

FMPBSS4240

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FMPBSS4240

2A, 40V NPN Low $V_{CE(sat)}$ (BISS) Transistor

Features

- Low collector-emitter saturation voltage.
- High current capability.
- Improved device reliability due to reduced heat generation.
- Suffix "-H" indicates Halogen free part, ex. FMPBSS4240-H.

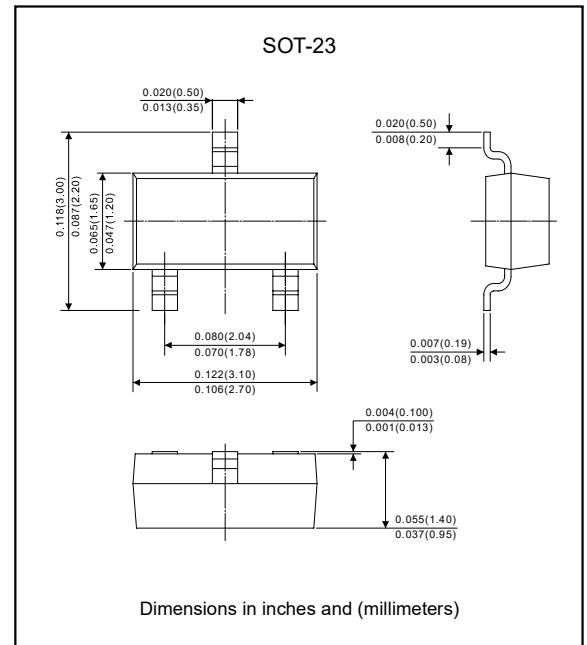
Applications

- Supply line switching circuits.
- Battery management applications.
- DC/DC Converter applications.
- Strobe flash units.
- Heavy duty battery powered equipment (motor and lamp drivers).

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-23.
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026.
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline



Maximum ratings (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	40	V
Collector to emitter voltage	V_{CEO}	40	V
Emitter to base voltage	V_{EBO}	5	V
Collector current	I_C	2	A
Peak collector current	I_{CM}	3	A
Peak base current	I_{BM}	300	mA
Total power dissipation	P_D	300	mW
Thermal resistance, junction to ambient	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Junction temperature	T_J	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-65 ~ +150	$^\circ\text{C}$

Note : 1. Device mounted on a printed-circuit board; single sided copper; tin plated and standard footprint.

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Electrical characteristics (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector-base cut off current	$V_{CB} = 30\text{V}$	I_{CBO}			0.1	μA
Emitter-Base cut-off current	$V_{EB} = 4\text{V}$	I_{EBO}			0.1	μA
Collector-emitter saturation voltage	$I_C = 100\text{mA}, I_B = 1\text{mA}$	$V_{CE(SAT)}$			70	mV
	$I_C = 500\text{mA}, I_B = 50\text{mA}$				100	
	$I_C = 750\text{mA}, I_B = 15\text{mA}$				180	
	$I_C = 1\text{A}, I_B = 50\text{mA}$				180	
	$I_C = 2\text{A}, I_B = 200\text{mA}$				320	
Equivalent on-resistance	$I_C = 500\text{mA}, I_B = 200\text{mA}$	$R_{CE(sat)}$		140	<200	m Ω
Collector-emitter breakdown voltage	$I_C = 100\mu\text{A}$	$V_{BE(sat)}$			1.1	V
Base on voltage	$I_C = 100\text{mA}, V_{CE} = 5\text{V}$	$V_{BE(ON)}$			0.75	V
DC current gain	$V_{CE} = 2\text{V}, I_C = 100\text{mA}$	h_{FE}	350			
	$V_{CE} = 2\text{V}, I_C = 500\text{mA}$		300			
	$V_{CE} = 2\text{V}, I_C = 1\text{A}$		250			
	$V_{CE} = 2\text{V}, I_C = 2\text{A}$		80			
Transition Frequency	$V_{CE} = 10\text{V}, I_C = 100\text{mA}, f = 100\text{MHz}$	f_T	100	230		MHz
Collector capacitance	$V_{CB} = 10\text{V}, f = 100\text{MHz}$	C_C		15	20	pF

