



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

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

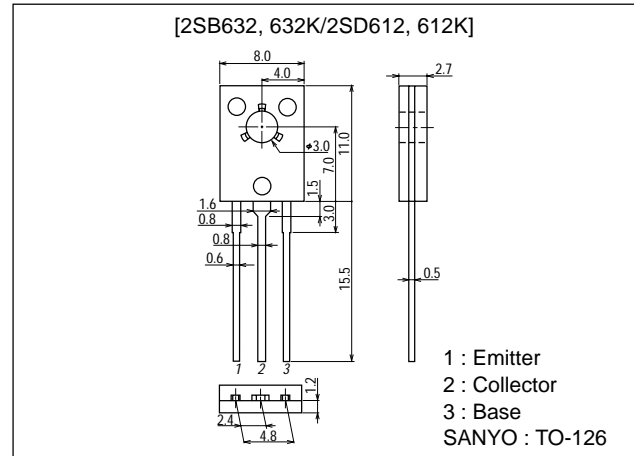
#### Features

- High collector dissipation and wide ASO.

#### Package Dimensions

unit:mm

2009B



() : 2SB632, 632K

#### Specifications

##### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CBO}$	B632, D612	(-25	V
		B632K, D612K	(-35	
Collector-to-Emitter Voltage	$V_{CEO}$	B632, D612	(-25	V
		B632K, D612K	(-35	
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	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

##### Electrical Characteristics at $T_a = 25^\circ\text{C}$

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	$\mu\text{A}$

Continued on next page.

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**SANYO Electric Co., Ltd. Semiconductor Company**

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13004TN (KT)/91098HA (KT)/90595MO (KOTO)/4017KI/D174MW, TS/E108, 8-2176 No.341-1/9

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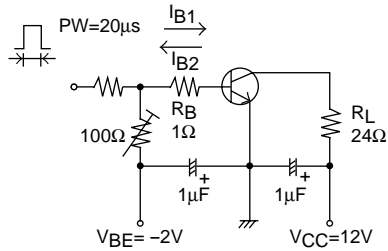
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
DC Current Gain	$h_{FE1}$	$V_{CE}=(-)2V, I_C=(-)500mA$	60*		320*	
	$h_{FE2}$	$V_{CE}=(-)2V, I_C=(-)1.5A$	30			
Gain-Bandwidth Product	$f_T$	$V_{CE}=(-)10V, I_C=(-)50mA$		100		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=(-)10V, f=1MHz$		(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

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

Rank	D	E	F
$h_{FE}$	60 to 120	100 to 200	160 to 320

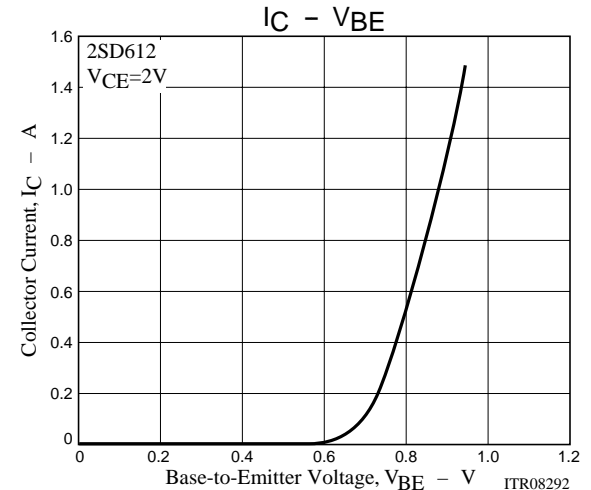
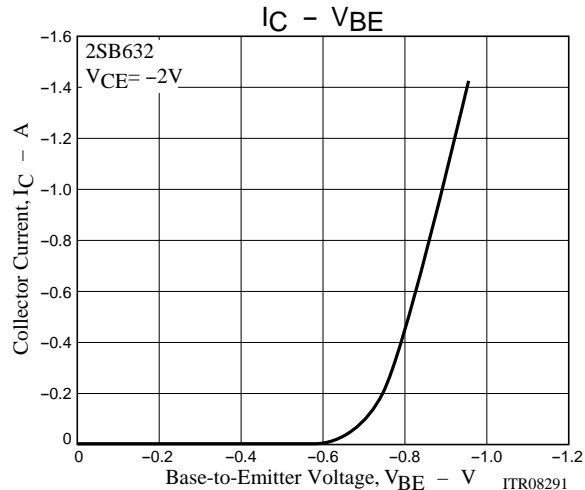
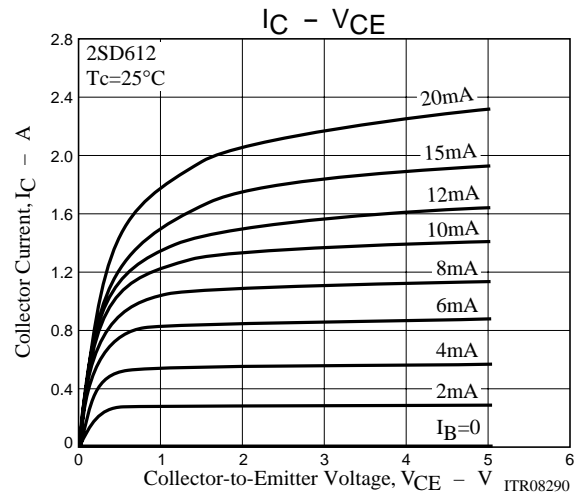
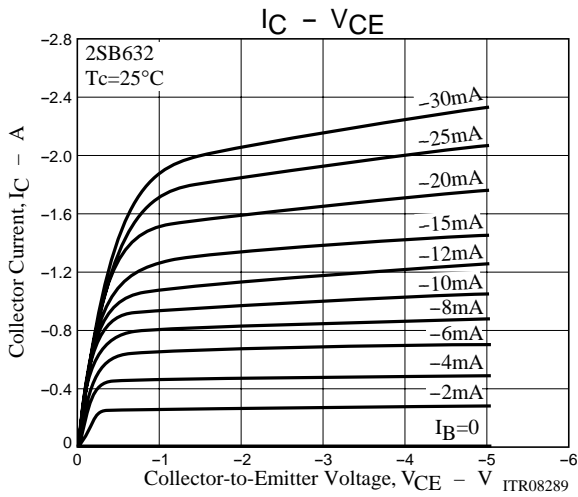
## Switching Time Test Circuit



