RCA
Solid State
Division

Power Transistors

2N5189

"MODIFIED TO-39"

H-1546

High-Voltage Silicon N-P-N Switching Transistor

For Core-Driver and Line-Driver Service in Data-Processing Equipment and Other Critical Industrial and Military Applications

Features:

- **Excellent power handling capability**
- **High switching speeds at high currents**
- **High breakdown-voltage capabilities**
- **High reliability**

TERMINAL CONNECTIONS

LEAD 1 – EMITTER
LEAD 2 – BASE
LEAD 3 – COLLECTOR, CASE

RCA-2N5189● is a double-diffused epitaxial planar transistor of the silicon n-p-n type featuring high breakdown voltages, low saturation voltages, and high switching speeds over a wide range of collector current.

It is especially useful in switching applications of high-performance computers and in other critical industrial applications where high-voltage and high-current-handling capabilities and short "turn-off" and "turn-on" times are important design features. These features also make the 2N5189 particularly useful in class C circuits for mobile and portable equipment.

The 2N5189 is hermetically sealed in a metal package like the JEDEC TO-39 but with a reduced height (0.180 in. max., 0.160 in. min.) and 0.5 in. min. leads.

●Formerly RCA Dev. No. TA7322.

MAXIMUM RATINGS, *Absolute Maximum Values:*

*COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	60	V
COLLECTOR-TO-EMITTER VOLTAGE:			
* With base shorted to emitter	V_{CES}	55	V
With base open	V_{CEO}	35	V
*EMITTER-TO-BASE VOLTAGE	V_{EBO}	5	V
*CONTINUOUS COLLECTOR CURRENT	I_C	2	A
TRANSISTOR DISSIPATION:	P_T		
At case temperatures up to 25°C		5	W
At case temperatures above 25°C, derate linearly		28.5	mW/°C
* At ambient temperatures up to 25°C		0.8	W
* At ambient temperatures above 25°C, derate linearly		4.57	mW/°C
*TEMPERATURE RANGE:			
Storage and operating (Junction)		−65 to +200	°C
*LEAD TEMPERATURE (During soldering):			
At distances ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max.		265	°C

* In accordance with JEDEC registration data format JS-8/RDF-7.

ELECTRICAL CHARACTERISTICS, *At Ambient Temperature (T_A) = 25°C*

	CHARACTERISTIC	SYMBOL	TEST CONDITIONS				LIMITS		UNITS
			VOLTAGE V dc		CURRENT A dc		2N5189		
			V_{CB}	V_{CE}	I_C	I_B	MIN.	MAX.	
*	Collector Cutoff Current: With emitter open	I_{CBO}	60				–	100	μA
	With emitter-base junction shorted	I_{CES}		55			–	100	
*	Emitter Cutoff Current (V_{EB}=5V)	I_{EBO}			0		–	10	μA
*	Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$			0.01		35	–	V
*	Collector-to-Emitter Saturation Voltage	$V_{CE}(sat)$			1[a]	0.1	–	1	V
*	Base-to-Emitter Saturation Voltage	$V_{BE}(sat)$			1[a]	0.1	–	1.5	V
*	DC Forward Current Transfer Ratio	h_{FE}		1 1 1	0.1[a] 0.5[a] 1[b]		30 35 15	– – –	
	Common-Emitter, Small-Signal, Short-Circuit, Forward Current Transfer Ratio (f = 100 MHz)	h_{fe}		10	0.05		2.5	–	
	Common-Base, Open-Circuit Output Capacitance (f = 1 MHz)	C_{ob}	10				–	15	pF
*	Switching Time (I_{B1}=0.1 A): Turn-on ($t_d + t_r$)	t_{ON}			I_C 1	I_{B_2} –	–	40	ns
	Turn-off ($t_s + t_f$)	t_{OFF}			1	–0.1	–	70	

*In accordance with JEDEC registration data format JS-8/RDF-7.

[a]Pulsed: Pulse duration = 300 μs; duty factor ≤ 2%.

[b]Pulsed: Pulse duration ≤ 400 μs; duty factor ≤ 0.03.

