

# High-Current, High-Power, High-Speed Silicon N-P-N Planar Transistors

For Switching and Amplifier Applications in Military, Industrial and Commercial Equipment

**Features:**

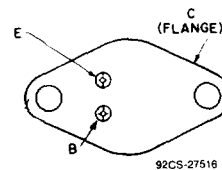
- *Maximum Safe-Area-of-Operation Curves* -  $I_{S/O}$  limit line beginning at 24 V
- *Fast Turn-On Time* -  $t_{ON} = 0.5 \mu s$  max. at  $I_C = 15 A$

Types 2N5671 and 2N5672\* are epitaxial silicon n-p-n transistors having high current and high power handling capability and fast switching speed. The 2N5672 is similar to the 2N5671 except that it has higher voltage ratings and lower leakage currents. These devices are especially suitable for switching-control amplifiers, power gates, switching regulators, power-switching circuits, converters, inverters, control circuits. Other recommended applications included DC-RF amplifiers and power oscillators.

These types are supplied in the JEDEC TO-204AA hermetic steel package.

\*Formerly Dev. Types TA7323 and TA7323A, respectively.

**TERMINAL DESIGNATIONS**



JEDEC TO-204AA

**MAXIMUM RATINGS, Absolute-Maximum Values:**

	2N5671	2N5672	
* COLLECTOR-TO-BASE VOLTAGE, $V_{CBO}$ .....	120	150	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:			
With base open, $V_{CE0}(SUS)$ .....	90	120	V
With external base-to-emitter resistance ( $R_{BE}$ ) $\leq 50 \Omega$ , $V_{CE0}(SUS)$ .....	110	140	V
With external base-to-emitter resistance ( $R_{BE}$ ) $\leq 50 \Omega$ & $V_{BE} = -1.5$ , $V_{CE0}(SUS)$ .....	120	150	V
* EMITTER-TO-BASE VOLTAGE, $V_{EBO}$ .....	7	7	V
* COLLECTOR CURRENT, $I_C$ .....	30	30	A
* BASE CURRENT, $I_B$ .....	10	10	A
* TRANSISTOR DISSIPATION, $P_T$ :			
At case temperatures up to 25°C and $V_{CE}$ up to 24 V .....	140	140	W
At case temperatures up to 25°C and $V_{CE}$ above 24 V .....		See Fig. 1	
At case temperatures above 25°C and $V_{CE}$ above 24 V .....		See Figs. 1 & 2	
* TEMPERATURE RANGE:			
Storage and Operating (Junction) .....	-65 to +200		°C
* PIN TEMPERATURE (During Soldering):			
At distances $\geq 1/32$ in. from seating plane for 10 s max. ....	230		°C

\*In accordance with JEDEC registration data format (JS-6, RFD-1).

ELECTRICAL CHARACTERISTICS, Case Temperature ( $T_C$ ) = 25°C Unless Otherwise Specified

CHARACTERISTIC	SYMBOL	TEST CONDITIONS						LIMITS				UNITS	
		DC Collector Voltage(V)		DC Emitter or Base Voltage (V)		DC Current (A)		Type 2N5671		Type 2N5672			
		V <sub>CB</sub>	V <sub>CE</sub>	V <sub>EB</sub>	V <sub>BE</sub>	I <sub>C</sub>	I <sub>E</sub>	I <sub>B</sub>	Min.	Max.	Min.		Max.
* Collector-Cutoff Current	I <sub>CEO</sub>	-	80	-	-	-	-	0	-	10	-	10	mA
	I <sub>CEV</sub>	-	110	-	-1.5	-	-	-	-	12	-	-	mA
	I <sub>CEV</sub> (T <sub>C</sub> =150°C)	-	135	-	-1.5	-	-	-	-	15	-	10	mA
* Emitter-Cutoff Current	I <sub>EBO</sub>	-	-	7	-	0	-	-	-	10	-	10	mA
Collector-to-Emitter Sustaining Voltage:	V <sub>CE0(sus)</sub>	-	-	-	-	0.2	-	0	90°	-	120°	-	V
With base open													
With external base-to-emitter resistance (R <sub>BE</sub> ) ≤ 50 Ω	V <sub>CER(sus)</sub>	-	-	-	-	0.2	-	0	110°	-	140°	-	V
With base-emitter junction reverse biased & R <sub>BE</sub> ≤ 50 Ω	V <sub>CEx(sus)</sub>	-	-	-	-1.5	0.2	-	-	120°	-	150°	-	V
* Base-to-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	-	-	-	-	15	-	1.2	-	1.5	-	1.5	V
Base-to-Emitter Voltage	V <sub>BE</sub>	-	5	-	-	15	-	-	-	1.6	-	1.6	V
* Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	-	-	-	15	-	1.2	-	0.75	-	0.75	V
* DC Forward-Current Transfer Ratio	h <sub>FE</sub>	-	2	-	-	15	-	-	20	20	20	100	
Second-Breakdown Collector Current <sup>c</sup> With base forward biased	I <sub>S/b</sub> <sup>b</sup>	-	24	-	-	-	-	-	5.8 <sup>c</sup>	-	5.8 <sup>c</sup>	-	A
Second-Breakdown Energy With base reverse biased R <sub>BE</sub> = 20 Ω, L = 180 μH	E <sub>S/b</sub> <sup>d</sup>	-	-	-	-4	15	-	-	20	-	20	-	mJ
Gain-Bandwidth Product	f <sub>T</sub>	-	10	-	-	2	-	-	50	-	50	-	MHz
Output Capacitance (At 1 MHz)	C <sub>ob</sub>	10	-	-	-	-	0	-	-	900	-	900	pF
* Saturated Switching Turn-On Time (Delay Time + Rise Time)	t <sub>on</sub>	V <sub>CC</sub> =30 V	-	-	-	15	-	I <sub>B1</sub> = I <sub>B2</sub> =1.2	-	0.5	-	0.5	μs
* Saturated Switching Storage Time	t <sub>s</sub>	V <sub>CC</sub> =30 V	-	-	-	15	-	I <sub>B1</sub> = I <sub>B2</sub> =1.2	-	1.5	-	1.5	μs
* Saturated Switching Fall Time	t <sub>f</sub>	V <sub>CC</sub> =30 V	-	-	-	15	-	I <sub>B1</sub> = I <sub>B2</sub> =1.2	-	0.5	-	0.5	μs
Thermal Resistance (Junction-to-Case)	θ <sub>J-C</sub>	-	40	-	-	0.5	-	-	-	1.25	-	1.25	°C/W