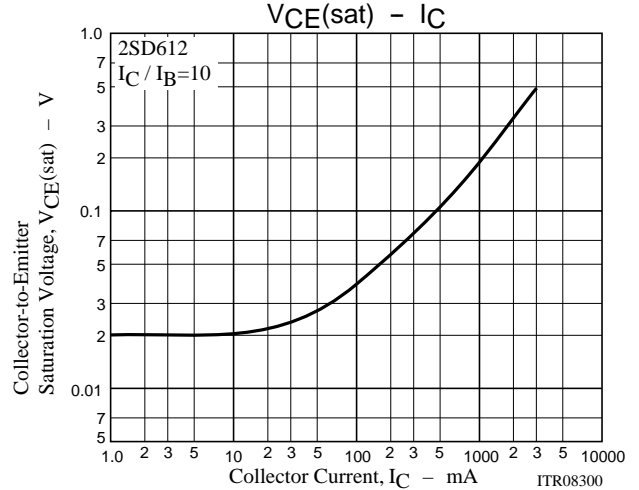
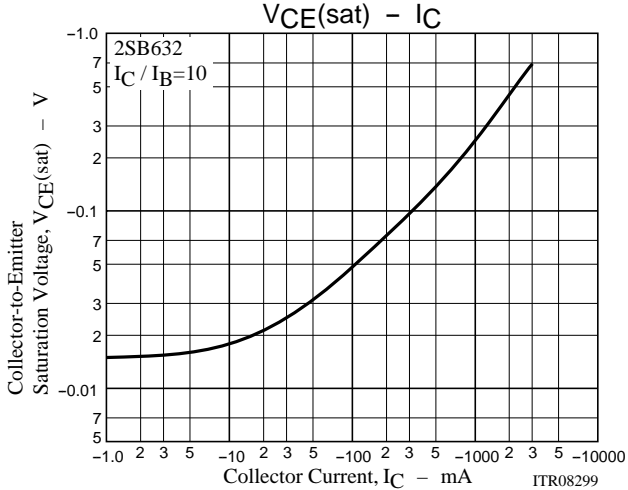
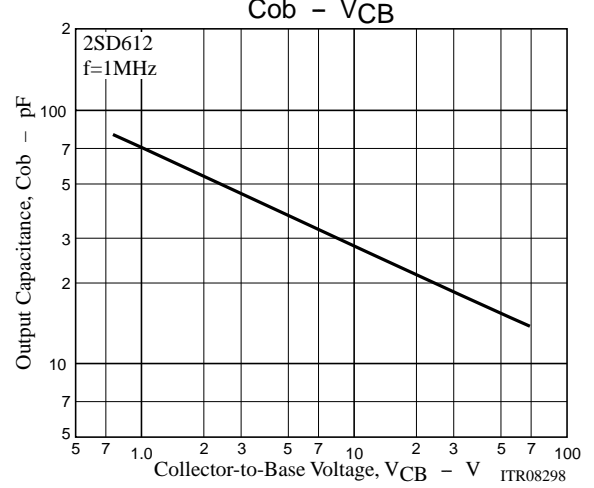
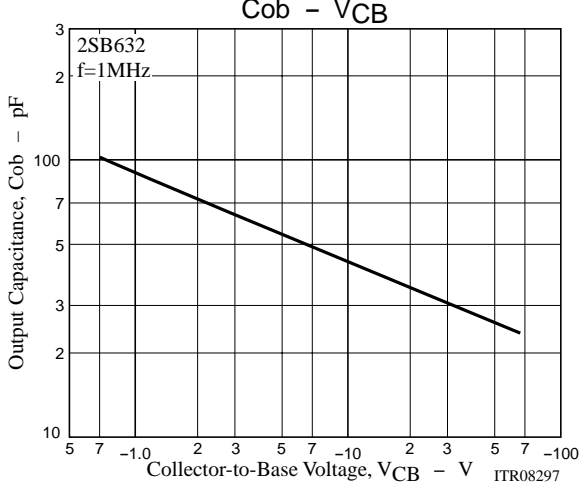
