

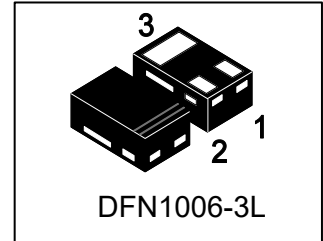
# MBT3904N

## S-MBT3904N

General Purpose Transistors NPN Silicon

### 1. FEATURES

- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- S- prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.

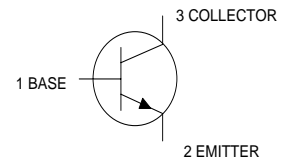


### 2. DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
MBT3904N	1A	10000/Tape&Reel

### 3. MAXIMUM RATINGS(Ta = 25°C)

Parameter	Symbol	Limits	Unit
Collector–Emitter Voltage	VCEO	40	V
Collector–Base Voltage	VCBO	60	V
Emitter–Base Voltage	VEBO	6	V
Collector Current — Continuous	IC	200	mA



### 4. THERMAL CHARACTERISTICS

Parameter	Symbol	Limits	Unit
Total Device Dissipation, FR-5 Board (Note 1) @ TA = 25°C Derate above 25°C	PD	250 2	mW mW/°C
Thermal Resistance, Junction–to–Ambient(Note 1)	RθJA	500	°C/W
Junction and Storage temperature	TJ, Tstg	-55~+150	°C

1. FR-5 = 1.0×0.75×0.062 in.



**5. ELECTRICAL CHARACTERISTICS (Ta= 25°C)**

OFF CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Collector–Emitter Breakdown Voltage (IC = 1.0 mA, IB = 0)	VBR(CEO)	40	-	-	V
Collector–Base Breakdown Voltage (IC = 10 μA, IE = 0)	VBR(CBO)	60	-	-	V
Emitter–Base Breakdown Voltage (IE = 10 μA, IC = 0)	VBR(EBO)	6	-	-	V
Collector Cutoff Current ( VCE = 30 V, VEB = 3.0V)	ICEX	-	-	50	nA
Base Cutoff Current (VCE = 30 V, VEB = 3.0V)	IBL	-	-	50	nA

ON CHARACTERISTICS (Note 2.)

DC Current Gain (IC = 0.1 mA, VCE = 1.0 V)	HFE	40	-	-	V
(IC = 1.0 mA, VCE = 1.0 V)		70	-	-	
(IC = 10 mA, VCE = 1.0 V)		100	-	300	
(IC = 50 mA, VCE = 1.0 V)		60	-	-	
(IC = 100 mA, VCE = 1.0 V)		30	-	-	
Collector–Emitter Saturation Voltage (IC = 10 mA, IB = 1.0 mA)	VCE(sat)	-	-	0.2	V
(IC = 50 mA, IB = 5.0 mA)		-	-	0.3	
Base–Emitter Saturation Voltage (IC = 10 mA, IB = 1.0 mA)	VBE(sat)	0.65	-	0.85	V
(IC = 50 mA, IB = 5.0 mA)		-	-	0.95	

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product (IC = 10mA, VCE= 20V, f = 100MHz)	fT	300	-	-	MHz
Output Capacitance (VCB = 5.0 V, IE = 0, f = 1.0 MHz)	Cobo	-	-	4	pF
Input Capacitance (VEB = 0.5 V, IC = 0, f = 1.0 MHz)	Cibo	-	-	8	pF

