

# **DIGITOR D-2510 INSTRUCTIONS**

Thank you for your purchase of the Digitor model D-2510 2m RF power amplifier. Please follow these instructions for reliable operation from your amplifier.

## **Initial Connections**

The D-2510 RF amplifier is designed for use with low power FM or CW transmitters operating in the 144-148MHz range. Typical uses would include boosting the operating range of a handheld transceiver when being used in a vehicle or base station application. An inbuilt low-noise GaAs FET receive pre-amp aids in reception of weak signals. The amplifier operates from negative ground 13.8v DC, and is supplied with mounting hardware that can be used for both vehicle and base station areas. Before mounting the amplifier in a vehicle or other confined area, ensure that sufficient air can flow around the D-2510 heatsink to aid cooling.

- a) Check that the amplifier front panel switches are both in the "Off" position, and that a 5amp fuse is mounted in the fuse holder in the red DC lead.
- b) After determining a suitable mounting position, connect up the amplifier DC lead to your 13.8v DC power source. The red coloured amplifier lead is the positive connection, and the black coloured lead is the negative connection. Take care not to reverse the polarity of the amplifier's DC supply, as damage to the amplifier may occur, or the fuse may blow. If mounted in a vehicle, also ensure that the DC voltage of the electrical system does not exceed 15v while the engine is running.
- b) Connect a coax patch cable between your transceiver and the SO-239 socket marked "Tx/Input" on the amplifier rear panel. As most handheld transceivers use a BNC antenna connector, it may be necessary to construct a BNC male to PL-259 lead using a short length of high quality RG-58C/U 50 ohm coax cable.
- c) Connect the coax lead from your external antenna to the amplifier rear panel SO-239 socket marked "Ant/Output". Check that the coax leads now connected to both sockets on the rear panel of the amplifier are tightened firmly. DO NOT OVER-TIGHTEN.

## **Operation**

Once you have completed the initial connection stage, the D-2510 amplifier is ready to operate, with a choice of using just the transmit or receive amplifiers, or both.

