

BC846BDW1T1, BC847BDW1T1, BC848CDW1T1

Dual General Purpose Transistors

NPN Duals

These transistors are designed for general purpose amplifier applications. They are housed in the SOT-363/SC-88 which is designed for low power surface mount applications.

- Device Marking:
BC846BDW1T1 = 1B
BC847BDW1T1 = 1F
BC848CDW1T1 = 1L

Features

- Pb-Free Package is Available

MAXIMUM RATINGS

Rating	Symbol	BC846	BC847	BC848	Unit
Collector–Emitter Voltage	V_{CEO}	65	45	30	V
Collector–Base Voltage	V_{CBO}	80	50	30	V
Emitter–Base Voltage	V_{EBO}	6.0	6.0	5.0	V
Collector Current – Continuous	I_C	100	100	100	mA _{dc}

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation Per Device FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate Above 25°C	P_D	380 250 3.0	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	328	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	–55 to +150	$^\circ\text{C}$

1. FR-5 = 1.0 x 0.75 x 0.062 in



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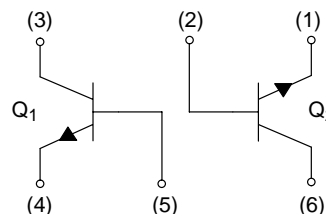
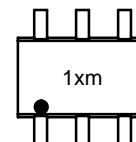


DIAGRAM MARKING



SOT-363
CASE 419B
STYLE 1



1x = Specific Device Code
x = B, F, L
m = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
BC846BDW1T1	SOT-363	3000 Units/Reel
BC847BDW1T1	SOT-363	3000 Units/Reel
BC847BDW1T1G	SOT-363 (Pb-Free)	3000 Units/Reel
BC848CDW1T1	SOT-363	3000 Units/Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

Characteristic	Symbol	Min	Typ	Max	Unit	
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage (I _C = 10 mA)	BC846 BC847 BC848	V _{(BR)CEO}	65 45 30	– – –	– – –	V
Collector–Emitter Breakdown Voltage (I _C = 10 μA, V _{EB} = 0)	BC846 BC847 BC848	V _{(BR)CES}	80 50 30	– – –	– – –	V
Collector–Base Breakdown Voltage (I _C = 10 μA)	BC846 BC847 BC848	V _{(BR)CBO}	80 50 30	– – –	– – –	V
Emitter–Base Breakdown Voltage (I _E = 1.0 μA)	BC846 BC847 BC848	V _{(BR)EBO}	6.0 6.0 5.0	– – –	– – –	V
Collector Cutoff Current (V _{CB} = 30 V) (V _{CB} = 30 V, T _A = 150°C)		I _{CBO}	– –	– –	15 5.0	nA μA

ON CHARACTERISTICS

DC Current Gain (I _C = 10 μA, V _{CE} = 5.0 V)	BC846B, BC847B BC848C	h _{FE}	– –	150 270	– –	–
(I _C = 2.0 mA, V _{CE} = 5.0 V)	BC846B, BC847B BC848C		200 420	290 520	450 800	
Collector–Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA) (I _C = 100 mA, I _B = 5.0 mA)		V _{CE(sat)}	– –	– –	0.25 0.6	V
Base–Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA) (I _C = 100 mA, I _B = 5.0 mA)		V _{BE(sat)}	– –	0.7 0.9	– –	V
Base–Emitter Voltage (I _C = 2.0 mA, V _{CE} = 5.0 V) (I _C = 10 mA, V _{CE} = 5.0 V)		V _{BE(on)}	580 –	660 –	700 770	mV

SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (I _C = 10 mA, V _{CE} = 5.0 Vdc, f = 100 MHz)		f _T	100	–	–	MHz
Output Capacitance (V _{CB} = 10 V, f = 1.0 MHz)		C _{obo}	–	–	4.5	pF
Noise Figure (I _C = 0.2 mA, V _{CE} = 5.0 Vdc, R _S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)		NF	–	–	10	dB

