RCA
Solid State
Division

RF Power Transistors

40608

RCA-40608 is an epitaxial silicon n-p-n planar transistor. It is especially designed for operation as a Class A, wide-band power amplifier in VHF circuits.

The features of high gain-bandwidth product and low cross-modulation make the 40608 especially suited for use in CATV and MATV systems.

*Formerly RCA Dev. Type No. TA2761

SILICON N-P-N "overlay" TRANSISTOR

For Class A Wide-Band CATV and MATV Applicatiations

JEDEC TO-39

Features:

- High Gain-Bandwidth Product
- Low Cross-Modulation

MAXIMUM RATINGS, *Absolute-Maximum Values:*

COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	40	V
COLLECTOR-TO-EMITTER VOLTAGE: With external base-to-emitter resistance, (R_{BE}) = 100Ω	V_{CER}	40	V
EMITTER-TO-BASE VOLTAGE	V_{EBO}	2	V
COLLECTOR CURRENT	I_C	0.4	A
TRANSISTOR DISSIPATION	P_T		
At case temperatures up to 25°C		3.5	W
At case temperatures above 25°C		See *Fig. 1.*	
TEMPERATURE RANGE: Storage & Operating (Junction)		-65 to +200	°C
LEAD TEMPERATURE (During soldering): At distances ≥ 1/32 in. (0.79 mm) from seating plane for 10 s max.		230	°C

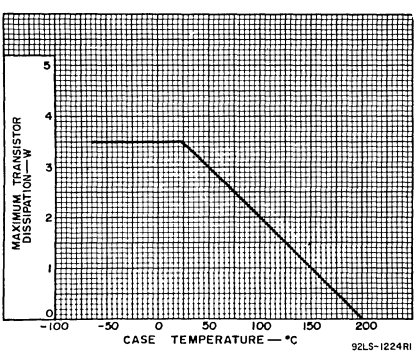
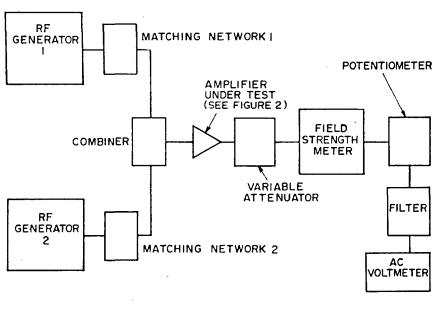


Fig. 1 - Dissipation Derating Curve

ELECTRICAL CHARACTERISTICS, *Case Temperature* = 25° C

Characteristic	Symbol	Test Conditions					Limits		Units
		DC Collector Volts		DC Current (mA)					
		V_{CB}	V_{CE}	I_E	I_B	I_C	Min.	Max.	
Collector-Cutoff Current	I_{CEO}		20		0			100	μA
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$			0		0.1	40		V
Collector-to-Emitter Voltage (Sustaining)	$V_{CER(sus)}$					50[a]	40		V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$			0.1		0	2		V
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$				10	50		1.0	V
Collector-to-Base Capacitance (Measured at 1MHz)	C_{ob}	30		0				3.0	pF
Gain-Bandwidth Product	f_T		15			50	700		MHz
DC Forward-Current Transfer Ratio	h_{FE}		15			50	35	120	
Voltage Gain (See Fig. 2.)	VG		15			50	11		dB
Cross Modulation @46 dB mV (See Fig. 3.)	CM		15			50	−57 (Typ.)		dB

[a] Pulsed through an inductor (20 mH); duty factor = 50%; R_{BE} = 100 Ω.

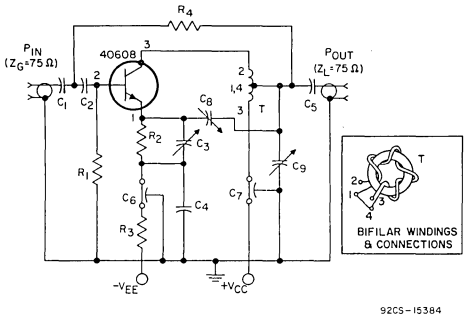


Generator No. 1 & No. 2	Hewlett-Packard, HP608D,
Matching Network No. 1 & No. 2:	or equivalent 50 to 75 Ω
Combiner:	20 dB isolation between generators
Variable Attenuator:	As required
Field Strength Meter, with Detector Output:	50-220 MHz
Potentiometer:	100 kΩ
Filter:	1000 Hz
AC Voltmeter:	Ballantine 861, or equivalent

Fig. 2 - Block Diagram for Cross-Modulation Test Set-Up

OPERATING INSTRUCTIONS FOR CROSS-MODULATION TEST

1. Set up equipment as shown in Fig. 2.
2. Set generator No. 1 to 150 MHz modulated 30% by 1000 Hz, and tune field strength meter to 150 MHz.
3. Adjust output of generator No. 1 to give rated output of the amplifier.
4. Adjust potentiometer to calibrate voltmeter for a convenient level. This level then corresponds to 100% cross modulation.
5. Remove modulation.
6. Set generator No. 2 to 210 MHz modulated 30% by 1000 Hz and tune field strength meter to 210 MHz.
7. Adjust output of generator No. 2 to give rated output of the amplifier. (If the amplifier has a flat response then the output of the two signal generators will be equal.)
8. Tune field strength meter to 150 MHz CW and read voltmeter.
9. Turn voltmeter to proper scale for reading. Calculate percentage of cross modulation based upon 100% level set in step 4.



