Microsemi RF Products
Progress Powered by Technology

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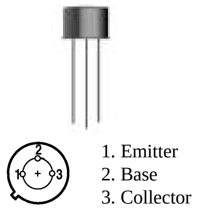
MRF544

RF & MICROWAVE DISCRETE LOW POWER TRANSISTORS

Features

- Silicon NPN, high Frequency, high breakdown, To-39 packaged, Transistor
- Maximum Unilateral Gain = 13.5 dB (typ) @ f = 200 MHz
- High Collector Base Breakdown Voltage - BVCBO = 100 V (min)
- High F_T - 1400 MHz



TO-39

DESCRIPTION:

Designed primarily for use in high frequency and medium and high resolution color video display monitors as well as other applications requiring high breakdown characteristics.

ABSOLUTE MAXIMUM RATINGS (Tcase = 25°C)

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emitter Voltage	70	Vdc
V_{CBO}	Collector-Base Voltage	100	Vdc
V_{EBO}	Emitter-Base Voltage	3.0	Vdc
I_C	Collector Current	400	mA

Thermal Data

P_D	Total Device Dissipation @ T_A = 25ºC Derate above 25ºC	3.5 20	Watts mW/ ºC

ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

STATIC

(off)

Symbol	Test Conditions	Value			
		Min.	Typ.	Max.	Unit
BVCEO	Collector-Emitter Breakdown Voltage (IC = 1.0 mAdc, IB = 0)	70	-	-	Vdc
BVCBO	Collector-Base Breakdown Voltage (IC= 100 µAdc, IE=0)	100	-	-	Vdc
BVEBO	Emitter-Base Breakdown Voltage (IE = 100 µAdc, IC = 0)	3.0	-	-	Vdc
ICBO	Collector Cutoff Current (VCE = 80 Vdc, IE = 0 Vdc)	-	-	20	µA
ICES	Collector Cutoff Current (VCE = 80 Vdc, IE = 0 Vdc)	-	1.0	100	µA

(on)

HFE	DC Current Gain (IC = 50 mAdc, VCE = 6.0 Vdc)	15	-	-	-

DYNAMIC

Symbol	Test Conditions	Value			
		Min.	Typ.	Max.	Unit
COB	Output Capacitance (VCB = 10Vdc, IE=0, f=1 MHz)	-	2.5	-	pF
CIB	Input Capacitance (VEB = 3Vdc, IE=0, f=1 MHz)	-	6.1	-	pF
f_T	Current-Gain - Bandwidth Product (IC = 50 mAdc, VCE = 10 Vdc, f = 250 MHz)	1000	1500	-	MHz

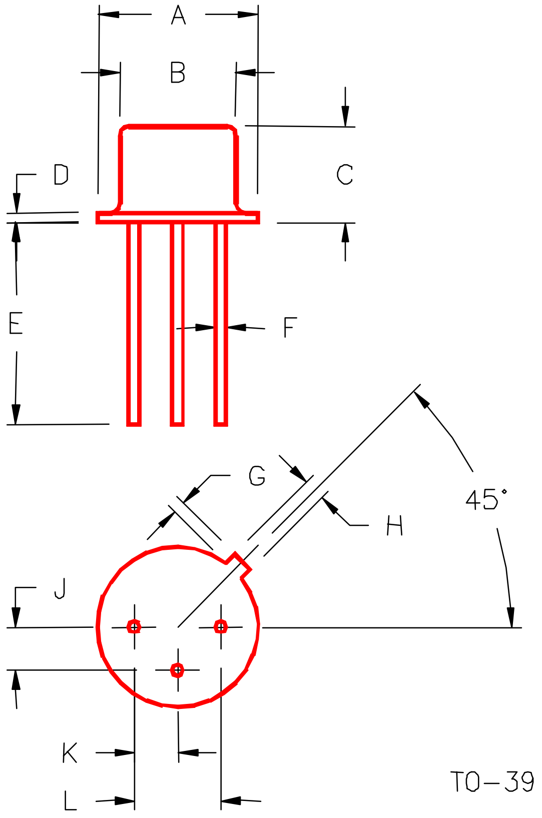
FUNCTIONAL

Symbol	Test Conditions		Value			
			Min.	Typ.	Max.	Unit
$G_{U\,max}$	Maximum Unilateral Gain	IC = 50 mAdc, VCE = 25Vdc, f = 200 MHz	-	13.5	-	dB
MAG	Maximum Available Gain	IC = 50 mAdc, VCE = 25Vdc, f = 200 MHz	-	13.5	-	dB
$\|S_{21}\|^2$	Insertion Gain	IC = 50 mAdc, VCE = 25Vdc, f = 200 MHz	11.7	12.7	-	dB

