



DESCRIPTION

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

We declare that the material of product compliance with RoHS requirements.

The BC846BPDW~BC848CPDW is available in SC-88 Package

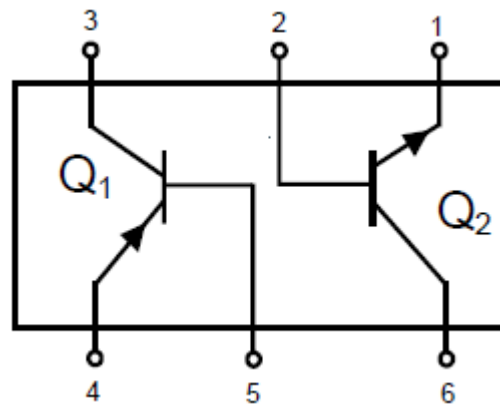
ORDERING INFORMATION

Package Type	Part Number
SC-88	BC846BPDW
	BC847BPDW
	BC847CPDW
	BC848BPDW
	BC848CPDW
Note	SPQ: 3,000pcs/Reel
AiT provides all RoHS Compliant Products	

FEATURES

- Available in SC-88 Package

PIN DESCRIPTION



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



ABSOLUTE MAXIMUM RATINGS

MAXIMUM RATINGS-NPN

Parameter	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 \bar{I} Continuous	I_C	100	100	100	mAdc

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

MAXIMUM RATINGS -PNP

Parameter	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}	-5.0	-5.0	-5.0	V
Collector Current \bar{I} Continuous	I_C	-100	-100	-100	mAdc

THERMAL CHARACTERISTICS

Parameter	Symbol	Max	Unit
Total Device Dissipation	P_D	380	mW
Per Device FR-5 Board ^{NOTE1}		250	
$T_A = 25^\circ\text{C}$ Derate Above 25°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 Range	T_J, T_{STG}	-55~+150	$^\circ\text{C}$

NOTE1: FR-5 = 1.0 x 0.75 x 0.062 in



ELECTRICAL CHARACTERISTICS (NPN)

T_A = 25°C, unless otherwise noted

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
OFF CHARACTERISTICS							
Collector–Emitter Breakdown Voltage	V _{(BR)CEO}	I _C = 10mA	BC846	65	-	-	V
			BC847	45	-	-	
			BC848	30	-	-	
Collector–Emitter Breakdown Voltage	V _{(BR)CES}	I _C = 10μA, V _{EB} = 0	BC846	80	-	-	V
			BC847BPDW	50	-	-	
			BC848	30	-	-	
Collector–Base Breakdown Voltage	V _{(BR)CBO}	I _C = 10μA	BC846	80	-	-	V
			BC847	50	-	-	
			BC848	30	-	-	
Emitter–Base Breakdown Voltage	V _{(BR)EBO}	I _E = 1.0μA	BC846	6.0	-	-	V
			BC847	6.0	-	-	
			BC848	5.0	-	-	
Collector Cutoff Current	I _{CBO}	V _{CB} = 30V	-	-	15	nA	
		V _{CB} = 30V, T _A = 150°C	-	-	5.0	μA	
ON CHARACTERISTICS							
DC Current Gain	h _{FE}	I _C = 2.0mA, V _{CE} = 5.0V	BC846BPDW	200	290	475	-
			BC847BPDW				
			BC848BPDW	420	520	800	
			BC847CPDW				
BC848CPDW							
Collector–Emitter Saturation Voltage	V _{CE(sat)}	I _C = 10mA, I _B = 0.5mA	-	-	0.25	V	
		I _C = 100mA, I _B = 5.0mA	-	-	0.6		
Base–Emitter Saturation Voltage	V _{BE(sat)}	I _C = 10mA, I _B = 0.5mA	-	0.7	-	V	
		I _C = 100mA, I _B = 5.0mA	-	0.9	-		
Base–Emitter Voltage	V _{BE(on)}	I _C = 2.0mA, V _{CE} = 5.0V	580	660	700	mV	
		I _C = 10mA, V _{CE} = 5.0V	-	-	770		
SMALL–SIGNAL CHARACTERISTICS							
Current–Gain — Bandwidth Product	f _T	I _C = 10mA, V _{CE} = 5.0Vdc, f = 100MHz	100	-	-	MHz	
Output Capacitance	C _{obo}	V _{CB} = 10 V, f = 1.0 MHz	-	-	4.5	pF	
Noise Figure	NF	I _C = 0.2mA, V _{CE} = 5.0Vdc, R _S = 2.0kΩ, f = 1.0kHz, BW = 200Hz	-	-	10	dB	