<sup>a</sup> CAUTION: The sustaining voltages V<sub>CE0(sus)</sub>, V<sub>CER(sus)</sub>, and V<sub>CEx(sus)</sub> MUST NOT be measured on a curve tracer.

<sup>b</sup> I<sub>S/b</sub> is defined as the current at which second breakdown occurs at a specified collector voltage with the emitter-base junction forward biased for transistor operation in the active region.

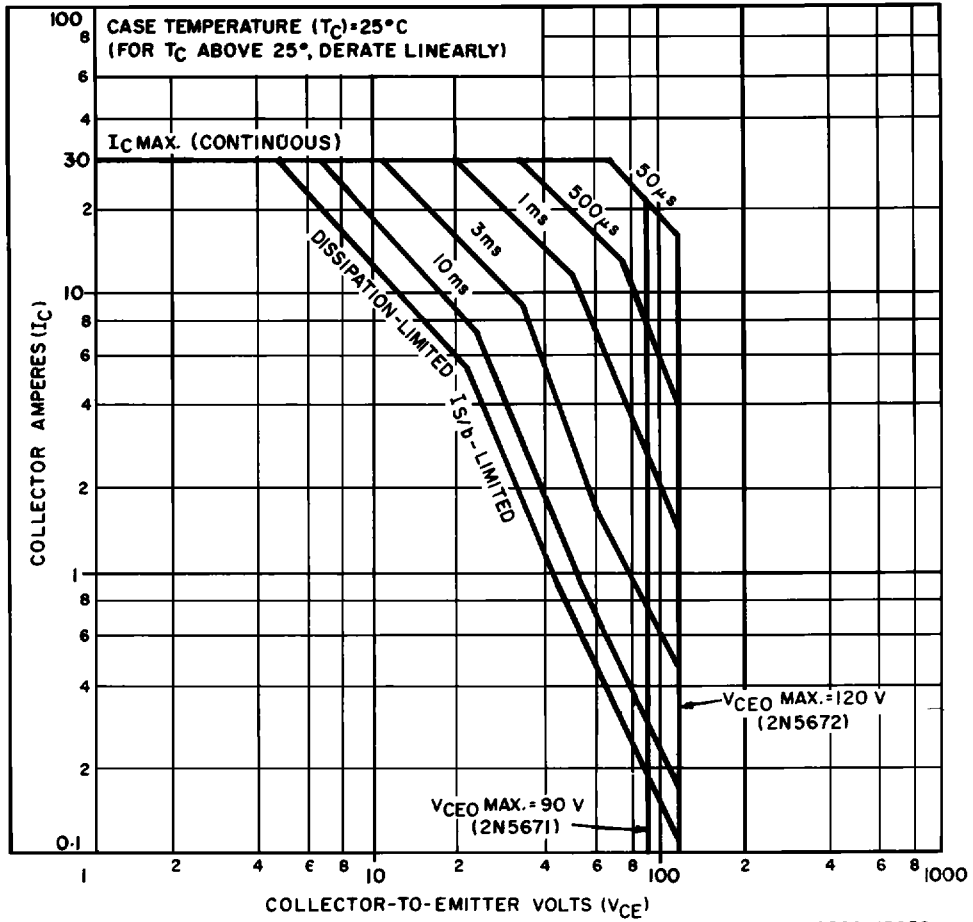
<sup>c</sup> Pulsed; 1-s, non-repetitive pulse.

