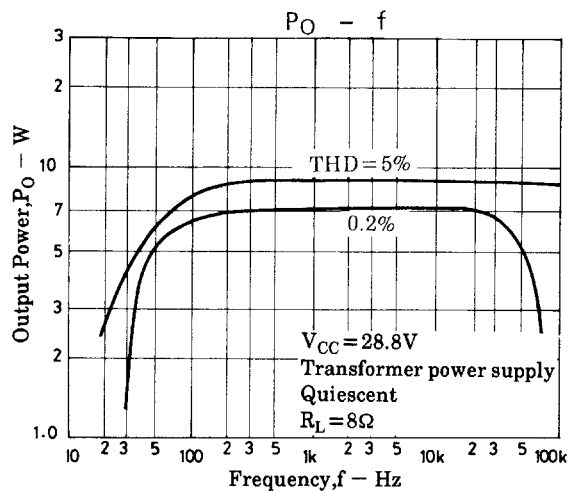
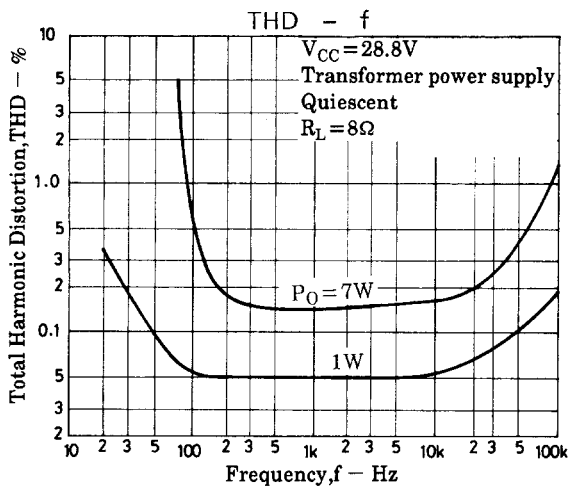
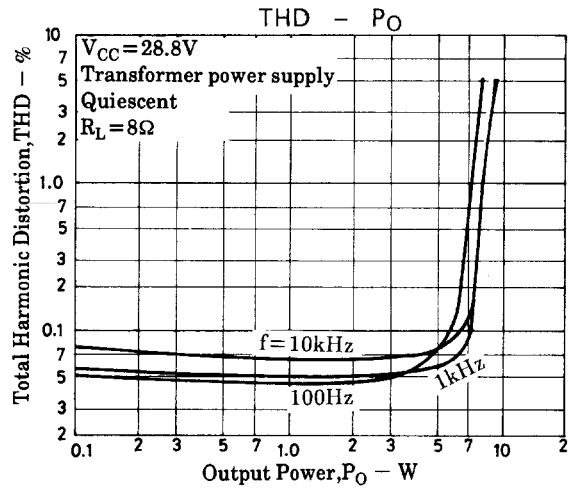
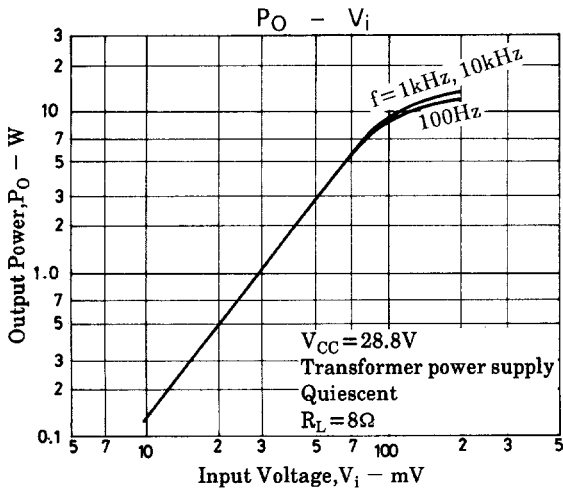
Parameter	Symbol	Conditions	typ	Unit
Quiescent Current (Collector Current)	I_{CCO}	Output stage	14.0	mA
	I_D	Drive stage	42.0	mA
	I_C	First stage	1.4	mA
Voltage Gain	V_G	Without NFB	75	dB
	V_G	With NFB	40	dB
Output Power	P_O	THD=5%	8.7	W
Total Harmonic Distortion	THD	$P_O=1\text{W}$	0.05	%
Input Resistance	r_i	$P_O=1\text{W}$	60	k Ω
Output Resistance	r_o	$P_O=1\text{W}$	0.2	Ω

