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

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

Features:

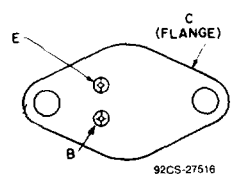
- *Maximum Safe-Area-of-Operation Curves - $I_{s/b}$ limit line beginning at 24 V*
- *Fast Turn-On Time - $t_{ON} = 0.5\ \mu s$ max. at $I_C = 15$ A*

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, $V_{CEO}(sus)$	90	120	V
With external base-to-emitter resistance (R_{BE}) ≤ 50 Ω, $V_{CER}(sus)$	110	140	V
With external base-to-emitter resistance (R_{BE}) ≤ 50 Ω & V_{BE}=-1.5, $V_{CEX}(sus)$	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 ≥ 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: DC Collector Voltage(V) V_{CB}	V_{CE}	DC Emitter or Base Voltage (V) V_{EB}	V_{BE}	DC Current (A) I_C	I_E	I_B	LIMITS: Type 2N5671 Min.	Max.	Type 2N5672 Min.	Max.	UNITS
		I_{CEO}	–	80	–	–	–	–	0	–	10	–	10	mA
*	Collector-Cutoff Current	I_{CEV}	–	110	–	−1.5	–	–	–	–	12	–	–	mA
		I_{CEV}	–	135	–	−1.5	–	–	–	–	–	–	10	mA
*		I_{CEV} (T_C=150° C)	–	100	–	−1.5	–	–	–	–	15	–	10	mA
*	Emitter-Cutoff Current	I_{EBO}	–	–	7	–	0	–	–	–	10	–	10	mA
	Collector-to-Emitter Sustaining Voltage: With base open	$V_{CEO(sus)}$	–	–	–	–	0.2	–	0	90[a]	–	120[a]	–	V
	With external base-to-emitter resistance (R_{BE}) ≤ 50 Ω	$V_{CER(sus)}$	–	–	–	–	0.2	–	0	110[a]	–	140[a]	–	V
	With base-emitter junction reverse biased & R_{BE} ≤ 50 Ω	$V_{CEX(sus)}$	–	–	–	−1.5	0.2	–	–	120[a]	–	150[a]	–	V
*	Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	–	–	–	–	15	–	1.2	–	1.5	–	1.5	V
	Base-to-Emitter Voltage	V_{BE}	–	5	–	–	15	–	–	–	1.6	–	1.6	V
*	Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	–	–	–	–	15	–	1.2	–	0.75	–	0.75	V
*	DC Forward-Current Transfer Ratio	h_{FE}	–	2	–	–	15	–	–	20	70	20	100	
			–	5	–	–	20	–	–	20	–	20	–	
	Second-Breakdown Collector Current[c] With base forward biased	$I_{S/b}$[b]	–	24	–	–	–	–	–	5.8[c]	–	5.8[c]	–	A
			–	45	–	–	–	–	–	0.9[c]	–	0.9[c]	–	A
	Second-Breakdown Energy With base reverse biased R_{BE} = 20 Ω, L = 180 μH	$E_{S/b}$[d]	–	–	–	−4	15	–	–	20	–	20	–	mJ
	Gain-Bandwidth Product	f_T	–	10	–	–	2	–	–	50	–	50	–	MHz
	Output Capacitance (At 1 MHz)	C_{ob}	10	–	–	–	–	0	–	–	900	–	900	pF
*	Saturated Switching Turn-On Time (Delay Time + Rise Time)	t_{on}	V_{CC}= 30 V	–	–	–	15	–	I_{B_1}= I_{B_2}= 1.2	–	0.5	–	0.5	μs
*	Saturated Switching Storage Time	t_s	V_{CC}= 30 V	–	–	–	15	–	I_{B_1}= I_{B_2}= 1.2	–	1.5	–	1.5	μs
*	Saturated Switching Fall Time	t_f	V_{CC}= 30 V	–	–	–	15	–	I_{B_1}= I_{B_2}= 1.2	–	0.5	–	0.5	μs
	Thermal Resistance (Junction-to-Case)	$\theta_{J\text{-}C}$	–	40	–	–	0.5	–	–	–	1.25	–	1.25	°C/W

[a] CAUTION: The sustaining voltages $V_{CEO(sus)}$, $V_{CER(sus)}$, and $V_{CEX(sus)}$ MUST NOT be measured on a curve tracer.