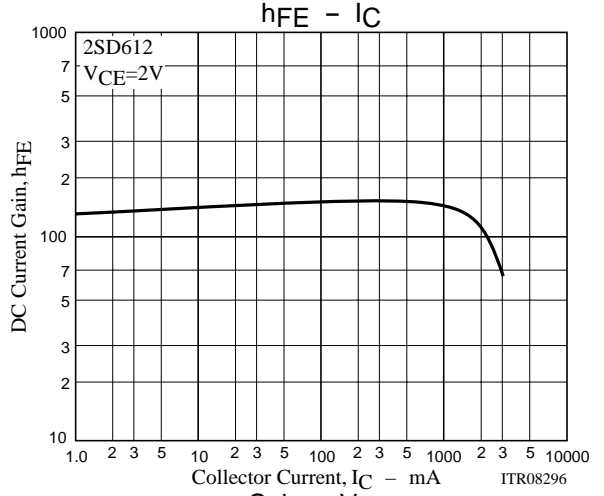
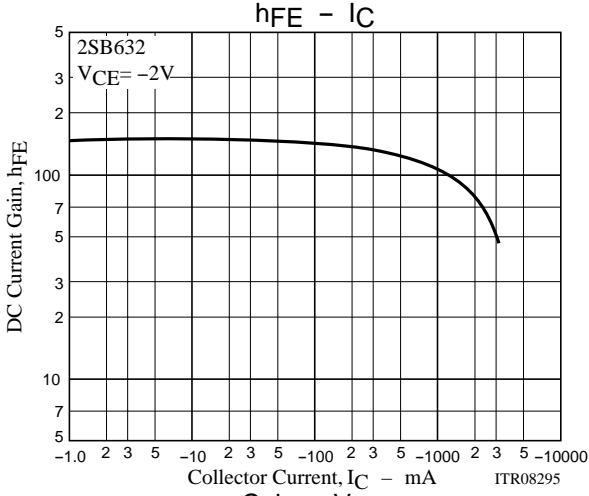
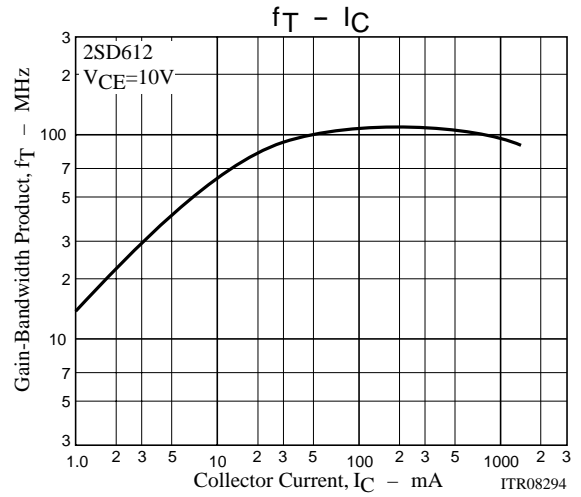
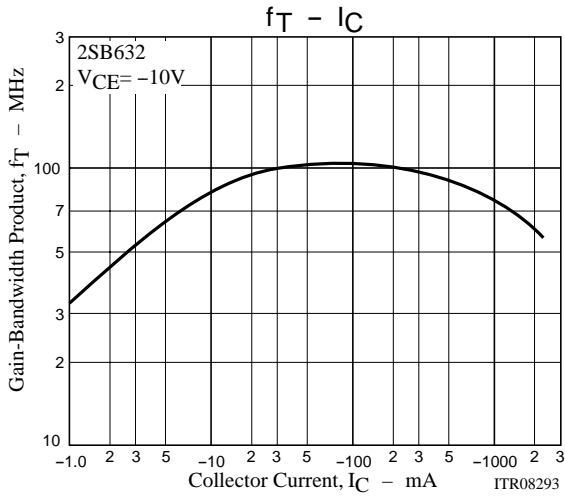
$$V_{CE}=12V$$

