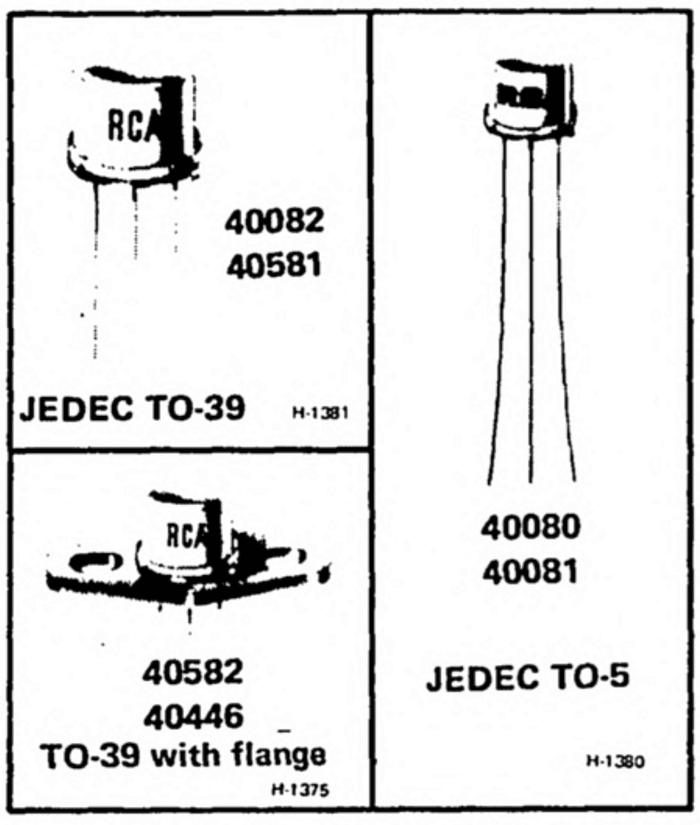
RCA
Solid State
Division

RF Power Transistors

40080 40082 40581
40081 40446 40582



Silicon N-P-N Planar Transistors

For Class C Operation in
27-MHz "CB" Circuits

- **OSCILLATOR:** 40080 (TO-5)
- **DRIVER:** 40081 (TO-5)
- **OUTPUT:** 40082, 40581 (TO-39)
  40446, 40582 (TO-39 + Flange)

RCA-40080, 40081, 40082, 40446, 40581, and 40582 are triple-diffused, silicon planar n-p-n transistors, specifically designed for application in a 5-watt-output, 27-MHz citizens-band transmitter. Type 40581 is a higher-power version of the 40082 and is intended to provide an output power of 3.5 W in this application. Type 40582 is a higher-power version of the 40446. These types have factory-attached diamond-shaped mounting flanges.

MAXIMUM RATINGS, *Absolute-Maximum Values:*		40080	40081	40082 40581	40446 40582	
COLLECTOR-TO-EMITTER VOLTAGE:						
With V_{BE} = –0.5 volts	V_{CEV}	–	60	60	60	V
With base open	V_{CEO}	30	–	–	–	V
EMITTER-TO-BASE VOLTAGE	V_{EBO}	–	2.0	2.5	2.5	V
PEAK COLLECTOR CURRENT		0.25	0.25	1.5	1.5	A
TRANSISTOR DISSIPATION:	P_T					
At case temperatures up to 25°C		–	2.0	5.0	10	W
At free-air temperatures up to 25°C		0.5	–	–	–	W
At case temperatures above 25°C		← See Fig. 2 →				
TEMPERATURE RANGE:						
Storage & Operating (Junction)		← –65 to 200 →				°C
LEAD TEMPERATURE (During soldering):						
At distances ≥ 1/32 in. (0.8 mm) from insulating wafer for 10s max ...		← 230 →				°C