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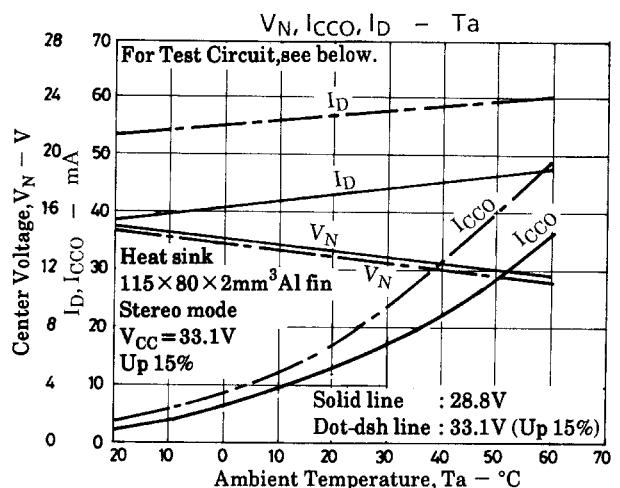
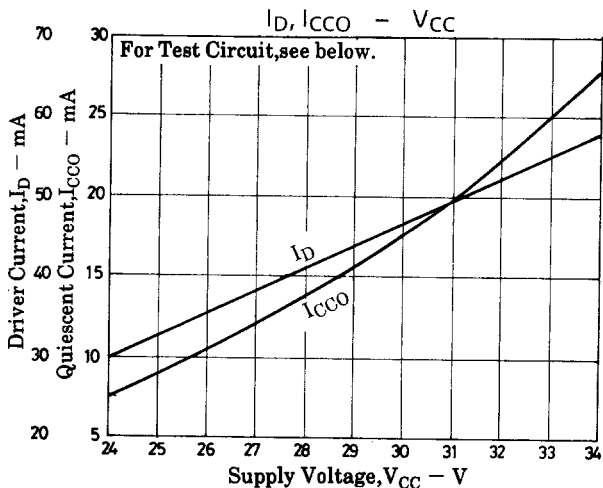
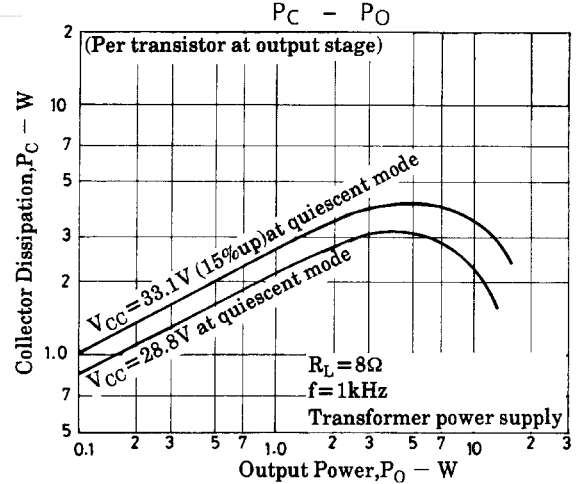