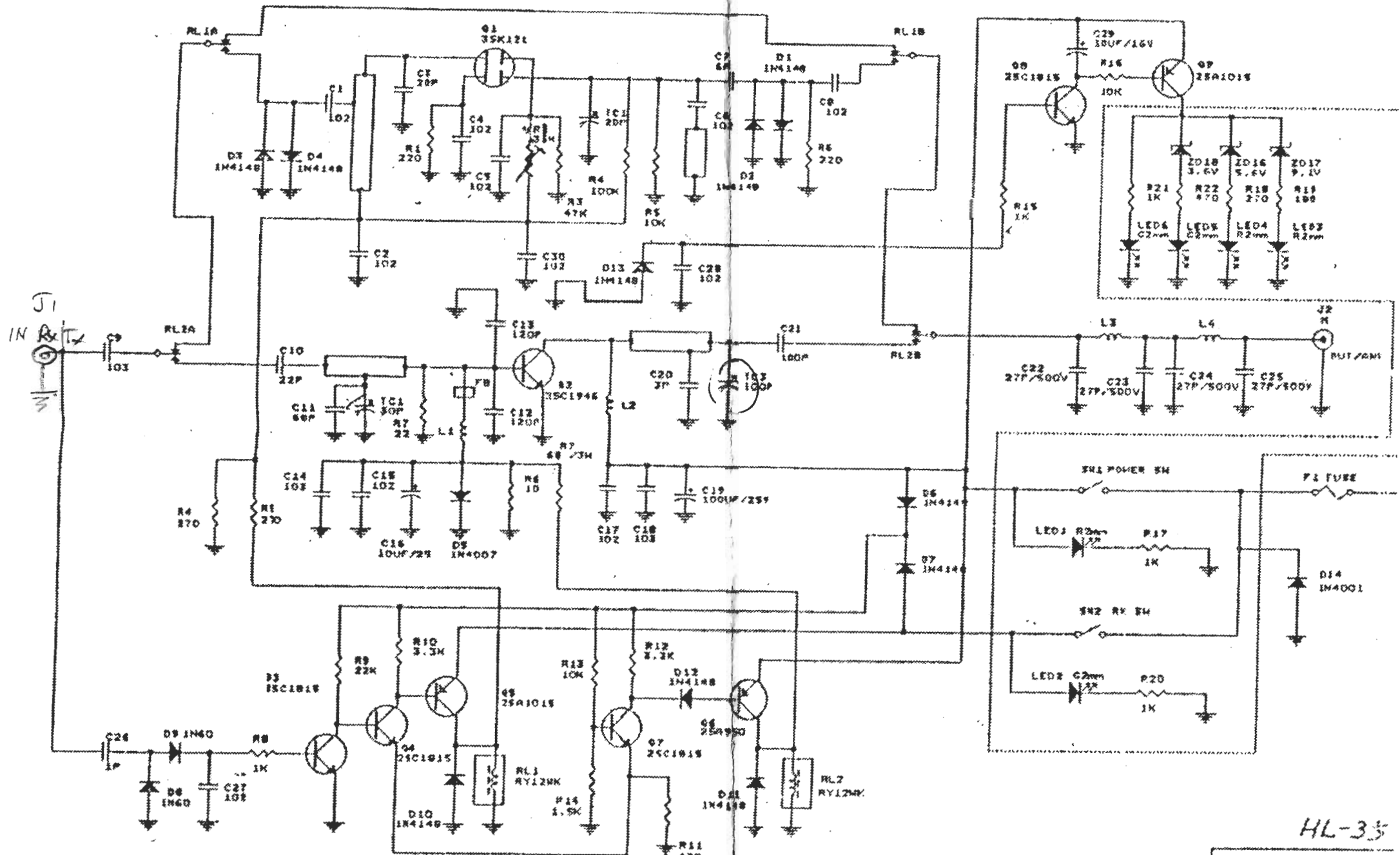
- a) To activate the transmit amplifier, simply locate the switch marked "On/Off Power" on the right-hand side of the front panel, and switch it to the On position. The red LED marked "Tx" will light up. Now, whenever the amplifier detects a transmission on its input connector it will activate the amplifier's Tx/Rx switching circuit, and the amplifier will provide boosted RF output. Note that the transmitter connected to the amplifier input must provide a nominal minimum of 200mW RF for the amplifier's "Carrier Detect" circuitry to operate reliably. The D-2510 amplifier is capable of transmissions at full power for up to 10mins, but must be allowed to cool down sufficiently between such extended transmission sessions.
- b) To activate the GaAs FET receive pre-amp, locate the front panel switch marked "On/Off Rx" and switch it to the On position. The green LED marked "Rx" will light up, indicating that the pre-amp is activated. When using the D-2510 amplifier in crowded RF areas, and especially when used with handheld transceivers, it is recommended that the GaAs FET be left switched Off unless receiving a weak signal, as this will result in less interference from strong out of band signals.
- c) If operation of the Tx amp and Rx pre-amp are not required, leave both switches in the Off position. This will bypass the amplifier on both transmit and receive.

## **Caution**

- a) Never use the amplifier with a transmitter capable of greater than 6w RF output, as damage to the amplifier's RF output device and other components will occur.
- b) Do not operate the amplifier with a DC supply voltage greater than 16v.
- c) Do not operate the Tx section of the D-2510 amplifier if your antenna SWR is greater than 2.5:1, otherwise damage to the RF output device may occur.
- d) The D-2510 is not recommended for use with SSB transmitters.
- e) Use only a 5amp fast blow fuse when replacing the fuse in the DC lead.

