

Collector-Cutoff Current (with collector-to-base volts = 30 and emitter current = 0).....	50 max	μa
Emitter-Cutoff Current (with emitter-to-base volts = 10 and collector current = 0).....	50 max	μa
Thermal Resistance:		
Junction-o-case.....	1.17 max	°C/watt
Thermal Time Constant.....	30	msec

In Common-Base Circuit

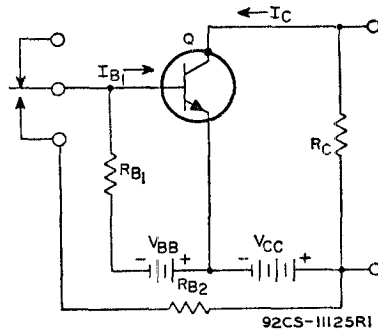
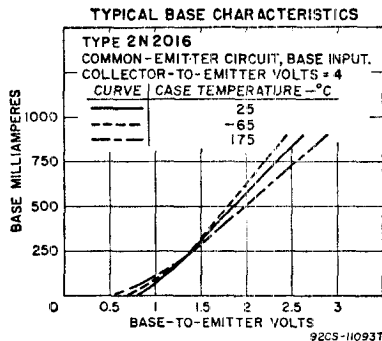
Collector-to-Base Capacitance (with collector-to-base volts = 40 and emitter current = 0).....	400	pf
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In Common-Emitter Circuit

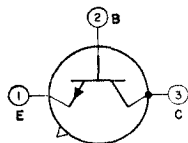
DC Forward Current-Transfer Ratio:		
With collector-to-emitter volts = 4 and collector amperes = 5.....	15 to 50	
With collector-to-emitter volts = 4 and collector amperes = 10.....	7.5 min	
Small-Signal Forward-Current-Transfer-Ratio Cutoff Frequency.....	25	kc
DC Collector-to-Emitter Saturation Resistance (with collector amperes = 5 and base amperes = 0.5).....	0.25	ohm

TYPICAL OPERATION IN PULSE-RESPONSE TEST CIRCUIT BELOW

DC Collector-Supply Voltage (V_{CC}).....	24	volts
DC Base-Supply Voltage (V_{BB}).....	-6	volts
On DC Collector Current (I_C).....	10	amperes
Turn-On DC Base Current (I_{B1}).....	2	amperes
Base-Circuit Resistance (R_{B1} or R_{B2}).....	10	ohms
Collector-Circuit Resistance (R_C).....	2	ohms
Switching Time:		
On time (Delay time t_d plus rise time t_r).....	4	μsec
Off time (Storage time t_s plus fall time t_f).....	7	μsec



TRANSISTOR



Silicon n-p-n type used in a wide variety of small-signal and medium-power applications in industrial and military equipment. It can be used in rf service as an amplifier, mixer, oscillator, and converter; in af service for

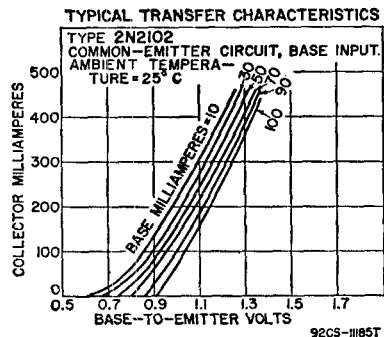
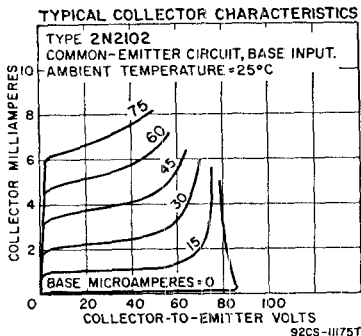
2N2102

small- and large-signal driver and power applications; in switching service for high-speed switching circuits requiring transistors having high voltage and current values. It features low saturation voltage, high sustaining voltage, high dissipation, high pulse beta, low output capacitance, and exceptionally low noise and leakage characteristics. JEDEC No. TO-5 package; outline 6, Outlines Section.

RCA TRANSISTOR MANUAL

MAXIMUM RATINGS

COLLECTOR-TO-BASE VOLTAGE (with emitter open).....	120 max	volts
COLLECTOR-TO-EMITTER VOLTAGE:		
With external base-to-emitter resistance = 10 ohms or less.....	80 max	volts
With base open.....	65 max	volts
EMITTER-TO-BASE VOLTAGE (with collector open).....	7 max	volts
COLLECTOR CURRENT.....	1 max	ampere
TRANSISTOR DISSIPATION:		
At case temperatures up to 25°C.....	5 max	watts
At ambient temperatures up to 25°C.....	1 max	watt
At case or ambient temperatures above 25°C.....	See curve page 68	
TEMPERATURE RANGE:		
Operating (junction).....	-65 to 200	°C
Storage.....	-65 to 300	°C
LEAD TEMPERATURE (for 10 seconds maximum).....	300 max	°C

