

BC846BPDW

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BC846BPDW

Dual NPN/PNP General Purpose Transistor

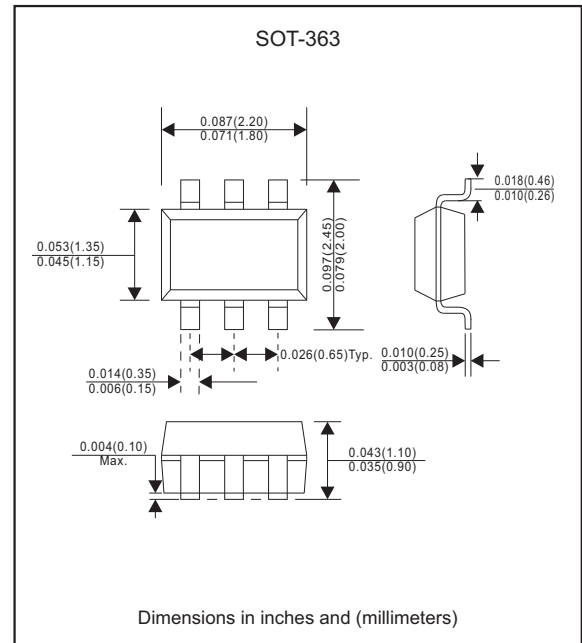
Features

- Epitaxial die construction
- Two isolated NPN/PNP transistors in one package
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen free part, ex. BC846BPDW-H

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-363
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.006 gram

Package outline



Maximum ratings TR1 (At $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CBO}	80	V
Collector to emitter voltage	V_{CEO}	65	V
Emitter to base voltage	V_{EBO}	6	V
Collector current –continuous	I_C	100	mA
Collector power dissipation	P_C	200	mW
Operating junction temperature range	T_J	-55 to +150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical characteristics of TR1 (NPN Transistor) (At $T_A=25^\circ\text{C}$ unless otherwise)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector to base breakdown voltage	$I_C=10\mu\text{A}$, $I_E=0$	BV_{CBO}	80			V
Collector to emitter breakdown voltage	$I_C=10\text{mA}$, $I_B=0$	BV_{CEO}	65			V
Emitter to base breakdown voltage	$I_E=1\mu\text{A}$, $I_C=0\text{V}$	BV_{EBO}	6			V
Collector cut-off current	$V_{CB}=30\text{V}$, $I_E=0$	I_{CBO}			15	nA
Emitter cut-off current	$V_{EB}=5\text{V}$, $I_C=0$	I_{EBO}			15	nA
DC current gain	$V_{CE}=5\text{V}$, $I_C=2\text{mA}$	h_{FE}	200		450	
Collector-emitter saturation voltage	$I_C=10\text{mA}$, $I_B=500\mu\text{A}$	$V_{CE(sat)}$			0.25	V
	$I_C=100\text{mA}$, $I_B=5\text{mA}$				0.6	
Base-emitter saturation voltage	$I_C=10\text{mA}$, $I_B=500\mu\text{A}$	$V_{BE(sat)}$		0.7		V
	$I_C=100\text{mA}$, $I_B=5\text{mA}$			0.9		
Base-emitter voltage	$V_{CE}=5\text{V}$, $I_C=2\text{mA}$	$V_{BE(ON)}$	0.58		0.7	V
	$V_{CE}=5\text{V}$, $I_C=10\text{mA}$				0.72	
Transition frequency	$V_{CE}=5\text{V}$, $I_C=10\text{mA}$, $f=100\text{MHz}$	f_T	100			MHz
Collector output capacitance	$V_{CB}=10\text{V}$, $I_E=0$, $f=1\text{MHz}$	C_{ob}			6.0	pF
Noise figure	$V_{CE}=5\text{V}$, $I_C=200\mu\text{A}$, $f=1\text{KHz}$, $R_g=2\text{K}\Omega$, $\Delta f=200\text{Hz}$	NF			10	dB

