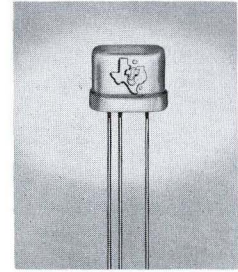




P-N-P GROWN-DIFFUSED GERMANIUM TRANSISTOR

TYPE 2N1110
BULLETIN NO. DL-5 1020, FEBRUARY, 1959

455-kc IF AMPLIFIER
FOR
BROADCAST-BAND RECEIVERS



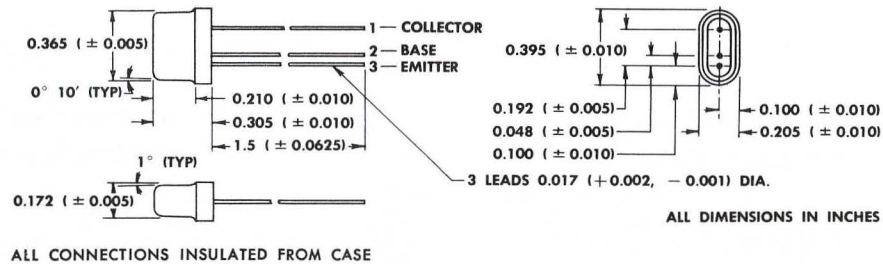
ACTUAL SIZE

qualification testing

To assure maximum reliability, stability and long life, all units are heat cycled from -55°C and room humidity to $+75^{\circ}\text{C}$ and 95% relative humidity for four complete cycles over an eight-hour period. All transistors are thoroughly tested for rigid adherence to specified design characteristics.

mechanical data

Metal case with glass-to-metal hermetic seal between case and leads. Unit weight is 1 gram.



absolute maximum ratings at 25°C case temperature (unless otherwise noted)

Collector-to-Base Voltage	16 v
Collector Current	5 ma
Total Dissipation	30 mw
Collector Junction Temperature	+ 85°C
Storage Temperature Range	- 55°C to + 85°C

typical design characteristics at 25°C

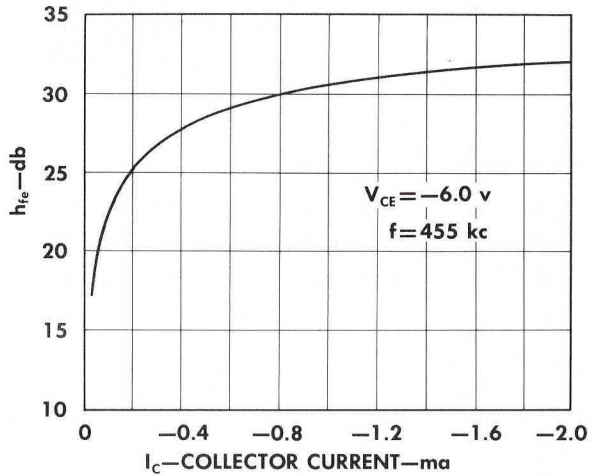
			typical	max.	units
I_{CBO}	Collector Reverse Current	$I_E = 0$	-5	-10	μa
h_{fe}	Forward Current Transfer Ratio (455 kc)	$I_C = -0.5 \text{ ma}$	29	—	db
$f_{\alpha b}$	Current Transfer Ratio Cutoff Frequency	$I_C = -1 \text{ ma}$	35	—	mc
C_{ob}	Output Capacitance	$I_C = -1 \text{ ma}$	1.5	—	μf
		$V_{CB} = -12 \text{ v}$			
		$V_{CB} = -6 \text{ v}$			
		$V_{CB} = -5 \text{ v}$			
		$V_{CB} = -6 \text{ v}$			

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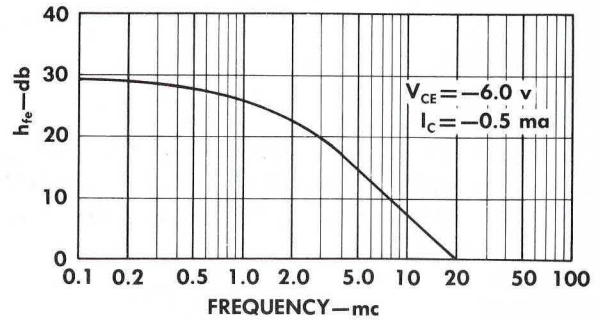
TYPE 2N1110