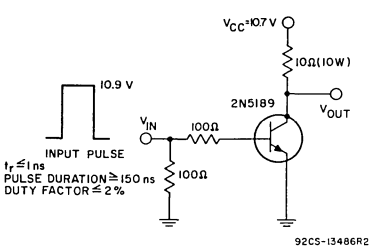

Fig. 1—Circuit used to measure turn-on time.

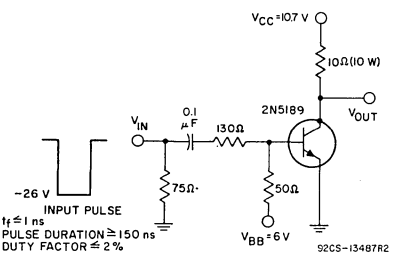

Fig. 2—Circuit used to measure turn-off time.

TYPICAL CHARACTERISTICS

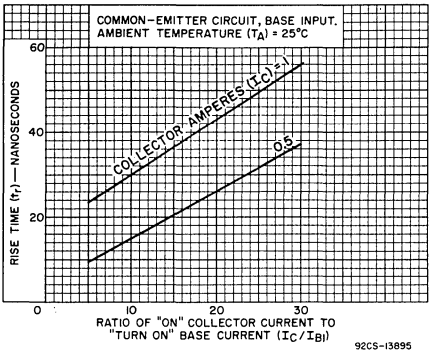

Fig. 3 – Rise Time vs I_C/I_{B1}

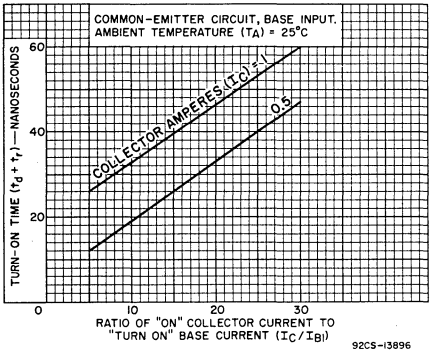

Fig. 4 – Turn-On Time vs I_C/I_{B1}

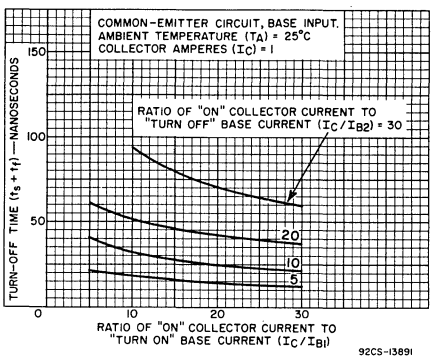

Fig. 5 – Turn-Off Time vs I_C/I_{B1}

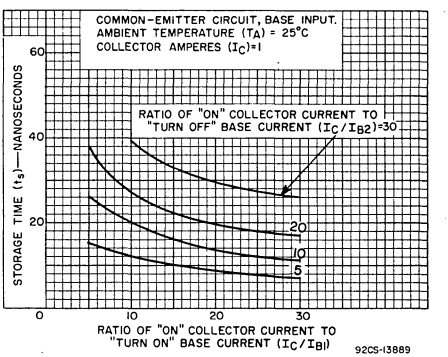

Fig. 6 – Storage Time vs I_C/I_{B1}

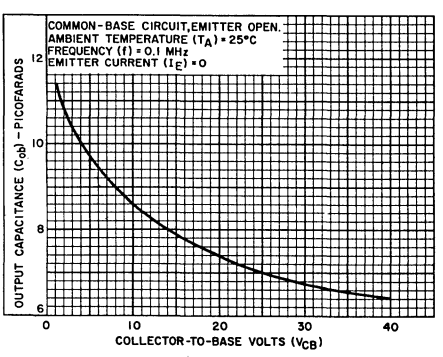

Fig. 7 – Output Capacitance vs Collector-to-Base Voltage

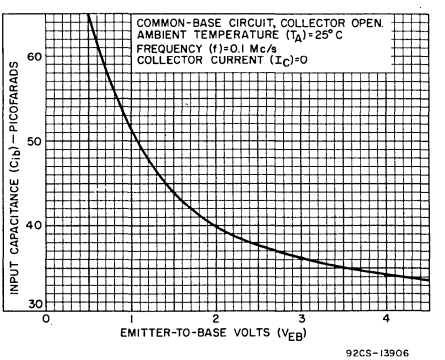

