TYPES 2N6270, 2N6271, 2N6272, 2N6273
N-P-N SILICON POWER TRANSISTORS

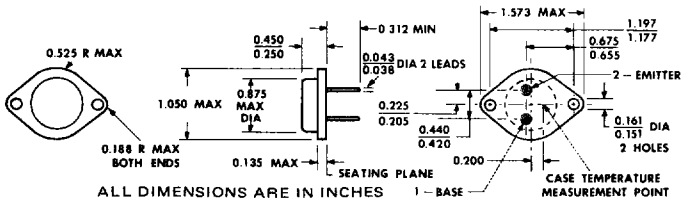
FOR POWER-AMPLIFIER AND HIGH-SPEED SWITCHING APPLICATIONS

- 100-mJ Reverse-Energy Rating
- 30-A Rated Continuous Collector Current
- 150 Watts at 100°C Case Temperature
- Min f_T of 75 MHz at 10 V, 1 A

*mechanical data

2N6270, 2N6271

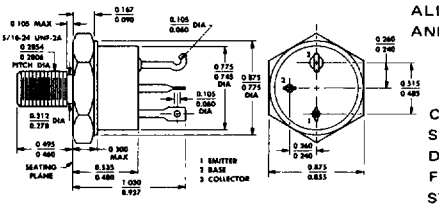
THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE
ALL JEDEC TO-3 DIMENSIONS AND NOTES ARE APPLICABLE



ALL DIMENSIONS ARE IN INCHES

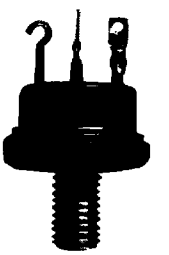
2N6272, 2N6273

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)

	2N6270 2N6271 2N6272 2N6273
Collector-Base Voltage	100 V 120 V
Collector-Emitter Voltage (See Note 1)	80 V 100 V
Emitter-Base Voltage	8 V 8 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)	← 150 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	← 300°C →

NOTES: 1. This value applies 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 = 1 mH, $R_{BB2} = 100\ \Omega$, $V_{BB2} = 0$ V, $R_S = 0.1\ \Omega$, $V_{CC} = 20$ V, Energy ≈ $I_C^2 L/2$.
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 2N6270, 2N6271, 2N6272, 2N6273
N-P-N SILICON POWER TRANSISTORS

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

PARAMETER		TEST CONDITIONS			2N6270 2N6272		2N6271 2N6273		UNIT
					MIN	MAX	MIN	MAX	
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 30 mA,	I_B = 0,	See Note 6	80		100		V
I_{CEO}	Collector Cutoff Current	V_{CE} = 40 V,	I_B = 0			1			mA
		V_{CE} = 50 V,	I_B = 0					1	
I_{CES}	Collector Cutoff Current	V_{CE} = 100 V,	V_{BE} = 0			1			mA
		V_{CE} = 120 V,	V_{BE} = 0					1	
		V_{CE} = 60 V,	V_{BE} = 0,	T_C = 150°C		2		2	
I_{EBO}	Emitter Cutoff Current	V_{EB} = 5 V,	I_C = 0			0.1		0.1	mA
		V_{EB} = 8 V,	I_C = 0			1		1	
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = 4 V,	I_C = 15 A,	See Notes 6 and 7	20	100	20	100	
		V_{CE} = 4 V,	I_C = 30 A,	See Notes 6 and 7	10		10		
V_{BE}	Base-Emitter Voltage	V_{CE} = 4 V,	I_C = 30 A,	See Notes 6 and 7		2.2		2.2	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_B = 1.5 A,	I_C = 15 A,	See Notes 6 and 7		1		1	V
		I_B = 6 A,	I_C = 30 A,	See Notes 6 and 7		2		2	
h_{fe}	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = 10 V,	I_C = 1 A,	f = 1 kHz	30		30		
$\lvert h_{fe} \rvert$	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = 10 V,	I_C = 1 A,	f = 5 MHz	15		15		

*JEDEC registered data

switching characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS†			2N6270 2N6272	2N6271 2N6273	UNIT
					TYP	TYP	
t_{on}	Turn-On Time	I_C = 15 A,	$I_{B(1)}$ = 1.2 A,	$I_{B(2)}$ = −1.2 A,	0.5	0.5	μs
t_{off}	Turn-Off Time	$V_{BE(off)}$ = −6.3 V,	R_L = 2 Ω,	See Figure 1	1.3	1.3	

