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October 2015

FJN3305R

NPN Epitaxial Silicon Transistor with Bias Resistor

Features

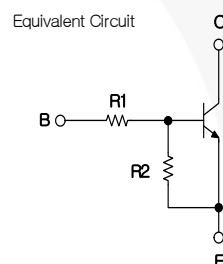
- 100 mA Output Current Capability
- Built-in Bias Resistor ($R_1 = 4.7 \text{ k}\Omega$, $R_2 = 10 \text{ k}\Omega$)

Applications

- Switching, Interface, and Driver Circuits
- Inverters
- Digital Applications in Industrial Segments

Description

Transistors with built-in resistors can be excellent space- and cost-saving solutions by reducing component count and simplifying circuit design.



Ordering Information

Part Number	Top Mark	Package	Packing Method
FJN3305RTA	R3305	TO-92 3L	Ammo

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	50	V
V_{CEO}	Collector-Emitter Voltage	50	V
V_{EBO}	Emitter-Base Voltage	10	V
I_C	Collector Current	100	mA
T_J	Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature	-55 to +150	$^\circ\text{C}$

Thermal Characteristics⁽¹⁾

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Value	Unit
P_D	Power Dissipation	300	mW
	Derate Above $T_A = 25^\circ\text{C}$	2.4	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	416	$^\circ\text{C/W}$

Note:

1. PCB size: FR-4 76 x 114 x 0.6T mm³ (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

Electrical Characteristics

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CBO}	Collector-Base Breakdown Voltage	$I_C = 10\ \mu\text{A}$, $I_E = 0$	50			V
BV_{CEO}	Collector-Emitter Breakdown Voltage	$I_C = 100\ \mu\text{A}$, $I_B = 0$	50			V
I_{CBO}	Collector Cut-Off Current	$V_{CB} = 40\ \text{V}$, $I_E = 0$			0.1	μA
h_{FE}	DC Current Gain	$V_{CE} = 5\ \text{V}$, $I_C = 5\ \text{mA}$	30			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\ \text{mA}$, $I_B = 0.5\ \text{mA}$			0.3	V
C_{ob}	Output Capacitance	$V_{CE} = 10\ \text{V}$, $I_C = 5\ \text{mA}$, $f = 1\ \text{MHz}$		3.7		pF
f_T	Current Gain Bandwidth Product	$V_{CE} = 10\ \text{V}$, $I_C = 5\ \text{mA}$		250		MHz
$V_I(\text{off})$	Input-Off Voltage	$V_{CE} = 5\ \text{V}$, $I_C = 100\ \mu\text{A}$			0.3	V
$V_I(\text{on})$	Input-On Voltage	$V_{CE} = 0.3\ \text{V}$, $I_C = 20\ \text{mA}$	2.5			V
R_1	Input Resistor		3.2	4.7	6.2	k Ω
R_1/R_2	Resistor Ratio		0.42	0.47	0.52	

