Dual General Purpose Transistors

NPN/PNP Duals (Complimentary)

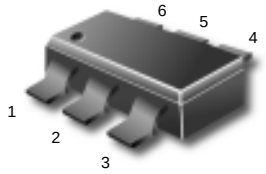
LBC846BPDW1T1G
LBC847BPDW1T1G
LBC847CPDW1T1G
LBC848BPDW1T1G
LBC848CPDW1T1G

S-LBC846BPDW1T1G
S-LBC847BPDW1T1G
S-LBC847CPDW1T1G
S-LBC848BPDW1T1G
S-LBC848CPDW1T1G

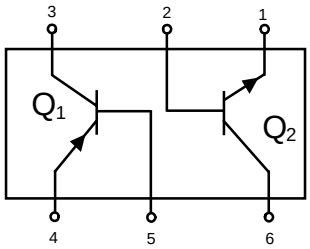
These transistors are designed for general purpose amplifier applications. They are housed in the SOT–363/SC–88 which is designed for low power surface mount applications.

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

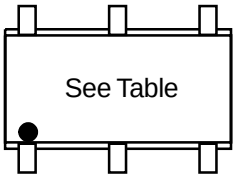
S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.



SOT–363/SC-88
CASE 419B STYLE 1



DEVICE MARKING



ORDERING INFORMATION

Device		Marking	Shipping
LBC846BPDW1T1G	S-LBC846BPDW1T1G	BB	3000 Units/Reel
LBC846BPDW1T3G	S-LBC846BPDW1T3G	BB	10000 Units/Reel
LBC847BPDW1T1G	S-LBC847BPDW1T1G	BF	3000 Units/Reel
LBC847BPDW1T3G	S-LBC847BPDW1T3G	BF	10000 Units/Reel
LBC847CPDW1T1G	S-LBC847CPDW1T1G	BG	3000 Units/Reel
LBC847CPDW1T3G	S-LBC847CPDW1T3G	BG	10000 Units/Reel
LBC848BPDW1T1G	S-LBC848BPDW1T1G	BK	3000 Units/Reel
LBC848BPDW1T3G	S-LBC848BPDW1T3G	BK	10000 Units/Reel
LBC848CPDW1T1G	S-LBC848CPDW1T1G	BL	3000 Units/Reel
LBC848CPDW1T3G	S-LBC848CPDW1T3G	BL	10000 Units/Reel

MAXIMUM RATINGS – NPN

Rating	Symbol	LBC846	LBC847	LBC848	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 Ð Continuous	I_C	100	100	100	mAdc

MAXIMUM RATINGS – PNP

Rating	Symbol	LBC846	LBC847	LBC848	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 Ð Continuous	I_C	−100	−100	−100	mAdc

THERMAL CHARACTERISTICS

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

1. FR−5 = 1.0 x 0.75 x 0.062 in

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series
S-LBC846BPDW1T1G S-LBC847BPDW1T1G Series, S-LBC848BPDW1T1G Series

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage (I_C = 10 mA)	LBC846 Series	$V_{(BR)CEO}$	65	—	—	V
	LBC847 Series		45	—	—	
	LBC848 Series		30	—	—	
Collector–Emitter Breakdown Voltage (I_C = 10 μA, V_{EB} = 0)	LBC846 Series	$V_{(BR)CES}$	80	—	—	V
	LBC847B Only		50	—	—	
	LBC848 Series		30	—	—	
Collector–Base Breakdown Voltage (I_C = 10 μA)	LBC846 Series	$V_{(BR)CBO}$	80	—	—	V
	LBC847 Series		50	—	—	
	LBC848 Series		30	—	—	
Emitter–Base Breakdown Voltage (I_E = 1.0 μA)	LBC846 Series	$V_{(BR)EBO}$	6.0	—	—	V
	LBC847 Series		6.0	—	—	
	LBC848 Series		5.0	—	—	
Collector Cutoff Current (V_{CB} = 30 V)		I_{CBO}	—	—	15	nA
(V_{CB} = 30 V, T_A = 150°C)			—	—	5.0	μA
ON CHARACTERISTICS						
DC Current Gain (I_C = 2.0 mA, V_{CE} = 5.0 V)	LBC846B, LBC847B, LBC848B	h_{FE}	200	290	475	—
	LBC847C, LBC848C		420	520	800	
Collector–Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.5 mA)		$V_{CE(sat)}$	—	—	0.25	V
(I_C = 100 mA, I_B = 5.0 mA)			—	—	0.6	
Base–Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.5 mA)		$V_{BE(sat)}$	—	0.7	—	V
(I_C = 100 mA, I_B = 5.0 mA)			—	0.9	—	
Base–Emitter Voltage (I_C = 2.0 mA, V_{CE} = 5.0 V)		$V_{BE(on)}$	580	660	700	mV
(I_C = 10 mA, V_{CE} = 5.0 V)			—	—	770	
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