[b] $I_{S/b}$ 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.

[c] Pulsed; 1-s, non-repetitive pulse.

[d] $E_{S/b}$ is defined as the energy at which second breakdown occurs under specified reverse bias conditions. $E_{S/b} = \frac{1}{2}LI^2$, 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)

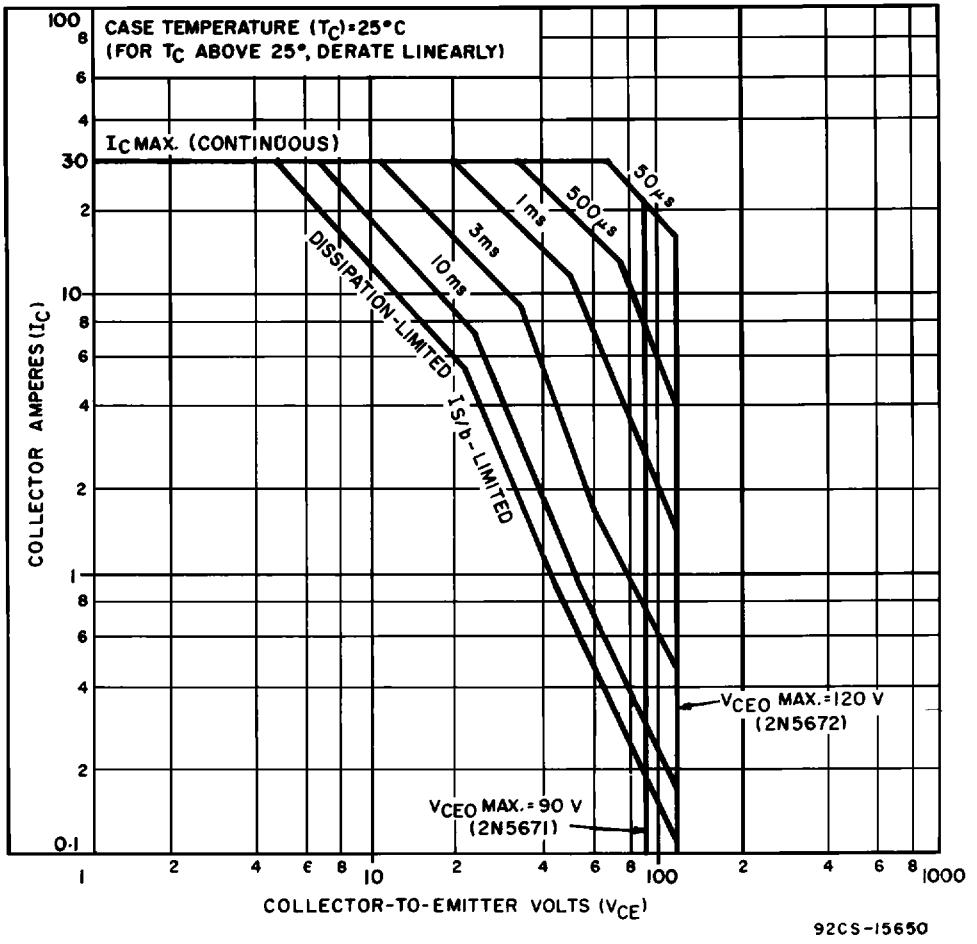


Fig. 1 - Maximum operating areas for types 2N5671 & 2N5672.

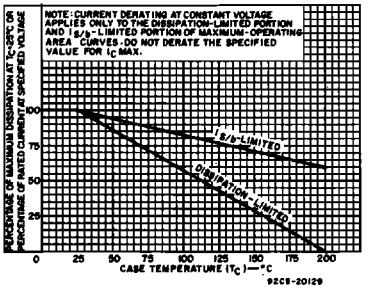


Fig. 2 - Dissipation derating curves for types 2N5671 & 2N5672.

