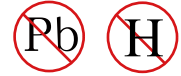




YEA SHIN TECHNOLOGY CO., LTD

BC846xDW THRU BC848xDW

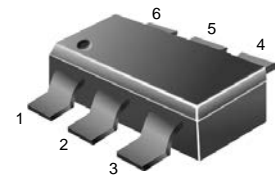
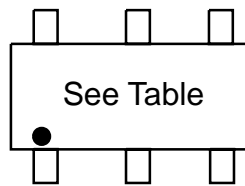
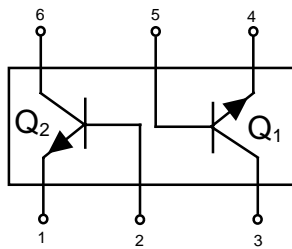
# General Purpose Transistors



## Dual NPN

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.

SC-88 / SOT-363



SOT-363/SC-88  
CASE 419B STYLE1

## 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	mAdc

## THERMAL CHARACTERISTICS

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

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

## ORDERING INFORMATION

Device	Marking	Packag	Shipping
BC846BDW	1B	SOT-363	3000 Units/Reel
BC847BDW	1F	SOT-363	3000 Units/Reel
BC847CDW	1G	SOT-363	3000 Units/Reel
BC848BDW	1K	SOT-363	3000 Units/Reel
BC848CDW	1L	SOT-363	3000 Units/Reel

# ELECTRICAL CHARACTERISTICS

## BC846xDW THRU BC848xDW

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 10 mA)	V <sub>(BR)CEO</sub>				V
BC846 Series		65	—	—	
BC847 Series		45	—	—	
BC848 Series		30	—	—	
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 10 µA, V <sub>EB</sub> = 0)	V <sub>(BR)CES</sub>				V
BC846 Series		80	—	—	
BC847 Series		50	—	—	
BC848 Series		30	—	—	
Collector–Base Breakdown Voltage (I <sub>C</sub> = 10 µA)	V <sub>(BR)CBO</sub>				V
BC846 Series		80	—	—	
BC847 Series		50	—	—	
BC848 Series		30	—	—	
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 1.0 µA)	V <sub>(BR)EBO</sub>				V
BC846 Series		6.0	—	—	
BC847 Series		6.0	—	—	
BC848 Series		5.0	—	—	
Collector Cutoff Current (V <sub>CB</sub> = 30 V)	I <sub>CBO</sub>	—	—	15	nA
(V <sub>CB</sub> = 30 V, T <sub>A</sub> = 150°C)		—	—	5.0	µA

### ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = 10 µA, V <sub>CE</sub> = 5.0 V)	h <sub>FE</sub>				—
BC846B, BC847B, BC848B		—	150	—	
BC847C, BC848C		—	270	—	
(I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 V)					
BC846B, BC847B, BC848B		200	290	450	
BC847C, BC848C		420	520	800	
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.5 mA)	V <sub>CE(sat)</sub>	—	—	0.25	V
(I <sub>C</sub> = 100 mA, I <sub>B</sub> = 5.0 mA)		—	—	0.6	
Base–Emitter Saturation Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.5 mA)	V <sub>BE(sat)</sub>	—	0.7	—	V
(I <sub>C</sub> = 100 mA, I <sub>B</sub> = 5.0 mA)		—	0.9	—	
Base–Emitter Voltage (I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 V)	V <sub>BE(on)</sub>	580	660	700	mV
(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 V)		—	—	770	

### SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 Vdc, f = 100 MHz)	f <sub>T</sub>	100	—	—	MHz
Output Capacitance (V <sub>CB</sub> = 10 V, f = 1.0 MHz)	C <sub>obo</sub>	—	—	4.5	pF
Noise Figure (I <sub>C</sub> = 0.2 mA, V <sub>CE</sub> = 5.0 V <sub>dc</sub> , R <sub>S</sub> = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)	NF				dB
BC846B, BC847B, BC848B		—	—	10	
BC847C, BC848C		—	—	4.0	