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series
S-LBC846BPDW1T1G S-LBC847BPDW1T1G Series, S-LBC848BPDW1T1G Series

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage		$V_{(BR)CEO}$				V
(I_C = –10 mA)	LBC846 Series		–65	—	—	
	LBC847 Series		–45	—	—	
	LBC848 Series		–30	—	—	
Collector–Emitter Breakdown Voltage		$V_{(BR)CES}$				V
(I_C = –10 μA, V_{EB} = 0)	LBC846 Series		–80	—	—	
	LBC847 Series		–50	—	—	
	LBC848 Series		–30	—	—	
Collector–Base Breakdown Voltage		$V_{(BR)CBO}$				V
(I_C = –10 μA)	LBC846 Series		–80	—	—	
	LBC847 Series		–50	—	—	
	LBC848 Series		–30	—	—	
Emitter–Base Breakdown Voltage		$V_{(BR)EBO}$				V
(I_E = –1.0 μA)	LBC846 Series		–5.0	—	—	
	LBC847 Series		–5.0	—	—	
	LBC848 Series		–5.0	—	—	
Collector Cutoff Current (V_{CB} = –30 V)		I_{CBO}	—	—	–15	nA
(V_{CB} = –30 V, T_A = 150°C)			—	—	–4.0	μA
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				—
(I_C = –10 μA, V_{CE} = –5.0 V)	LBC846B, LBC847B, LBC848B		—	150	—	
	LBC847C, LBC848C		—	270	—	
(I_C = –2.0 mA, V_{CE} = –5.0 V)	LBC846B, LBC847B, LBC848B		200	290	475	
	LBC847C, LBC848C		420	520	800	
Collector–Emitter Saturation Voltage		$V_{CE(sat)}$				V
(I_C = –10 mA, I_B = –0.5 mA)			—	—	–0.3	
(I_C = –100 mA, I_B = –5.0 mA)			—	—	–0.65	
Base–Emitter Saturation Voltage		$V_{BE(sat)}$				V
(I_C = –10 mA, I_B = –0.5 mA)			—	–0.7	—	
(I_C = –100 mA, I_B = –5.0 mA)			—	–0.9	—	
Base–Emitter On Voltage		$V_{BE(on)}$				V
(I_C = –2.0 mA, V_{CE} = –5.0 V)			–0.6	—	–0.75	
(I_C = –10 mA, V_{CE} = –5.0 V)			—	—	–0.82	
SMALL–SIGNAL CHARACTERISTICS						
Current–Gain — Bandwidth Product		f_T	100	—	—	MHz
(I_C = –10 mA, V_{CE} = –5.0 Vdc, f = 100 MHz)						
Output Capacitance		C_{ob}	—	—	4.5	pF
(V_{CB} = –10 V, f = 1.0 MHz)						
Noise Figure		NF	—	—	10	dB
(I_C = –0.2 mA, V_{CE} = –5.0 Vdc, R_S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)						

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series
S-LBC846BPDW1T1G S-LBC847BPDW1T1G Series, S-LBC848BPDW1T1G Series

