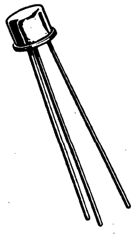
2N1893 (SILICON)
2N2405

NPN silicon annular transistors designed for medium-power amplifier and switching applications.



CASE 31
(TO-5)
Collector connected to case

MAXIMUM RATINGS

Rating	Symbol	2N1893	2N2405	Unit
Collector-Emitter Voltage	V_{CEO}	80	90	Vdc
Collector-Emitter Voltage	V_{CER}	100	140	Vdc
Collector-Base Voltage	V_{CB}	120		Vdc
Emitter-Base Voltage	V_{EB}	7.0		Vdc
Collector Current	I_C	0.5	1.0	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.8 4.57	1.0 5.71	Watt mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	3.0 17.2	5.0 28.6	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	2N1893	2N2405	Unit
Thermal Resistance, Junction to Case	θ_{JC}	58.3	35	°C/W
Thermal Resistance, Junction to Ambient	θ_{JA}	219	175	°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage* (I_C = 30 mAdc, I_B = 0) (I_C = 100 mAdc, I_B = 0)	 2N1893 2N2405	$BV_{CEO(sus)}$*	 80 90	 - -	Vdc
Collector-Emitter Sustaining Voltage (I_C = 100 mAdc, R_{BE} = 10 ohms)	 2N1893 2N2405	$BV_{CER(sus)}$	 100 140	 - -	Vdc
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)		BV_{CBO}	120	-	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)		BV_{EBO}	7.0	-	Vdc
Collector Cutoff Current (V_{CB} = 90 Vdc, I_E = 0) (V_{CB} = 90 Vdc, I_E = 0, T_A = 150°C)	 2N1893 2N2405	I_{CBO}	 - - -	 0.01 15 10	μAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)		I_{EBO}	-	0.01	μAdc

ELECTRICAL CHARACTERISTICS (continued)

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS					
DC Current Gain [1]		h_{FE}			-
(I_C = 0.1 mAdc, V_{CE} = 10 Vdc)	2N1893		20	-	
(I_C = 10 mAdc, V_{CE} = 10 Vdc)	2N1893		35	-	
(I_C = 10 mAdc, V_{CE} = 10 Vdc, T_A = -55°C)	2N1893		20	-	
(I_C = 150 mAdc, V_{CE} = 10 Vdc)	2N1893		40	120	
	2N2405		60	200	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 50 mAdc, I_B = 5.0 mAdc)	2N1893		-	1.2	
(I_C = 150 mAdc, I_B = 15 mAdc)	2N1893		-	5.0	
	2N2405		-	0.5	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$			Vdc
(I_C = 50 mAdc, I_B = 5.0 mAdc)	2N1893		-	0.9	
(I_C = 150 mAdc, I_B = 15 mAdc)	2N1893		-	1.3	
	2N2405		-	1.1	
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain—Bandwidth Product		f_T			MHz
(I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 20 MHz)	2N1893		50	-	
Output Capacitance		C_{ob}			pF
(V_{CB} = 10 Vdc, I_E = 0, 100 kHz ≦ f ≦ 1.0 MHz)			-	15	
Input Capacitance		C_{ib}			pF
(V_{BE} = 0.5 Vdc, I_C = 0, 100 kHz ≦ f ≦ 1.0 MHz)	2N1893		-	85	
Input Impedance		h_{ib}			ohms
(I_C = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)	2N1893		20	30	
(I_C = 5.0 mAdc, V_{CB} = 10 Vdc, f = 1.0 kHz)	2N1893, 2N2405		4.0	8.0	
Voltage Feedback Ratio		h_{rb}			$X 10^{-4}$
(I_C = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)	2N1893		-	1.25	
(I_C = 5.0 mAdc, V_{CB} = 10 Vdc, f = 1.0 kHz)	2N1893		-	1.5	
	2N2405		-	3.0	
Small-Signal Current Gain		h_{fe}			-
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 1.0 kHz)	2N1893		30	100	
(I_C = 5.0 mAdc, V_{CE} = 5.0 Vdc, f = 1.0 kHz)	2N2405		50	275	
(I_C = 5.0 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)	2N1893		45	-	
Output Admittance		h_{ob}			μmho
(I_C = 1.0 mAdc, V_{CB} = 5.0 Vdc, f = 1.0 kHz)	2N1893		-	0.5	
(I_C = 5.0 mAdc, V_{CB} = 10 Vdc, f = 1.0 kHz)	2N1893, 2N2405		-	0.5	

[1] Pulse Test: Pulse Width ≦ 300 μs, Duty Cycle ≦ 2.0%.