

## NPN POWER TRANSISTOR SILICON AMPLIFIER

Qualified per MIL-PRF-19500/583

### Devices

2N5681

2N5682

### Qualified Level

JAN  
JANTX  
JANTXV

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

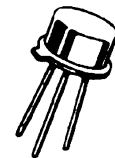
Ratings	Symbol	2N5681	2N5682	Units
Collector-Emitter Voltage	$V_{CEO}$	100	120	Vdc
Collector-Base Voltage	$V_{CBO}$	100	120	Vdc
Emitter-Base Voltage	$V_{EBO}$	4.0	4.0	Vdc
Collector Current	$I_C$	1.0	1.0	Adc
Base Current	$I_B$	0.5	0.5	Adc
Total Power Dissipation	$P_T$	@ $T_A = +25^\circ\text{C}^{(1)}$	1.0	W
		@ $T_C = +25^\circ\text{C}^{(2)}$	10	W
Operating & Storage Temperature Range	$T_{op}, T_{stg}$	-65 to +200	-65 to +200	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	17.5	$^\circ\text{C}$

1) Derate linearly 5.7 mW/ $^\circ\text{C}$  for  $T_A > +25^\circ\text{C}$

2) Derate linearly 57 mW/ $^\circ\text{C}$  for  $T_C > +25^\circ\text{C}$



TO-39\*  
(TO-205AD)

\*See appendix A for package outline

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 10 \text{ mAdc}$	$V_{(BR)CEO}$	100 120		Vdc
Emitter-Base Cutoff Current $V_{EB} = 4.0 \text{ Vdc}$	$I_{EBO}$		1.0	$\mu\text{Adc}$
Collector-Emitter Cutoff Current $V_{CE} = 70 \text{ Vdc}$ $V_{CE} = 80 \text{ Vdc}$	$I_{CEO}$		10	$\mu\text{Adc}$
Collector-Emitter Cutoff Current $V_{BE} = 1.5 \text{ Vdc}$ $V_{CE} = 100 \text{ Vdc}$ $V_{CE} = 120 \text{ Vdc}$	$I_{CEX}$		100	nAdc
Collector-Base Cutoff Current $V_{CE} = 100 \text{ Vdc}$ $V_{CE} = 120 \text{ Vdc}$	$I_{CBO}$		100	nAdc

**2N5681, 2N5682 JAN SERIES**

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
<b>ON CHARACTERISTICS</b> <sup>(3)</sup>				
Forward Current Transfer Ratio I <sub>C</sub> = 250 mA <sub>dc</sub> , V <sub>CE</sub> = 2.0 V <sub>dc</sub> I <sub>C</sub> = 500 mA <sub>dc</sub> , V <sub>CE</sub> = 2.0 V <sub>dc</sub> I <sub>C</sub> = 1.0 A <sub>dc</sub> , V <sub>CE</sub> = 2.0 V <sub>dc</sub>	h <sub>FE</sub>	40 20 5	150	
Collector-Emitter Saturation Voltage I <sub>C</sub> = 250 mA <sub>dc</sub> , I <sub>B</sub> = 25 mA <sub>dc</sub> I <sub>C</sub> = 500 mA <sub>dc</sub> , I <sub>B</sub> = 50 mA <sub>dc</sub>	V <sub>CE(sat)</sub>		0.6 1.0	V <sub>dc</sub>
Base-Emitter Saturation Voltage I <sub>C</sub> = 250 mA <sub>dc</sub> , I <sub>B</sub> = 25 mA <sub>dc</sub> I <sub>C</sub> = 500 mA <sub>dc</sub> , I <sub>B</sub> = 50 mA <sub>dc</sub>	V <sub>BE(sat)</sub>		1.1 1.3	V <sub>dc</sub>

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short Circuit Forward-Current Transfer Ratio I <sub>C</sub> = 0.1 A <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 10 kHz	h <sub>fe</sub>	3.0		
Small Signal Short Circuit Forward-Current Transfer Ratio I <sub>C</sub> = 0.2 A <sub>dc</sub> , V <sub>CE</sub> = 1.5 V <sub>dc</sub> , f = 1.0 kHz	h <sub>fe</sub>	40		
Output Capacitance V <sub>CB</sub> = 20 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1 MHz	C <sub>obo</sub>		50	pF

**SAFE OPERATING AREA**

<p><b>DC Tests</b> T<sub>C</sub> = +25°C, 1 Cycle, t ≥ 0.5 s</p> <p><b>Test 1</b> V<sub>CE</sub> = 2 V<sub>dc</sub>, I<sub>C</sub> = 1.0 A<sub>dc</sub></p> <p><b>Test 2</b> V<sub>CE</sub> = 10 V<sub>dc</sub>, I<sub>C</sub> = 1.0 A<sub>dc</sub></p> <p><b>Test 3</b> V<sub>CE</sub> = 90 V<sub>dc</sub>, I<sub>C</sub> = 50 mA<sub>dc</sub></p>
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