## SPECIFICATIONS

Model	Digitor D-2510
RF Connections	M-type (SO-239) connectors
Input/Output Impedance	50ohms nominal
Power Supply	DC 13.8volts (Negative ground)
Current consumption	5A maximum
RF Output Power	30w maximum
RF Input Power	0.2w to 5w
Harmonic Output	-60dB typical
Rx Pre-amp Gain	13dB nominal
Dimensions	100 x 36 x 175mm (W.H.D)
Weight	550g



HL-35

Title	05-36V CIRCU
Draw Document Number	B
Date	November 10, 1954

## ➤ GaAs MES FET ◀

### Application

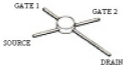
UHF RF

Type No.		V <sub>DS</sub> (V)	I <sub>D</sub> (mA)	P <sub>D</sub> (mW)	I <sub>DSS</sub>		Y <sub>f</sub>   (1KHz) TYP.			NF TYP.				
					(mA)	V <sub>DS</sub> (V)	V <sub>G1S/G2S</sub> (V)	(mS)	V <sub>DS</sub> (V)	I <sub>D</sub> (mA)	V <sub>G2S</sub> (V)	(dB)	V <sub>DS</sub> (V)	F (MHz)
N-Channel	P-Channel	10	50	200	20~45	5	0/0	17	5	10	0	1.5	5	800

Y : 20~35

GR : 30~45

μ-X



# 2SC1946A

NPN EPITAXIAL PLANAR TYPE

## DESCRIPTION

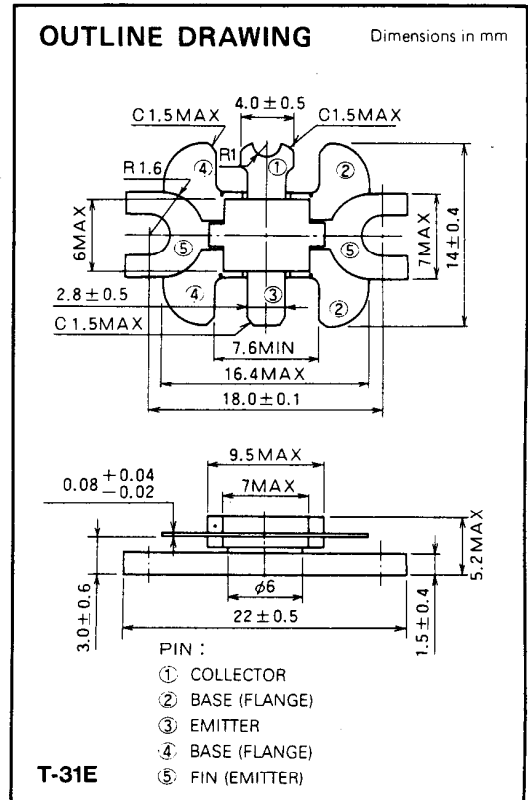
2SC1946A is a silicon NPN epitaxial planar type transistor designed for RF power amplifiers on VHF band mobile radio applications.

## FEATURES

- High power gain:  $G_{pe} \geq 10\text{dB}$   
@  $V_{CC} = 13.5\text{V}$ ,  $P_O = 30\text{W}$ ,  $f = 175\text{MHz}$
- Emitter ballasted construction and gold metallization for high reliability and good performances.
- Low thermal resistance ceramic package with flange.
- Ability of withstanding more than 20:1 load VSWR when operated at  $V_{CC} = 15.2\text{V}$ ,  $P_O = 30\text{W}$ ,  $f = 175\text{MHz}$ .
- Equivalent input/output impedance at rated operating conditions:  $Z_{in} = 0.65 + j1.4\Omega$   
 $Z_{out} = 1.9 + j0.75\Omega$

## APPLICATION

25 watts output power amplifiers in VHF band mobile radio applications.



## ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Ratings	Unit
$V_{CBO}$	Collector to base voltage		35	V
$V_{EBO}$	Emitter to base voltage		4	V
$V_{CEO}$	Collector to emitter voltage	$R_{BE} = \infty$	17	V
$I_C$	Collector current		7	A
$P_C$	Collector dissipation	$T_a = 25^\circ\text{C}$	3	W
		$T_C = 25^\circ\text{C}$	50	W
$T_j$	Junction temperature		175	$^\circ\text{C}$
$T_{stg}$	Storage temperature		-55 to 175	$^\circ\text{C}$
$R_{th-a}$	Thermal resistance	Junction to ambient	50	$^\circ\text{C}/\text{W}$
$R_{th-c}$		Junction to case	3	$^\circ\text{C}/\text{W}$

Note. Above parameters are guaranteed independently.