ELECTRICAL CHARACTERISTICS (PNP)

T_A = 25°C, unless otherwise noted

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
OFF CHARACTERISTICS							
Collector–Emitter Breakdown Voltage	V _{(BR)CEO}	I _C = -10mA	BC846	-65	-	-	V
			BC847	-45	-	-	
			BC848	-30	-	-	
Collector–Emitter Breakdown Voltage	V _{(BR)CES}	I _C = -10μA, V _{EB} = 0	BC846	-80	-	-	V
			BC847	-50	-	-	
			BC848	-30	-	-	
Collector–Base Breakdown Voltage	V _{(BR)CBO}	I _C = -10μA	BC846	-80	-	-	V
			BC847	-50	-	-	
			BC848	-30	-	-	
Emitter–Base Breakdown Voltage	V _{(BR)EBO}	I _E = -1.0μA	BC846	-5.0	-	-	V
			BC847	-5.0	-	-	
			BC848	-5.0	-	-	
Collector Cutoff Current	I _{CBO}	V _{CB} = -30V	-	-	-15	nA	
		V _{CB} = -30V, T _A = 150°C	-	-	-4.0	μA	
ON CHARACTERISTICS							
DC Current Gain	h _{FE}	I _C = -10μA, V _{CE} = -5.0V	BC846BPDW BC847BPDW BC848BPDW	-	150	-	-
			BC847CPDW BC848CPDW	-	270	-	
		I _C = -2.0mA, V _{CE} = -5.0V	BC846BPDW BC847BPDW BC848BPDW	200	290	475	-
			BC847CPDW BC848CPDW	420	520	800	
Collector–Emitter Saturation Voltage	V _{CE(sat)}	I _C = -10mA, I _B = -0.5mA	-	-	-0.3	V	
		I _C = -100mA, I _B = -5.0mA	-	-	-0.65		
Base–Emitter Saturation Voltage	V _{BE(sat)}	I _C = -10mA, I _B = -0.5mA	-	-0.7	-	V	
		I _C = -100mA, I _B = -5.0mA	-	-0.9	-		
Base–Emitter Voltage	V _{BE(on)}	I _C = -2.0mA, V _{CE} = -5.0V	-0.6	-	-0.75	V	
		I _C = -10mA, V _{CE} = -5.0V	-	-	-0.82		
SMALL–SIGNAL CHARACTERISTICS							
Current–Gain — Bandwidth Product	f _T	I _C = -10mA, V _{CE} = -5.0Vdc, f = 100MHz	100	-	-	MHz	
Output Capacitance	C _{ob}	V _{CB} = -10V, f = 1.0 MHz	-	-	4.5	pF	
Noise Figure	NF	I _C = -0.2mA, V _{CE} = -5.0Vdc, R _S = 2.0kΩ, f = 1.0kHz, BW = 200Hz	-	-	10	dB	



