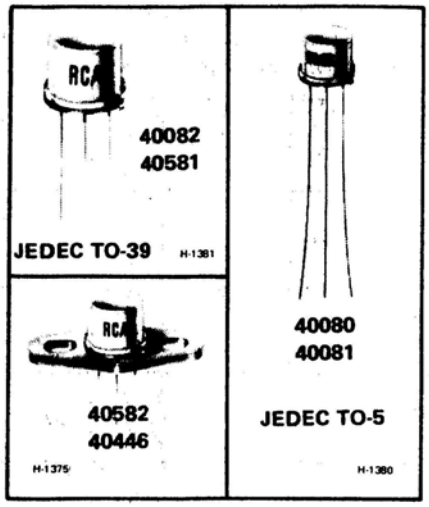
RCA
Solid State
Division

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*

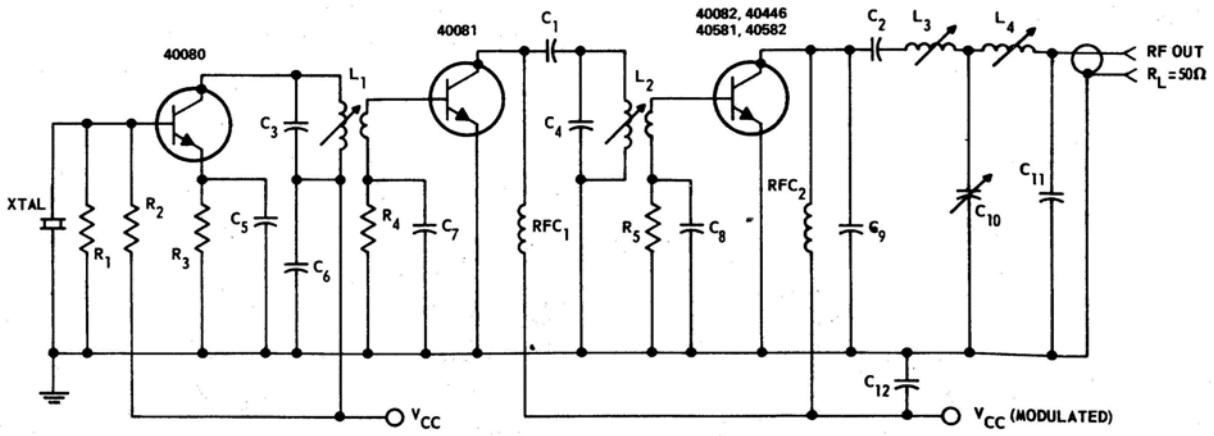
CHARACTERISTIC	SYMBOL	TEST CONDITIONS							LIMITS						UNITS
		DC COLLECTOR VOLTAGE V			DC EMITTER OR BASE VOLTAGE V	DC CURRENT mA			40080		40081		40581 40582 40082 40446		
		V_{CB}	V_{CE}	V_{CC}	V_{BE}	I_C	I_E	I_B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Collector-to-Emitter Voltage:	V_{CEO}					10		0	30	–	–	–	–	–	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.



92SS-3699 RI

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

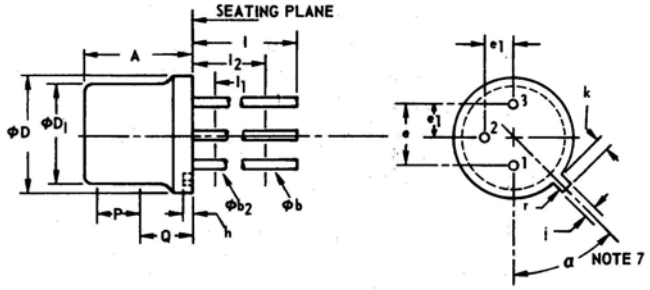
L_1: Primary 14 turns, Secondary 3 turns No. 22 wire ¼ in. (6.35 mm) CTC coil form with "green dot" core 0.75–1.2 μH, Q = 100
L_2: Primary 14 turns, Secondary 2-¾ turns No. 22 wire ¼ in. (6.35 mm) CTC coil form with "green dot" core 0.75–1.2 μH, Q = 100
L_3: 11 turns No. 22 wire ¼ in. (6.35 mm) CTC coil 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.

