



# DATA SHEET

SEMICONDUCTOR

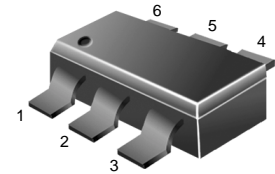
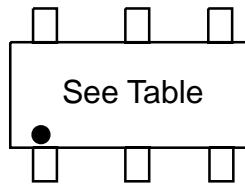
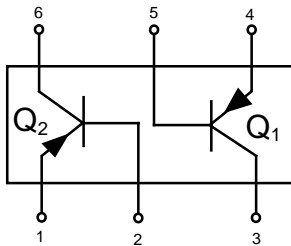
BC85xBDW/CDW Series

## Dual General Purpose Transistors



### PNP 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.



SOT-363/SC-88  
CASE 419B STYLE 1

### MAXIMUM RATINGS

Rating	Symbol	BC856	BC857	BC858	Unit
Collector-Emitter Voltage	$V_{CEO}$	-65	-45	-30	V
Collector-Base Voltage	$V_{CBO}$	-80	-50	-30	V
Emitter-Base Voltage	$V_{EBO}$	-5.0	-5.0	-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	$^\circ\text{C}/\text{W}$
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	Package	Shipping
BC856BDW	SOT-363	3000 Units/Reel
BC857BDW	SOT-363	3000 Units/Reel
BC857CDW	SOT-363	3000 Units/Reel
BC858BDW	SOT-363	3000 Units/Reel
BC858CDW	SOT-363	3000 Units/Reel

# ELECTRICAL CHARACTERISTICS

## BC85xBDW/CDW Series

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector–Emitter Breakdown Voltage ( $I_C = -10\text{ mA}$ )	$V_{(BR)CEO}$				V
BC856 Series		-65	—	—	
BC857 Series		-45	—	—	
BC858 Series		-30	—	—	
Collector–Emitter Breakdown Voltage ( $I_C = -10\ \mu\text{A}$ , $V_{EB} = 0$ )	$V_{(BR)CES}$				V
BC856 Series		-80	—	—	
BC857 Series		-50	—	—	
BC858 Series		-30	—	—	
Collector–Base Breakdown Voltage ( $I_C = -10\ \mu\text{A}$ )	$V_{(BR)CBO}$				V
BC856 Series		-80	—	—	
BC857 Series		-50	—	—	
BC858 Series		-30	—	—	
Emitter–Base Breakdown Voltage ( $I_E = -1.0\ \mu\text{A}$ )	$V_{(BR)EBO}$				V
BC856 Series		-5.0	—	—	
BC857 Series		-5.0	—	—	
BC858 Series		-5.0	—	—	
Collector Cutoff Current ( $V_{CB} = -30\text{ V}$ ) ( $V_{CB} = -30\text{ V}$ , $T_A = 150^\circ\text{C}$ )	$I_{CBO}$				nA $\mu\text{A}$
		—	—	-15 -4.0	

### ON CHARACTERISTICS

DC Current Gain ( $I_C = -10\ \mu\text{A}$ , $V_{CE} = -5.0\text{ V}$ )	$h_{FE}$				—
BC856B, BC857B, BC858B		—	150	—	
BC857C, BC858C		—	270	—	
( $I_C = -2.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ )					
BC856B, BC857B, BC858B		220	290	475	
BC857C, BC858C		420	520	800	
Collector–Emitter Saturation Voltage ( $I_C = -10\text{ mA}$ , $I_B = -0.5\text{ mA}$ ) ( $I_C = -100\text{ mA}$ , $I_B = -5.0\text{ mA}$ )	$V_{CE(sat)}$				V
		—	—	-0.3 -0.65	
Base–Emitter Saturation Voltage ( $I_C = -10\text{ mA}$ , $I_B = -0.5\text{ mA}$ ) ( $I_C = -100\text{ mA}$ , $I_B = -5.0\text{ mA}$ )	$V_{BE(sat)}$				V
		—	-0.7 -0.9	—	
Base–Emitter Voltage ( $I_C = -2.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ ) ( $I_C = -10\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ )	$V_{BE(on)}$				V
		-0.6	—	-0.75 -0.82	

### SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ( $I_C = -10\text{ mA}$ , $V_{CE} = -5.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	100	—	—	MHz
Output Capacitance ( $V_{CB} = -10\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	—	—	4.5	pF
Noise Figure ( $I_C = -0.2\text{ mA}$ , $V_{CE} = -5.0\text{ Vdc}$ , $R_S = 2.0\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ , $BW = 200\text{ Hz}$ )	NF	—	—	10	dB

# DEVICE CHARACTERISTICS

## BC85xBDW/CDW Series

### TYPICAL PNP CHARACTERISTICS — BC856

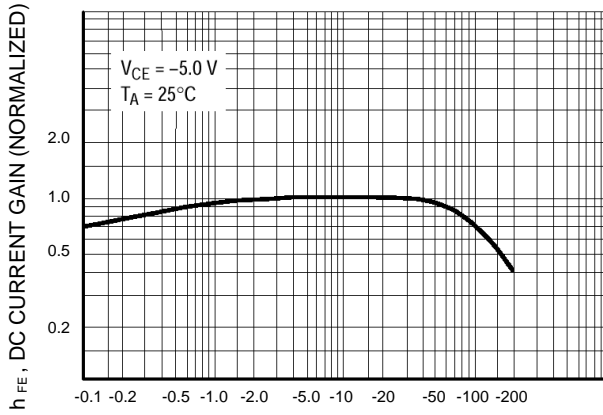


Figure 1. DC Current Gain

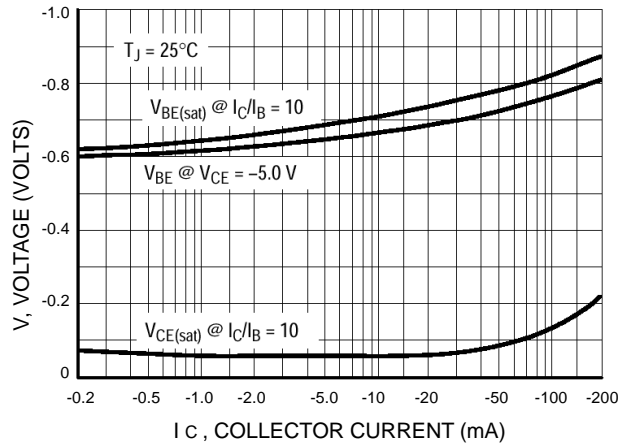


Figure 2. "On" Voltage

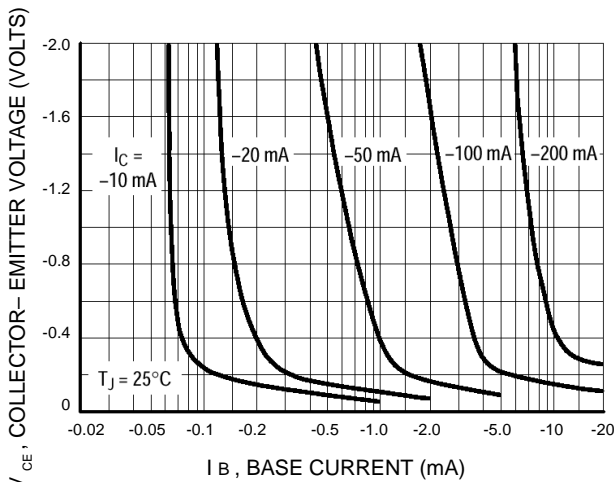


Figure 3. Collector Saturation Region

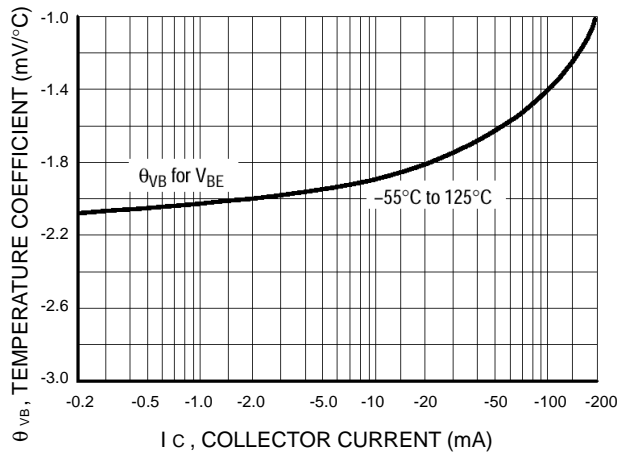


Figure 4. Base-Emitter Temperature Coefficient

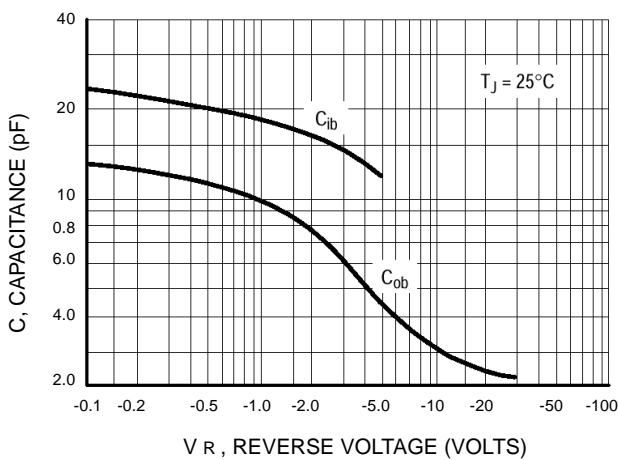


Figure 5. Capacitance

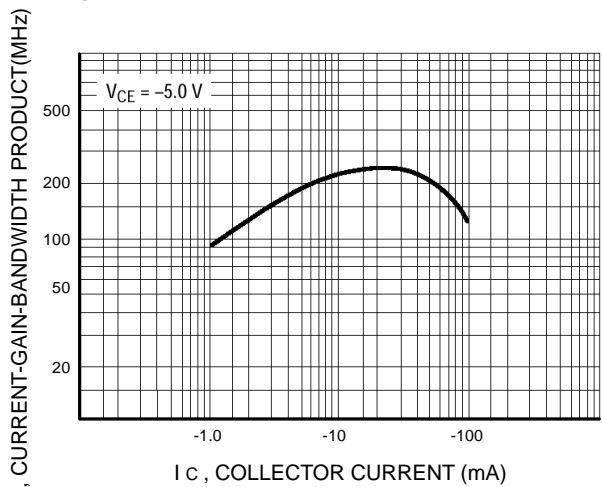
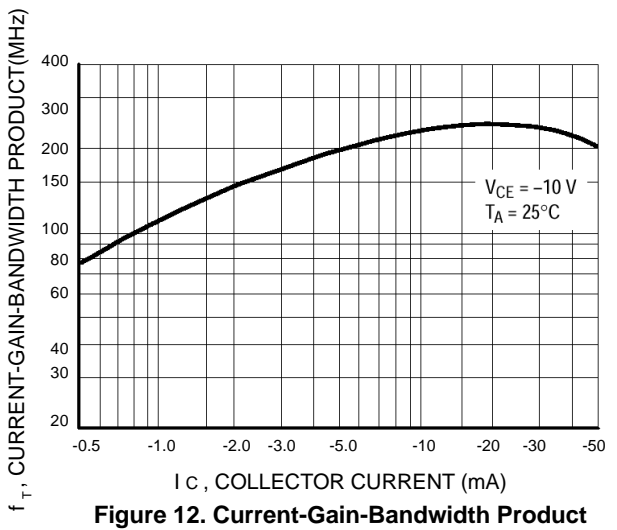
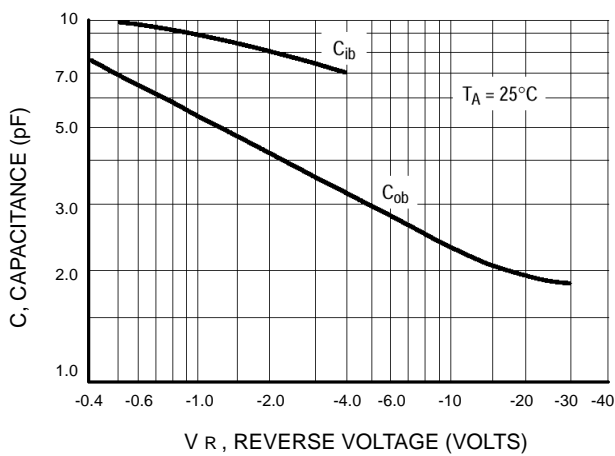
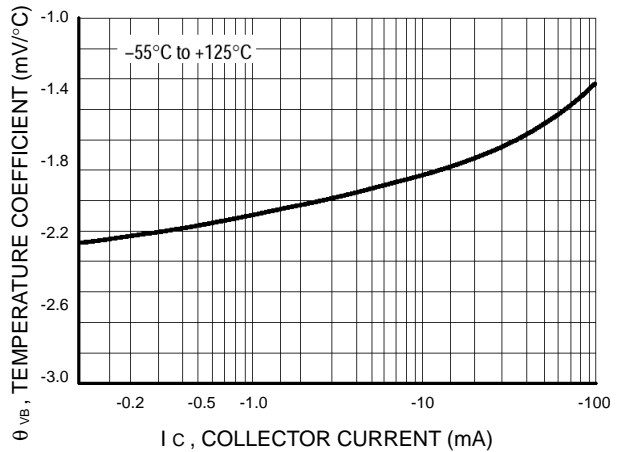
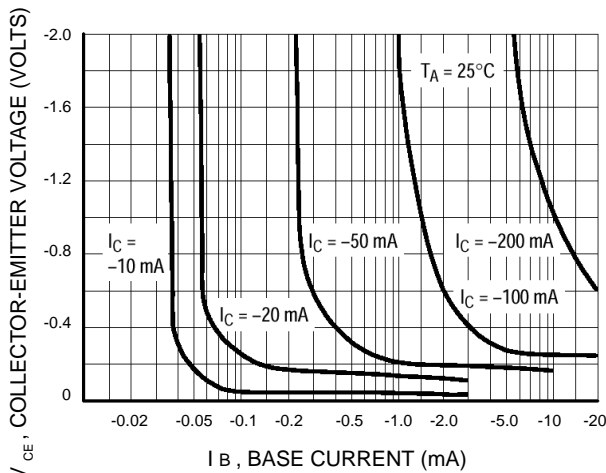
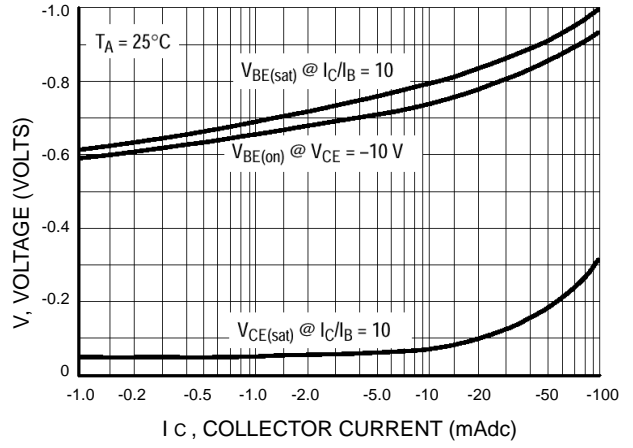
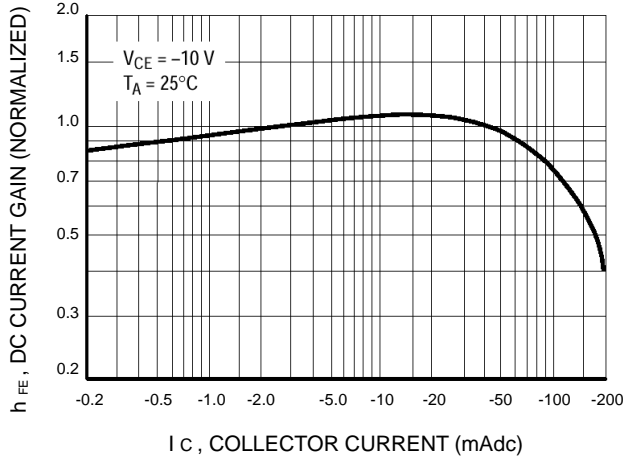