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

TYPICAL CHARACTERISTICS

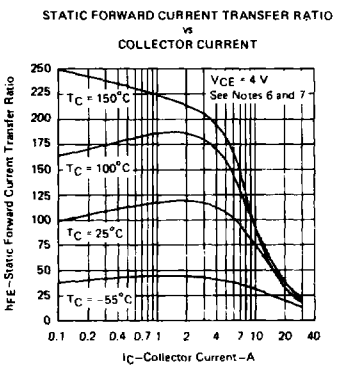


FIGURE 1

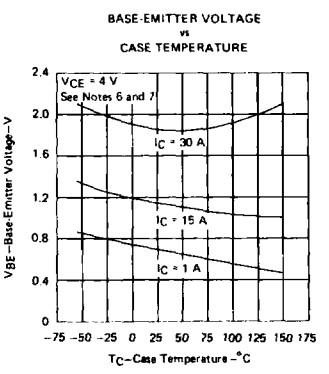


FIGURE 2

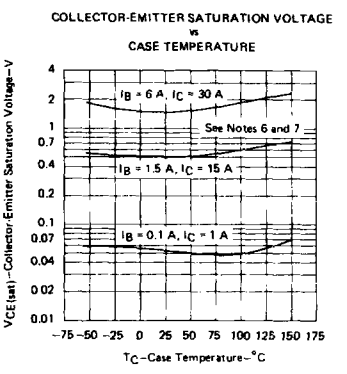


FIGURE 3

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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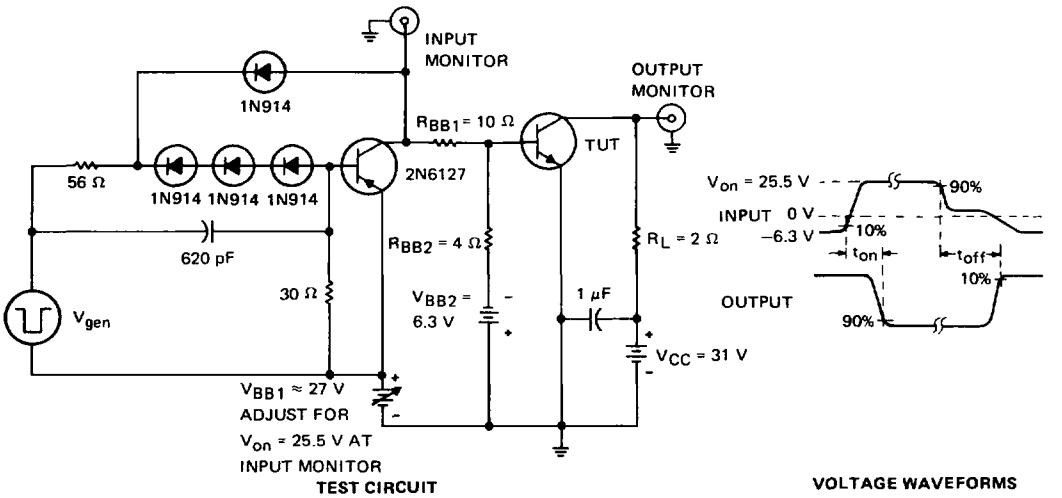
PARAMETER MEASUREMENT INFORMATION

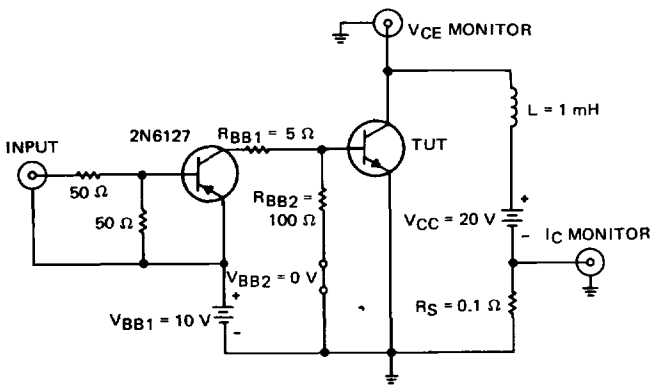


TEST CIRCUIT VOLTAGE WAVEFORMS

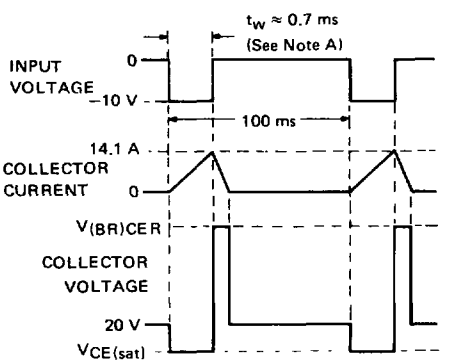
NOTES: A. V_{gen} is a −30-V pulse (from 0 V) into a 50-Ω termination.
B. The V_{gen} waveform is supplied by a generator with the following characteristics: $t_r \leq 15$ ns, $t_f \leq 15$ ns, Z_{out} = 50 Ω, t_w = 20 μs, duty cycle ≤ 2%.
C. Waveforms are monitored on an oscilloscope with the following 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} = 14.1 A.

