TYPES 2N1021 and 2N1022

PNP ALLOY JUNCTION GERMANIUM POWER TRANSISTORS

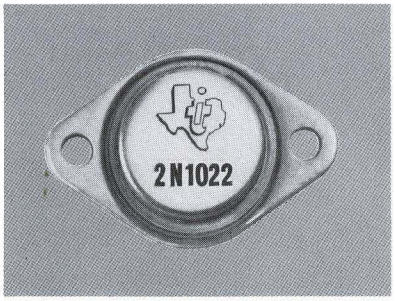
TYPES 2N1021 AND 2N1022
BULLETIN NO. DL-S 1003, NOV. 1958
REPLACES BULLETIN NO. DL-S 963, AUG. 1958

High Voltage

100 and 120 Volts

Low I_{CO} • High Beta • Low R_{CS}

Designed specifically for high voltage power converters, high voltage amplifiers and switching circuits. Featuring low distortion, linear transconductance, low saturation resistance and fast switching times.



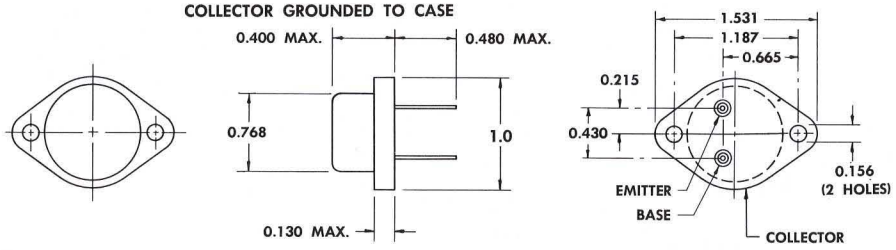
ACTUAL SIZE

qualification testing

To assure maximum reliability, stability and long life, all units are heat cycled from −55°C and room humidity to +85°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

The welded case is hermetically sealed with glass-to-metal seals between the mounting base and the leads. The mounting base material is high conductivity copper providing an excellent path for heat flow to a heat sink which must be provided to permit operation at maximum rated dissipation. The collector is electrically attached to the mounting base. The approximate weight of the unit is 20 grams.



maximum ratings at 25°C*

		2N1021	2N1022	Unit
V_{CBO}	Collector to Base ($I_C = -2mA$)	−100	−120	V
V_{CEX}	Collector to Emitter ($V_{BE} = +0.2V$, $I_C = -2mA$)	−100	−120	V
V_{EBO}	Emitter to Base ($I_E = -2mA$)	−30	−30	V
P_T	Total Dissipation†	50	50	W
I_C	Collector Current	−5	−5	A
I_B	Base Current	−3	−3	A
T_j	Junction Temperature	95	95	°C

typical characteristics at 25°C*

BV_{CBO}	Collector to Base Breakdown Voltage ($I_C = -10mA$, $I_E = 0$)	−120	−140	V
h_{FE}	Forward Current Transfer Ratio			
	($I_C = -1.0A$, $V_{CE} = -1.5V$)	70	70	—
	($I_C = -5.0A$, $V_{CE} = -1.5V$)	23	23	—
R_{CS}	Common-Emitter Saturation Resistance ($I_C = -5.0A$, $I_B = -1.0A$)	0.08	0.08	Ohm
	Thermal Resistance from Collector Junction to Mounting Base	1.1	1.1	°C/W

* Temperature is measured on mounting base.
† For operation at higher temperatures refer to Derating Curve.