TYPICAL NPN CHARACTERISTICS – LBC846

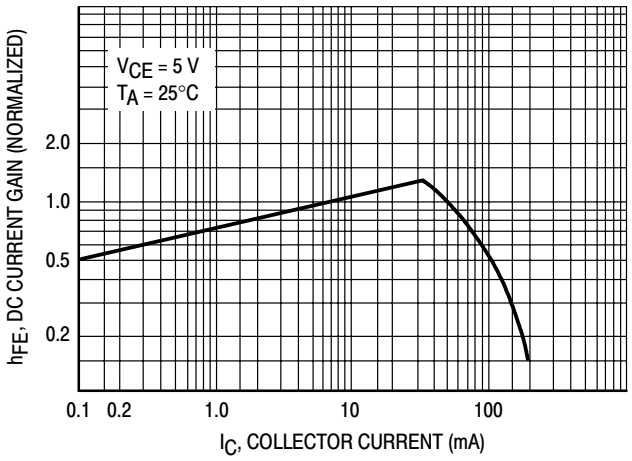


Figure 1. DC Current Gain

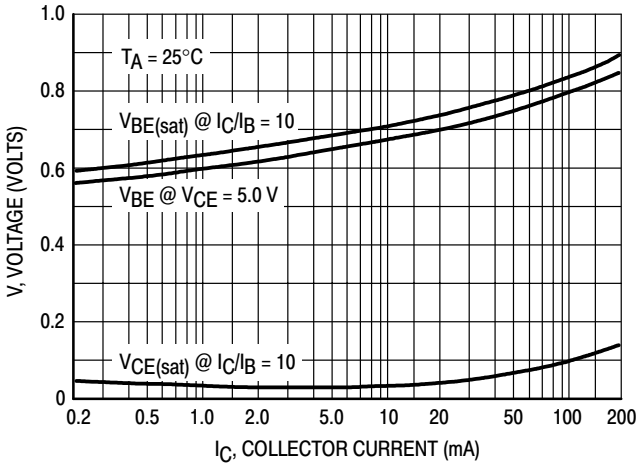


Figure 2. “On” Voltage

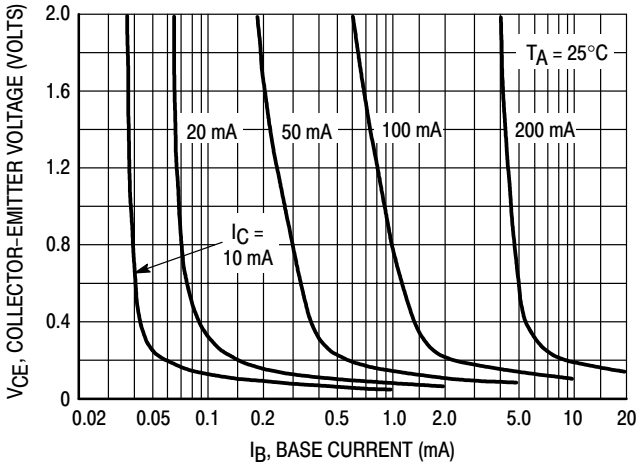


Figure 3. Collector Saturation Region

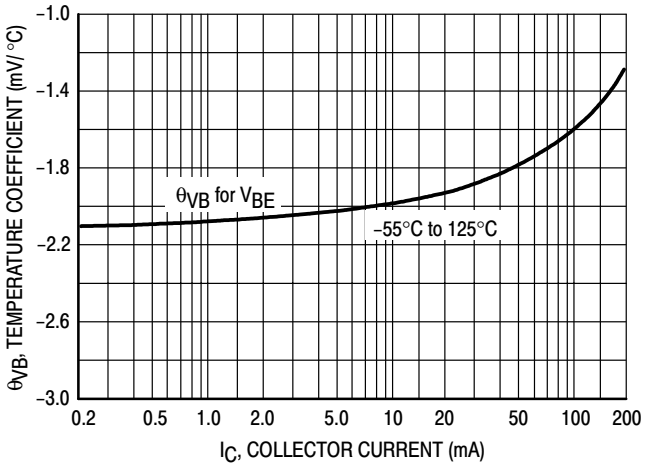


Figure 4. Base–Emitter Temperature Coefficient

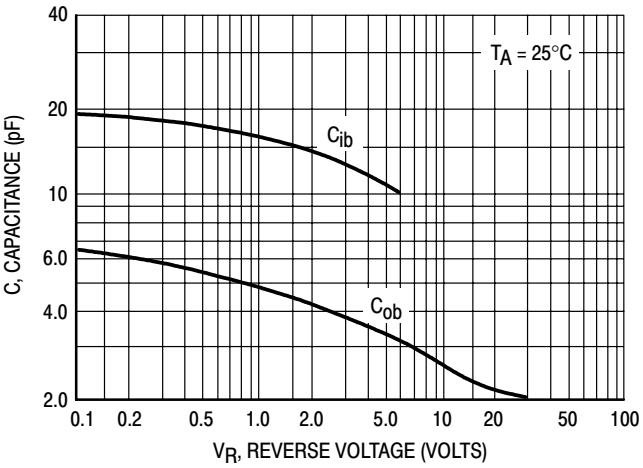


Figure 5. Capacitance

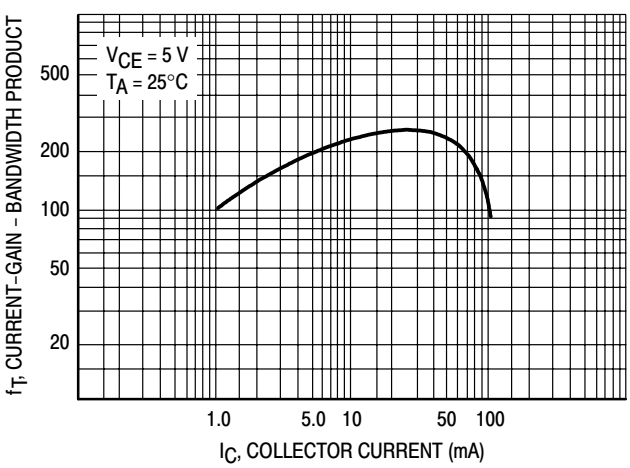


Figure 6. Current–Gain – Bandwidth Product

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series
S-LBC846BPDW1T1G S-LBC847BPDW1T1G Series, S-LBC848BPDW1T1G Series