BC846BDW1T1, BC847BDW1T1, BC848CDW1T1

TYPICAL CHARACTERISTICS – BC847 & BC848

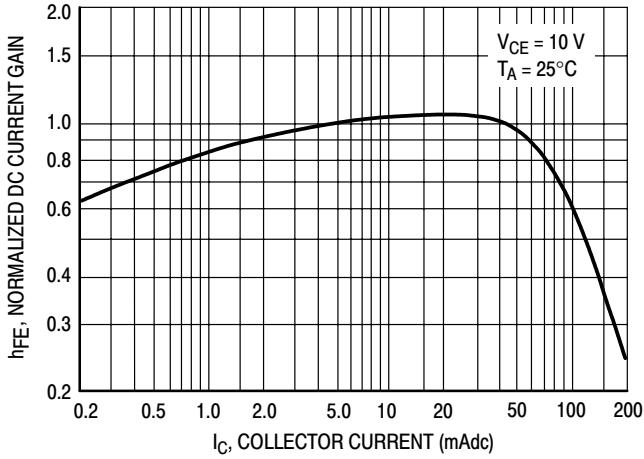


Figure 1. Normalized DC Current Gain

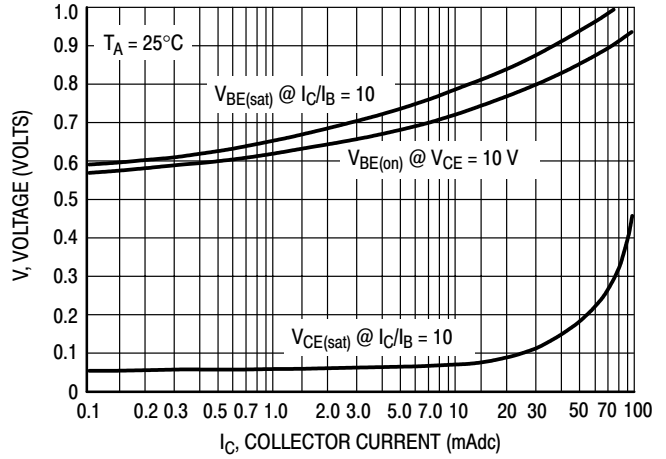


Figure 2. "Saturation" and "On" Voltages

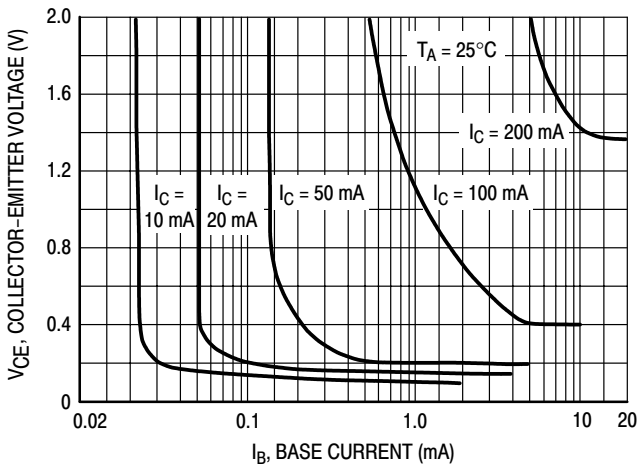


Figure 3. Collector Saturation Region

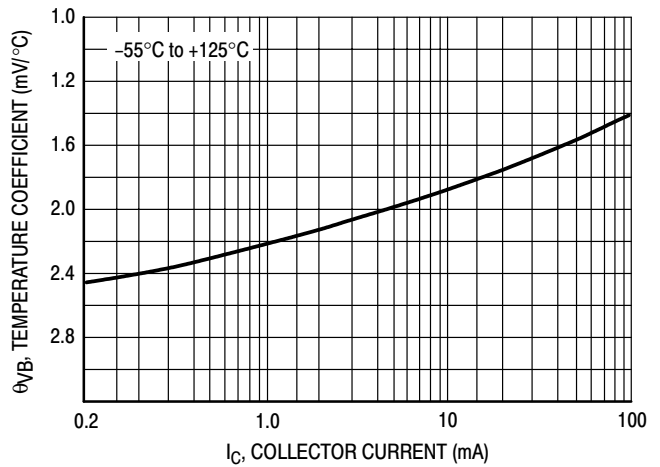


Figure 4. Base-Emitter Temperature Coefficient

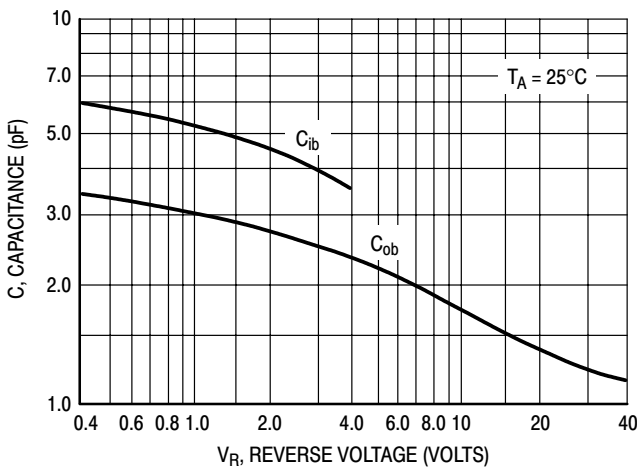


Figure 5. Capacitances

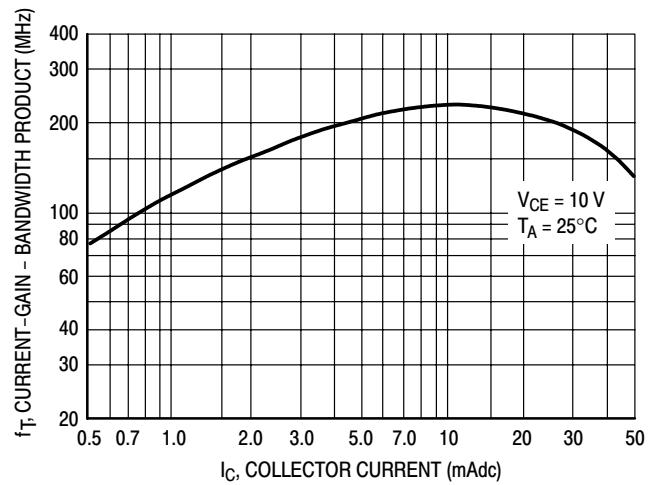