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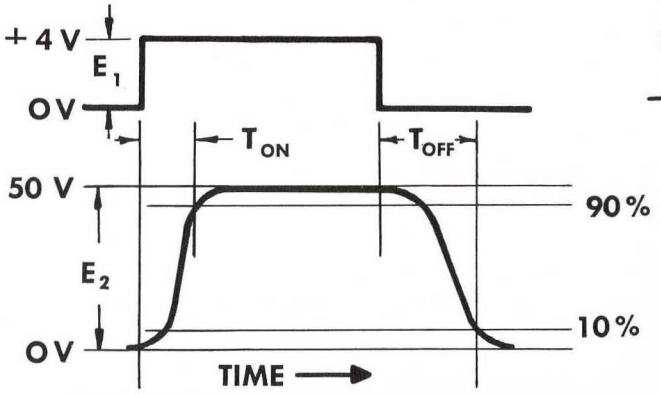
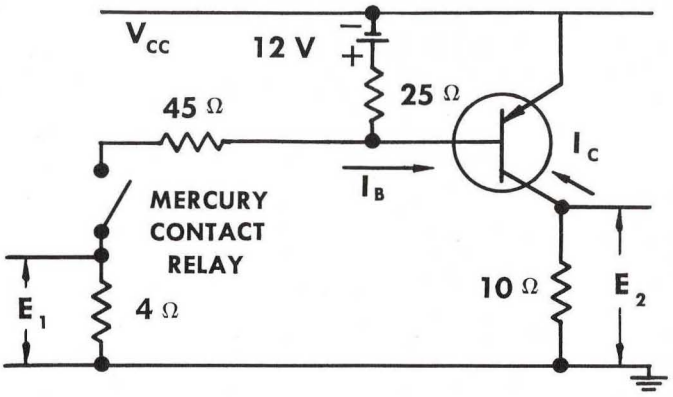
TYPICAL SWITCHING CHARACTERISTICS AT 25°C MOUNTING BASE TEMPERATURE

2N1021		2N1022	
T_{ON}	T_{OFF}	T_{ON}	T_{OFF}
*11.0	*11.5	*12.0	*12.5

* Microseconds





V_{CC} = + 50 volts

I_{B_1} (Turn-on Current) = − 500 mA

I_{B_2} (Turn-off Current) = + 500 mA

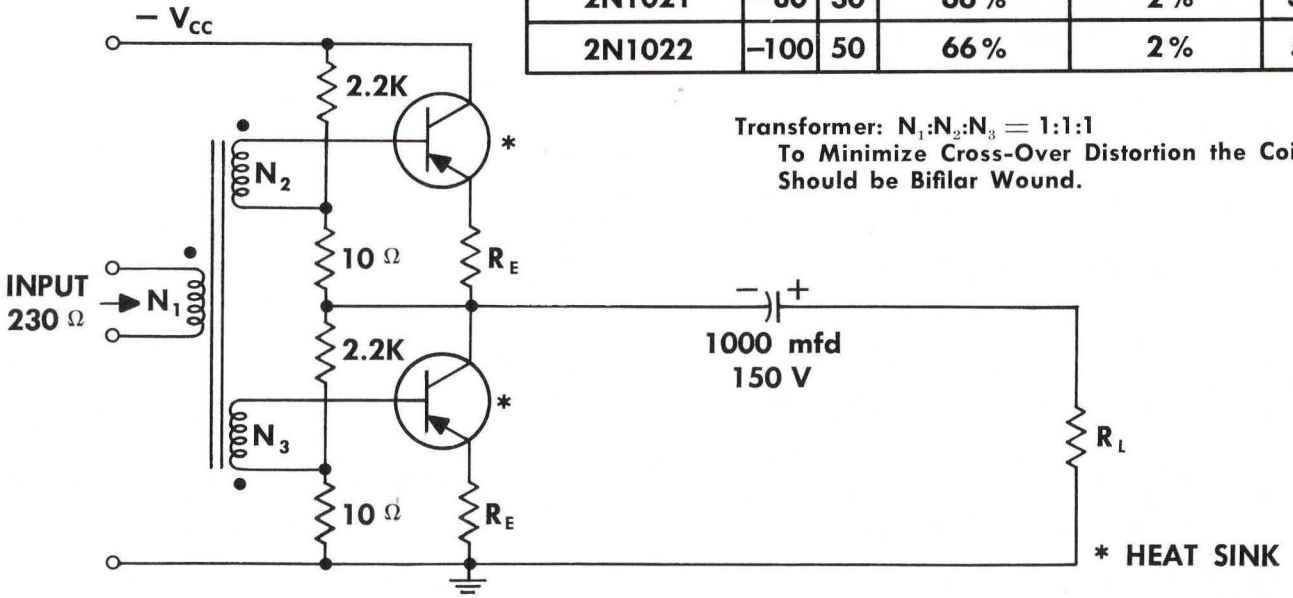
I_C = −5A

TYPICAL 20 WATT AMPLIFIER

POWER GAIN = 23 db

TRANSISTOR	V_{CC} V	R_L Ω	EFFICIENCY	DISTORTION 20 WATTS	R_E Ω
2N1021	−80	30	66%	2%	3
2N1022	−100	50	66%	2%	5

Transformer: $N_1:N_2:N_3 = 1:1:1$
To Minimize Cross-Over Distortion the Coils Should be Bifilar Wound.