Typical characteristics

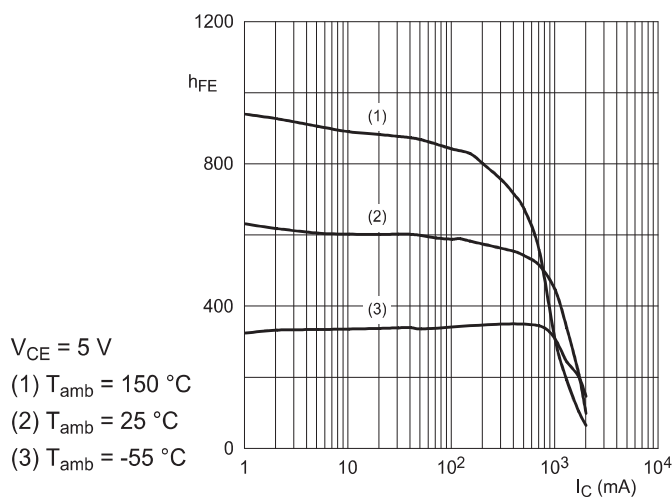


Fig. 1. DC current gain as a function of collector current; typical values

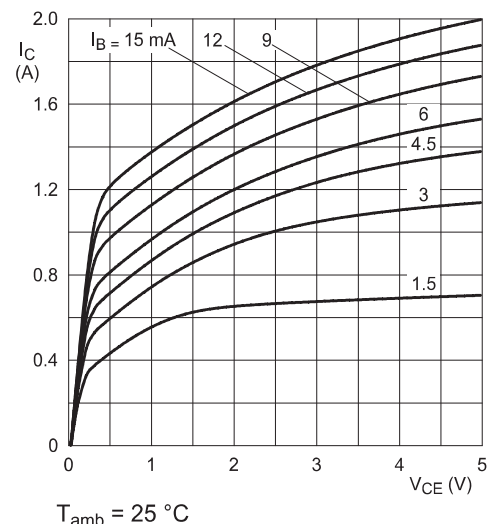


Fig. 2. Collector current as a function of collector-emitter voltage; typical values

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Typical characteristics

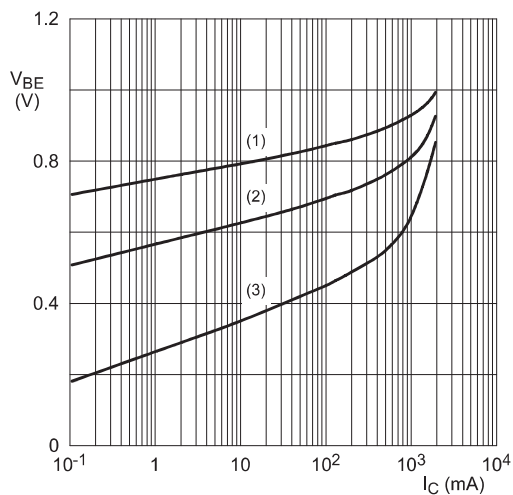

 $V_{CE} = 5 \text{ V}$
(1) $T_{amb} = -55 \text{ }^{\circ}\text{C}$ (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$ (3) $T_{amb} = 150 \text{ }^{\circ}\text{C}$

Fig. 3. Base-emitter voltage as a function of collector current; typical values

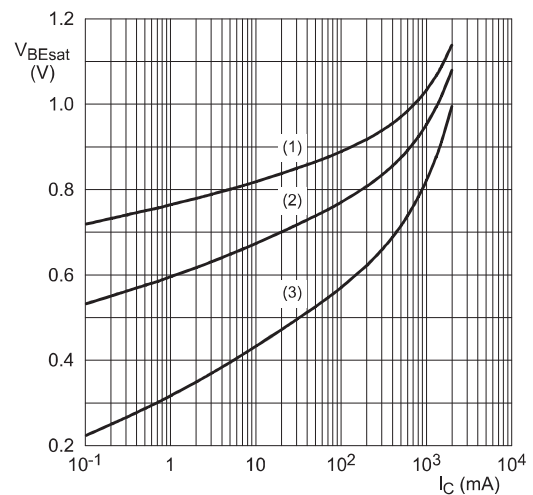

 $I_C/I_B = 20$
(1) $T_{amb} = -55 \text{ }^{\circ}\text{C}$ (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$ (3) $T_{amb} = 150 \text{ }^{\circ}\text{C}$

Fig. 4. Base-emitter saturation voltage as a function of collector current; typical values