$$I_C=10I_{B1} = -10I_{B2}=500mA$$

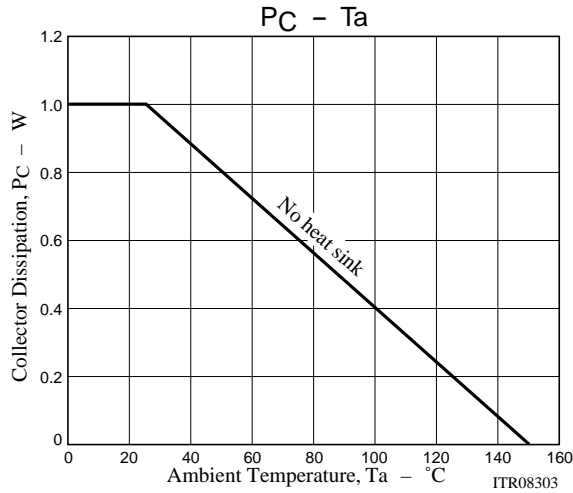
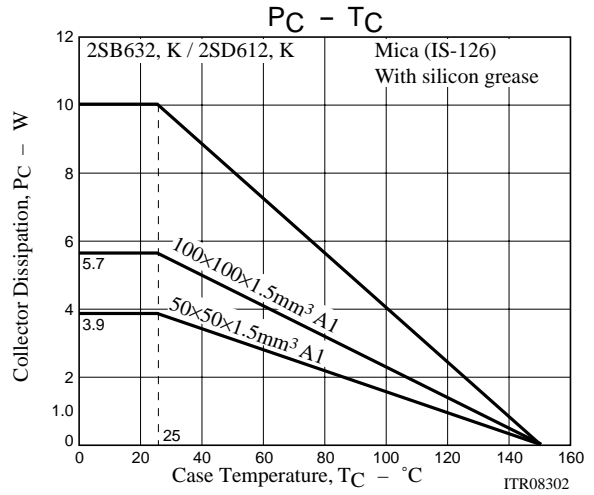
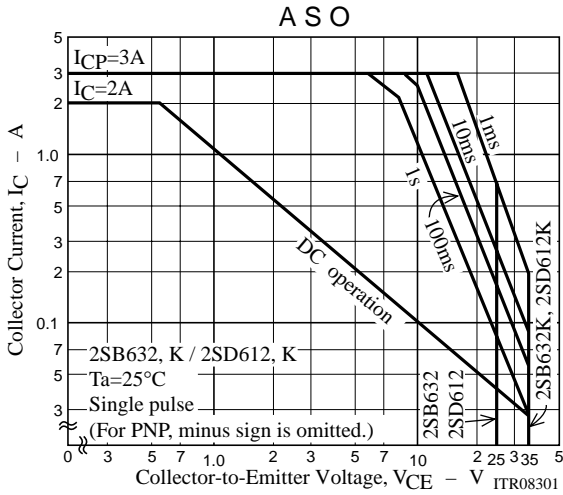
For PNP, the polarity is reversed.



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



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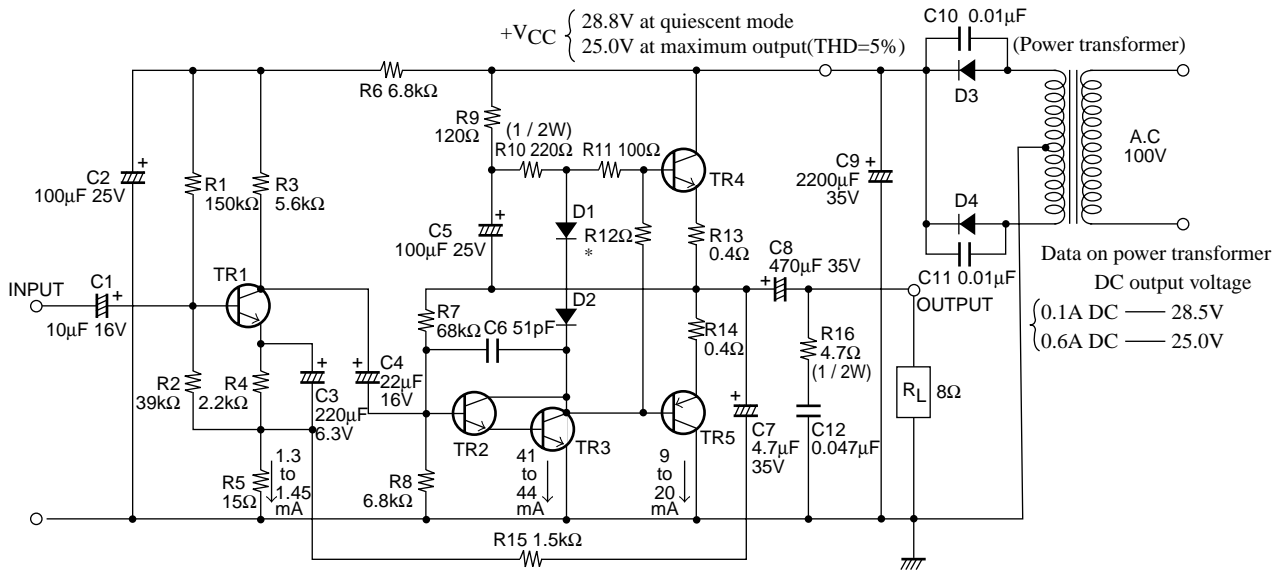
### Sample Application Circuit 1 : 8W pure complementary amplifier using the 2SB632K/2SD612K

