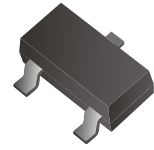


MMBT2222A-G (NPN) RoHS Device

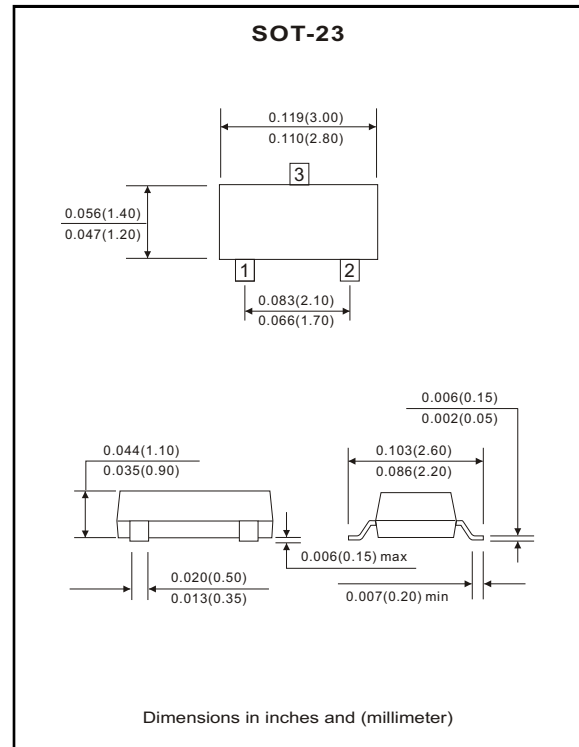


Features

-NPN silicon epitaxial planar transistor for switching and amplifier application.

Mechanical data

- Case: SOT-23, molded plastic.
- Terminals: solderable per MIL-STD-750, method 2026.
- Approx. weight: 0.008 grams



Maximum Ratings and Thermal Characteristics

(at Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Units
Collector-Base voltage	V_{CB0}	75	V
Collector-Emitter voltage	V_{CEO}	40	V
Emitter-Base voltage	V_{EBO}	6.0	V
Collector current	I_c	600	mA
Power dissipation on FR-5 board(1), $T_A=25^\circ\text{C}$ Derate above 25°C	P_{tot}	225 1.9	mW mW/°C
Power dissipation on aluminum substrate(2), $T_A=25^\circ\text{C}$ Derate above 25°C	P_{tot}	300 2.4	mW mW/°C
Thermal resistance, junction to ambient air FR-5 board Aluminum substrate	$R_{\theta JA}$	556 417	°C/mW
Junction temperature	T_J	150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Notes:

- FR-5=1.0×0.75×0.062 in.
- Alumina=0.4×0.3×0.024 in. 99.5% alumina.