# DEVICE CHARACTERISTICS

## BC846xDW THRU BC848xDW

### TYPICAL CHARACTERISTICS

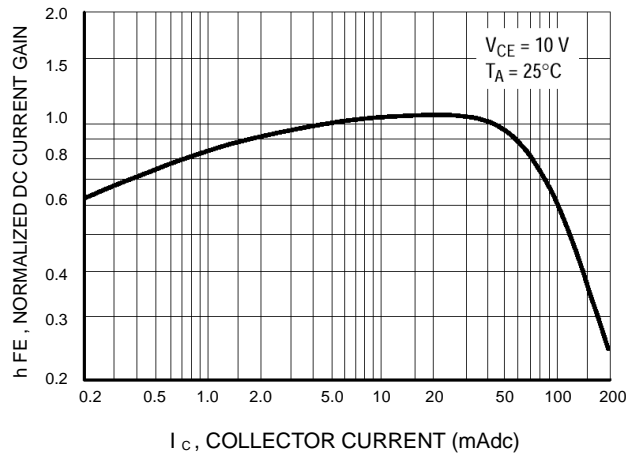


Figure 1. Normalized DC Current Gain

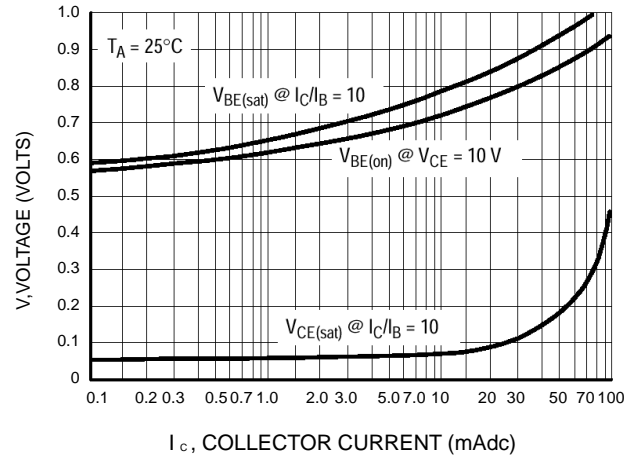


Figure 2. "Saturation" and "On" Voltages

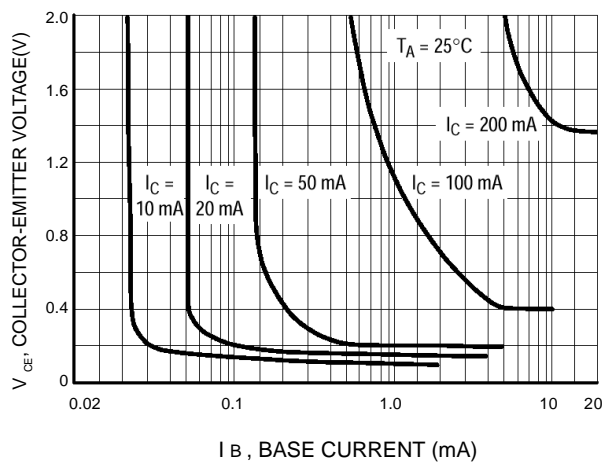


Figure 3. Collector Saturation Region

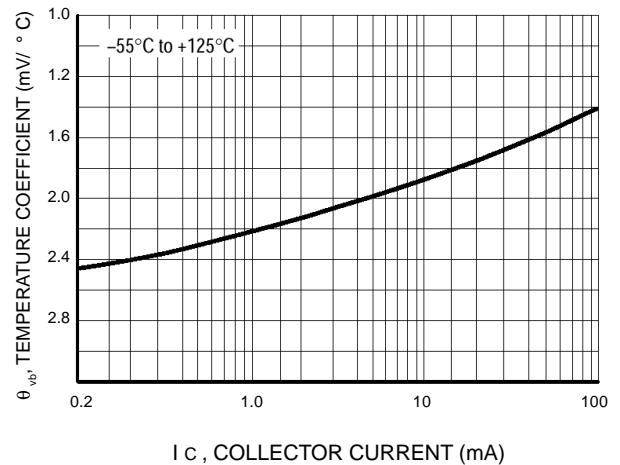


Figure 4. Base-Emitter Temperature Coefficient

# DEVICE CHARACTERISTICS

## BC846xDW THRU BC848xDW

### TYPICAL CHARACTERISTICS

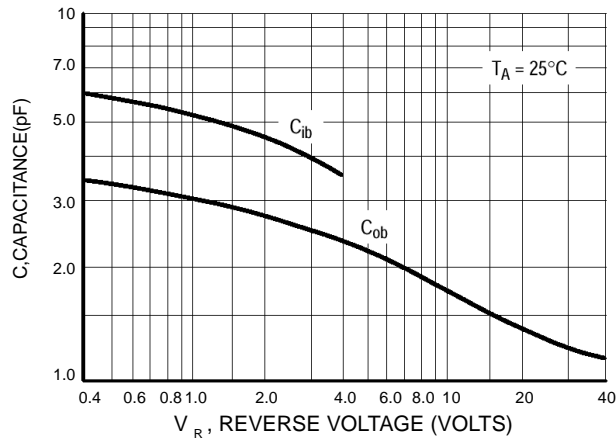


Figure 5. Capacitances

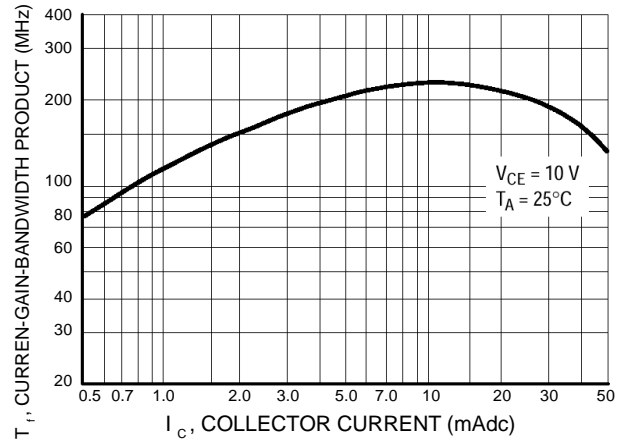


Figure 6. Current-Gain – Bandwidth Product

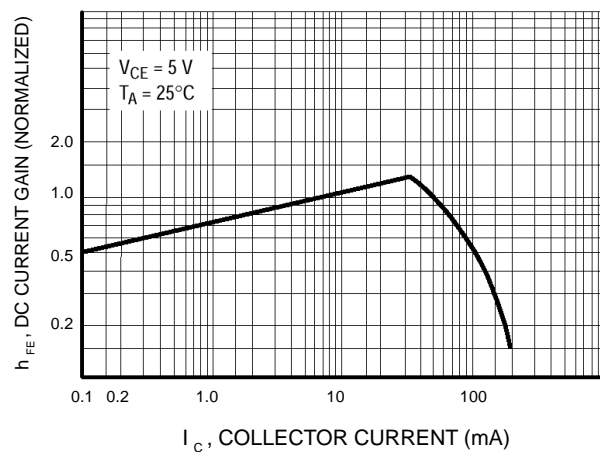


Figure 7. DC Current Gain

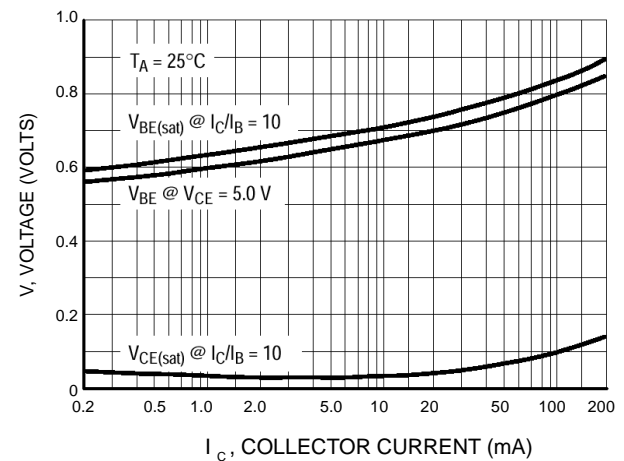


Figure 8. "On" Voltage

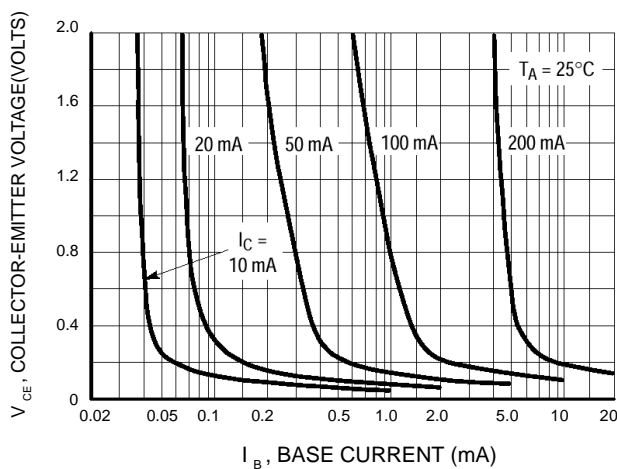


Figure 9. Collector Saturation Region

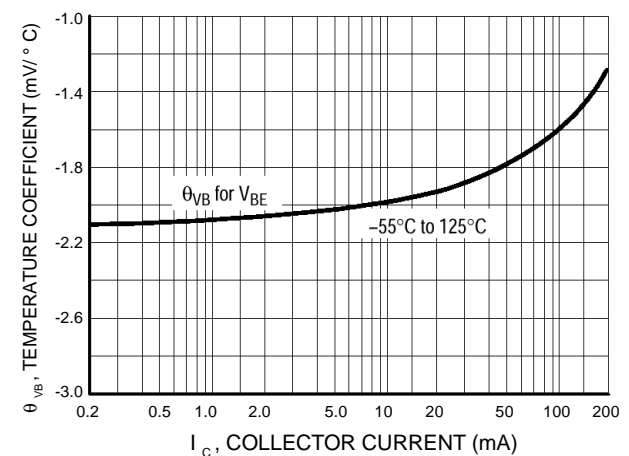


Figure 10. Base-Emitter Temperature Coefficient

# DEVICE CHARACTERISTICS

## BC846xDW THRU BC848xDW

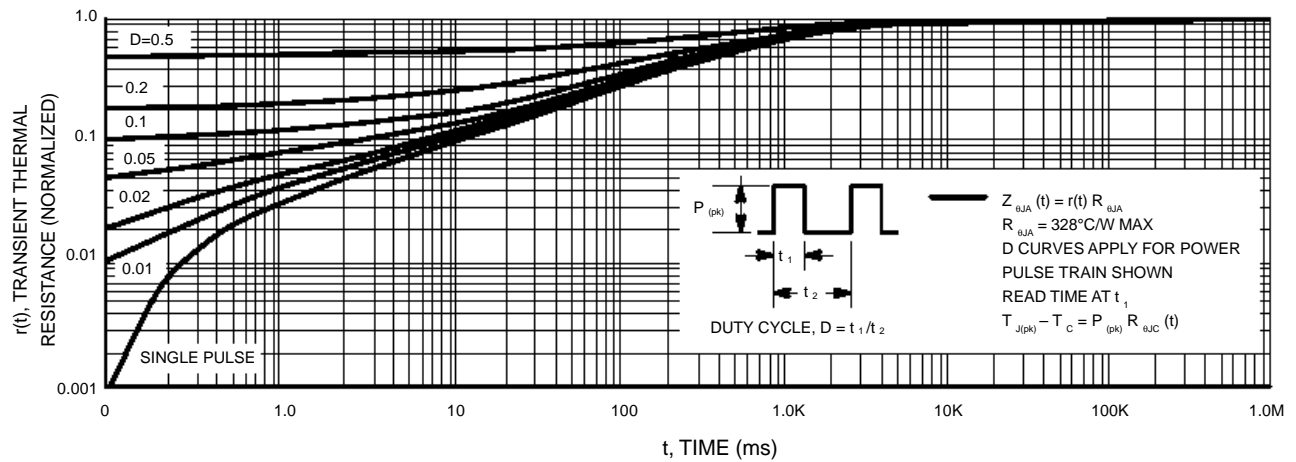


Figure 11. Thermal Response