TYPICAL PNP CHARACTERISTICS — LBC846

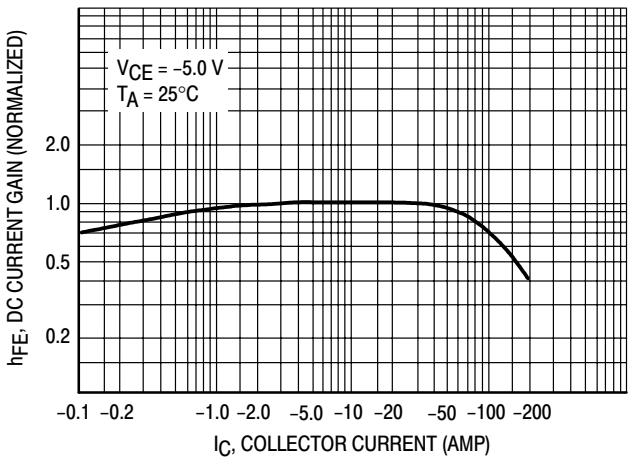


Figure 7. DC Current Gain

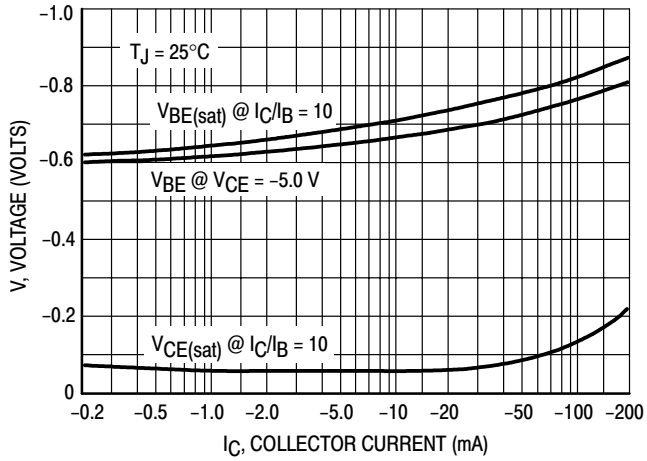


Figure 8. “On” Voltage

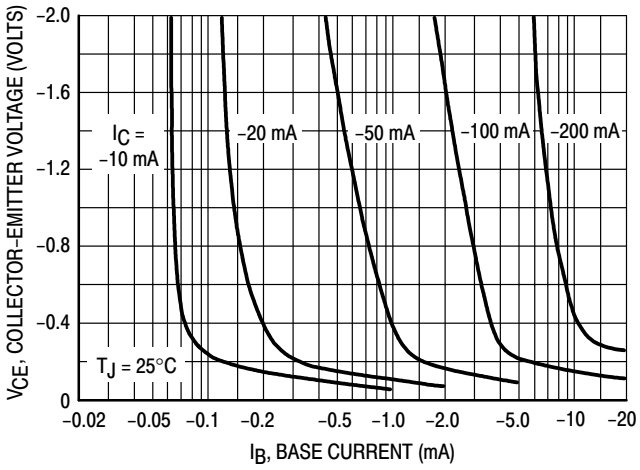


Figure 9. Collector Saturation Region

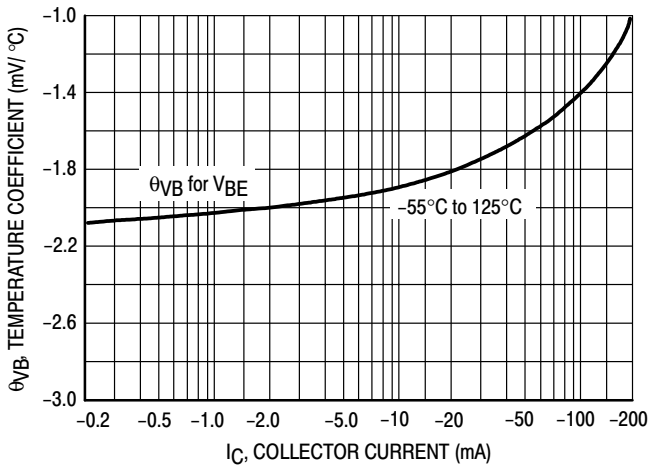


Figure 10. Base−Emitter Temperature Coefficient

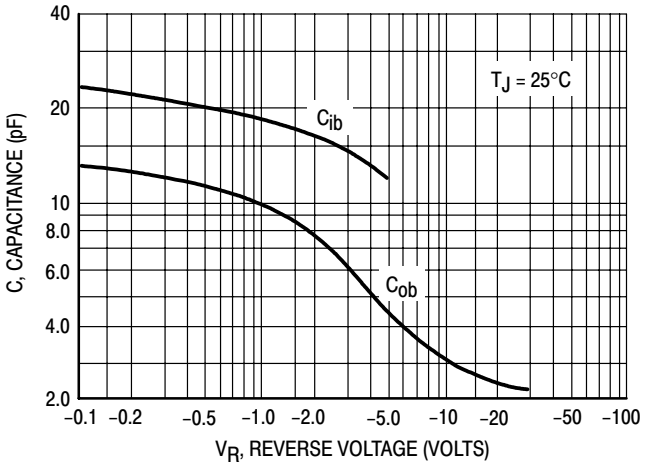


Figure 11. Capacitance

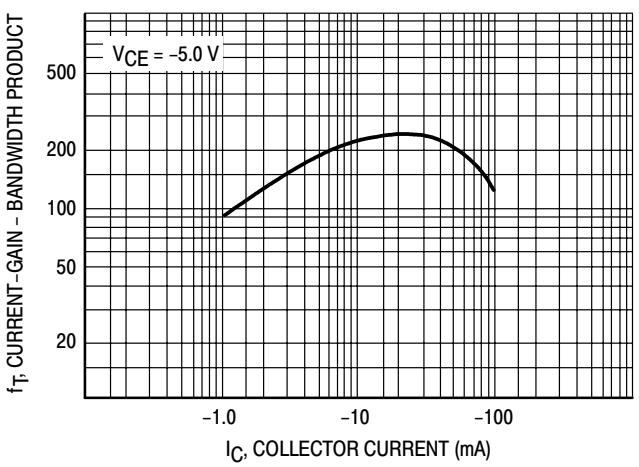


Figure 12. Current−Gain − Bandwidth Product

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series
S-LBC846BPDW1T1G S-LBC847BPDW1T1G Series, S-LBC848BPDW1T1G Series