DIMENSIONAL OUTLINE
JEDEC TO-5



SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	0.240	0.260	6.10	6.60	
øb	0.016	0.021	0.406	0.533	2
$øb_2$	0.016	0.019	0.406	0.483	2
øD	0.335	0.370	8.51	9.40	
$øD_1$	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

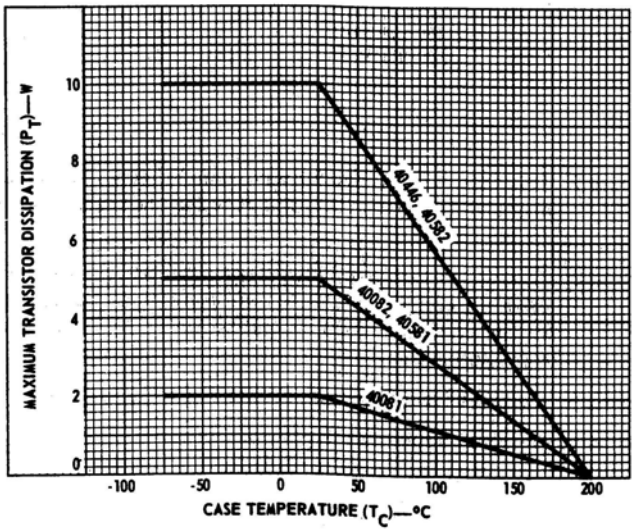

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Fig. 2—Dissipation derating curve.

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) $øb_2$ applies between l_1 and l_2. øb applies between l_2 and 1.5 in. (38.20 mm) from seating plane. Diameter is uncontrolled in l_1 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 0.054 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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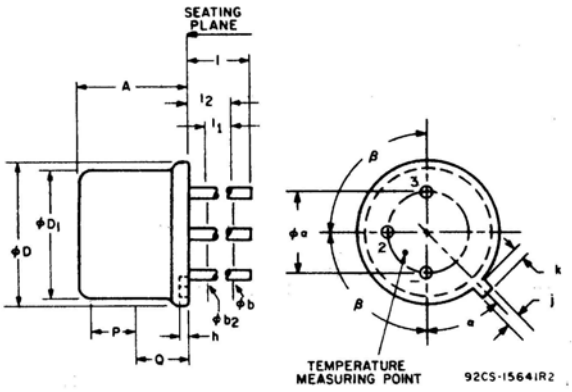
DIMENSIONAL OUTLINE
JEDEC TO-39



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	
j	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.

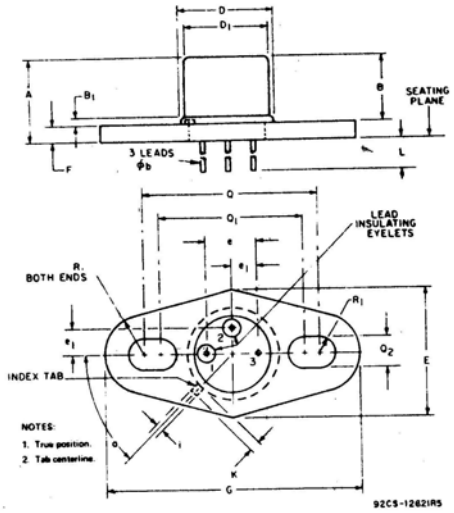
Note 3: Measured from maximum diameter of the actual device.

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.

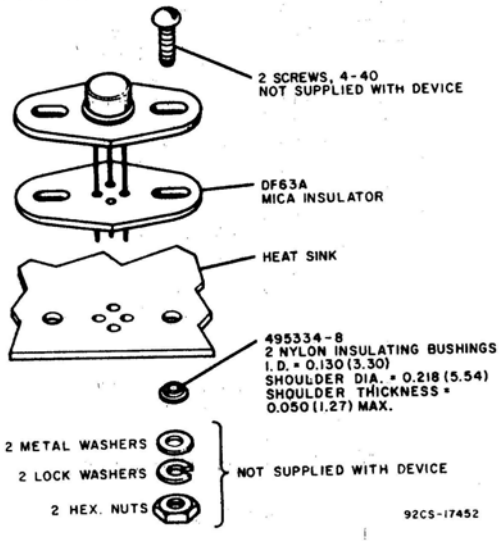


Fig. 3–Suggested mounting hardware for JEDEC TO-5 with mounting flange.

2SC799

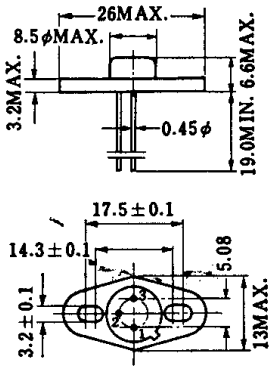
NPN エピタキシアル形シリコントランジスタ／NPN SILICON EPITAXIAL TRANSISTOR

トランシーバ送信出力用／Transceiver Power Output

特 徴／FEATURE

・2SC799 は高周波高出力段用に設計されており，27MHz 帯の CB に適します。
また高耐圧のためAM変調時の負荷の開放，短絡に対する耐破壊強度が大です。
The 2SC799 is designed for use in high power output amplifier stages. It is intended for use in citizen band communications equipment to 30MHz.
High breakdown voltage allow to withstand an open and short circuit lord in AM operation.
f=27MHz, V_{CC}=12V
出力電力/Output Power 3.5W TYP.
利 得/Power Gain 9.4dB TYP.

