

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 @ $T_A = +25^\circ\text{C}^{(1)}$	P_T	1.0	1.0	W
@ $T_C = +25^\circ\text{C}^{(2)}$		10	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		Vdc
2N5681 2N5682		120		
Emitter-Base Cutoff Current $V_{EB} = 4.0 \text{ Vdc}$	I_{EBO}		1.0	μAdc
Collector-Emitter Cutoff Current $V_{CE} = 70 \text{ Vdc}$	I_{CEO}		10	μAdc
2N5681 $V_{CE} = 80 \text{ Vdc}$ 2N5682				
Collector-Emitter Cutoff Current $V_{BE} = 1.5 \text{ Vdc}$	I_{CEX}		100	nAdc
$V_{CE} = 100 \text{ Vdc}$				
2N5681 $V_{CE} = 120 \text{ Vdc}$ 2N5682				
Collector-Base Cutoff Current $V_{CE} = 100 \text{ Vdc}$	I_{CBO}		100	nAdc
2N5681 $V_{CE} = 120 \text{ Vdc}$ 2N5682				

2N5681, 2N5682 JAN SERIES

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
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ON CHARACTERISTICS ⁽³⁾

Forward Current Transfer Ratio $I_C = 250 \text{ mAdc}, V_{CE} = 2.0 \text{ Vdc}$ $I_C = 500 \text{ mAdc}, V_{CE} = 2.0 \text{ Vdc}$ $I_C = 1.0 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$	h_{FE}	40 20 5	150	
Collector-Emitter Saturation Voltage $I_C = 250 \text{ mAdc}, I_B = 25 \text{ mAdc}$ $I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$	$V_{CE(sat)}$		0.6 1.0	Vdc
Base-Emitter Saturation Voltage $I_C = 250 \text{ mAdc}, I_B = 25 \text{ mAdc}$ $I_C = 500 \text{ mAdc}, I_B = 50 \text{ mAdc}$	$V_{BE(sat)}$		1.1 1.3	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short Circuit Forward-Current Transfer Ratio $I_C = 0.1 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 10 \text{ kHz}$	$ h_{fe} $	3.0		
Small Signal Short Circuit Forward-Current Transfer Ratio $I_C = 0.2 \text{ Adc}, V_{CE} = 1.5 \text{ Vdc}, f = 1.0 \text{ kHz}$	h_{fe}	40		
Output Capacitance $V_{CB} = 20 \text{ Vdc}, I_E = 0, f = 1 \text{ MHz}$	C_{obo}		50	pF

SAFE OPERATING AREA

DC Tests

$T_C = +25^\circ\text{C}$, 1 Cycle, $t \geq 0.5 \text{ s}$

Test 1

$V_{CE} = 2 \text{ Vdc}, I_C = 1.0 \text{ Adc}$

Test 2

$V_{CE} = 10 \text{ Vdc}, I_C = 1.0 \text{ Adc}$

Test 3

$V_{CE} = 90 \text{ Vdc}, I_C = 50 \text{ mAdc}$