RF Products
Microsemi
Progress Powered by Technology

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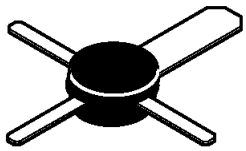
MRF553

RF & MICROWAVE DISCRETE LOW POWER TRANSISTORS

Features

- Specified @ 12.5 V, 175 MHz Characteristics
- Output Power = 1.5 W
- Minimum Gain = 11.5 dB
- Efficiency 60% (Typ)
- Cost Effective PowerMacro Package
- Electroless Tin Plated Leads for Improved Solderability



Power Macro

DESCRIPTION: Designed primarily for wideband large signal stages in the VHF frequency range.

ABSOLUTE MAXIMUM RATINGS (Tcase = 25°C)

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emitter Voltage	16	Vdc
V_{CBO}	Collector-Base Voltage	36	Vdc
V_{EBO}	Emitter-Base Voltage	4.0	Vdc
I_C	Collector Current	500	mA

Thermal Data

P_D	Total Device Dissipation @ TC = 75ºC Derate above 75ºC	3.0 40	Watts mW/ ºC

ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

STATIC

(off)

Symbol	Test Conditions	Value			
		Min.	Typ.	Max.	Unit
BVCEO	Collector-Emitter Breakdown Voltage (IC=10 mAdc, IB=0)	16	-	-	Vdc
BVCES	Collector-Emitter Sustaining Voltage (IC = 5.0 mAdc, IB = 0)	36	-	-	Vdc
BVCBO	Collector-Base Breakdown Voltage (IE = 0, IC = 5 mAdc)	36	-	-	Vdc
BVEBO	Emitter-Base Breakdown Voltage (IE = 1 mAdc, IC = 0)	4.0	-	-	Vdc
ICES	Collector Cutoff Current (VCE = 15 Vdc, VBE = 0 Vdc)	-	-	5	mA

(on)

HFE	DC Current Gain (IC = 250 mAdc, VCE = 5.0 Vdc) Both	30	-	200	-

DYNAMIC

Symbol	Test Conditions	Value			
		Min.	Typ.	Max.	Unit
COB	Output Capacitance (VCB = 10 Vdc, IE = 0, f = 1.0 MHz)	-	12	20	pF

FUNCTIONAL

Symbol	Test Conditions		Value			
			Min.	Typ.	Max.	Unit
G_{PE}	Power Gain	Test Circuit-Figure 1 Pout = 1.5 W, VCE =12.5Vdc f = 175 MHz	11.5	13	-	dB
η	Collector Efficiency	Test Circuit-Figure 1 Pout = 1.5 W, VCE =12.5Vdc f = 175 MHz	50	60	-	%
Ψ	Load Mismatch VSWR ≥ 10:1 All Phase Angles	Test Circuit-Figure 1 Pout = 1.5 W, VCE =12.5Vdc f = 175 MHz	No Degradation in Output Power			-

