

# FrelTec

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82319 Starnberg  
Germany

Transistor Diode  
SOT883

# SOT883

## SPECIFICATION

# FrelTec Transistor Diode

671	MMBT3906Nx	ST83	E10
Type	Type	Package	Packing
671: Transistor Diode	MMBT3906N	SOT883	E10: Embossed tape and reel for 10k pc (7'Reel)

All products according to RoHS (2015/863/EU)

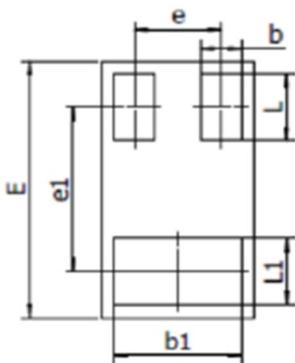
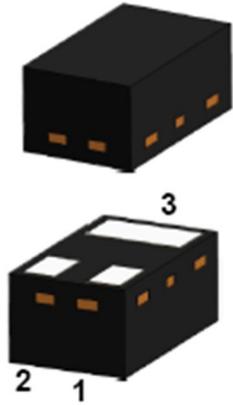


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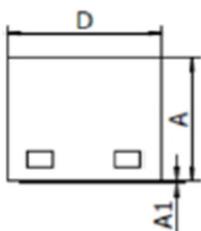
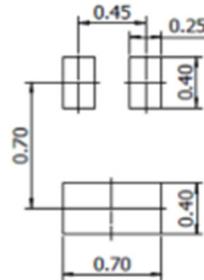
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Transistor Diode

MMBT3906N

**PACKAGE OUTLINE**



Typical Soldering Pattern(mm):



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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Absolute Maximum Ratings TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V <sub>CB0</sub>	Collector-Base Voltage	-40	V
V <sub>CEO</sub>	Collector-Emitter Voltage	-40	V
V <sub>EBO</sub>	Emitter-Base Voltage	-5	V
I <sub>C</sub>	Collector Current - Continuous	-200	mA
P <sub>D</sub>	Power Dissipation (FR-4 Board-minimum pad 25°C)	200	mW
R <sub>θJA</sub>	Typical thermal resistance	600	°C/W
T <sub>J</sub> T <sub>STG</sub>	Storage Temperature Range	-55 to +150	°C

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

## Electrical Characteristics (TA = 25°C unless otherwise noted)

## Off Characteristics

Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
V <sub>(BR)CBO</sub>	Collector-Base Breakdown Voltage(Note 1)	I <sub>C</sub> =-1mA, I <sub>B</sub> =0A	-40		Volts
V <sub>(BR)CEO</sub>	Collector-Emitter Breakdown Voltage	I <sub>C</sub> =-10uA, I <sub>E</sub> =0A	-40		Volts
V <sub>(BR)EBO</sub>	Emitter-Base Breakdown Voltage	I <sub>E</sub> =-10uA, I <sub>B</sub> =0A	-5		Volts
I <sub>C</sub> EX	Collector Cut-off Current	V <sub>CB</sub> =-30V, V <sub>EB</sub> =-3V	-	-50	nA
I <sub>E</sub> BO	Emitter Cut-off Current	V <sub>EB</sub> =-5V, I <sub>C</sub> =0A		-100	nA

Note 1: Pulse Test. Pulse width < 300us, Duty cycle < 2,0%

## On Characteristics(Note 1)

h <sub>FE</sub>	DC Current Gain	I <sub>C</sub> =-0,1mA, V <sub>CE</sub> =-1V	60	-	-
		I <sub>C</sub> =1,0mA, V <sub>CE</sub> =-1V	80	-	
		I <sub>C</sub> =-10mA, V <sub>CE</sub> =-1V	100	300	
		I <sub>C</sub> =-50mA, V <sub>CE</sub> =-1V	60	-	
		I <sub>C</sub> =-100mA, V <sub>CE</sub> =-1V	30	-	
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA	-	-0,25	Volts
		I <sub>C</sub> =-50mA, I <sub>B</sub> =-1mA	-	-0,4	
V <sub>BE(sat)</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA	0,65	-0,85	Volts
		I <sub>C</sub> =-50mA, I <sub>B</sub> =-1mA	-	-0,95	

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## Small-signal Characteristics

Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
$f_T$	Current-Gain-Bandwidth Product	$I_C = -10\text{mA}$ , $V_{CE} = -20\text{V}$ , $f = 100\text{MHz}$	250	-	MHz
$C_{obo}$	Output Capacitance	$V_{CB} = -5\text{V}$ , $I_E = 0\text{A}$ , $f = 1,0\text{MHz}$	-	4,5	pF
$C_{ibo}$	Input Capacitance	$V_{CB} = -0,5\text{V}$ , $I_C = 0\text{A}$ , $f = 1,0\text{KHz}$	-	10	pF
$H_{ie}$	Input Impedance	$V_{CB} = -10\text{V}$ , $I_C = -1\text{mA}$ , $f = 1,0\text{KHz}$	2	12	pF
$H_{re}$	Voltage Feedback Ratio	$V_{CB} = -10\text{V}$ , $I_C = -1\text{mA}$ , $f = 1,0\text{KHz}$	0,1	10	$\times 10^{-4}$
$H_{fe}$	Small-signal Current Gain	$V_{CB} = -10\text{V}$ , $I_C = -1\text{mA}$ , $f = 1,0\text{KHz}$	100	400	0 mhos
$H_{oe}$	Output Admittance	$V_{CB} = -10\text{V}$ , $I_C = -1\text{mA}$ , $f = 1,0\text{KHz}$	3	60	---
NF	Noise Figure	$V_{CB} = -5\text{V}$ , $I_C = -100\mu\text{A}$ , $R_s = 1,0\text{k}\Omega$ , $f = 1,0\text{KHz}$		4	dB

## Switching Characteristics

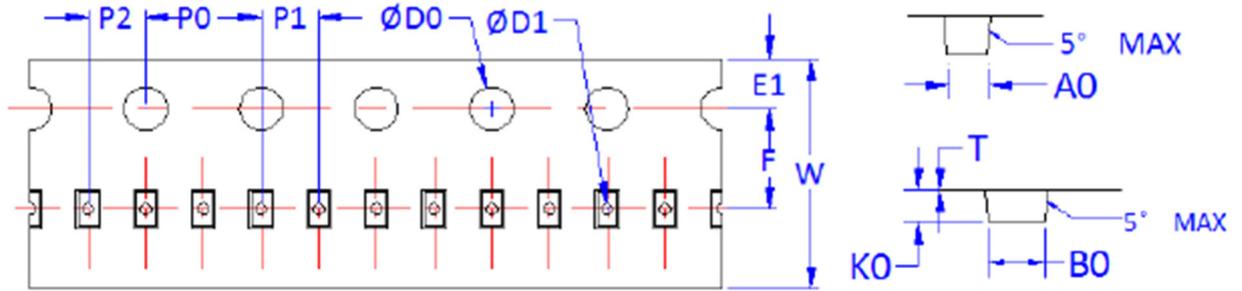
Symbol	Parameter	Test Condition	Limits		Unit
			Min	Max	
$t_d$	Delay Time	$V_{CC} = -3\text{V}$ , $V_{BE} = -0,5\text{V}$	-	35	nS
$t_r$	Rise time	$I_C = -10\text{mA}$ , $I_{B1} = -1\text{mA}$	-	35	
$t_s$	Storage Time	$V_{CC} = -3\text{V}$ , $I_C = -10\text{mA}$ ,	-	225	nS
$t_f$	Fall time	$I_{B1} = I_{B2} = -1\text{mA}$	-	75	

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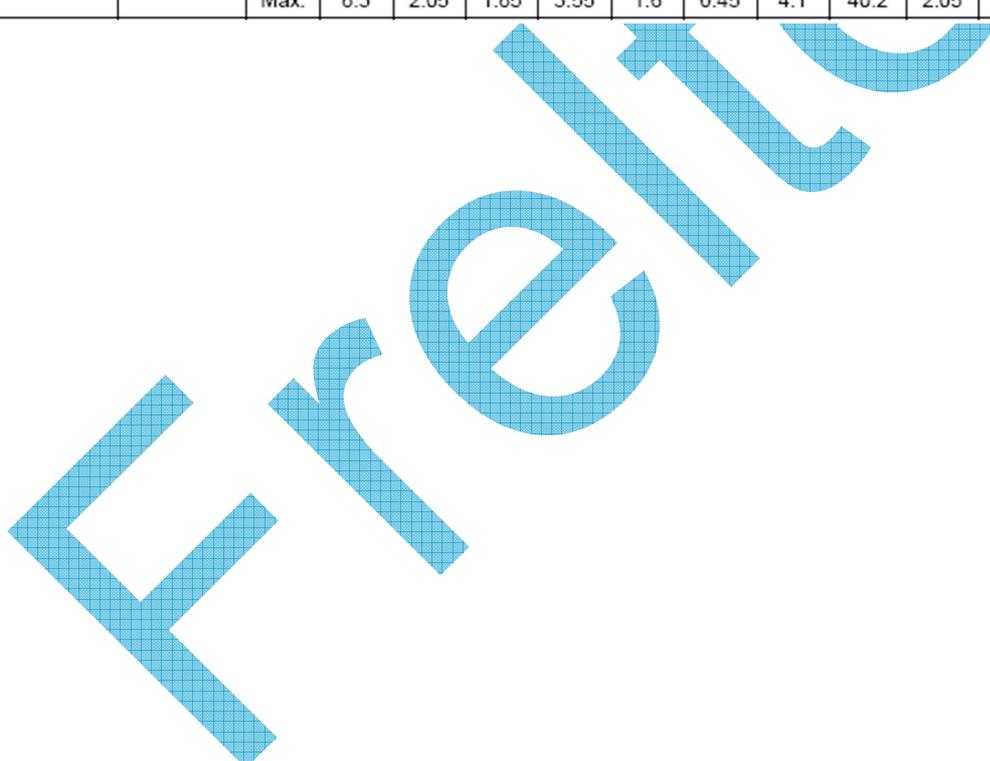
## SPECIFICATION

