

Dual General Purpose Transistors

NPN/PNP Duals (Complimentary)

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.

• Device Marking:

LBC846BPDW1T1G = BB LBC847BPDW1T1G = 3F
 LBC847CPDW1T1G = 3G LBC848BPDW1T1G = 13K
 LBC848CPDW1T1G = 13L

ORDERING INFORMATION

Device	Shipping
LBC846BPDW1T1G_S	3000 Units/Reel
LBC846BPDW1T3G_S	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 I_C Continuous	I_C	100	100	100	mA

MAXIMUM RATINGS – PNP

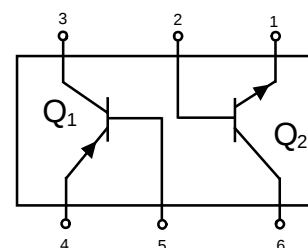
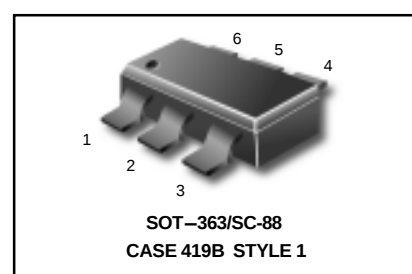
Rating	Symbol	LBC846	LBC847	LBC848	Unit
Collector-Emitter Voltage	V_{CEO}	-65	-45	-30	V
Collector-Base Voltage	V_{CBO}	-80	-50	-30	V
Emitter-Base Voltage	V_{EBO}	-5.0	-5.0	-5.0	V
Collector Current I_C Continuous	I_C	-100	-100	-100	mA

THERMAL CHARACTERISTICS

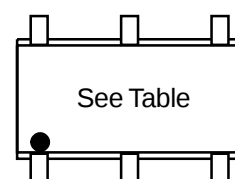
Characteristic	Symbol	Max	Unit
Total Device Dissipation Per Device FR-5 Board (1) $T_A = 25^\circ\text{C}$ Derate Above 25°C	P_D	380 250	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	328	$^\circ\text{C/W}$
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

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

LBC846BPDW1T1G
LBC847BPDW1T1G
LBC847CPDW1T1G
LBC848BPDW1T1G
LBC848CPDW1T1G



DEVICE MARKING



LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 10\text{ mA}$)	LBC846 Series LBC847 Series LBC848 Series	$V_{(BR)CEO}$	65 45 30	— — —	— — —	V
Collector–Emitter Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$, $V_{EB} = 0$)	LBC846 Series LBC847B Only LBC848 Series	$V_{(BR)CES}$	80 50 30	— — —	— — —	V
Collector–Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$)	LBC846 Series LBC847 Series LBC848 Series	$V_{(BR)CBO}$	80 50 30	— — —	— — —	V
Emitter–Base Breakdown Voltage ($I_E = 1.0\text{ }\mu\text{A}$)	LBC846 Series LBC847 Series LBC848 Series	$V_{(BR)EBO}$	6.0 6.0 5.0	— — —	— — —	V
Collector Cutoff Current ($V_{CB} = 30\text{ V}$) ($V_{CB} = 30\text{ V}$, $T_A = 150^\circ\text{C}$)		I_{CBO}	— —	— —	15 5.0	nA μA

ON CHARACTERISTICS

DC Current Gain ($I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5.0\text{ V}$)	LBC846B, LBC847B, LBC848B LBC847C, LBC848C	h_{FE}	— —	150 270	— —	—
($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$)	LBC846B, LBC847B, LBC848B LBC847C, LBC848C		200 420	290 520	475 800	
Collector–Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$)		$V_{CE(sat)}$	— —	— —	0.25 0.6	V
Base–Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$)		$V_{BE(sat)}$	— —	0.7 0.9	— —	V
Base–Emitter Voltage ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$)		$V_{BE(on)}$	580 —	660 —	700 770	mV

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

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = -10\text{ mA}$)	LBC846 Series LBC847 Series LBC848 Series	$V_{(BR)CEO}$	-65 -45 -30	— — —	— — —	V
Collector–Emitter Breakdown Voltage ($I_C = -10\text{ }\mu\text{A}$, $V_{EB} = 0$)	LBC846 Series LBC847 Series LBC848 Series	$V_{(BR)CES}$	-80 -50 -30	— — —	— — —	V
Collector–Base Breakdown Voltage ($I_C = -10\text{ }\mu\text{A}$)	LBC846 Series LBC847 Series LBC848 Series	$V_{(BR)CBO}$	-80 -50 -30	— — —	— — —	V
Emitter–Base Breakdown Voltage ($I_E = -1.0\text{ }\mu\text{A}$)	LBC846 Series LBC847 Series LBC848 Series	$V_{(BR)EBO}$	-5.0 -5.0 -5.0	— — —	— — —	V
Collector Cutoff Current ($V_{CB} = -30\text{ V}$) ($V_{CB} = -30\text{ V}$, $T_A = 150^\circ\text{C}$)		I_{CBO}	— —	— —	-15 -4.0	nA μA