Typical Performance Characteristics

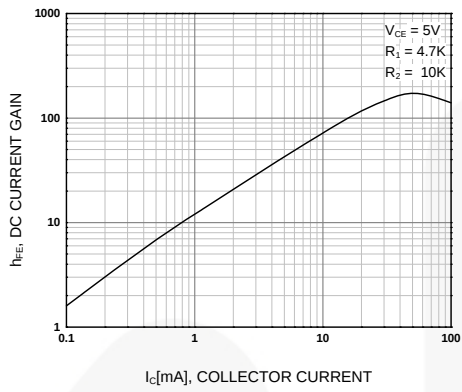


Figure 1. DC Current Gain

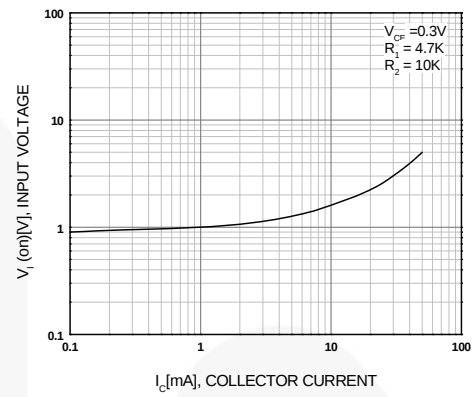


Figure 2. Input-On Voltage

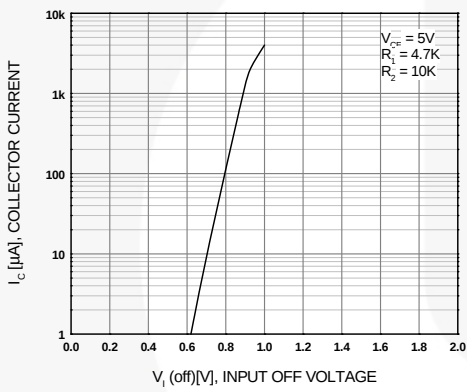


Figure 3. Input-Off Voltage

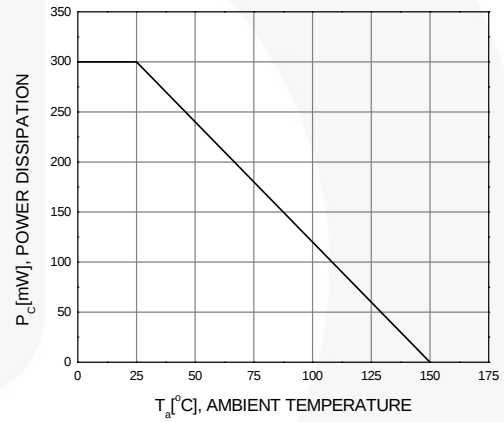
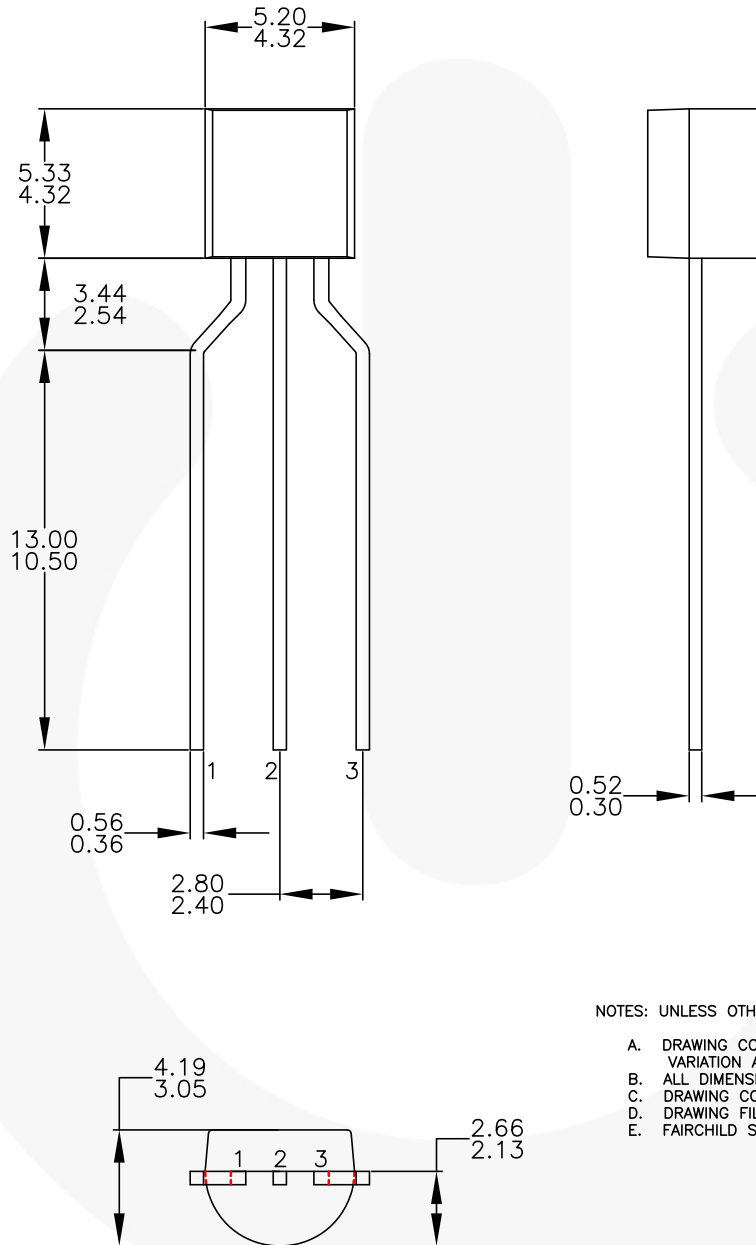


Figure 4. Power Derating

Physical Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED

- A. DRAWING CONFORMS TO JEDEC MS-013, VARIATION AC.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5M-2009.
- D. DRAWING FILENAME: MKT-ZA03FREX3.
- E. FAIRCHILD SEMICONDUCTOR.

Figure 5. 3-LEAD, TO-92, MOLDED 0.200 IN-LINE SPACING LD FORM



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