ELECTRICAL CHARACTERISTICS, *Case Temperature (T_C) = 25°C*

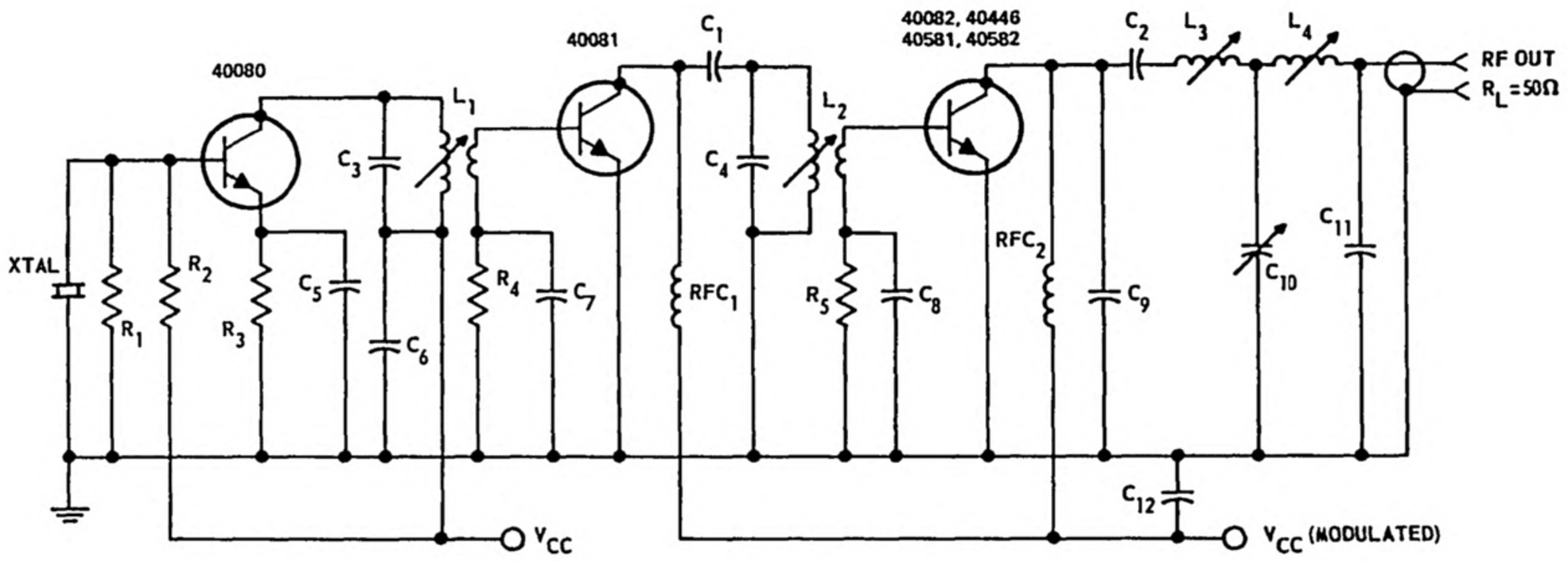
CHARACTERISTIC	SYMBOL	TEST CONDITIONS							LIMITS						UNITS
		DC COLLECTOR VOLTAGE V			DC EMITTER OR BASE VOLTAGE V	DC CURRENT mA			40080		40081		40581 40582 40082 40446		
		V_{CB}	V_{CE}	V_{CC}	V_{BE}	I_C	I_E	I_B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Collector-to-Emitter Voltage:	V_{CEO}					10		0	30	–	–	–	–	–	V
	V_{CEV}				-0.5 -0.5	100μA 500μA			–	–	60	–	60	–	V
Emitter-to-Base Voltage:	V_{EBO}					0 0	500μA 500μA		–	–	2.0	–	2.5	–	V
Collector-Cutoff Current	I_{CBO}	15 15 15					0 0 0		–	10	–	10	–	10	μA
Collector-to Base Capacitance: (Measured at 1 MHz)	C_{ob}		30 30 30							6		6		20	pF
RF Power Output: Oscillator (f = 27 MHz)	P_{OUT}			12		32			100		–	–	–	–	mW
Driver (f = 27 MHz, P_{IN} = 75 mW)	P_{OUT}			12		85			–	–	400		–	–	mW
Output Amplifier (f = 27 MHz, P_{IN} = 350 mW)	P_{OUT}			12		415							3.0 (min.) [40082, 40446]		W
				12		415							3.5 (min.) [40581, 40582]		
Junction-to-Case Thermal Resistance:	$R_{\theta JC}$								350[a] (max.)		87.5 (max.)		17.5 (max.) [40446, 40582]		°C/W
													35 (max.) [40082, 40581]		