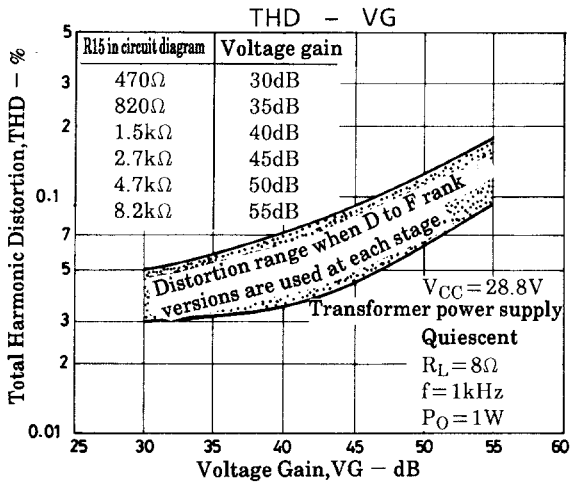
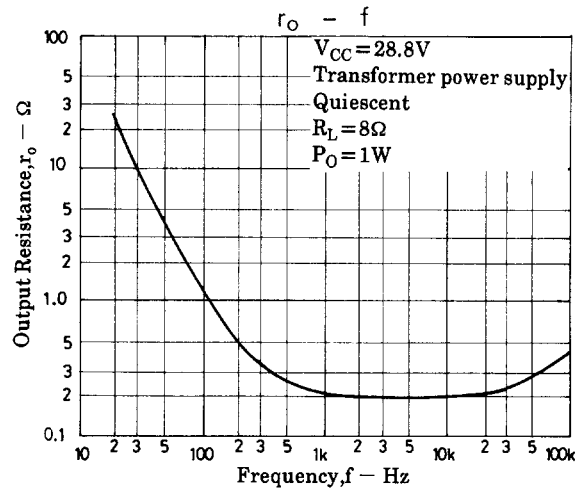
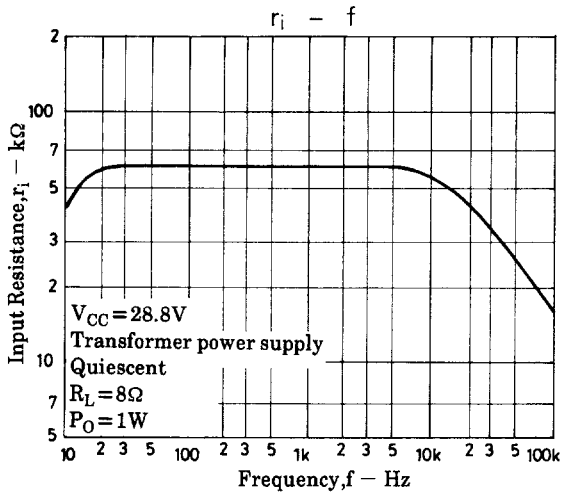
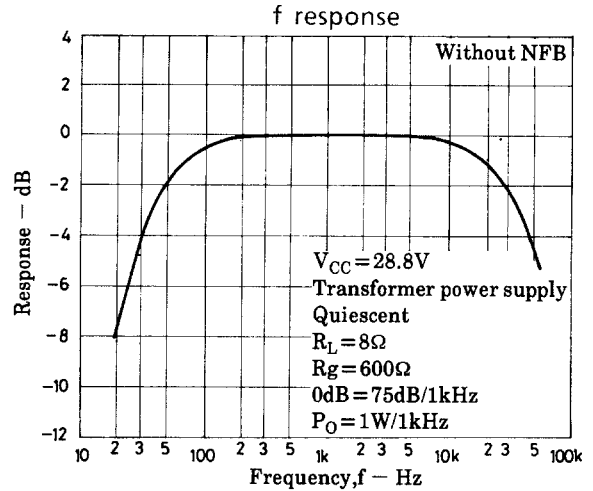
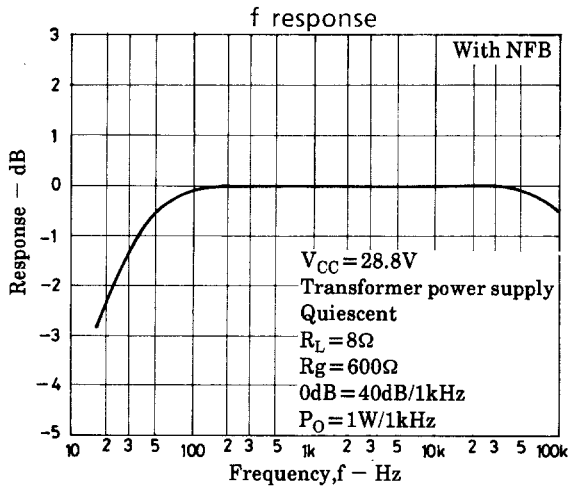