ON CHARACTERISTICS

DC Current Gain ($I_C = -10\text{ }\mu\text{A}$, $V_{CE} = -5.0\text{ V}$)	LBC846B, LBC847B, LBC848B LBC847C, LBC848C	h_{FE}	— —	150 270	— —	—
($I_C = -2.0\text{ mA}$, $V_{CE} = -5.0\text{ V}$)	LBC846B, LBC847B, LBC848B LBC847C, LBC848C		200 420	290 520	475 800	
Collector–Emitter Saturation Voltage ($I_C = -10\text{ mA}$, $I_B = -0.5\text{ mA}$) ($I_C = -100\text{ mA}$, $I_B = -5.0\text{ mA}$)		$V_{CE(sat)}$	— —	— —	-0.3 -0.65	V
Base–Emitter Saturation Voltage ($I_C = -10\text{ mA}$, $I_B = -0.5\text{ mA}$) ($I_C = -100\text{ mA}$, $I_B = -5.0\text{ mA}$)		$V_{BE(sat)}$	— —	-0.7 -0.9	— —	V
Base–Emitter On Voltage ($I_C = -2.0\text{ mA}$, $V_{CE} = -5.0\text{ V}$) ($I_C = -10\text{ mA}$, $V_{CE} = -5.0\text{ V}$)		$V_{BE(on)}$	-0.6 —	— —	-0.75 -0.82	V

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_{ob}	—	—	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

