MMBT2907 / MMBT2907A

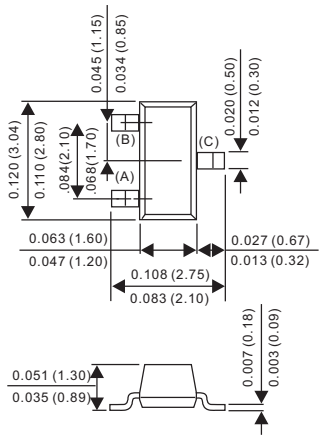
General Purpose PNP Transistor

Features

- High collector-emitterbreakdien voltage.
- PNP silicon epitaxial planar transistor, is designed for general purpose and amplifier applications.
- Capable of 225mW power dissipation.
- Lead-free parts meet RoHS requirments.
- Suffix "-H" indicates Halogen-free part, ex.MMBT2907-H.

Package outline

SOT-23



Dimensions in inches and (millimeters)

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any

Maximum ratings (AT T_A=25°C unless otherwise noted)

PARAMETER		Symbol	MMBT2907	MMBT2907A	UNIT
Collector-emitter voltage		V_{CEO}	-40	-60	V
Collector-base voltage		V_{CBO}	-60		V
Emitter-base voltage		V_{EBO}	-5.0		V
Collector current - continuous		I_C	-600		mA
Total device dissipation FR-5 board (1)	T_A = 25°C	P_D	225		mW
	Derate above 25°C		1.8		mW/°C
Thermal resistance	Junction to ambient	$R_{\theta JA}$	556		°C/W
Total device dissipation alumina substrate(2)	T_A = 25°C	P_D	300		mW
	Derate above 25°C		2.4		mW/°C
Thermal resistance	Junction to ambient	$R_{\theta JA}$	417		°C/W
Operating junction temperature range		T_J	-55 to +150		°C
Storage temperature range		T_{STG}	-55 to +150		°C

1.FR-5 = 1.0 X 0.75 X0.062 in.
2.Alumina = 0.4 X 0.3 X 0.024 in. 99.5% alumina.

ELECTRICAL CHARACTERISTICS (TA = 25°C unless otherwise noted)

Characteristics		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C= -10 mAdc, I_B=0)	MMBT2907 MMBT2907A	$V_{(BR)CEO}$	-40 -60	- -	Vdc
Collector-Base Breakdown Voltage (I_C= -10 uAdc, I_E=0)		$V_{(BR)CBO}$	-60	-	Vdc
Emitter-Base Breakdown Voltage (I_E= -10 uAdc, I_C=0)		$V_{(BR)EBO}$	-5.0	-	Vdc
Collector Cutoff Current (V_{CE}= -30 Vdc, $V_{EB\ (0ff)}$ = -0.5Vdc)		I_{CEX}	-	-50	nAdc
Collector Cutoff Current (V_{CB}= -50 Vdc, I_E=0) (V_{CB}= -50Vdc, I_E=0, T_A=125°C)	MMBT2907 MMBT2907A MMBT2907 MMBT2907A	I_{CBO}	- - - -	-0.020 -0.010 -20 -10	uAdc
Base Cutoff Current (V_{CE}= -30Vdc, $V_{EB(off)}$ = -0.5Vdc)	MMBT2907A	I_B	-	-50	nAdc

ELECTRICAL CHARACTERISTICS (T A = 25°C unless otherwise noted) (Continued)

Characteristics		Symbol	Min	Max	Unit
ON CHARACTERISTICS					
DC Current Gain (I_C= -0.1 mAdc, V_{CE}= -10 Vdc)	MMBT2907 MMBT2907A	h_{FE}	35 75	- -	
(I_C= -1.0 mAdc, V_{CE}= -10 Vdc)	MMBT2907 MMBT2907A		50 100	- -	
(I_C= -10 mAdc, V_{CE}= -10 Vdc)	MMBT2907 MMBT2907A		75 100	- -	
(I_C= -150 mAdc, V_{CE}= -10 Vdc)	MMBT2907 MMBT2907A		- 100	- 300	
(I_C= -500 mAdc, V_{CE}= -10 Vdc)	MMBT2907 MMBT2907A		30 50	- -	
Collector-Emitter Saturation Voltage (I_C= -150 mAdc, I_B= -15mAdc) (I_C= -500 mAdc, I_B= -50mAdc)		$V_{CE(sat)}$	- -	-0.4 -1.6	Vdc
Base-Emitter Saturation Voltage (I_C= -150 mAdc, I_B= -15mAdc) (I_C= -500 mAdc, I_B= -50mAdc)		$V_{BE(sat)}$	- -	-1.3 -2.6	Vdc

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ELECTRICAL CHARACTERISTICS (T A = 25°C unless otherwise noted) (Continued)