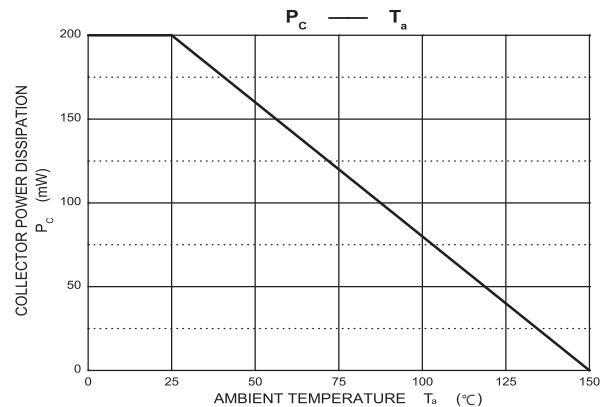
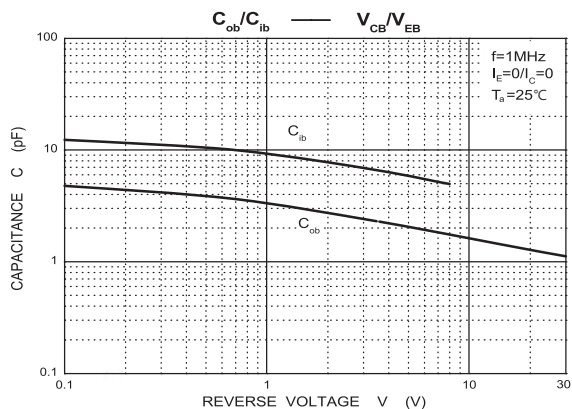
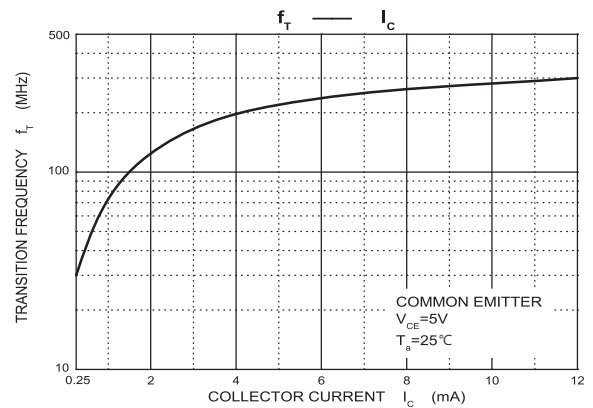
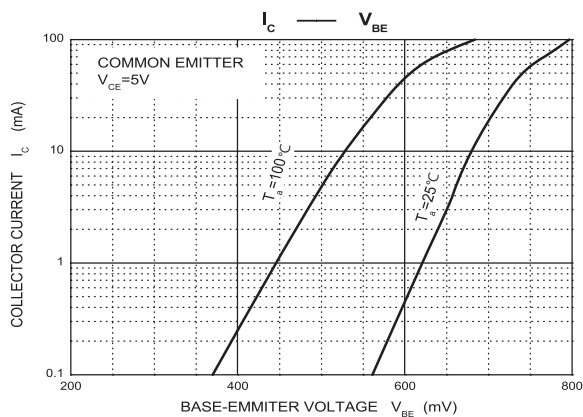
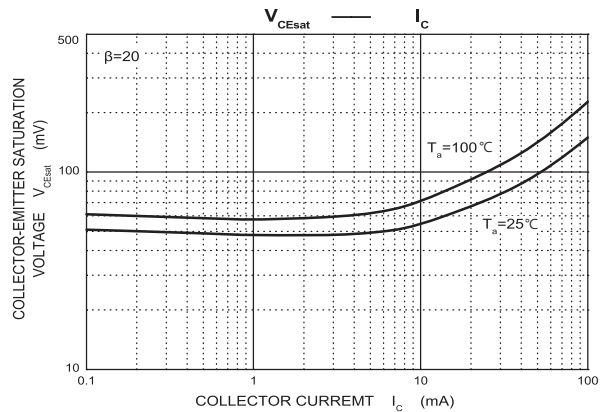
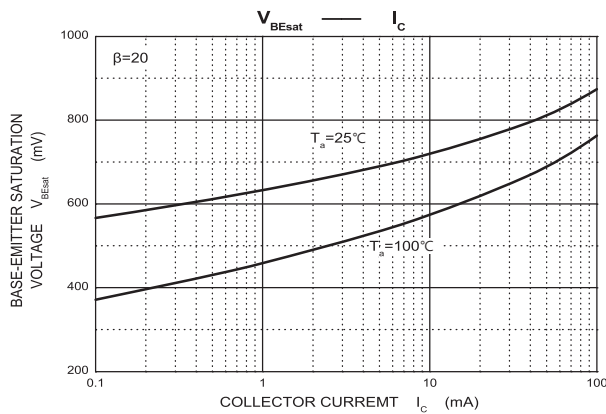
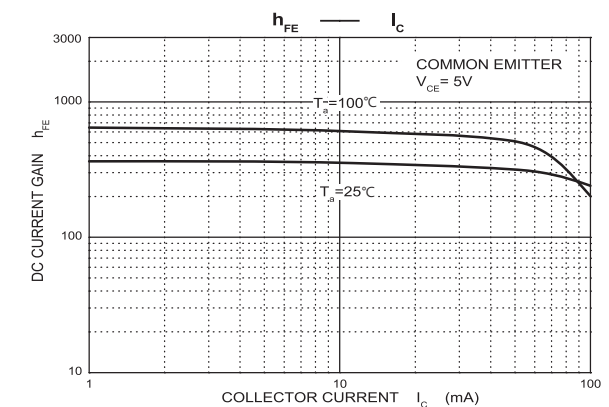
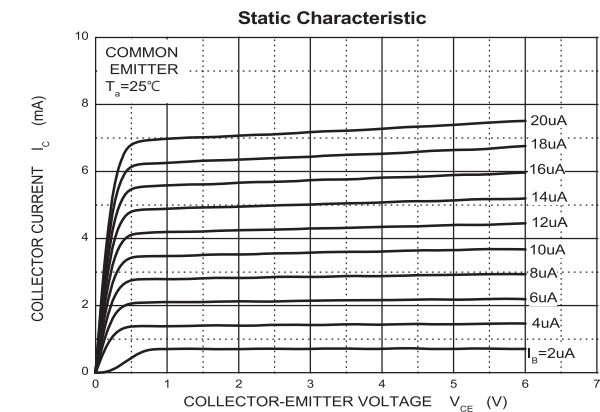
BC846BPDW**Maximum ratings TR2** (At $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector to base voltage	$-V_{\text{CBO}}$	80	V
Collector to emitter voltage	$-V_{\text{CEO}}$	65	V
Emitter to base voltage	$-V_{\text{EBO}}$	5	V
Collector current –continuous	$-I_{\text{C}}$	100	mA
Collector power dissipation	P_{C}	200	mW
Operating junction temperature range	T_{J}	-55 to +150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^{\circ}\text{C}$

