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2N4123 & 2N4124 Silicon NPN Transistor General Purpose TO92 Type Package

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CEO}		
2N4123	30V	
2N4124	25V	
Collector–Base Voltage, V_{CBO}		
2N4123	40V	
2N4124	30V	
Emitter–Base Voltage, V_{EBO}	5V	
Continuous Collector Current, I_C	200mA	
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	350mW	
Derate Above 25°C	2.8mW/ $^\circ\text{C}$	
Total Device Dissipation ($T_C = +25^\circ\text{C}$), P_D	1.0W	
Derate Above 25°C	8mW/ $^\circ\text{C}$	
Operating Junction Temperature Range, T_J	-55° to $+150^\circ\text{C}$	
Storage Temperature Range, T_{stg}	-55° to $+150^\circ\text{C}$	
Thermal Resistance, Junction to Case, R_{thJC}	83.3 $^\circ\text{C}/\text{W}$	
Thermal Resistance, Junction to Ambient, R_{thJA}	200 $^\circ\text{C}/\text{W}$	

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector–Emitter Breakdown Voltage 2N4123	$V_{(BR)CEO}$	$I_C = 1\text{mA}, I_E = 0$, Note 1	30	–	–	V
2N4124			25	–	–	V
Collector–Base Breakdown Voltage 2N4123	$V_{(BR)CBO}$	$I_C = 10^\circ\text{A}, I_E = 0$	40	–	–	V
2N4124			30	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10^\circ\text{A}, I_C = 0$	5	–	–	V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 30\text{V}, I_E = 0$	–	–	50	nA
Base Cutoff Current	I_{BL}	$V_{BE} = 3\text{V}, I_C = 0$	–	–	50	nA
ON Characteristics (Note 1)						
DC Current Gain 2N4123	h_{FE}	$V_{CE} = 1\text{V}, I_C = 2\text{mA}$	50	–	150	
2N4124			120	–	360	
2N4123		$V_{CE} = 1\text{V}, I_C = 50\text{mA}$	25	–	–	
2N4124			60	–	–	

Note 1. Pulse Test: Pulse Width = 300 $^\circ\text{s}$, Duty Cycle = 2%.

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics (Cont'd) (Note 1)						
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 50\text{mA}, I_B = 5\text{mA}$	–	–	0.3	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 50\text{mA}, I_B = 5\text{mA}$	–	–	0.95	V
Small–Signal Characteristics						
Current Gain–Bandwidth Product 2N4123	f_T	$I_C = 10\text{mA}, V_{CE} = 20\text{V}, f = 100\text{MHz}$	250	–	–	MHz
2N4124			300	–	–	MHz
Output Capacitance	C_{obo}	$V_{CB} = 5\text{V}, I_E = 0, f = 100\text{MHz}$	–	–	4.0	pF
Input Capacitance	C_{ibo}	$V_{BE} = 0.5\text{V}, I_C = 0, f = 100\text{kHz}$	–	–	8.0	pF
Collector–Base Capacitance	C_{cb}	$I_E = 0, V_{CB} = 5\text{V}, f = 100\text{kHz}$	–	–	4.0	pF
Small–Signal Current Gain 2N4123	h_{fe}	$I_C = 2\text{mA}, V_{CE} = 10\text{V}, f = 1\text{kHz}$	50	–	200	
2N4124			120	–	480	
Current Gain – High Frequency 2N4123	$ h_{fe} $	$I_C = 10\text{mA}, V_{CE} = 20\text{V}, f = 100\text{Hz}$	2.5	–	–	–
2N4124			3.0	–	–	–
2N4123		$I_C = 2\text{mA}, V_{CE} = 10\text{V}, f = 1\text{kHz}$	50	–	200	–
2N4124			120	–	480	–
Noise Figure 2N4123	NF	$I_C = 100^\circ\text{A}, V_{CE} = 5\text{V}, R_S = 1\text{k}\Omega,$ Noise Bandwidth = 10Hz to 15.7kHz	–	–	6.0	db
2N4124			–	–	5.0	db

Note 1. Pulse Test: Pulse Width $\leq 300^\circ\text{s}$, Duty Cycle $\leq 2\%$.