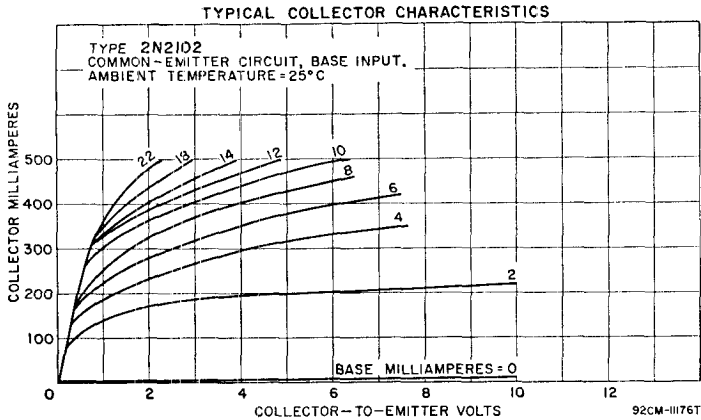


CHARACTERISTICS

Collector-to-Base Breakdown Voltage (with collector ma = 0.1 and emitter current = 0).....	120 min	volts
Emitter-to-Base Breakdown Voltage (with emitter ma = 0.1 and collector current = 0).....	7 min	volts
Collector-to-Emitter Reach-Through Voltage (with emitter-to-base volts = 1.5 and collector ma = 0.1).....	120 min	volts
Collector-to-Emitter Sustaining Voltage:		
With external base-to-emitter resistance = 10 ohms or less and collector ma = 100.....	80 min	volts
With collector ma = 100 and base current = 0.....	65 min	volts
Base-to-Emitter Saturation Voltage (with collector ma = 150 and base ma = 15).....	1.1 max	volts
Collector-to-Emitter Saturation Voltage (with collector ma = 150 and base ma = 15).....	0.5 max	volt
Collector-Cutoff Current (with collector-to-base volts = 60 and emitter current = 0).....	0.002 max	μa
Emitter-Cutoff Current (with emitter-to-base volts = 5 and collector current = 0).....	0.002 max	μa
Thermal Resistance:		
Junction-to-case.....	35 max	°C/watt
Junction-to-ambient.....	175 max	°C/watt

In Common-Base Circuit

Input Resistance at 1 kilocycle:		
With collector-to-base volts = 5 and collector ma = 1.....	24 to 34	ohms
With collector-to-base volts = 10 and collector ma = 5.....	4 to 8	ohms
Input Capacitance (with emitter-to-base volts = 0.5 and collector current = 0).....	80 max	pf
Output Capacitance (with collector-to-base volts = 10 and emitter current = 0).....	15 max	pf
Output Conductance at 1 kilocycle:		
With collector-to-base volts = 5 and collector ma = 1.....	0.1 to 0.5	μmho
With collector-to-base volts = 10 and collector ma = 5.....	0.1 to 1	μmho
Small-Signal Open-Circuit Reverse Voltage-Transfer Ratio at 1 kilocycle:		
With collector-to-base volts = 5 and collector ma = 1.....	0.0003 max	
With collector-to-base volts = 10 and collector ma = 5.....	0.0003 max	



n Common-Emitter Circuit

DC-Pulse Forward Current-Transfer Ratio:*

With collector-to-emitter volts = 10 and collector ma = 150.....	40 to 120
With collector-to-emitter volts = 10 and collector ma = 500.....	25 min
With collector-to-emitter volts = 10 and collector ma = 1000.....	10 min

DC Forward Current-Transfer Ratio:

With collector-to-emitter volts = 10 and collector ma = 0.01.....	10 min
With collector-to-emitter volts = 10 and collector ma = 0.1.....	20 min
With collector-to-emitter volts = 10 and collector ma = 10.....	35 min

Small-Signal Forward Current-Transfer Ratio:

With collector-to-emitter volts = 5, collector ma = 1, and frequency = 1 kilocycle.....	30 to 100
With collector-to-emitter volts = 10, collector ma = 5, and frequency = 1 kilocycle.....	35 to 150
With collector-to-emitter volts = 10, collector ma = 50, and frequency = 20 Mc.....	3 min

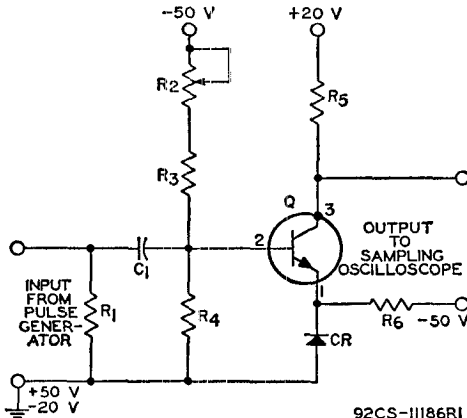
Noise Figure (with collector-to-emitter volts = 10, collector ma = 0.3, generator resistance = 1000 ohms, circuit bandwidth = 15 kilocycles, and signal frequency = 1 kilocycle).....

6 max db
30 max nsec

Total Switching Time† (delay time plus rise time plus fall time).....

* Pulse duration = 300 μ sec, duty factor = 0.018.

† See Total-Switching-Time Measurement Circuit below.



C₁ = 0.01 μ f
R₁, R₄ = 100 ohms
R₂ = 1000 ohms
R₃ = 4700 ohms
R₅ = 40 ohms
R₆ = 1000 ohms, 5 watts