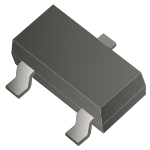
General Purpose Transistor

AMMBT3904-HF (NPN)

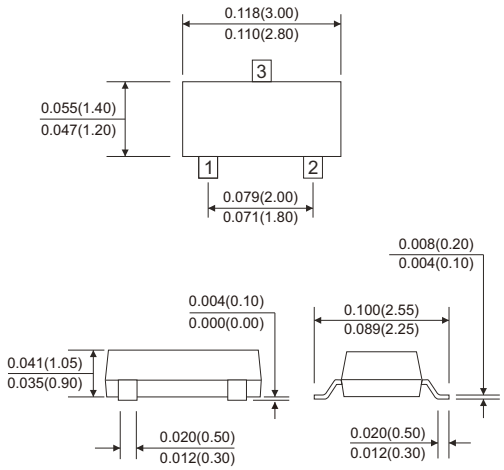
RoHS Device
Halogen Free



Features

- Epoxy meets UL-94 V-0 flammability rating.
- Moisture sensitivity Level 1.
- AEC-Q101 Qualified.

SOT-23



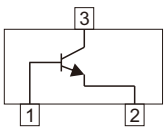
Dimensions in inches and (millimeter)

Mechanical data

- Case: SOT-23, molded plastic.
- Terminals: Tin plated leads, solderable per J-STD-002 and JESD22-B102.

Circuit Diagram

1. Base
2. Emitter
3. Collector



Maximum Ratings (at Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-base voltage	V_{CBO}	60	V
Collector-emitter voltage	V_{CEO}	40	V
Emitter-base voltage	V_{EBO}	6	V
Collector current-continuous	I_C	200	mA
Total device dissipation	P_D	300	mW
Thermal resistance junction to ambient	$R_{\theta JA}$	357	K/W
Junction temperature range	T_J	-55 to +150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Electrical Characteristics (at Ta=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Max	Unit
Collector-emitter breakdown voltage	I_C = 1mAdc, I_B = 0	$V_{(BR)CEO}$	40		Vdc
Collector-base breakdown voltage	I_C = 10μAdc, I_E = 0	$V_{(BR)CBO}$	60		Vdc
Emitter-base breakdown voltage	I_E = 10μAdc, I_C = 0	$V_{(BR)EBO}$	6		Vdc
Collector cut-off current	V_{CB} = 60Vdc, I_E = 0	I_{CBO}		50	nAdc
Collector cut-off current	V_{CE} = 30Vdc, V_{EB} = 3Vdc	I_{CEX}		50	nAdc
DC current gain	V_{CE} = 1Vdc, I_C = 0.1mAdc	$h_{FE(1)}$	40		
	V_{CE} = 1Vdc, I_C = 1mAdc	$h_{FE(2)}$	70		
	V_{CE} = 1Vdc, I_C = 10mAdc	$h_{FE(3)}$	100	300	
	V_{CE} = 1Vdc, I_C = 50mAdc	$h_{FE(4)}$	60		
	V_{CE} = 1Vdc, I_C = 100mAdc	$h_{FE(5)}$	30		
Collector-emitter saturation voltage	I_C = 10mAdc, I_B = 1mAdc	$V_{CE(sat)}$		0.2	Vdc
	I_C = 50mAdc, I_B = 5mAdc			0.3	
Base-emitter saturation voltage	I_C = 10mAdc, I_B = 1mAdc	$V_{BE(sat)}$	0.65	0.85	Vdc
	I_C = 50mAdc, I_B = 5mAdc			0.95	
Output capacitance	V_{CB} = 5Vdc, f = 1MHz, I_E = 0	Cobo		4.0	pF
Input capacitance	V_{EB} = 0.5Vdc, f = 1MHz, I_C = 0	Cibo		8.0	pF
Delay time	V_{CC} = 3Vdc, V_{BE} = 0.5Vdc, I_C = 10mAdc, I_{B1} = 1mAdc	t_d		35	ns
Rise time		t_r		35	ns
Storage time	V_{CC} = 3Vdc, I_C = 10mAdc, I_{B1} = I_{B2} = 1mAdc	t_s		200	ns
Fall time		t_f		50	ns

Rating and Characteristic Curves (AMMBT3904-HF)

