

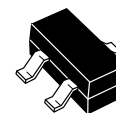
The RF Line  
**NPN Silicon**  
**Low Noise, High-Frequency**  
**Transistors**

Designed for use in high gain, low noise small-signal amplifiers. This series features excellent broadband linearity and is offered in a variety of packages.

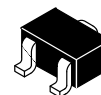
- Fully Implanted Base and Emitter Structure
- 18 Finger, 1.25 Micron Geometry with Gold Top Metal
- Gold Sintered Back Metal
- Available in tape and reel packaging options:  
T1 suffix = 3,000 units per reel

**MMBR951**  
**MRF957**  
**MRF9511**  
**SERIES**

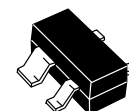
**$I_C = 100 \text{ mA}$**   
**LOW NOISE**  
**HIGH-FREQUENCY**  
**TRANSISTORS**



**CASE 318-08, STYLE 6**  
**SOT-23**  
**LOW PROFILE**  
**MMBR951LT1, MMBR951ALT1**



**CASE 419-02, STYLE 3**  
**MRF957T1**



**CASE 318A-05, STYLE 1**  
**SOT-143**  
**LOW PROFILE**  
**MRF9511LT1**



## MAXIMUM RATINGS

Rating	Symbol	MMBR951LT1 MMBR951ALT1	MRF9511LT1	MRF957T1	Unit
Collector–Emitter Voltage	$V_{CEO}$	10	10	10	Vdc
Collector–Base Voltage	$V_{CBO}$	20	20	20	Vdc
Emitter–Base Voltage	$V_{EBO}$	1.5	1.5	15	Vdc
Power Dissipation (1) $T_C = 75^\circ\text{C}$ Derate linearly above $T_{\text{case}} = 75^\circ\text{C}$ @	$P_{D(\text{max})}$	0.322 4.29	0.322 4.29	0.227 3.03	Watts mW/°C
Collector Current — Continuous (2)	$I_C$	100	100	100	mA
Maximum Junction Temperature	$T_{J\text{max}}$	150	150	150	°C
Storage Temperature	$T_{\text{stg}}$	–55 to +150	–55 to +150	–55 to +150	°C
Thermal Resistance, Junction to Case	$R_{\theta\text{JC}}$	233	233	330	°C/W

## DEVICE MARKING

MRF9511LT1 = 11	MMBR951ALT1 = AAG	MMBR951LT1 = 7Z	MRF957T1 = B
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## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS (3)

Collector–Emitter Breakdown Voltage ( $I_C = 0.1\text{ mA}$ , $I_B = 0$ )	$V_{(\text{BR})\text{CEO}}$	10	13	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 0.1\text{ mA}$ , $I_E = 0$ )	$V_{(\text{BR})\text{CBO}}$	20	25	—	Vdc
Emitter Cutoff Current ( $V_{EB} = 1.0\text{ V}$ , $I_C = 0$ )	$I_{EBO}$	—	—	0.1	$\mu\text{A}_{\text{dc}}$
Collector Cutoff Current ( $V_{CB} = 10\text{ V}$ , $I_E = 0$ )	$I_{CBO}$	—	—	0.1	$\mu\text{A}_{\text{dc}}$

### ON CHARACTERISTICS (3)

DC Current Gain ( $V_{CE} = 6.0\text{ V}$ , $I_C = 5.0\text{ mA}$ ) All ( $V_{CE} = 6.0\text{ V}$ , $I_C = 5.0\text{ mA}$ ) MMBR951ALT1	$h_{FE}$	50 75	— —	200 150	—
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### DYNAMIC CHARACTERISTICS

Collector–Base Capacitance ( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{cb}$	—	0.45	1.0	pF
Current Gain — Bandwidth Product ( $V_{CE} = 6.0\text{ V}$ , $I_C = 30\text{ mA}$ , $f = 1.0\text{ GHz}$ ) MRF9511LT1, MMBR951LT1, MMBR951ALT1 MRF957T1	$f_T$	— —	8.0 9.0	— —	GHz

#### NOTES:

- To calculate the junction temperature use  $T_J = (P_D \times R_{\theta\text{JA}}) + T_{\text{CASE}}$ . Case temperature measured on collector lead immediately adjacent to body of package.
- $I_C$  — Continuous (MTBF  $\approx 10$  years).
- Pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$  pulsed.

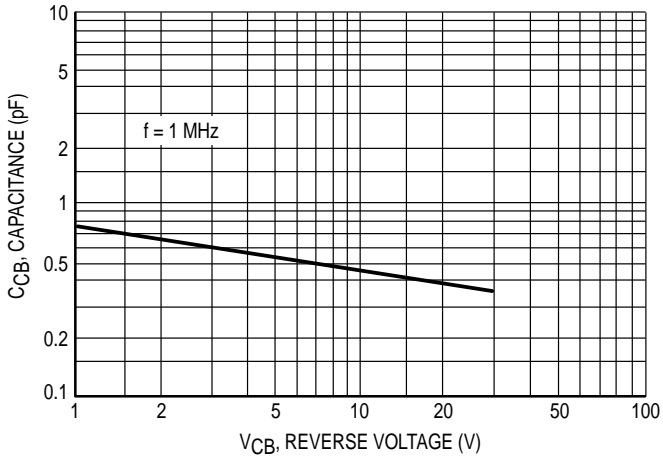
**PERFORMANCE CHARACTERISTICS**

Conditions	Symbol	MRF9511LT1			MMBR951LT1 MMBR951ALT1			MRF957T1			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Insertion Gain (V <sub>CE</sub> = 6.0 V, I <sub>C</sub> = 30 mA, f = 1.0 GHz) (V <sub>CE</sub> = 6.0 V, I <sub>C</sub> = 30 mA, f = 2.0 GHz) (V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 30 mA, f = 1.5 GHz)	S <sub>21</sub>   <sup>2</sup>	—	14.5	—	—	12.5	—	—	13.3	—	dB
Maximum Unilateral Gain (1) (V <sub>CE</sub> = 8.0 V, I <sub>C</sub> = 30 mA, f = 1.0 GHz) (V <sub>CE</sub> = 8.0 V, I <sub>C</sub> = 30 mA, f = 2.0 GHz) (V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 30 mA, f = 1.5 GHz)	G <sub>U max</sub>	—	17	—	—	14	—	—	14	—	dB
Noise Figure — Minimum (Figure 9) (V <sub>CE</sub> = 6.0 V, I <sub>C</sub> = 5.0 mA, f = 1.0 GHz) (V <sub>CE</sub> = 6.0 V, I <sub>C</sub> = 5.0 mA, f = 2.0 GHz) (V <sub>CE</sub> = 6.0 V, I <sub>C</sub> = 5.0 mA, f = 1.5 GHz)	N <sub>F MIN</sub>	—	1.3	—	—	1.3	—	—	1.5	—	dB
Associated Gain at Minimum NF (Figure 9) (V <sub>CE</sub> = 6.0 V, I <sub>C</sub> = 5.0 mA, f = 1.0 GHz) (V <sub>CE</sub> = 6.0 V, I <sub>C</sub> = 5.0 mA, f = 2.0 GHz) (V <sub>CE</sub> = 6.0 V, I <sub>C</sub> = 5.0 mA, f = 1.5 GHz)	G <sub>NF</sub>	—	14	—	—	13	—	—	11.8	—	dB
Noise Figure — 50 ohm Source (V <sub>CE</sub> = 6.0 V, I <sub>C</sub> = 5.0 mA, f = 1.0 GHz)	N <sub>F50 Ω</sub>	—	1.9	2.8	—	1.9	2.8	—	1.9	2.8	dB

