TYPES 2N456A, 2N457A, 2N458A, 2N1021 AND 2N1022
P-N-P ALLOY-JUNCTION GERMANIUM POWER TRANSISTORS

TYPES 2N456A, 2N457A, 2N458A, 2N1021, 2N1022
BULLETIN NO. DL-S 711419, MARCH 1961
REVISED SEPTEMBER 1971

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CHOICE OF 40v, 60v, 80v, 100v, or 120v DEVICES
LOW I_{CO} HIGH BETA LOW R_{CS}
LOW THERMAL RESISTANCE
150 WATTS DISSIPATION

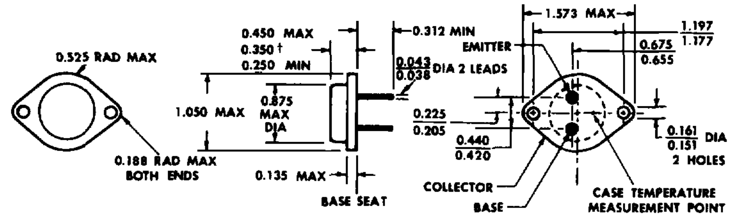
Designed specifically for High-Voltage Power Converters, High-Voltage Amplifiers and Switching Circuits. Featuring Low Distortion, Low Saturation Resistance and Fast Switching Times

mechanical data

The use of silver alloy to assemble the mounting base and the use of resistance welding to seal the can, provide a hermetically sealed enclosure. During the assembly process the absence of flux, combined with extreme cleanliness, prevents sealed-in contamination.

The mounting base provides an excellent heat path from the collector junction to a heat sink which must be in intimate contact to permit operation at maximum rated dissipation.

The transistors are in a JEDEC TO-3 case.



THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE

†The TI guaranteed maximum value.

DIMENSIONS ARE IN INCHES

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

	2N456A	2N457A	2N458A	2N1021	2N1022
Collector-Base Voltage	−40 v	−60 v	−80 v	−100 v	−120 v
Collector-Emitter Voltage (see Note 1)	−30 v	−40 v	−45 v	−50 v	−55 v
Emitter-Base Voltage			−30 v		
Collector Current			−7 a		
Base Current			−3 a		
Total Device Dissipation at (or below) 25°C Case Temperature (see Note 2)			150 w		
Collector Junction Temperature			100°C		
Storage Temperature Range			−55°C to + 100°C		

NOTES: 1. This value applies when the base-emitter diode is open circuited.
2. Derate linearly to + 100°C case temperature at the rate of 2w/°C.

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electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER		TYPE	TEST CONDITIONS		MIN	TYP	MAX	UNIT
I_{CBO}	Collector Reverse Current	2N456A	V_{CB} = —40 v	I_E = 0, 25°C		—1.0	—2.0	ma
			V_{CB} = —20 v	I_E = 0, 25°C		—0.2	—0.5	ma
			V_{CB} = —40 v	I_E = 0, 71°C		—6.0	—10.0	ma
		2N457A	V_{CB} = —60 v	I_E = 0, 25°C		—1.0	—2.0	ma
			V_{CB} = —30 v	I_E = 0, 25°C		—0.2	—0.5	ma
			V_{CB} = —60 v	I_E = 0, 71°C		—6.0	—10.0	ma
		2N458A	V_{CB} = —80 v	I_E = 0, 25°C		—1.0	—2.0	ma
			V_{CB} = —40 v	I_E = 0, 25°C		—0.2	—0.5	ma
			V_{CB} = —80 v	I_E = 0, 71°C		—6.0	—10.0	ma
		2N1021	V_{CB} = —100 v	I_E = 0, 25°C		—1.0	—2.0	ma
			V_{CB} = —50 v	I_E = 0, 25°C		—0.2	—0.5	ma
			V_{CB} = —100 v	I_E = 0, 71°C		—6.0	—10.0	ma
		2N1022	V_{CB} = —120 v	I_E = 0, 25°C		—1.0	—2.0	ma
			V_{CB} = —60 v	I_E = 0, 25°C		—0.2	—0.5	ma
			V_{CB} = —120 v	I_E = 0, 71°C		—6.0	—10.0	ma
I_{EBO}	Emitter Reverse Current	All	V_{EB} = — 10 v	I_C = 0		—0.2		ma
BV_{CBO}	Collector-Base Breakdown Voltage	2N456A	I_C = —2 ma	I_E = 0	—40			v
		2N457A	I_C = —2 ma	I_E = 0	—60			v
		2N458A	I_C = —2 ma	I_E = 0	—80			v
		2N1021	I_C = —2 ma	I_E = 0	—100			v
		2N1022	I_C = —2 ma	I_E = 0	—120			v
BV_{CEO}	Collector-Emitter Breakdown Voltage	2N456A	I_C = —500 ma	I_B = 0	—30	—40		v
		2N457A	I_C = —500 ma	I_B = 0	—40	—50		v
		2N458A	I_C = —500 ma	I_B = 0	—45	—55		v
		2N1021	I_C = —500 ma	I_B = 0	—50	—60		v
		2N1022	I_C = —500 ma	I_B = 0	—55	—60		v
BV_{CER}	Collector-Emitter Breakdown Voltage	2N456A	I_C = —200 ma	R_{BE} = 33 Ω		—50		v
		2N457A	I_C = —200 ma	R_{BE} = 33 Ω		—60		v
		2N458A	I_C = —200 ma	R_{BE} = 33 Ω		—67		v
		2N1021	I_C = —200 ma	R_{BE} = 33 Ω		—73		v
		2N1022	I_C = —200 ma	R_{BE} = 33 Ω		—78		v
BV_{CES}	Collector-Emitter Breakdown Voltage	2N456A	I_C = —200 ma	V_{BE} = 0	—50	—60		v
		2N457A	I_C = —200 ma	V_{BE} = 0	—60	—70		v
		2N458A	I_C = —200 ma	V_{BE} = 0	—65	—78		v
		2N1021	I_C = —200 ma	V_{BE} = 0	—70	—85		v
		2N1022	I_C = —200 ma	V_{BE} = 0	—75	—90		v
BV_{EBO}	Emitter-Base Breakdown Voltage	All	I_E = —2 ma	I_C = 0	—30			v
h_{FE}	DC Forward Current Transfer Ratio	All	V_{CE} = —1.5 v	I_C = —7 a	22	47		
			V_{CE} = —1.5 v	I_C = —5 a	30	60	90	
			V_{CE} = —1.5 v	I_C = —3 a	35	82		
			V_{CE} = —1.5 v	I_C = —1 a	40	120		

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electrical characteristics at 25°C case temperature

PARAMETER		TYPE	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{BE}	Base-Emitter Voltage	All	$V_{CE} = -1.5$ v $I_C = -7$ a		−1.2		v
			$V_{CE} = -1.5$ v $I_C = -5$ a		−0.9	−1.5	v
			$V_{CE} = -1.5$ v $I_C = -3$ a		−0.6		v
			$V_{CE} = -1.5$ v $I_C = -1$ a		−0.35		v
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	All	$I_B = -700$ ma $I_C = -7$ a		−0.3		v
			$I_B = -500$ ma $I_C = -5$ a		−0.2	−0.5	v
			$I_B = -300$ ma $I_C = -3$ a		−0.1		v
			$I_B = -100$ ma $I_C = -1$ a		−.05		v
y_{FE}	DC Common-Emitter Forward Transfer Admittance	All	$V_{CE} = -1.5$ v $I_C = -7$ a		5.7		mhos
			$V_{CE} = -1.5$ v $I_C = -5$ a	3.3	5.5		mhos
			$V_{CE} = -1.5$ v $I_C = -3$ a		4.8		mhos
			$V_{CE} = -1.5$ v $I_C = -1$ a		3.0		mhos
h_{IE}	DC Common-Emitter Input Impedance	All	$V_{CE} = -1.5$ v $I_C = -7$ a		8		ohms
			$V_{CE} = -1.5$ v $I_C = -5$ a		11	28	ohms
			$V_{CE} = -1.5$ v $I_C = -3$ a		16		ohms
			$V_{CE} = -1.5$ v $I_C = -1$ a		42		ohms
f_T	Internal Cutoff Frequency (where $\|h_{fe}\| = 1$)	All	$V_{CE} = -2$ v $I_C = -1$ a	200	430		kc

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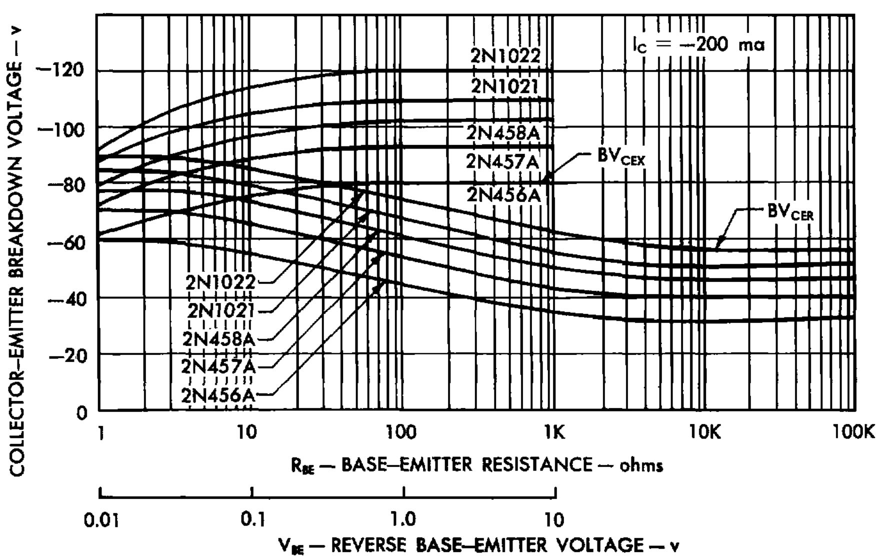
TYPICAL COMMON–EMITTER BREAKDOWN VOLTAGE CHARACTERISTICS



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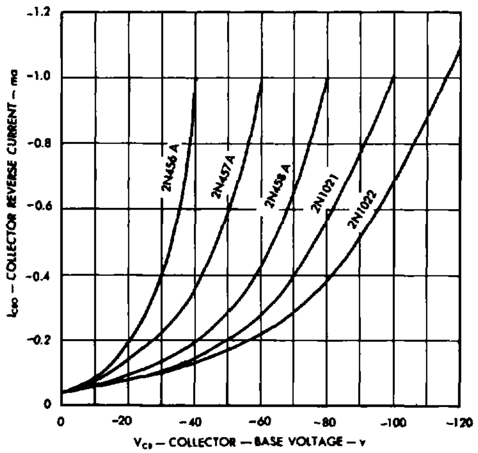
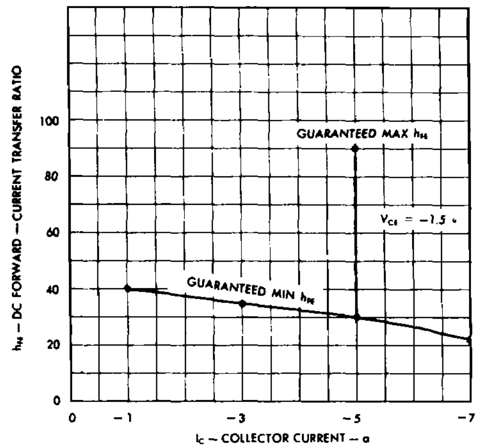
TYPICAL CHARACTERISTICS

COLLECTOR REVERSE-CURRENT CHARACTERISTICS



GUARANTEED COMMON-EMITTER DC FORWARD-CURRENT TRANSFER RATIO VS COLLECTOR CURRENT



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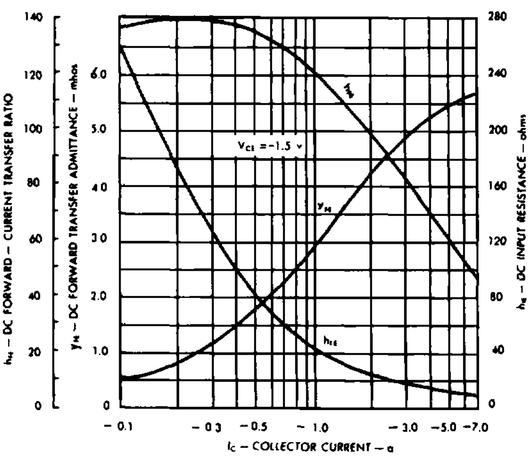
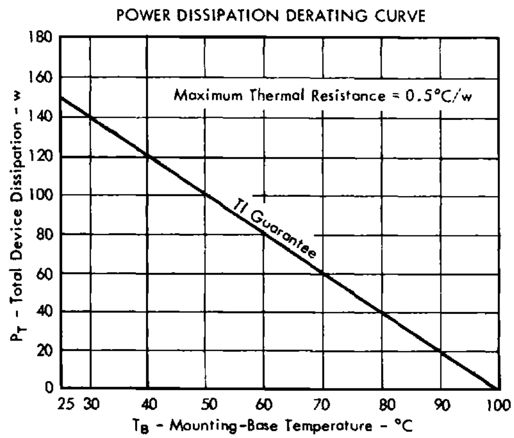
COMMON-EMITTER DC FORWARD CURRENT TRANSFER RATIO, DC INPUT RESISTANCE, AND DC FORWARD TRANSFER ADMITTANCE VS COLLECTOR CURRENT



DISSIPATION DERATING



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