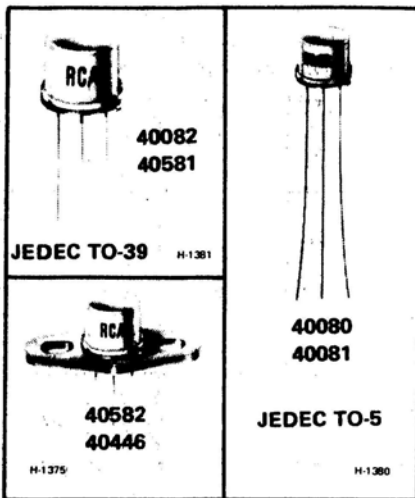




# RF Power Transistors

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	
<b>COLLECTOR-TO-EMITTER VOLTAGE:</b>					
With $V_{BE} = -0.5$ volts	$V_{CEV}$	60	60	60	V
With base open	$V_{CEO}$	30	—	—	V
<b>EMITTER-TO-BASE VOLTAGE</b>	$V_{EBO}$	—	2.0	2.5	V
<b>PEAK COLLECTOR CURRENT</b>		0.25	0.25	1.5	A
<b>TRANSISTOR DISSIPATION:</b>	$P_T$				
At case temperatures up to 25°C		—	2.0	5.0	W
At free-air temperatures up to 25°C		0.5	—	—	W
At case temperatures above 25°C		← See Fig. 2 →			
<b>TEMPERATURE RANGE:</b>					
Storage & Operating (Junction)		← -65 to 200 →			°C
<b>LEAD TEMPERATURE (During soldering):</b>					
At distances $\geq 1/32$ in. (0.8 mm) from insulating wafer for 10s max		← 230 →			°C

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

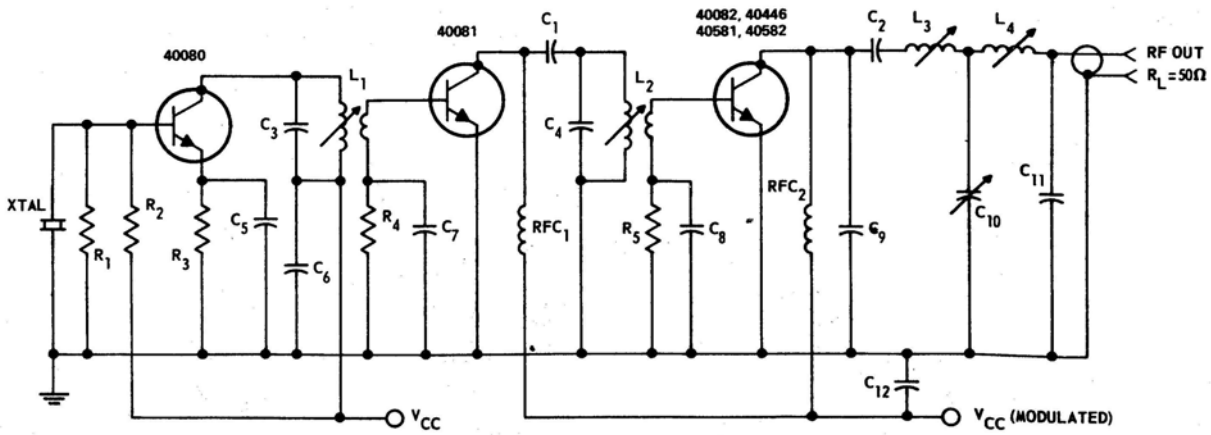
CHARACTERISTIC	SYMBOL	TEST CONDITIONS							LIMITS						UNITS
		DC COLLECTOR VOLTAGE V			DC EMITTER OR BASE VOLTAGE V	DC CURRENT mA			40080		40081		40581 40582 40082 40446		
		$V_{CB}$	$V_{CE}$	$V_{CC}$	$V_{BE}$	$I_C$	$I_E$	$I_B$	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Collector-to-Emitter Voltage:	$V_{CEO}$					10		0	30	—	—	—	—	—	V
	$V_{CEV}$				-0.5 -0.5	100 $\mu$ A 500 $\mu$ A			—	—	60	—	60	—	V
Emitter-to-Base Voltage:	$V_{EBO}$					0 0	500 $\mu$ A 500 $\mu$ A		—	—	2.0	—	2.5	—	V
Collector-Cutoff Current	$I_{CBO}$	15 15 15					0 0 0		—	10	—	10	—	10	$\mu$ A
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 <sup>a</sup> (max.)	87.5 (max.)			17.5 (max.) [40446, 40582] 35 (max.) [40082, 40581]	$^{\circ}$ C/W	

<sup>a</sup>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 <sup>a</sup>	330	4.8 (typ.)

<sup>a</sup>Adjusted for maximum legal power output.