Fig. 8 – Input Capacitance vs Emitter-to-Base Voltage

TYPICAL CHARACTERISTICS

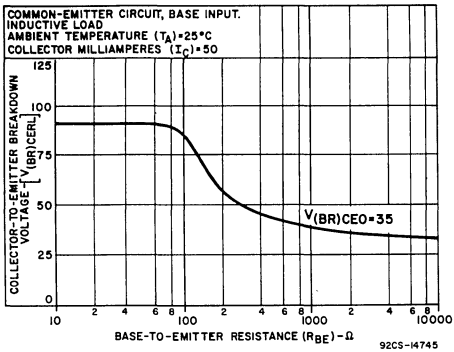

Fig. 9 – Collector-Cutoff Current vs Ambient Temperature

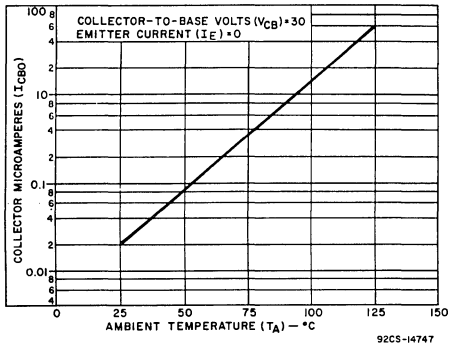

Fig. 10 – Collector-to-Emitter Breakdown Voltage vs Base-to-Emitter Resistance

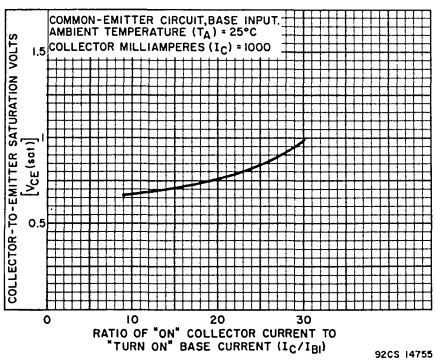

Fig. 11 – Collector-to-Emitter Saturation Voltage vs I_C/I_{B1}

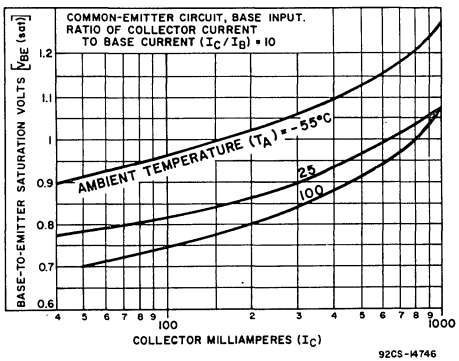

Fig. 12 – Base-to-Emitter Saturation Voltage vs I_C

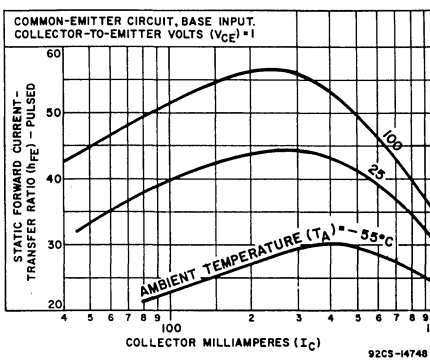

Fig. 13 – Static Forward Current-Transfer Ratio (Pulsed) vs I_C

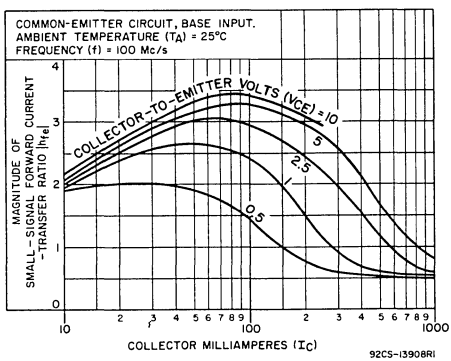

Fig. 14 – Small-Signal Forward Current-Transfer Ratio vs I_C