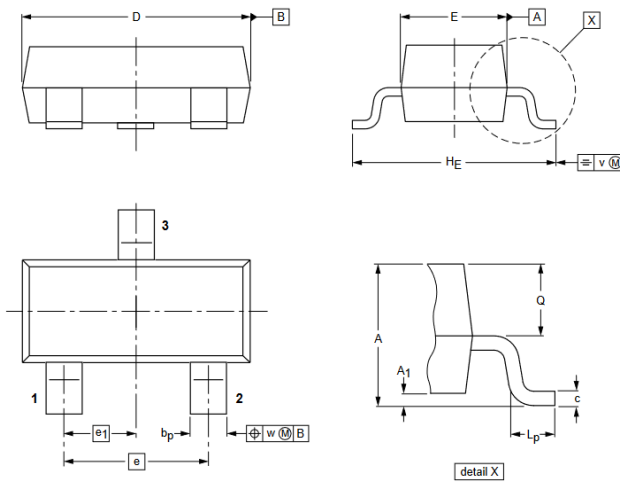
NPN Bipolar Transistor

Primary characteristics			
Symbol	**Parameter**	**Value**	**Unit**
I_C	Continuous collector current	600	mA
V_{CBO}	Collector-base voltage	75	V

Features

- **SOT-23** case for easy automatic insertion
- Pb-free and **RoHS** compliant
- Epitaxial planar die construction
- Complementary **PNP** type available (**MMBT2907**)

Case dimensions



1 – Gate; 2 – Source; 3 - Drain

SOT-23 (TO-236AB)

Unit	A	A_1max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.0 ±0.1	0.1	0.43 ±0.05	0.12 ±0.03	2.9 ±0.1	1.3 ±0.1	1.9	0.95	2.3 ±0.2	0.3 ±0.15	0.5 ±0.05	0.2	0.1

Absolute maximum ratings (T_A = 25°C unless otherwise noted)			
Characteristic	**Symbol**	**Value**	**Unit**
Collector-base voltage	V_{CBO}	75	V
Collector-emitter voltage	V_{CEO}	40	V
Emitter-base voltage	V_{EBO}	6.0	V
Continuous collector current	I_C	600	mA
Total power dissipation (FR-5 board, T_A=25°C) Derate above 25°C	P_D	225 1.8	mW mW/°C
Total power dissipation (Aluminum substrate, T_A=25°C) Derate above 25°C	P_D	300 2.4	mW mW/°C
Thermal resistance junction-ambient [2)]	$R_{\theta JA}$	417	°C/W
Solder temperature Solder time	T t	260 10	°C W
Operating junction temperature range	T_J, T_{STG}	-55 ~ 150	°C

Electrical characteristics (T_A = 25°C)

Characteristic	Test condition	Symbol	Value			Unit
			Min.	Typ.	Max.	
Collector-base breakdown voltage	I_E=0V, I_C=10μA	$V_{(BR)CBO}$	75	-	-	V
Collector-emitter breakdown voltage	I_C=10mA, I_B=0V	$V_{(BR)CEO}$	40	-	-	V
Emitter-base breakdown voltage	I_E=10μA, I_C=0	$V_{(BR)EBO}$	6.0	-	-	V
Collector cut-off current	V_{CE}=60V, $V_{EB(OFF)}$=3.0V	I_{CEX}	-	-	10	nA
Collector cut-off current	V_{CB}=60V, I_E=0, T_A=25°C	I_{CBO}	-	-	10	nA
	V_{CB}=60V, I_E=0, T_A=125°C		-	-	10	μA
Emitter cutoff current	V_{EB}=3.0V, I_C=0	I_{EBO}	-	-	100	nA
Base cutoff current	V_{CE}=60V, $V_{EB(OFF)}$=3.0V	I_{BL}	-	-	20	nA
DC current gain	V_{CE}=10V, I_C=100μA	h_{FE}	35	-	-	
	V_{CE}=10V, I_C=1.0mA		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}=1.0V, I_C=150mA		50	-	-	
	V_{CE}=10V, I_C=500mA		40	-	-	
Collector-emitter saturation voltage	I_B=15mA, I_C=150mA	$V_{CE(sat)}$	-	-	300	mV
	I_B=50mA, I_C=500mA		-	-	1000	
Base-emitter saturation voltage	I_B=15mA, I_C=150mA	$V_{CE(sat)}$	0.6	-	1.2	V
	I_B=50mA, I_C=500mA		-	-	2.0	