外形図／PACKAGE DIMENSIONS (Unit:mm)



電極接続
1．Emitter
2．Base
3．Collector(Case)
EIAJ ：TC-17, TB-22B
JEDEC：TO-37が近い
IEC ：——

絶対最大定格／ABSOTUTE MAXIMUM RATINGS (T_a=25℃)

項 目	略 号	定 格	単 位
コレクタ・ベース間電圧	V_{CBO}	80	V
コレクタ・エミッタ間電圧	V_{CEO}	40	V
エミッタ・ベース間電圧	V_{EBO}	5.0	V
コレクタ電流	$I_{C(DC)}$	1.5	A
コレクタ電流	$I_{C(Pulse)}$	3.0	A
全損失	$P_{T(T_C=25°C)}$	10	W
ジャンクション温度	T_j	175	℃
保存温度	T_{stg}	−65～+175	℃

電気的特性／ELECTRICAL CHARACTERISTICS (T_a=25℃)

項 目	略 号	条 件	MIN.	TYP.	MAX.	単 位
コレクタしゃ断電流	I_{CBO}	V_{CB}=40V, I_E=0			1.0	μA
直流電流増幅率	h_{FE}	V_{CE}=10V, I_C=0.5A*	50	90	200	
コレクタ飽和電圧	$V_{CE(sat)}$	I_C=1.0A, I_B=0.2A*		0.3	0.6	V
利得帯域幅積	f_T	V_{CE}=10V, I_E=−150mA	150	250		MHz
コレクタ容量	C_{ob}	V_{CB}=10V, I_E=0, f=1.0MHz		15	20	pF
出力電力	P_o	V_{CC}=12V, P_i=0.4W, f=27MHz 測定回路図参照/See test circuit	3.0	3.5		W
コレクタ能率	η_C		60	70		%

* パルス測定／Pulsed

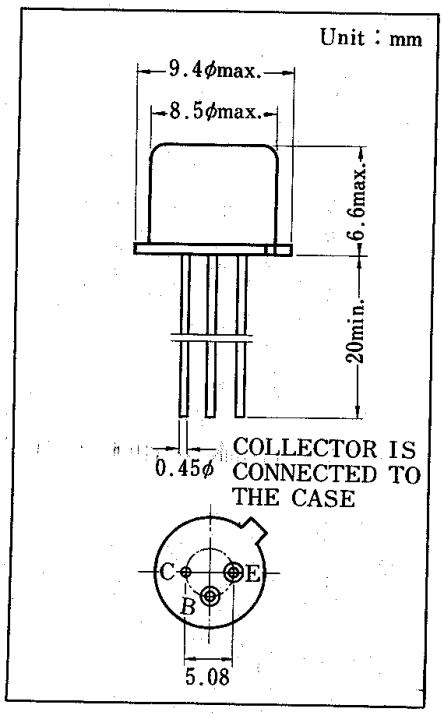
2SC2034

シリコン NPN エピタキシアルプレーナ型／Si NPN Epitaxial Planar

トランシーバ送信出力用／Transceiver Power Output

特　徴／Features

- 高耐圧／V_{CBO}=120V



最大定格／Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Value	Unit
コレクタ・ベース電圧	V_{CBO}	120	V
コレクタ・エミッタ電圧 (R_{BE}=100Ω)	V_{CER}	90	V
エミッタ・ベース電圧	V_{EBO}	5	V
せん頭コレクタ電流	I_{CM}	3	A
コレクタ電流	I_C	2	A
コレクタ損失 (Tc=25°C)	P_C	12	W
接合部温度	T_j	150	°C
保存温度	T_{stg}	−55～+150	°C

電気的特性／Electrical Characteristics (Ta=25°C)

Item	Symbol	Condition	min.	typ.	max.	Unit
コレクタ・ベース電圧	V_{CBO}	I_C=1mA, I_E=0	120			V
コレクタ・エミッタ電圧	V_{CER}	I_C=2mA, R_{BE}=100Ω	90			V
エミッタ・ベース電圧	V_{EBO}	I_E=10μA, I_C=0	5			V
コレクタしゃ断電流	I_{CEO}	V_{CE}=40V, I_B=0			1	μA
直流電流増幅率	h_{FE}	V_{CE}=5V, I_C=1A	50		200	
コレクタ・エミッタ飽和電圧	$V_{CE(sat)}$	I_C=2A, I_B=0.2A		0.6	1	V
トランジション周波数	f_T	V_{CE}=5V, I_C=500mA		150		MHz
コレクタ出力容量	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		40		pF
出力電力	P_o	V_{CC}=13.5V, f=27MHz, P_{in}=0.2W	3.8	4.2		W