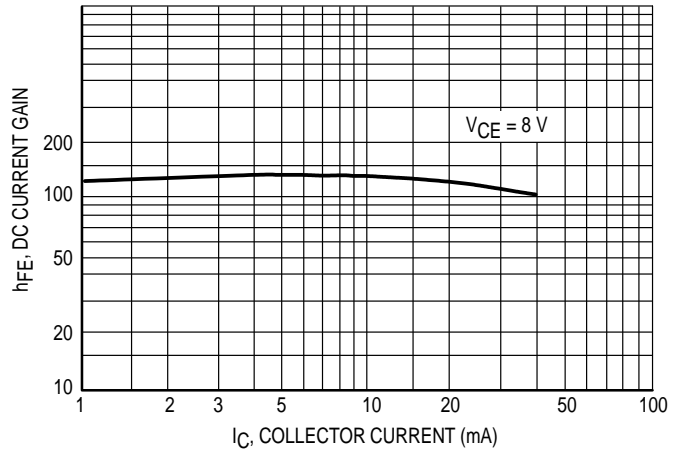
NOTE:

$$1. \text{ Maximum Unilateral Gain is } G_{U\max} = \frac{|S_{21}|^2}{(1-|S_{11}|^2)(1-|S_{22}|^2)}$$

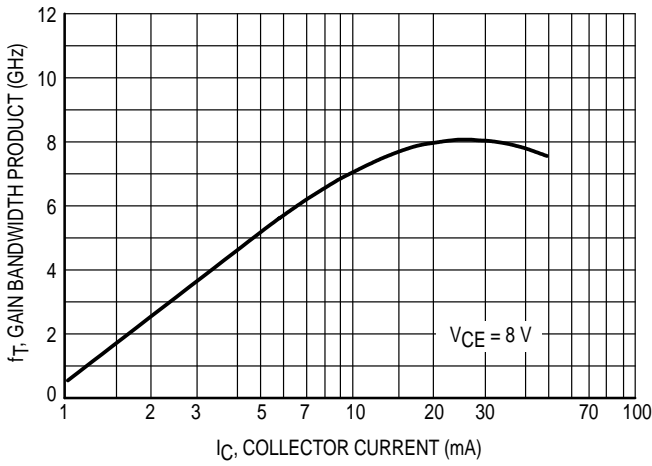
**TYPICAL CHARACTERISTICS**  
**MMBR951LT1, MMBR951ALT1, MRF9511LT1**



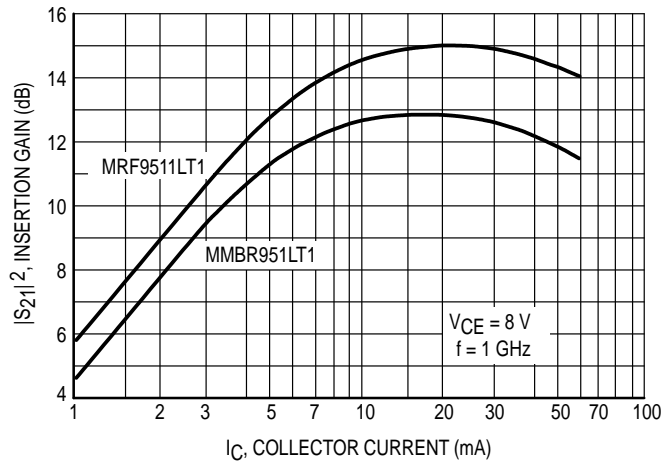
**Figure 1. Collector-Base Capacitance versus Voltage**



**Figure 2. DC Current Gain versus Collector Current**

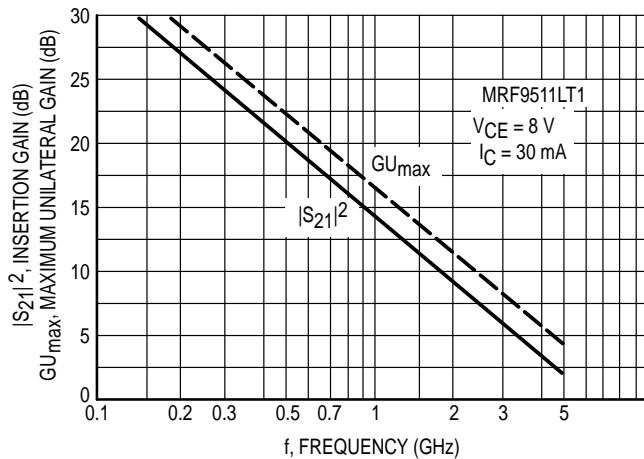


**Figure 3. Gain Bandwidth Product versus Collector Current**

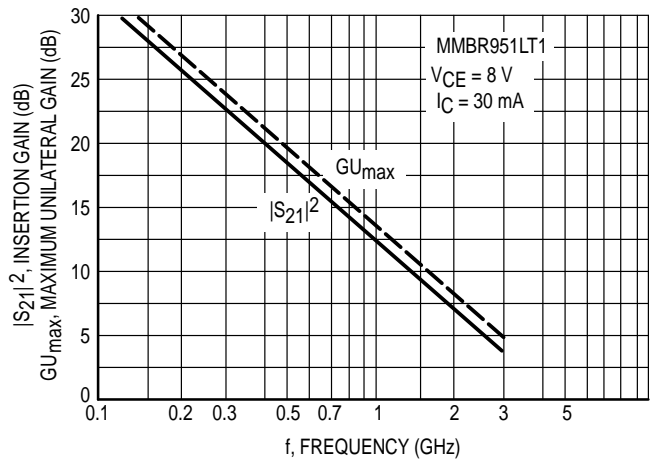


**Figure 4. Insertion Gain versus Collector Current**

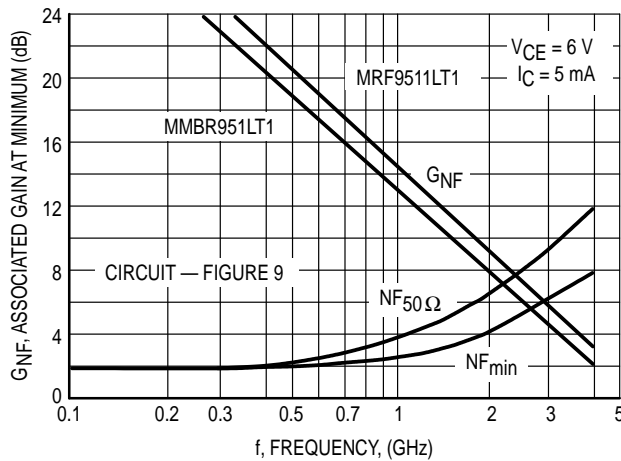
## TYPICAL FORWARD INSERTION GAIN AND MAXIMUM UNILATERAL GAIN versus FREQUENCY