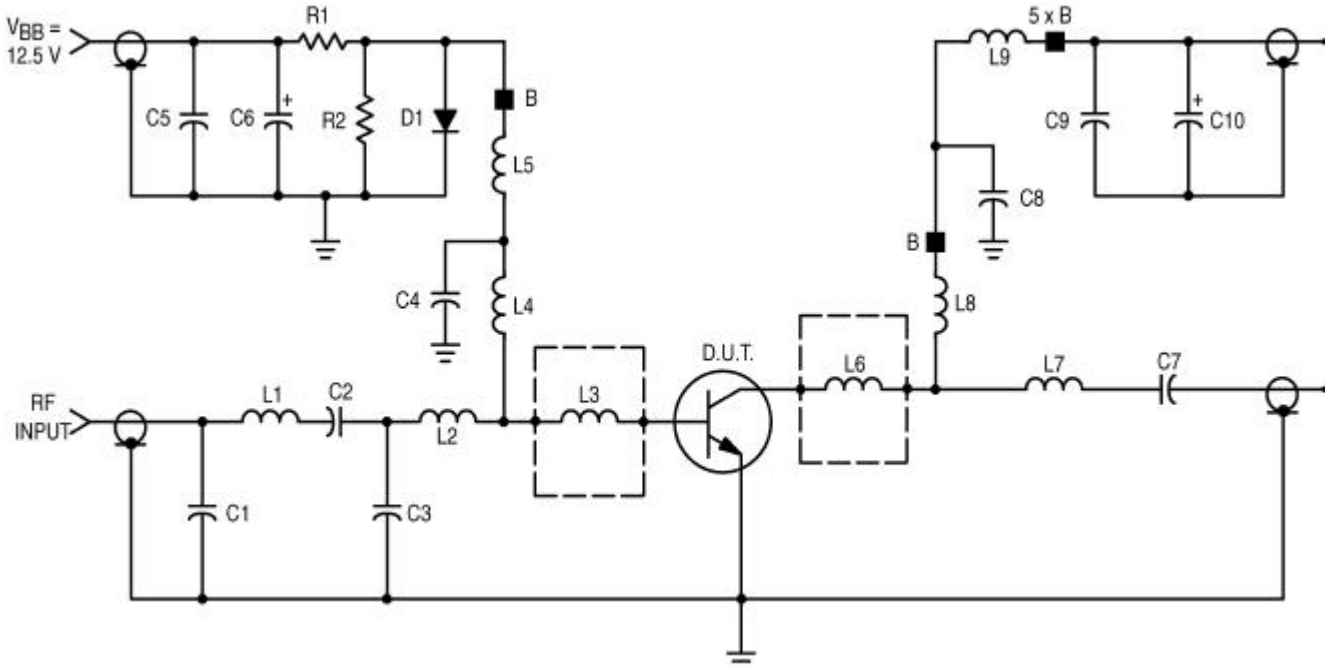


Figure 1. 140–175 MHz Broadband Circuit Schematic, Stub tuning implemented on the input to improve match. Microsemi fixture schematic with input match optimization will be available in the final version of the data sheet.

C1 — 36 pF Mini Underwood
C2 — 47 pF Mini Underwood
C3 — 91 pF Mini Underwood
C4 — 68 pF Mini Underwood
C5, C9 — 1.0 µF Erie Red Cap Capacitor
C6, C10 — 0.1 µF, 35 V Tantulum
C7 — 470 pF Chip Capacitor
C8 — 2200 pF Chip Capacitor
R1 — 4.7 kΩ, 1/4 W
R2 — 100 Ω, 1/4 W
D1 — 1N4148 Diode
L1 — 3 Turns, #18 AWG, 0.210, ID, 3/16, Length
L2, L4, L7 — 0.62,, #18 AWG Wire Bent into "V"
L3, L6 — 60 x 125 x 250 Mils Copper Pad on 27Mils
L5 — 12 µH Molded Choke
L8 — 7 Turns, #18 AWG, 0.170, ID, 7/16, Length
L9 — 1.0,, #18 AWG Wire with 5 Ferrite Beads
B — Ferrite Bead
Thick Alumina Substrate
Board Material — Glass Teflon, $\varepsilon r = 2.56$, t = 0.0625,