TYPICAL NPN CHARACTERISTICS

BC846

Figure 1. DC Current Gain

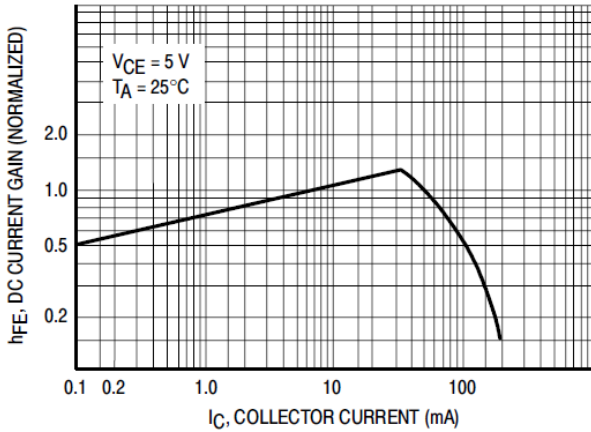


Figure 2. "On" Voltage

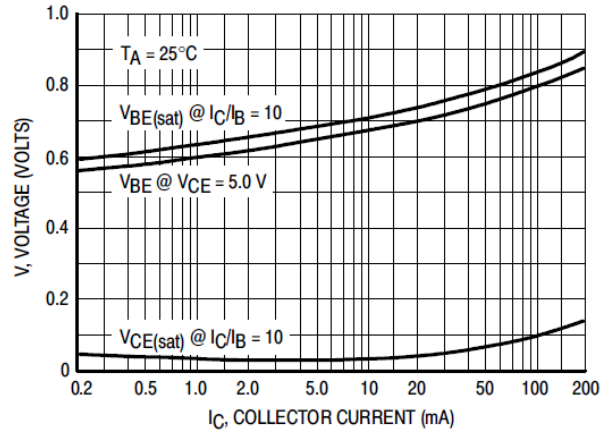


Figure 3. Collector Saturation Region

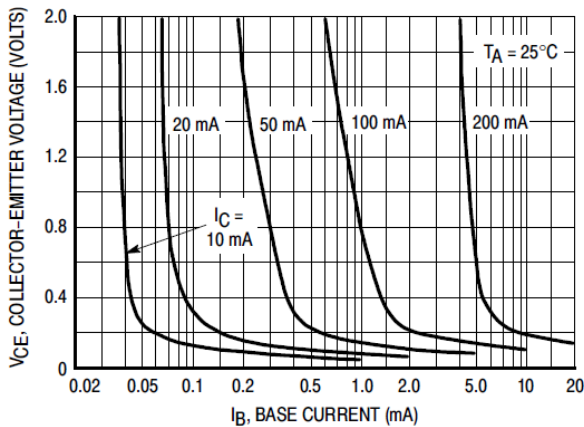


Figure 4. Base-Emitter Temperature Coefficient

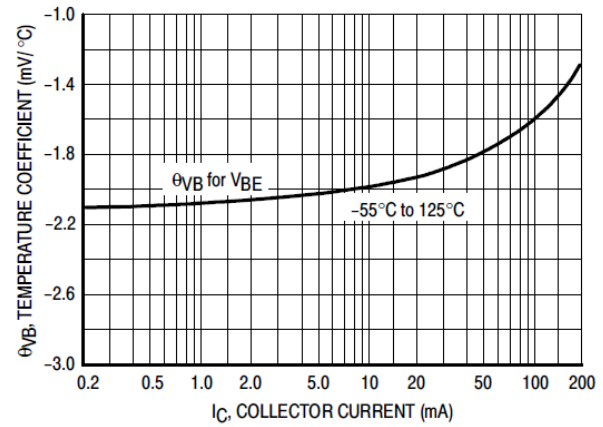


Figure 5. Capacitance

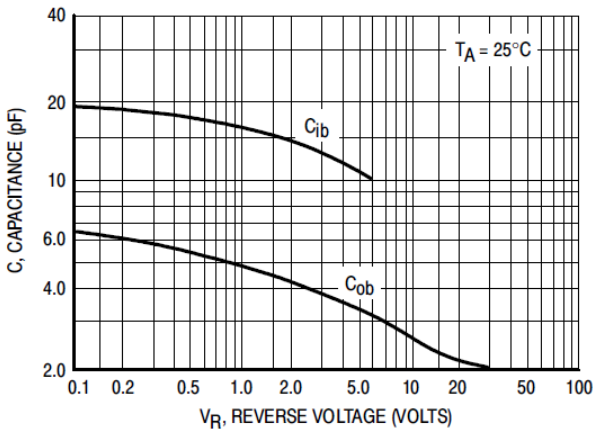
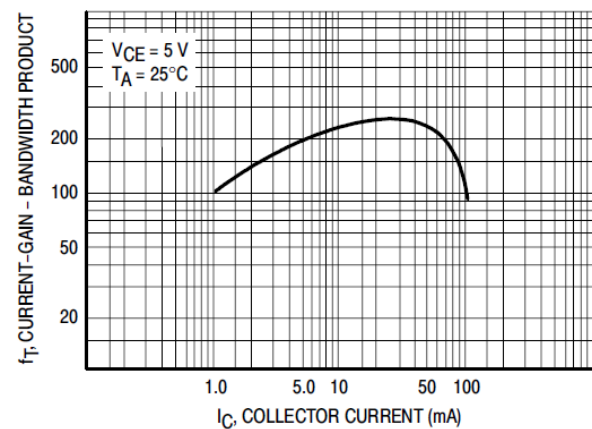


