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MRF207, MRF208, MRF209 (SILICON)

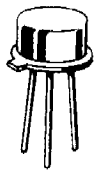
The RF Line

NPN SILICON RF POWER TRANSISTORS

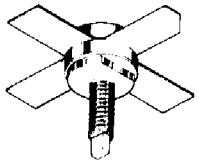
. . . designed for 12.5 Volt large-signal power amplifier applications in communications equipment operating at 220 MHz.

- 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_{CEO}	← 18 →			Vdc
Collector-Base Voltage	V_{CBO}	← 36 →			Vdc
Emitter-Base Voltage	V_{EBO}	← 4.0 →			Vdc
Collector Current – Continuous	I_C	0.4	2.0	4.0	Adc
Total Device Dissipation @ $T_C = 25^oC$[1] Derate above 25^oC	P_D	3.5 20	37.5 214	50 286	Watts mW/^oC
Storage Temperature Range	T_{stg}	-65 to +200			^oC
Stud Torque[2]	–	–	6.5		in. lb.

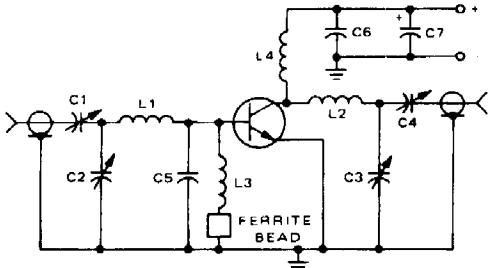
(1) These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.
(2) For Repeated Assembly use 5 in. lb.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage		BV_{CEO}				Vdc
(I_C = 5.0 mAdc, I_B = 0)	MRF207		18	–	–	
(I_C = 15 mAdc, I_B = 0)	MRF208		18	–	–	
(I_C = 20 mAdc, I_B = 0)	MRF209		18	–	–	
Collector-Base Breakdown Voltage		BV_{CBO}				Vdc
(I_C = 2.0 mAdc, I_E = 0)	MRF207		36	–	–	
(I_C = 5.0 mAdc, I_E = 0)	MRF208		36	–	–	
(I_C = 10 mAdc, I_E = 0)	MRF209		36	–	–	
Emitter-Base Breakdown Voltage		BV_{EBO}				Vdc
(I_E = 1.0 mAdc, I_C = 0)	MRF207		4.0	–	–	
(I_E = 2.5 mAdc, I_C = 0)	MRF208		4.0	–	–	
(I_E = 5.0 mAdc, I_C = 0)	MRF209		4.0	–	–	
Collector Cutoff Current		I_{CBO}				mAdc
(V_{CB} = 15 Vdc, I_E = 0)	MRF207		–	–	0.1	
	MRF208		–	–	0.25	
	MRF209		–	–	0.5	
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				–
(I_C = 100 mAdc, V_{CE} = 5.0 Vdc)	MRF207		5.0	–	–	
(I_C = 250 mAdc, V_{CE} = 5.0 Vdc)	MRF208		5.0	–	–	
(I_C = 500 mAdc, V_{CE} = 5.0 Vdc)	MRF209		5.0	–	–	
FUNCTIONAL TESTS						
Common-Emitter Amplifier Power Gain		G_{PE}				dB
(V_{CC} = 12.5 Vdc, P_{out} = 1.0 W, f = 220 MHz)	MRF207		8.2	12.5	–	
(V_{CC} = 12.5 Vdc, P_{out} = 10 W, f = 220 MHz)	MRF208		10	12.5	–	
(V_{CC} = 12.5 Vdc, P_{out} = 25 W, f = 220 MHz)	MRF209		4.4	5.2	–	
Input Impedance		Z_{in}				Ohms
(P_{out} = 1.0 W, f = 220 MHz)	MRF207		–	10-j11.5	–	
(P_{out} = 10 W, f = 220 MHz)	MRF208		–	1.4+j1.4	–	
(P_{out} = 25 W, f = 220 MHz)	MRF209		–	1.4+j1.8	–	
Output Impedance		Z_{out}				Ohms
(P_{out} = 1.0 W, f = 220 MHz)	MRF207		–	32 - j41	–	
(P_{out} = 10 W, f = 220 MHz)	MRF208		–	5.7 - j1.3	–	
(P_{out} = 25 W, f = 220 MHz)	MRF209		–	3.9 - j0.2	–	

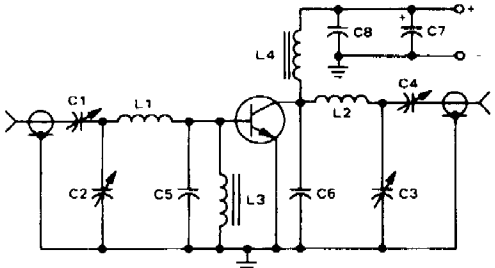
220 MHz TEST CIRCUIT

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, 1¼" Long, Straight	
L2	1 Turn, #14 AWG, 3/8" ID	
L3, L4	RFC VK200	