Figure 6. Current-Gain - Bandwidth Product

BC846BDW1T1, BC847BDW1T1, BC848CDW1T1

TYPICAL CHARACTERISTICS – BC846

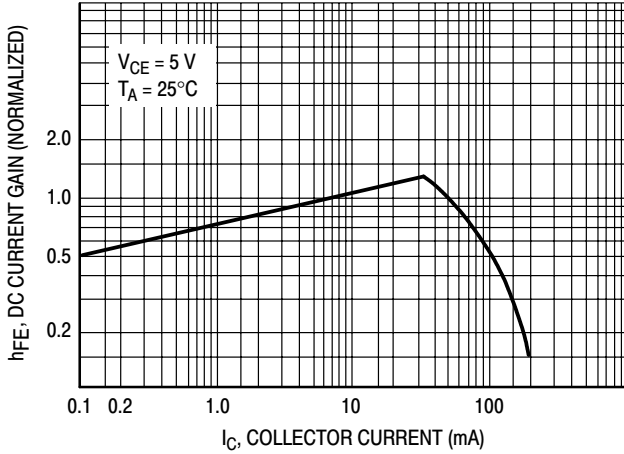


Figure 7. Normalized DC Current Gain

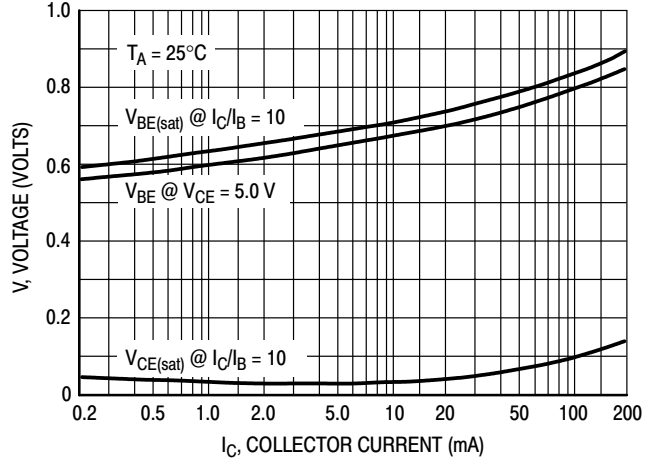


Figure 8. "On" Voltage

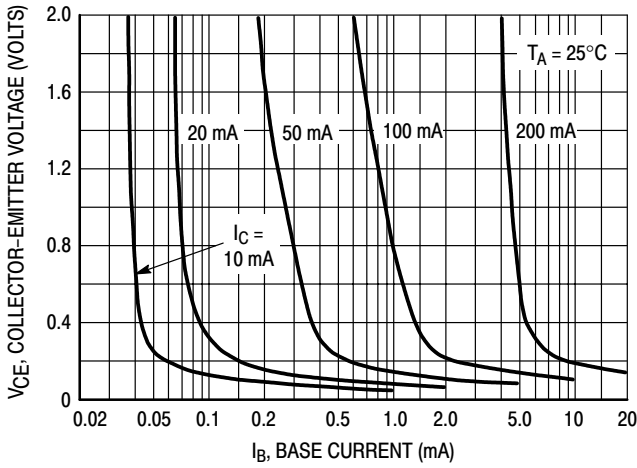


Figure 9. Collector Saturation Region

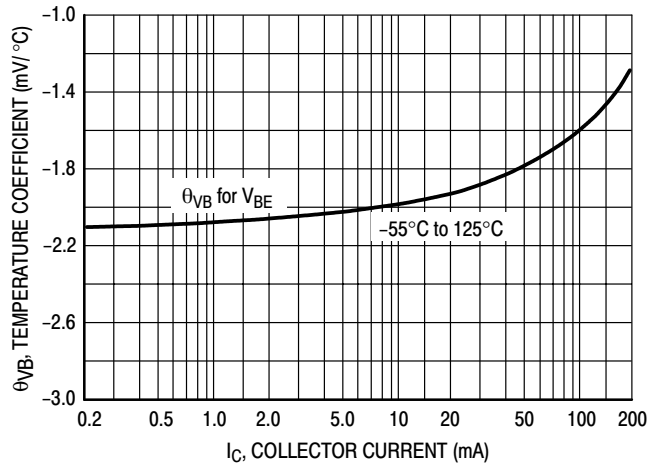


Figure 10. Base-Emitter Temperature Coefficient

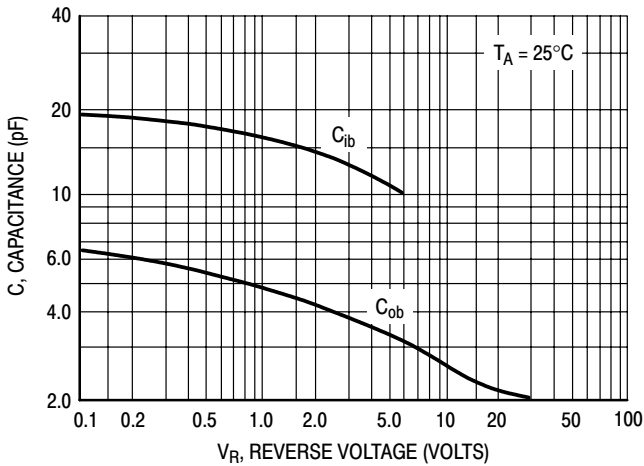


Figure 11. Capacitance

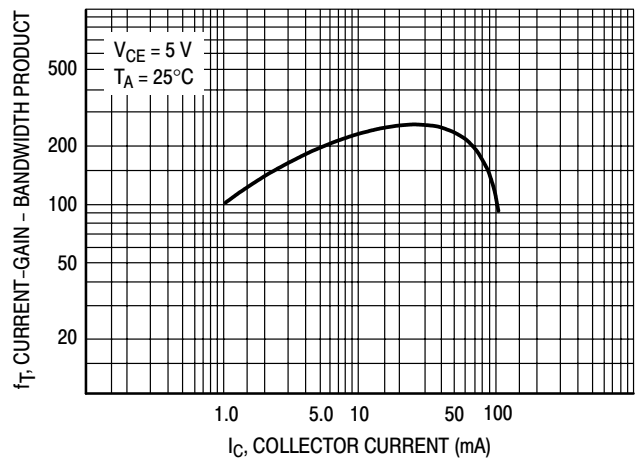


