BORN SEMICONDUCTOR

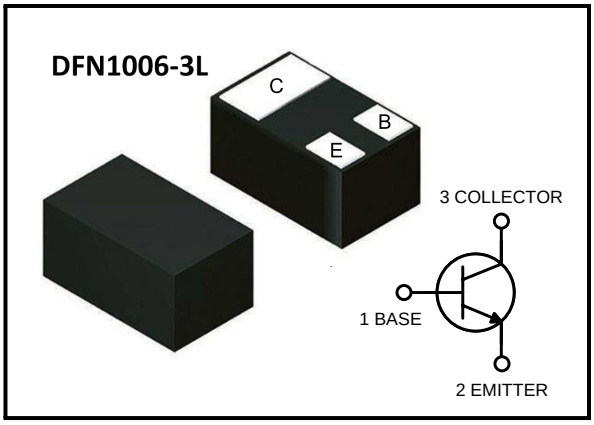
MMBT3904N

NPN Plastic-Encapsulate Transistor

Features

- V_{CE}=40V
- I_C=0.2A
- f_T=300MHZ @V_{CE}=20V, I_C=10mA,f=100MHz

Package



Description

- As complementary type the PNP transistor MMBT3906N is recommended
- Epitaxial planar die construction
- DFN1006-3L Plastic Package.

Marking

1N

Ordering information

Order code	Package	Marking	Base qty	Delivery mode
MMBT3904N	DFN1006-3L	1N	10K	Tape and reel

Absolute Maximum Ratings @T_A=25°C unless otherwise noted

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	60	V
V_{CEO}	Collector-Emitter Voltage	40	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current	200	mA
P_C	Collector Power Dissipation	150	mW
$R_{\theta JA}$	Thermal Resistance From Junction to Ambient	833	°C/W
T_J	Junction Temperature	150	°C
T_{stg}	Storage Temperature Range	-55 to +150	°C

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Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$V_{(BR)CBO}$	Collector-base breakdown voltage	I_C=10μA, I_E=0	60	–	–	V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C=1mA,I_B=0	40	–	–	
$V_{(BR)EBO}$	Emitter-base breakdown voltage	I_E=10μA,I_C=0	6	–	–	
I_{CEX}	Collector cut-off current	V_{CE}=30V,V_{EB}(off)=3V	–	–	50	nA
I_{EBO}	Emitter cut-off current	V_{EB}=5V, I_C=0mA	–	–	100	nA
$h_{FE(1)}$	DC current gain	V_{CE}=1V,I_C=0.1mA	40	–	–	–
$h_{FE(2)}$		V_{CE}=1V,I_C=1mA	70	–	–	
$h_{FE(3)}$		V_{CE}=1V,I_C=10mA	100	–	300	
$h_{FE(4)}$		V_{CE}=1V,I_C=50mA	60	–	–	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C=10mA,I_B=1mA	–	–	0.2	V
		I_C=50mA,I_B=5mA	–	–	0.3	
$V_{BE(sat)}$	Base-emitter saturation voltage	I_C=10mA,I_B=1mA	0.65	–	0.85	
		I_C=50mA,I_B=5mA	–	–	0.95	
t_d	Delay time	V_{CC}=3V, $V_{BE(off)}$=-0.5V, I_C=10mA,I_{B1}=1mA	–	–	35	nS
t_r	Rise time		–	–	35	
t_s	Storage time	V_{CC}=3V, I_C=10mA,I_{B1}=I_{B2}=1mA	–	–	200	
t_f	Fall time		–	–	50	
f_T	Transition frequency	V_{CE}=20V,I_C=10mA ,f=100MHZ	300	–	–	MHZ
C_{ob}	Output Capacitance	V_{CB}=5V,I_E=0,f=1MHZ	–	–	4	pF
C_{ib}	Input Capacitance	V_{EB}=0.5V,I_C=0,f=1MHZ	–	–	8	pF

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Typical Performance Characteristics(T_J = 25 °C, unless otherwise noted)

Figure 1 : Static Characteristic

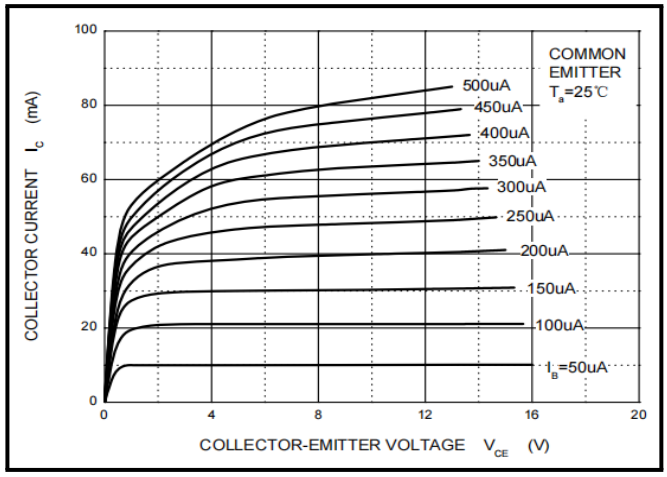

Figure 2 :h_{FE}—I_C

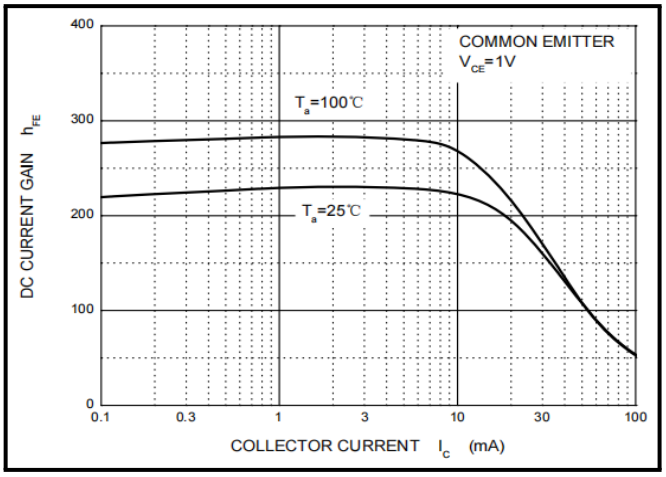

Figure 3 :$V_{CE(sat)}$—I_C

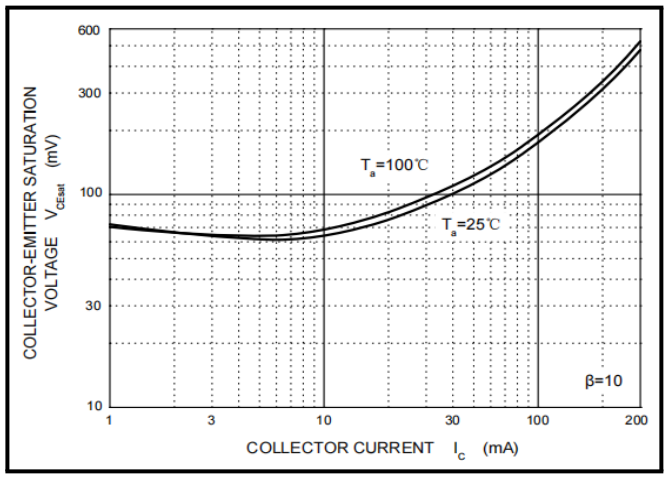

Figure 4 : $V_{BE(sat)}$— I_C

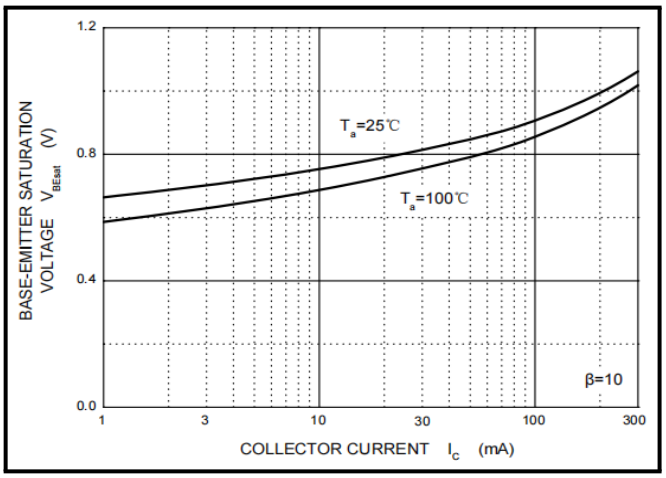

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Figure 5 :I_C—V_{BE}

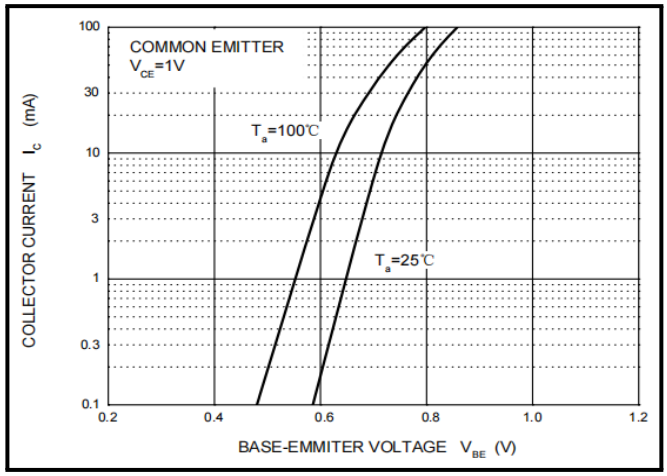


Figure 6 :C_{ob}/C_{ib}—V_{CB}/V_{EB}

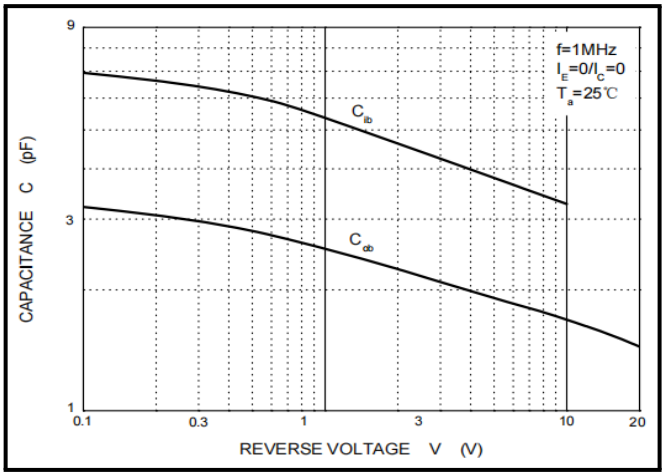


Figure 7 :f_C—I_C

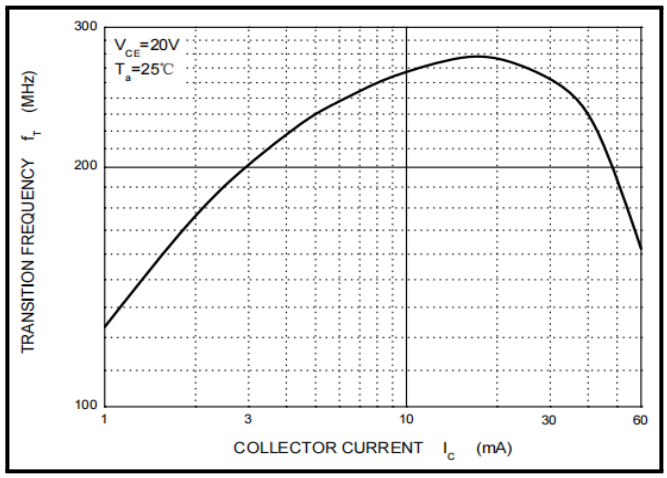
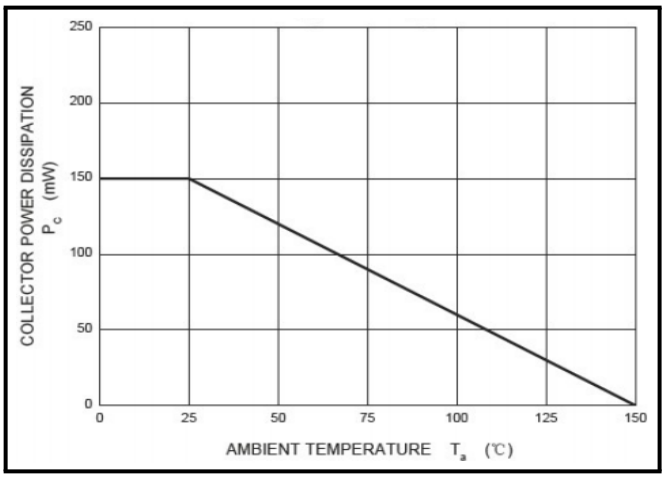