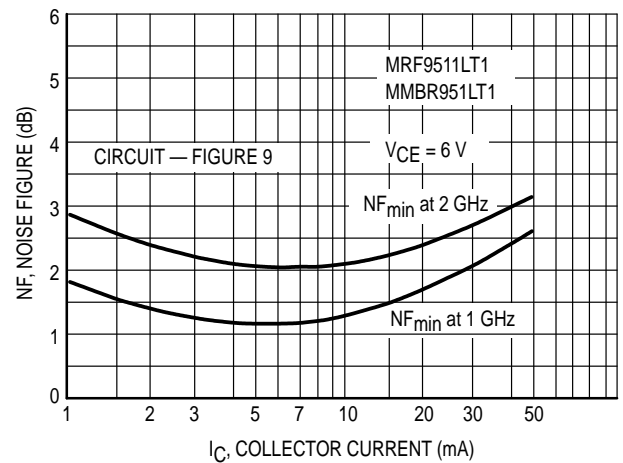
**Figure 5. MRF9511LT1**



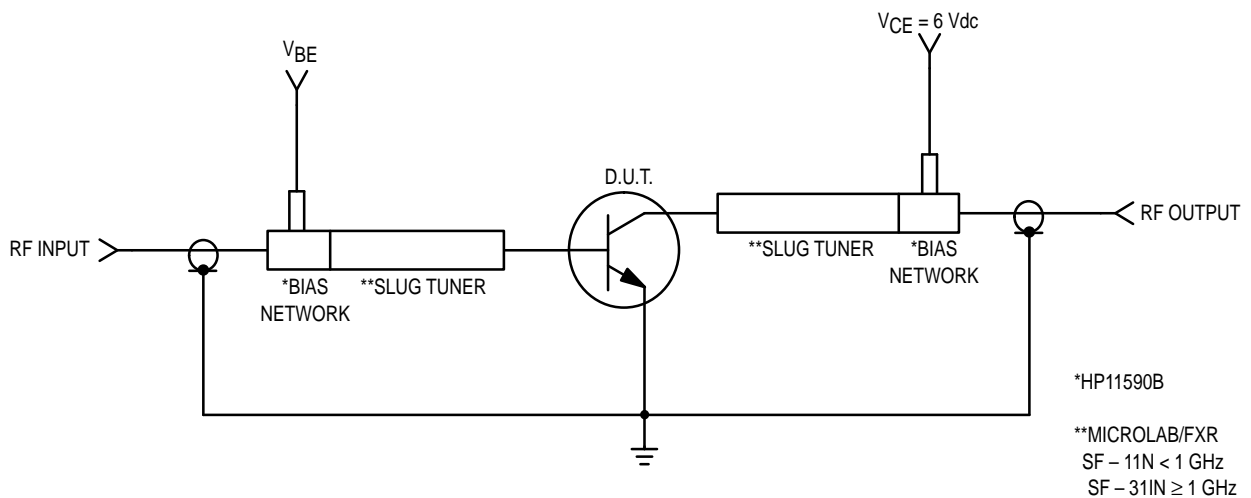
**Figure 6. MMBR951LT1**



**Figure 7. Typical Noise Figure and Associated Gain versus Frequency**



**Figure 8. Typical Noise Figure versus Collector Current**



**Figure 9. Functional Circuit Schematic (All Devices)**

V <sub>CE</sub> (Volts)	I <sub>C</sub> (mA)	f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
			S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
6.0	5.0	100	0.82	-36.6	14.0	153	0.04	44.7	0.88	-18.2
		500	0.50	-119	6.6	104	0.07	48.2	0.52	-40
		1000	0.39	-162	3.5	81	0.11	55	0.43	-43
		2000	0.32	150	1.9	57	0.21	66	0.42	-50
		3000	0.36	110	1.4	40	0.31	66	0.40	-67
	10	100	0.66	-54	22.6	142	0.03	60	0.78	-29
		500	0.38	-138	7.8	96	0.07	55	0.40	-42
		1000	0.32	-176	4.0	78	0.13	71	0.34	-47
		2000	0.26	142	2.2	57	0.22	70	0.36	-46
		3000	0.31	105	1.6	41	0.32	64	0.33	-62
	20	100	0.49	-76	30	131	0.01	85	0.67	-37
		500	0.32	-153	8.3	92	0.08	76	0.34	-39
		1000	0.29	175	4.3	77	0.11	67	0.29	-44
		2000	0.24	137	2.3	57	0.24	71	0.32	-48
		3000	0.28	102	1.6	42	0.34	63	0.29	-60
	30	100	0.40	-94	33	125	0.03	87	0.58	-42
		500	0.30	-162	8.4	90	0.07	84	0.31	-35
		1000	0.29	170	4.3	76	0.12	80	0.27	-39
		2000	0.24	134	2.3	56	0.23	71	0.33	-48
		3000	0.30	101	1.6	41	0.35	66	0.30	-60
	60	100	0.38	-126	31	116	0.03	74	0.49	-37
		500	0.37	-176	7.3	77.6	0.05	84	0.34	-26
		1000	0.36	163	3.7	73.4	0.12	84	0.34	-37
		2000	0.33	130	2.0	52	0.22	78	0.37	-48
3000		0.38	98	1.4	37	0.34	69	0.34	-62	
8.0	5.0	100	0.83	-35	13.9	154	0.04	92	0.90	-19
		500	0.51	-117	6.7	104	0.08	51	0.55	-38
		1000	0.38	-160	3.6	82	0.10	72	0.44	-42
		2000	0.31	151	1.9	58	0.20	73	0.46	-47
		3000	0.35	110	1.4	41	0.32	71	0.43	-63
	10	100	0.67	-52	23	143	0.02	96	0.81	-28
		500	0.37	-135	7.9	97	0.07	64	0.43	-38
		1000	0.30	-173	4.1	80	0.11	78	0.37	-41
		2000	0.25	143	2.2	57	0.21	74	0.38	-47
		3000	0.30	105	1.6	42	0.31	67	0.34	-60
	20	100	0.51	-72	30	131	0.02	68	0.68	-35
		500	0.31	-150	8.5	92	0.07	75	0.36	-36
		1000	0.28	177	4.3	77	0.13	76	0.32	-39
		2000	0.23	138	2.3	57	0.22	72	0.35	-45
		3000	0.27	103	1.6	42	0.31	64	0.31	-58
	30	100	0.42	-87	33	125	0.02	71	0.61	-38
		500	0.31	-159	8.6	90	0.07	71	0.33	-33
		1000	0.27	172	4.4	76	0.11	74	0.32	-39
		2000	0.23	135	2.3	57	0.22	73	0.34	-42
		3000	0.28	102	1.6	41	0.31	65	0.33	-55
	60	100	0.39	-119	32	117	0.02	31	0.52	-31
		500	0.36	-174	7.4	87	0.06	84	0.37	-25
		1000	0.35	164	3.8	74	0.11	78	0.35	-33
		2000	0.32	131	2.0	53	0.22	81	0.42	-41
3000		0.37	100	1.4	38	0.33	70	0.40	-62	