Microsemi RF Products

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MRF553

RF Low Power PA, LNA, and General Purpose Discrete Selector Guide

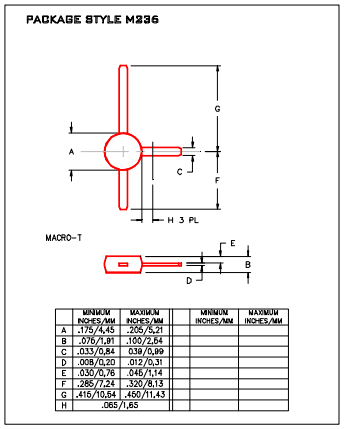
Package	Device	Type	GPE Freq (MHz	Pout (watts)	GPE (dB)	Efficiency (%)	GPE VCC	BVCEO	IC max (mA)
SO-8	MRF4427, R2	NPN	175	0.15	18	60	12	20	400
TO-39	2N4427	NPN	175	1	10	50	12	20	400
POWER MACRO	MRF553	NPN	175	1.5	11.5	60	12.5	16	500
POWER MACRO	MRF553T	NPN	175	1.5	11.5	50	12.5	16	500
TO-39	MRF607	NPN	175	1.75	11.5	50	12.5	16	330
TO-39	2N6255	NPN	175	3	7.8	50	12.5	18	1000
TO-72	2N5179	NPN	200		20		6	12	50
MACRO X	MRF559	NPN	512	0.5	10	65	7.5	16	150
MACRO X	MRF559	NPN	512	0.5	13	60	12.5	16	150
TO-39	2N3866A	NPN	400	1	10	45	28	30	400
SO-8	MRF3866, R1, R2	NPN	400	1	10	45	28	30	400
POWER MACRO	MRF555	NPN	470	1.5	11	50	12.5	16	400
POWER MACRO	MRF555T	NPN	470	1.5	11	50	12.5	16	400
MACRO X	MRF559	NPN	870	0.5	6.5	70	7.5	16	150
MACRO X	MRF559	NPN	870	0.5	9.5	65	12.5	16	150
SO-8	MRF8372,R1,R2	NPN	870	0.75	8	55	12.5	16	200
POWER MACRO	MRF557	NPN	870	1.5	8	55	12.5	16	400
POWER MACRO	MRF557T	NPN	870	1.5	8	55	12.5	16	400

RF (Low Power PA / General Purpose) Selection Guide

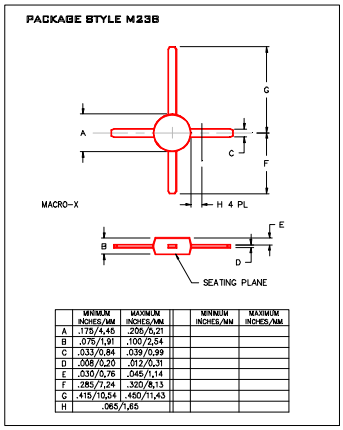
Package	Device	Type	Freq (MHz)	NF (dB)	NF IC (mA)	NF VCE	GN (dB)	Gu Max (dB)	Ftau (MHz)	Ccb(pF)	BVCEO	IC max (mA)
TO-39	2N5109	NPN	200	3	10	15		12	1200	3.5	20	400
TO-39	MRF5943C	NPN	200	3.4	30	15		11.4	1000		30	400
SO-8	MRF5943, R1, R2	NPN	200	3.4	30	15		15	1300		30	400
TO-72	2N5179	NPN	200	4.5	1.5	6		17	900	1	12	50
TO-72	2N2857	NPN	300	5.5	50	6		13	1600	1	15	40
TO-39	MRF517	NPN	300	7.5	50	15		5.5	4600	3	25	150
TO-72	MRF904	NPN	450	1.5	5	6		11	4000	1	15	30
TO-72	2N6304	NPN	450	5	2	5		14	1400	1	15	50
MACRO T	BFR91	NPN	500	1.9	2	5	11	16.5	5000	1	12	35
MACRO T	BFR96	NPN	500	2	10	10		14.5	500	2.6	15	100
SO-8	MRF5812, R1, R2	NPN	500	2	50	10	15.5	17.8	5000		15	200
MACRO X	MRF581A	NPN	500	2	50	10	14	15	5000		15	200
Macro	BFR90	NPN	500	2.4	2	10	15	18	5000	1	15	30
TO-72	BFY90	NPN	500	2.5	2	5		20	1300		15	50
TO-72	MRF914	NPN	500	2.5	5	10		15	4500		12	40
MACRO X	MRF581	NPN	500	2.5	50	10	15	17.8	5000		16	200
TO-39	MRF586	NPN	500	3	90	15	11	14.5	4500	2.2	17	200
MACRO X	MRF951	NPN	1000	1.3	5	6	14	17	8000	0.45	10	100
MACRO X	MRF571	NPN	1000	1.5	10	6	10		8000	1	10	70
MACRO T	BFR91	NPN	1000	2.5	2	5	8	11	5000	1	12	35
MACRO T	BFR90	NPN	1000	3	2	10	10	12.5	5000	1	15	30
TO-39	MRF545	PNP						14	1400	2	70	400
TO-39	MRF544	NPN						13.5	1500		70	400

