

## FEATURES

- | Epitaxial Planar Die Construction

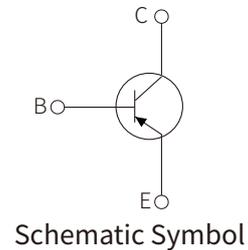
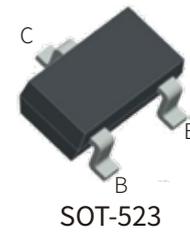
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- | Complementary NPN Type Available

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- | Also Available in Lead Free Version

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## MECHANICAL DATA

- | SOT-523 small outline plastic package

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- | Epoxy UL: 94V-0

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- | Mounting position: Any

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## APPROVALS

<b>RoHS</b>	Compliance with 2011/65/EU
<b>HF</b>	Compliance with IEC61249-2-21:2003

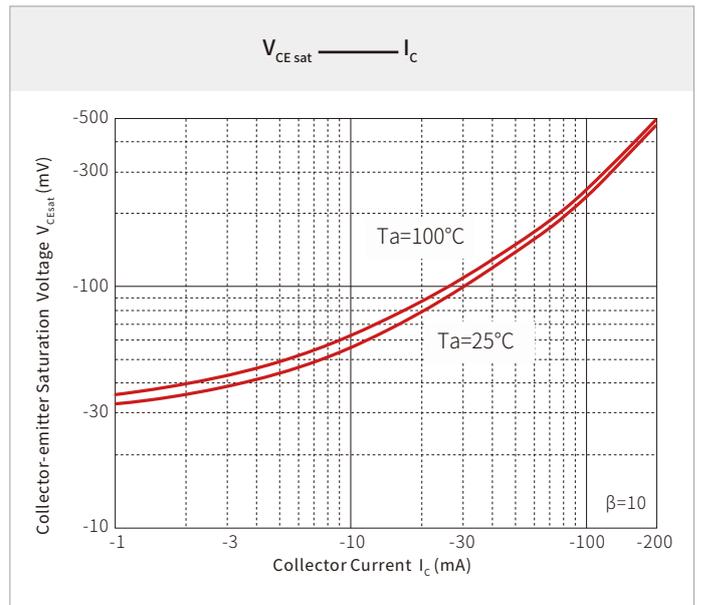
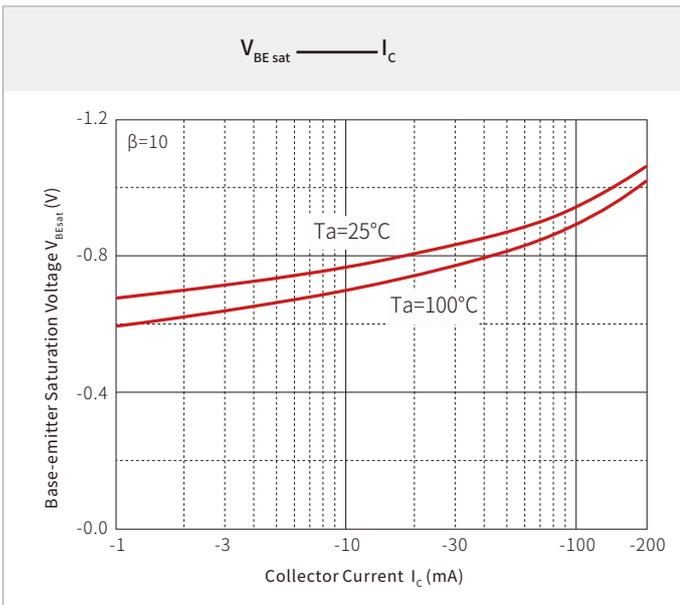
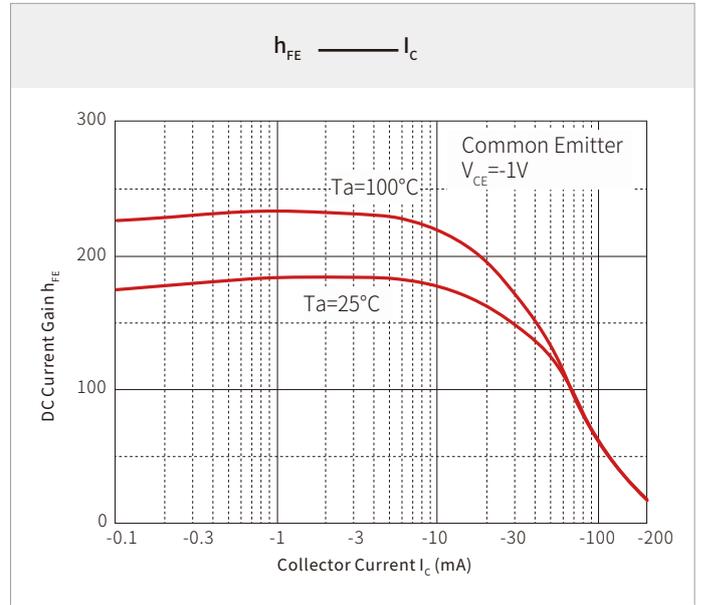
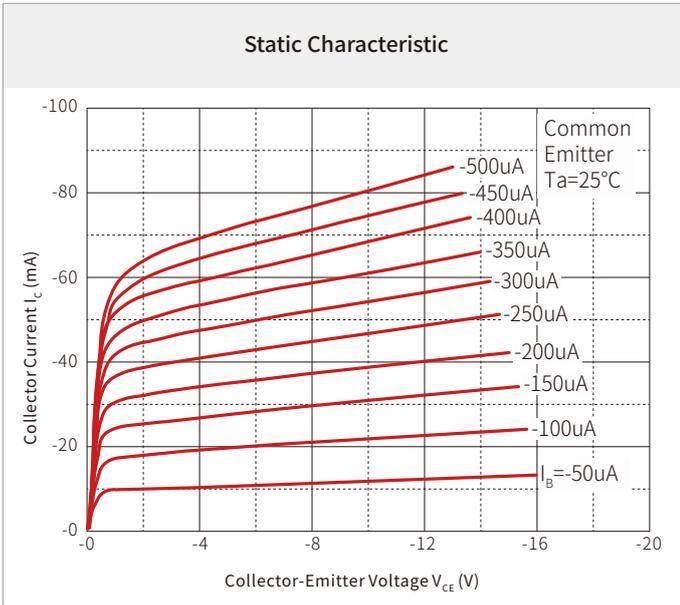
## MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ )

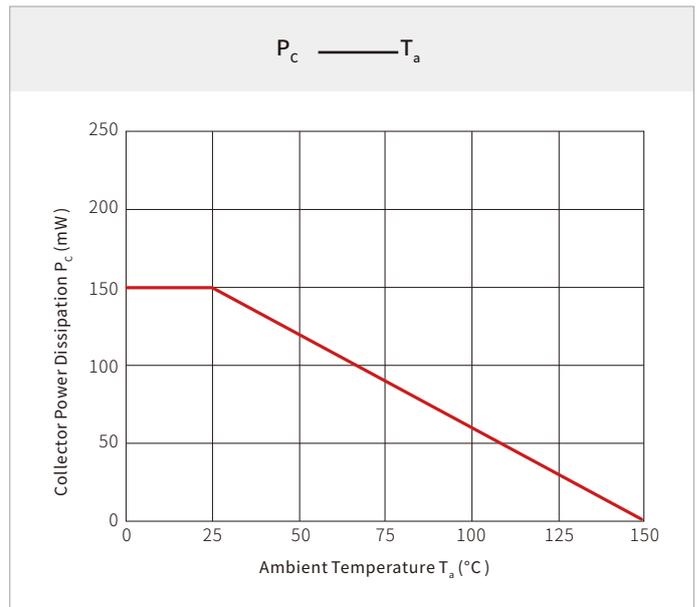
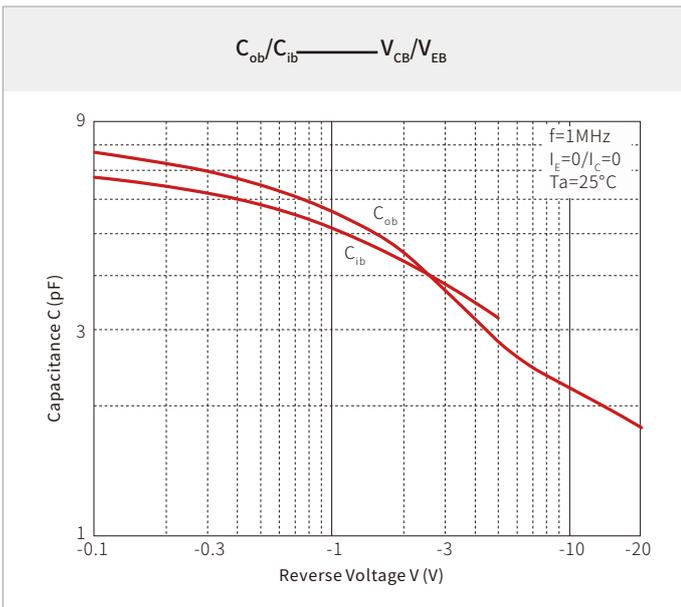
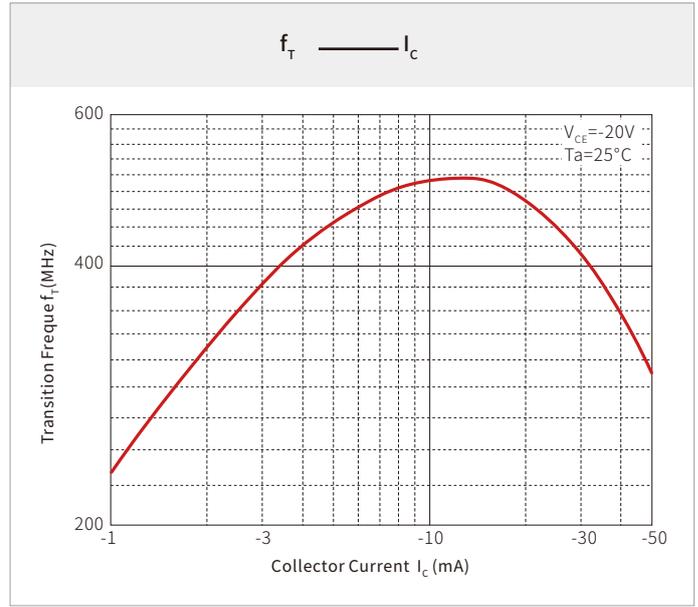
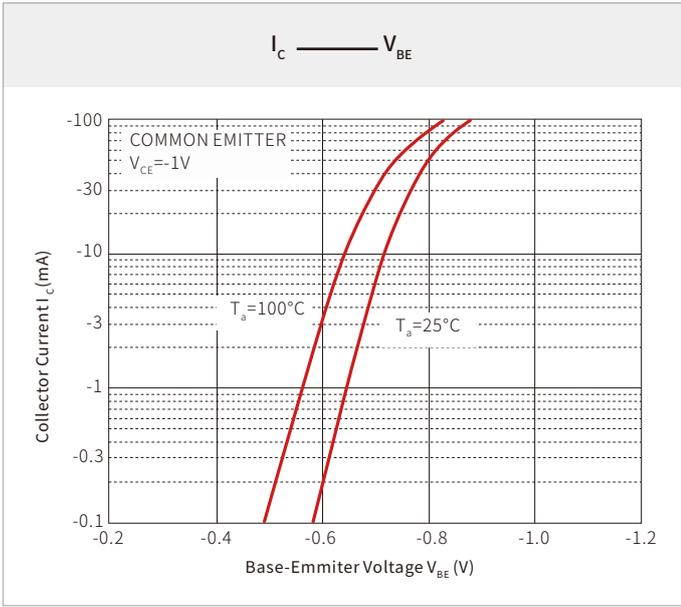
Parameter	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-40	
Emitter-Base Voltage	$V_{EBO}$	-5.0	
Collector Current	$I_C$	-200	mA
Collector Power Dissipation	$P_C$	150	mW
Thermal Resistance From Junction To Ambient	$R_{\theta JA}$	833	$^{\circ}\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	-55~+150	$^{\circ}\text{C}$