TYPICAL CHARACTERISTICS

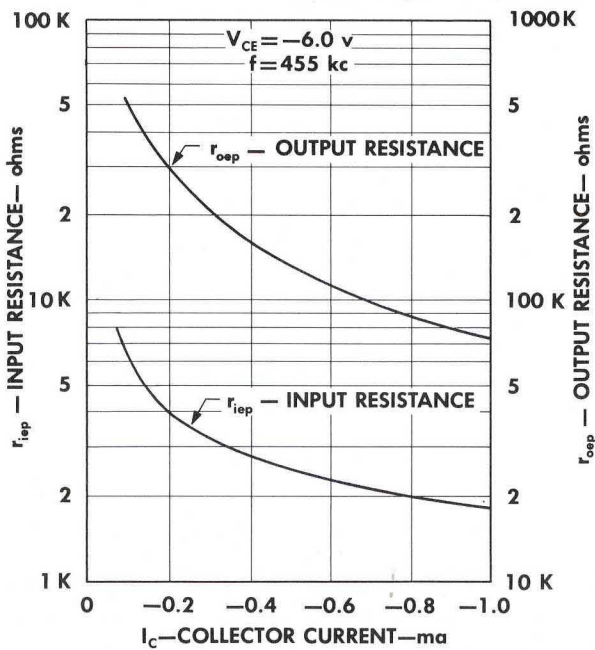
TYPICAL CURRENT AMPLIFICATION (h_{fe}) VS COLLECTOR CURRENT



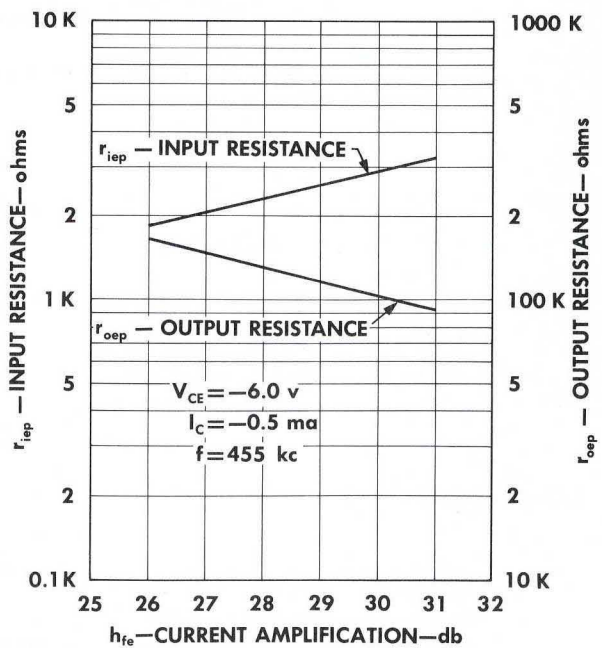
TYPICAL CURRENT AMPLIFICATION (h_{fe}) VS FREQUENCY



