

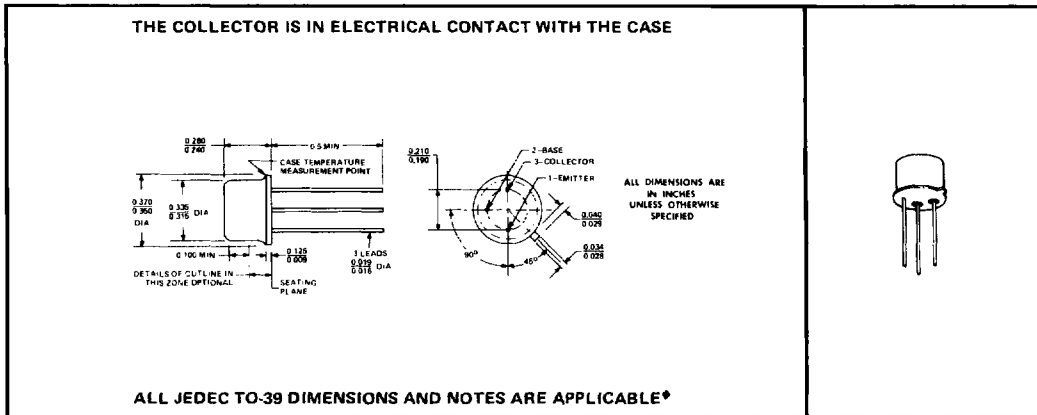
TYPES 2N2192, 2N2193, 2N2194, 2N2243, 2N2243A  
 2N2192A, 2N2193A, 2N2194A  
**2N2243, 2N2243A**  
**N-P-N SILICON TRANSISTORS**

BULLETIN NO. DL-S 733571, MARCH 1963—REVISED MARCH 1973

**FOR MEDIUM-POWER SWITCHING  
 AND AMPLIFIER APPLICATIONS**

- High Breakdown Voltage Combined with Very Low Saturation Voltage
- $h_{FE}$ —Guaranteed from 100  $\mu$ a to 1 amp

**mechanical data**



4

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

	2N2192 2N2192A	2N2193 2N2193A	2N2194 2N2194A	2N2243 2N2243A	UNIT
Collector-Base Voltage	60*	80*	60*	120*	v
Collector-Emitter Voltage (See Note 1)	40*	50*	40*	80*	v
Emitter-Base Voltage	5*	8*	5*	7*	v
Collector Current	1*	1*	1*	1*	a
Total Device Dissipation at (or below) 25° C Free-Air Temperature (See Note 2)	0.8*	0.8*	0.8*	0.8*	w
Total Device Dissipation at (or below) 25° C Case Temperature (See Note 3)	10†	10†	10†	10†	w
Storage Temperature Range	-65° C to 200° C*				
Lead 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. Derate linearly to 200° C free-air temperature at the rate of 4.57  $mw/^\circ C$ .  
 3. Derate the 10-watt rating linearly to 200° C case temperature at the rate of 57.1  $mw/^\circ C$ . Derate the 2.8-watt (JEDEC registered) rating linearly to 200° C case temperature at the rate of 16  $mw/^\circ C$ .

\*The JEDEC registered outline for these devices is TO-5. TO-39 falls within TO-5 with the exception of lead length.

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

‡This value is guaranteed by Texas Instruments in addition to the JEDEC registered value which is also shown.

