BULLETIN NO. DL-S 660
SEPTEMBER, 1956

TENTATIVE SPECIFICATIONS

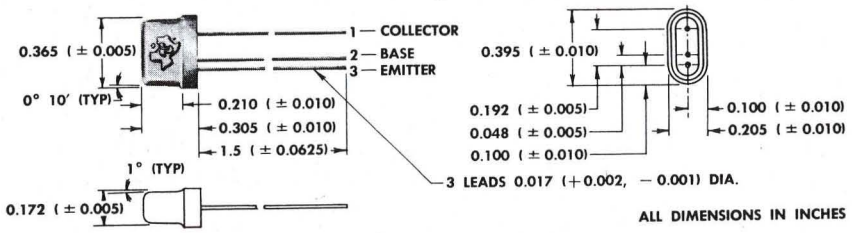
TYPE 2N252
P-N-P GROWN JUNCTION GERMANIUM TRANSISTOR

Texas Instruments Type 2N252 germanium P-N-P grown-diffused transistor is especially designed to serve as a Converter in 455 kc IF Broadcast Band commercial radio receivers. The closely controlled characteristics of these transistors permit interchangeability in properly designed circuits. All units are thoroughly tested for design characteristics and to assure conversion gain across the broadcast band in the recommended circuit. Also, a test is made on each transistor to ensure satisfactory operation at a reduced collector voltage of 4.5 volts.

To assure maximum reliability, stability, and long life, all units are cycled from -55°C to +75°C 95% relative humidity for four complete cycles over an eight-hour period. In addition, the hermetic seal is checked by vacuum testing.

mechanical data

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



electrical data

Absolute Maximum Collector Voltage Referred to Emitter	−16 v
Absolute Maximum Collector Current	−5 ma
Absolute Maximum Collector Dissipation at 25°C	30 mw
Maximum Operating Temperature	55 °C

typical design characteristics at $T_j = 25°C$

		design center	max.	unit
I_{CO}	Collector Cutoff Current at −12 V	−5	−10	μa
C_{ob}	Output Capacitance Referred to Base at 1mc *	1	3	μμfd
C_{oe}	Output Capacitance Referred to Emitter at 455 kc *	6	—	μμfd

* V_c = −12 Volts and I_c = −0.5 milliamperes.

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SEMICONDUCTOR-COMPONENTS DIVISION

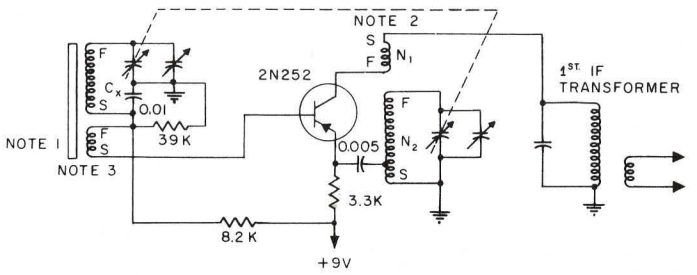
TYPE 2N252

TYPICAL CHARACTERISTICS

common emitter operating characteristics

		min.	design center	max.	unit
V_c	Collector Voltage	—	−9	—	Volt
I_c	Collector Current	—	−0.45	—	ma
C_G	Conversion Gain, (NOTE 8)	30	34	—	db

RECOMMENDED CONVERTER CIRCUIT



NOTES:

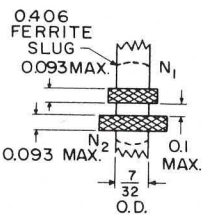
1. Pickup coil is six turns bifilar wound at start end of antenna primary winding.

   Minimum K = 0.5 at 540 kc, where $K = \sqrt{1 - \frac{C_{oc}}{C_{sc}}}$ = Coefficient of coupling.

   C_{oc} = Capacity required for primary resonance with secondary open circuited.

   C_{sc} = Capacity required for primary resonance with secondary short circuited.

2. Oscillator coil is made as follows:

   Slug, Ferrite, El-Rad No. 21B100, or equivalent. Slug must extend through primary coil (N_1) a distance of 1/8" minimum. N_1, 28 turns, No. 40 SF solid wire, Universal wound. N_2, 117 turns, No. 40 SF solid wire, Universal wound with tap at 6 turns from start. Oscillator coil characteristics: Q = 70 min, 80 max at 995 kc. K = 0.5 min, 0.55 max at 995 kc. Inductance = 0.224 mh at 790 kc.

3. The R.F. voltage applied to the converter base is the sum of the voltage across the pickup winding and the voltage across C_X. At the low frequency end of the band, the voltage across C_X is the highest of the two. At the high frequency end of the band, an opposite condition exists. At some frequency near the middle of the band the two voltages are equal. Therefore, the phasing of the pickup winding must be as shown to avoid a midband null.

4. Antenna coupling circuits other than that shown are not recommended.

5. Tolerances on bias resistors, coupling capacitors and C_X are ± 10%. G.M.V. capacitors are not recommended.

6. A 0.406 ferrite slug is required in the oscillator coil to obtain required coupling.

7. Avoid mounting oscillator coil near ferrous material such as metal chassis, etc.

8. Conversion gain is measured with a tuned 1800 kc, 2000 ohm, R.F. signal source and 455 kc, 100,000 ohm load.

$$\text{Conversion gain} = \frac{\text{455 kc power delivered to 100K load}}{\text{max power available from 2000 ohm source}}$$

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