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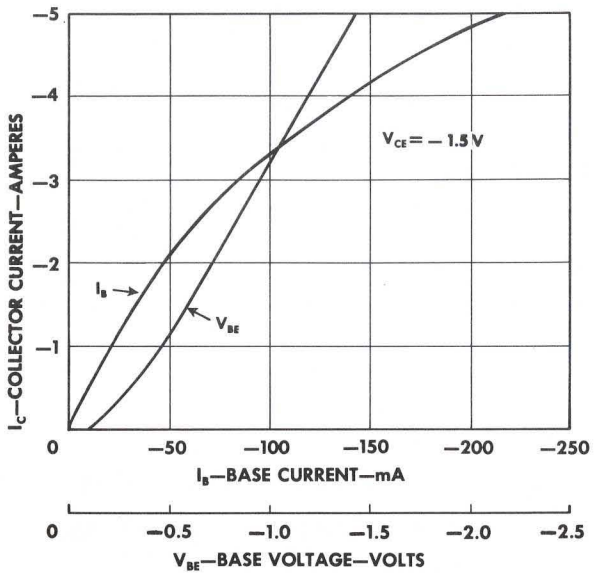
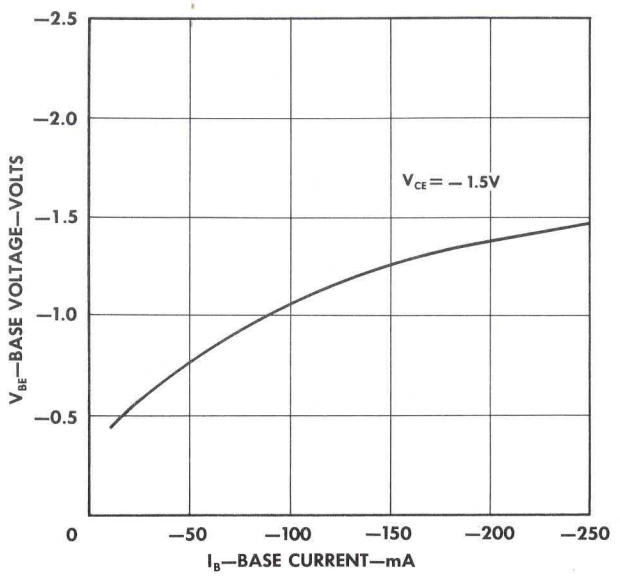
TYPICAL CHARACTERISTICS

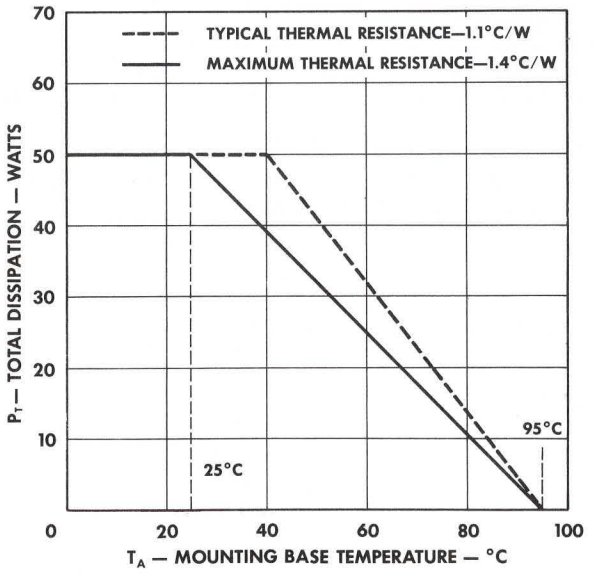
CURRENT TRANSFER AND TRANSCONDUCTANCE CHARACTERISTICS