FIGURE 5

MAXIMUM SAFE OPERATING AREAS

MAXIMUM COLLECTOR CURRENT
vs
COLLECTOR-EMITTER VOLTAGE

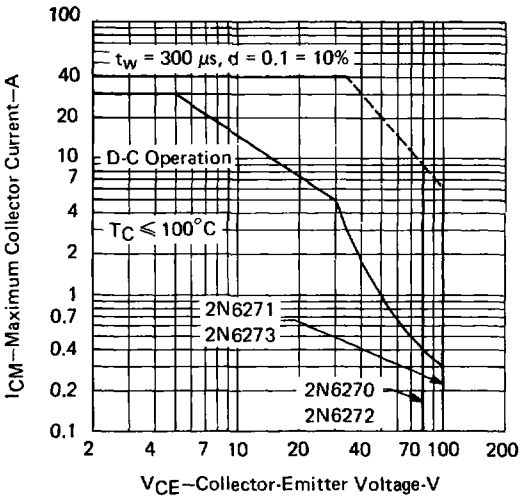


FIGURE 6

MAXIMUM COLLECTOR CURRENT
vs
UNCLAMPED INDUCTIVE LOAD

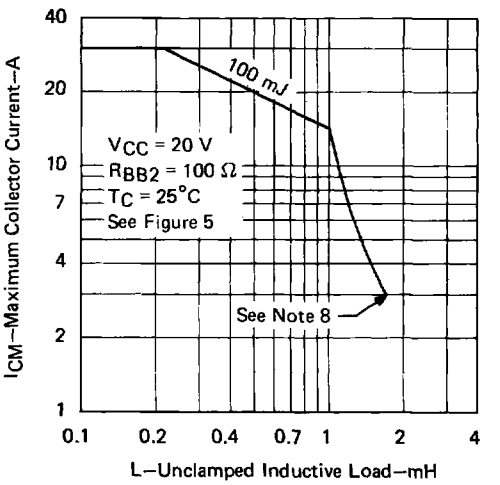


FIGURE 7

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

THERMAL INFORMATION

CASE TEMPERATURE
DISSIPATION DERATING CURVE

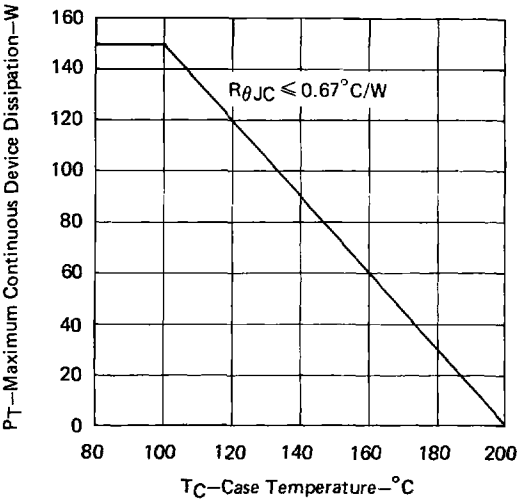


FIGURE 8

FREE-AIR TEMPERATURE
DISSIPATION DERATING CURVE

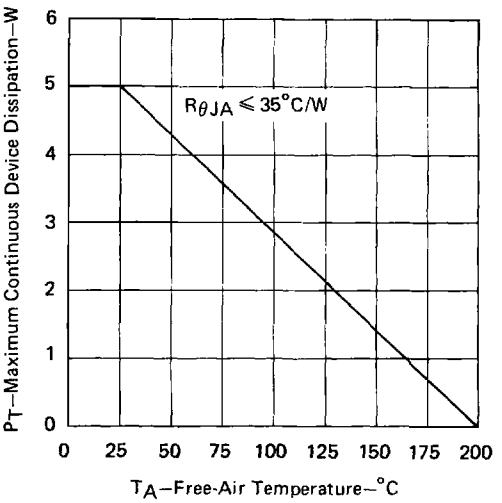


FIGURE 9

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