



ELECTRONICS, INC.
44 FARRAND STREET
BLOOMFIELD, NJ 07003
(973) 748-5089
<http://www.nteinc.com>

MMBT3906

Silicon PNP Transistor

General Purpose Amp, Surface Mount

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

Collector-Emitter Voltage, V_{CEO}	40V
Collector-Base Voltage, V_{CBO}	40V
Emitter-Base Voltage, V_{EBO}	5V
Continuous Collector Current, I_C	200mA
Total Device Dissipation (Note 2), P_D	350mW
Derate above $+25^\circ\text{C}$	2.8mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 2), R_{thJA}	375 $^\circ\text{C}/\text{W}$
Operating Junction Temperature Range, T_J	-55° to $+150^\circ\text{C}$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ\text{C}$

Note 1. These are steady-state limits and are based on a maximum junction temperature of $+150^\circ\text{C}$.

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

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$, $I_B = 0$, Note 3	40	–	–	V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}$, $I_E = 0$	40	–	–	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$, $I_C = 0$	5	–	–	V
Base Cut-Off Current	I_{BL}	$V_{CE} = 30\text{V}$, $V_{BE} = 3\text{V}$	–	–	50	nA
Collector Cutoff Current	I_{CEX}	$V_{CE} = 30\text{V}$, $V_{BE} = 3\text{V}$	–	–	50	nA
ON Characteristics						
DC Current Gain (Note 3)	h_{FE}	$V_{CE} = 1\text{V}$, $I_C = 0.1\text{mA}$	60	–	–	
		$V_{CE} = 1\text{V}$, $I_C = 1\text{mA}$	80	–	–	
		$V_{CE} = 1\text{V}$, $I_C = 10\text{mA}$	100	–	300	
		$V_{CE} = 1\text{V}$, $I_C = 50\text{mA}$	60	–	–	
		$V_{CE} = 1\text{V}$, $I_C = 100\text{mA}$	30	–	–	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}$, $I_B = 1\text{mA}$	–	–	0.25	V
		$I_C = 50\text{mA}$, $I_B = 5\text{mA}$	–	–	0.40	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{mA}$, $I_B = 1\text{mA}$	0.65	–	0.85	V
		$I_C = 50\text{mA}$, $I_B = 5\text{mA}$	–	–	0.95	V

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
Small-Signal Characteristics						
Current Gain-Bandwidth Product	f_T	$I_C = 10\text{mA}$, $V_{CE} = 20\text{V}$, $f = 100\text{MHz}$	250	–	–	MHz
Output Capacitance	C_{obo}	$V_{CB} = 5\text{V}$, $I_E = 0$, $f = 100\text{kHz}$	–	–	4.5	pF
Input Capacitance	C_{ibo}	$V_{EB} = 0.5\text{V}$, $I_C = 0$, $f = 100\text{kHz}$	–	–	10	pF
Noise Figure	NF	$V_{CE} = 5\text{V}$, $I_C = 100\mu\text{A}$, $R_S = 1\text{k}\Omega$, $f = 10\text{Hz}$ to 15.7kHz	–	–	4	dB
Switching Characteristics						
Delay Time	t_d	$V_{CC} = 3\text{V}$, $V_{BE} = 0.5\text{V}$, $I_C = 10\text{mA}$, $I_{B1} = 1\text{mA}$	–	–	35	ns
Rise Time	t_r		–	–	35	ns
Storage Time	t_s	$V_{CC} = 3\text{V}$, $I_C = 10\text{mA}$, $I_{B1} = I_{B2} = 1\text{mA}$	–	–	225	ns
Fall Time	t_f		–	–	75	ns

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