Table 1. MMBR951LT1 Common Emitter S-Parameters

VCE (Vdc)	IC (mA)	f (MHz)	S11		S21		S12		S22		
			S11	∠φ	S21	∠φ	S12	∠φ	S22	∠φ	
6.0	5.0	100	0.81	-48	13.69	152	0.04	66	0.88	-22	
		500	0.67	-122	7.58	92	0.07	41	0.57	-50	
		1000	0.61	-157	4.65	76	0.09	40	0.45	-62	
		1500	0.57	86	2.87	70	0.10	44	0.42	-71	
		2000	0.54	156	2.14	60	0.12	52	0.42	-75	
		2500	0.55	121	1.72	51	0.14	57	0.40	-86	
		3000	0.57	121	1.48	44	0.17	59	0.39	-97	
		4000	0.65	110	1.28	38	0.21	60	0.37	-112	
			4000	0.67	100	1.14	33	0.24	54	0.38	-130
		10	100	0.71	-56	24.07	149	0.03	66	0.86	-28
			500	0.60	-143	9.47	101	0.05	46	0.41	-62
			1000	0.56	-176	4.97	81	0.07	51	0.30	-73
			1500	0.53	167	3.35	69	0.10	57	0.31	-78
			2000	0.50	148	2.54	60	0.13	63	0.30	-78
			2500	0.52	132	2.02	52	0.16	63	0.29	-89
			3000	0.54	116	1.75	45	0.19	61	0.29	-78
			4000	0.60	106	1.53	39	0.22	60	0.26	-115
			4000	0.64	97	1.35	34	0.26	57	0.28	-133
		20	100	0.59	-80	33.51	138	0.02	61	0.75	-38
			500	0.56	-159	10.39	95	0.04	54	0.31	-69
			1000	0.54	175	5.36	79	0.07	62	0.23	-79
			1500	0.51	161	3.58	68	0.10	66	0.25	-82
			2000	0.49	142	2.75	60	0.13	68	0.25	-80
			2500	0.52	128	2.18	52	0.16	66	0.23	-91
			3000	0.53	112	1.88	45	0.20	63	0.23	-99
			4000	0.60	103	1.65	39	0.24	62	0.21	-117
			4000	0.63	95	1.46	34	0.27	57	0.22	-137
		30	100	0.54	-97	37.48	133	0.02	57	0.67	-43
			500	0.56	-166	10.60	93	0.04	59	0.27	-70
			1000	0.54	171	5.45	78	0.07	68	0.21	-80
			1500	0.51	158	3.62	67	0.10	69	0.24	-81
			2000	0.50	140	2.73	60	0.13	70	0.23	-79
			2500	0.52	126	2.19	51	0.17	68	0.23	-90
			3000	0.53	111	1.89	45	0.20	64	0.23	-97
			4000	0.60	102	1.65	38	0.24	62	0.20	-115
			4000	0.63	94	1.47	33	0.27	58	0.22	-136
		60	100	0.54	-128	36.66	123	0.01	57	0.56	-43
			500	0.60	-177	8.97	89	0.03	67	0.27	-50
			1000	0.59	166	4.62	75	0.06	73	0.25	-59
			1500	0.56	153	3.05	64	0.09	75	0.29	-68
			2000	0.55	136	2.29	56	0.13	76	0.30	-71
			2500	0.57	125	1.85	48	0.16	74	0.29	-83
			3000	0.59	110	1.59	42	0.20	69	0.30	-92
			4000	0.65	102	1.41	36	0.23	67	0.27	-108
			4000	0.69	93	1.22	31	0.27	62	0.29	-130

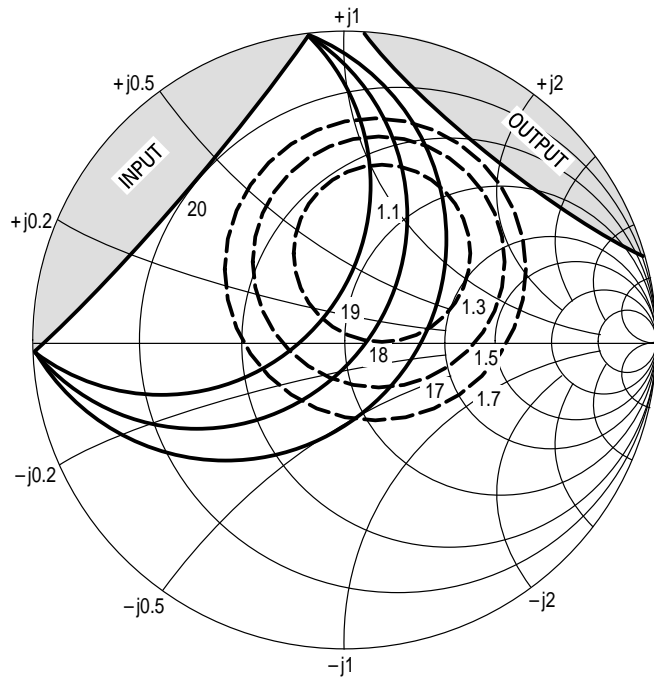
(continued)

Table 2. MRF9511LT1 Common Emitter S-Parameters

V <sub>CE</sub> (Vdc)	I <sub>C</sub> (mA)	f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
			S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
8.0	5.0	100	0.84	-36	14.65	158	0.03	72	0.94	-18
		500	0.68	-120	7.79	110	0.07	42	0.58	-48
		1000	0.60	-161	4.32	86	0.08	41	0.44	-60
		1500	0.56	88	2.95	71	0.10	45	0.44	-68
		2000	0.53	157	2.19	60	0.11	53	0.44	-71
		2500	0.55	140	1.76	51	0.14	58	0.42	-82
		3000	0.56	122	1.50	44	0.17	60	0.42	-92
		3500	0.63	112	1.33	39	0.18	62	0.38	-107
		4000	0.68	105	1.18	33	0.21	63	0.36	-125
		10	100	0.73	-53	24.04	150	0.02	68	0.87
	500		0.60	-140	9.68	101	0.05	46	0.43	-58
	1000		0.55	-174	5.10	82	0.07	52	0.32	-66
	1500		0.52	169	3.42	69	0.09	58	0.33	-72
	2000		0.49	149	2.59	61	0.12	63	0.33	-73
	2500		0.51	133	2.06	52	0.15	63	0.32	-83
	3000		0.53	116	1.78	45	0.19	63	0.32	-91
	3500		0.64	109	1.60	38	0.20	62	0.28	-108
	4000		0.67	101	1.39	34	0.23	60	0.29	-131
	20		100	0.61	-76	33.76	139	0.02	60	0.76
		500	0.56	-157	10.72	96	0.04	54	0.32	-63
		1000	0.53	176	5.53	79	0.07	62	0.29	-70
		1500	0.50	162	3.69	68	0.10	66	0.27	-75
		2000	0.48	143	2.79	60	0.13	68	0.27	-74
		2500	0.51	129	2.22	52	0.16	68	0.26	-84
		3000	0.52	112	1.92	46	0.19	65	0.26	-91
		3500	0.59	104	1.75	40	0.21	64	0.24	-109
		4000	0.63	98	1.54	35	0.24	59	0.25	-131
		30	100	0.57	-89	37.35	134	0.02	58	0.71
	500		0.55	-163	10.82	94	0.04	57	0.29	-63
	1000		0.53	128	5.54	78	0.07	65	0.24	-69
	1500		0.50	159	3.69	67	0.10	69	0.26	-73
	2000		0.49	141	2.77	59	0.13	70	0.27	-71
	2500		0.51	127	2.23	51	0.16	69	0.26	-82
	3000		0.52	112	1.93	45	0.19	66	0.26	-89
	3500		0.61	106	1.68	40	0.21	64	0.21	-110
	4000		0.66	97	1.51	34	0.24	60	0.23	-130
	60		100	0.55	-122	34.92	126	0.01	52	0.59
		500	0.59	-175	8.71	91	0.03	65	0.33	-42
		1000	0.58	167	4.52	76	0.06	73	0.30	-53
		1500	0.55	154	3.04	65	0.09	75	0.34	-62
2000		0.54	138	2.28	56	0.12	77	0.35	-66	
2500		0.57	125	1.82	48	0.16	76	0.34	-78	
3000		0.59	110	1.56	42	0.19	72	0.35	-88	
3500		0.66	104	1.28	36	0.22	70	0.32	-105	
4000		0.70	95	1.14	32	0.26	66	0.32	-132	