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series

TYPICAL NPN CHARACTERISTICS – LBC846

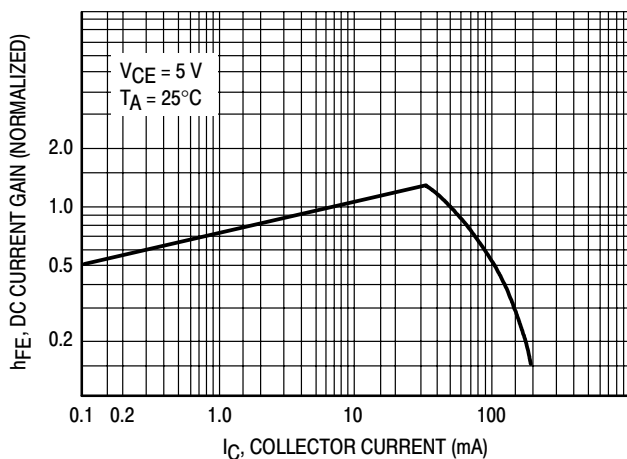


Figure 1. DC Current Gain

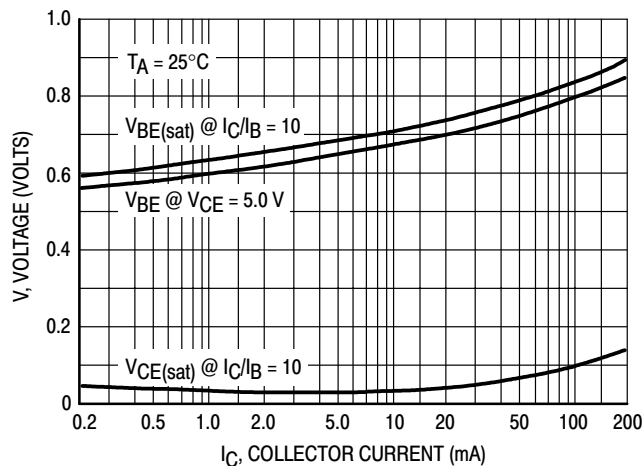


Figure 2. "On" Voltage

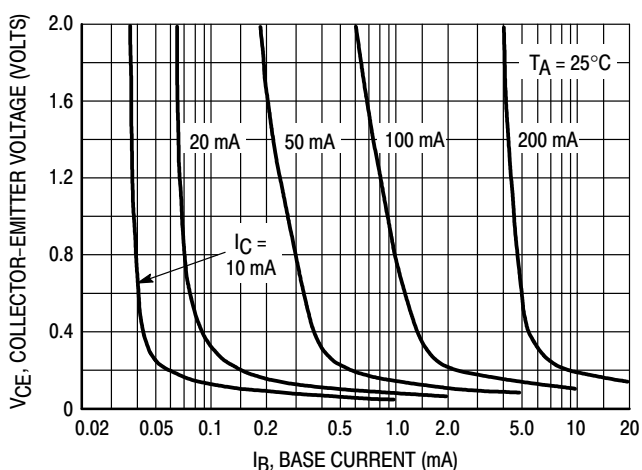


Figure 3. Collector Saturation Region

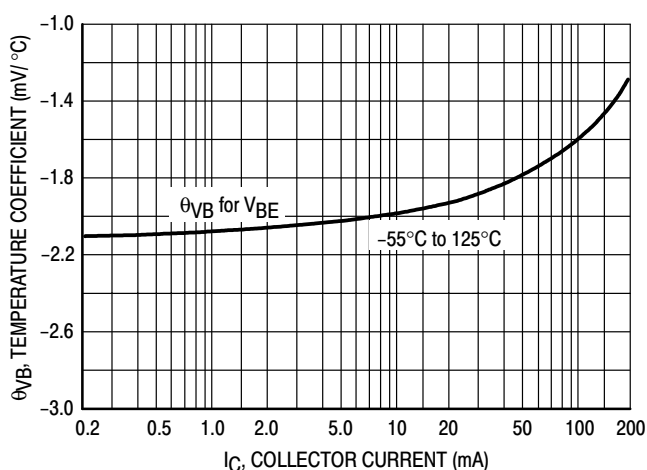


Figure 4. Base-Emitter Temperature Coefficient

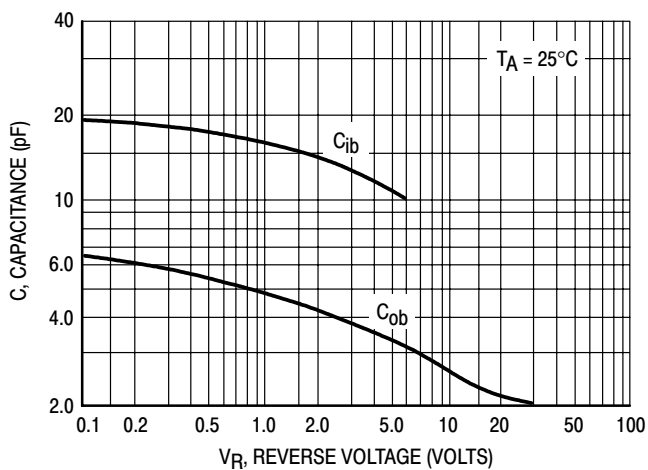


Figure 5. Capacitance

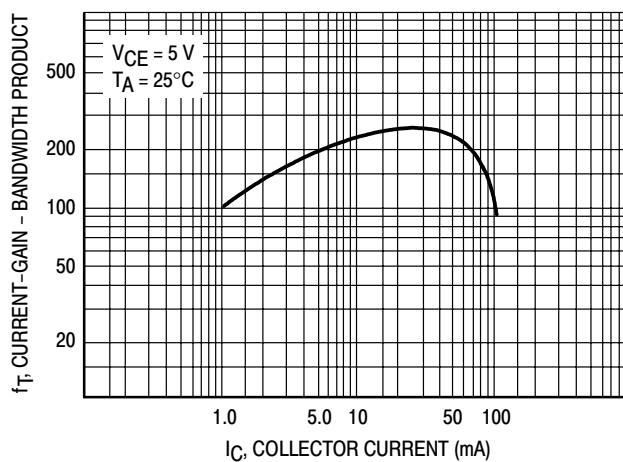


Figure 6. Current-Gain - Bandwidth Product

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series

