TYPES 2N6322 THRU 2N6325
N-P-N SILICON POWER TRANSISTORS

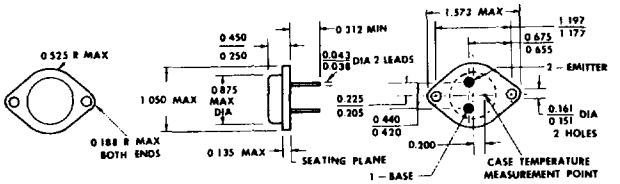
HIGH VOLTAGE, HIGH FORWARD AND REVERSE ENERGY DESIGNED FOR INDUSTRIAL AND MILITARY APPLICATIONS

- 100-mJ Reverse-Energy Rating
- 30-A Rated Continuous Collector Current
- 200 Watts at 100°C Case Temperature
- Min $V_{(BR)CEO}$ of 300 V (2N6323, 2N6325)

*mechanical data

2N6322, 2N6323

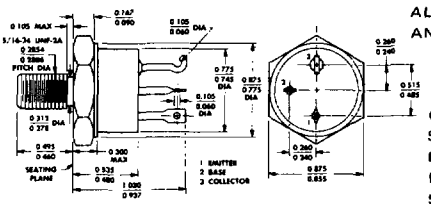
THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE
ALL JEDEC TO-3 DIMENSIONS AND NOTES ARE APPLICABLE



ALL DIMENSIONS ARE IN INCHES

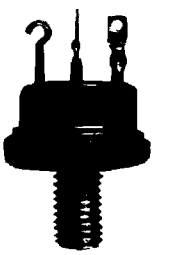
2N6324, 2N6325

THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE
ALL JEDEC TO-63 DIMENSIONS AND NOTES ARE APPLICABLE



CASE TEMPERATURE MEASUREMENT POINT IS UNDERSIDE OF FLAT SURFACE WITHIN 0.125" FROM STUD

ALL DIMENSIONS ARE IN INCHES



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

	2N6322 2N6324	2N6323 2N6325
Collector-Base Voltage	300 V	400 V
Collector-Emitter Voltage (See Note 1)	200 V	300 V
Emitter-Base Voltage	5 V	5 V
Continuous Collector Current	← 30 A →	
Peak Collector Current (See Note 2)	← 40 A →	
Continuous Base Current	← 10 A →	
Safe Operating Areas	See Figures 6 and 7	
Unclamped Inductive Load Energy (See Note 3 and Figure 7)	← 100 mJ →	
Continuous Device Dissipation at (or below) 100°C Case Temperature (See Note 4)	← 200 W →	
Continuous Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 5)	← 5 W →	
Operating Collector Junction Temperature Range	−65°C to 200°C	
Storage Temperature Range	−65°C to 200°C	
Terminal Temperature 1/16 Inch from Case for 10 Seconds	← 230°C →	

NOTES: 1. These values apply when the base-emitter diode is open-circuited.
2. This value applies for $t_w \leq 0.3$ ms, duty cycle ≤ 10%.
3. This rating is based on the capability of the transistor to operate safely in the circuit of Figure 5. L = 30 mH, R_{BB2} = 100 Ω, V_{BB2} = 0 V, R_S = 0.1 Ω, V_{CC} = 20 V, Energy ≈ $I_C^2L/2$.
4. For operation above 100°C case temperature, refer to Dissipation Derating Curve, Figure 8.
5. For operation above 25°C free-air temperature, refer to Dissipation Derating Curve, Figure 9.

*JEDEC registered data. This data sheet contains all applicable registered data in effect at the time of publication..