Characteristics	Symbol	Min	Max	Unit
SMALL–SIGNAL CHARACTERISTICS				
Current-Gain-Bandwidth Product (1),(2) (I_C= -50 mAdc, V_{CE} =20 Vdc, f=100MHz)	f_T	200 -	- -	MHz
Output Capacitance (V_{CB}= -10 Vdc, I_E=0, f=1.0MHz)	C_{obo}	-	8.0	pF
Input Capacitance (V_{EB}= -2.0 Vdc, I_C=0, f=1.0MHz)	C_{ibo}	- -	30	pF
SWITCHING CHARACTERISTICS				
Turn-On Time	(V_{CC}= -30 Vdc, I_C= -150 mAdc, I_{B1}= -15 mAdc)	ton	-	45
Delay Time		t_d	-	10
Rise Time		t_r	-	40
Turn-Out Time	(V_{CC}= -60 Vdc, I_C= -150 mAdc, I_{B1}=I_{B2}= -15 mAdc)	toff	-	100
Storage Time		t_s	-	80
Fall Time		t_f	-	30

ns

1. Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2.0%.
2. fT is defined as the frequency at which |h f e | extrapolates to unity.

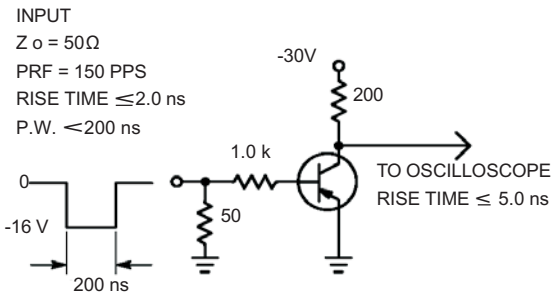

Figure 1. Delay and Rise Time Test Circuit

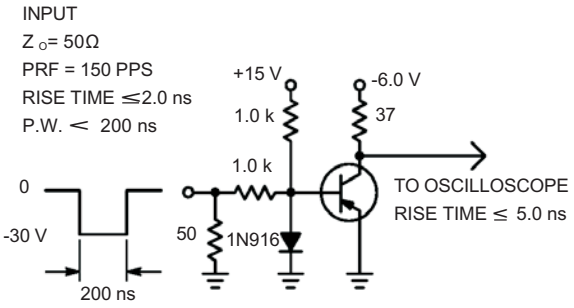

Figure 2. Storage and Fall Time Test Circuit

Rating and characteristic curves

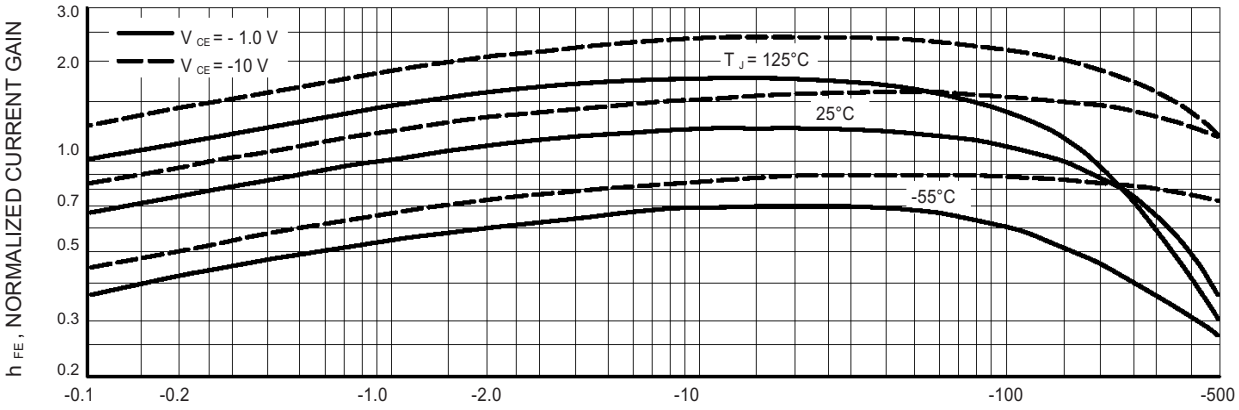

Figure 3. DC Current Gain

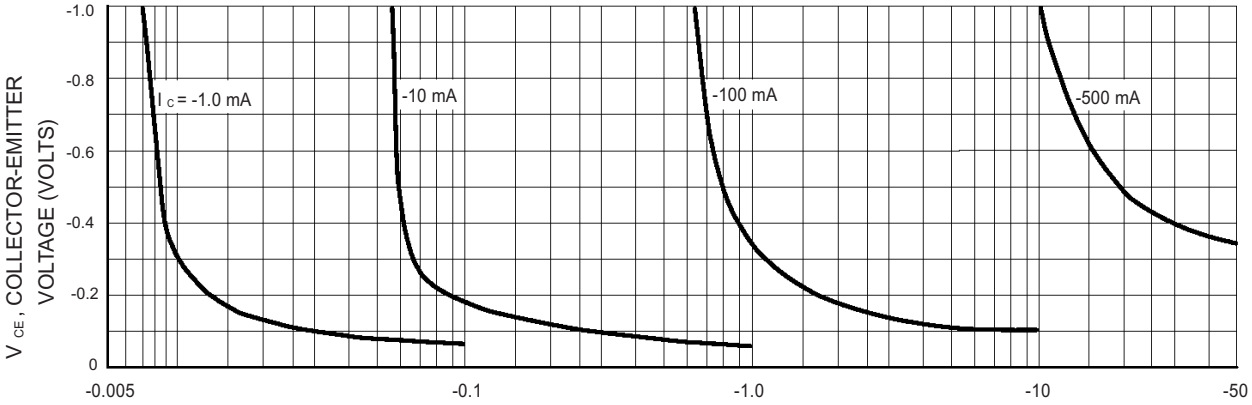

Figure 4. Collector Saturation Region

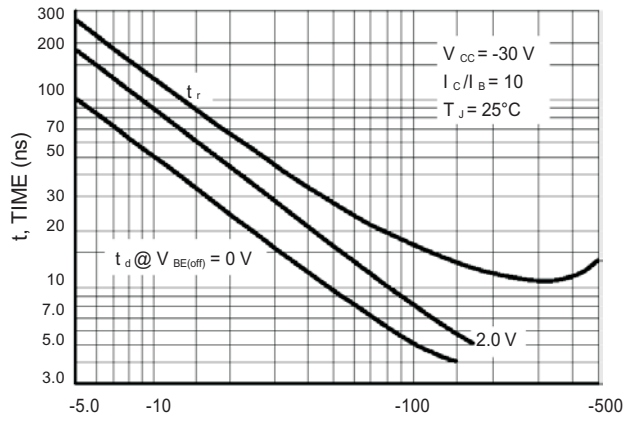

Figure 5. Turn-On Time

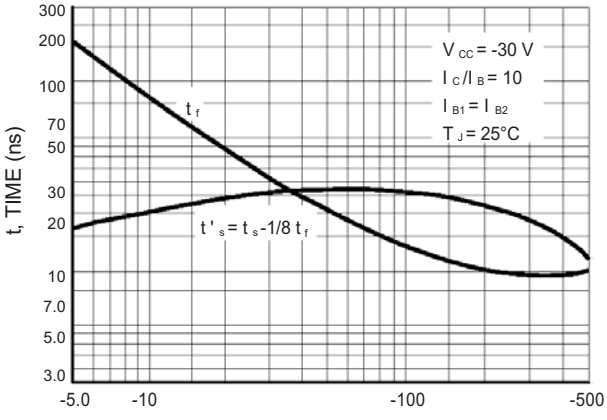

Figure 6. Turn-off Time

Rating and characteristic curves

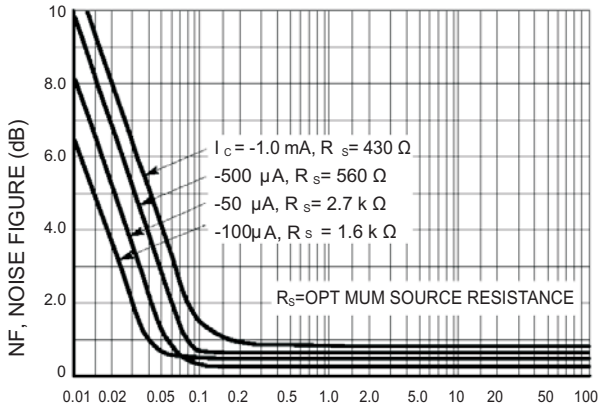

Figure 7. Frequency Effects

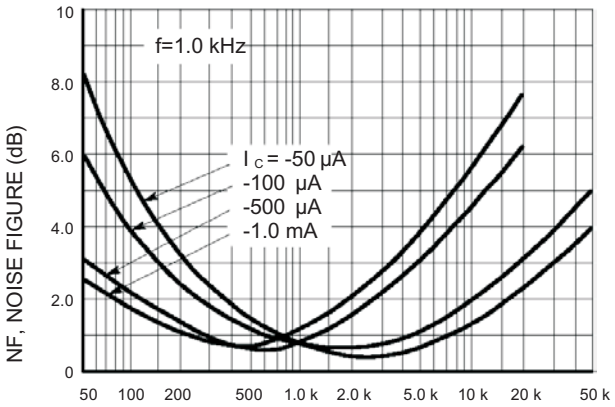

