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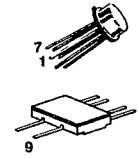
2N4937 thru 2N4939

CASE 654-07
STYLE 1

2N4941

CASE 610A-04
STYLE 1

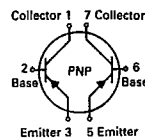
DUAL
AMPLIFIER TRANSISTORS
PNP SILICON



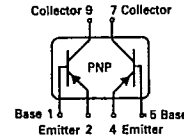
Refer to MD3250.A for graphs.

PIN CONNECTION DIAGRAMS

CASE 654-07
STYLE 1



CASE 610A-04
STYLE 1



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	40	Vdc
Collector 1 to Collector 2 Voltage Voltage Rating and Lead to Case	V_{C1C2}	± 200 ± 200	Vdc
Collector-Base Voltage	V_{CBO}	50	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	Vdc
Base Current	I_B	10	mA
Collector Current — Continuous	I_C	50	mA
		One Die	Both Die
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ — Ceramic Metal Can Derate above 25°C — Ceramic Metal Can	P_D	250 500 1.5 2.9	350 600 2.0 3.4 mW mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C Metal Can	P_D	1.2 6.85	2.0 11.42 Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	°C

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ($I_C = 10\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	40	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	50	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10\text{ }\mu\text{A}$, $I_C = 0$)	$V_{(BR)EBO}$	5.0	—	Vdc
Collector Cutoff Current ($V_{CB} = 40\text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	20	nA
Emitter Cutoff Current ($V_{BE} = 3.0\text{ Vdc}$, $I_C = 0$)	I_{EBO}	—	20	nA

ON CHARACTERISTICS

DC Current Gain ($I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ Vdc}$)	h_{FE}	40 50 50	200 250 250	—
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SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ($I_C = 10\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	300	900	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 140\text{ kHz}$) Emitter Guarded	C_{cb}	—	5.0	pF
Input Impedance ($I_{BE} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 140\text{ kHz}$) Collector Guarded	C_{eb}	—	10	pF
Input Impedance ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{ie}	1.0	10	k Ω
Voltage Feedback Ratio ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{re}	—	10	$\times 10^{-4}$
Small-Signal Current Gain ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{fe}	50	—	—
Output Admittance ($I_C = 1.0\text{ mA}$, $V_{CE} = 10\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{oe}	5.0	50	μmhos
Noise Figure ($I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 10\text{ Vdc}$, $R_S = 3.0\text{ k}\Omega$, $f = 10\text{ Hz to }15.7\text{ kHz}$)	NF	—	4.0	dB

MOTOROLA SMALL-SIGNAL TRANSISTORS, FETs AND DIODES

T-29-27

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

Characteristic		Symbol	Min	Max	Unit
MATCHING CHARACTERISTICS					
DC Current Gain Ratio(1) (I _C = 100 μAdc to 1.0 mAdc, V _{CE} = 10 Vdc)	2N4937, 2N4941	h _{FE1} /h _{FE2}	0.9	1.0	—
	2N4938		0.8	1.0	
(I _C = 100 μAdc to 1.0 mAdc, V _{CE} = 10 Vdc, T _A = -55°C to 125°C)	2N4937, 2N4941		0.85	1.0	
Base-Emitter Voltage Differential (I _C = 100 μAdc to 1.0 mAdc, V _{CE} = 10 Vdc)	2N4937, 2N4941	V _{BE1} -V _{BE2}	—	3.0	mVdc
	2N4938		—	5.0	
Base-Emitter Voltage Differential Gradient (I _C = 100 μAdc to 1.0 mAdc, V _{CE} = 10 Vdc, T _A = 25°C to +125°C)	2N4937, 2N4941	$\frac{\Delta(V_{BE1}-V_{BE2})}{\Delta T_A}$	—	1.0	mVdc
	2N4938		—	2.0	
(I _C = 100 μAdc to 1.0 mAdc, V _{CE} = 10 Vdc, T _A = -55°C to 25°C)	2N4937, 2N4941		—	0.8	
	2N4938		—	1.6	

(1) The lowest h_{FE} reading is taken as h_{FE1} for this ratio.