Figure 6. Current-Gain – Bandwidth Product





TYPICAL PNP CHARACTERISTICS

BC846

Figure 7. DC Current Gain

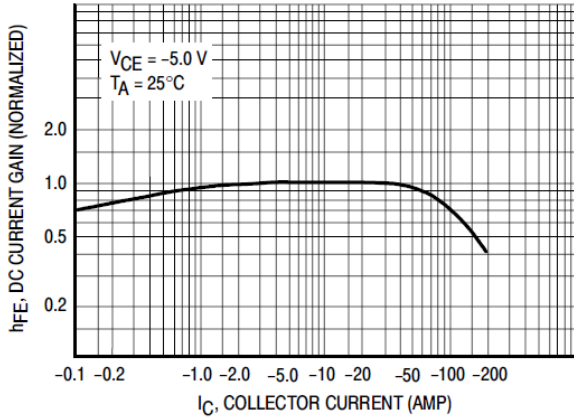


Figure 9. Collector Saturation Region

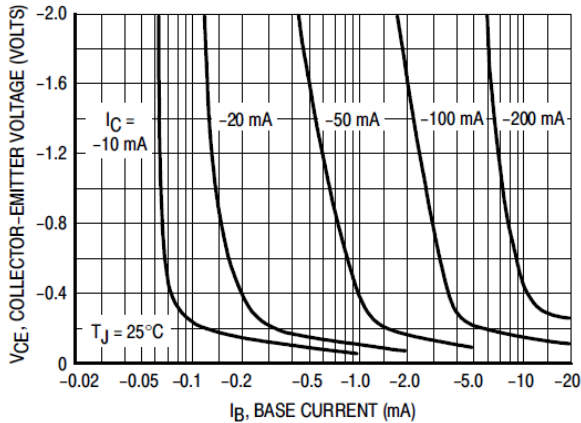


Figure 11. Capacitance

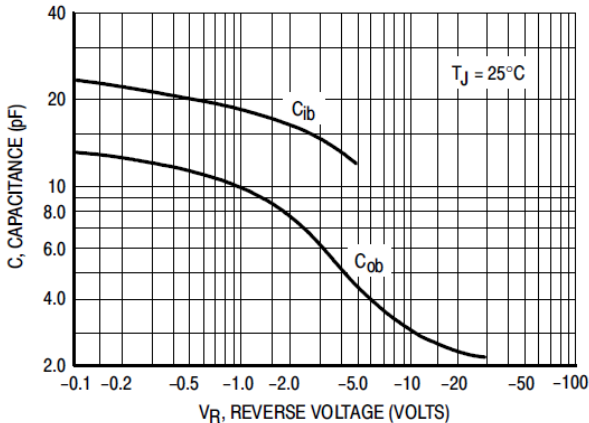


Figure 8. "On" Voltage

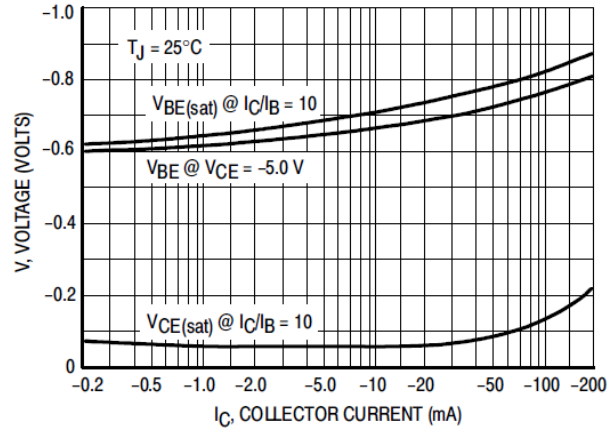


Figure 10. Base-Emitter Temperature Coefficient

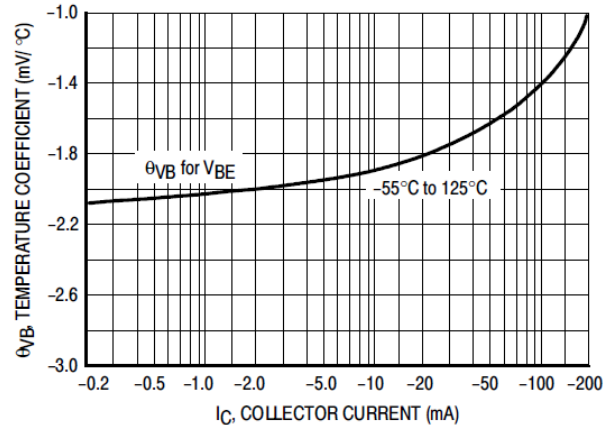
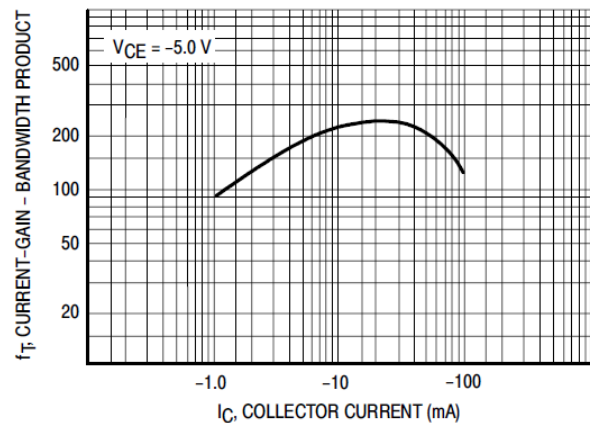