Table 1. Common Emitter S-Parameters, @ VCE = 25 V, IC = 50 mA

f	S11		S21		S12		S22	
(MHz)	|S11|	∠ φ	|S21|	∠ φ	|S12|	∠ φ	|S22|	∠ φ
100	0.221	-143	8.54	97	0.047	82	0.508	14
200	0.219	-108	4.36	87	0.091	87	0.413	49
300	0.250	-72	2.98	79	0.141	87	0.406	82
400	0.329	-34	2.39	72	0.178	84	0.445	108
500	0.338	9	2.11	70	0.237	87	0.409	140
600	0.348	51	1.83	65	0.292	86	0.412	176
700	0.371	94	1.61	61	0.35	86	0.411	-147
800	0.374	140	1.44	59	0.383	85	0.413	-112
900	0.402	-170	1.45	63	0.428	88	0.386	-78
1000	0.438	-126	1.56	64	0.503	86	0.405	-42

PACKAGE STYLE M246



	MINIMUM INCHES/MM	MAXIMUM INCHES/MM		MINIMUM INCHES/MM	MAXIMUM INCHES/MM
A	.350/8,89	.370/9,40	J	.095/2,41	.105/2,67
B	.315/8,00	.335/8,51	K	.095/2,41	.105/2,67
C	.240/6,10	.260/6,60	L	.190/4,83	.210/5,33
D	.015/0,38	.045/1,14			
E	.500/12,70				
F	.016/0,41	.019/0,48			
G	.029/0,74	.040/1,02			
H	.028/0,71	.034/0,86			

Microsemi

RF PRODUCTS DIVISION

MC1333 WAFFLE PACK DIE

RF & MICROWAVE TRANSISTORS

DESCRIPTION

The MC1333 is a low noise, high gain, discrete silicon bipolar transistor, shipped in waffle pack.

IMPORTANT: For the most current data, consult *MICROSEMI*'s website: **http://www.microsemi.com**

KEY FEATURES

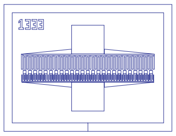
- High FTau-5GHz
- Low noise-2.5dB@500MHz
- Gold Back Metal

ABSOLUTE MAXIMUM RATINGS (T_{CASE} = 25□C)

Symbol□	Parameter□	Value	Unit
V_{CBO}	Collector-Base Voltage	30	V
V_{CEO}	Collector-Emitter Voltage	18	V
V_{EBO}	Emitter-Base Voltage	2.5	V
I_C	Device Current	200	mA
T_J	Junction Temperature	150	C
T_{STG}	Storage Temperature	-55 to +150	C

APPLICATIONS/BENEFITS

- LNA, Oscillator, Pre-Driver



MC1333 DIE

STATIC ELECTRICAL SPECIFICATIONS (TCASE = 25□C)

Symbol	Test	Conditions	Min.	Typ.	Max.	Units
BV_{CBO}	I_C = 1mA	I_E = 0	30			V
BV_{CEO}	I_C = 5mA	I_B = 0	18			V
I_{EBO}	V_{EB} = 2.5V	I_C = 0			100	uA
h_{FE}	V_{CE} = 5 V	I_C = 50mA	50		200	

DYNAMIC ELECTRICAL SPECIFICATIONS (TCASE = 25□C)