Small Signal Transistor



SMD Diodes Specialist

Electrical Characteristics (MMBT2222A-G, @T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Max.	Units
DC current gain	h _{FE}	V _{CE} =10V, I _C =0.1mA	35		
		V _{CE} =10V, I _C =1mA	50		
		V _{CE} =10V, I _C =10mA	75		
		V _{CE} =10V, I _C =10mA, T _A =-55°C	35		
		V _{CE} =10V, I _C =150mA	100	300	
		V _{CE} =10V, I _C =500mA	40		
		V _{CE} =1V, I _C =150mA	50		
Collector-Base breakdown voltage	V _{(BR)CBO}	I _C =10μA, I _E =0	75		V
Collector-Emitter breakdown voltage	V _{(BR)CEO}	I _C =10mA, I _B =0	40		V
Emitter-Base breakdown voltage	V _{(BR)EBO}	I _C =10μA, I _C =0	6		V
Collector-Emitter saturation voltage	V _{CEsat}	I _C =150mA, I _B =15mA I _C =500mA, I _B =50mA		0.3 1	V
Base-Emitter saturation voltage	V _{BEsat}	I _C =150mA, I _B =15mA I _C =500mA, I _B =50mA	0.6	1.2 2	V
Collector cut-off current	I _{CEX}	V _{EB} =3V, V _{CE} =60V		10	nA
Collector cut-off current	I _{CBO}	V _{CB} =60V, I _E =0 V _{CB} =50V, I _E =0, T _A =125°C		10 10	nA μA
Base cut-off current	I _{BL}	V _{EB} =3V, V _{CE} =60V		20	nA
Emitter cut-off current	I _{EBO}	V _{EB} =3V _{DC} , I _C =0		100	nA
Current gain-bandwidth product	f _T	V _{CE} =20V, I _C =20mA, f=100MHz	300		MHz
Output capacitance	C _{obo}	V _{CB} =10V, f=1MHz, I _E =0		8	pF
Input capacitance	C _{ibo}	V _{EB} =0.5V, f=1MHz, I _C =0		25	pF
Noise figure	NF	V _{CE} =10V, I _C =100μA, R _S =1kΩ, f=1kHz		4	dB
Input impedance	h _{ie}	V _{CE} =10V, I _C =1mA, f=1kHz	2	8	kΩ
		V _{CE} =10V, I _C =10mA, f=1kHz	0.25	1.25	
Small signal current gain	h _{fe}	V _{CE} =10V, I _C =1mA, f=1kHz	50	300	
		V _{CE} =10V, I _C =10mA, f=1kHz	75	375	
Voltage feedback ratio	h _{re}	V _{CE} =10V, I _C =1mA, f=1kHz		8	×10 ⁻⁴
		V _{CE} =10V, I _C =10mA, f=1kHz		4	
Output admittance	h _{oe}	V _{CE} =10V, I _C =1mA, f=1kHz	5	35	μS
		V _{CE} =10V, I _C =10mA, f=1kHz	25	200	
Collector base time constant	τ _{b'Cc}	I _E =20mA, V _{CB} =20V, f=31.8MHz		150	pS
Delay time (see fig.1)	t _d	I _{B1} =15mA, I _C =150mA, V _{CC} =30V, V _{BE} =-0.5V		10	nS
Rise time (see fig.1)	t _r	I _{B1} =15mA, I _C =150mA, V _{CC} =30V, V _{BE} =-0.5V		25	nS
Storage time (see fig.2)	t _s	I _{B1} =I _{B2} =15mA, I _C =150mA, V _{CC} =30V		225	nS
Fall time (see fig.2)	t _f	I _{B1} =I _{B2} =15mA, I _C =150mA, V _{CC} =30V		60	nS

Switching time equivalent test circuit

Figure 1. Turn-on Time

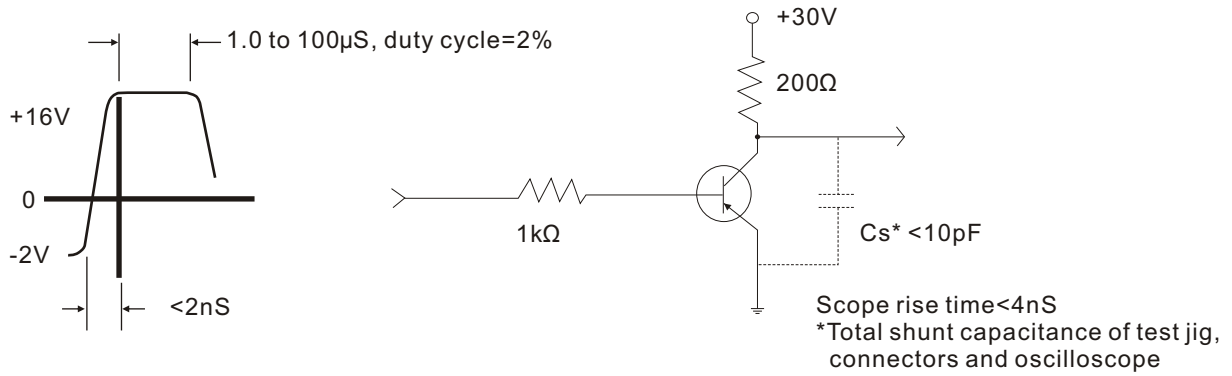


Figure 2. Turn-off Time