Small signal characteristics (T_A = 25°C)

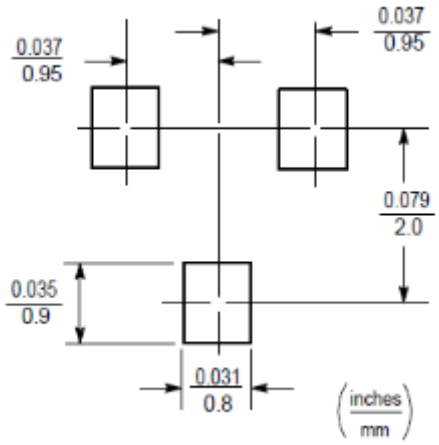
Characteristic	Test condition	Symbol	Value			Unit
			Min.	Typ.	Max.	
Current gain bandwidth product	I_C=20mA, V_{CE}=20V, f=100MHz	f_T	300	-	-	MHz
Output capacitance	V_{CB}=10V, I_E=0, f=1.0MHz	C_{obo}	-	-	80	pF
Input capacitance	V_{EB}=500mV, I_C=0, f=1.0MHz	C_{ibo}	-	-	25	pF
Input impedance	I_C=1.0mA, V_{CE}=10V, f=1.0kHz	h_{ie}	2.0	-	8.0	kQ
	I_C=10mA, V_{CE}=10V, f=1.0kHz		0.25	-	1.25	
Voltage feedback ratio	I_C=1.0mA, V_{CE}=10V, f=1.0kHz	h_{re}	-	-	8.0	$x10^{-4}$
	I_C=10mA, V_{CE}=10V, f=1.0kHz		-	-	4.0	
Small signal current gain	I_C=1.0mA, V_{CE}=10V, f=1.0kHz	h_{fe}	50	-	300	
	I_C=10mA, V_{CE}=10V, f=1.0kHz		75	-	375	
Output admittance	I_C=1.0mA, V_{CE}=10V, f=1.0kHz	h_{oe}	5.0	-	35	μ mhos
	I_C=10mA, V_{CE}=10V, f=1.0kHz		25	-	200	
Collector-base time constant	I_E=20mA, V_{CB}=20V, f=31.8MHz	r_b, C_c	-	-	150	ps
Noise figure	I_C=100μA, V_{CE}=10V, R_s=1.0kQ, f=1.0kHz	NF	-	-	4.0	dB

Switching characteristics (T_A = 25°C)						
Characteristic	**Test condition**	**Symbol**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Delay time	V_{CC}=30V, $V_{BE(OFF)}$=500mV, I_C=150mA, I_{B1}=15mA	t_d	-	-	10	Ns
Rise time		t_r	-	-	25	ns
Storage time	V_{CC}=30V, I_C=150mA, I_{B1}=I_{B2}=15mA	t_S	-	-	225	ns
Fall time		t_f	-	-	60	ns

Notes:

1. FR-5=1.0x0.75x0.062inch
2. Alumina=0.4x0.3x0.024inch, 99.5% aluminum
3. Pulse width≤300μs, duty cycle≤2.0%
4. f_T is defined as the frequency at which (h_{FE}) extrapolates to unity

Suggested soldering pad layout



SOT-23

Ordering information			
Part Number	**Package**	**Shipping Quantity**	**Dimensions**
MMBT2907	SOT-23	**3000 pcs / reel**	---

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