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

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

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	$P_O=1W$	0.05	%
Input Resistance	$r_i$	$P_O=1W$	60	k $\Omega$
Output Resistance	$r_o$	$P_O=1W$	0.2	$\Omega$

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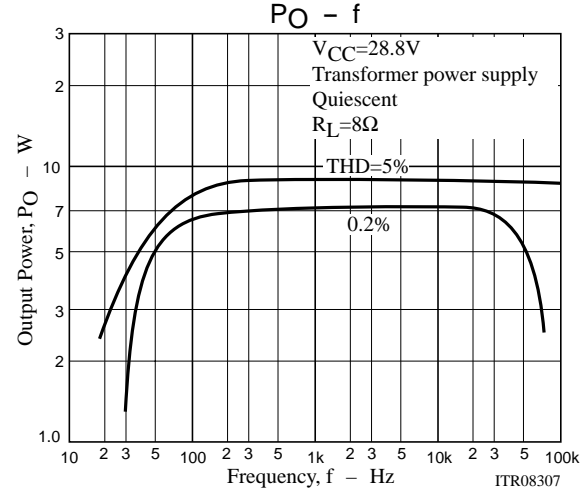
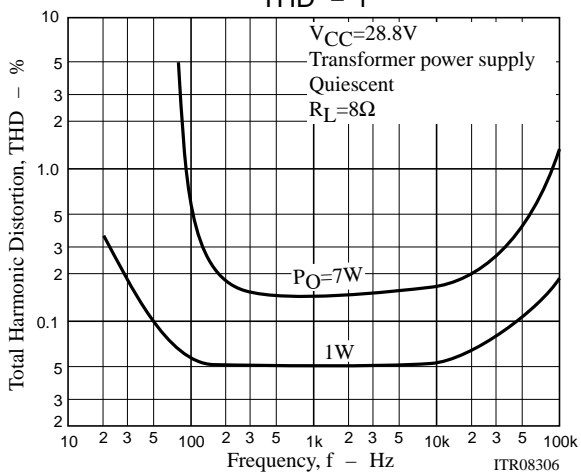
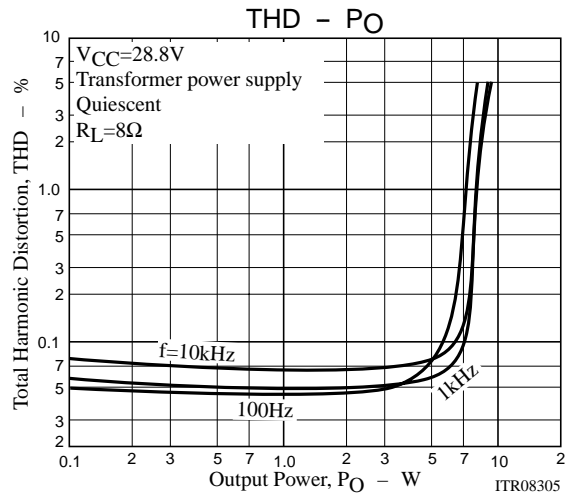
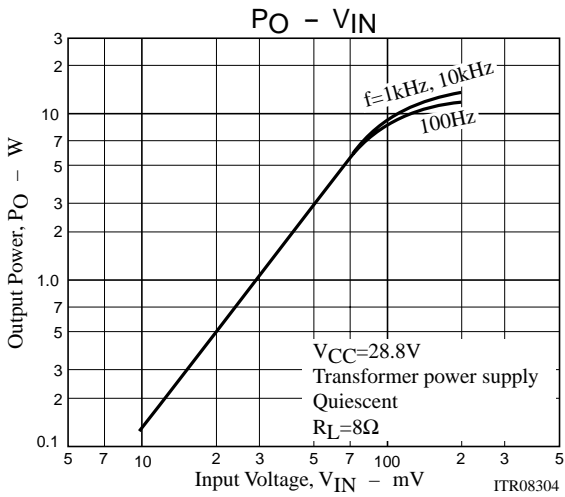


