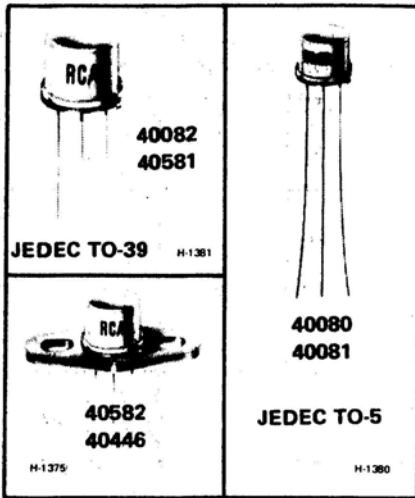




RF Power Transistors

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}
With base open	30	—	—	—	V_{CEO}
EMITTER-TO-BASE VOLTAGE					V_{EBO}
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:					°C
Storage & Operating (Junction)	← -65 to 200 →				
LEAD TEMPERATURE (During soldering):					°C
At distances $\geq 1/32$ in. (0.8 mm) from insulating wafer for 10s max	← 230 →				

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

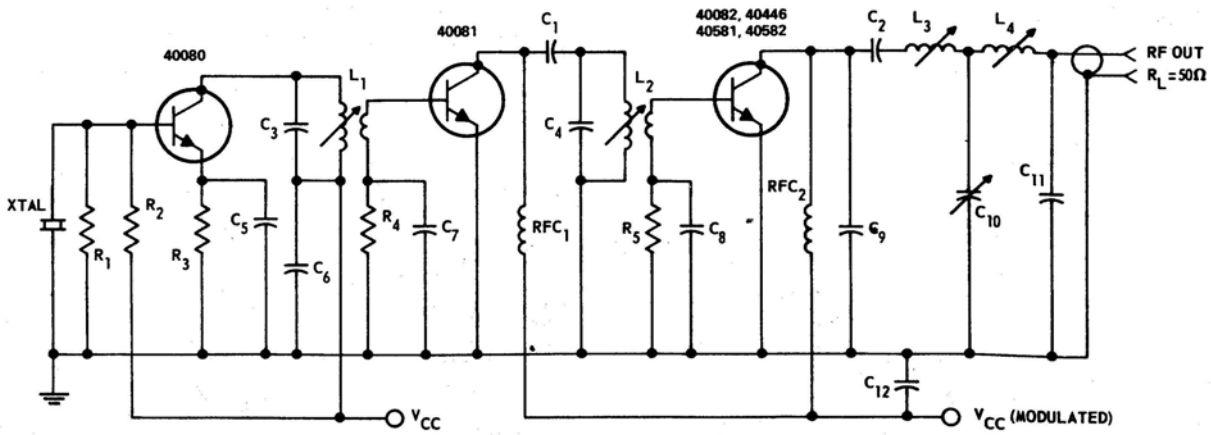
CHARACTERISTIC	SYMBOL	TEST CONDITIONS							LIMITS						UNITS
		DC COLLECTOR VOLTAGE V			DC EMITTER OR BASE VOLTAGE V	DC CURRENT mA			40080		40081		40581 40582 40082 40446		
		V_{CB}	V_{CE}	V_{CC}	V_{BE}	I_C	I_E	I_B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Collector-to-Emitter Voltage:	V_{CEO}					10		0	30	-	-	-	-	V	
	V_{CEV}				-0.5 -0.5	100 μ A 500 μ A			-	-	60	-	60	V	
Emitter-to-Base Voltage:	V_{EBO}					0 0	500 μ A 500 μ A		-	-	2.0	-	2.5	V	
Collector-Cutoff Current	I_{CBO}	15 15 15					0 0 0		-	10	-	10	-	μ A	
Collector-to Base Capacitance: (Measured at 1 MHz)	C_{ob}		30 30 30						-	6		6	-	pF	
RF Power Output: Oscillator (f = 27 MHz)	P_{OUT}			12		32			100		-	-	-	mW	
	Driver (f = 27 MHz, P_{IN} = 75 mW)			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] 35 (max.) [40082, 40581]	$^{\circ}$ C/W	

^aJunction-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.)

^aAdjusted for maximum legal power output.