TYPICAL NPN CHARACTERISTICS – LBC847 SERIES & LBC848 SERIES

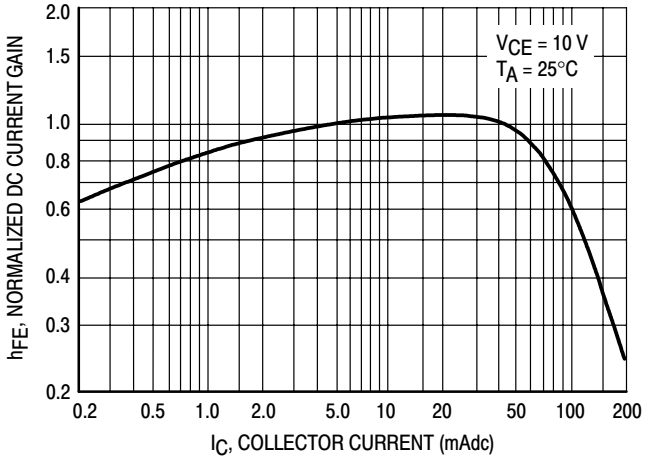


Figure 13. Normalized DC Current Gain

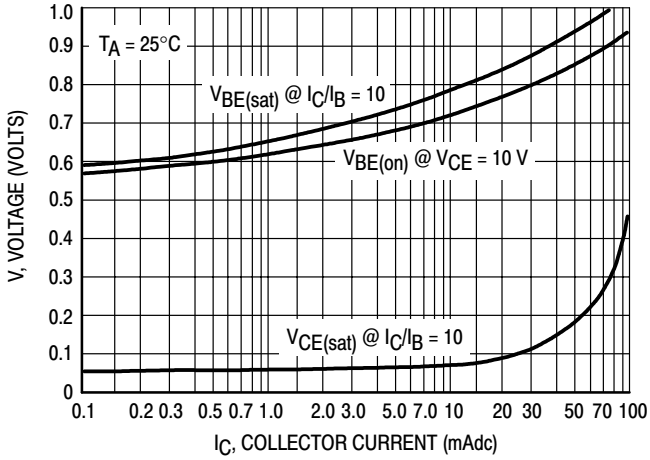


Figure 14. "Saturation" and "On" Voltages

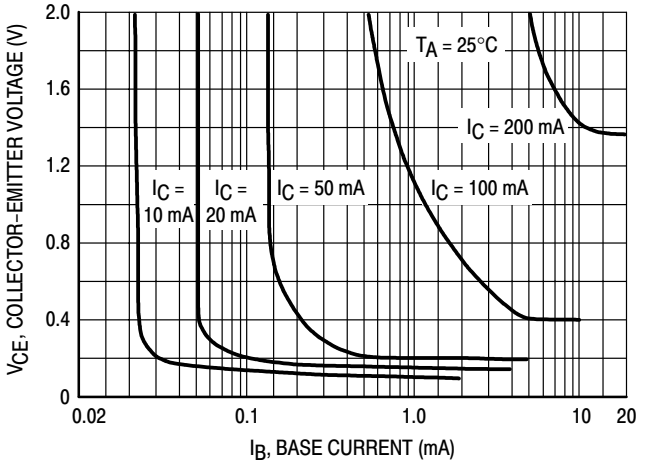


Figure 15. Collector Saturation Region

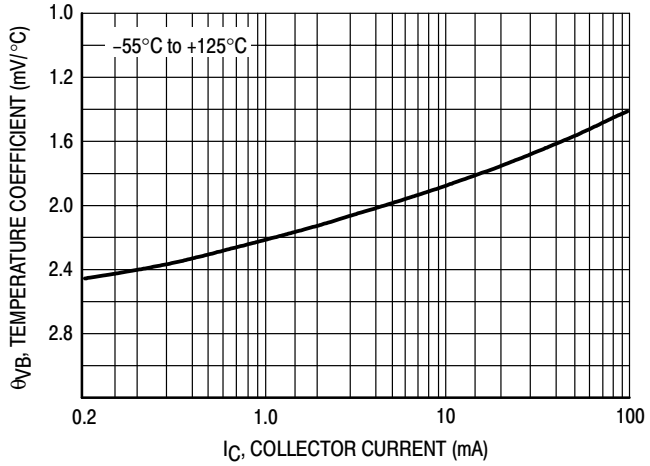