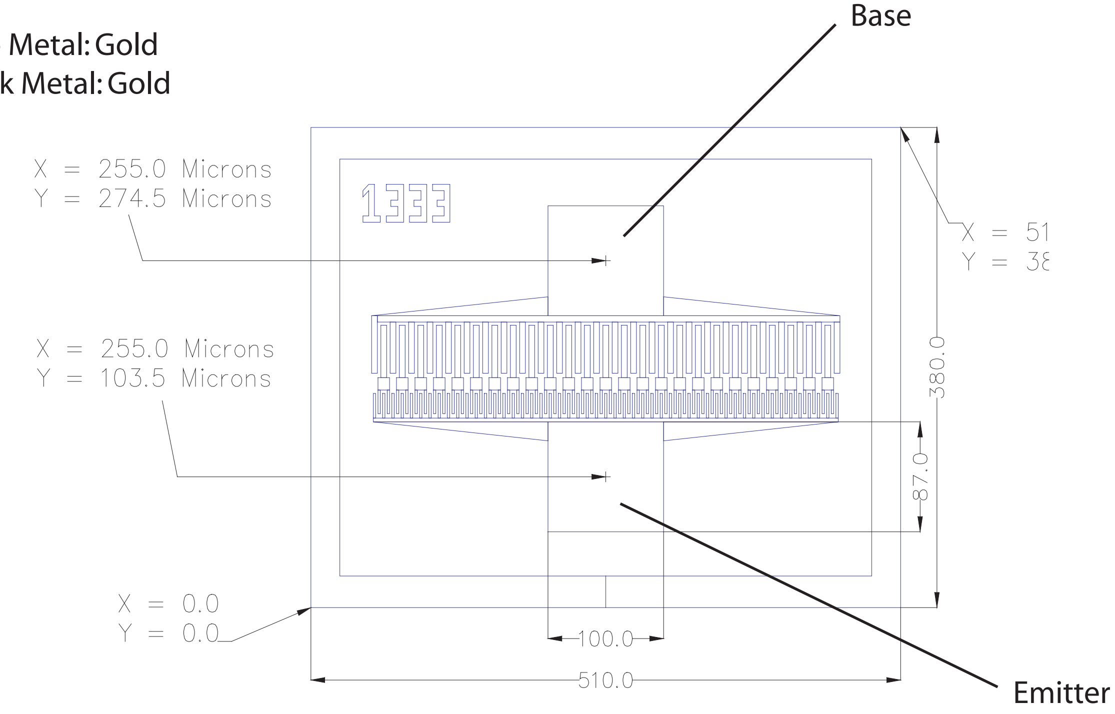
Symbol	Test	Conditions	Min.	Typ.	Max.	Units
FTau	V_{CE} = 10 V Ic= 75 mA	f = 500MHz		5.0		GHz
NFmin	V_{CE} = 10V Ic= 50 mA	f = 500MHz		2.5		dB
G_{NF}	V_{CE} = 10V Ic= 50 mA	f = 500MHz		15.5		dB
$S\|21\|^2$	V_{CE} = 10 V Ic= 50 mA	f = 500MHz	14	15		dB

MC1333 WAFFLE PACK DIE

RF & MICROWAVE TRANSISTORS

DIMENSIONS

Top Metal: Gold
Back Metal: Gold



RF DIE SELECTOR GUIDE

PN	Closest Packaged Equivalent	TYPE	CEO	IC MAX	Ftau	NFmin	Small Signal Gain
MCE545	MRF545	***PNP***	70V	400mA	1.4GHz	n/a	14dB/200MHz
MCE544	MRF544	NPN	70V	400mA	1.4GHz	n/a	13.5dB/200MHz
MC1309	MMBR5031LT1/2N5031	NPN	10V	20mA	2GHz	n/a	12dB/400MHz
MC1333	MRF581/MRF5812R1/BFR96	NPN	18V	200mA	5GHz	2.5dB/500MHz	14dB/500MHz

PN	Closest Packaged Equivalent	TYPE	CEO	ICMAX	Pout	Gain
MC1012	SD1127/MRF237	NPN	18V	640mA	4W/175MHz	12dB/175MHz
MC1826	MS1649/MRF630	NPN	16V	1A	3W/470MHz	9.5dB/470MHz
MC1343	MRF837/MRF8372	NPN	16V	200mA	0.75W/870MHz	8dB/870MHz
MC1333	MRF559	NPN	18V	200mA	0.5W/870MHz	8dB/870MHz