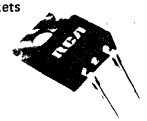
RCA
Solid State
Division

Power Transistors
2N6098 2N6099
2N6100 2N6101
2N6102 2N6103

For TO-66 Sockets



2N6098
2N6100
2N6102

JEDEC TO-220AA H1534R1

2N6099
2N6101
2N6103

JEDEC TO-220AB H1535R1

High-Current, Silicon N-P-N VERSAWATT Transistors

Designed for Medium-Power Linear and Switching Service in Consumer, Automotive, and Industrial Applications

Features:

- **Low saturation voltage –**
  V_{CE}(sat) = 1 V max. at I_C = 4 A (2N6098, 2N6099)
  = 1 V max. at I_C = 5 A (2N6100, 2N6101)
  = 1 V max. at I_C = 8 A (2N6102, 2N6103)
- **VERSAWATT package (molded-silicone plastic)**
- **Maximum safe-area-of-operation curves**
- **Thermal-cycle rating curve**

These RCA types are hometaxial-base silicon n-p-n transistors. Types 2N6098, 2N6100, and 2N6102 have formed emitter and base leads for easy insertion into TO-66 sockets. Types 2N6099, 2N6101, and 2N6103 are electrically identical to the 2N6098, 2N6100, and 2N6102, respectively.

These new VERSAWATT-package transistors differ in voltage ratings and in the currents at which the parameters are controlled. They are intended for a wide variety of medium-power switching and linear applications, such as series and shunt regulators, solenoid drivers, motor-speed controls, inverters, and driver and output stages of high-fidelity amplifiers.

*Formerly RCA Dev. Nos. TA7381-86, inclusive.

OPTIONAL LEAD CONFIGURATION

An additional lead forming for printed-circuit board mounting is also available.
Please submit requirements to your RCA Technical Sales Representative, or write to RCA Linear Power Marketing, Somerville, N.J. 08876.

Maximum Ratings, *Absolute-Maximum Values:*

		2N6102 2N6103	2N6098 2N6099	2N6100 2N6101	
*COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	45	70	80	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:					
With external base-to-emitter resistance (R_{BE}) = 100Ω	V_{CER}(sus)	45	65	75	V
* With base open	V_{CEO}(sus)	40	60	70	V
*EMITTER-TO-BASE VOLTAGE	V_{EBO}	5	8	8	V
*COLLECTOR CURRENT (Continuous)	I_C	16	10	10	A
*BASE CURRENT	I_B	4	4	4	A
TRANSISTOR DISSIPATION:	P_T				
* At case temperatures up to 25°C		75	75	75	W
At ambient temperatures up to 25°C		1.8	1.8	1.8	W
* At case temperatures above 25°C, derate linearly		← 0.6 →			W/°C
At ambient temperatures above 25°C, derate linearly		← 0.0144 →			W/°C
*TEMPERATURE RANGE:					
Storage & Operating (Junction)		← -65 to 150 →			°C
*LEAD TEMPERATURE (During Soldering):					
At distance ≥ 1/8 in. (3.17 mm) from case of 10 s max		← 235 →			°C

*In accordance with JEDEC registration data format JS-6 RDF-2.