RF (LNA / General Purpose) Selection Guide

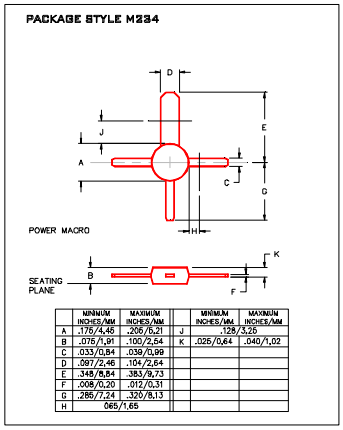
Low Cost RF Plastic Package Options



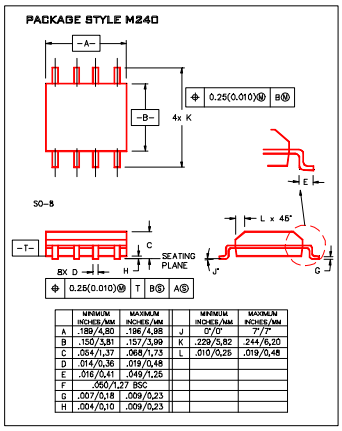
Macro T



Macro X



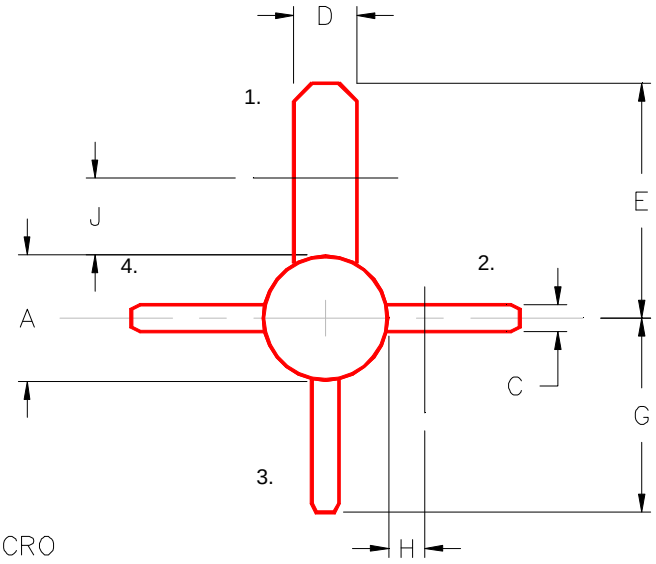
Power Macro



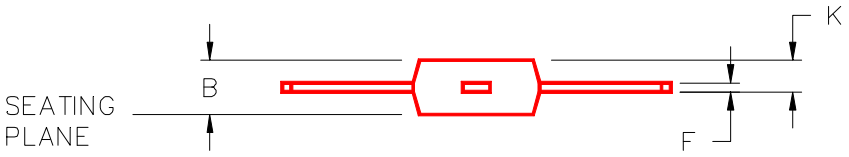
SO-8

PACKAGE STYLE M234

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



POWER MACRO



	MINIMUM INCHES/MM	MAXIMUM INCHES/MM		MINIMUM INCHES/MM	MAXIMUM INCHES/MM
A	.175/4,45	.205/5,21	J	.128/3,25	
B	.075/1,91	.100/2,54	K	.025/0,64	.040/1,02
C	.033/0,84	.039/0,99			
D	.097/2,46	.104/2,64			
E	.348/8,84	.383/9,73			
F	.008/0,20	.012/0,31			
G	.285/7,24	.320/8,13			
H	.065/1,65				