Figure 12. Current-Gain - Bandwidth Product





TYPICAL NPN CHARACTERISTICS

BC847 & BC848

Figure 13. Normalized DC Current Gain

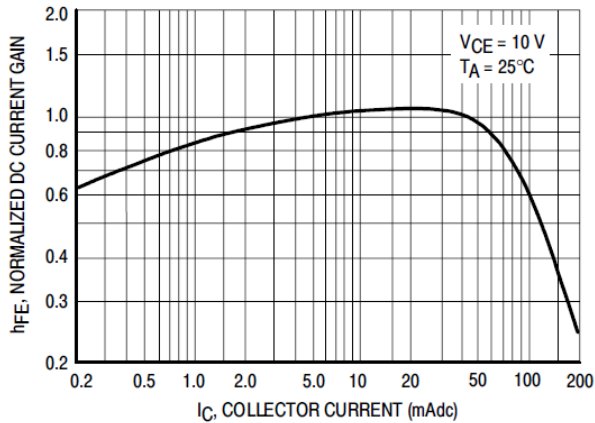


Figure 14. "Saturation" and "On" Voltages

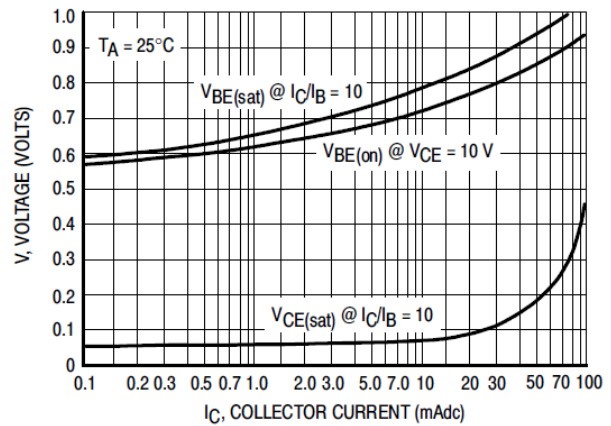


Figure 15. Collector Saturation Region

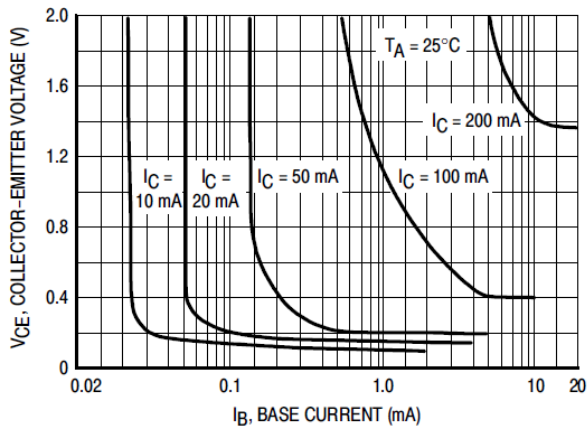


Figure 16. Base-Emitter Temperature Coefficient

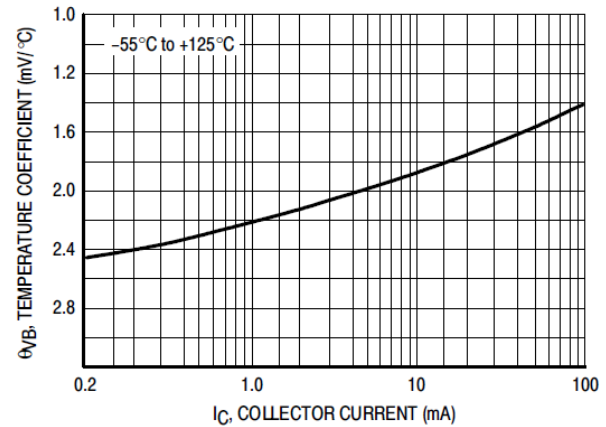


Figure 17. Capacitances

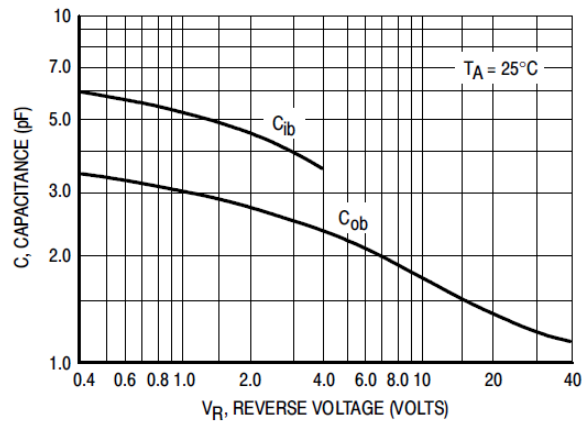
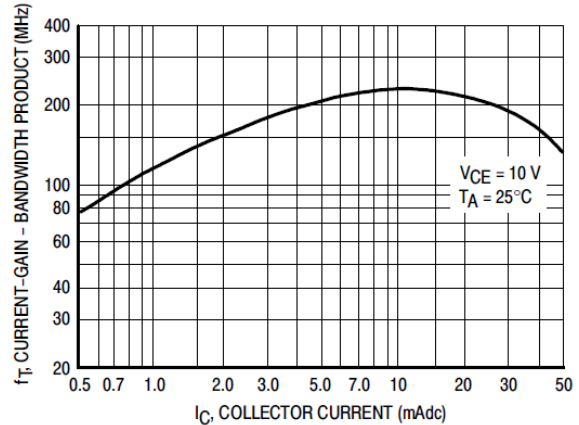