Figure 8 :P_C— T_A



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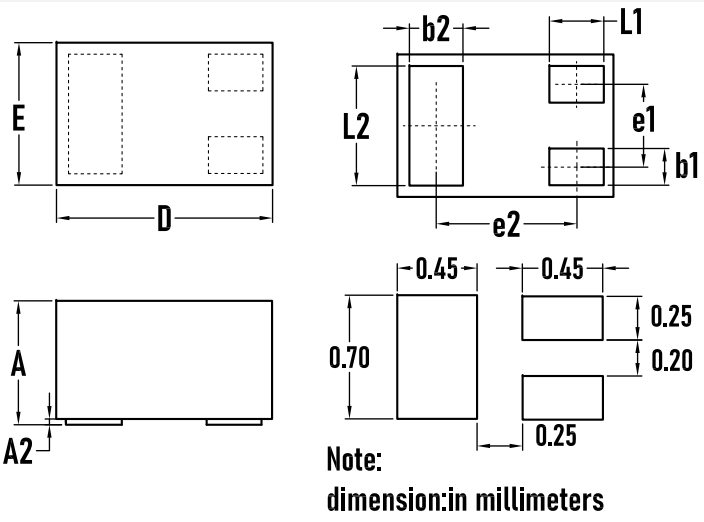
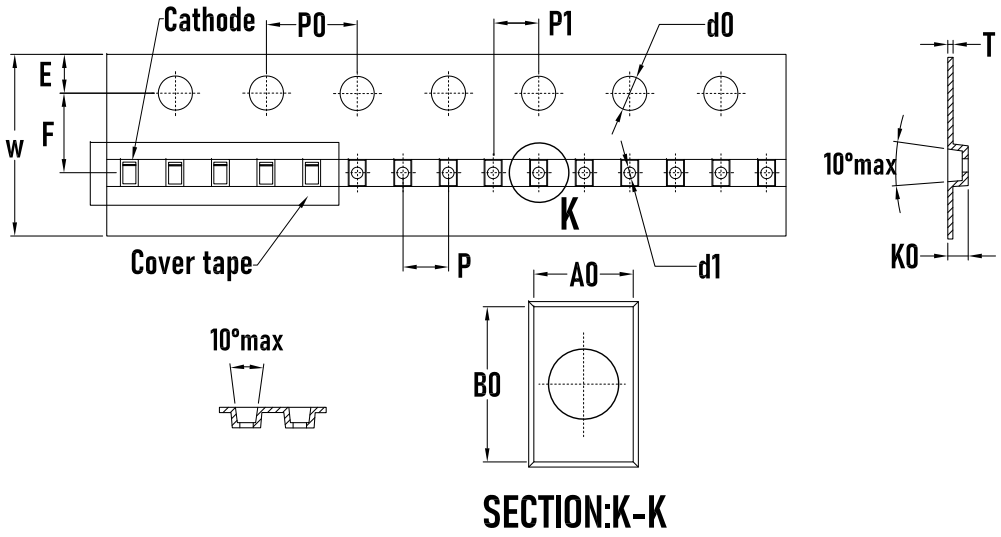
Outline Drawing – DFN1006-3L



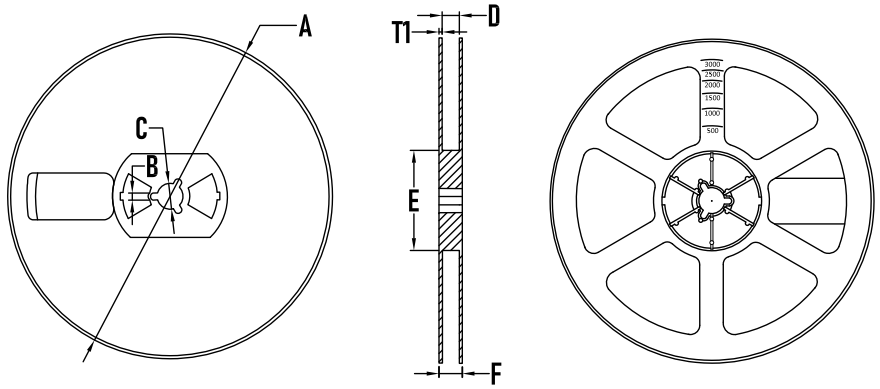
SYMBOL	MILLIMETER		
	MIN.	Typ.	MAX.
A	0.40	–	050
A2	0.00	–	.05
b1	0.10	0.15	0.20
b2	0.20	0.25	0.30
D	0.95	1.00	1.05
E	0.55	0.60	0.65
e1	0.350BSC		
e2	0.675BSC		
L1	0.20	0.30	0.40
L2	0.40	0.50	0.60

Packaging Tape - DFN1006



SYMBOL	MILLIMETER
A0	0.71±0.05
B0	1.11±0.05
d0	$1.5^{+0.1}_{-0}$
d1	0.50±0.05
E	1.75±0.10
F	3.50±0.05
K0	0.56±0.05
P	2.00±0.05
P0	4.00±0.10
P1	2.00±0.05
W	$8.00^{+0.03}_{-0.01}$
T	0.2±0.015

Packaging Reel



SYMBOL	MILLIMETER
A	178±1
B	3.5±0.2
C	14.3±0.2
D	9.8^{+2}_{-1}
E	54.5±0.5
F	12.4±0.2
T1	1.0±0.2
Quantity	10000PCS

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