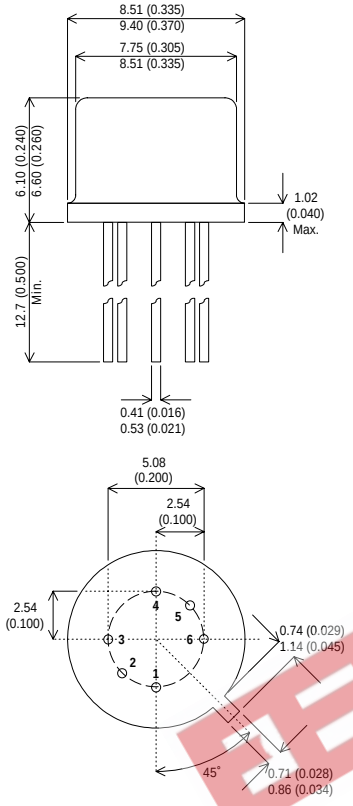
SEME LAB

2N2223A

MECHANICAL DATA

Dimensions in mm (inches)



DUAL NPN TRANSISTOR IN TO77 HERMETIC PACKAGE

FEATURES

- **Silicon Planar Epitaxial NPN Transistor**
- **High Rel and Screening Options Available.**

TO77 METAL PACKAGE

PIN 1 – Collector	**PIN 4 – Emitter**
PIN 2 – Base	**PIN 5 – Base**
PIN 3 – Emitter	**PIN 6 – Collector**

ABSOLUTE MAXIMUM RATINGS (T_{case} = 25°C unless otherwise stated)

V_{CEO}	Collector – Emitter Voltage		60V	
V_{CER}	Collector – Emitter Voltage		80V	
V_{CBO}	Collector – Base Voltage		100V	
V_{EBO}	Emitter – Base Voltage		7V	
I_C	Collector Current		500mA	
T_J , T_{stg}	Operating and Storage Junction Temperature Range		–65 to +200°C	
			Per Side	**Total Device**
P_D	Total Device Dissipation	@ T_A = 25°C	0.5W	0.6W
		Derate above 25°C	2.86mW/°C	3.43mW/°C
P_D	Total Device Dissipation	@ T_C = 25°C	1.6W	3.0W
		Derate above 25°C	9.1mW/°C	11.4mW/°C

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise stated)

	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
	OFF CHARACTERISTICS						
$V_{CER(sus)}$*	Collector – Emitter Breakdown Voltage	I_C = 100mA	$R_{BE} \leq 10\Omega$	80			V
$V_{CEO(sus)}$*	Collector – Emitter Sustaining Voltage	I_C = 30mA	I_B = 0	60			V
$V_{(BR)CBO}$	Collector – Base Breakdown Voltage	I_C = 100µA	I_E = 0	100			V
$V_{(BR)EBO}$	Emitter – Base Breakdown Voltage	I_E = 100µA	I_C = 0	7			V
I_{CBO}	Collector Cut-off Current	V_{CB} = 80V				0.01	µA
		I_E = 0	T_A = 150°C			15	
I_{EBO}	Emitter Cut-off Current	V_{BE} = 5V	I_C = 0			10	nA
	ON CHARACTERISTICS						
h_{FE}	DC Current Gain	I_C = 10µA	V_{CE} = 5V	15			—
		I_C = 100µA	V_{CE} = 5V	25		150	
		I_C = 10mA	V_{CE} = 5V	50		200	
$V_{CE(sat)}$	Collector – Emitter Saturation Voltage	I_C = 50mA	I_B = 5mA			1.2	V
$V_{BE(sat)}$	Base – Emitter Saturation Voltage	I_C = 50mA	I_B = 5mA			0.9	
	SMALL SIGNAL CHARACTERISTICS						
f_T	Current Gain Bandwidth Product	I_C = 50mA f = 20MHz	V_{CE} = 10V	50			MHz
C_{ob}	Output Capacitance	I_E = 0 f = 1MHz	V_{CB} = 10V			15	pF
C_{ib}	Input Capacitance	I_C = 0 f = 1MHz	V_{BE} = 0.5V			85	pF
h_{ib}	Input Impedance	I_C = 1mA f = 1kHz	V_{CB} = 5V	20		30	Ω
h_{fe}	Small Signal Current Gain	I_C = 1mA	V_{CE} = 5V	40		200	—
h_{oe}	Output Admittance	f = 1kHz				.05	µmhos
	MATCHING CHARACTERISTICS						
h_{FE1}/h_{FE2}	DC Current Gain Ratio [1]	I_C = 100µA	V_{CE} = 5V	0.9		1.0	—
$\lvert V_{BE1}-V_{BE2} \rvert$	Base – Emitter Voltage Differential	I_C = 100µA	V_{CE} = 5V		5.0		mV
$\frac{\Delta(V_{BE1}-V_{BE2})}{\Delta T}$	Base – Emitter Voltage Differential Change Due To Temperature	I_C = 100µA T_A = –55 to +125°C	V_{CE} = 5V			25	µV/°C

* Pulse Test: $t_p \leq 300\mu s$, $\delta \leq 2\%$.

1) The lowest h_{FE} reading is taken as h_{FE1} for this ratio.