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =-10μA, I <sub>E</sub> =0	-40			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =-1mA, I <sub>B</sub> =0	-40			
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =-10μA, I <sub>C</sub> =0	-5			
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> =-30V, I <sub>E</sub> =0			-0.1	μA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =-5V, I <sub>C</sub> =0			-0.1	
DC current gain	h <sub>FE</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-0.1mA	60			
		V <sub>CE</sub> =-1V, I <sub>C</sub> =-1mA	80			
		V <sub>CE</sub> =-1V, I <sub>C</sub> =-10mA	100		300	
		V <sub>CE</sub> =-1V, I <sub>C</sub> =-50mA	60			
		V <sub>CE</sub> =-1V, I <sub>C</sub> =-100mA	30			
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA			-0.25	V
		I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA			-0.4	
Base-emitter saturation voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA	-0.65		-0.85	V
		I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA			-0.95	
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =-20V, I <sub>C</sub> =-10mA, f=100MHz	250			MHz
Collector output capacitance	C <sub>obo</sub>	V <sub>CB</sub> =-5V, I <sub>E</sub> =0, f=1MHz			4.5	pF
Input capacitance	C <sub>iob</sub>	V <sub>EB</sub> =-0.5V, I <sub>E</sub> =0, f=1MHz			10	pF
Noise figure	NF	V <sub>CE</sub> =-5V, I <sub>C</sub> =0.1mA			4	dB
Delay time	t <sub>d</sub>	V <sub>CC</sub> =-3V, V <sub>BE(OFF)</sub> =-0.5V I <sub>C</sub> =-10mA, I <sub>B1</sub> =-1mA			35	ns
Rise time	t <sub>r</sub>				35	ns
Storage time	t <sub>s</sub>	V <sub>CC</sub> =-3V, I <sub>C</sub> =-10mA I <sub>B1</sub> =I <sub>B2</sub> =-1mA			225	ns
Fall time	t <sub>f</sub>				75	ns