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

	Characteristic	Symbol	TEST CONDITIONS				LIMITS						Units
			DC Collector Voltage (V)	DC Emitter Voltage (V)	DC Current (A)		2N6102 2N6103		2N6098 2N6099		2N6100 2N6101		
			V_{CE}	V_{EB}	I_C	I_B	Min.	Max.	Min.	Max.	Min.	Max.	
*	Collector-Cutoff Current	I_{CEX}	40	1.5			-	2	-	-	-	-	mA
			65	1.5			-	-	-	2	-	-	
			75	1.5			-	-	-	-	-	2	
	With base-emitter junction reverse biased	I_{CEX} (T_C=150°C)	40	1.5			-	10	-	-	-	-	
			65	1.5			-	-	-	10	-	-	
			75	1.5			-	-	-	-	-	10	
	With base open	I_{CEO}	30			0	-	2	-	-	-	-	mA
			50			0	-	-	-	2	-	-	
			60			0	-	-	-	-	-	2	
*	Emitter-Cutoff Current	I_{EBO}		5			-	1	-	-	-	-	mA
				8			-	-	-	1	-	1	
	Collector-to-Emitter Sustaining Voltage: With external base-to-emitter resistance (R_{BE}) = 100Ω[a]	V_{CER}(sus)			0.2		45	-	65	-	75	-	V
*	With base open[a]	V_{CEO}(sus)			0.2	0	40	-	60	-	70	-	
*	DC Forward-Current Transfer Ratio[a]	h_{FE}	4		4		-	-	20	80	-	-	
			4		5		-	-	-	-	20	80	
			4		8		15	60	-	-	-	-	
			4		10		-	-	5	-	5	-	
			4		16		5	-	-	-	-	-	
*	Base-to-Emitter Voltage[a]	V_{BE}	4		4		-	-	-	1.7	-	-	V
			4		5		-	-	-	-	-	1.7	
			4		8		-	1.7	-	-	-	-	
*	Collector-to-Emitter Saturation Voltage[a]	V_{CE}(sat)			10	2	-	-	-	2.5	-	2.5	V
					16	3.2	-	2.5	-	-	-	-	
*	Common-Emitter, small-signal short-circuit, forward current transfer ratio	h_{fe}	4	f=1kHz	0.5		15	-	15	-	15	-	
*	Magnitude of common-emitter, small-signal, short circuit, forward current transfer ratio	$\|h_{fe}\|$	4	f=0.1MHz	0.5		8	28	8	28	8	28	
	Thermal Resistance: Junction-to-Case	$\theta_{J\text{-}C}$					-	1.67	-	1.67	-	1.67	°C/W
	Junction-to-Ambient	$\theta_{J\text{-}A}$					-	70	-	70	-	70	

*In accordance with JEDEC registration data format (JS-6, RDF-2)

[a]Pulsed, pulse duration = 300 μs, duty factor = 0.018

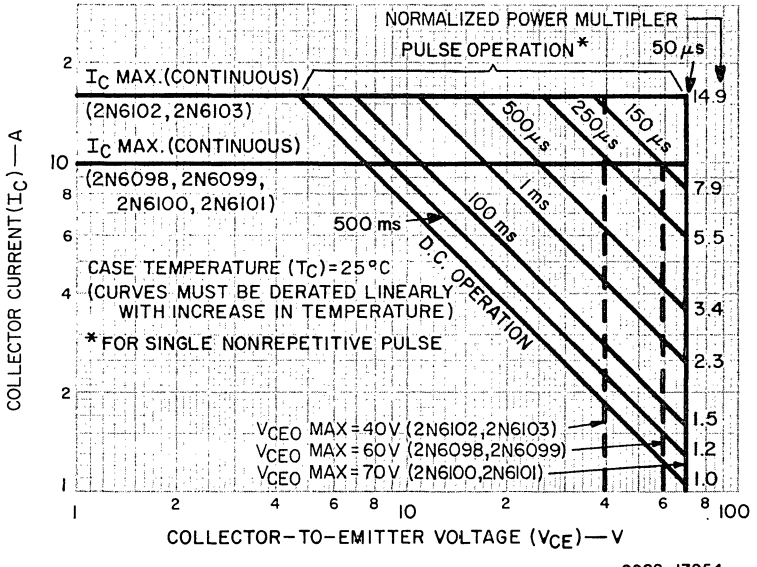


Fig. 1—Maximum safe operating areas for all types.

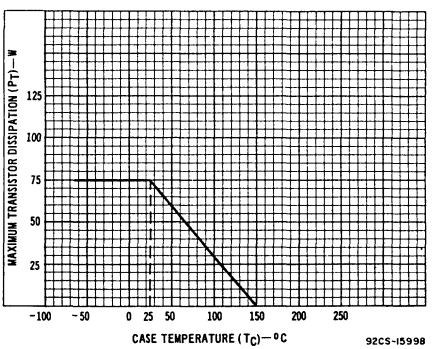


Fig. 2—Derating curve for all types.