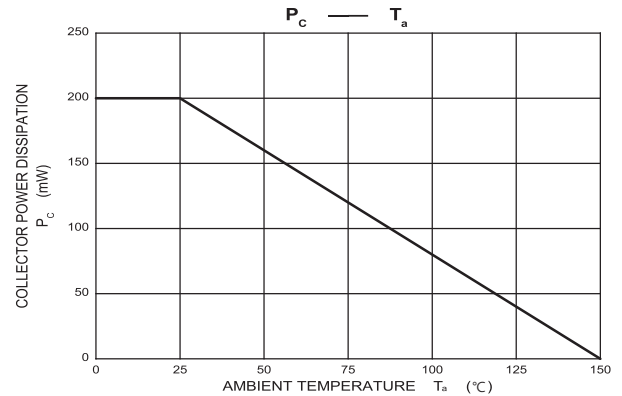
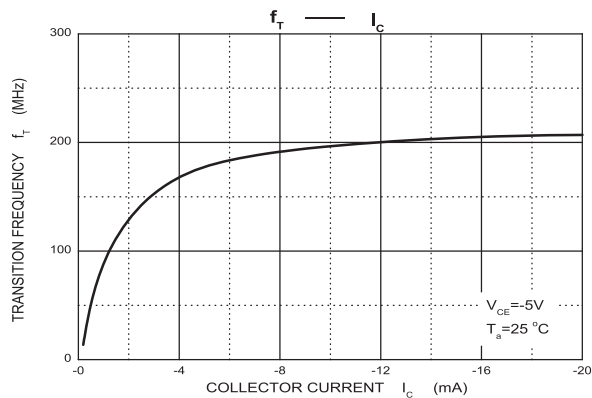
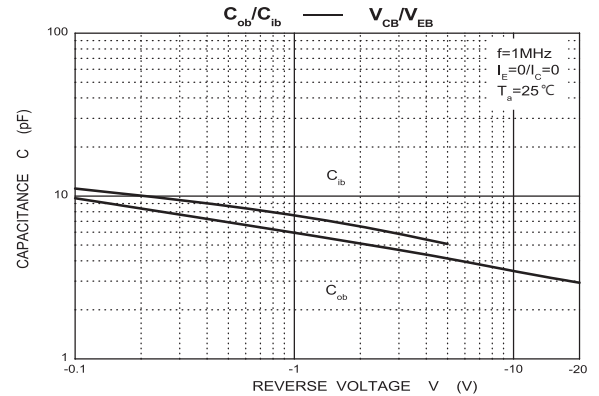
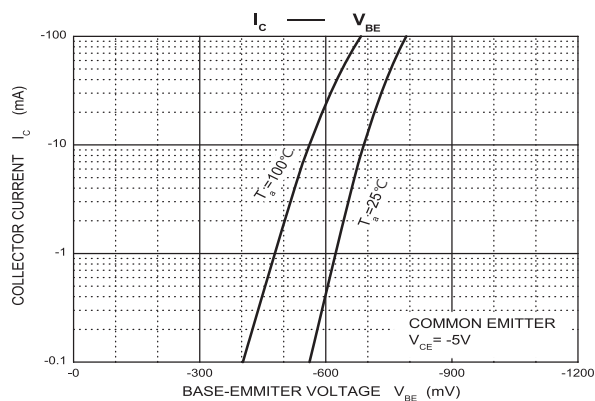
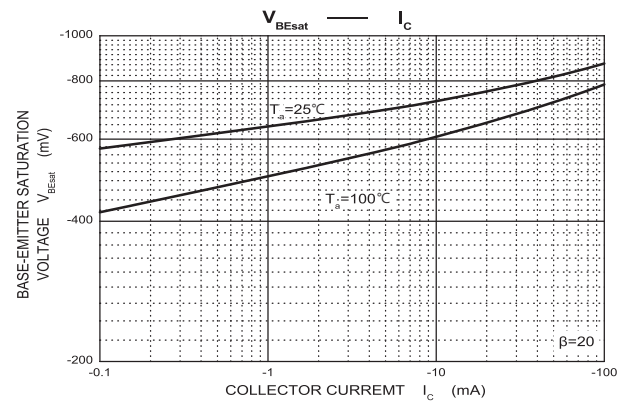
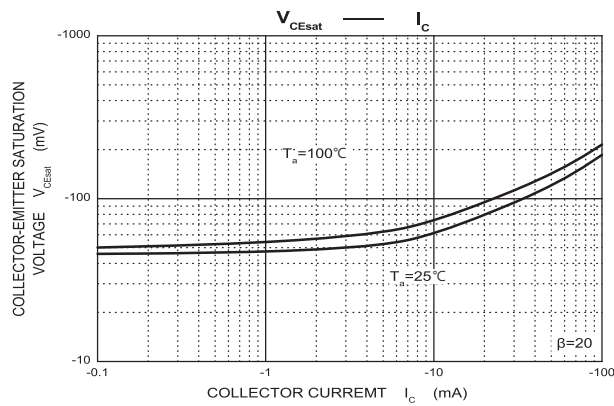
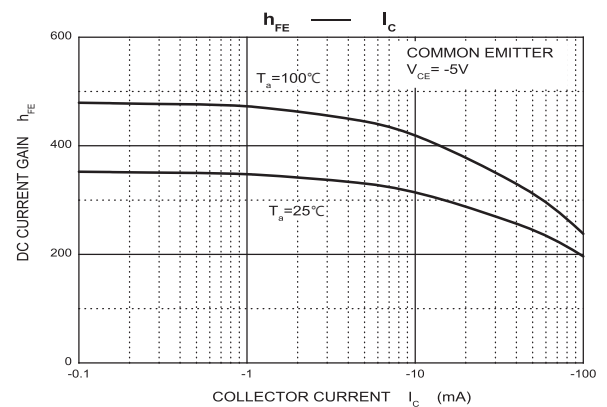
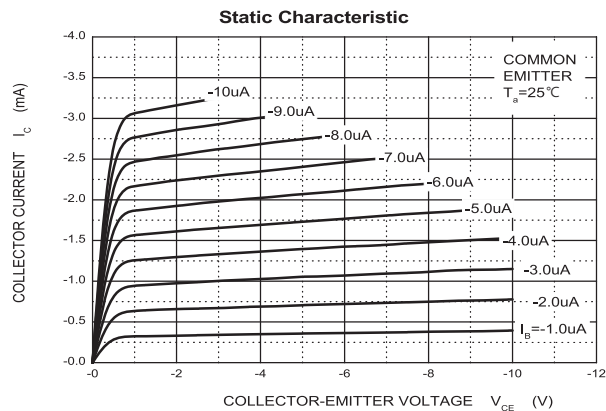
Electrical characteristics of TR2 (PNP Transistor) (At $T_A=25^{\circ}\text{C}$ unless otherwise)