TR1 : 2SC536(D, E, F) TR2 : 2SC536(D, E, F) TR4 : 2SD612K(D, E, F)  
 TR3 : 2SD438(D, E, F) P1 fin, P2 fin  
 TR5 : 2SB632K(D, E, F)  
 D1, D2 : DS448 D3, D4 : DS135

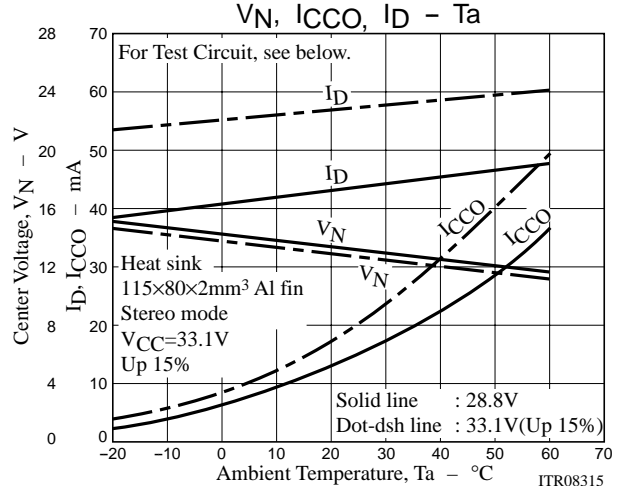
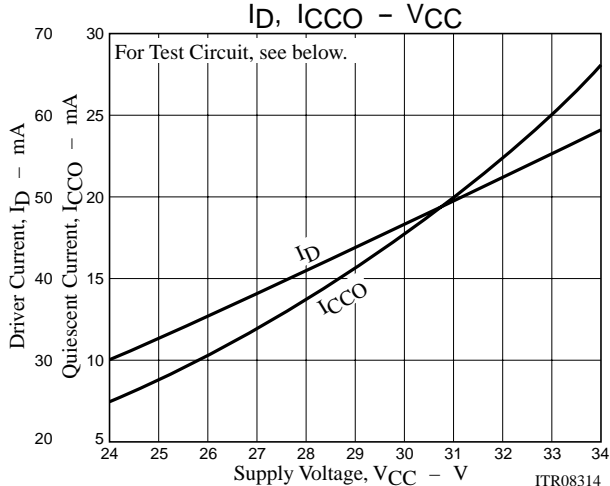