TYPICAL PNP CHARACTERISTICS — LBC846

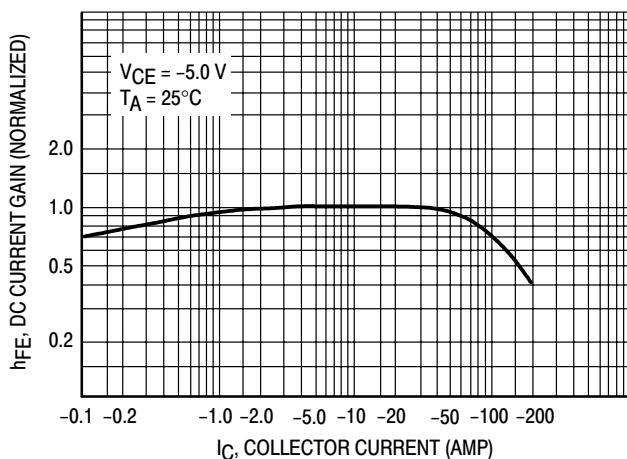


Figure 7. DC Current Gain

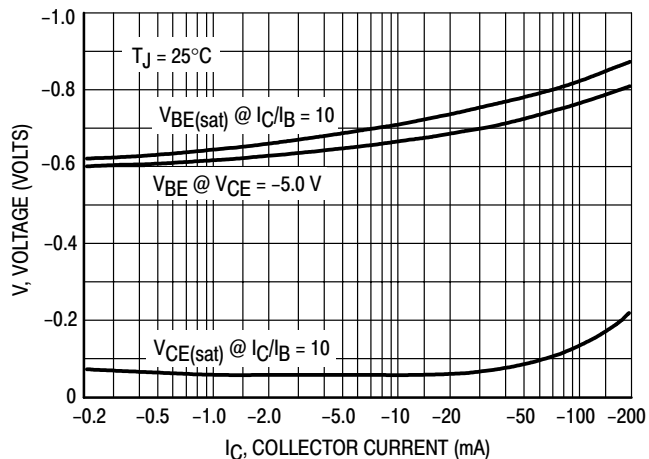


Figure 8. "On" Voltage

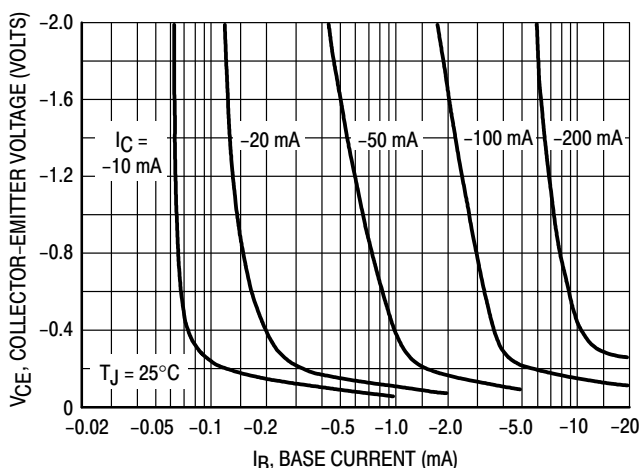


Figure 9. Collector Saturation Region

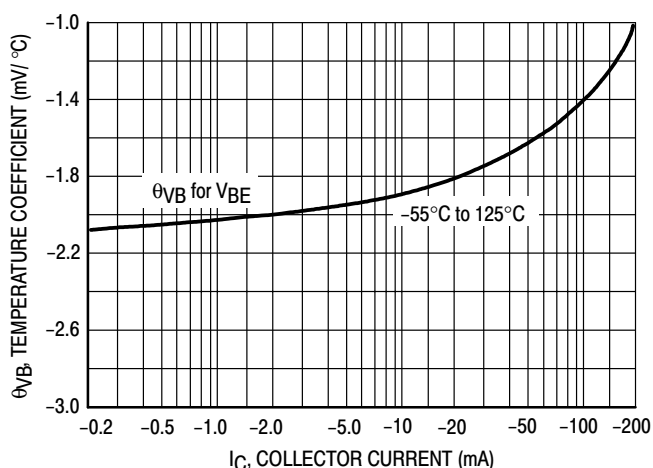


Figure 10. Base-Emitter Temperature Coefficient

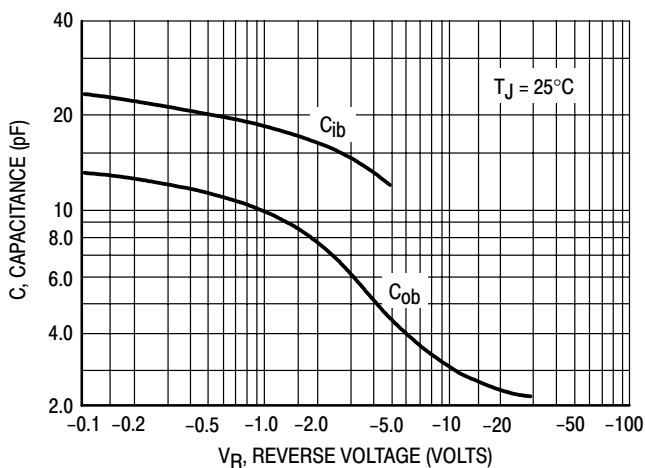


Figure 11. Capacitance

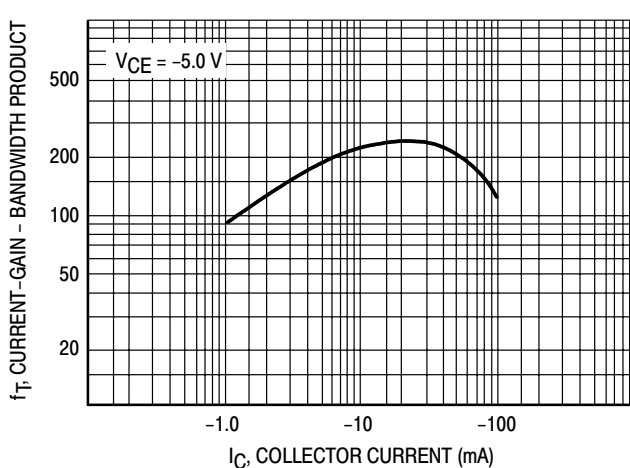


Figure 12. Current-Gain - Bandwidth Product

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series

