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MMBT918

Silicon NPN Transistor

High Frequency RF Amplifier

SOT-23 Type Surface Mount Package

Description:

The MMBT918 is a silicon NPN transistor in a SOT-23 surface mount type package designed for use as an RF amplifier, oscillator, and multiplier with collector currents in the 1mA to 30mA range

Absolute Maximum Ratings: ($T_A = +25^\circ\text{C}$, Note 1 unless otherwise specified)

Collector-Emitter Voltage, V_{CEO}	15V
Collector-Base Voltage, V_{CBO}	30V
Emitter-Base Voltage, V_{EBO}	3V
Continuous Collector Current, I_C	50mA
Total Device Dissipation ($T_A = +25^\circ\text{C}$, Note 2), P_D	225mW
Derate Above 25°C	1.8mW/ $^\circ\text{C}$
Operating Junction Temperature Range, T_J	-55° to $+150^\circ\text{C}$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 2), R_{thJA}	$+556^\circ\text{C/W}$

Note 1. The Absolute Maximum Ratings are limiting values above which the serviceability of any semiconductor device may be impaired. These ratings are based on a maximum junction temperature of $+150^\circ\text{C}$.

Note 2. Device mounted on FR-4 PCB 1.6" x 1.6" x 0.06".

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C = 3\text{mA}$, $I_B = 0$, Note 3	15	—	—	V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 1\mu\text{A}$, $I_E = 0$	30	—	—	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$, $I_C = 0$	3	—	—	V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 15\text{V}$, $I_E = 0$	—	—	0.01	μA
		$V_{CB} = 15\text{V}$, $I_E = 0$, $T_A = +150^\circ\text{C}$	—	—	1.0	μA

Note 3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

Electrical Characteristics (Cont'd): ($T_A = +25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics						
DC Current Gain	h_{FE}	$I_C = 3\text{mA}$, $V_{CE} = 1\text{V}$	20	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}$, $I_B = 1\text{mA}$	–	–	0.4	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{mA}$, $I_B = 1\text{mA}$	–	–	1.0	V
Small–Signal Characteristics						
Current Gain–Bandwidth Product	f_T	$I_C = 4\text{mA}$, $V_{CE} = 10\text{V}$, $f = 100\text{MHz}$	600	–	–	MHz
Output Capacitance	C_{obo}	$V_{CB} = 0\text{V}$, $I_E = 0$, $f = 1.0\text{MHz}$	–	–	3.0	pF
		$V_{CB} = 10\text{V}$, $I_E = 0$, $f = 1.0\text{MHz}$	–	–	1.7	pF
Input Capacitance	C_{ibo}	$V_{BE} = 0.5\text{V}$, $I_C = 0$, $f = 1.0\text{MHz}$	–	–	2.0	pF
Noise Figure	NF	$I_C = 1\text{mA}$, $V_{CE} = 6\text{V}$, $R_S = 400\Omega$, $f = 60\text{MHz}$	–	–	6	dB
Functional Test						
Amplifier Power Gain	G_{pe}	$I_C = 6\text{mA}$, $V_{CB} = 12\text{V}$, $f = 200\text{MHz}$	15	–	–	dB
Power Output	P_{out}	$I_C = 8\text{mA}$, $V_{CB} = 15\text{V}$, $f = 500\text{MHz}$	30	–	–	mW
Collector Efficiency	η	$I_C = 8\text{mA}$, $V_{CB} = 15\text{V}$, $f = 500\text{MHz}$	25	–	–	%