USES CHIP N23

# TYPES 2N2243, 2N2243A

## N-P-N SILICON TRANSISTORS

\*electrical characteristics at 25°C free-air temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS	2N2243		2N2243A		UNIT
		MIN	MAX	MIN	MAX	
$V_{(BR)CBO}$ Collector-Base Breakdown Voltage	$I_C = 100 \mu A, I_E = 0$	120		120		v
$V_{(BR)CEO}$ Collector-Emitter Breakdown Voltage	$I_C = 25 \text{ ma}, I_B = 0, \text{ See Note 4}$	80		80		v
$V_{(BR)EBO}$ Emitter-Base Breakdown Voltage	$I_E = 100 \mu A, I_C = 0$	7		7		v
$I_{CBO}$ Collector Cutoff Current	$V_{CB} = 60 \text{ v}, I_E = 0$		10		10	na
	$V_{CB} = 60 \text{ v}, I_E = 0, T_A = 150^\circ\text{C}$		15		15	$\mu A$
$I_{EBO}$ Emitter Cutoff Current	$V_{EB} = 5 \text{ v}, I_C = 0$		50		50	na
$h_{FE}$ Static Forward Current Transfer Ratio	$V_{CE} = 10 \text{ v}, I_C = 100 \mu A$	15		15		
	$V_{CE} = 10 \text{ v}, I_C = 10 \text{ ma}$	30		30		
	$V_{CE} = 10 \text{ v}, I_C = 10 \text{ ma}, T_A = -55^\circ\text{C}$	20		20		
	$V_{CE} = 10 \text{ v}, I_C = 150 \text{ ma}, \text{ See Note 4}$	40	120	40	120	
	$V_{CE} = 10 \text{ v}, I_C = 500 \text{ ma}, \text{ See Note 4}$	15		15		
	$V_{CE} = 1 \text{ v}, I_C = 150 \text{ ma}, \text{ See Note 4}$	30		30		
$V_{BE}$ Base-Emitter Voltage	$I_B = 15 \text{ ma}, I_C = 150 \text{ ma}$		1.3		1.3	v
$V_{CE(sat)}$ Collector-Emitter Saturation Voltage	$I_B = 15 \text{ ma}, I_C = 150 \text{ ma}$		0.35		0.25	v
$ h_{FE} $ Small-Signal Common-Emitter Forward Current Transfer Ratio	$V_{CE} = 10 \text{ v}, I_C = 50 \text{ ma}, f = 20 \text{ mc}$	2.5		2.5		
$C_{ob}$ Common-Base Open-Circuit Output Capacitance	$V_{CB} = 10 \text{ v}, I_E = 0, f = 1 \text{ mc}$		15		15	pf

\*switching characteristics at 25°C free-air temperature

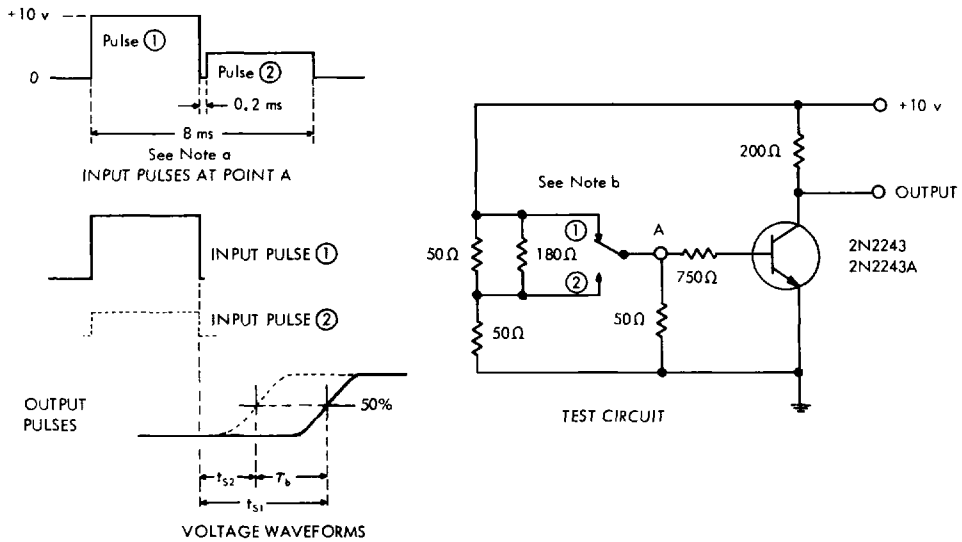
PARAMETER	TEST CONDITIONS	2N2243 2N2243A		UNIT
		MAX		
$\tau_b$ Stored-Charge Time Constant	See Figure 1	2.1		$\mu\text{sec}$

NOTE 4: These parameters must be measured using pulse techniques. PW = 300  $\mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .

\*Indicates JEDEC registered data

# TYPES 2N2243, 2N2243A N-P-N SILICON TRANSISTORS

## PARAMETER MEASUREMENT INFORMATION



\*FIGURE 1 — STORED-CHARGE TIME CONSTANT —  $\tau_b$

NOTES: a. Waveforms are monitored on an oscilloscope with the following characteristics:  $\tau_r \leq 14$  nsec,  $R_{in} = 10$  M $\Omega$ ,  $C_{in} = 11.5$  pF.  
b. The relay is Clare HG 1005 (or equivalent).

\*Indicates JEDEC registered data.