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Collector to base breakdown voltage	$-I_{\text{C}}=10\mu\text{A}, I_{\text{E}}=0$	$-BV_{\text{CBO}}$	80			V
Collector to emitter breakdown voltage	$-I_{\text{C}}=10\text{mA}, I_{\text{B}}=0$	$-BV_{\text{CEO}}$	65			V
Emitter to base breakdown voltage	$-I_{\text{E}}=1\mu\text{A}, I_{\text{C}}=0\text{V}$	$-BV_{\text{EBO}}$	5			V
Collector cut-off current	$-V_{\text{CB}}=30\text{V}, I_{\text{E}}=0$	$-I_{\text{CBO}}$			15	nA
Emitter cut-off current	$-V_{\text{EB}}=5\text{V}, I_{\text{C}}=0$	$-I_{\text{EBO}}$			15	nA
DC current gain	$-V_{\text{CE}}=5\text{V}, -I_{\text{C}}=2\text{mA}$	h_{FE}	220		475	
Collector-Emitter saturation voltage	$-I_{\text{C}}=10\text{mA}, -I_{\text{B}}=500\mu\text{A}$	$-V_{\text{CE(sat)}}$			0.3	V
	$-I_{\text{C}}=100\text{mA}, -I_{\text{B}}=5\text{mA}$				0.65	
Base-emitter saturation voltage	$-I_{\text{C}}=10\text{mA}, -I_{\text{B}}=500\mu\text{A}$	$-V_{\text{BE(sat)}}$		0.7		V
	$-I_{\text{C}}=100\text{mA}, -I_{\text{B}}=5\text{mA}$				0.95	
Base-emitter voltage	$-V_{\text{CE}}=5\text{V}, -I_{\text{C}}=2\text{mA}$	$-V_{\text{BE(ON)}}$	0.6		0.75	V
	$-V_{\text{CE}}=5\text{V}, -I_{\text{C}}=10\text{mA}$				0.82	
Transition frequency	$-V_{\text{CE}}=5\text{V}, -I_{\text{C}}=10\text{mA}, f=100\text{MHz}$	f_{T}	100			MHz
Collector output capacitance	$-V_{\text{CB}}=10\text{V}, I_{\text{E}}=0, f=1\text{MHz}$	C_{ob}			4.5	pF
Noise figure	$-V_{\text{CE}}=5\text{V}, -I_{\text{C}}=200\mu\text{A}, f=1\text{KHz}, R_{\text{B}}=2\text{K}\Omega, \Delta f=200\text{Hz}$	NF			10	dB