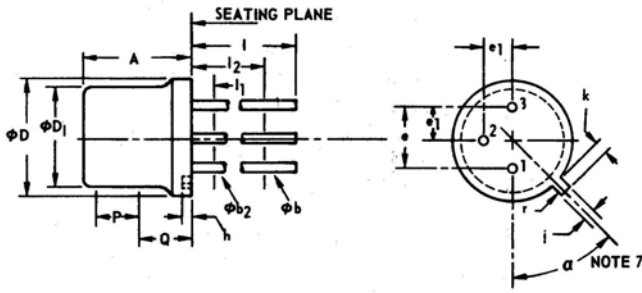


9255-3699 R1

- C₁: 47 pF
- C₂: 100 pF
- C₃: 30 pF
- C₄: 51 pF
- C₅: 75 pF
- C₆, C₁₂: 0.01 μF
- C₇: 0.001 μF
- C₈: 0.002 μF
- C₉: 24 pF
- C₁₀: 90-400 pF, ARCO No. 429 or equiv.
- C₁₁: 220 pF
- L₁: 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
- L₂: 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
- L₃: 11 turns No. 22 wire ¼ in. (6.35 mm) CTC coil form with "green dot" core 0.5–0.9 μH, Q = 120
- L₄: 7 turns No. 22 wire ¼ in. (6.35 mm) CTC coil form with "green dot" core 0.21–0.34 μH, Q = 140
- RFC₁, RFC₂: 15 μH, Miller No. 4624 or equiv.
- R₁: 510 Ω
- R₂: 5,100 Ω
- R₃: 51 Ω
- R₄: 120 Ω
- R₅: 47 Ω
- V_{CC}: 11 to 15 V
- XTAL: 27 MHz

Fig. 1—Typical 27-MHz amplifier chain.

DIMENSIONAL OUTLINE
JEDEC TO-5

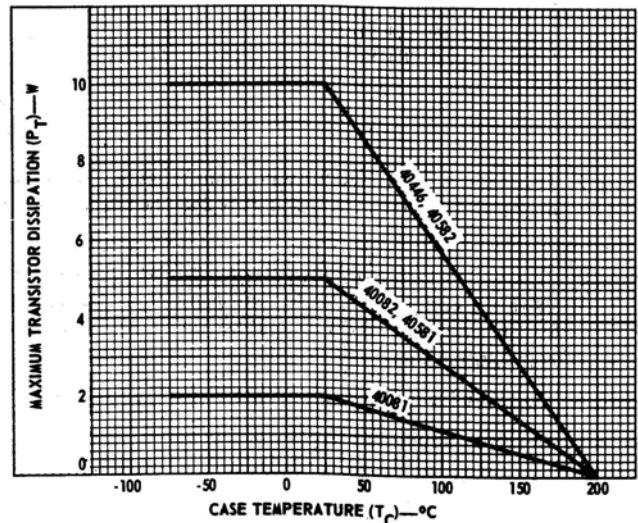


SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.240	0.260	6.10	6.60	
φb	0.016	0.021	0.406	0.533	2
φb ₂	0.016	0.019	0.406	0.483	2
φD	0.335	0.370	8.51	9.40	
φD ₁	0.305	0.335	7.75	8.51	
e	0.200 T.P.		5.08 T.P.		4, 5
e ₁	0.100 T.P.		2.54 T.P.		5
h	0.009	0.125	0.229	3.18	
i	0.028	0.034	0.711	0.864	5
k	0.029	0.045	0.737	1.14	3, 5
l	1.500	—	38.10	—	2
l ₁	—	0.050	—	1.27	2
l ₂	0.250	—	6.35	—	2
P	0.100	—	2.54	—	1
Q	—	—	—	—	6
r	—	0.007	—	0.179	
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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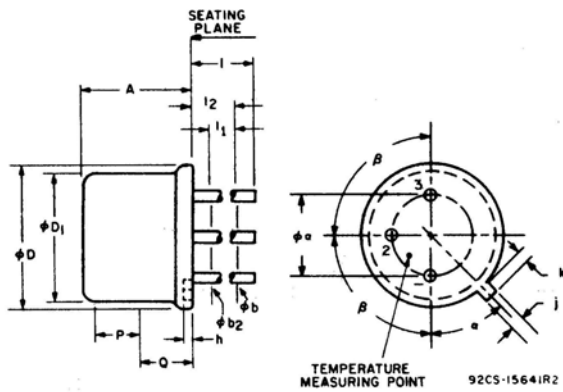
Fig. 2—Dissipation derating curve.