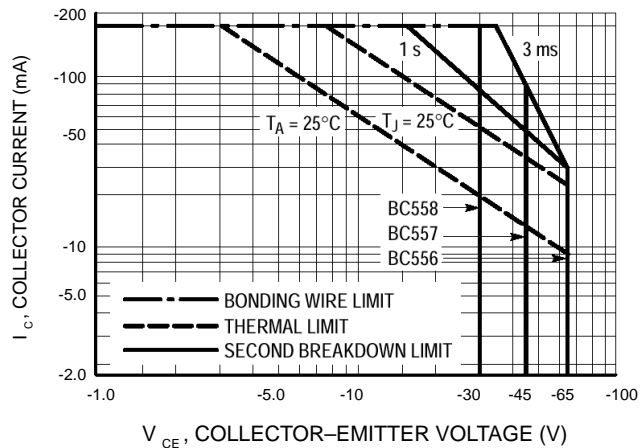


Figure 12. Active Region Safe Operating Area

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 12 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 12. 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.

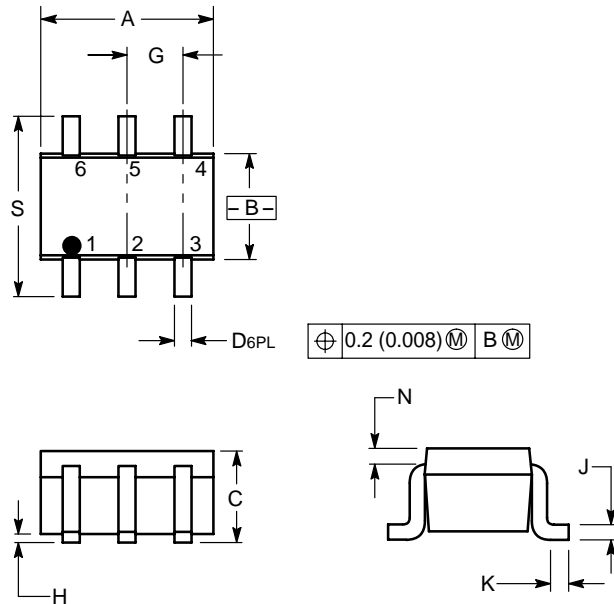
# PACKAGE OUTLINE & DIMENSIONS

## BC846xDW THRU BC848xDW

SC-88/SOT-363

### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.



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

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

