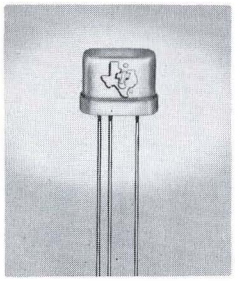
TYPE 2N1109
P-N-P GROWN-DIFFUSED GERMANIUM TRANSISTOR

TYPE 2N1109
BULLETIN NO. DL-S 1019, FEBRUARY, 1959

OSCILLATOR FOR BROADCAST-BAND RECEIVERS



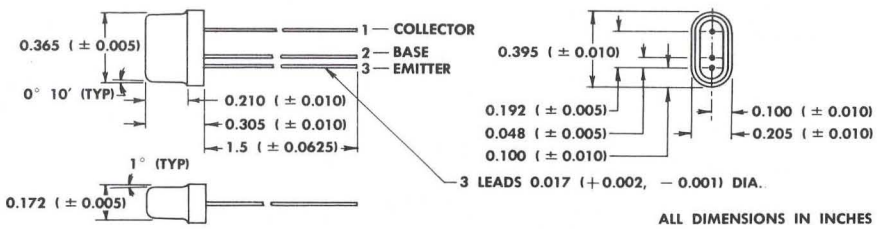
ACTUAL SIZE

qualification testing

To assure maximum reliability, stability and long life, all units are heat cycled from −55°C and room humidity to +75°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.



ALL DIMENSIONS IN INCHES

ALL CONNECTIONS INSULATED FROM CASE

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	$I_E = 0$	$V_{CB} = -12$ v	−5	−10	μa
h_{fe}	Forward Current Transfer Ratio (455 kc)	$I_C = -0.5$ ma	$V_{CB} = -6$ v	20	—	db
$f_{\alpha b}$	Current Transfer Ratio Cutoff Frequency	$I_C = -1$ ma	$V_{CB} = -5$ v	30	—	mc
C_{ob}	Output Capacitance	$I_C = -1$ ma	$V_{CB} = -6$ v	1.5	—	μμf

LICENSED UNDER BELL SYSTEM PATENTS

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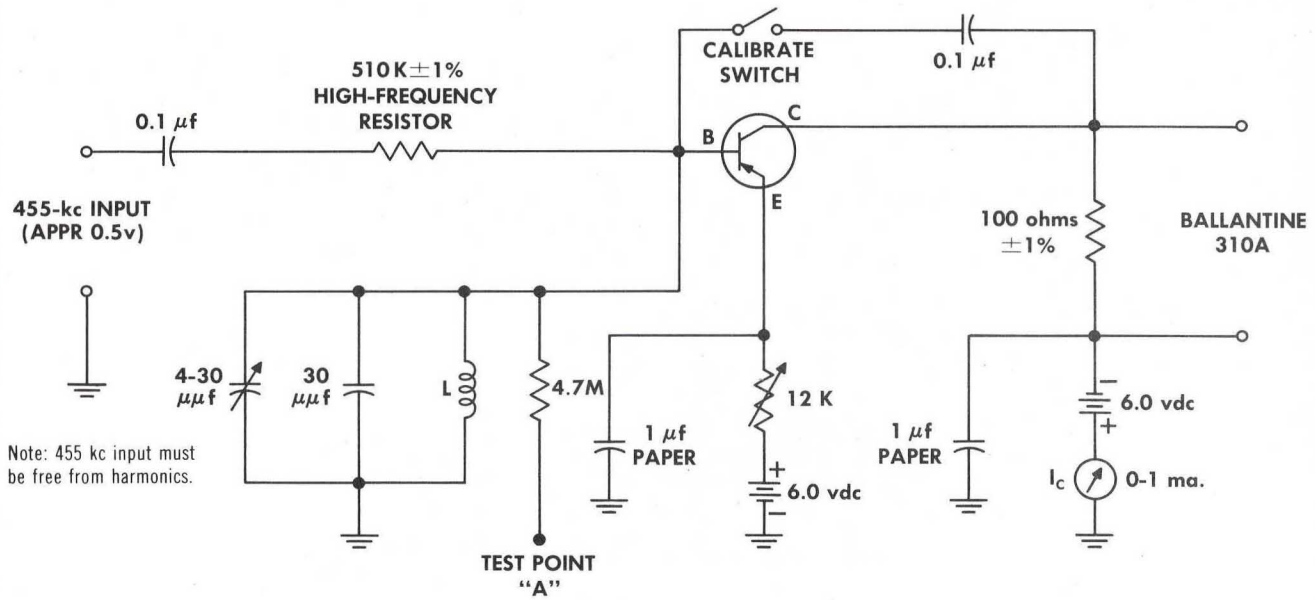
TEST CIRCUIT

455 — kc h_{fe} TEST SET



Note: 455 kc input must be free from harmonics.

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_1 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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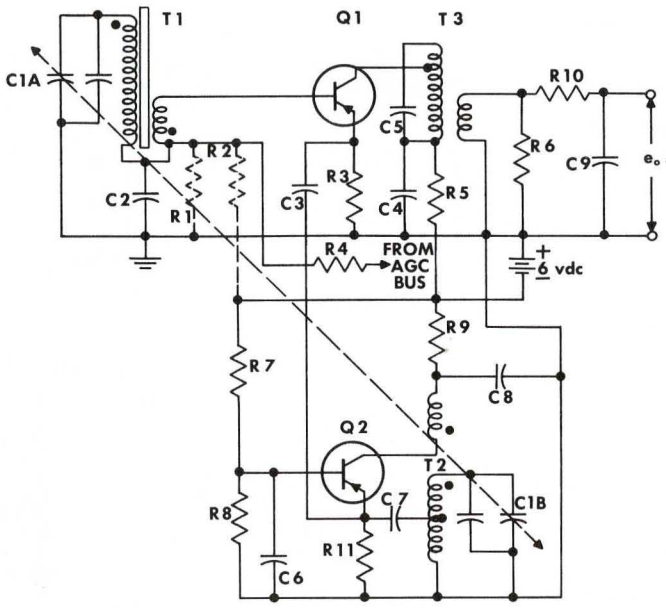
TYPICAL OSCILLATOR—MIXER (535 kc—1640 kc) TO 455 kc



e_o = 3.0 mv @ 455 kc with T-1 placed in a field strength of 5000 μv/m @ 1000 kc

PARTS LIST:

†R 1 = 6.8 K ohms
†R 2 = 33 K ohms
R 3, 11 = 3.3 K ohms
R 4 = 10 K ohms
R 5, 9 = 470 ohms
*R 6 , 10 = 4.7 K ohms
R 7, 8 = 10 K ohms

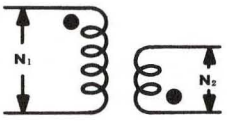
C 1A = 12-138 $\mu\mu$f
C 1B = 16.5-83 $\mu\mu$f
C 2 = 0.005 μf
C 3, 6 = 0.01 μf
C 4, 7, 8 = 0.05 μf
*C 9 = 100 $\mu\mu$f

Q 1 = 2N1108
Q 2 = 2N1109

* Used for measurement of e_o only. R 6 = 2.7 K for true loading.

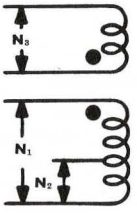
† To be used when AGC is not desired.

T1



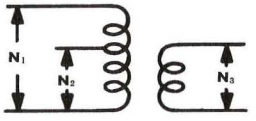
L = 0.69 mh
Q_U = 360
Q_L = 50
N_1/N_2 = 5.0
Bar size:
4⅝" x ¾" x ⅛"
Material: Ferrite
$C_{dist.}$ = 2.4 $\mu\mu$f
K = 0.64

T2



N_1 = 120T L_1 = 0.3 mh
N_2 = 2T Gears = 40/61
N_3 = 30T Cam = 0.156
Q_U = 90 Wire: 5-44 Litz
Coil Form: 0.285" dia.
Core Mat.: Powdered Iron
Universal Winding (1 pi)

T3



Q_U = 65
Q_L = 50
N_1/N_2 = 3.1
N_1/N_3 = 14.6
Ins. Loss = 13 db

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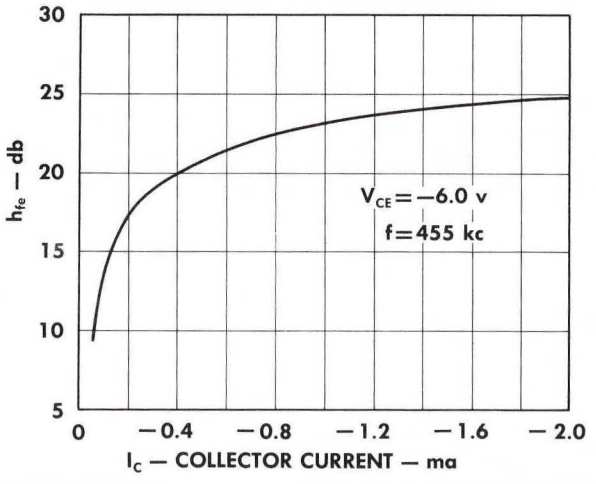
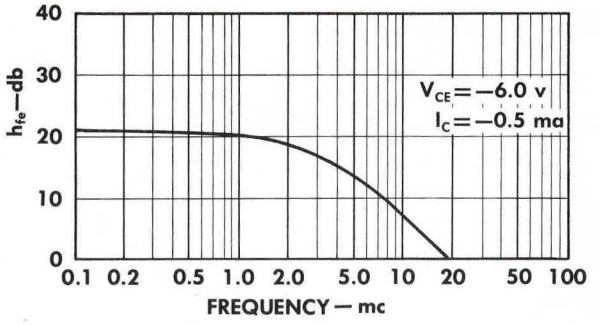
TYPICAL CHARACTERISTICS

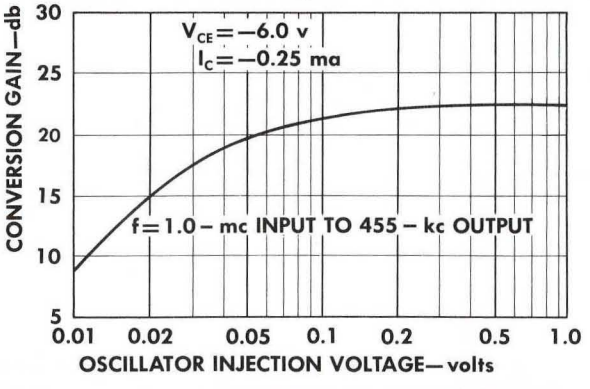
TYPICAL CURRENT AMPLIFICATION (h_{fe}) VS COLLECTOR CURRENT



TYPICAL CURRENT AMPLIFICATION (h_{fe}) VS FREQUENCY



TYPICAL CONVERSION GAIN VS OSCILLATOR INJECTION VOLTAGE



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