

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

MRF5943, R1, R2

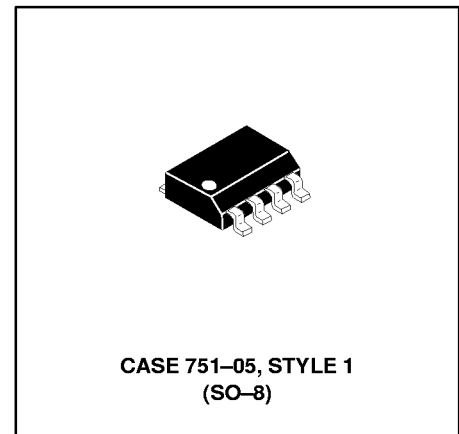
$I_C = 400$ mA
SURFACE MOUNT
HIGH-FREQUENCY
TRANSISTOR
NPN SILICON

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

ON CHARACTERISTICS

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

SMALL-SIGNAL CHARACTERISTICS

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

V _{CE} (Volts)	I _C (mA)	f (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
			S ₁₁	∠	S ₂₁	∠	S ₁₂	∠	S ₂₂	∠
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

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.18	0.25	0.007	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

STYLE 1:
 PIN 1. EMITTER
 2. COLLECTOR
 3. COLLECTOR
 4. EMITTER
 5. EMITTER
 6. BASE
 7. BASE
 8. EMITTER

**CASE 751-05
ISSUE N**

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