Rating and characteristic curves (BC846BPDW) TR1

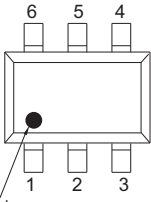
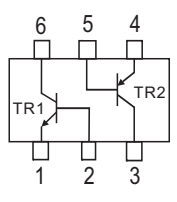


Rating and characteristic curves (BC846BPDW) TR2



BC846BPDW

Pinning information

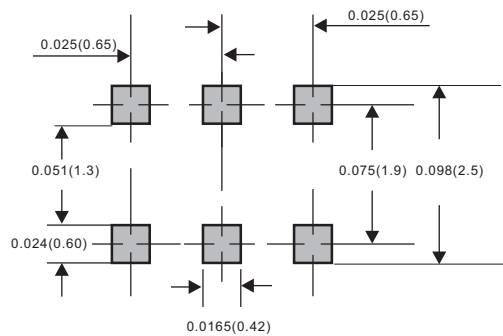
Pin	Simplified outline	Symbol
Pin 1 Emitter TR1 Pin 2 Base TR1 Pin 3 Collector TR2 Pin 4 Emitter TR2 Pin 5 Base TR2 Pin 6 Collector TR1	 Solid dot = Pin1 indicate	

Marking

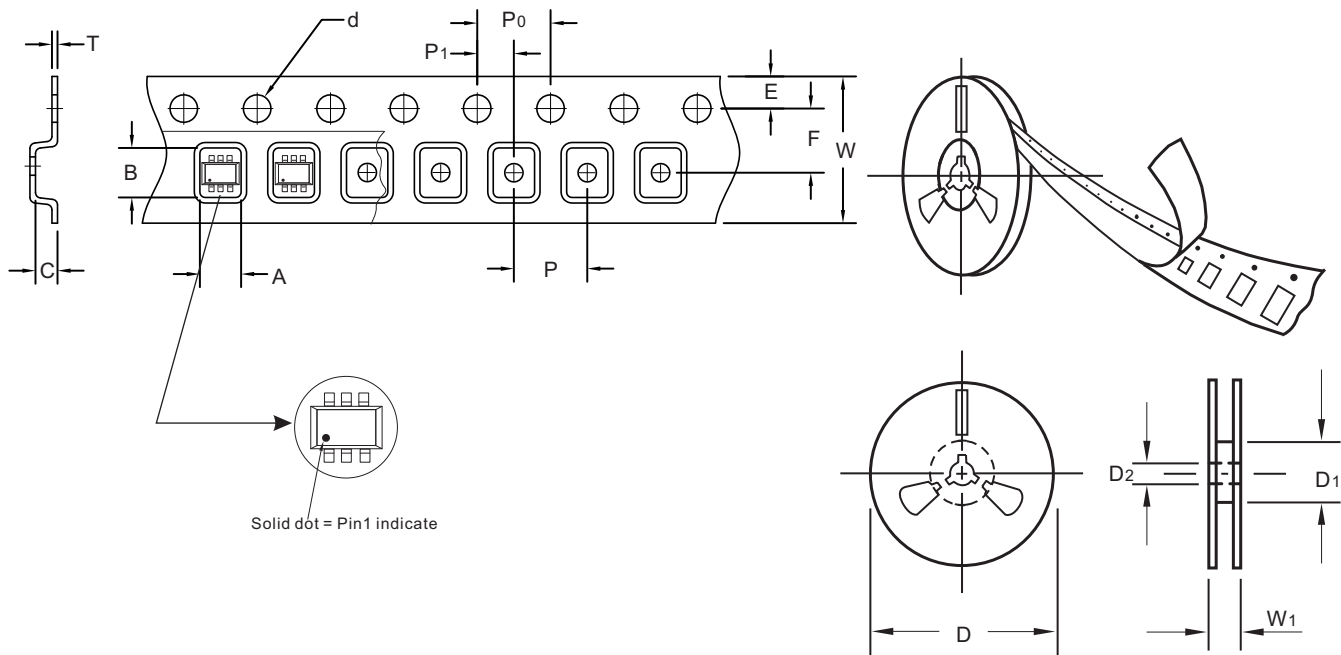
Type number	Marking code
BC846BPDW	BB

Suggested solder pad layout

SOT-363



Dimensions in inches and (millimeters)

