

MRF207, MRF208, MRF209 (SILICON)

The RF Line

NPN SILICON RF POWER TRANSISTORS

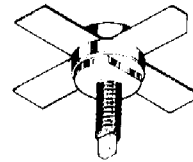
... designed for 12.5 Volt large-signal power amplifier applications in communications equipment operating at 220 MHz.

- Specified 12.5 Volt, 220 MHz Characteristics –
 - Output Power = 1.0 W – MRF207
 - 10 W – MRF208
 - 25 W – MRF209
- Minimum Gain = 8.2 dB – MRF207
- 10 dB – MRF208
- 4.4 dB – MRF209
- Balanced-Emitter Construction to provide the designer with the device technology that assures ruggedness and resists transistor damage caused by load mismatch.

1.0, 10, 25 WATTS – 220 MHz
 NPN SILICON
 RF POWER
 TRANSISTORS



MRF207



MRF208
 MRF209

MAXIMUM RATINGS

Rating	Symbol	MRF207	MRF208	MRF209	Unit
Collector-Emitter Voltage	V_{CE0}	18			Vdc
Collector-Base Voltage	V_{CB0}	36			Vdc
Emitter-Base Voltage	V_{EB0}	4.0			Vdc
Collector Current – Continuous	I_C	0.4	2.0	4.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above 25°C	P_D	3.5 20	37.5 214	50 286	Watts mW/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +200			$^\circ\text{C}$
Stud Torque(2)	–	–	6.5		in. lb.

(1) These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.

(2) For Repeated Assembly use 5 in. lb.

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MRF207, MRF208, MRF209 (continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage ($I_C = 5.0 \text{ mAdc}, I_B = 0$) ($I_C = 15 \text{ mAdc}, I_B = 0$) ($I_C = 20 \text{ mAdc}, I_B = 0$)	MRF207 MRF208 MRF209	18 18 18	-- -- --	-- -- --	Vdc
Collector-Base Breakdown Voltage ($I_C = 2.0 \text{ mAdc}, I_E = 0$) ($I_C = 5.0 \text{ mAdc}, I_E = 0$) ($I_C = 10 \text{ mAdc}, I_E = 0$)	MRF207 MRF208 MRF209	36 36 36	-- -- --	-- -- --	Vdc
Emitter-Base Breakdown Voltage ($I_E = 1.0 \text{ mAdc}, I_C = 0$) ($I_E = 2.5 \text{ mAdc}, I_C = 0$) ($I_E = 5.0 \text{ mAdc}, I_C = 0$)	MRF207 MRF208 MRF209	4.0 4.0 4.0	-- -- --	-- -- --	Vdc
Collector Cutoff Current ($V_{CB} = 15 \text{ Vdc}, I_E = 0$)	MRF207 MRF208 MRF209	-- -- --	-- -- --	0.1 0.25 0.5	mAdc

ON CHARACTERISTICS

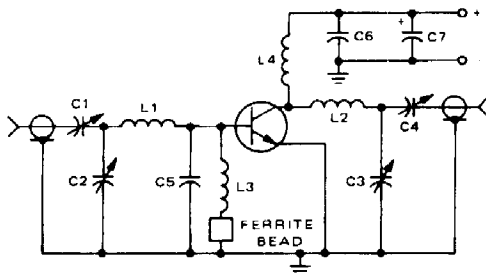
DC Current Gain	Symbol	Min	Typ	Max	Unit
($I_C = 100 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$)	MRF207	5.0	--	--	--
($I_C = 250 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$)	MRF208	5.0	--	--	--
($I_C = 500 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$)	MRF209	5.0	--	--	--

FUNCTIONAL TESTS

Common-Emitter Amplifier Power Gain	Symbol	Min	Typ	Max	Unit
($V_{CC} = 12.5 \text{ Vdc}, P_{out} = 1.0 \text{ W}, f = 220 \text{ MHz}$)	MRF207	8.2	12.5	--	dB
($V_{CC} = 12.5 \text{ Vdc}, P_{out} = 10 \text{ W}, f = 220 \text{ MHz}$)	MRF208	10	12.5	--	dB
($V_{CC} = 12.5 \text{ Vdc}, P_{out} = 25 \text{ W}, f = 220 \text{ MHz}$)	MRF209	4.4	5.2	--	dB
Input Impedance ($P_{out} = 1.0 \text{ W}, f = 220 \text{ MHz}$) ($P_{out} = 10 \text{ W}, f = 220 \text{ MHz}$) ($P_{out} = 25 \text{ W}, f = 220 \text{ MHz}$)	MRF207 MRF208 MRF209	-- -- --	$10-j11.5$ $1.4+j1.4$ $1.4+j1.8$	-- -- --	Ohms
Output Impedance ($P_{out} = 1.0 \text{ W}, f = 220 \text{ MHz}$) ($P_{out} = 10 \text{ W}, f = 220 \text{ MHz}$) ($P_{out} = 25 \text{ W}, f = 220 \text{ MHz}$)	MRF207 MRF208 MRF209	-- -- --	$32-j41$ $5.7-j1.3$ $3.9-j0.2$	-- -- --	Ohms

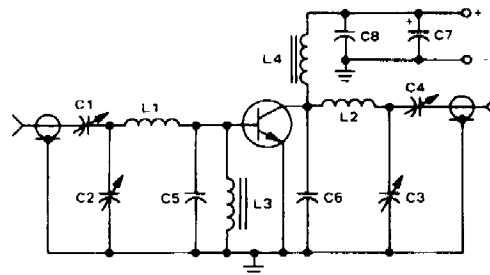
220 MHz TEST CIRCUIT

FIGURE 1 - MRF207



C1	2.0 - 50 pF	ARCO 461
C2, C4	5.0 - 80 pF	ARCO 462
C3	1.5 - 15 pF	ARCO 460
C5	40 pF	
C6	1000 pF	
C7	5.0 μF	TANTALUM
L1	1 Turn, #20 AWG, 1/4" ID	
L2	4 Turns, #20 AWG, 1/4" ID	
L3, L4	15 μH RFC	

FIGURE 2 - MRF208, MRF209



C1, C2, C3, C4	5.0 - 80 pF	ARCO 462
C5, C6	100 pF	
C7	10 μF	TANTALUM
C8	1000 pF	
L1	#14 AWG, 1/4" Long, Straight	
L2	1 Turn, #14 AWG, 3/8" ID	
L3, L4		RFC VK200