TYPICAL NPN CHARACTERISTICS – LBC847 SERIES & LBC848 SERIES

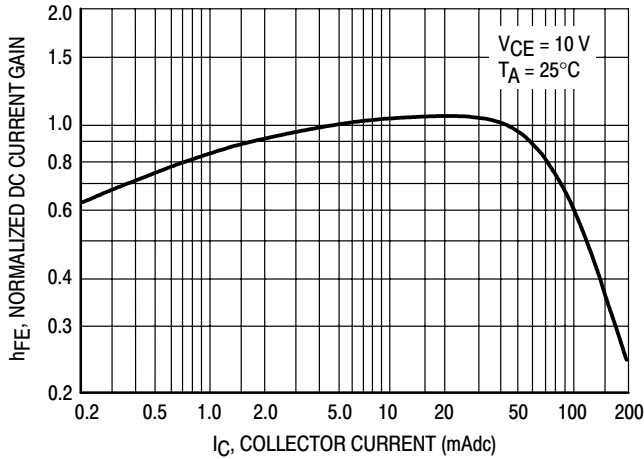


Figure 13. Normalized DC Current Gain

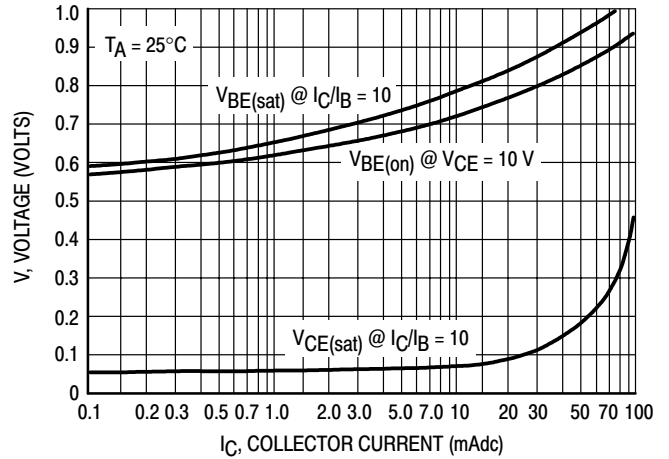


Figure 14. "Saturation" and "On" Voltages

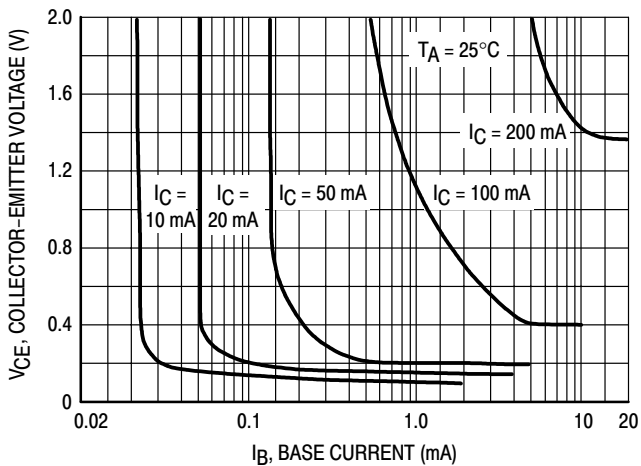


Figure 15. Collector Saturation Region

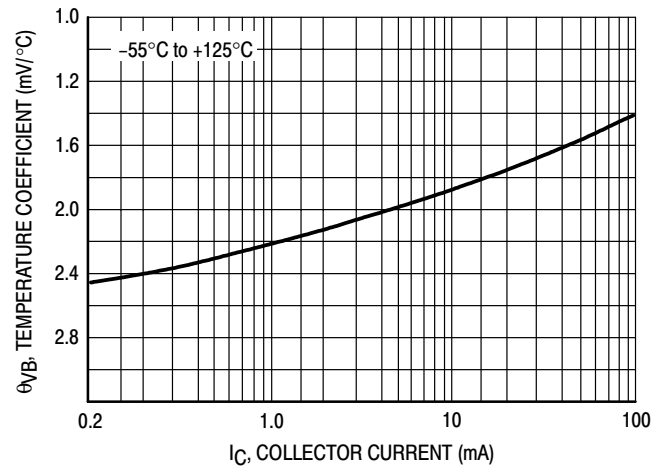


Figure 16. Base-Emitter Temperature Coefficient

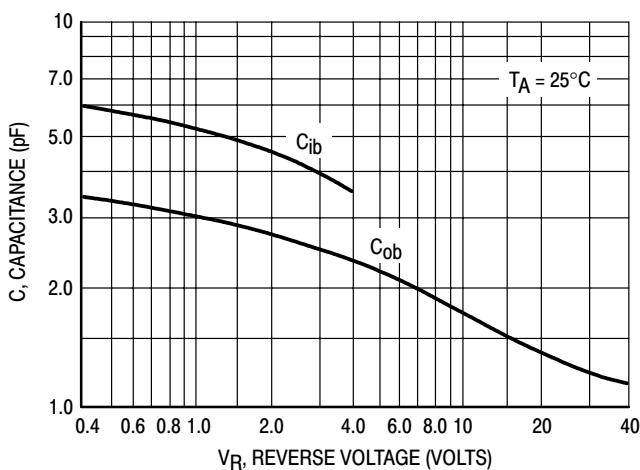


Figure 17. Capacitances



Figure 18. Current-Gain – Bandwidth Product

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series

TYPICAL PNP CHARACTERISTICS — LBC847 SERIES & LBC848 SERIES