Table 2. MRF9511LT1 Common Emitter S-Parameters (continued)

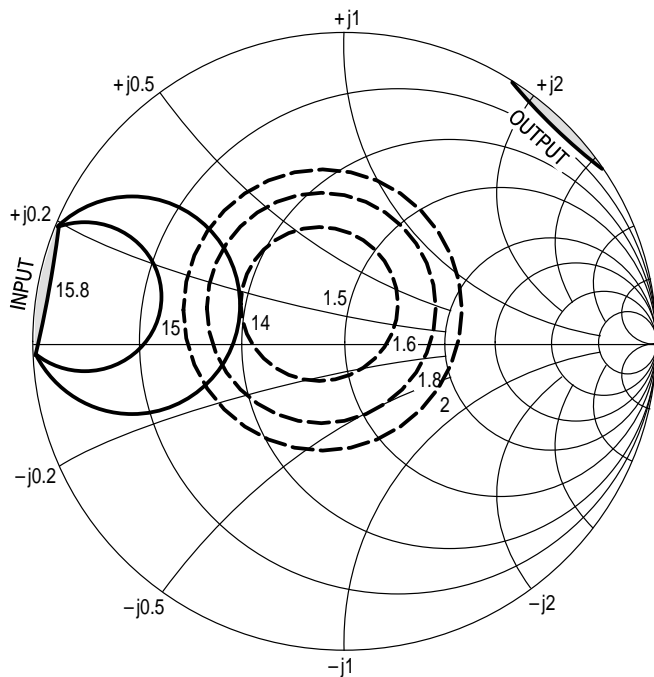




$V_{CE} = 6.0 \text{ V}$   
 $I_C = 5.0 \text{ mA}$   
 □ — AREA OF INSTABILITY

f (GHz)	NF OPT (dB)	$\Gamma_{MS}$ NF OPT	Rn	K
0.5	1.13	$0.35 \angle 68^\circ$	9	0.68

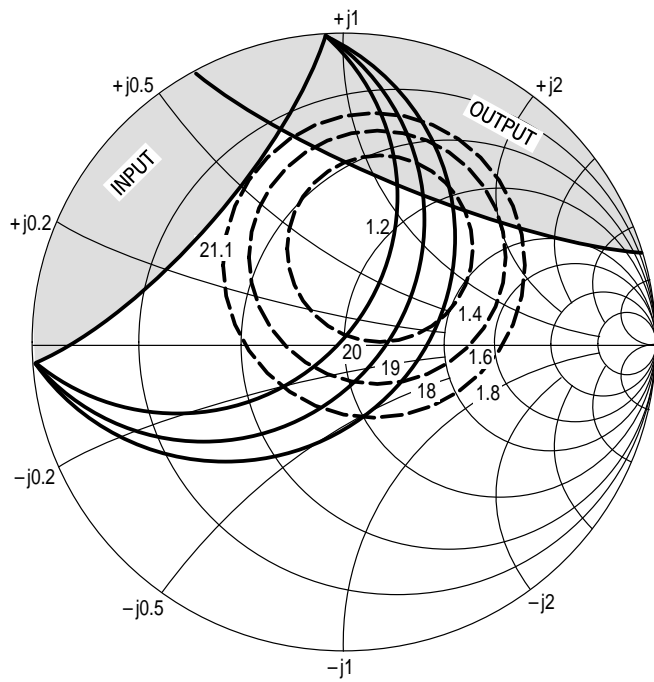
**Figure 10. MMBR951LT1 Constant Gain and Noise Figure Contours (f = 0.5 GHz)**



$V_{CE} = 6.0 \text{ V}$   
 $I_C = 5.0 \text{ mA}$   
 □ — AREA OF INSTABILITY

f (GHz)	NF OPT (dB)	$\Gamma_{MS}$ NF OPT	Rn	K
1.0	1.45	$0.16 \angle 124^\circ$	8	0.97

**Figure 11. MMBR951LT1 Constant Gain and Noise Figure Contours (f = 1.0 GHz)**



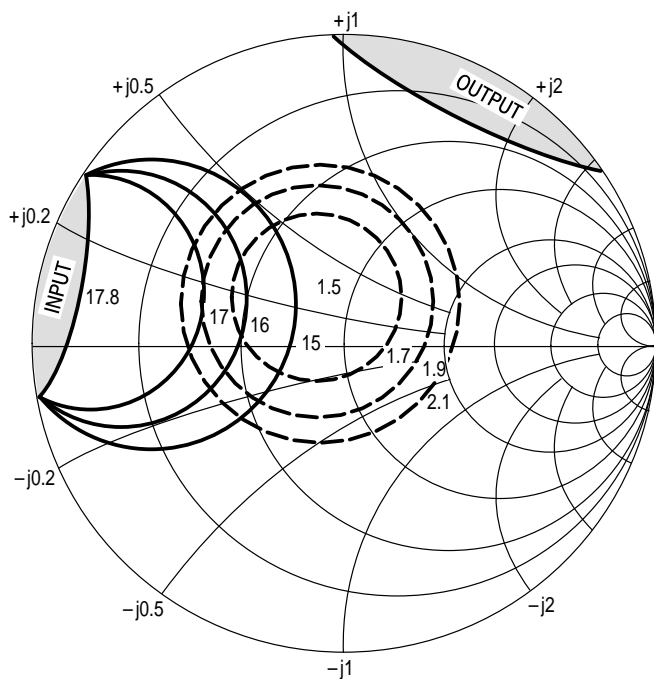
$V_{CE} = 6.0 \text{ V}$

$I_C = 5.0 \text{ mA}$

— AREA OF INSTABILITY

f (GHz)	NF OPT (dB)	$\Gamma_{MS}$ NF OPT	Rn	K
0.5	1.20	$0.37 \angle 69^\circ$	10	0.42

**Figure 12. MRF9511LT1 Constant Gain and Noise Figure Contours (f = 0.5 GHz)**



$V_{CE} = 6.0 \text{ V}$

$I_C = 5.0 \text{ mA}$

— AREA OF INSTABILITY

f (GHz)	NF OPT (dB)	$\Gamma_{MS}$ NF OPT	Rn	K
1.0	1.50	$0.19 \angle 120^\circ$	9	0.74

