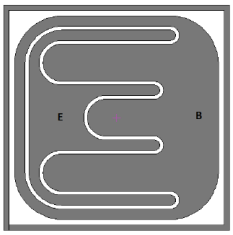
JANHCD2N3500, JANHCD2N3501
JANKCD2N3500, JANKCD2N3501

NPN Medium Power Silicon Transistor Die

Rev. V1

Features

- Available in JANHC, JANKC and R versions per MIL-PRF-19500/366
- Rad Hard Assurance Levels M, D, P, L and R
- Ideal for High Voltage Inductive Load Switching Applications



Electrical Characteristics (T_A = +25°C unless otherwise noted)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Breakdown Voltage	I_C = 10 mA dc	$V_{(BR)CEO}$	V dc	150	—
Collector - Base Cutoff Current	V_{CB} = 150 V	I_{CBO1}	µA dc	—	10
Collector - Base Cutoff Current	V_{CB} = 75 V	I_{CBO2}	nA dc	—	50
Emitter - Base Cutoff Current	V_{EB} = 6.0 V dc	I_{EBO1}	µA dc	—	10
Emitter - Base Cutoff Current	V_{EB} = 4.0 V dc	I_{EBO2}	nA dc	—	25
Collector - Emitter Saturation Voltage	I_C = 10 mA dc; I_B = 1 mA dc	$V_{CE(SAT)1}$	V dc	—	0.2
Collector - Emitter Saturation Voltage	I_C = 150 mA dc; I_B = 15 mA dc	$V_{CE(SAT)2}$	V dc	—	0.4
Base - Emitter Saturation Voltage	I_C = 10 mA dc; I_B = 1 mA dc	$V_{BE(SAT)1}$	V dc	—	0.8
Base - Emitter Saturation Voltage	I_C = 150 mA dc; I_B = 15 mA dc	$V_{BE(SAT)2}$	V dc	—	1.2
Collector - Base Cutoff Current	T_A = +150°C V_{CB} = 75 V dc	I_{CBO3}	µA dc	—	50
Forward Current Transfer Ratio	T_A = -55°C V_{CE} = 10 V dc; I_C = 150 mA dc 2N3500 2N3501	h_{FE7}	-	 22 45	

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Electrical Characteristics (T_A = +25°C unless otherwise noted)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Forward Current Transfer Ratio	V_{CE} = 10 V dc; I_C = 0.1 mA dc 2N3500 2N3501	h_{FE1}	-	 20 35	
Forward Current Transfer Ratio	V_{CE} = 10 V dc; I_C = 1.0 mA dc 2N3500 2N3501	h_{FE2}	-	 25 50	
Forward Current Transfer Ratio	V_{CE} = 10 V dc; I_C = 10 mA dc 2N3500 2N3501	h_{FE3}	-	 35 75	
Forward Current Transfer Ratio	V_{CE} = 10 V dc; I_C = 150 mA dc 2N3500 2N3501	h_{FE4}	-	 40 100	 120 300
Forward Current Transfer Ratio	V_{CE} = 10 V dc; I_C = 300 mA dc 2N3500 2N3501	h_{FE5}	-	 15 20	
Dynamic Characteristics					
Magnitude of Small-Signal Short-Circuit Forward Current Transfer Ratio	I_C = 20 mA dc; V_{CE} = 20 V dc; f = 100 mHz	$\lvert h_{fe} \rvert$	-	1.5	8
Small-Signal Short-Circuit Forward Current Transfer Ratio	V_{CE} = 10 V dc; I_C = 10 mA dc; f = 1 kHz 2N3500 2N3501	h_{fe}		 35 75	 300 375
Open Circuit Output Capacitance	V_{CB} = 10 V dc; I_E = 0; 100 kHz ≤f≤ 1 MHz 2N3500, 2N3501	C_{obo}	pF	—	8
Input Capacitance (Output Open Circuited)	V_{EB} = 0.5 V dc; I_C = 0; 100 kHz ≤f≤ 1 MHz	C_{ibo}	pF		80
Switching Characteristics					
Turn-On Time	I_C = 150 mA dc; I_{B1} = 15 mA dc; V_{EB} = 5 V dc	t_{on}	ns	—	115
Turn-Off Time	I_C = 150 mA dc; I_{B1} = I_{B2} = 15 mA dc	t_{off}	ns	—	1150

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Absolute Maximum Ratings

Ratings	Symbol	Value
Collector - Emitter Voltage	V_{CEO}	150 V dc
Collector - Base Voltage	V_{CBO}	150 V dc
Emitter - Base Voltage	V_{EBO}	6.0 V dc
Collector Current	I_C	300 mA dc
Operating & Storage Temperature Range	T_{OP}, T_{STG}	-65°C to +200°C

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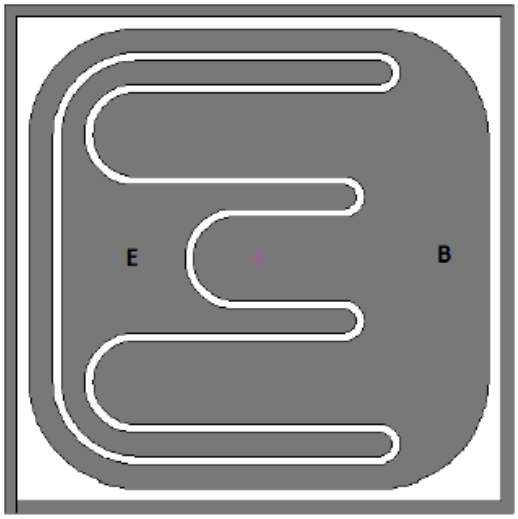
Outline Drawing (Chip)



NOTES

1.	Die Size:	.023 x .023 Inch ± .002 Inch (.584 mm x .584 mm ± .0508)
2.	Die Thickness:	.010 Inch + .002 Inch (.254 mm + .508 mm)
3.	Top Metal:	Aluminum, 16,000 Å Minimum, 20,000 Å Nominal
4.	Back Metal:	Gold, 4,500 Å Minimum, 5,500 Å Nominal
5.	Backside:	Collector
6.	Bonding pads:	Base = .004 x .004 Inch (.100 x .100 mm) Emitter = .004 x .010 Inch (.100 x .254 mm)

* FIGURE 6. Physical dimensions, JANHCD and JANKCD die.