

# The RF Line NPN Silicon High-Frequency Transistor

... designed for amplifier, oscillator or frequency multiplier applications in industrial equipment. Suitable for use as a Class A, B or C output driver or pre-driver stages in VHF and UHF.

- Low Cost SORF Plastic Surface Mount Package
- Guaranteed RF Specification —  $|S_{21}|^2$
- S-Parameter Characterization
- Tape and Reel Packaging Options Available by adding suffix:  
R1 suffix = 500 units per reel  
R2 suffix = 2,500 units per reel

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	30	Vdc
Collector-Base Voltage	$V_{CBO}$	40	Vdc
Emitter-Base Voltage	$V_{EBO}$	3.5	Vdc
Collector Current — Continuous	$I_C$	400	mAdc
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	°C

## DEVICE MARKING

MRF5943 = 5943

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0 8.0	Watt mW/°C
Storage Temperature	$T_{stg}$	150	°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	125	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
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## OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C = 5.0\text{ mA}$ )	$V_{(BR)CEO}$	30	—	—	V
Collector-Base Breakdown Voltage ( $I_C = 100\text{ }\mu\text{A}$ )	$V_{(BR)CBO}$	40	—	—	V
Emitter-Base Breakdown Voltage ( $I_E = 100\text{ }\mu\text{A}$ )	$V_{(BR)EBO}$	3.5	—	—	V
Collector Cutoff Current ( $V_{CE} = 20\text{ V}$ )	$I_{CEO}$	—	—	50	$\mu\text{A}$
Collector Cutoff Current ( $V_{CB} = 15\text{ V}$ )	$I_{CBO}$	—	—	10	$\mu\text{A}$

## ON CHARACTERISTICS

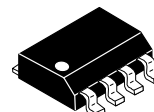
DC Current Gain ( $I_C = 50\text{ mA}$ , $V_{CE} = 15\text{ V}$ )	$h_{FE}$	25	—	300	—
Collector-Emitter Saturation Voltage ( $I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$ )	$V_{CE(sat)}$	—	—	0.2	V
Base-Emitter Saturation Voltage ( $I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$ )	$V_{BE(sat)}$	—	—	1.0	V

## SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ( $I_C = 35\text{ mA}$ , $V_{CE} = 15\text{ V}$ , $f = 100\text{ MHz}$ )	$f_T$	—	1550	—	MHz
Insertion Gain ( $V_{CE} = 15\text{ V}$ , $I_C = 35\text{ mA}$ , $f = 250\text{ MHz}$ )	$ S_{21} ^2$	12	15	—	dB

**MRF5943, R1, R2**

$I_C = 400\text{ mA}$   
SURFACE MOUNT  
HIGH-FREQUENCY  
TRANSISTOR  
NPN SILICON

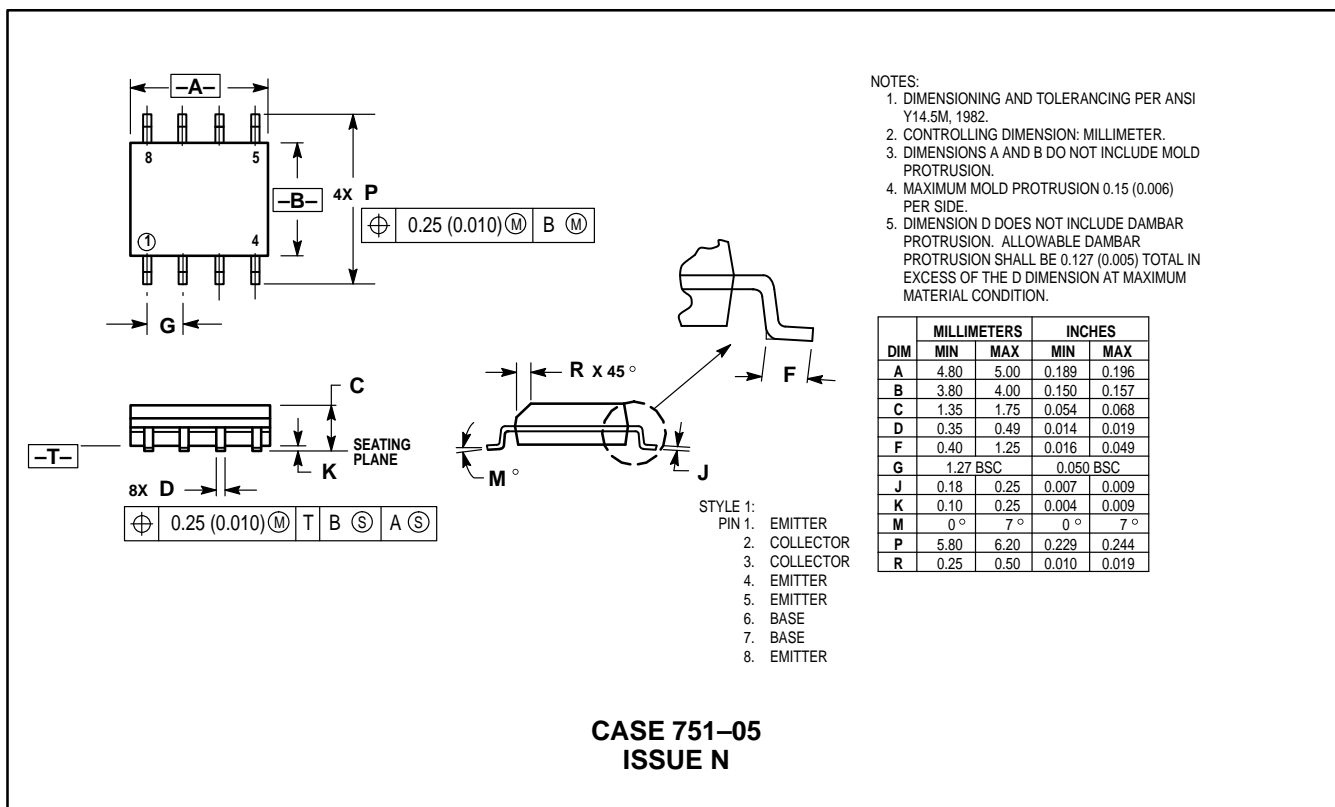


CASE 751-05, STYLE 1  
(SO-8)

V <sub>CE</sub> (Volts)	I <sub>C</sub> (mA)	f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
			S <sub>11</sub>	∠ φ	S <sub>21</sub>	∠ φ	S <sub>12</sub>	∠ φ	S <sub>22</sub>	∠ φ
15	35	10	0.37	-63	53.7	157	0.01	59	0.91	-18
		30	0.52	-120	36.5	128	0.01	48	0.64	-38
		50	0.58	-142	25.4	113	0.02	45	0.47	-44
		70	0.59	-154	19	105	0.02	46	0.38	-44
		100	0.60	-162	13.6	97	0.02	49	0.32	-43
		300	0.64	178	4.6	77	0.05	59	0.28	-49
		500	0.65	168	2.8	64	0.07	60	0.32	-62
		700	0.65	159	2.0	53	0.09	63	0.38	-76
		1000	0.64	144	1.4	38	0.13	63	0.46	-93

Table 1. Common Emitter S-Parameters

## PACKAGE DIMENSIONS



### CASE 751-05 ISSUE N

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MRF5943/D