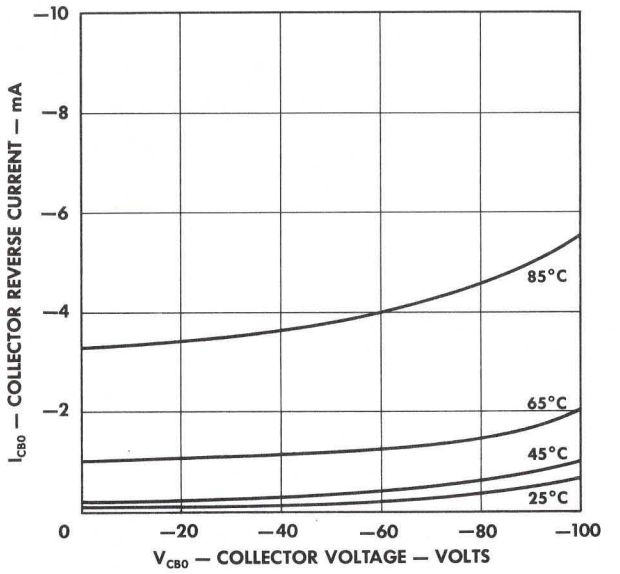
INPUT CHARACTERISTICS



DISSIPATION DERATING



COLLECTOR REVERSE CURRENT VS. JUNCTION TEMPERATURE



TYPES 2N1021 and 2N1022

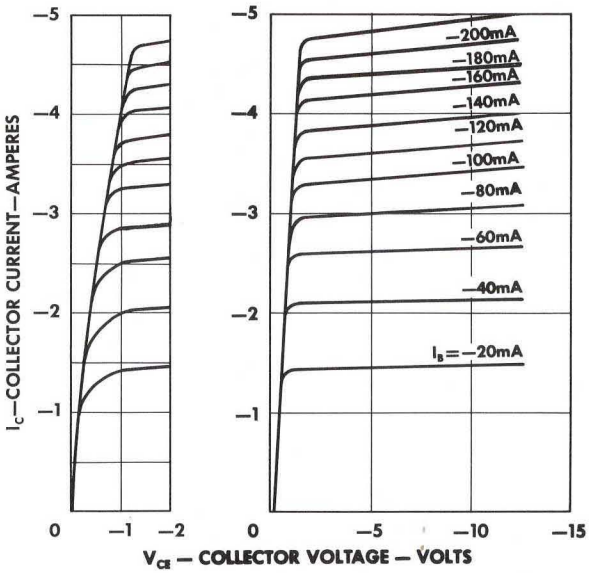
TYPICAL CHARACTERISTICS

typical design characteristics at 25°C

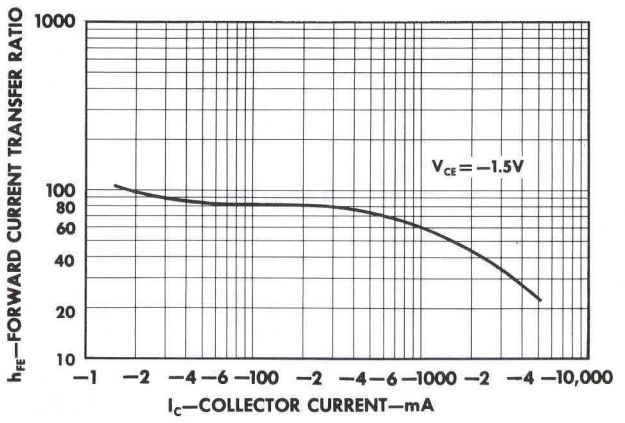
type	symbol	test conditions	design center	max.	unit
2N1021	I_{CBO}	Collector Reverse Current			
		($V_{CB} = -100V$, $I_E = 0$)	−0.85	−2.0	mA
		($V_{CB} = -50V$, $I_E = 0$)	−0.10	−0.5	mA
2N1022	I_{CBO}	Collector Reverse Current			
		($V_{CB} = -120V$, $I_E = 0$)	−0.85	−2.0	mA
		($V_{CB} = -60V$, $I_E = 0$)	−0.13	−0.7	mA
Both Types	I_{EBO}	Emitter Reverse Current ($V_{EB} = -30V$, $I_C = 0$)	−0.15	−2.0	mA
Both Types	I_B	Base Current			
		($V_{CE} = -1.5V$, $I_C = -1.0A$)	−16.7	—	mA
		($V_{CE} = -1.5V$, $I_C = -5.0A$)	−220	−500	mA
Both Types	V_{BE}	Base Voltage			
		($V_{CE} = -1.5V$, $I_C = -1.0A$)	−0.4	—	V
		($V_{CE} = -1.5V$, $I_C = -5.0A$)	−1.3	−3.0	V
Both Types	V_{CE} (Sat.)	($I_C = -5.0A$, $I_B = -1.0A$)	−0.4	−1.0	V

TYPICAL CHARACTERISTICS — COMMON EMITTER

OUTPUT CHARACTERISTICS



h_{FE} CHARACTERISTICS



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