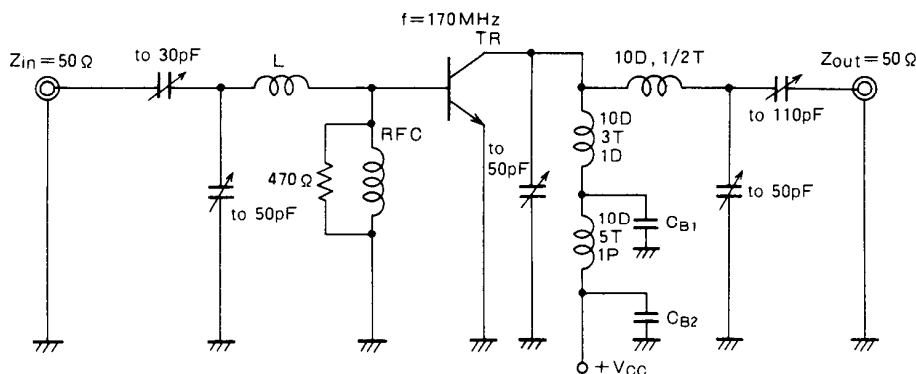
## ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$V_{(BR)EBO}$	Emitter to base breakdown voltage	$I_E = 10\text{mA}$ , $I_C = 0$	4			V
$V_{(BR)CBO}$	Collector to base breakdown voltage	$I_C = 10\text{mA}$ , $I_E = 0$	35			V
$V_{(BR)CEO}$	Collector to emitter breakdown voltage	$I_C = 0.1\text{A}$ , $R_{BE} = \infty$	17			V
$I_{CBO}$	Collector cutoff current	$V_{CB} = 25\text{V}$ , $I_E = 0$			2	mA
$I_{EBO}$	Emitter cutoff current	$V_{EB} = 3\text{V}$ , $I_C = 0$			1	mA
$h_{FE}$	DC forward current gain *	$V_{CE} = 10\text{V}$ , $I_C = 0.2\text{A}$	10	50	180	—
$P_O$	Output power	$V_{CC} = 13.5\text{V}$ , $P_{in} = 3\text{W}$ , $f = 175\text{MHz}$	30	35		W
$\eta_C$	Collector efficiency		60	70		%

Note. \* Pulse test,  $P_w = 150\mu\text{s}$ , duty=5%.

Above parameters, ratings, limits and conditions are subject to change.

**TEST CIRCUIT**

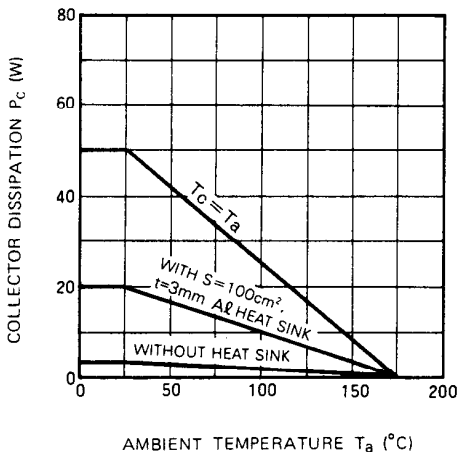


L: Length 10mm  
 RFC: 0.4mm enameled wire 12T with Ferrite Bead  
 CB1: 220pF, 2200pF in parallel  
 CB2: 220pF, 2200pF, 10μF in parallel

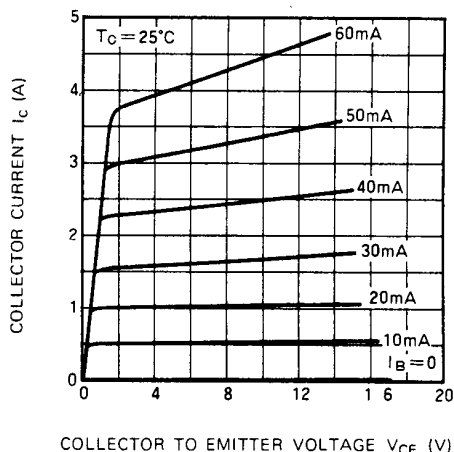
Notes: All coils are made from 1.5mmφ silver plated copper wire  
 Coil dimensions in milli-meter  
 D: Inner diameter of coil  
 T: Turn number of coil  
 P: Pitch of coil