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) φb₂ applies between l₁ and l₂. φb applies between l₂ and 1.5 in. (38.20 mm) from seating plane. Diameter is uncontrolled in l₁ 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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**DIMENSIONAL OUTLINE
JEDEC TO-39**



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
ϕa	0.190	0.210	4.83	5.33	
A	0.240	0.260	6.10	6.60	
ϕb	0.016	0.021	0.406	0.533	2
ϕb_2	0.016	0.019	0.406	0.483	2
ϕD	0.350	0.370	8.89	9.40	
ϕD_1	0.315	0.335	8.00	8.51	
h	0.009	0.125	0.229	3.18	
i	0.028	0.034	0.711	0.864	
k	0.029	0.040	0.737	1.02	3
l	0.500		12.70		2
l ₁		0.050		1.27	2
l ₂	0.250		6.35		2
P	0.100		2.54		1
Q					4
α	45° NOMINAL				
β	90° NOMINAL				

Note 1: This zone is controlled for automatic handling. The variation in actual diameter within this zone shall not exceed 0.010 in (0.254 mm).

Note 2: (Three leads) ϕb_2 applies between l_1 and l_2 ϕb applies between l_2 and 0.5 in (12.70 mm) from seating plane. Diameter is uncontrolled in l_1 and beyond 0.5 in (12.70 mm) from seating plane.

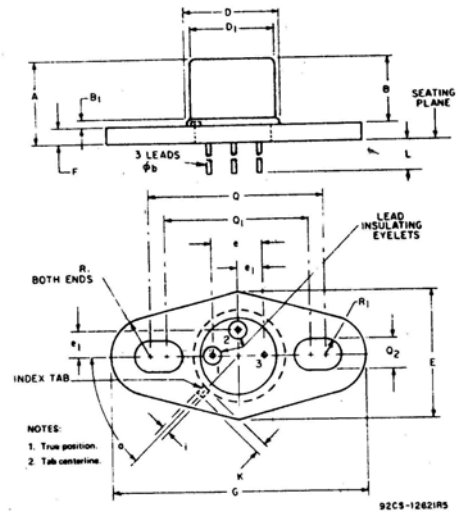
Note 3: Measured from maximum diameter of the actual device.

Note 4: Details of outline in this zone optional.

**TERMINAL CONNECTIONS
FOR ALL TYPES**

- LEAD 1 – EMITTER
- LEAD 2 – BASE
- LEAD 3 – COLLECTOR, CASE

**DIMENSIONAL OUTLINE
JEDEC TO-5 WITH MOUNTING FLANGE**



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	—	0.328	—	8.33	
B	0.240	0.260	6.10	6.60	
B ₁	0.009	0.125	0.229	3.18	
ϕb	0.016	0.019	0.406	0.483	
D	0.335	0.370	8.51	9.40	
D ₁	0.305	0.335	7.75	8.51	
E	0.495	0.505	12.57	12.83	
e	0.200 T.P.		5.08 T.P.		1
e ₁	0.100 T.P.		2.54 T.P.		1
F	0.062	0.068	1.57	1.74	
G	0.995	1.005	25.27	25.53	
i	0.028	0.034	0.711	0.864	
k	0.029	0.045	0.737	1.14	
L	1.43	—	36.32	—	
Q	0.685	0.691	17.40	17.55	
Q ₁	0.559	0.565	14.20	14.35	
Q ₂	0.128	0.132	3.25	3.35	
R	0.156 T.P.		3.96 T.P.		1
R ₁	0.064	0.066	1.63	1.67	
α	45° T.P.				1, 2

NOTES:
1. True position.
2. Tab centerline.

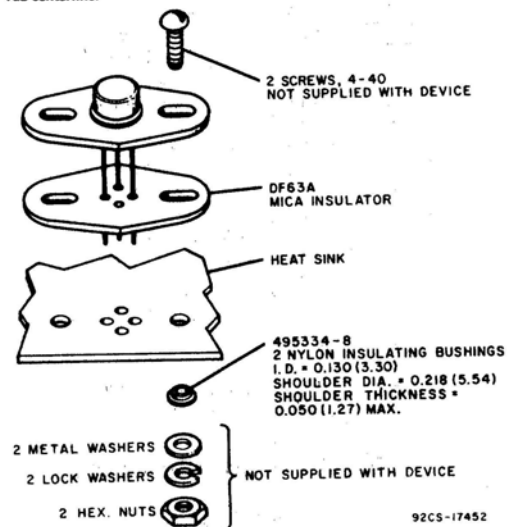


Fig. 3—Suggested mounting hardware for JEDEC TO-5 with mounting flange.