[a]Junction-to-Ambient Thermal Resistance, $R_{\theta JA}$

TYPICAL C.B. TRANSMITTER PERFORMANCE (V_{CC} = 13.8 V)

STAGE	RCA TYPE	NO MODULATION		100% MODULATION	
		I_C mA	RF P_{OUT} W	I_C mA	RF P_{OUT} W
Oscillator	40080	15	–	15	–
Driver	40081	55	–	50	–
Output	40082, 40581 40446, or 40582	330	3.5[a]	330	4.8 (typ.)

[a]Adjusted for maximum legal power output.



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C_1: 47 pF
C_2: 100 pF
C_3: 30 pF
C_4: 51 pF
C_5: 75 pF
C_6, C_{12}: 0.01 μF
C_7: 0.001 μF
C_8: 0.002 μF
C_9: 24 pF
C_{10}: 90-400 pF, ARCO No. 429 or equiv.
C_{11}: 220 pF

L_1: Primary 14 turns, Secondary 3 turns No. 22 wire ¼ in. (6.35 mm) CTC coil form with "green dot" core 0.75—1.2 μH, Q = 100
L_2: Primary 14 turns, Secondary 2-¾ turns No. 22 wire ¼ in. (6.35 mm) CTC coil form with "green dot" core 0.75—1.2 μH, Q = 100
L_3: 11 turns No. 22 wire ¼ in. (6.35 mm) CTC coil form with "green dot" core 0.5—0.9 μH, Q = 120
L_4: 7 turns No. 22 wire ¼ in. (6.35 mm) CTC coil form with "green dot" core 0.21—0.34 μH, Q = 140
RFC_1, RFC_2: 15 μH, Miller No. 4624 or equiv.

R_1: 510 Ω
R_2: 5,100 Ω
R_3: 51 Ω
R_4: 120 Ω
R_5: 47 Ω
V_{CC}: 11 to 15 V
XTAL: 27 MHz

Fig. 1—Typical 27-MHz amplifier chain.