**Figure 13. MRF9511LT1 Constant Gain and Noise Figure Contours (f = 1.0 GHz)**

$V_{CE}$ (Vdc)	$I_C$ (mA)	f (MHz)	NF <sub>min</sub> (dB)	$\Gamma_o$ (MAG, ANG)	$r_N$ (ohms)
6.0	5.0	1000	1.7	0.27 $\angle$ 97	0.2
		1500	2.0	0.21 $\angle$ 54	0.28

Table 3. MRF957T1 Typical Noise Parameters

TYPICAL CHARACTERISTICS  
MRF957T1

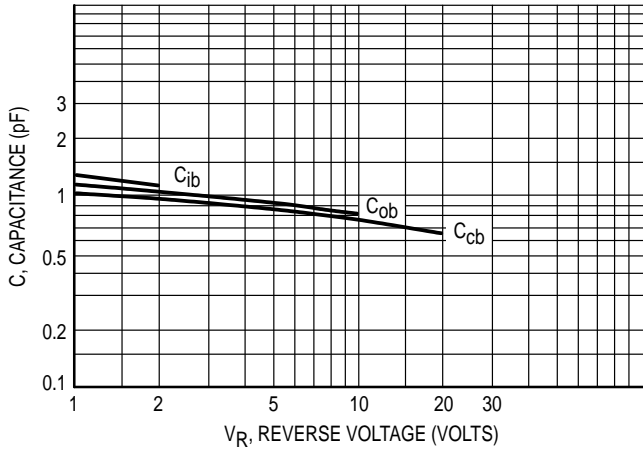


Figure 14. Capacitance versus Voltage

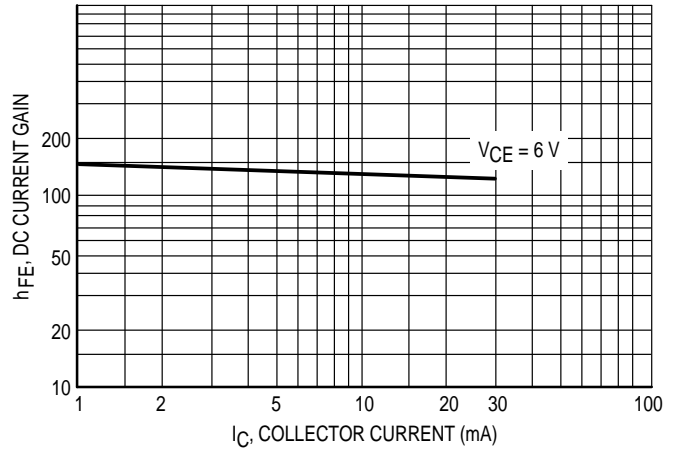
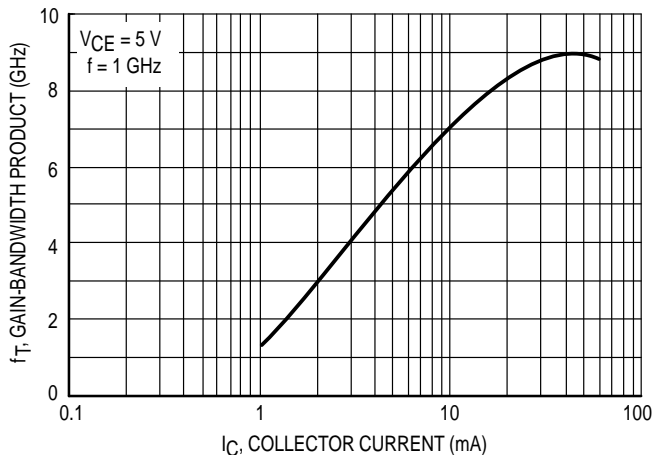
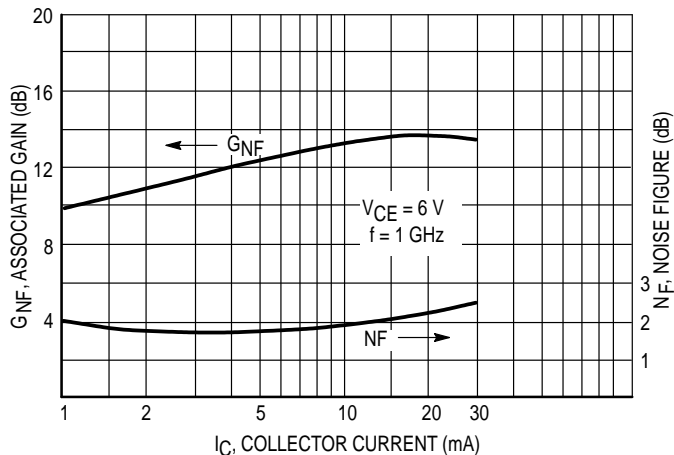


Figure 15. DC Current Gain versus Collector Current

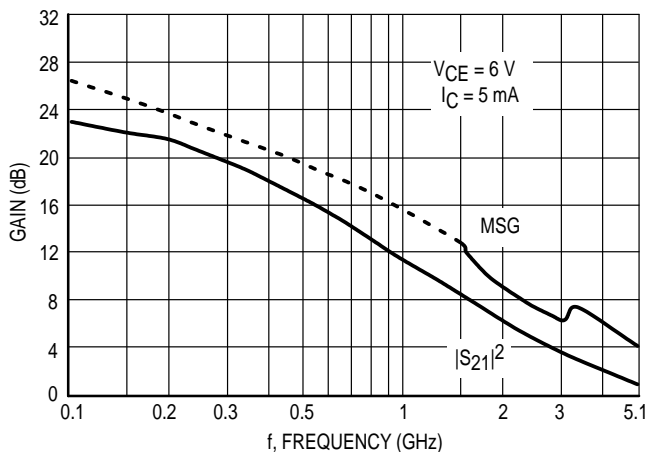
## TYPICAL CHARACTERISTICS MRF957T1



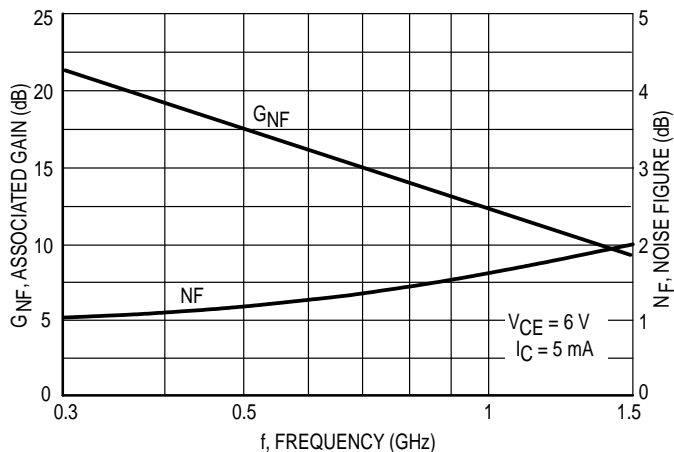
**Figure 16. Gain-Bandwidth Product versus Collector Current**