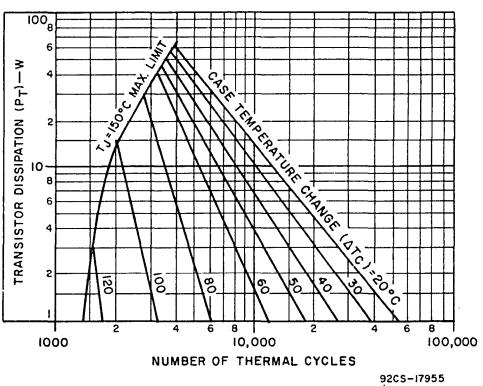


Fig. 3—Thermal-cycling rating for all types.

TERMINAL CONNECTIONS FOR TYPES 2N6098, 2N6100, 2N6102

Terminal No. 1-Base
Terminal No. 3-Emitter
Terminal No. 4-Collector

TERMINAL CONNECTIONS FOR TYPES 2N6099, 2N6101, 2N6103

Terminal No. 1-Base
Terminal No. 2-Collector
Terminal No. 3-Emitter
Terminal No. 4-Collector

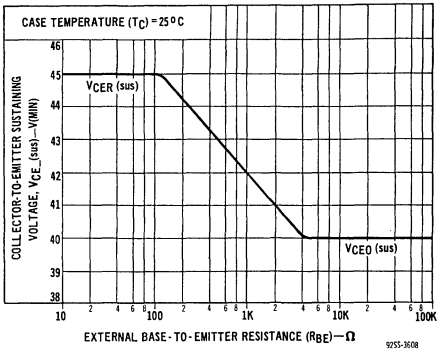


Fig.4—Sustaining voltage vs. base-to-emitter resistance for types 2N6102 and 2N6103.

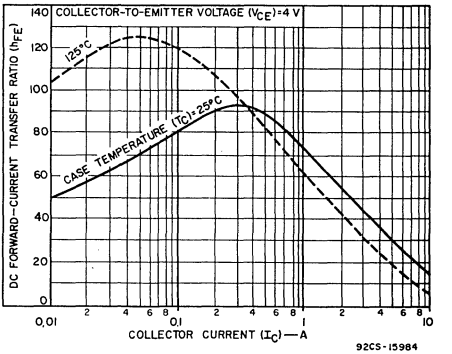


Fig.5—Typical dc beta characteristics for types 2N6102 and 2N6103.

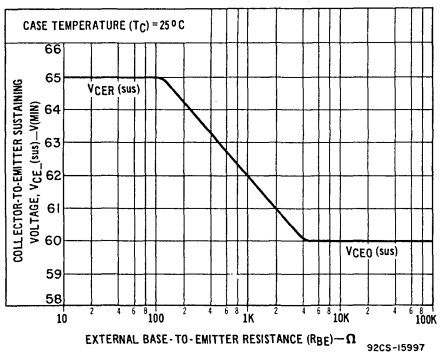


Fig.6—Sustaining voltage vs. base-to-emitter resistance for types 2N6098 and 2N6099.

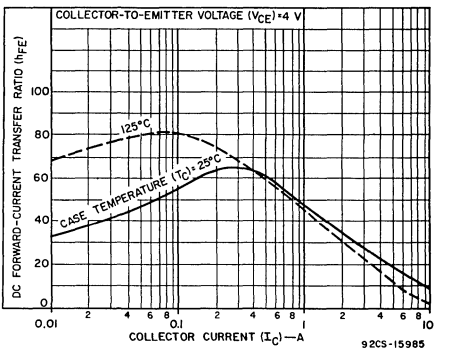


Fig.7—Typical dc-beta characteristics for types 2N6098 and 2N6099.

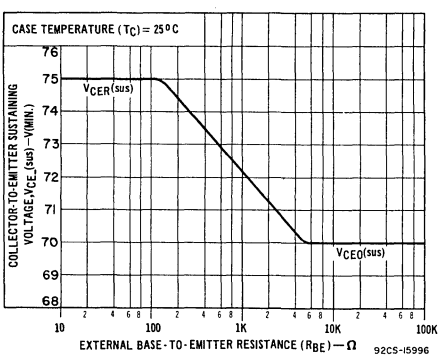


Fig.8—Sustaining voltage vs. base-to-emitter resistance for types 2N6100 and 2N6101.