Figure 18. Current-Gain - Bandwidth Product





TYPICAL PNP CHARACTERISTICS

BC847 & BC848

Figure 19. Normalized DC Current Gain

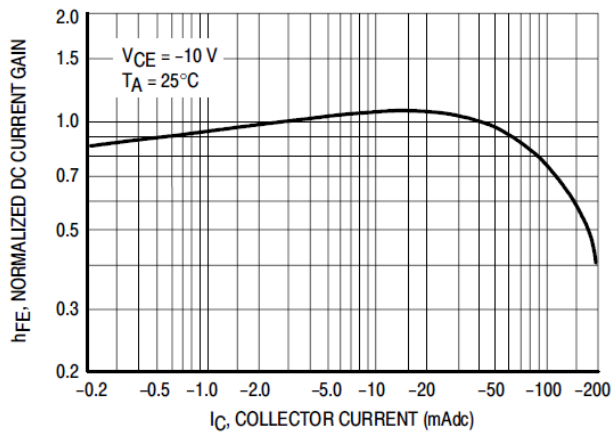


Figure 20. "Saturation" and "On" Voltages

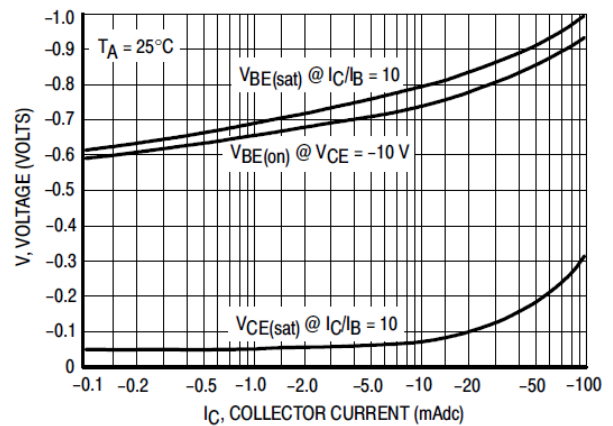


Figure 21. Collector Saturation Region