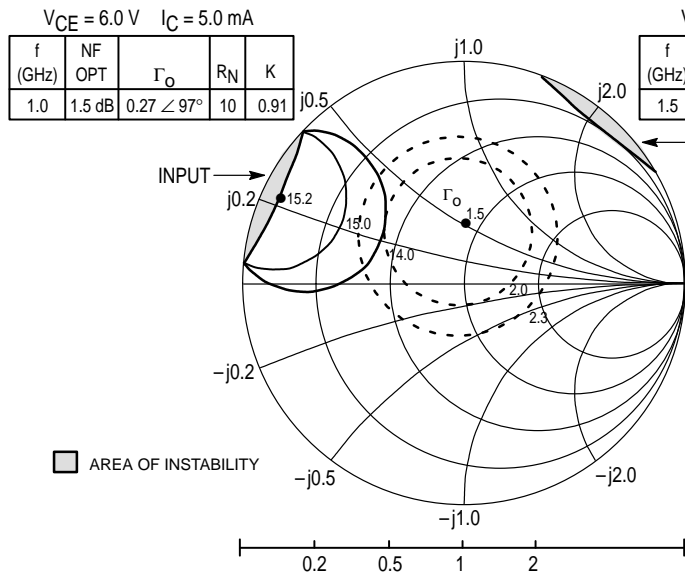
**Figure 17. Associated Gain versus Collector Current**



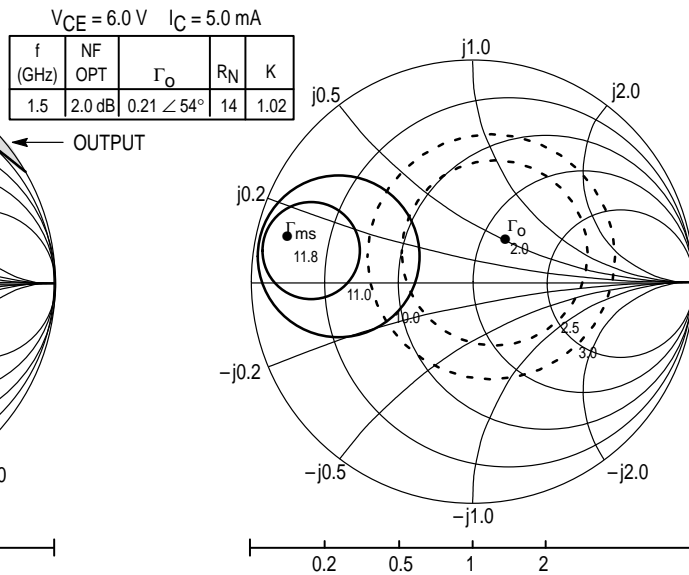
**Figure 18. Insertion Gain and Maximum Stable Power Gain versus Frequency**



**Figure 19. Noise Figure and Associated Gain versus Frequency**



**Figure 20. Constant Gain and Noise Figure Contours  
 $f = 1.0\text{ GHz}$**



**Figure 21. Constant Gain and Noise Figure Contours  
 $f = 1.5\text{ GHz}$**

VCE (Vdc)	I <sub>C</sub> (mA)	f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
			S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
2.0	1.0	100	0.959	-19.22	3.518	166.25	0.044	78.43	0.986	-8.12
		200	0.922	-38.32	3.482	153.75	0.079	69.06	0.948	-15.98
		500	0.825	-81.94	2.614	122.98	0.146	44.99	0.803	-30.02
		1000	0.690	-125.83	1.737	93.40	0.167	30.15	0.662	-41.41
		2000	0.600	-174.02	1.079	63.65	0.131	44.93	0.576	-51.42
		3000	0.640	147.15	0.791	50.62	0.196	80.39	0.517	-64.42
	2.0	100	0.922	-24.97	6.598	162.54	0.042	75.55	0.967	-12.35
		200	0.862	-48.55	6.177	147.47	0.075	64.60	0.893	-23.28
		500	0.713	-96.45	4.140	116.09	0.123	43.92	0.671	-38.55
		1000	0.586	-137.24	2.483	90.37	0.140	38.71	0.524	-46.93
		2000	0.506	179.54	1.462	64.47	0.158	57.00	0.456	-51.97
		3000	0.546	144.80	1.079	49.98	0.232	74.13	0.416	-61.22
	5.0	100	0.815	-39.45	14.163	153.09	0.038	70.19	0.895	-22.63
		200	0.708	-71.89	11.635	133.50	0.061	58.57	0.739	-38.46
		500	0.541	-121.43	6.284	104.78	0.090	49.12	0.454	-52.31
		1000	0.461	-155.05	3.428	85.44	0.123	54.90	0.337	-56.38
		2000	0.406	169.75	1.921	65.04	0.198	65.80	0.304	-54.16
		3000	0.438	139.42	1.424	51.41	0.282	69.61	0.276	-57.77
	10	100	0.667	-57.75	22.121	142.36	0.032	64.38	0.788	-34.26
		200	0.559	-95.89	15.709	121.54	0.048	57.27	0.574	-52.06
		500	0.447	-140.52	7.417	98.06	0.075	58.00	0.317	-63.32
		1000	0.405	-166.70	3.921	82.59	0.123	66.07	0.235	-65.49
		2000	0.360	162.90	2.155	65.25	0.222	69.45	0.220	-57.93
		3000	0.390	134.95	1.597	52.60	0.311	68.14	0.196	-57.79
30	100	0.435	-99.80	31.662	125.82	0.023	62.49	0.570	-51.69	
	200	0.421	-135.04	18.696	108.07	0.034	64.74	0.360	-68.74	
	500	0.398	-162.97	8.025	91.81	0.069	71.43	0.192	-75.85	
	1000	0.382	-179.33	4.163	79.67	0.127	74.17	0.151	-77.73	
	2000	0.347	155.68	2.269	64.55	0.240	72.04	0.155	-63.30	
	3000	0.379	130.21	1.686	52.60	0.336	67.80	0.132	-60.40	
60	100	0.442	-131.87	26.755	118.52	0.021	62.60	0.422	-56.23	
	200	0.483	-155.78	15.086	103.17	0.032	66.87	0.261	-70.51	
	500	0.484	-173.89	6.390	88.79	0.067	74.30	0.154	-73.64	
	1000	0.472	172.69	3.317	76.81	0.127	76.73	0.140	-74.96	
	2000	0.452	149.80	1.834	60.68	0.243	72.97	0.155	-66.57	
	3000	0.496	126.23	1.393	48.59	0.345	68.81	0.131	-71.10	

(continued)

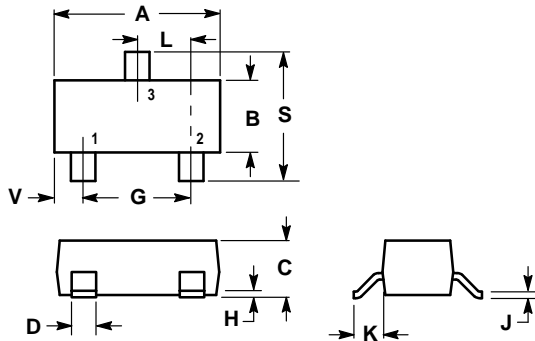
Table 4. MRF957T1 Typical Common Emitter S-Parameters