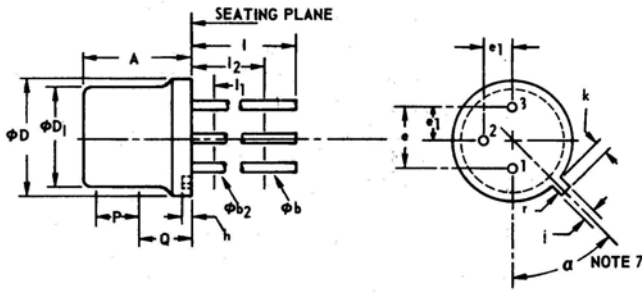


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- C<sub>1</sub>: 47 pF
- C<sub>2</sub>: 100 pF
- C<sub>3</sub>: 30 pF
- C<sub>4</sub>: 51 pF
- C<sub>5</sub>: 75 pF
- C<sub>6</sub>, C<sub>12</sub>: 0.01 μF
- C<sub>7</sub>: 0.001 μF
- C<sub>8</sub>: 0.002 μF
- C<sub>9</sub>: 24 pF
- C<sub>10</sub>: 90-400 pF, ARCO No. 429 or equiv.
- C<sub>11</sub>: 220 pF
- L<sub>1</sub>: 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<sub>2</sub>: 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<sub>3</sub>: 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<sub>4</sub>: 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<sub>1</sub>, RFC<sub>2</sub>: 15 μH, Miller No. 4624 or equiv.
- R<sub>1</sub>: 510 Ω
- R<sub>2</sub>: 5,100 Ω
- R<sub>3</sub>: 51 Ω
- R<sub>4</sub>: 120 Ω
- R<sub>5</sub>: 47 Ω
- V<sub>CC</sub>: 11 to 15 V
- XTAL: 27 MHz

Fig. 1—Typical 27-MHz amplifier chain.

**DIMENSIONAL OUTLINE**  
JEDEC TO-5

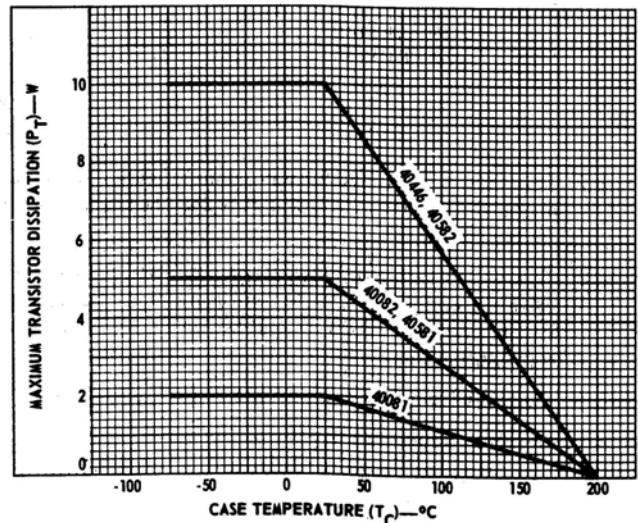


SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.240	0.260	6.10	6.60	
φb	0.016	0.021	0.406	0.533	2
φb <sub>2</sub>	0.016	0.019	0.406	0.483	2
φD	0.335	0.370	8.51	9.40	
φD <sub>1</sub>	0.305	0.335	7.75	8.51	
e	0.200 T.P.		5.08 T.P.		4, 5
e <sub>1</sub>	0.100 T.P.		2.54 T.P.		5
h	0.009	0.125	0.229	3.18	
i	0.028	0.034	0.711	0.864	5
k	0.029	0.045	0.737	1.14	3, 5
l	1.500	—	38.10	—	2
l <sub>1</sub>	—	0.050	—	1.27	2
l <sub>2</sub>	0.250	—	6.35	—	2
P	0.100	—	2.54	—	1
Q	—	—	—	—	6
r	—	0.007	—	0.178	
α	45° T.P.		—		5, 7

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**TERMINAL CONNECTIONS**

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



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Fig. 2—Dissipation derating curve.

**NOTES:**

1. This zone is controlled for automatic handling. The variation in actual diameter within the zone shall not exceed 0.010 in. (0.254 mm).
2. (Three leads) φb<sub>2</sub> applies between l<sub>1</sub> and l<sub>2</sub>. φb applies between l<sub>2</sub> and 1.5 in. (38.20 mm) from seating plane. Diameter is uncontrolled in l<sub>1</sub> and beyond 1.5 in. (38.10 mm) from seating plane.
3. Measured from maximum diameter of the actual device.
4. Leads having maximum diameter 0.019 in. (0.483 mm) measured in gaging plane 0.064 in. (1.37 mm) ± 0.001 in. (0.25 mm) - 0.000 in. (0.000 mm) below the seating plane of the device shall be within 0.007 in. (0.178 mm) of their true positions relative to the maximum-width tab.
5. The device may be measured by direct methods or by the gage and gaging procedure described on gage drawing GS-1.
6. Details of outline in this zone optional.
7. Tab centerline.

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