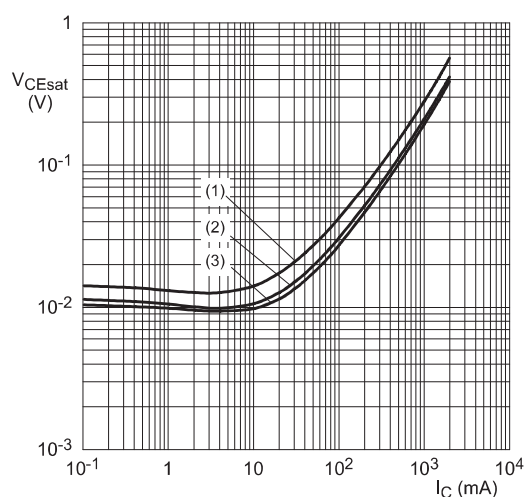

 $I_C/I_B = 20$
(1) $T_{amb} = 150 \text{ }^{\circ}\text{C}$ (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$ (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$

Fig. 5. Collector-emitter saturation voltage as a function of collector current; typical values

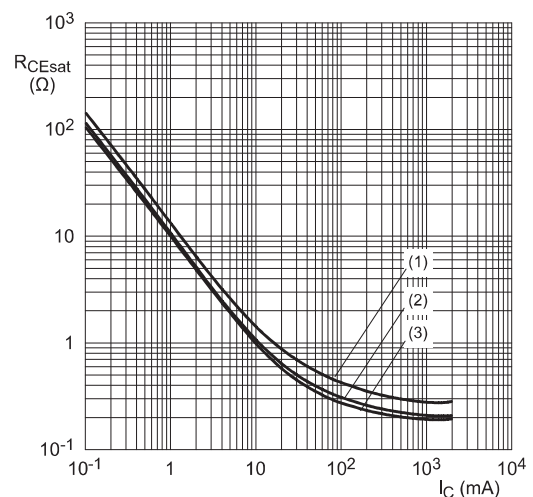
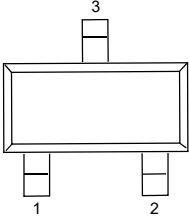
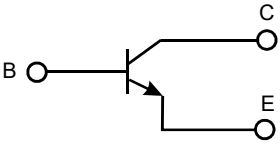

 $I_C/I_B = 20$
(1) $T_{amb} = 150 \text{ }^{\circ}\text{C}$ (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$ (3) $T_{amb} = -55 \text{ }^{\circ}\text{C}$

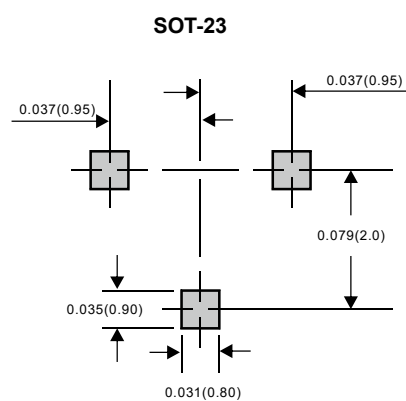
Fig. 6. Collector-emitter saturation resistance as a function of collector current; typical values