TYPICAL INPUT AND OUTPUT RESISTANCE VS I_C



TYPICAL INPUT AND OUTPUT RESISTANCE VS h_{fe}



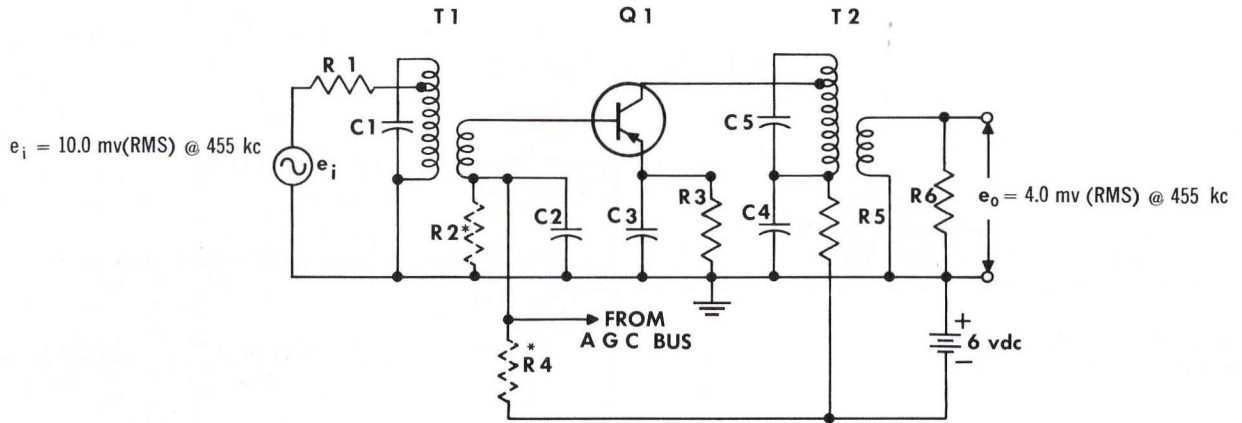
r_{iep} = Common-emitter parallel input resistance with output shorted

r_{oep} = Common-emitter parallel output resistance with input shorted

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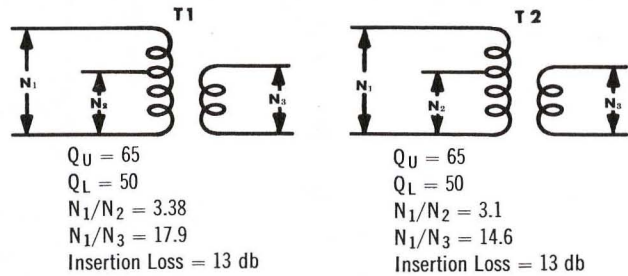
TYPICAL INPUT IF AMPLIFIER
(455 kc)



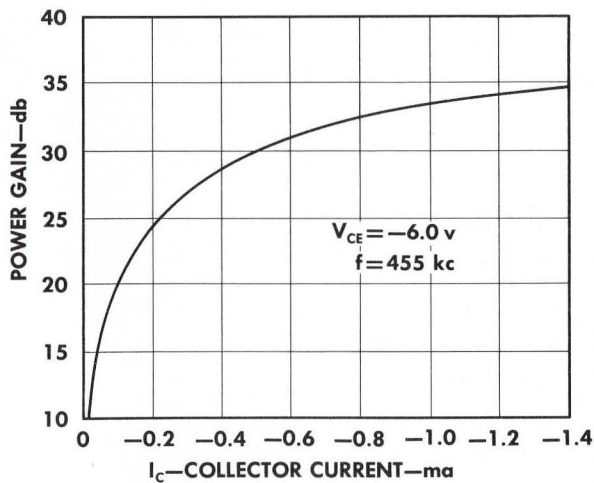
PARTS LIST:

- | | |
|-------------------|--------------------------------|
| R 1 = 165 K ohms | C 1, 5 = 190 $\mu\mu\text{f}$ |
| *R 2 = 4.7 K ohms | C 2, 3, 4 = 0.05 μf |
| R 3 = 680 ohms | Q 1 = 2N1110 |
| *R 4 = 33 K ohms | |
| R 5 = 1.0 K ohms | |
| R 6 = 1.8 K ohms | |

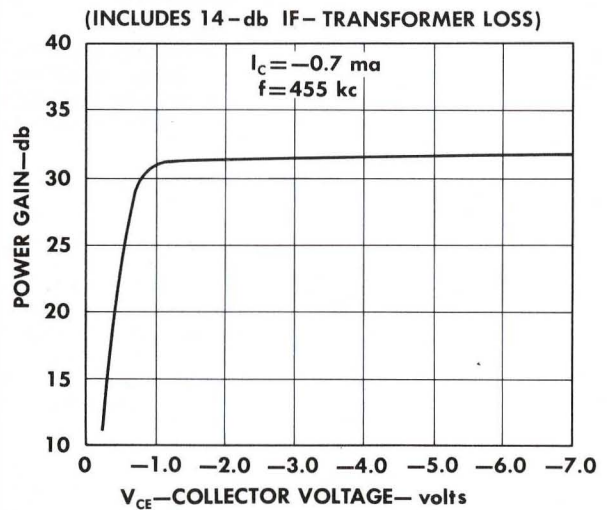
* To be used when AGC is not desired.