Figure 8. Source Resistance Effects

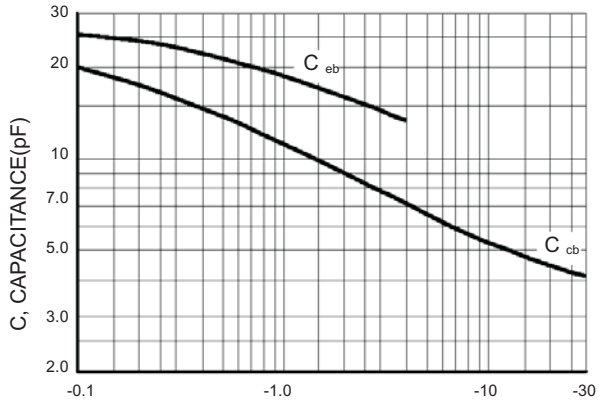

Figure 9. Capacitances

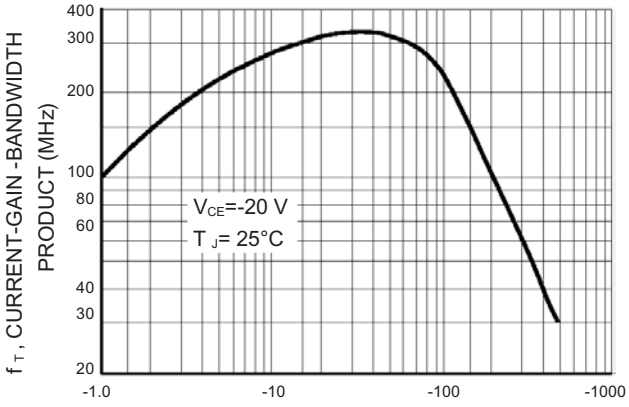

Figure 10. Current-Gain-Bandwidth Product

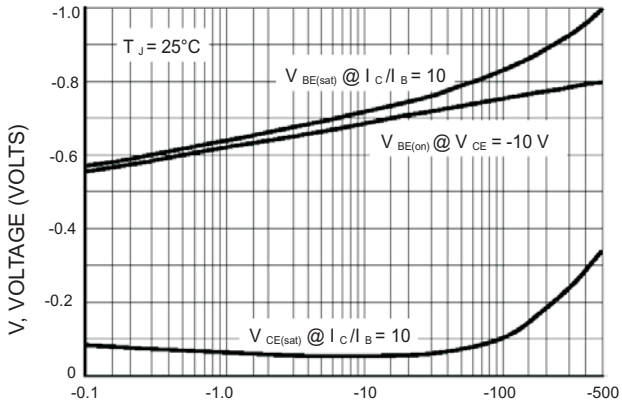

Figure 11. "On" Voltage

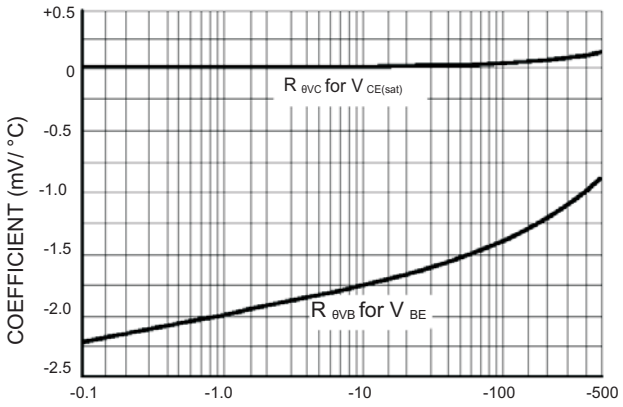

Figure 12. Temperature Coefficients

MMBT2907 / MMBT2907A

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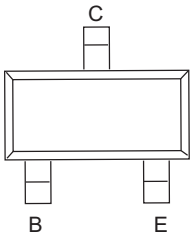
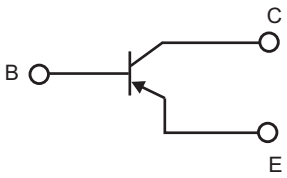
Pinning information

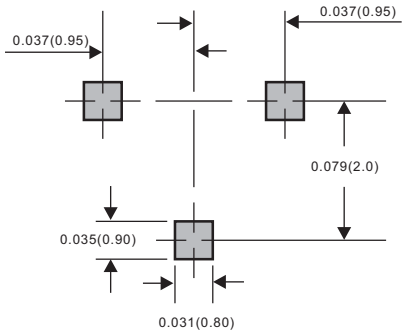
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
MMBT2907	M2B
MMBT2907A	2F

Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)