Figure 16. Base–Emitter Temperature Coefficient

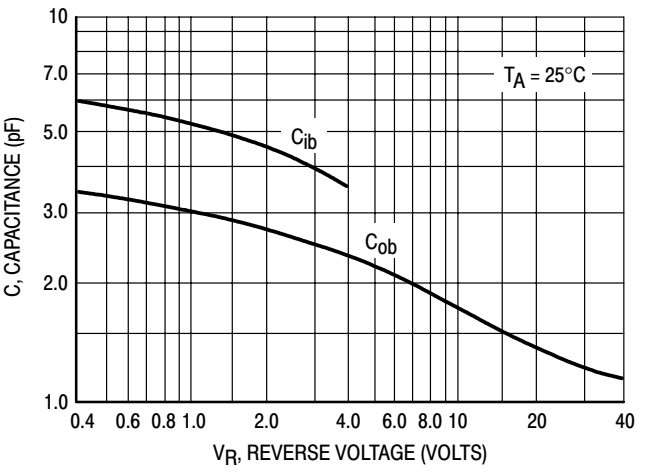


Figure 17. Capacitances

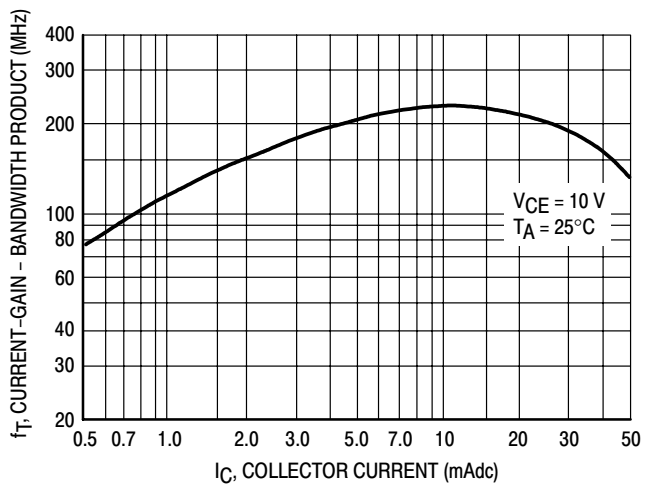


Figure 18. Current–Gain – Bandwidth Product

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series
S-LBC846BPDW1T1G S-LBC847BPDW1T1G Series, S-LBC848BPDW1T1G Series

