

The RF Line  
**NPN Silicon**  
**High-Frequency Transistor**

**MRF3866R2**

- Tape and reel packaging available for MRF3866R2:  
R2 suffix = 2,500 units per reel

**I<sub>C</sub> = 400 mA**  
**HIGH-FREQUENCY**  
**TRANSISTORS**  
**NPN SILICON**

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V <sub>CEO</sub>	30	Vdc
Collector–Base Voltage	V <sub>CBO</sub>	55	Vdc
Emitter–Base Voltage	V <sub>EBO</sub>	3.5	Vdc
Collector Current — Continuous	I <sub>C</sub>	0.4	Adc
Total Device Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	625 5.0	mW mW/°C
Total Device Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C	P <sub>D</sub>	1.5 12	Watts mW/°C
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	–55 to +150	°C
Maximum Junction Temperature	T <sub>Jmax</sub>	150	°C



**CASE 751–05, STYLE 1**  
**(SO–8)**

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	83.3	°C/W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	125	°C/W

**ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 5.0 mA <sub>dc</sub> , R <sub>BE</sub> = 10 Ω)	V <sub>(BR)CER</sub>	55	—	Vdc
Collector–Emitter Sustaining Voltage (I <sub>C</sub> = 5.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)	V <sub>CEO(sus)</sub>	30	—	Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 100 μA <sub>dc</sub> , I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	3.5	—	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 28 Vdc, I <sub>B</sub> = 0)	I <sub>CEO</sub>	—	0.02	mA <sub>dc</sub>
Collector Cutoff Current (V <sub>CE</sub> = 30 Vdc, V <sub>BE</sub> = –1.5 Vdc (Rev.), T <sub>C</sub> = 150°C) (V <sub>CE</sub> = 55 Vdc, V <sub>BE</sub> = –1.5 Vdc (Rev.))	I <sub>CEx</sub>	— —	5.0 0.1	mA <sub>dc</sub>
Emitter Cutoff Current (V <sub>BE</sub> = 3.5 Vdc, I <sub>C</sub> = 0)	I <sub>EBO</sub>	—	0.1	mA <sub>dc</sub>

(continued)

**ELECTRICAL CHARACTERISTICS — continued** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>				
DC Current Gain ( $I_C = 360\text{ mA}_{dc}$ , $V_{CE} = 5.0\text{ V}_{dc}$ ) (1) ( $I_C = 50\text{ mA}_{dc}$ , $V_{CE} = 5.0\text{ V}_{dc}$ )	$h_{FE}$	5.0 10	— 200	—
Collector–Emitter Saturation Voltage ( $I_C = 100\text{ mA}_{dc}$ , $I_B = 20\text{ mA}_{dc}$ )	$V_{CE(sat)}$	—	1.0	Vdc

**SMALL–SIGNAL CHARACTERISTICS**

Current–Gain — Bandwidth Product ( $I_C = 50\text{ mA}_{dc}$ , $V_{CE} = 15\text{ V}_{dc}$ , $f = 200\text{ MHz}$ )	$f_T$	500	—	MHz
Output Capacitance ( $V_{CB} = 28\text{ V}_{dc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	—	3.0	pF

**FUNCTIONAL TEST**

Amplifier Power Gain ( $V_{CC} = 28\text{ V}_{dc}$ , $P_{out} = 1.0\text{ W}$ , $f = 400\text{ MHz}$ )	$G_{pe}$	10	—	dB
Collector Efficiency ( $V_{CC} = 28\text{ V}_{dc}$ , $P_{out} = 1.0\text{ W}$ , $f = 400\text{ MHz}$ )	$\eta$	45	—	%

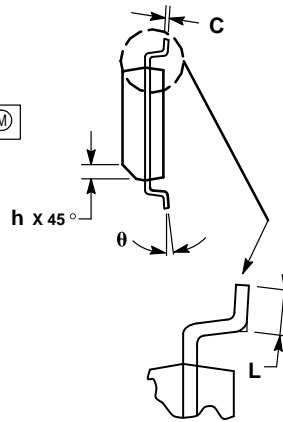
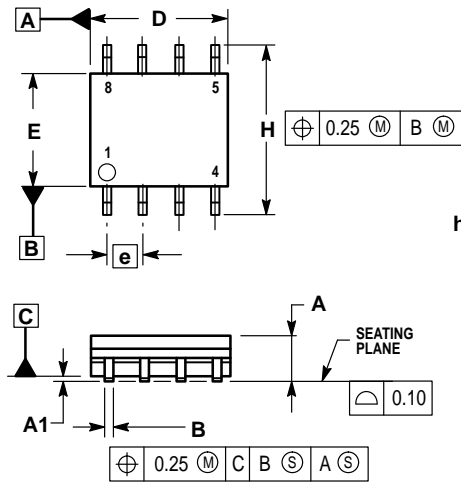
**NOTE:**

1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

$V_{CE}$ (Volts)	$I_C$ (mA)	$f$ (MHz)	$S_{11}$		$S_{21}$		$S_{12}$		$S_{22}$	
			$S_{11}$	$\angle\phi$	$S_{21}$	$\angle\phi$	$S_{12}$	$\angle\phi$	$S_{22}$	$\angle\phi$
15	50	100	0.67	–166	13.75	92	0.016	44	0.32	–27
		200	0.69	–176	6.93	81	0.024	53	0.30	–24
		300	0.70	177	4.57	73	0.032	57	0.32	–31
		400	0.71	172	3.38	67	0.042	59	0.34	–37
		500	0.72	168	2.66	61	0.049	59	0.37	–45
		600	0.72	164	2.17	54	0.056	61	0.40	–53
		700	0.72	160	1.85	49	0.061	63	0.43	–60
		800	0.72	155	1.61	44	0.068	65	0.47	–66
		900	0.71	151	1.40	39	0.075	64	0.50	–73
		1000	0.70	146	1.25	34	0.084	68	0.53	–79

**Table 1. MRF3866R2 Common Emitter S–Parameters**

# PACKAGE DIMENSIONS



**NOTES:**


1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.18	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
$\theta$	0°	7°

**STYLE 1:**

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

**CASE 751-05  
ISSUE S**

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**MRF3866/D**