Note : TR3 : With P1 fin or P2 fin

* TR4, TR5 : D, E rank version R12=560Ω
 F rank version R12=470Ω) Must be paired in the same rank.



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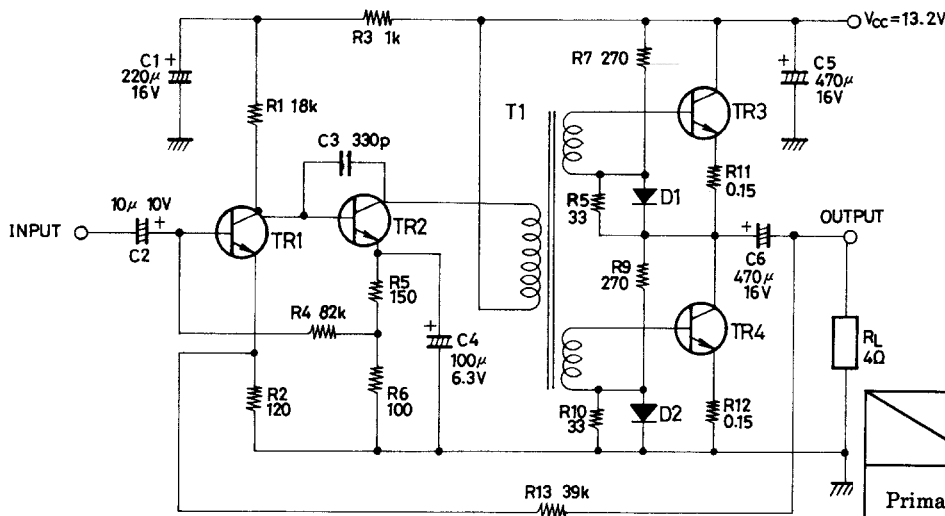
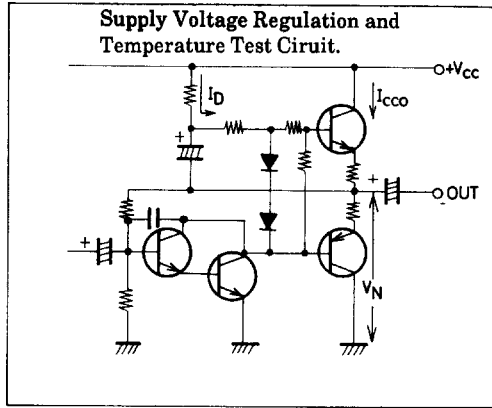
Sample Application Circuit 2 : 2SD612-Used

4W Input Transformer coupling Amplifier for Car Use.

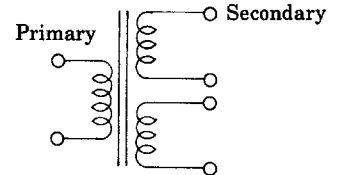
[Specifications] $V_{CC}=13.2V$, $R_L=4\Omega$, $R_g=600\Omega$, $f=1kHz$.

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 Ω

Test Circuit



Data on transformer (T1)