TYPICAL PNP CHARACTERISTICS — LBC847 SERIES & LBC848 SERIES

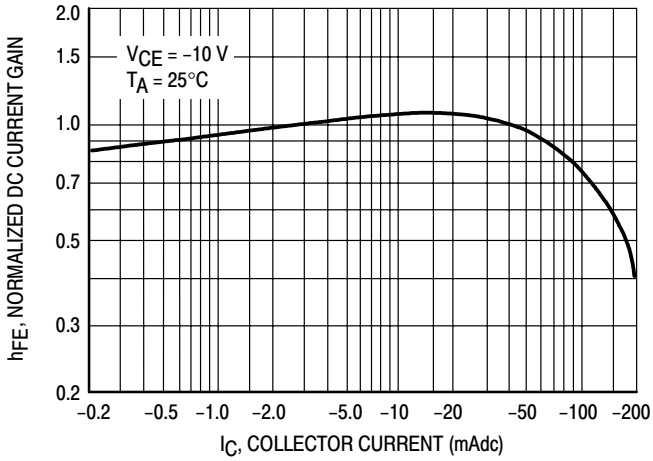


Figure 19. Normalized DC Current Gain

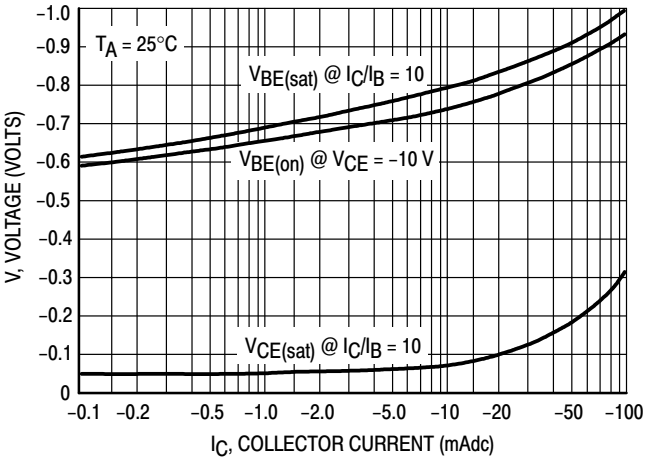


Figure 20. “Saturation” and “On” Voltages

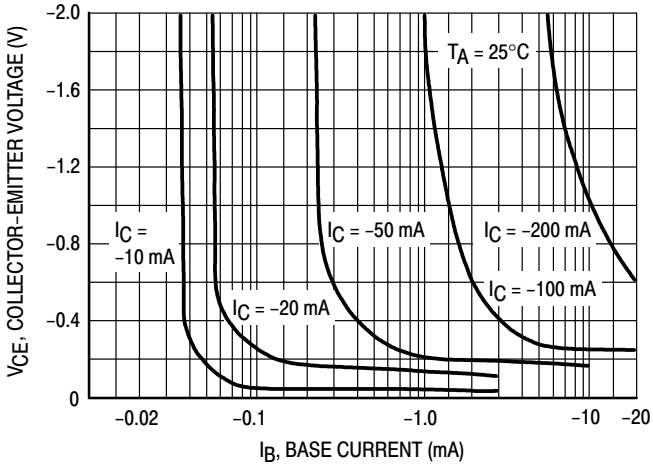


Figure 21. Collector Saturation Region

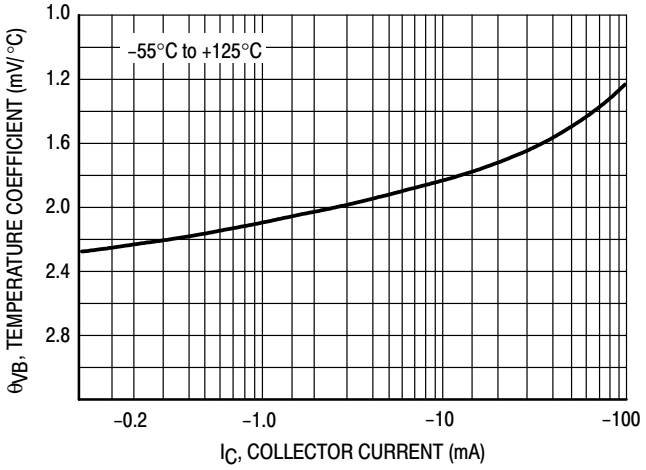


Figure 22. Base–Emitter Temperature Coefficient

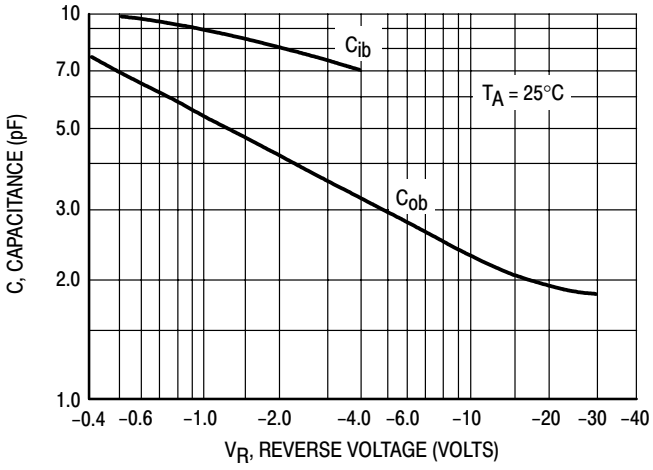


Figure 23. Capacitances

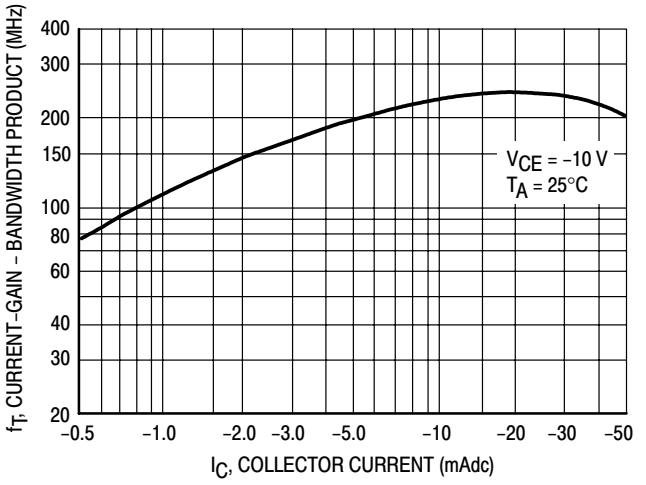