Figure 6. Current-Gain - Bandwidth Product

# DEVICE CHARACTERISTICS

## BC85xBDW/CDW Series

### TYPICAL PNP CHARACTERISTICS — BC857/BC858



# DEVICE CHARACTERISTICS

## BC85xBDW/CDW Series

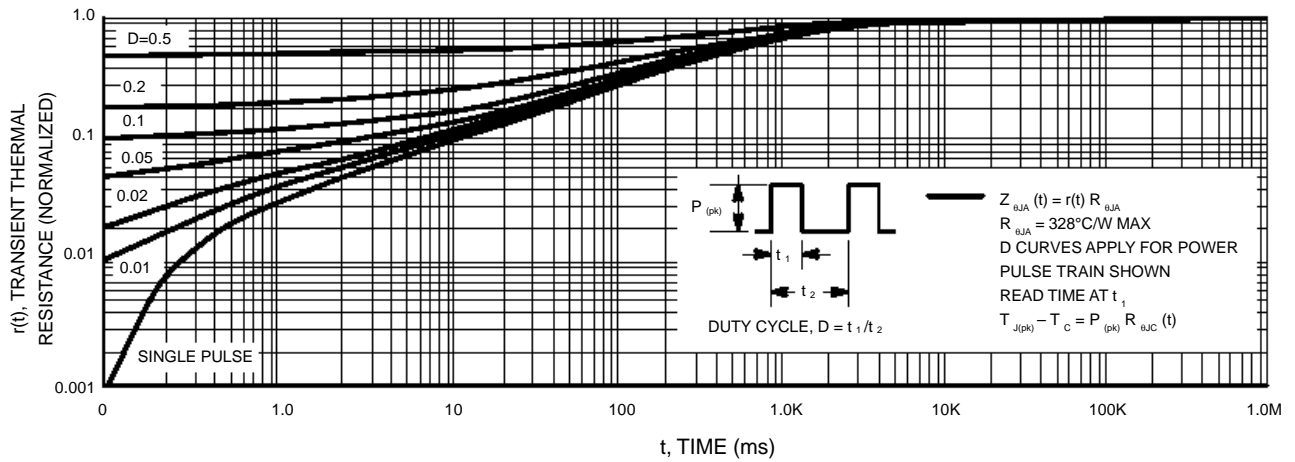


Figure 13. Thermal Response

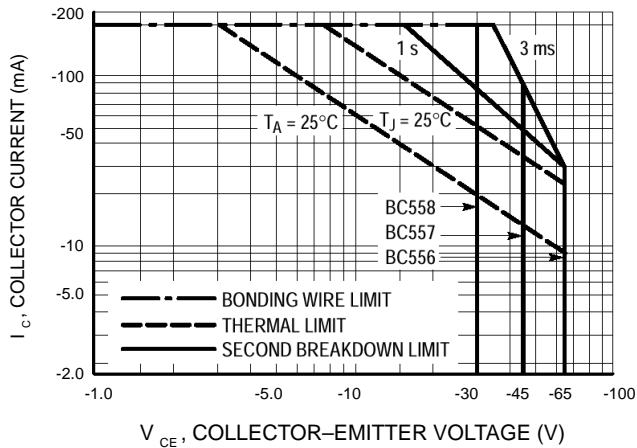


Figure 14. Active Region Safe Operating Area

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.

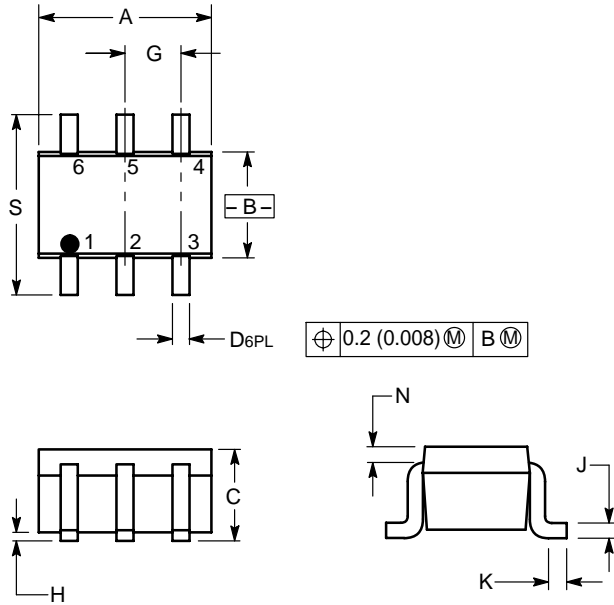
# PACKAGE OUTLINE & DIMENSIONS

## BC85xBDW/CDW Series

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