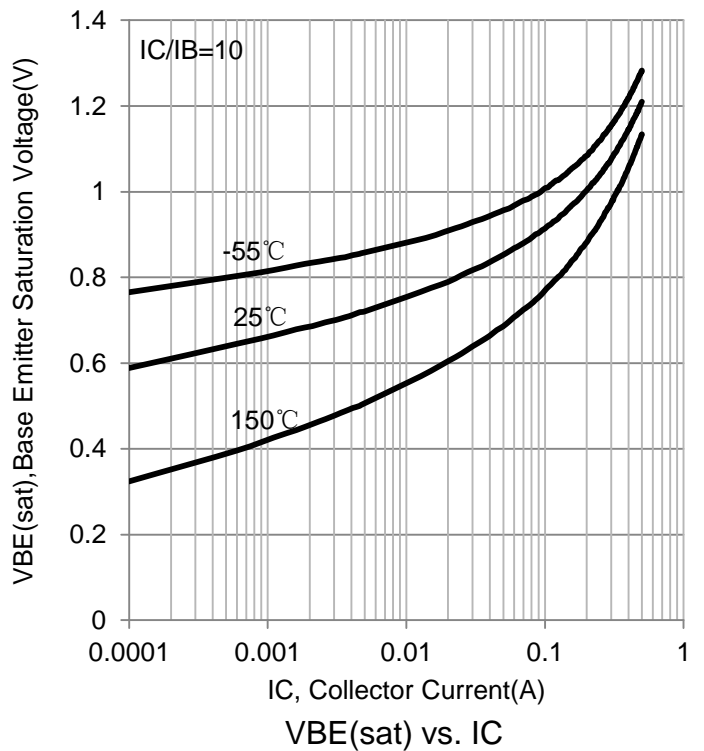
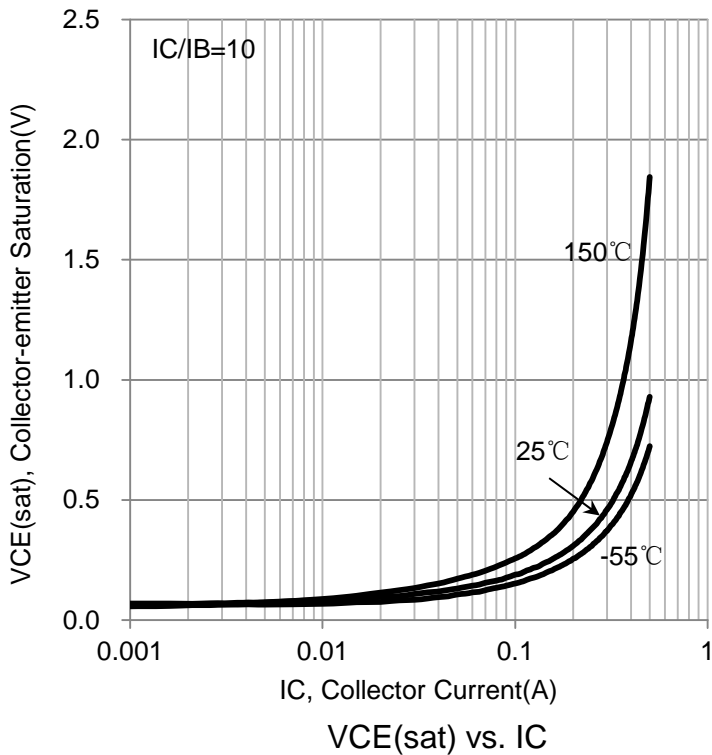
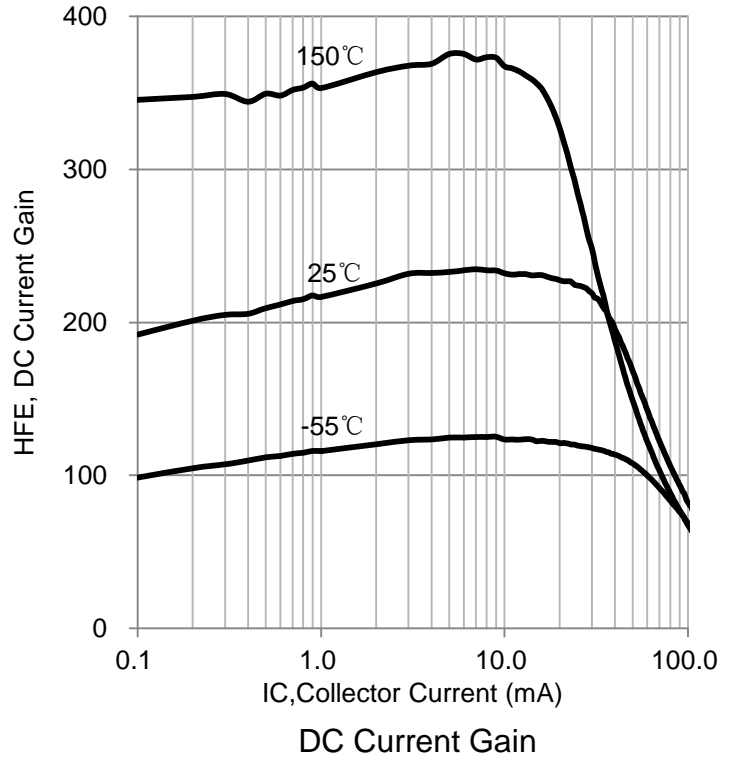
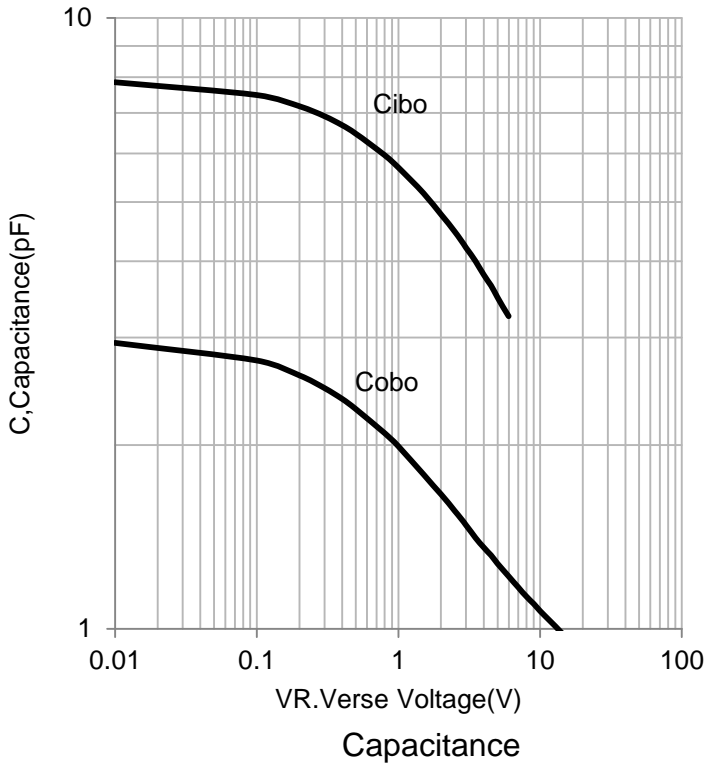
SWITCHING CHARACTERISTICS