BC846BPDW**Packing information**

unit:mm

Item	Symbol	Tolerance	SOT-363
Carrier width	A	0.1	2.25
Carrier length	B	0.1	2.55
Carrier depth	C	0.1	1.20
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	54.40
Feed hole diameter	D ₂	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	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	12.3

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

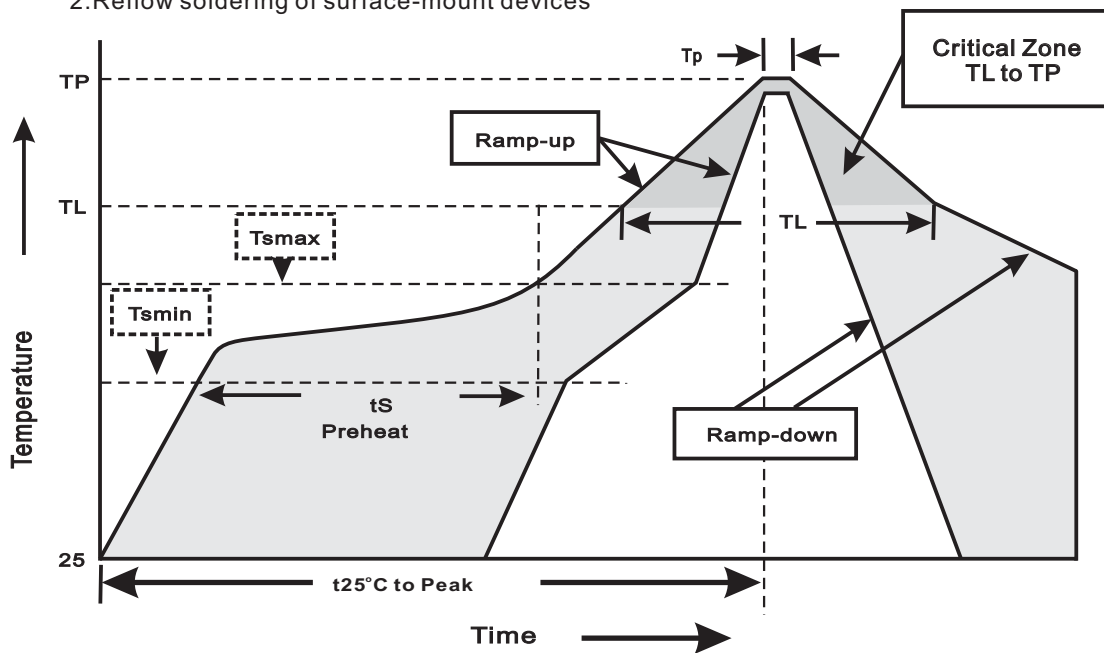
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Reel packing

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-363	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	9.50

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 _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} 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

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High reliability test capabilities

Item Test	Conditions
1. Steady State Operating Life	$P_D=200\text{mW}$ Test Duration:1000hrs
2. High Temperature Reverse Bias	$T_J=150^{\circ}\text{C}$, $V_{CE}=80\%$ related volage, 1000hrs
3. Temperature Cycle	$-55^{\circ}\text{C}(15\text{min})$ to $150^{\circ}\text{C}(15\text{min})$ Air to Air Transition Time<20sec Test Cycles: 1000cycle
4. Autoclave	$P=2\text{atm}$ $T_a=121^{\circ}\text{C}$ $\text{RH}=100\%$ Test Duration: 96hrs
5. High Temperature Storage Life	$T_a=150^{\circ}\text{C}$ Test Duration: 1000hrs
6. Solderability	245°C ,5sec
7. High Temperature High Humidity Reverse Bias	$T_a=85^{\circ}\text{C}$, 85%RH, $V_{CE}=80\%$ related volage, 1000hrs
8. Resistance to Soldering Heat	260°C ,10sec