TYPES 2N6322 THRU 2N6325
N-P-N SILICON POWER TRANSISTORS

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

PARAMETER		TEST CONDITIONS			2N6322 2N6324	2N6323 2N6325	UNIT
					MIN MAX	MIN MAX	
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 30 mA,	I_B = 0,	See Note 6	200	300	V
I_{CEO}	Collector Cutoff Current	V_{CE} = 100 V,	I_B = 0		5		mA
		V_{CE} = 150 V,	I_B = 0			5	
I_{CES}	Collector Cutoff Current	V_{CE} = 300 V,	V_{BE} = 0		2		mA
		V_{CE} = 400 V,	V_{BE} = 0			2	
		V_{CE} = 200 V,	V_{BE} = 0,	T_C = 150°C	10	10	
I_{EBO}	Emitter Cutoff Current	V_{EB} = 5 V,	I_C = 0		5	5	mA
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = 5 V,	I_C = 5 A	See Notes 6 and 7	40 150	30 150	
		V_{CE} = 5 V,	I_C = 20 A		12	12	
		V_{CE} = 5 V,	I_C = 30 A		6	6	
V_{BE}	Base-Emitter Voltage	V_{CE} = 5 V,	I_C = 30 A,	See Notes 6 and 7	2.5	2.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_B = 0.5 A,	I_C = 5 A	See Notes 6 and 7	0.5	0.5	V
		I_B = 2 A,	I_C = 20 A		1.5	1.5	
		I_B = 6 A,	I_C = 30 A		3	3	
h_{fe}	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = 10 V,	I_C = 1 A,	f = 1 kHz	35	30	
$\lvert h_{fe} \rvert$	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = 10 V,	I_C = 1 A,	f = 5 MHz	2	2	

*JEDEC registered data

switching characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS†			TYP	UNIT
t_{on}	Turn-On Time	I_C = 20 A,	$I_{B(1)}$ = 2 A,	$I_{B(2)}$ = −2 A,	0.8	μs
t_{off}	Turn-Off Time	$V_{BE(off)}$ = −3 V,	R_L = 2 Ω,	See Figure 4	3	

†Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

TYPICAL CHARACTERISTICS

STATIC FORWARD CURRENT TRANSFER RATIO vs COLLECTOR CURRENT

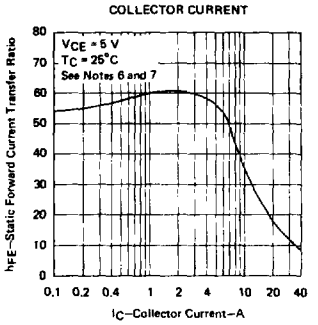


FIGURE 1

BASE-EMITTER VOLTAGE vs COLLECTOR CURRENT

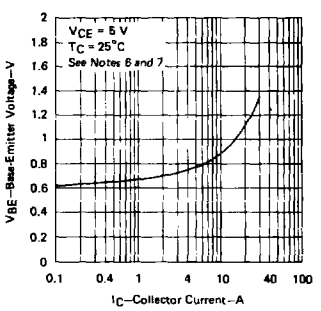


FIGURE 2

COLLECTOR-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

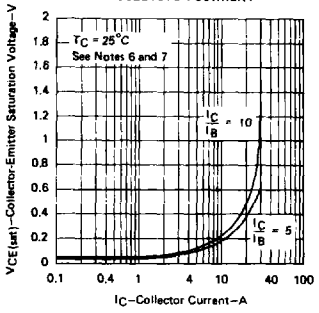


FIGURE 3

NOTES: 6. *These parameters must be measured using pulse techniques.* t_w = 300 μs, *duty cycle* ≤ 2%.
7. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 0.125 inch from the device body.

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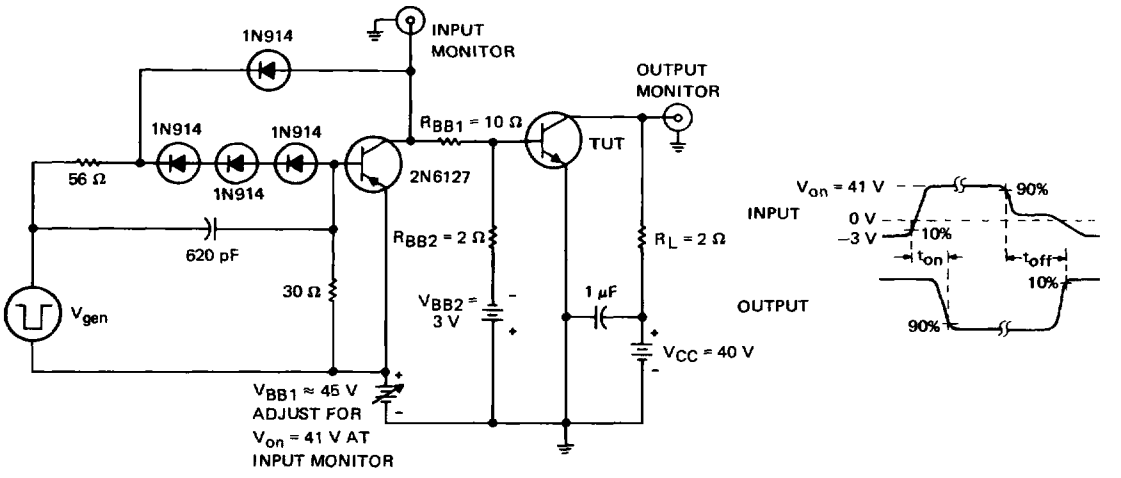
PARAMETER MEASUREMENT INFORMATION

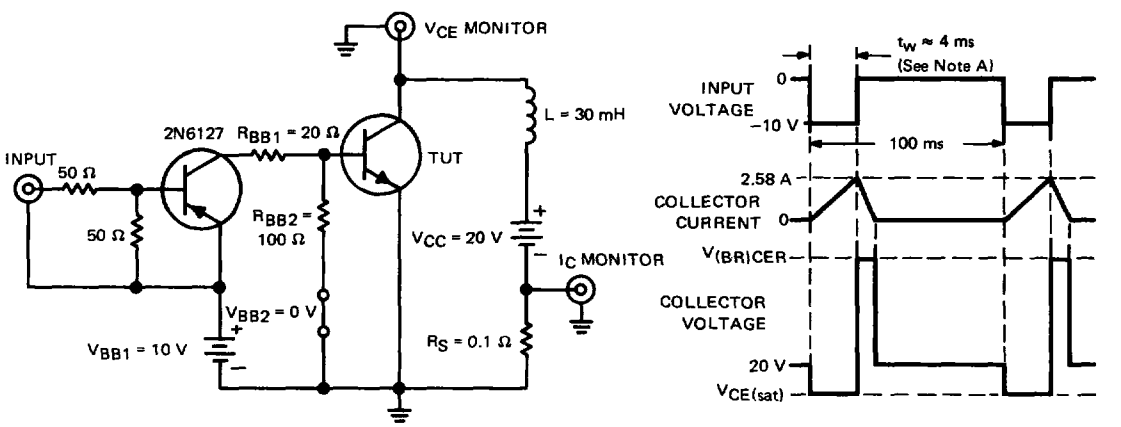


TEST CIRCUIT VOLTAGE WAVEFORMS

NOTES: A. V_{gen} is a −30-V pulse (from 0 V) into a 50-Ω termination.
B. The V_{gen} waveform is supplied by a generator with the following characteristics: $t_r \leq 15$ ns, $t_f \leq 15$ ns, Z_{out} = 50 Ω, t_w = 20 μs, duty cycle ≤ 2%.
C. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 15$ ns, $R_{in} \geq 10$ MΩ, $C_{in} \leq 11.5$ pF.
D. Resistors must be noninductive types.
E. The d-c power supplies may require additional bypassing in order to minimize ringing.

FIGURE 4

INDUCTIVE LOAD SWITCHING



TEST CIRCUIT VOLTAGE AND CURRENT WAVEFORMS

NOTE A: Input pulse width is increased until I_{CM} = 2.58 A.

FIGURE 5

MAXIMUM SAFE OPERATING AREAS

MAXIMUM COLLECTOR CURRENT
vs
COLLECTOR-EMITTER VOLTAGE

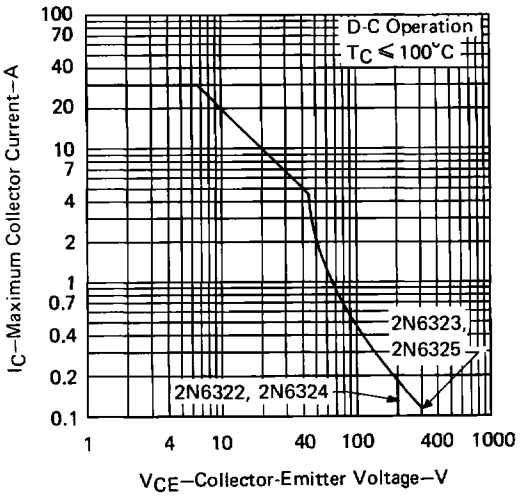


FIGURE 6

MAXIMUM COLLECTOR CURRENT
vs
UNCLAMPED INDUCTIVE LOAD

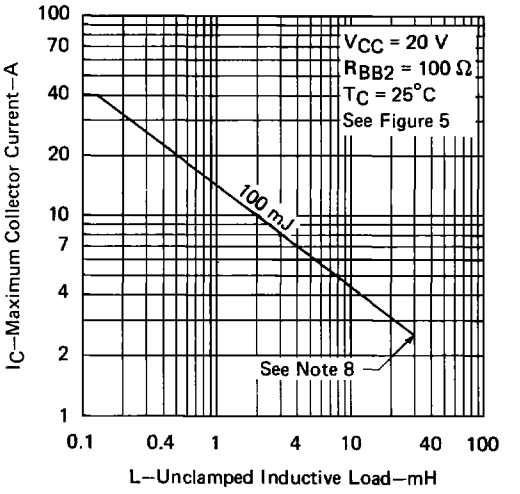


FIGURE 7

NOTE 8: Above this point the safe operating area has not been defined.

THERMAL INFORMATION

CASE TEMPERATURE
DISSIPATION DERATING CURVE

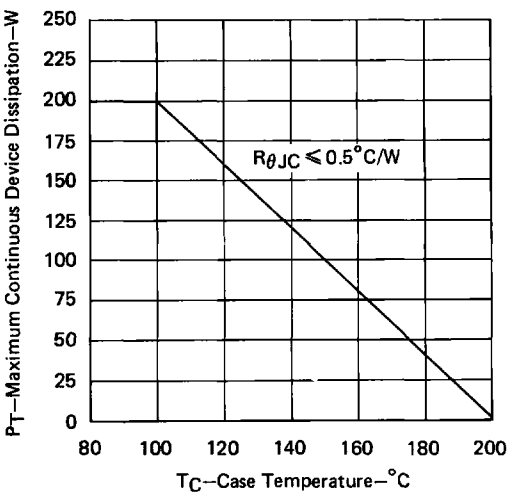


FIGURE 8

FREE-AIR TEMPERATURE
DISSIPATION DERATING CURVE

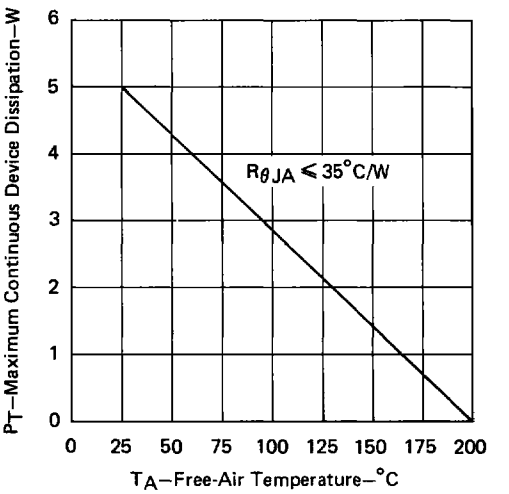


FIGURE 9