FMPBSS4240**Pinning information**

Pin	Simplified outline	Symbol
Pin 1 Base Pin 2 Emitter Pin 3 Collector		

Marking

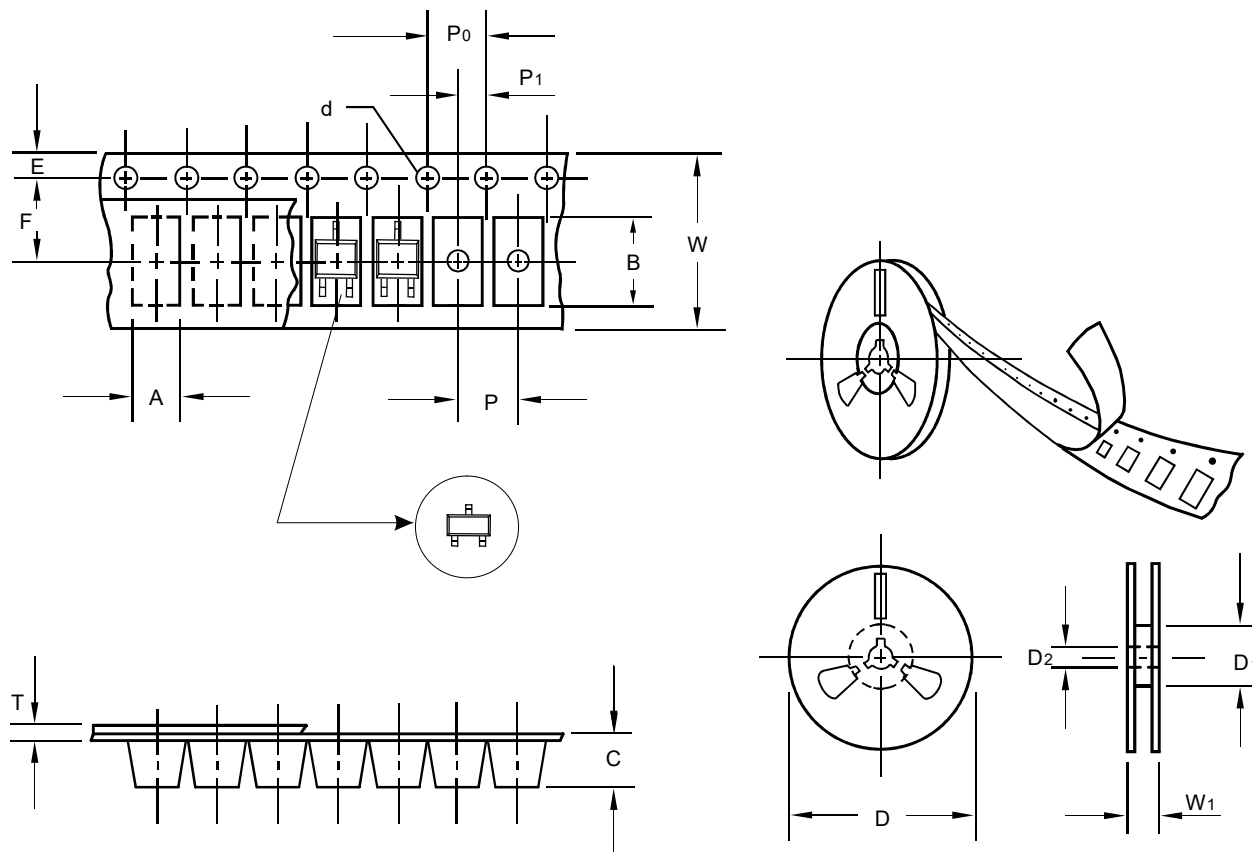
Type Number	Marking Code
FMPBSS4240	ZE

Suggested solder pad layout

Dimensions in inches and (millimeters)

FMPBSS4240

Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.15
Carrier length	B	0.1	2.77
Carrier depth	C	0.1	1.22
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	54.40
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	11.40

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

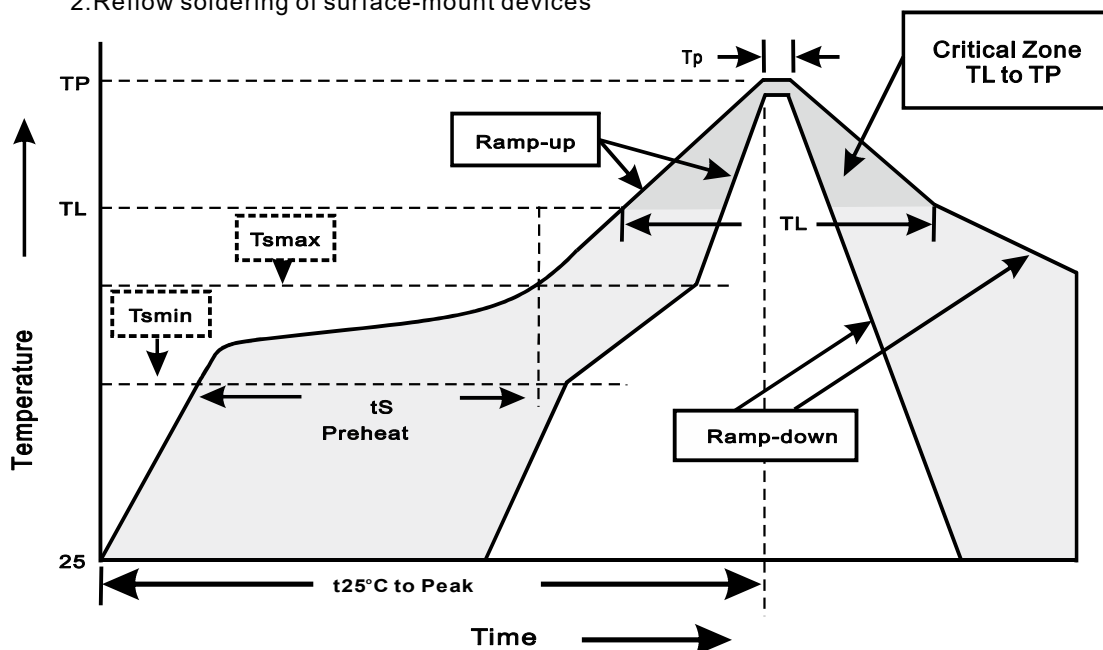
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{min}) -Temperature Max(T _{max}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{max} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes