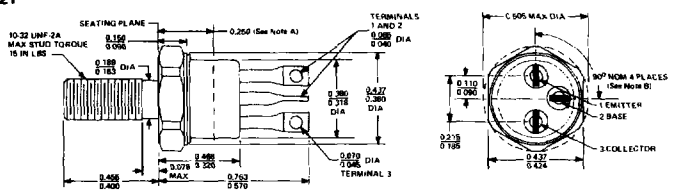
FOR POWER-AMPLIFIER AND HIGH-SPEED-SWITCHING APPLICATIONS

- 200 V Min $V_{(BR)CEO}$
- 2-A Rated Continuous Collector Current
- 20 Watts at 100°C Case Temperature (TIP521)
- 4 Watts at 100°C Case Temperature (TIP522)
- Min f_T of 50 MHz at 5 V, 0.2 A

mechanical data

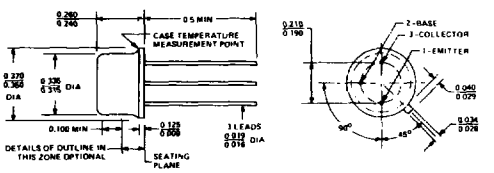
TIP521 — ALL TERMINALS ARE INSULATED FROM THE CASE



ALL JEDEC TO-59 DIMENSIONS AND NOTES ARE APPLICABLE

NOTES: A. Within this dimension, case diameter may vary.
B. Position of terminals with respect to hexagon is not controlled.
C. The case temperature may be measured anywhere on the seating plane within 0.125 inch of the stud.
D. All dimensions are in inches unless otherwise specified.

TIP522 — THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE



ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED

ALL JEDEC TO-39 DIMENSIONS AND NOTES ARE APPLICABLE

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

	TIP521	TIP522
Collector-Base Voltage	←—200 V—→	
Collector-Emitter Voltage (See Note 1)	←—200 V—→	
Emitter-Base Voltage	←—5 V—→	
Continuous Collector Current	←—2 A—→	
Peak Collector Current (See Note 2)	←—3 A—→	
Continuous Base Current	←—0.6 A—→	
Safe Operating Area at (or below) 100°C Case Temperature	See Figure 1	
Continuous Device Dissipation at (or below) 100°C Case Temperature (See Note 3)	20 W	4 W
Continuous Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 4)	2 W	1 W
Operating Collector Junction Temperature Range	−65°C to 200°C	
Storage Temperature Range	−65°C to 200°C	
Lead or 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. Derate linearly to 200°C case temperature at the rate of 200 mW/°C for TIP521 and 40 mW/°C for TIP522.
4. Derate linearly to 200°C free-air temperature at the rate of 11.4 mW/°C for TIP521 and 5.7 mW/°C for TIP522.

TYPES TIP521, TIP522
P-N-P SILICON POWER TRANSISTORS

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

PARAMETER		TEST CONDITIONS			MIN	MAX	UNIT
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = −30 mA,	I_B = 0,	See Note 5	−200		V
I_{CEO}	Collector Cutoff Current	V_{CE} = −100 V,	I_B = 0			−200	μA
I_{CES}	Collector Cutoff Current	V_{CE} = −200 V,	V_{BE} = 0			−1	mA
		V_{CE} = −100 V,	V_{BE} = 0,	T_C = 150°C		−2	
I_{EBO}	Emitter Cutoff Current	V_{EB} = −2.5 V,	I_C = 0			−100	μA
		V_{EB} = −5 V,	I_C = 0			−1	mA
h_{FE}	Static Forward Current Transfer Ratio	V_{CE} = −4 V,	I_C = −1 A,	See Notes 5 and 6	20	100	
		V_{CE} = −4 V,	I_C = −2 A,	See Notes 5 and 6	5		
V_{BE}	Base-Emitter Voltage	V_{CE} = −4 V,	I_C = −2 A,	See Notes 5 and 6		−2.2	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_B = −0.1 A,	I_C = −1 A,	See Notes 5 and 6		−1.5	V
		I_B = −0.5 A,	I_C = −2 A,	See Notes 5 and 6		−2.5	
h_{fe}	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = −5 V,	I_C = −0.2 A,	f = 1 kHz	20		
$\|h_{fe}\|$	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = −5 V,	I_C = −0.2 A,	f = 5 MHz	10		

NOTES: 5. These parameters must be measured using pulse techniques. t_w = 300 μs, duty cycle ≤ 2%.
6. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 0.125 inch from the device body.

5

thermal characteristics

PARAMETER		TIP521 MAX	TIP522 MAX	UNIT
$R_{\theta JC}$	Junction-to-Case Thermal Resistance	5	25	°C/W
$R_{\theta JA}$	Junction-to-Free-Air Thermal Resistance	87.5	175	

MAXIMUM SAFE OPERATING AREA

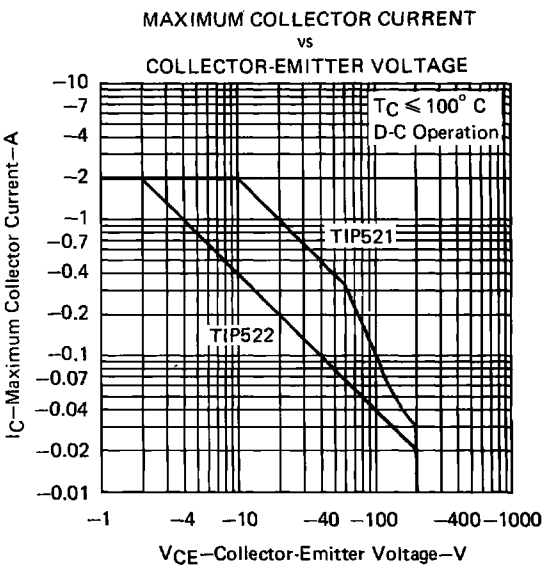


FIGURE 1

TEXAS INSTRUMENTS
INCORPORATED
POST OFFICE BOX 5012 • DALLAS, TEXAS 75222