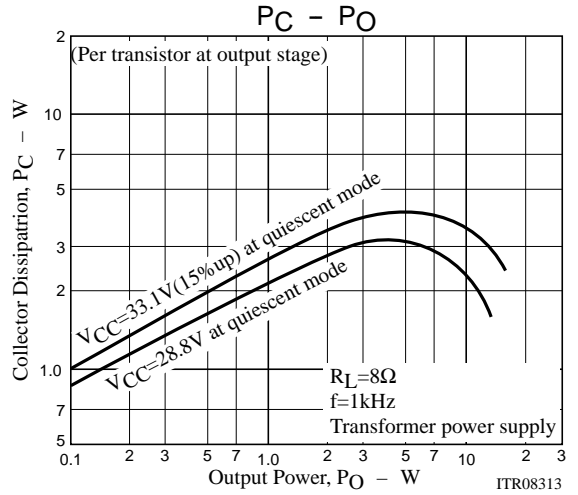
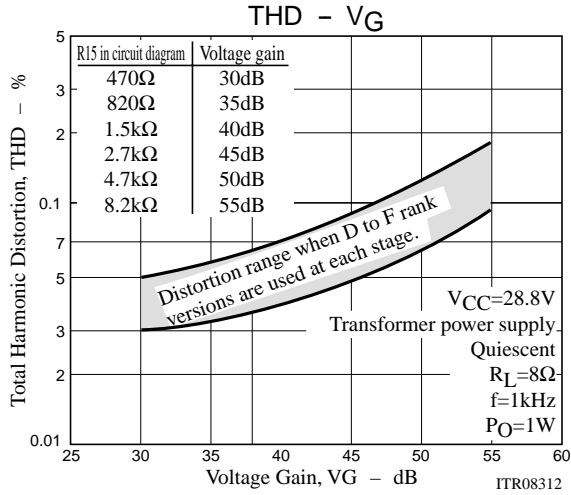
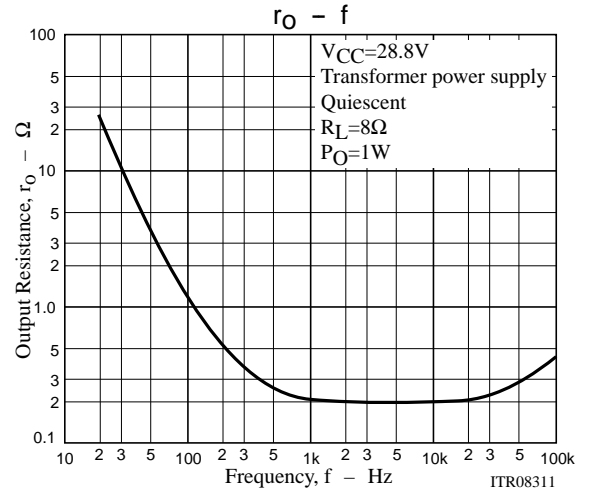
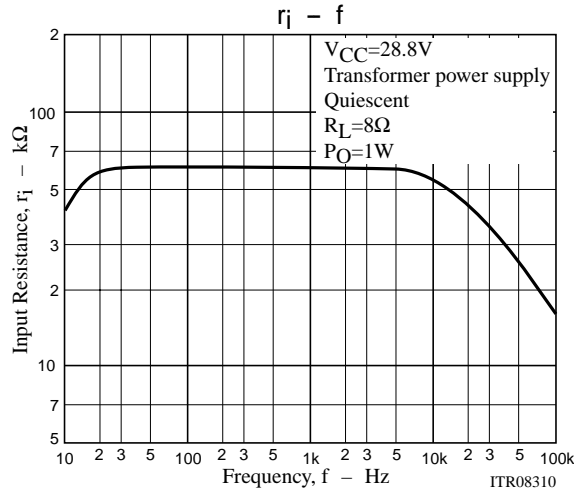
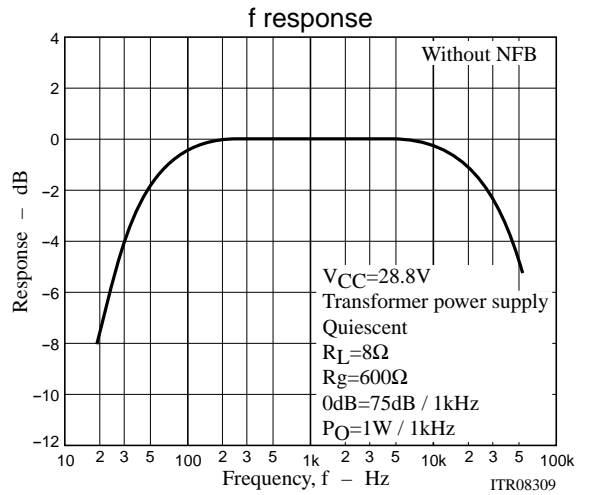
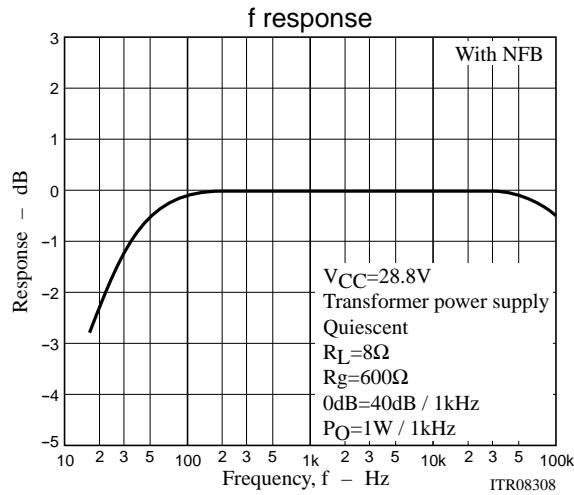
Note : TR3 : With P1 fin or P2 fin