TYPICAL POWER GAIN VS
COLLECTOR CURRENT
(INCLUDES 14-db IF-TRANSFORMER LOSS)



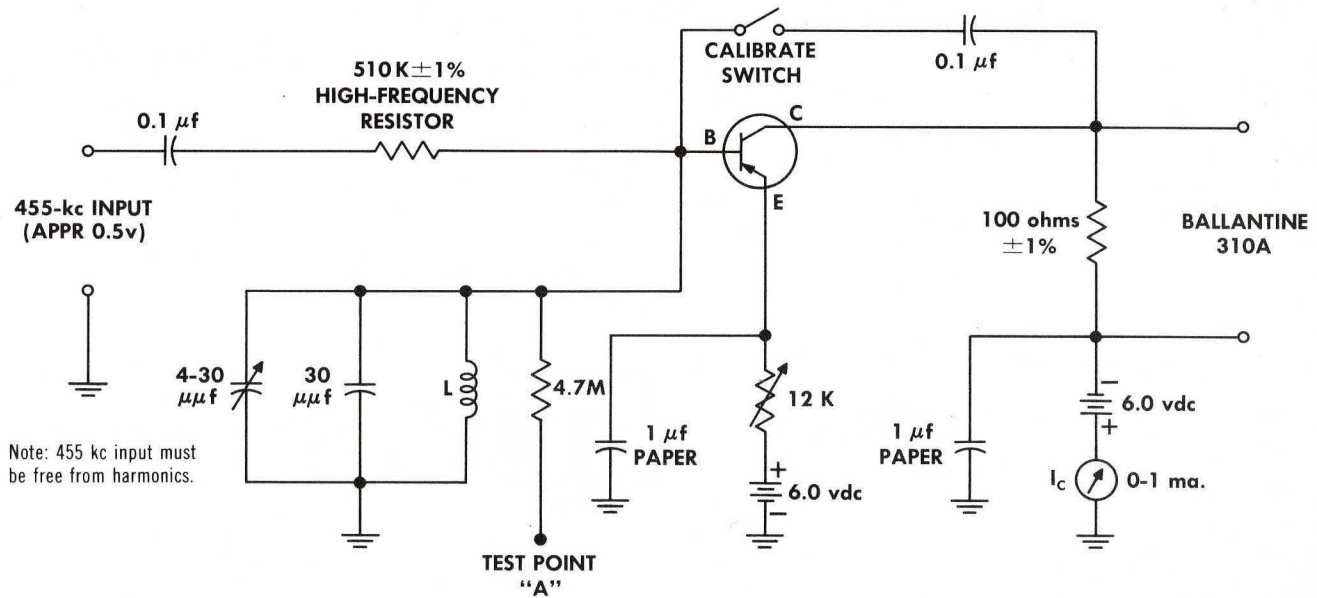
TYPICAL POWER GAIN VS
COLLECTOR VOLTAGE
(INCLUDES 14-db IF-TRANSFORMER LOSS)



TYPE 2N1110

TEST CIRCUIT

455 - kc h_{fe} TEST SET



Coil Data

$L = 2.5$ mh

$Q = 150$ minimum at 455 kc

260 turns of #32 wire random wound on general ceramics

#F624-2 steatite Q, toroid core with one layer of insulated tape on bare core.

455-kc h_{fe} Test Set Operating Instructions

1. Connect a VTVM to test point "A" and adjust the 455-kc tuned circuit for resonance.
2. Close calibrate switch and adjust 455-kc input to give 0.1 mv reading on Ballantine 310A or equivalent.
3. Open calibrate switch, insert transistor, and set $I_c = 0.5$ ma.
4. Read h_{fe} value directly in db (0 db = 0.1 mv reference level).

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