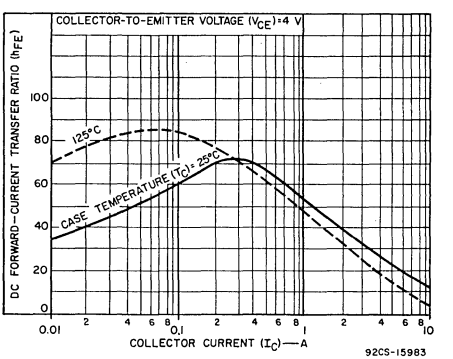


Fig.9—Typical dc beta characteristics for types 2N6100 and 6101.

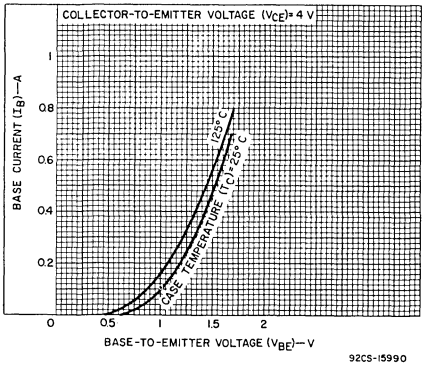


Fig. 10—Typical input characteristics for types 2N6102 and 2N6103.

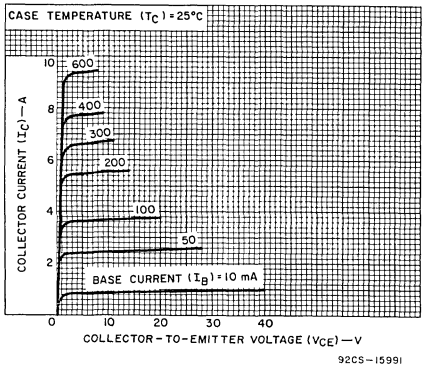


Fig. 11—Typical output characteristics for types 2N6102 and 2N6103.

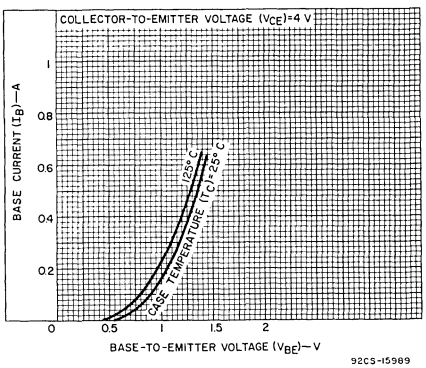


Fig. 12—Typical input characteristics for types 2N6098 and 2N6099.

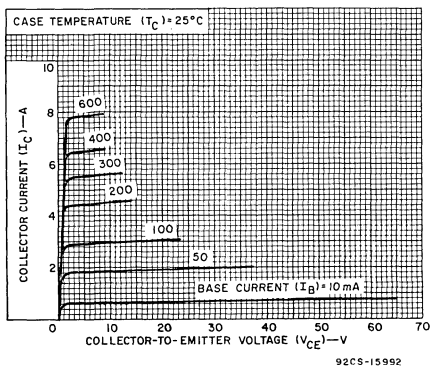


Fig. 13—Typical output characteristics for types 2N6098 and 2N6099.

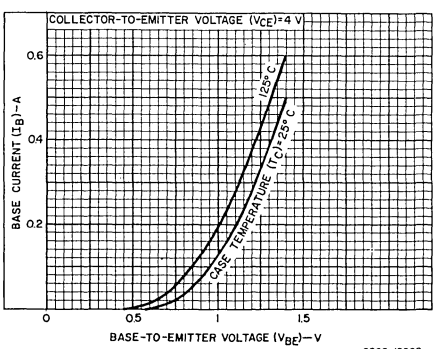


Fig. 14—Typical input characteristics for types 2N6100 and 2N6101.

