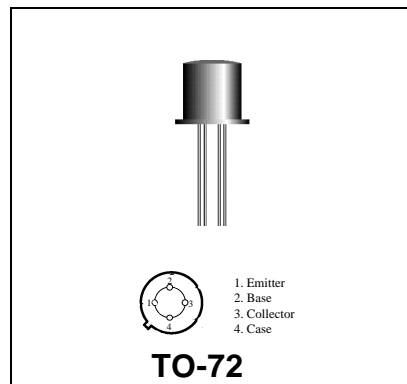


MRF904

**RF & MICROWAVE DISCRETE
 LOW POWER TRANSISTORS**

Features

- Silicon NPN, high Frequency, To-72 packaged, Transistor
- High Power Gain - $G_U(\text{max})=11 \text{ dB (typ) @ } f = 450 \text{ MHz}$
 $7 \text{ dB (typ) @ } f = 1 \text{ GHz}$
- Low Noise Figure
 $NF = 1.5 \text{ dB (typ) @ } f = 450 \text{ MHz}$
- High $F_T - 4 \text{ GHz (typ) @ } I_C = 15 \text{ mAdc}$



DESCRIPTION:

Designed primarily for use IN High Gain, low noise general purpose amplifiers.

ABSOLUTE MAXIMUM RATINGS ($T_{\text{case}} = 25^\circ\text{C}$)

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emitter Voltage	15	Vdc
V_{CBO}	Collector-Base Voltage	25	Vdc
V_{EBO}	Emitter-Base Voltage	3.0	Vdc
I_C	Collector Current	30	mA

Thermal Data

P_D	Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	200 1.14	mWatts mW/ $^\circ\text{C}$
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ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

STATIC
 (off)

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
BVCEO	Collector-Emitter Breakdown Voltage (IC = 1.0 mA _{dc} , IB = 0)	15	-	-	V _{dc}
BVCBO	Collector-Base Breakdown Voltage (IC = .1 mA _{dc} , IE = 0)	25	-	-	V _{dc}
BVEBO	Emitter-Base Breakdown Voltage (IE = 0.1 mA _{dc} , IC = 0)	3.0	-	-	V _{dc}
ICBO	Collector Cutoff Current (VCE = 15 V _{dc} , IE = 0 V _{dc})	-	-	50	nA

(on)

HFE	DC Current Gain (IC = 5.0 mA _{dc} , VCE = 5 V _{dc})	30	-	200	-
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DYNAMIC

Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
f _T	Current-Gain - Bandwidth Product (IC = 15 mA _{dc} , VCE = 10 V _{dc} , f = 1 GHz)	-	4.0	-	GHz
CCB	Junction Capacitance (VCB = 10V _{dc} , IE=0, f=1 MHz)	-	1.0	1.5	pF
NF	Noise Figure (IC = 5.0 mA _{dc} , VCE = 6.0 V _{dc} , f = 450 MHz)	-	1.5	-	dB

MRF904

Functional

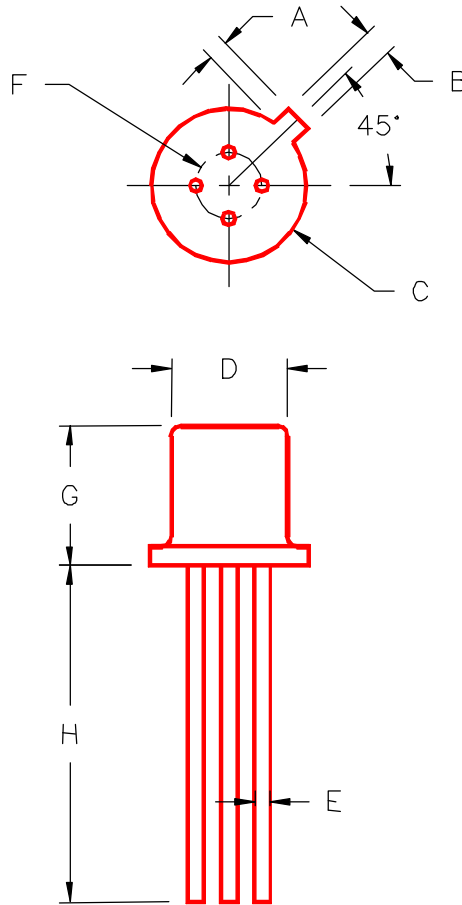
Symbol	Test Conditions	Value			Unit
		Min.	Typ.	Max.	
GU max	Maximum Unilateral Gain (1)	-	11	-	dB
	(IC = 5.0 mAdc, VCE = 6.0 Vdc, f = 500 MHz) (IC = 5.0 mAdc, VCE = 6.0 Vdc, f = 1 GHz)	-	7	-	
$S_{ 21 ^2}$	Maximum Available Gain (1)	9.5	10.5	-	dB
	(IC = 5.0 mAdc, VCE = 6.0 Vdc, f = 500 MHz) (IC = 5.0 mAdc, VCE = 6.0 Vdc, f = 1 GHz)	-	6.5	-	
MAG	Maximum Available Gain (1)	-	11	-	dB
	(IC = 5.0 mAdc, VCE = 6.0 Vdc, f = 500 MHz) (IC = 5.0 mAdc, VCE = 6.0 Vdc, f = 1 GHz)	-	7	-	

(1) Maximum Unilateral Gain = $|S_{21}|^2 / (1 - |S_{11}|^2) (1 - |S_{22}|^2)$

Table 1. Common Emitter S-Parameters, @ VCE = 5 V, IC = 6 mA

f (MHz)	S11		S21		S12		S22	
	S11	$\angle \phi$	S21	$\angle \phi$	S12	$\angle \phi$	S22	$\angle \phi$
100	.66	-37	10.5	131	.040	71	.781	-23
200	.41	-52	7.03	111	.065	71	.597	-27
300	.31	-54	5.33	98	.093	70	.551	-26
400	.26	-59	4.00	90	.111	69	.517	-30
500	.20	-61	3.38	87	.136	71	.467	-30
600	.18	-59	3.00	81	.162	68	.455	-32
700	.16	-60	2.69	75	.186	66	.438	-36
800	.16	-66	2.30	70	.200	63	.437	-42
900	.15	-74	2.16	71	.215	65	.409	-47
1000	.15	-76	2.16	63	.243	62	.413	-48

PACKAGE STYLE M244



	MINIMUM INCHES/MM	MAXIMUM INCHES/MM		MINIMUM INCHES/MM	MAXIMUM INCHES/MM
A	.020/0,51	.048/1,22			
B	.036/0,91	.046/1,17			
C	.209/5,31	.230/5,84			
D	.178/4,52	.195/4,95			
E	.016/0,41	.020/0,51			
F	.100/2,54				
G	.170/4,32	.210/5,33			
H	.500/12,70				