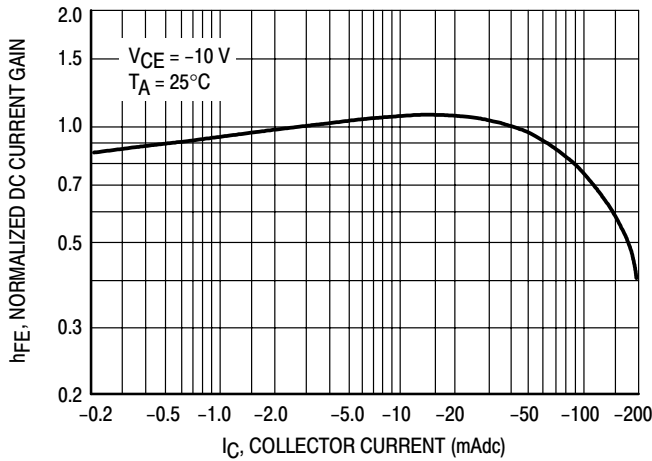


Figure 19. Normalized DC Current Gain

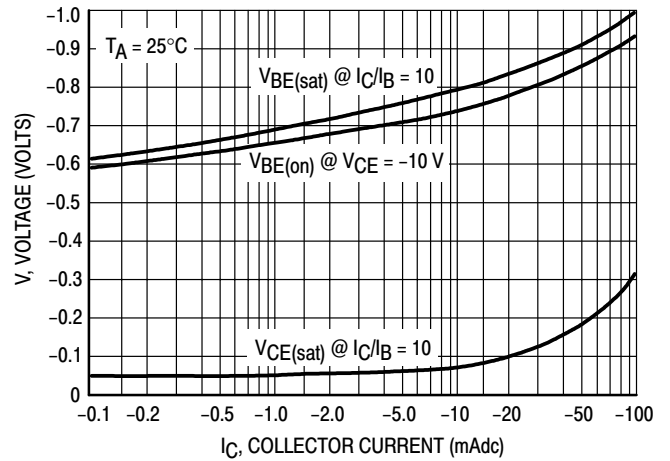


Figure 20. "Saturation" and "On" Voltages

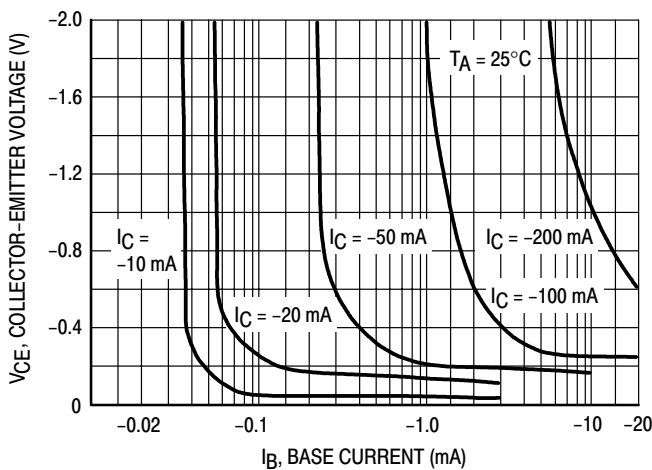


Figure 21. Collector Saturation Region

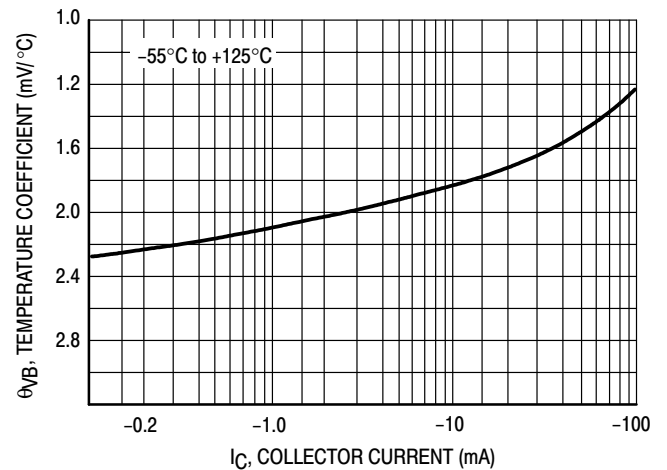


Figure 22. Base-Emitter Temperature Coefficient

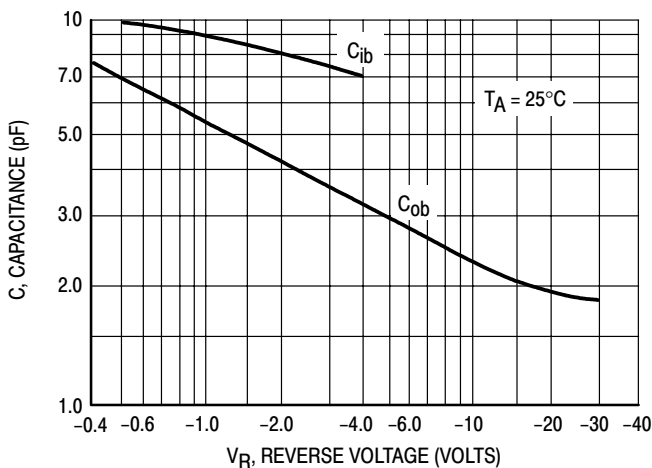


Figure 23. Capacitances

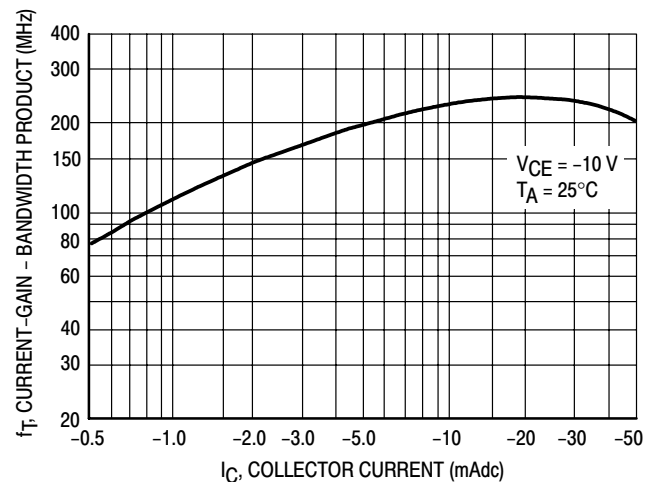


Figure 24. Current-Gain - Bandwidth Product

LBC846BPDW1T1G LBC847BPDW1T1G Series, LBC848BPDW1T1G Series