### *Tape And Reel Package*



Unit: mm

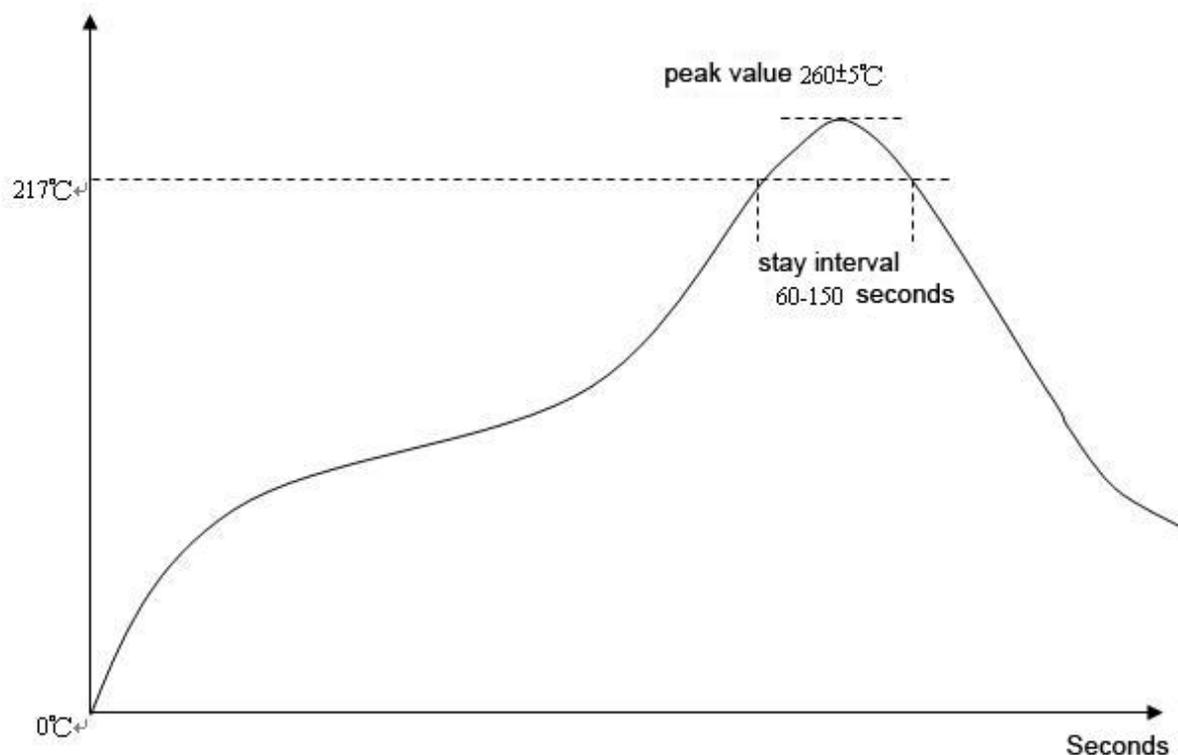
PKG Type	Tape Size	Dim.	W	P1	E1	F	D0	D1	P0	10P0	P2	A0	B0	K0	t
SOD882	8mm	Min.	7.9	1.95	1.65	3.45	1.5	0.35	3.9	39.8	1.95	0.64	1.14	0.61	0.23
		Max.	8.3	2.05	1.85	3.55	1.6	0.45	4.1	40.2	2.05	0.74	1.24	0.71	0.27



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## Lead Free Reflow Soldering Profile

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### Stock period

The performance of these products, including the solderability, is guaranteed for 12 month, provided that they remain packed as they were when delivered and stored at a temperature of 25°C ± 3°C and a relative humidity less than 80%RH

1/30/2022

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Please read cautions and warnings and important notes at the end of this document.

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