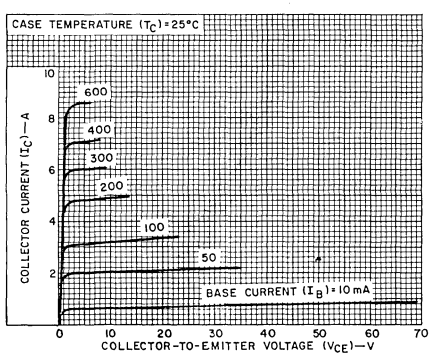


Fig. 15—Typical output characteristics for types 2N6100 and 2N6101.

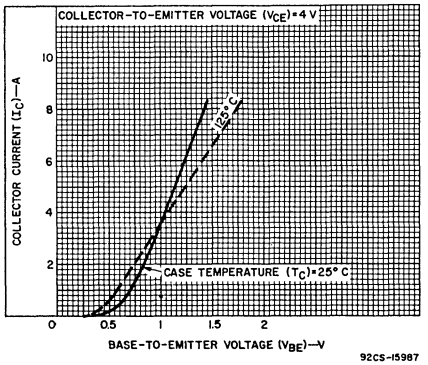


Fig.16—Typical transfer characteristics for all types.

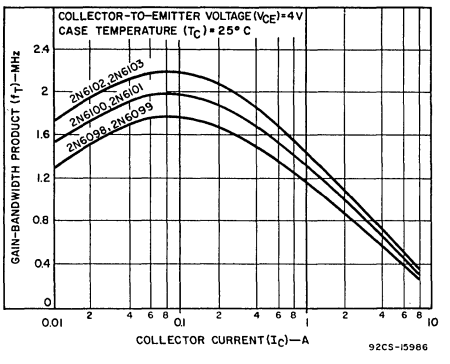


Fig.17—Typical gain-bandwidth product for all types.

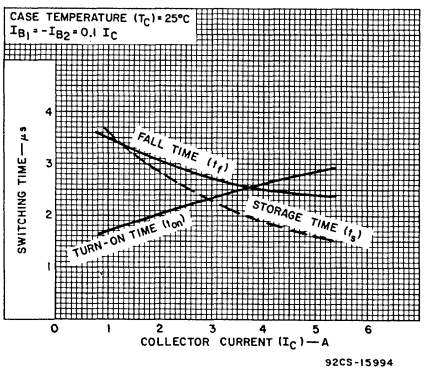


Fig.18—Typical saturated switching characteristics for all types.

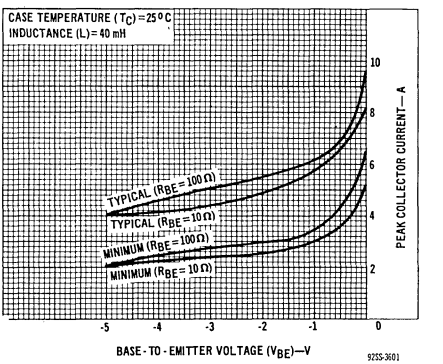
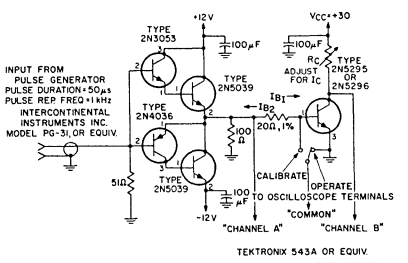


Fig.19—Reverse-bias, second-breakdown characteristics for all types.



NOTE: Collector-terminal connection for transistor under test is mounting-flange (2N6098, 2N6100, 2N6102), lead No. 3 (2N6099, 2N6101, 2N6103).

Fig.20—Circuit used to measure switching times for all types.

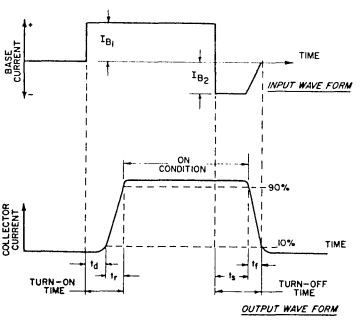


Fig.21—Phase relationship between input current and output current showing reference points for specification of switching times. (Test circuit shown in Fig.20).