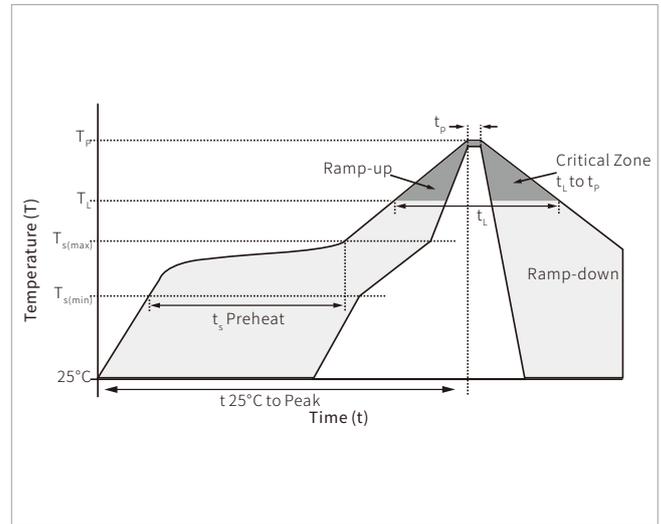
# TYPICAL CHARACTERISTICS



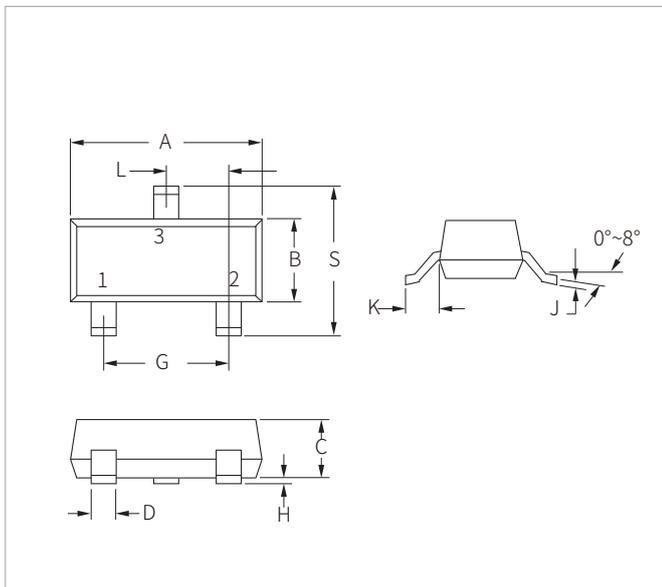


## SOLDERING PARAMETERS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Max ( $T_{s(min)}$ )	150°C
	Temperature Max ( $T_{s(max)}$ )	200°C
	Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3°C/second max
Reflow	$T_{s(max)}$ to $T_L$ - Ramp-up Rate	3°C/second max
	Temperature ( $T_L$ ) (Liquidus)	217°C
	Time (min to max) ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260°C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes max.
Do not exceed		260°C

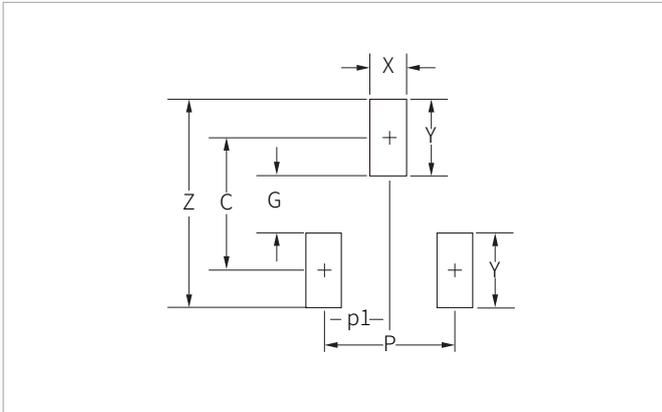


## SOT-523 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.50	1.70	0.059	0.067
B	0.70	0.90	0.028	0.035
C	0.60	0.90	0.023	0.035
D	0.15	0.30	0.005	0.012
G	1.00BSC		0.039BSC	
H	0.00	0.10	0.000	0.004
J	0.10	0.20	0.004	0.008
K	(0.22)		(0.009)	
L	0.50BSC		0.020BSC	
S	1.45	1.75	0.057	0.069

## RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters	Inches
C	(1.40)	(0.055)
P	1.00	0.039
p1	0.50	0.020
G	0.60	0.024
X	0.40	0.016
Y	0.80	0.031
Z	2.20	0.087

## ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
MMBT3906T	SOT-523	3000PCS	7"

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