Figure 12. Current-Gain - Bandwidth Product

BC846BDW1T1, BC847BDW1T1, BC848CDW1T1

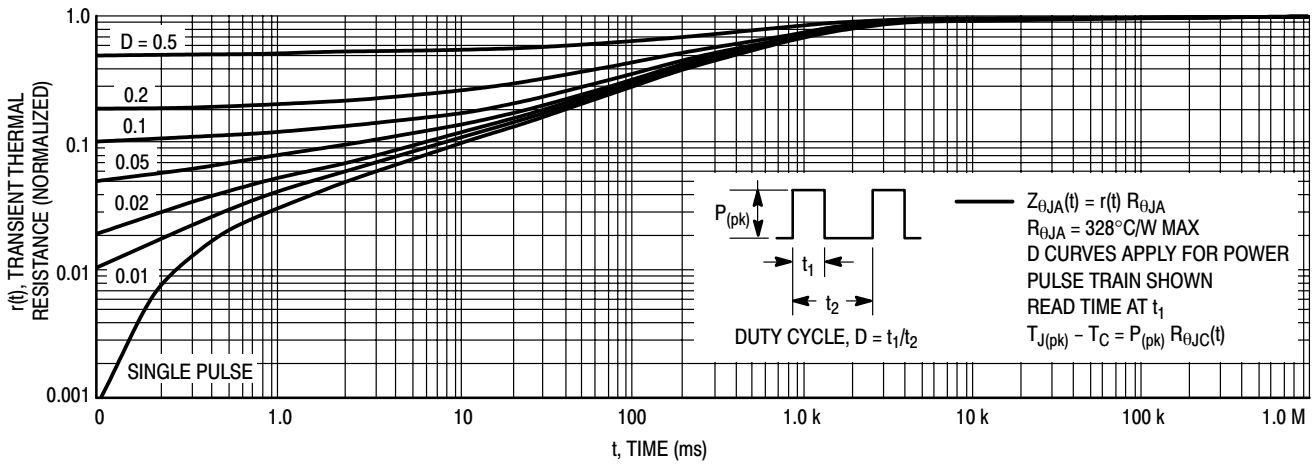


Figure 13. Thermal Response

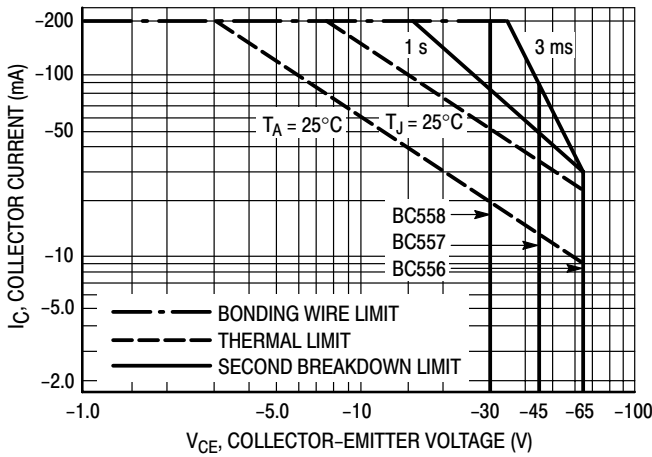


Figure 14. Active Region Safe Operating Area

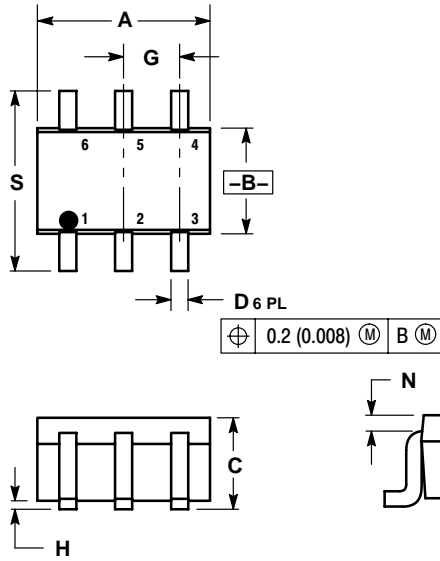
The safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

The data of Figure 14 is based upon $T_{J(pk)} = 150^{\circ}\text{C}$; T_C or T_A is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^{\circ}\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 