C_1, C_2, C_5: 0.002 μF
C_3: 7-100 pF, ARCO 423, or equivalent
C_4: .03 μF
C_6, C_7: 1,500 pF
C_8, C_9: 8-60 pF, ARCO 404, or equivalent
R_1: 390 Ω, ½ W
R_2: 6.8 Ω, ½ W
R_3: 330 Ω, 1 W
R_4: 270 Ω, ½ W
T: 4 turns No. 30 wire, bifilar wound; toroidal core: 3/8 in. OD, 3/16 in. ID, 1/8 in. thick, IGC* type Q-1, or equivalent.

*Indiana General Corp., Electronics/Ferrites Div., Keasbey, N.J.

Fig. 3 - RF Amplifier Circuit for Voltage Gain Test

TYPICAL ADMITTANCE CHARACTERISTICS

(Common-Emitter Circuit)

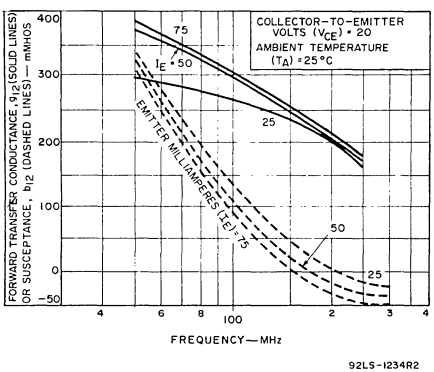


Fig. 4 - Forward Transfer Admittance

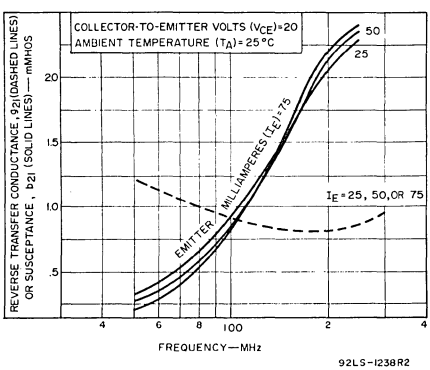


Fig. 5 - Reverse Transfer Admittance

TYPICAL ADMITTANCE CHARACTERISTICS

(Common-Emitter Circuit)

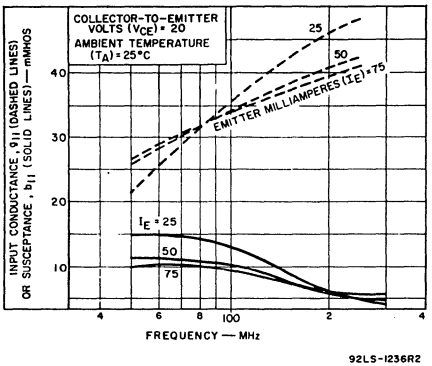


Fig. 6 - Input Admittance

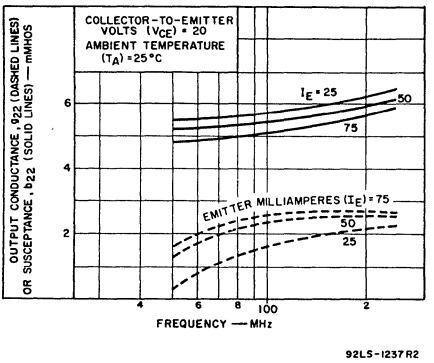


Fig. 7 - Output Admittance

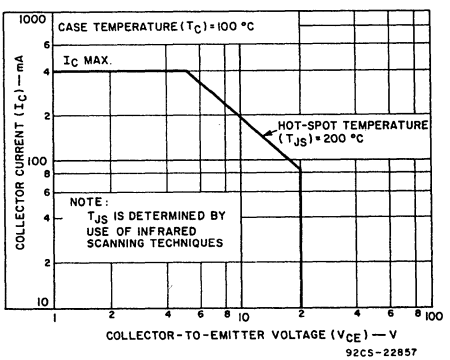


Fig. 8 - Safe Area for DC Operation

TERMINAL CONNECTIONS

Lead 1 — Emitter
Lead 2 — Base
Lead 3 — Collector, Case