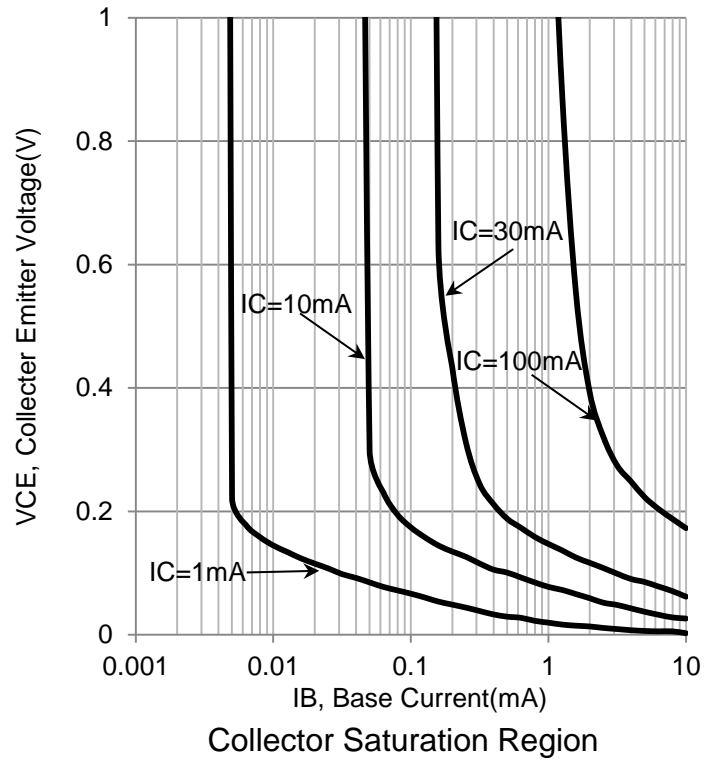
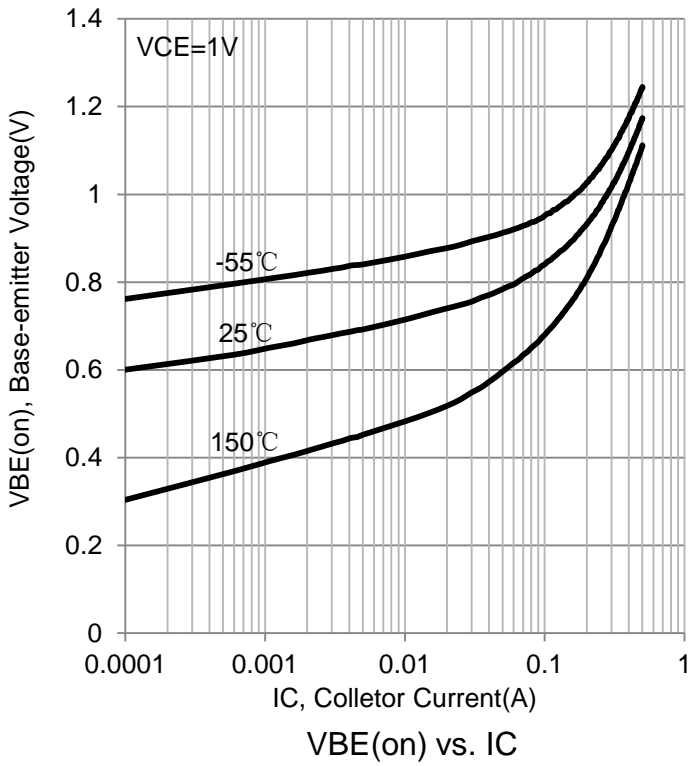
Delay Time	(VCC = 3.0 V, VBE=-0.5V, IC = 10mA, IB1 = 1.0 mA)	td	-	-	35	ns
Rise Time		tr	-	-	35	
Storage Time	(VCC = 3.0 V, IC = 10 mA, IB1 = IB2 = 1.0 mA)	ts	-	-	200	
Fall Time		tf	-	-	50	

