MRF313
MRF313A

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CASE 305A-01, STYLE 1

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HIGH FREQUENCY TRANSISTOR

NPN SILICON

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	30	Vdc
Collector-Base Voltage	V_{CBO}	40	Vdc
Emitter-Base Voltage	V_{EBO}	3.0	Vdc
Collector Current — Continuous	I_C	150	mAdc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	2.5 35	Watts mW/°C
Storage Temperature	T_{stg}	−65 to +200	°C

THERMAL CHARACTERISTICS

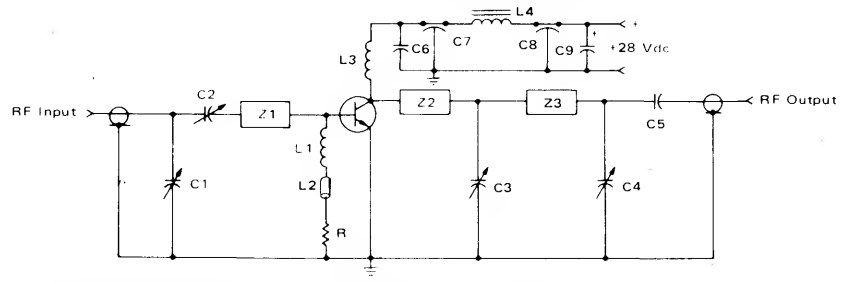
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	28.5	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)	$V_{(BR)CEO}$	30	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 5.0 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	35	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	35	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 1.0 mAdc, I_C = 0)	$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current (V_{CE} = 20 Vdc, I_B = 0)	I_{CEO}	—	—	1.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 100 mAdc, V_{CE} = 10 Vdc)	h_{FE}	20	60	150	—
SMALL SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 100 mAdc, V_{CE} = 20 Vdc, f = 200 MHz)	f_T	—	2.5	—	GHz
Output Capacitance (V_{CB} = 28 Vdc, I_E = 0, f = 1.0 MHz)	C_{obo}	—	3.5	5.0	pF
FUNCTIONAL TEST					
Common-Emitter Amplifier Power Gain(1) (V_{CC} = 28 Vdc, P_{out} = 1.0 W, f = 400 MHz)	G_{pe}	15	16	—	dB
Collector Efficiency (V_{CC} = 28 Vdc, P_{out} = 1.0 W, f = 400 MHz)	η	—	45	—	%
Series Equivalent Input Impedance (V_{CC} = 28 Vdc, P_{out} = 1.0 W, f = 400 MHz)	Z_{in}	—	6.4 − j4.8	—	Ohms
Series Equivalent Output Impedance (V_{CC} = 28 Vdc, P_{out} = 1.0 W, f = 400 MHz)	Z_{out}	—	75 − j45	—	Ohms

(1) Class C

FIGURE 1 – 400 MHz POWER GAIN TEST CIRCUIT



C1,C2,C4	1.0-20 pF JOHANSON 9063	L1,L3	5 Turns, AWG #20, ¼" I.D.	R	4.7 Ohms, ¼ W
C3	1.0-10 pF JOHANSON	L2	Ferrite Bead, FERROXCUBE	Z1	2.0" x 0.1" MICROSTRIP LINE
C5	150 pF Chip		No. 56 590-65/4B	Z2,Z3	2.6" x 0.1" MICROSTRIP LINE
C6	0.1 μF	L4	FERROXCUBE VK200-20/4B		
C7,C8	680 pF Feedthru	Input/Output Connectors — Type N			
C9	1.0 μF TANTALUM	Board — Glass Teflon, ε = 2.56, t = 0.062"			