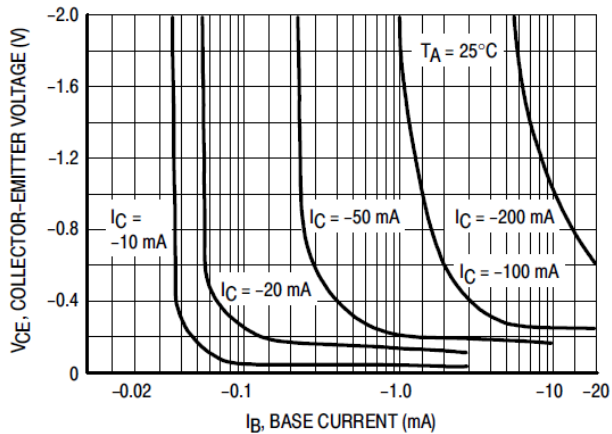


Figure 22. Base-Emitter Temperature Coefficient

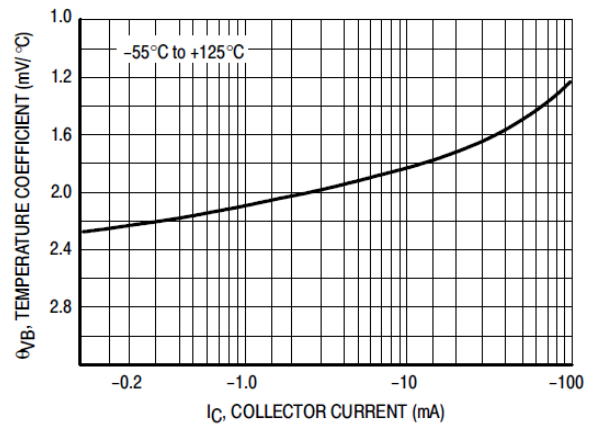


Figure 23. Capacitances

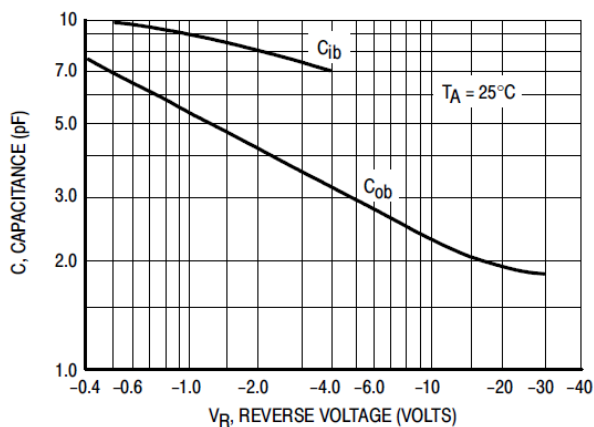


Figure 24. Current-Gain - Bandwidth Product

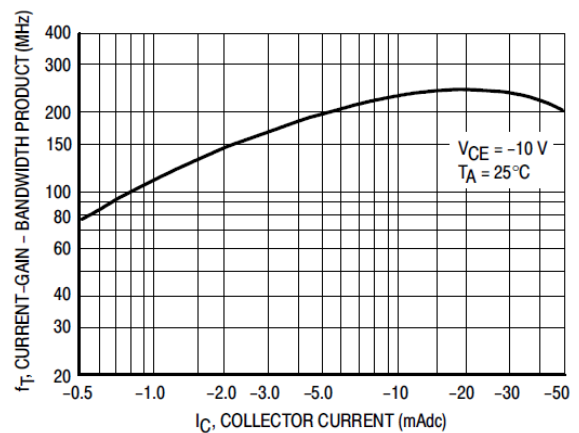