2.Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2.0%.

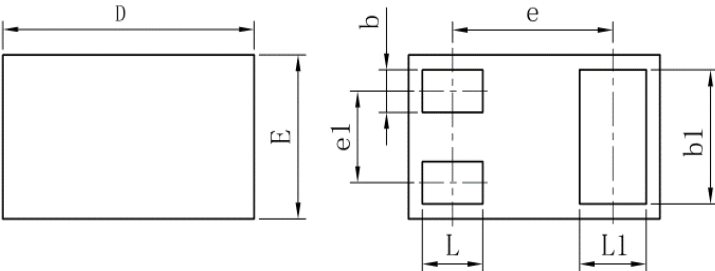


6. ELECTRICAL CHARACTERISTICS CURVES



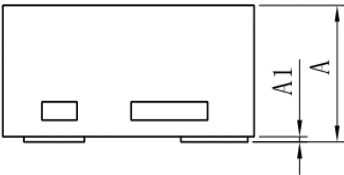


**7.OUTLINE AND DIMENSIONS**



TOP VIEW

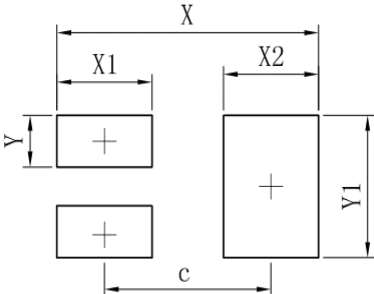
BOTTOM VIEW



SIDE VIEW

DFN1006-3L			
DIM	MIN	TYP	MAX
D	0.95	1.00	1.05
E	0.55	0.60	0.65
e	-	0.64	-
e1	-	0.34	-
L	0.19	0.24	0.29
L1	0.22	0.27	0.32
b	0.10	0.15	0.20
b1	0.44	0.49	0.54
A	0.43	0.48	0.53
A1	0	-	0.05
All Dimensions in mm			

**8.SOLDERING FOOTPRINT**



Dimensions	(mm)
c	0.70
X	1.10
X1	0.40
X2	0.40
Y	0.20
Y1	0.55

