

SOT-883 General Purpose Transistor

NPN Silicon

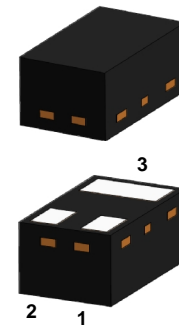
Surface Mount Plastic Package

Green Product

Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V _{CB0}	Collector-Base Voltage	60	V
V _{CE0}	Collector-Emitter Voltage	40	V
V _{EBO}	Emitter-Base Voltage	6	V
I _C	Collector Current	200	mA
P _D	Power Dissipation (FR-4 Board – minimum pad 25°C)	200	mW
R _{θJA}	Thermal Resistance from Junction to Ambient	500	°C/W
T _J T _{STG}	Junction & Storage Temperature Range	-55 to +150	°C

These ratings are limiting values above which the serviceability of the device may be impaired.

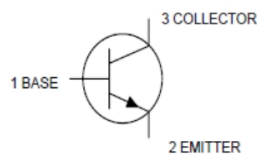


SOT-883 (DFN1006-3)


Specification Features:

- § DFN1006-3
- § Simplifies Circuit Design
- § RoHS Compliant
- § Green EMC
- § Matte Tin(Sn) Lead Finish
- § Weight: approx. 0.001g

Electrical Symbol:



Device Marking Code:

Device Type	Marking	Shipping
MMBT3904N3		10,000/Reel

Electrical Characteristics (T_A = 25°C unless otherwise noted)

Off Characteristics

Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
V _{(BR)CEO}	Collector-Emitter Breakdown Voltage (Note 1)	I _C = 1mA, I _B = 0A	40	-	Volts
V _{(BR)CBO}	Collector-Base Breakdown Voltage	I _C = 10uA, I _E = 0A	60	-	Volts
V _{(BR)EBO}	Emitter-Base Breakdown Voltage	I _E = 10uA, I _B = 0A	6	-	Volts
I _{CBO}	Collector Cutoff Current	V _{CB} = 60V, I _E = 0A	-	0.1	uA
I _{CEX}	Collector Cutoff Current	V _{CE} = 30V, V _{EB} = 3V	-	50	nA
I _{EBO}	Emitter Cutoff Current	V _{EB} = 5V, I _C = 0A	-	0.1	uA

Note 1: Pulse Test. Pulse width <300us, Duty cycle < 2.0%

On Characteristics (Note 1)

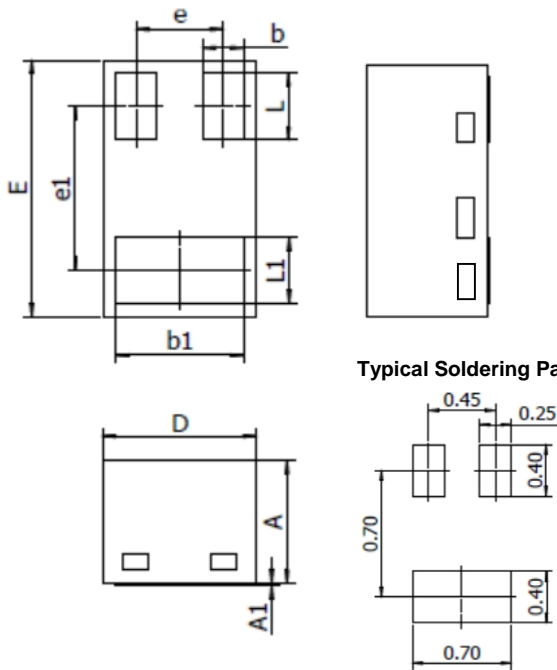
Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
H_{FE}	DC Current Gain	$I_C = 0.1\text{mA}, V_{CE} = 1\text{V}$	40	-	-
		$I_C = 1.0\text{mA}, V_{CE} = 1\text{V}$	70	-	
		$I_C = 10\text{mA}, V_{CE} = 1\text{V}$	100	300	
		$I_C = 50\text{mA}, V_{CE} = 1\text{V}$	60	-	
		$I_C = 100\text{mA}, V_{CE} = 1\text{V}$	30	-	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 1\text{mA}$	-	0.2	Volts
		$I_C = 50\text{mA}, I_B = 5\text{mA}$	-	0.3	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 1\text{mA}$	0.65	0.85	Volts
		$I_C = 50\text{mA}, I_B = 5\text{mA}$	-	0.95	

Small-signal Characteristics

Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
f_T	Current-Gain-Bandwidth Product	$I_C = 10\text{mA}, V_{CE} = 20\text{V}, f = 100\text{MHz}$	200	-	MHz
C_{obo}	Output Capacitance	$V_{CB} = 5\text{V}, I_E = 0\text{A}, f = 1.0\text{MHz}$	-	4	pF
C_{ibo}	Input Capacitance	$V_{BE} = 0.5\text{V}, I_C = 0\text{A}, f = 1.0\text{MHz}$	-	8	pF
h_{ie}	Input Impedance	$V_{CE} = 10\text{V}, I_C = 1\text{mA}, f = 1.0\text{kHz}$	1	10	k Ω
h_{re}	Voltage Feedback Ratio	$V_{CE} = 10\text{V}, I_C = 1\text{mA}, f = 1.0\text{kHz}$	0.5	8	$\times 10^{-4}$
h_{fe}	Small-signal Current Gain	$V_{CE} = 10\text{V}, I_C = 1\text{mA}, f = 1.0\text{kHz}$	100	400	-
h_{oe}	Output Admittance	$V_{CE} = 10\text{V}, I_C = 1\text{mA}, f = 1.0\text{kHz}$	1	40	μmhos
NF	Noise Figure	$V_{CE} = 5\text{V}, I_C = 100\mu\text{A}$ $R_s = 1.0\text{k}\Omega, f = 1.0\text{kHz}$		5	dB

Switching Characteristics

Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
t_d	Delay Time	$V_{CC} = 3\text{V}, V_{BE} = 0.5\text{V},$	-	35	nS
t_r	Rise Time	$I_C = 10\text{mA}, I_{B1} = 1\text{mA}$	-	35	
t_s	Storage Time	$V_{CC} = 3\text{V}, I_C = 10\text{mA},$	-	200	nS
t_f	Fall Time	$I_{B1} = I_{B2} = 1\text{mA}$	-	50	

SOT-883 Package Outline


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.46	0.50	0.018	0.020
A1	---	0.03	---	0.001
D	0.55	0.65	0.022	0.026
E	0.95	1.05	0.037	0.041
b	0.12	0.22	0.005	0.008
b1	0.45	0.55	0.018	0.022
L	0.22	0.32	0.008	0.013
L1	0.22	0.32	0.008	0.013
e	Typ. 0.34		Typ. 0.013	
e1	Typ. 0.65		Typ. 0.026	

NOTICE

The information presented in this document is for reference only. Tak Cheong reserves the right to make changes without notice for the specification of the products displayed herein.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Tak Cheong Semiconductor Co., Ltd., or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website <http://www.takcheong.com>, or consult your nearest Tak Cheong's sales office for further assistance.