13. At high case or ambient temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by the secondary breakdown.

BC846BDW1T1, BC847BDW1T1, BC848CDW1T1

PACKAGE DIMENSIONS

SOT-363 (SC-88)
CASE 419B-02
ISSUE T

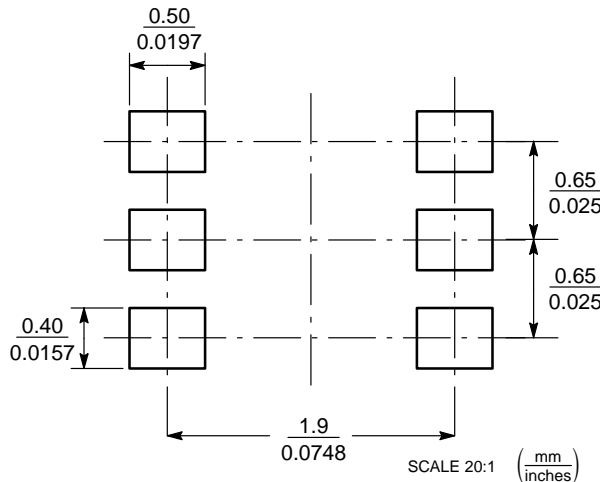


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. 419B-01 OBSOLETE, NEW STANDARD 419B-02.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

- STYLE 1:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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