Fig.1 - Static Characteristic

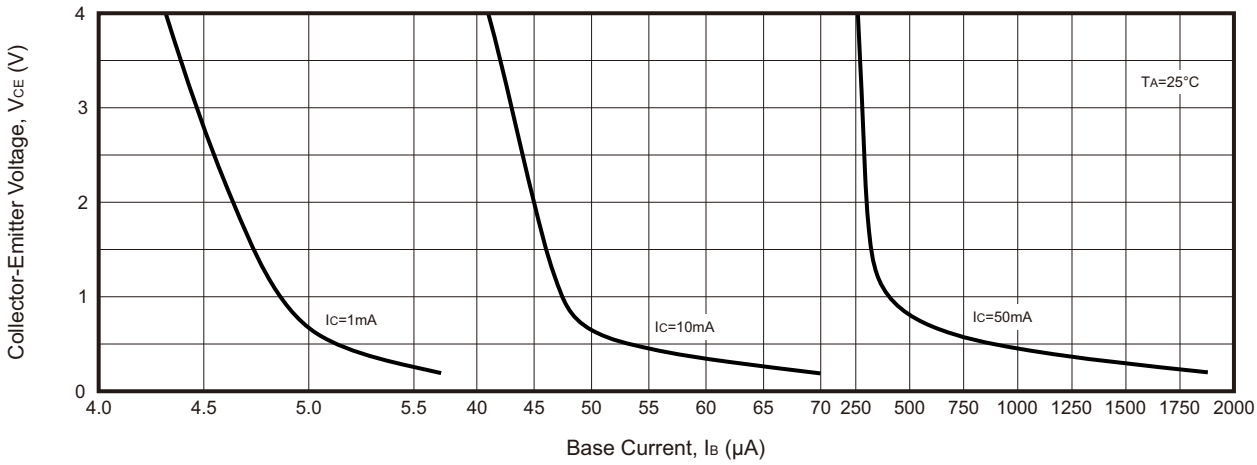


Fig.2 - H_{FE} — I_C

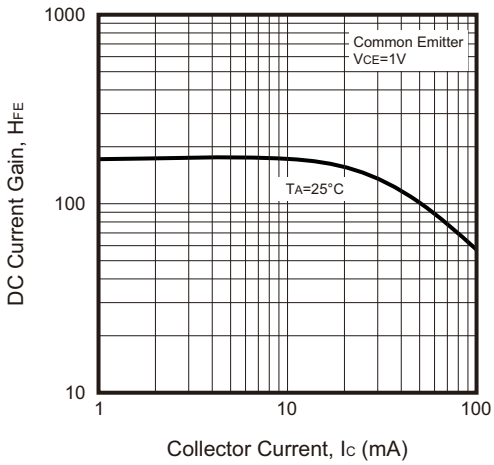


Fig.3 - V_{BEsat} — I_C

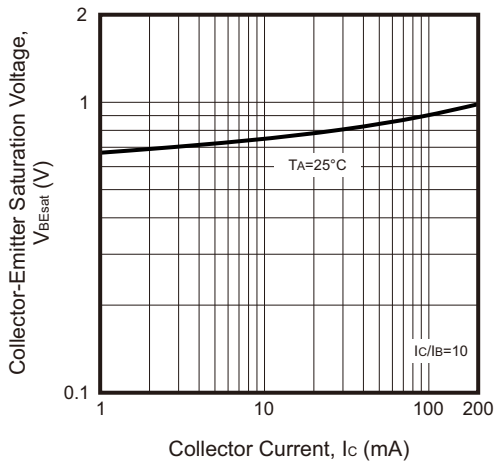
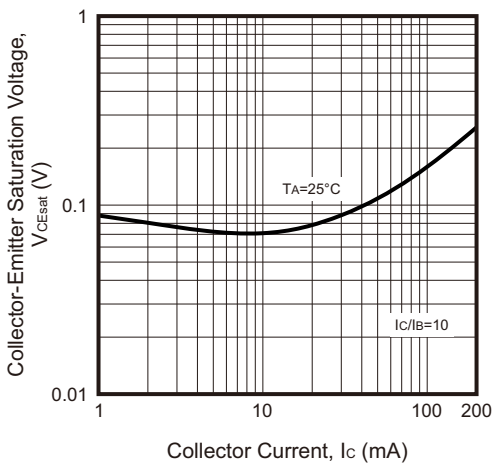
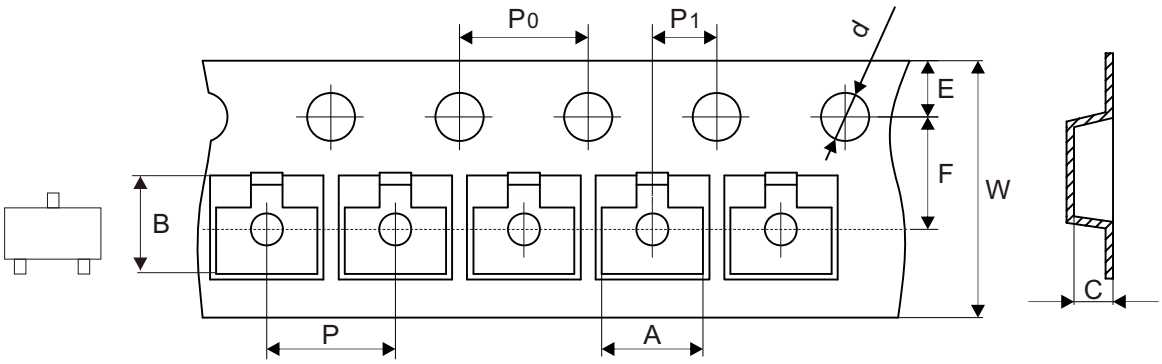
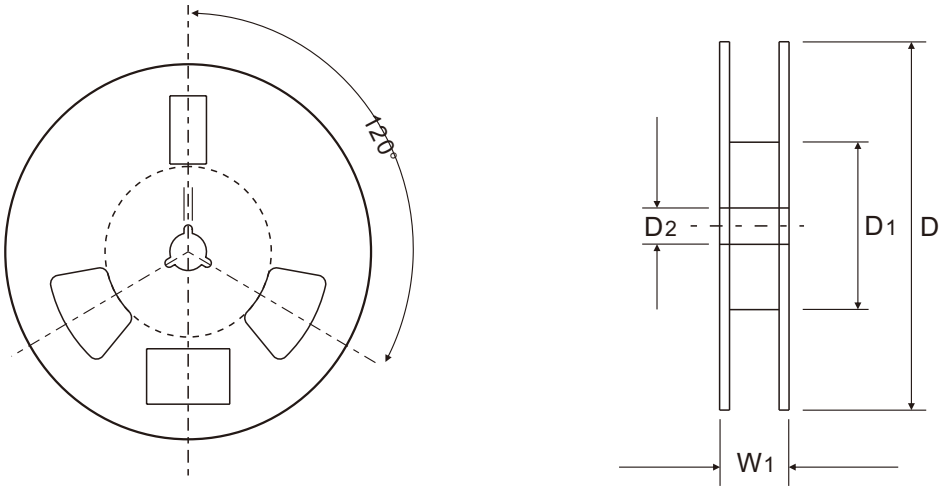