Figure 24. Current–Gain – Bandwidth Product

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series
S-LBC846BPDW1T1G S-LBC847BPDW1T1G Series, S-LBC848BPDW1T1G Series

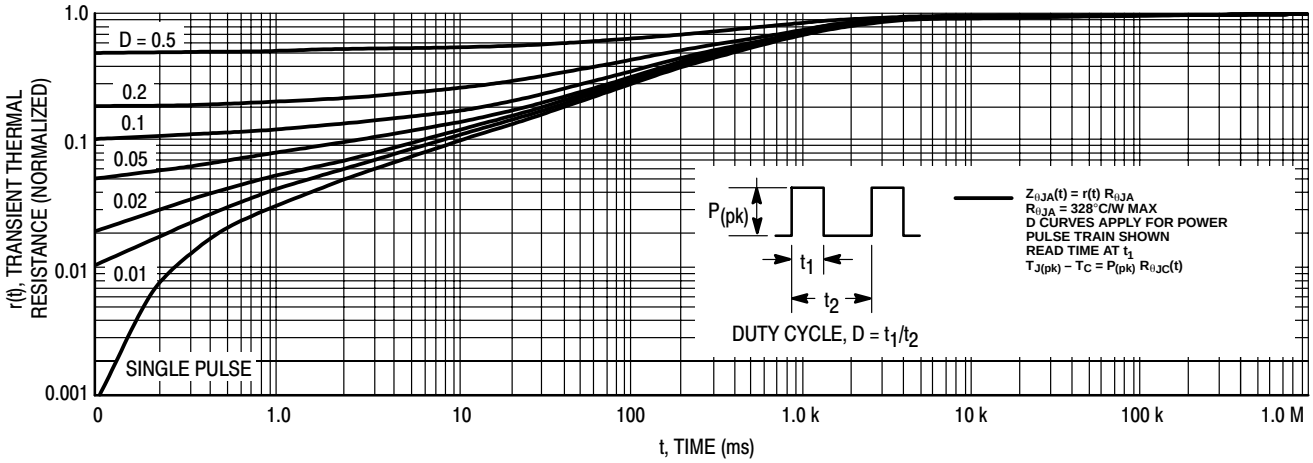
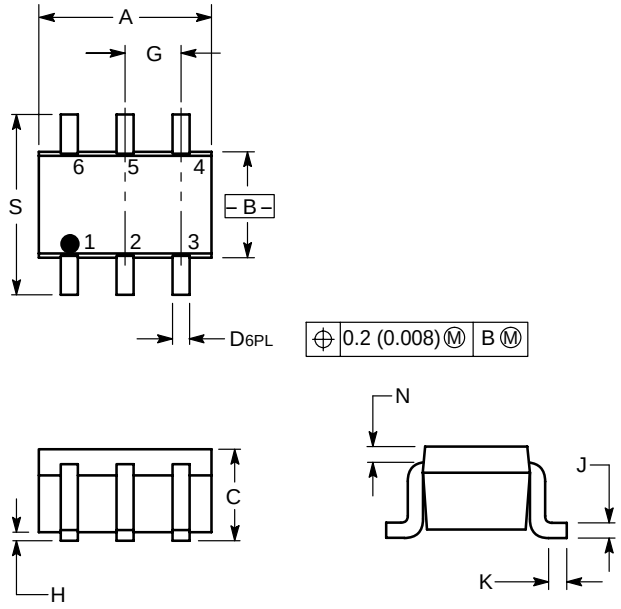


Figure 25. Thermal Response

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series
S-LBC846BPDW1T1G S-LBC847BPDW1T1G Series, S-LBC848BPDW1T1G 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 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2