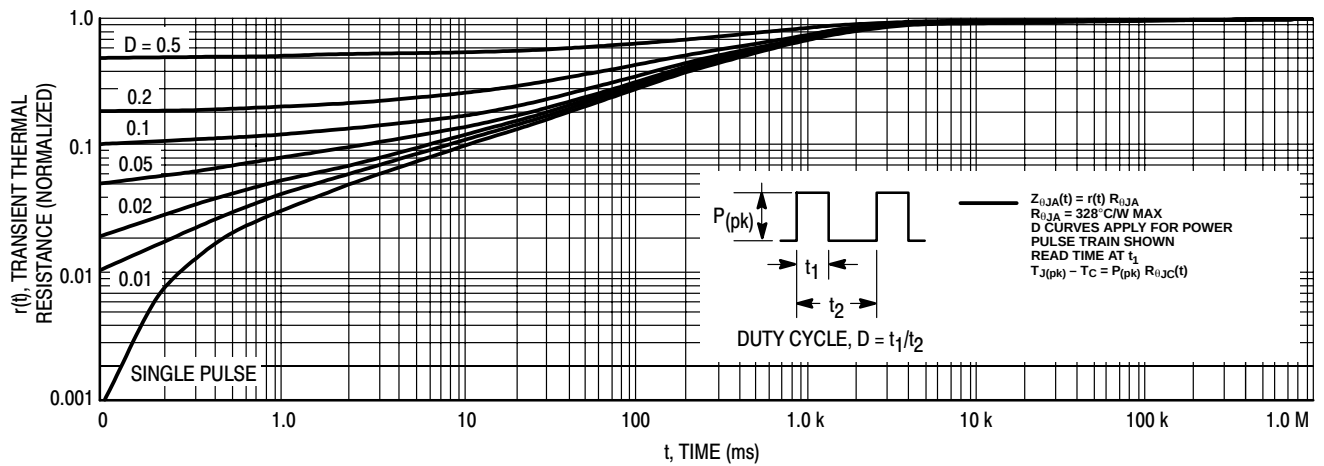


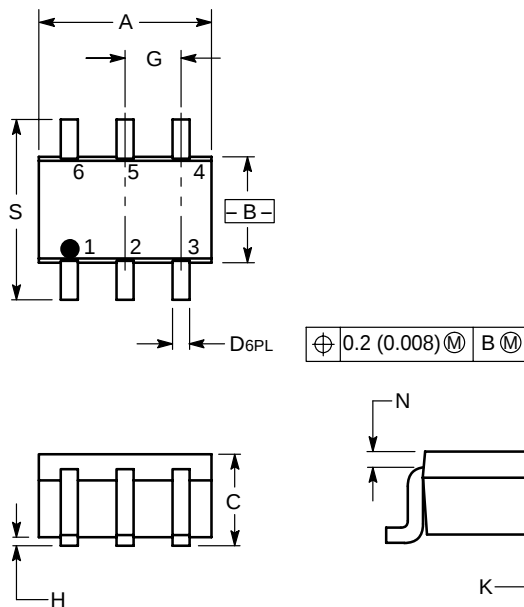
Figure 25. Thermal Response

LBC846BPDW1T1, LBC847BPDW1T1 Series, LBC848BPDW1T1 Series

SC-88/SOT-363

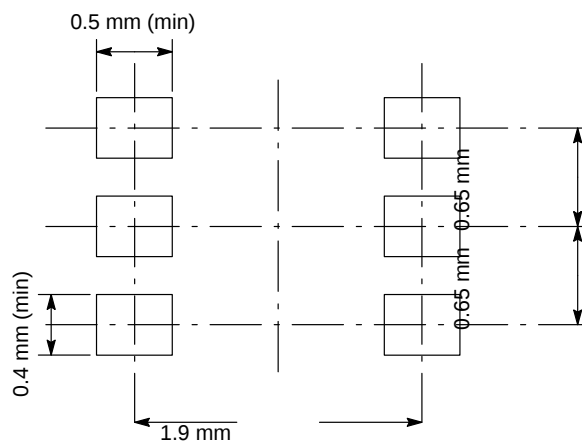
NOTES:

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

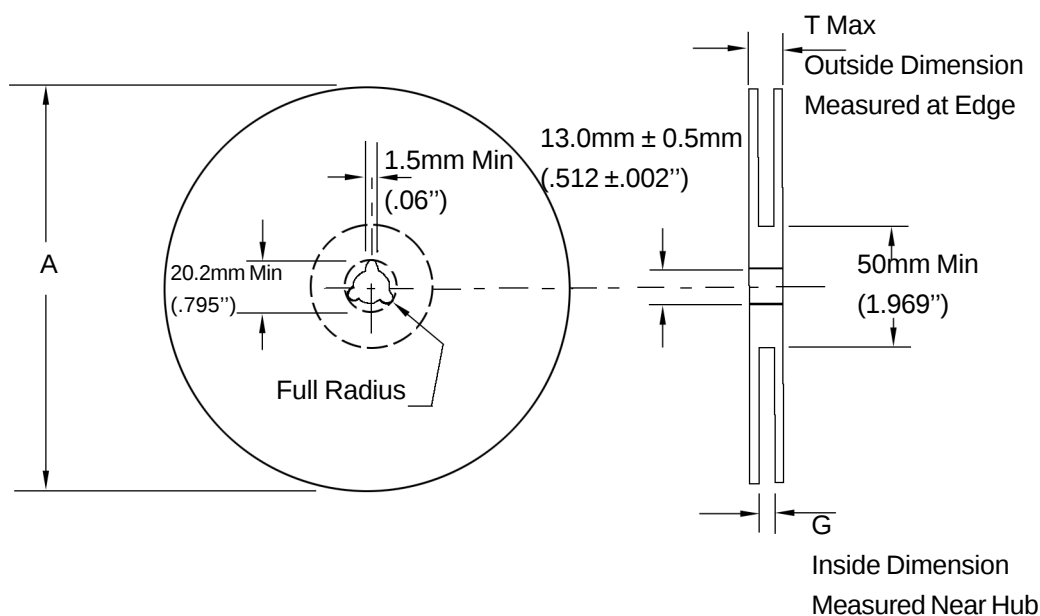


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.031	0.043	0.80	1.10
D	0.004	0.012	0.10	0.30
G	0.026 BSC		0.65 BSC	
H	---	0.004	---	0.10
J	0.004	0.010	0.10	0.25
K	0.004	0.012	0.10	0.30
N	0.008 REF		0.20 REF	
S	0.079	0.087	2.00	2.20

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



EMBOSED TAPE AND REEL DATA FOR DISCRETES



Size	A Max	G	T Max
8 mm	330mm (12.992")	8.4mm+1.5mm, -0.0 (.33"+.059", -0.00)	14.4mm (.56")

Reel Dimensions

Metric Dimensions Govern — English are in parentheses for reference only

Storage Conditions

Temperature: 5 to 40 Deg.C (20 to 30 Deg. C is preferred)

Humidity: 30 to 80 RH (40 to 60 is preferred)

Recommended Period: One year after manufacturing

(This recommended period is for the soldering condition only. The characteristics and reliabilities of the products are not restricted to this limitation)

Shipment Specification