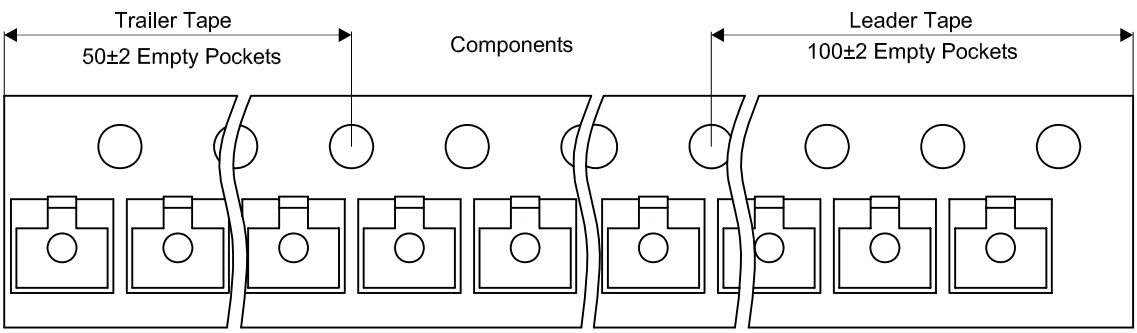
Fig.4 - V_{CEsat} — I_C



Reel Taping Specification





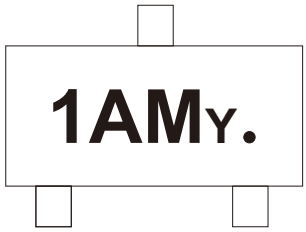


	SYMBOL	A	B	C	d	D	D1	D2
SOT-23	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 + 0.10 − 0.00	178.00 ± 1.00	54.60 ± 1.00	13.30 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 + 0.004 − 0.000	7.008 ± 0.039	2.150 ± 0.039	0.524 ± 0.039

	SYMBOL	E	F	P	P0	P1	W	W1
SOT-23	(mm)	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	8.00 + 0.30 − 0.10	11.10 ± 0.20
	(inch)	0.069 ± 0.004	0.138 ± 0.002	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.315 + 0.012 − 0.004	0.437 ± 0.008

Marking Code

Part Number	Marking Code
AMMBT3904-HF	1AMY.



Y = Date code

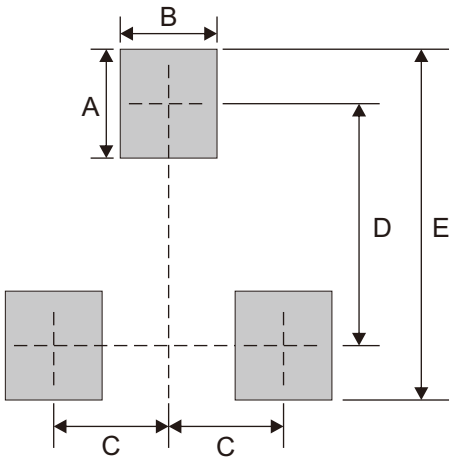
Date code: (2 years a cycle)

Month	Odd Year	Even Year
Jan	J	W
Feb	O	N
Mar	L	Y
Apr	C	T
May	K	R
Jun	B	H

Month	Odd Year	Even Year
Jul	P	A
Aug	D	I
Sep	M	U
Oct	E	X
Nov	G	Z
Dec	F	S

Suggested P.C.B. PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.90	0.035
B	0.80	0.031
C	0.95	0.037
D	2.00	0.079
E	2.90	0.114



Note: 1. The pad layout is for reference purposes only.

Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7