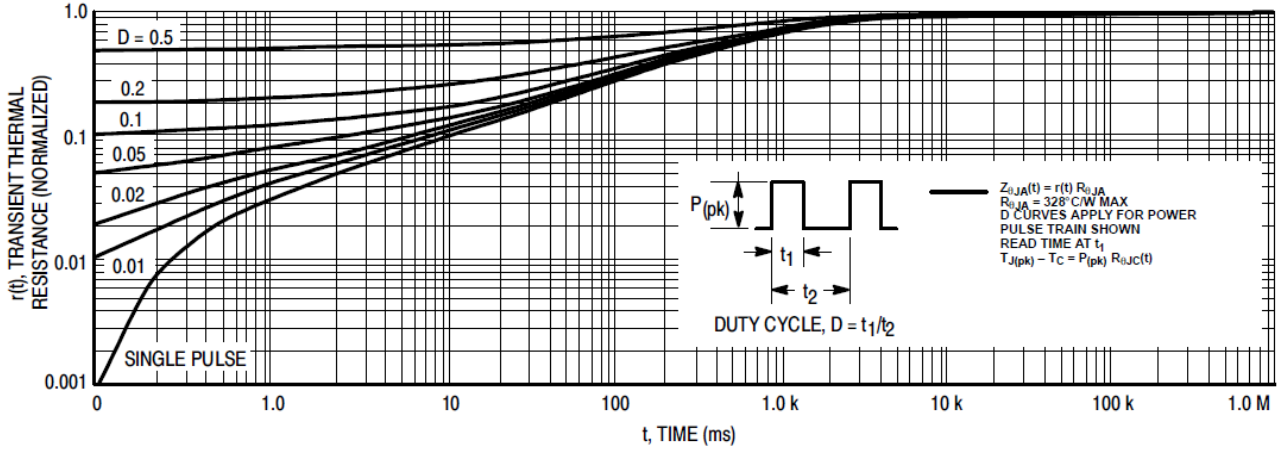




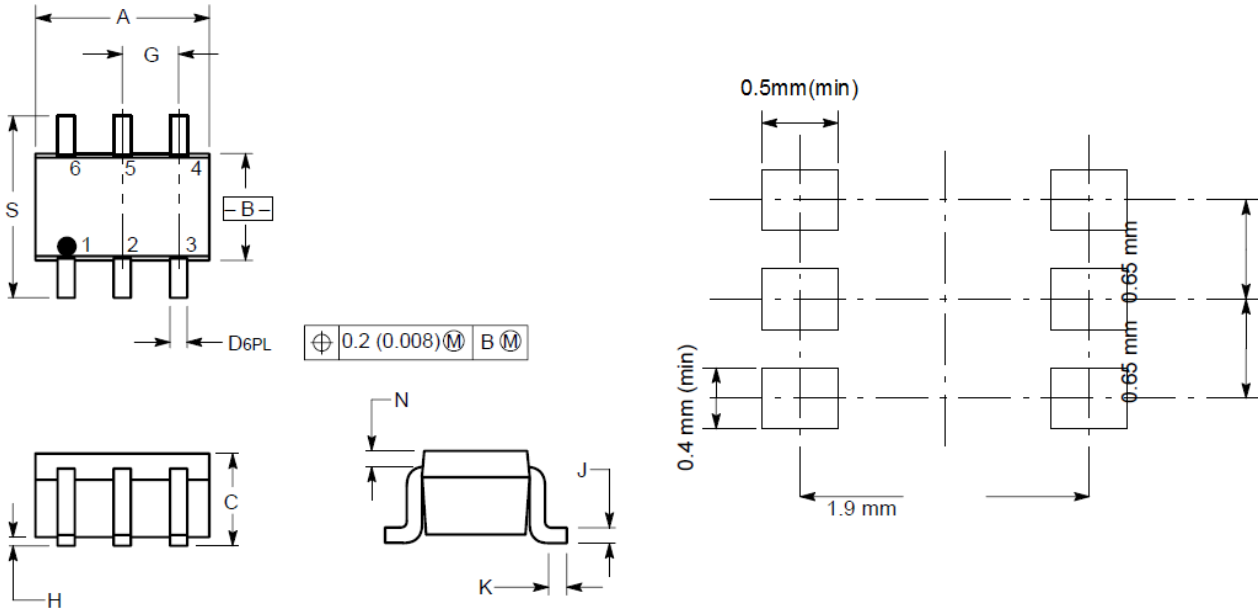
Figure 25. Thermal Response





PACKAGE INFORMATION

Dimension in SC-88 (Unit: mm)



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



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