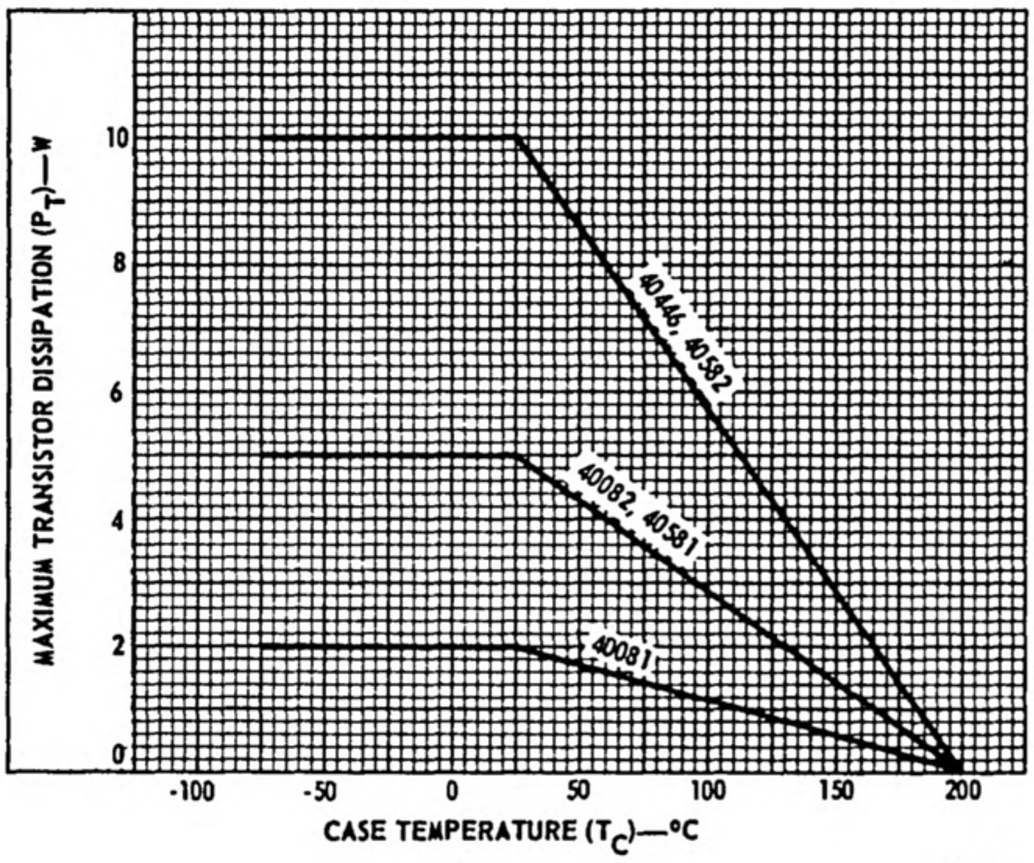

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Fig. 2—Dissipation derating curve.

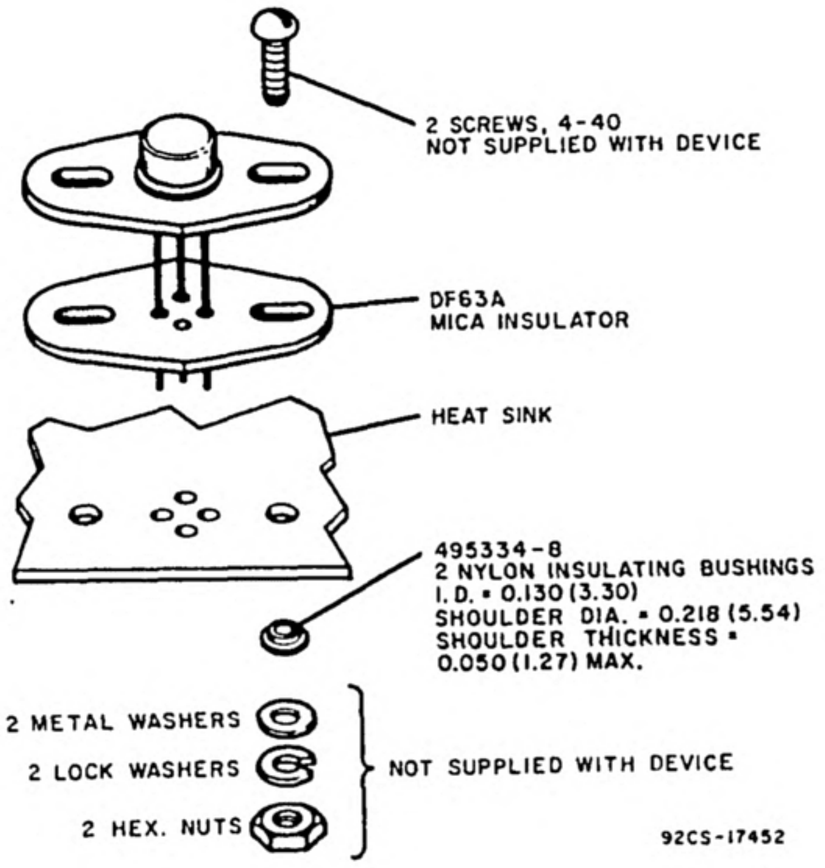

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Fig. 3—Suggested mounting hardware for JEDEC TO-5 with mounting flange.

TERMINAL CONNECTIONS

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