	Impedance	DC resistance
Primary	3k Ω	180 Ω
Secondary	400 Ω	18 Ω

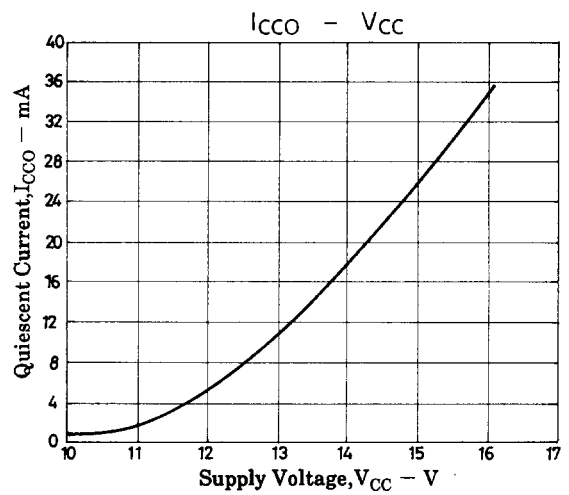
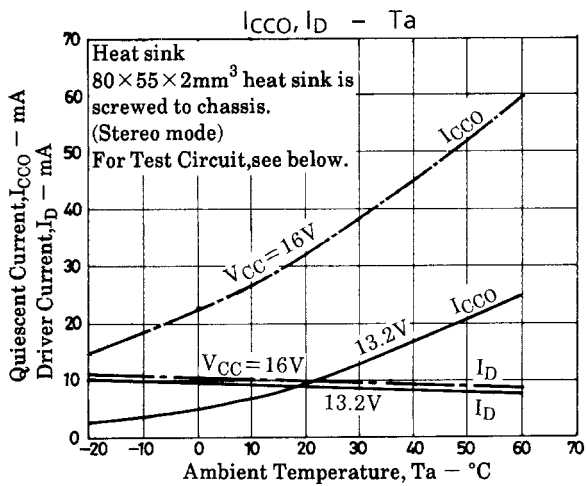
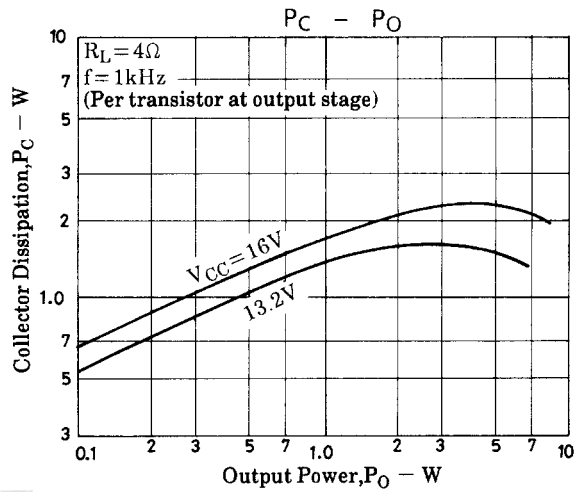
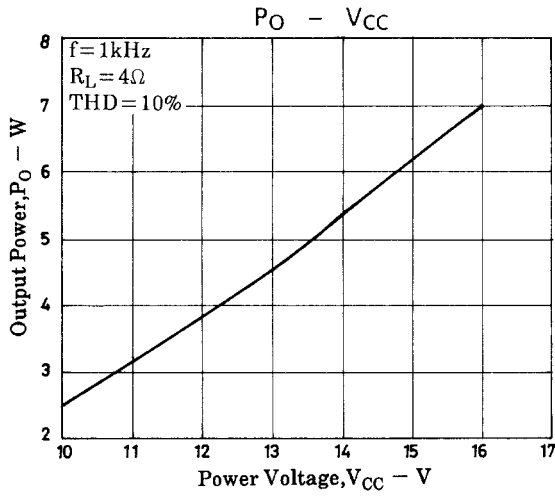
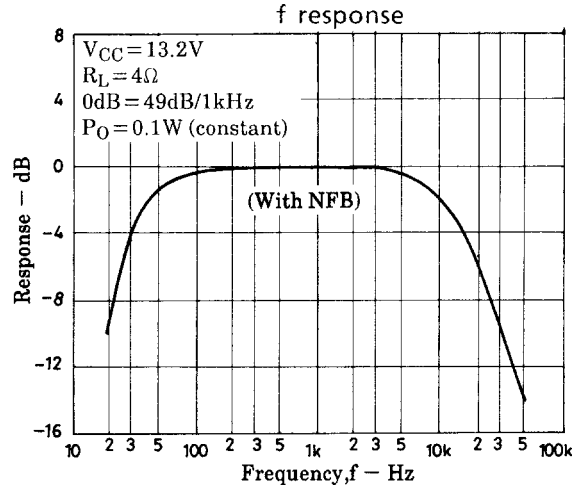
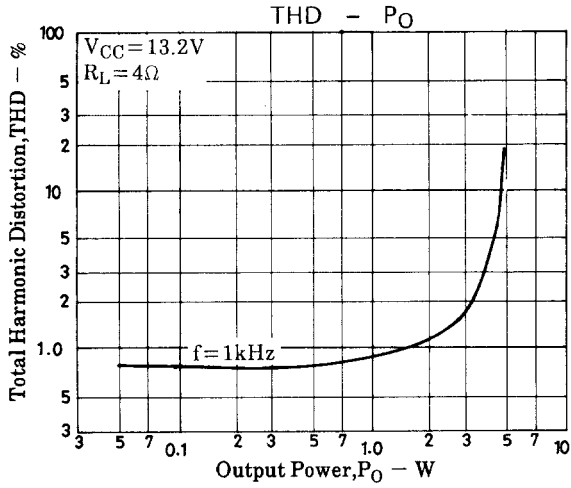
TR1: 2SC536(E,F) 2SC1175(E,F)
TR2

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

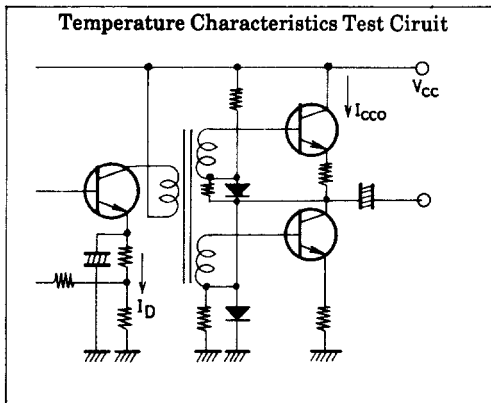
(Must be paired in the same rank).

Unit (resistance : Ω , capacitance : F)

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Test Circuit



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