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

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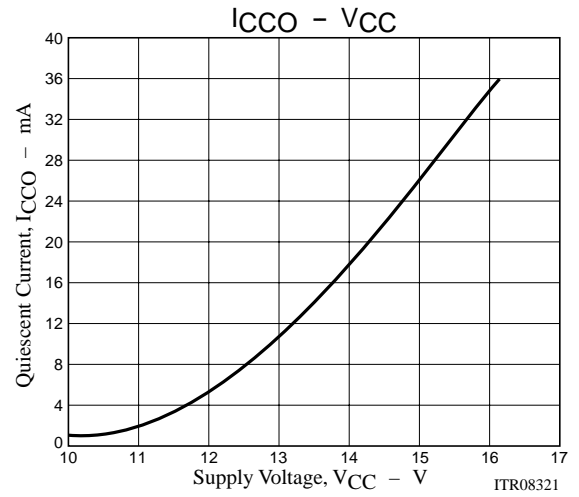
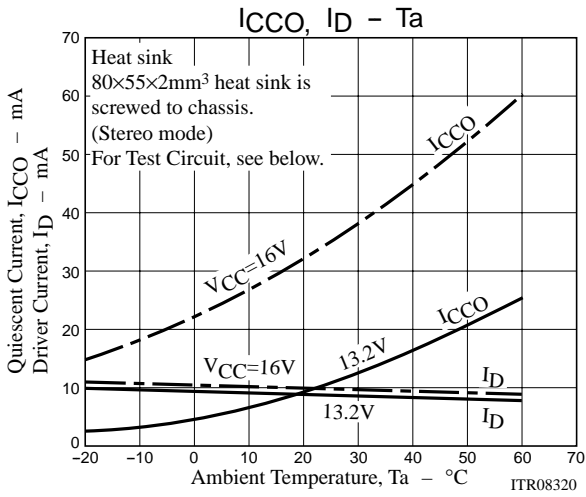
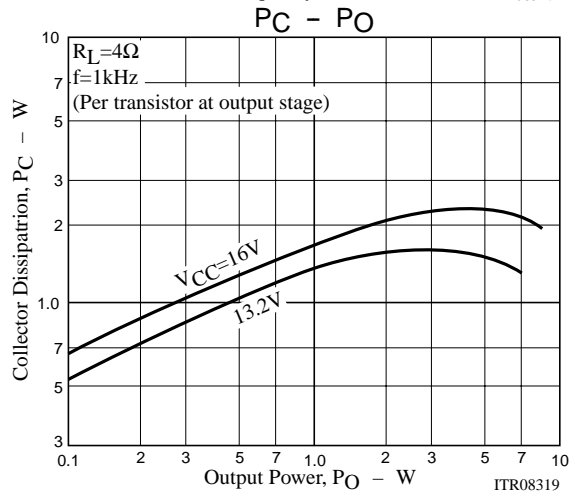
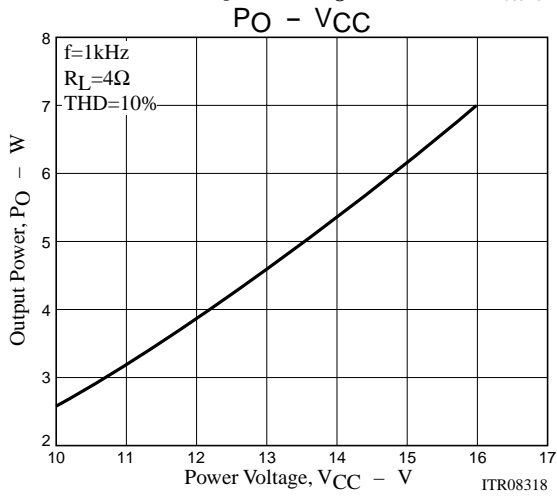
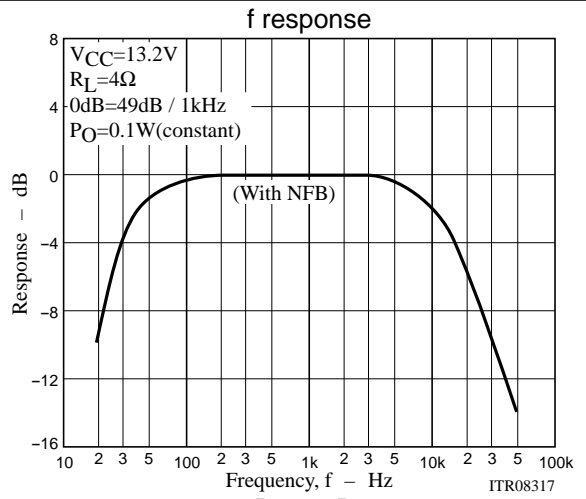
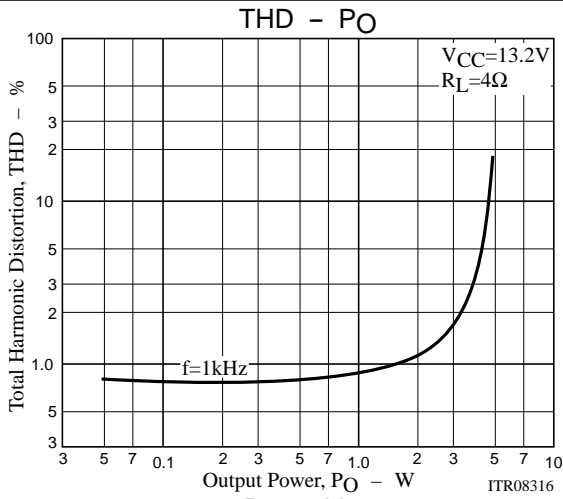


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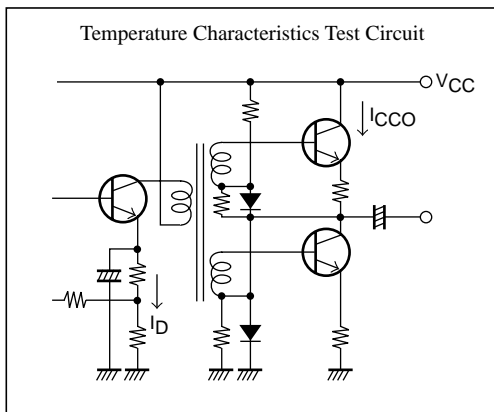




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## Test Circuit





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