MRF957T1

V <sub>CE</sub> (Vdc)	I <sub>C</sub> (mA)	f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
			S <sub>11</sub>	∠φ	S <sub>21</sub>	∠φ	S <sub>12</sub>	∠φ	S <sub>22</sub>	∠φ
5.0	1.0	100	0.965	-17.73	3.508	167.36	0.035	78.18	0.990	-6.80
		200	0.931	-35.39	3.495	155.78	0.065	71.66	0.958	-13.35
		500	0.835	-77.08	2.680	126.50	0.122	48.12	0.839	-25.23
		1000	0.694	-120.78	1.820	97.22	0.143	33.67	0.713	-35.51
		2000	0.583	-170.80	1.133	67.35	0.115	50.88	0.629	-44.48
		3000	0.615	148.45	0.813	53.19	0.182	85.71	0.565	-55.47
	2.0	100	0.932	-22.38	6.532	164.05	0.034	77.81	0.975	-9.92
		200	0.875	-44.00	6.217	150.00	0.061	67.15	0.914	-18.98
		500	0.726	-89.77	4.314	119.58	0.106	47.42	0.724	-31.79
		1000	0.582	-131.10	2.638	93.76	0.122	41.23	0.586	-39.20
		2000	0.483	-176.30	1.544	67.35	0.140	60.85	0.521	-43.55
		3000	0.515	146.92	1.117	52.27	0.208	78.88	0.479	-51.26
	5.0	100	0.836	-34.35	14.112	155.49	0.031	71.72	0.920	-18.06
		200	0.731	-63.59	11.971	137.05	0.052	61.40	0.785	-31.06
		500	0.539	-112.00	6.737	107.93	0.080	51.32	0.522	-41.63
		1000	0.438	-147.18	3.710	88.06	0.110	57.59	0.408	-43.94
		2000	0.364	175.10	2.050	67.58	0.175	68.31	0.383	-42.49
		3000	0.392	142.26	1.501	53.59	0.251	73.36	0.357	-45.46
	10	100	0.704	-49.02	22.526	145.79	0.027	67.46	0.831	-27.03
		200	0.577	-83.93	16.647	125.23	0.042	59.78	0.634	-41.45
		500	0.421	-129.59	8.120	100.71	0.069	60.52	0.385	-47.31
		1000	0.361	-158.62	4.290	84.82	0.109	67.54	0.305	-46.57
		2000	0.307	168.57	2.330	67.52	0.196	71.46	0.305	-42.00
		3000	0.332	137.50	1.706	54.85	0.277	71.05	0.288	-42.21
20	100	0.559	-66.34	30.018	136.00	0.023	64.88	0.720	-35.45	
	200	0.453	-103.91	19.598	116.12	0.036	61.80	0.501	-48.64	
	500	0.358	-143.87	8.835	96.19	0.064	68.23	0.298	-49.15	
	1000	0.324	-167.05	4.595	83.08	0.112	72.95	0.247	-47.12	
	2000	0.278	163.88	2.462	67.27	0.208	72.96	0.263	-41.09	
	3000	0.306	133.94	1.809	55.45	0.291	70.31	0.249	-39.38	
30	100	0.492	-73.65	32.055	131.68	0.022	64.17	0.669	-37.70	
	200	0.412	-110.53	20.121	113.25	0.033	64.60	0.459	-49.28	
	500	0.345	-147.89	8.900	94.88	0.062	69.52	0.278	-48.58	
	1000	0.319	-169.39	4.646	82.13	0.113	74.20	0.234	-46.64	
	2000	0.277	162.38	2.492	67.55	0.210	73.10	0.255	-40.63	
	3000	0.305	133.57	1.821	55.24	0.295	70.42	0.239	-38.73	

Table 4. MRF957T1 Typical Common Emitter S-Parameters (continued)

## PACKAGE DIMENSIONS



**NOTES:**

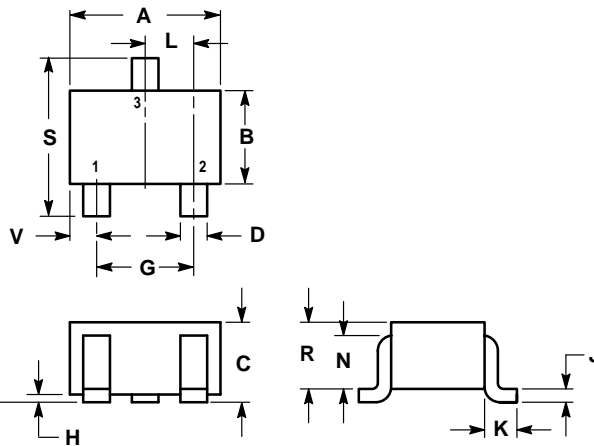
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

**STYLE 6:**

- PIN 1. BASE
2. EMITTER
3. COLLECTOR

**CASE 318-08  
ISSUE AF  
MMBR951LT1, MMBR951ALT1**



**NOTES:**

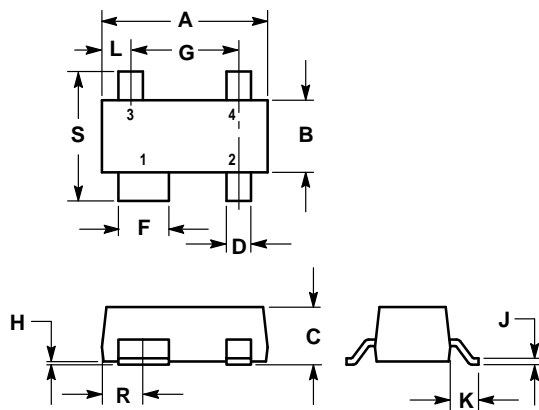
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.035	0.049	0.90	1.25
D	0.012	0.016	0.30	0.40
G	0.047	0.055	1.20	1.40
H	0.000	0.004	0.00	0.10
J	0.004	0.010	0.10	0.25
K	0.017 REF		0.425 REF	
L	0.026 BSC		0.650 BSC	
N	0.028 REF		0.700 REF	
R	0.031	0.039	0.80	1.00
S	0.079	0.087	2.00	2.20
V	0.012	0.016	0.30	0.40

**STYLE 3:**

- PIN 1. BASE
2. EMITTER
3. COLLECTOR

**CASE 419-02  
ISSUE H  
MRF957T1**




NOTES:  
 4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 5. CONTROLLING DIMENSION: MILLIMETER.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.80	3.04	0.110	0.120
B	1.20	1.39	0.047	0.055
C	0.84	1.14	0.033	0.045
D	0.39	0.50	0.015	0.020
F	0.79	0.93	0.031	0.037
G	1.78	2.03	0.070	0.080
H	0.013	0.10	0.0005	0.004
J	0.08	0.15	0.003	0.006
K	0.46	0.60	0.018	0.024
L	0.445	0.60	0.0175	0.024
R	0.72	0.83	0.028	0.033
S	2.11	2.48	0.083	0.098

STYLE 1:  
 PIN 1. COLLECTOR  
 2. EMITTER  
 3. EMITTER  
 4. BASE

**CASE 318A-05  
 ISSUE R  
 MRF9511LT1**

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