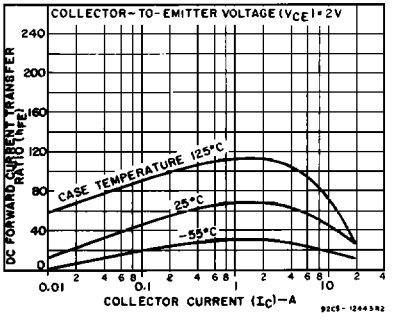


Fig. 3 - Typical dc beta characteristics for types 2N5671 & 2N5672.

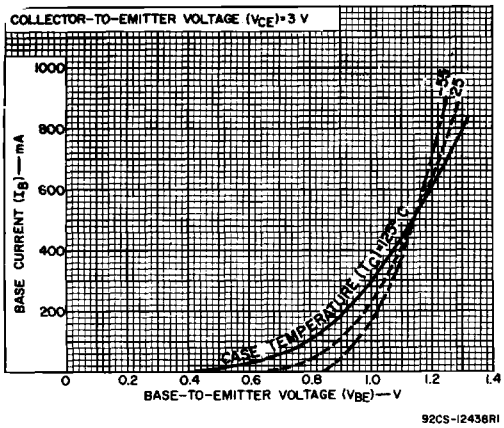


Fig. 4 - Typical input characteristics for types 2N5671 & 2N5672.

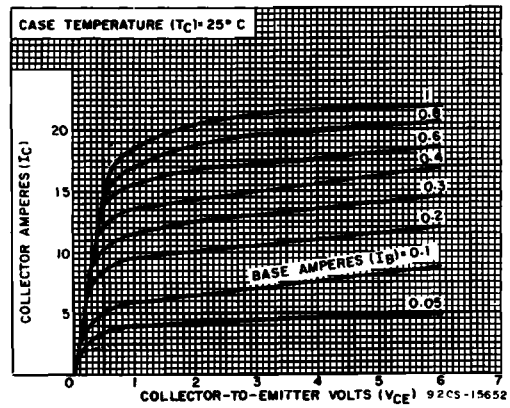


Fig. 5 - Typical output characteristics for types 2N5671 & 2N5672.

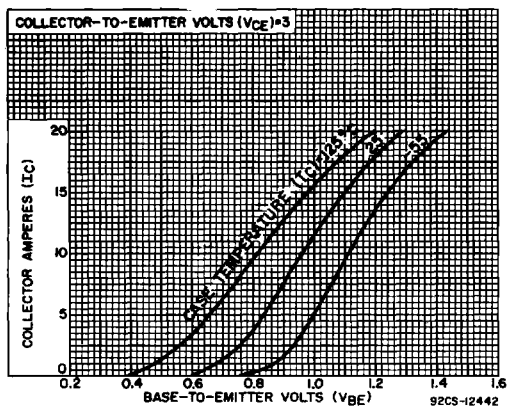


Fig. 6 - Typical transfer characteristics for types 2N5671 & 2N5672.

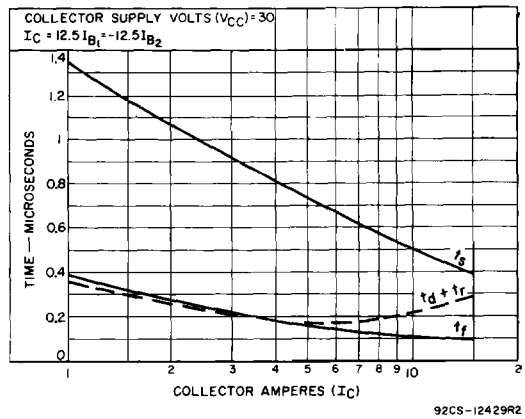


Fig. 7 - Typical saturated switching characteristics for types 2N5671 & 2N5672.