<sup>d</sup> E<sub>S/b</sub> is defined as the energy at which second breakdown occurs under specified reverse bias conditions. E<sub>S/b</sub> = ½ LI<sup>2</sup>, where L is a series load or leakage inductance and I is the peak collector current.

\* In accordance with JEDEC registration data format (JS-6, RFD-1)

2  
POWER TRANSISTORS

# 2N5671, 2N5672



92CS-15650

Fig. 1 - Maximum operating areas for types 2N5671 & 2N5672.

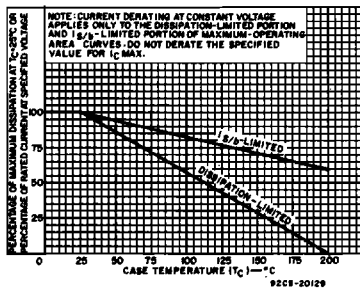


Fig. 2 - Disipation derating curves for types 2N5671 & 2N5672.

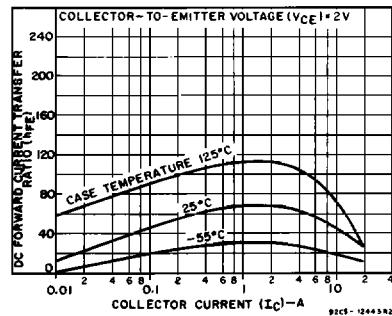


Fig. 3 - Typical dc beta characteristics for types 2N5671 & 2N5672.

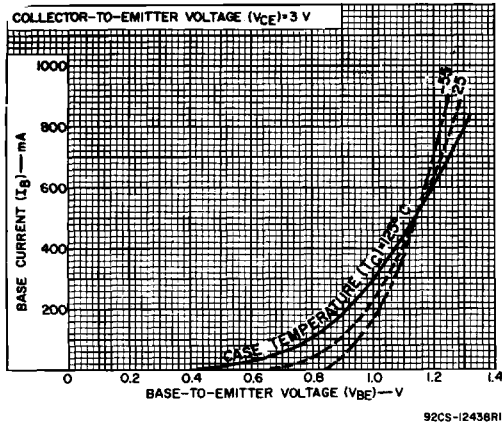


Fig. 4 - Typical input characteristics for types 2N5671 & 2N5672.

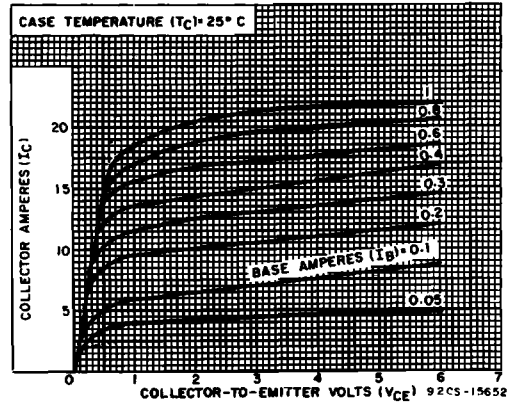


Fig. 5 - Typical output characteristics for types 2N5671 & 2N5672.

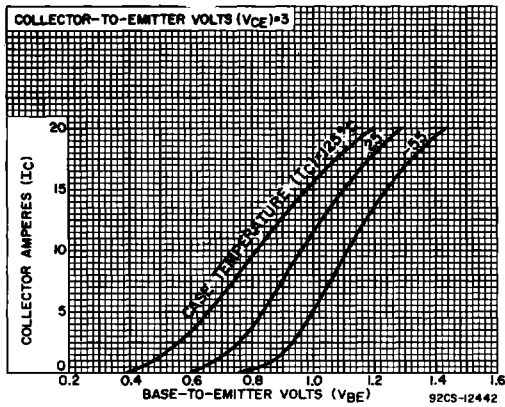


Fig. 6 - Typical transfer characteristics for types 2N5671 & 2N5672.

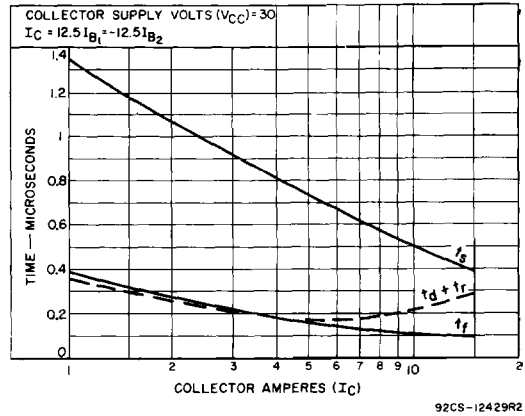


Fig. 7 - Typical saturated switching characteristics for types 2N5671 & 2N5672.