**TYPICAL PERFORMANCE DATA**

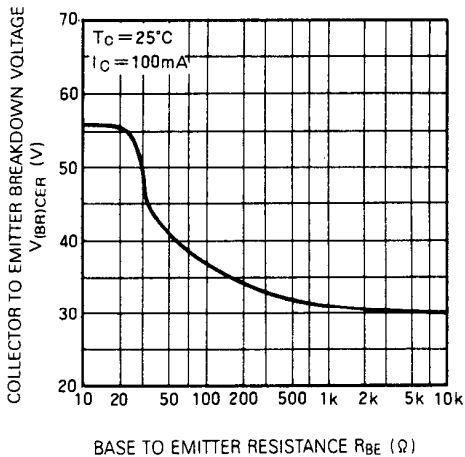
**COLLECTOR DISSIPATION VS. AMBIENT TEMPERATURE**



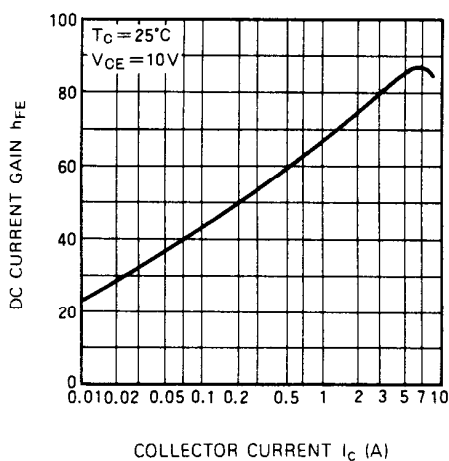
**COLLECTOR CURRENT VS. COLLECTOR TO EMITTER VOLTAGE**



**COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE**

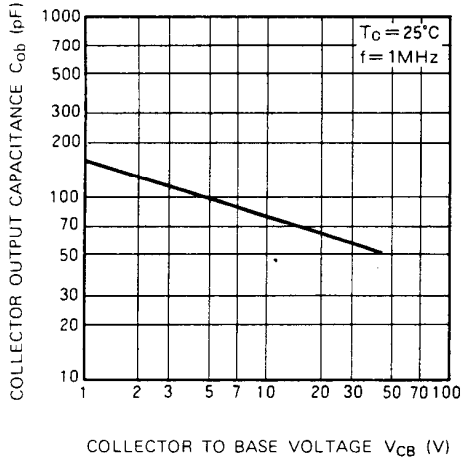


**DC CURRENT GAIN VS. COLLECTOR CURRENT**

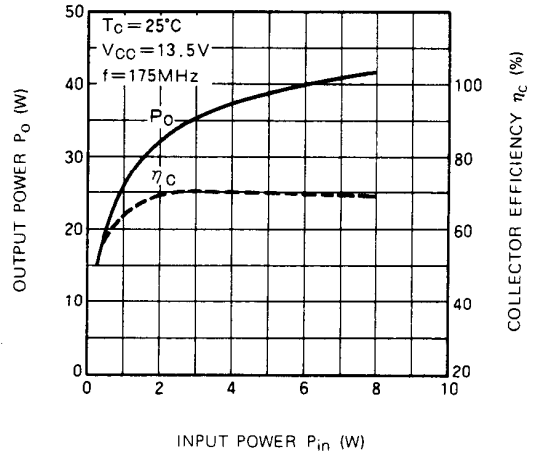


**NPN EPITAXIAL PLANAR TYPE**

**COLLECTOR OUTPUT CAPACITANCE VS.  
 COLLECTOR TO BASE VOLTAGE**



**OUTPUT POWER, COLLECTOR EFFICIENCY  
 VS. INPUT POWER**



**OUTPUT POWER VS. COLLECTOR  
 SUPPLY VOLTAGE**

