

SOT-883 General Purpose Transistor

NPN Silicon

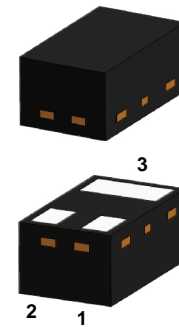
Surface Mount Plastic Package

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 _{EB0}	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.

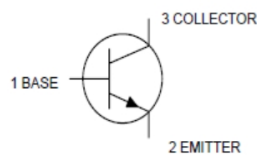


SOT-883 (DFN1006-3)


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)

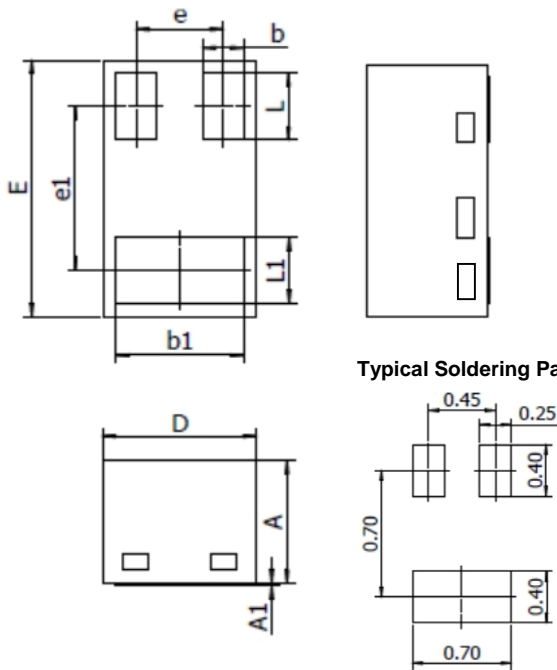
Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
H_{FE}	DC Current Gain	$I_C = 0.1\text{mA}, V_{CE} = 1\text{V}$	40	-	-
		$I_C = 1.0\text{mA}, V_{CE} = 1\text{V}$	70	-	
		$I_C = 10\text{mA}, V_{CE} = 1\text{V}$	100	300	
		$I_C = 50\text{mA}, V_{CE} = 1\text{V}$	60	-	
		$I_C = 100\text{mA}, V_{CE} = 1\text{V}$	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	

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