TYPE TIS128
P-N-P SILICON TRANSISTOR

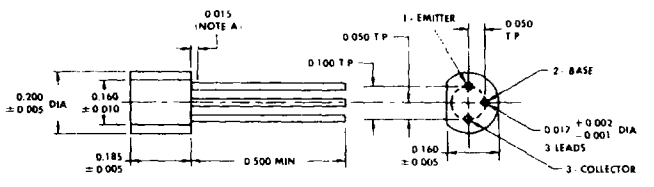
BULLETIN NO. DL-S 7312005, MARCH 1973

SILECT† VHF/UHF TRANSISTOR‡ WITH FORWARD-AGC CHARACTERISTICS DESIGNED FOR COMMON-BASE AMPLIFIER APPLICATIONS

- **Low C_{ce} . . . 0.3 pF Max**
- **Low Noise at 850 MHz . . . 6.5 dB Max**
- **High Power Gain at 850 MHz . . . 10 dB Min**

mechanical data

This transistor is encapsulated in a plastic compound specifically designed for this purpose, using a highly mechanized process developed by Texas Instruments. The case will withstand soldering temperatures without deformation. This device exhibits stable characteristics under high-humidity conditions and is capable of meeting MIL-STD-202C, Method 106B. The transistor is insensitive to light.



NOTES: A. Lead diameter is not controlled in this area.
B. Leads having maximum diameter (0.019) shall be witnin 0.007 of their true positions measured in the gaging plane 0.054 below the seating plane of the device relative to a maximum-diameter package.
C. All dimensions are in inches.

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absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

Collector-Base Voltage	−60 V
Collector-Emitter Voltage (See Note 1)	−45 V
Emitter-Base Voltage	−4 V
Continuous Collector Current	−30 mA
Continuous Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 2)	250 mW
Storage Temperature Range	−65°C to 150°C
Lead Temperature 1/16 Inch from Case for 10 Seconds	260°C

electrical characteristics at 25°C free-air temperature

PARAMETER		TEST CONDITIONS	MIN	MAX	UNIT
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = -100\ \mu A$, $I_E = 0$	−60		V
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = -1$ mA, $I_B = 0$, See Note 3	−45		V
I_{CBO}	Collector Cutoff Current	$V_{CB} = -25$ V, $I_E = 0$		−100	nA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = -4$ V, $I_C = 0$		−100	μA
h_{FE}	Static Forward Current Transfer Ratio	$V_{CE} = -10$ V, $I_C = -2$ mA	30		
$\lvert h_{fe} \rvert$	Small-Signal Common-Emitter Forward Current Transfer Ratio	$V_{CE} = -10$ V, $I_C = -2$ mA, f = 100 MHz	6.5		
C_{ce}	Collector-Emitter Capacitance	$V_{CE} = -10$ V, $I_B = 0$, f = 1 MHz, See Note 4		0.3	pF

NOTES: 1. This value applies when the base-emitter diode is open-circuited.
2. Derate linearly to 150°C free-air temperature at the rate of 2 mW/°C.
3. This parameter must be measured using pulse techniques. $t_w = 300\ \mu s$, duty cycle ≤ 2%.
4. C_{ce} measurement employs a three-terminal capacitance bridge incorporating a guard circuit. The base is connected to the guard terminal of the bridge.

†Trademark of Texas Instruments
‡U.S. Patent No. 3,439,238

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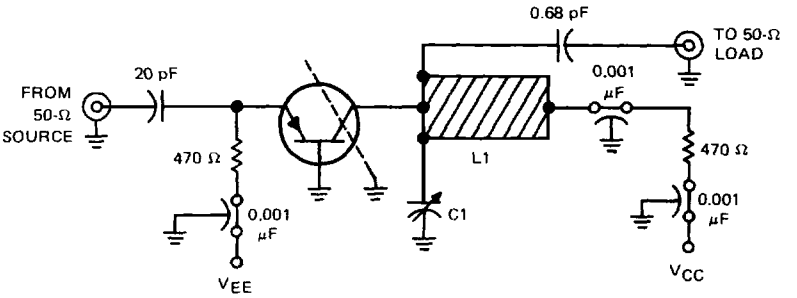
operating characteristics at 25°C free-air temperature

	PARAMETER	TEST CONDITIONS	MIN	MAX	UNIT
F	Spot Noise Figure	V_{CC} = −10 V, I_C = −2 mA, R_G = 50 Ω, f = 850 MHz, See Figure 1		6.5	dB
G_{pb}	Unneutralized Small-Signal Common-Base Insertion Power Gain	V_{CC} = −10 V, I_C = −2 mA, f = 850 MHz, See Figure 1	10		dB
B	Bandwidth		15		MHz
I_C	Collector Current for 30-dB Gain Reduction	V_{CC} = −10 V, f = 850 MHz, ΔG_{pb} = −30 dB† See Figure 1	−4.5	−7	mA

†ΔG_{pb} is defined as the change in G_{pb} from the value at I_C = −2 mA.

PARAMETER MEASUREMENT INFORMATION



CIRCUIT COMPONENT INFORMATION
L1: Silver-plated brass 1/32" thick, 1/2" wide, 1" long
C1: 0.8-10 pF, Johansen #4642, or equivalent

FIGURE 1–850-MHz POWER GAIN, NOISE FIGURE, AND GAIN-CONTROL TEST CIRCUIT

TYPICAL CHARACTERISTICS

SMALL-SIGNAL COMMON-EMITTER FORWARD CURRENT TRANSFER RATIO vs COLLECTOR CURRENT

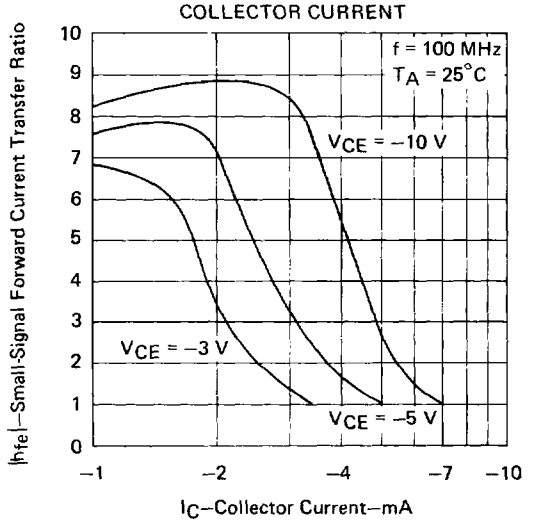


FIGURE 2

SMALL-SIGNAL COMMON-BASE INSERTION POWER GAIN vs COLLECTOR CURRENT

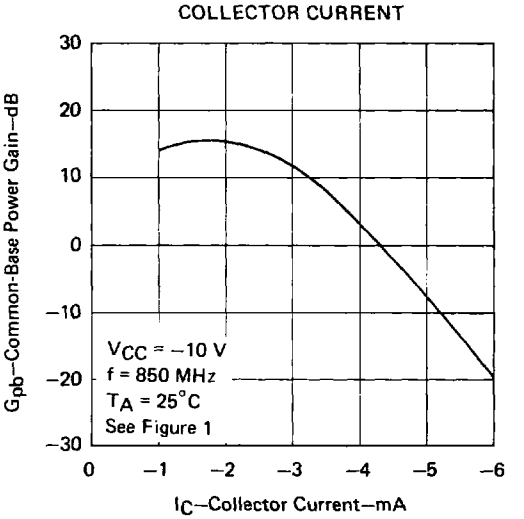


FIGURE 3

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