ELECTRICAL CHARACTERISTICS (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)					
BC846		65	–	–	
BC847		45	–	–	
BC848		30	–	–	
Collector – Emitter Breakdown Voltage	$V_{(BR)CES}$				V
(I_C = 10 μA, V_{EB} = 0)					
BC846		80	–	–	
BC847		50	–	–	
BC848		30	–	–	
Collector – Base Breakdown Voltage	$V_{(BR)CBO}$				V
(I_C = 10 μA)					
BC846		80	–	–	
BC847		50	–	–	
BC848		30	–	–	
Emitter – Base Breakdown Voltage	$V_{(BR)EBO}$				V
(I_E = 1.0 μA)					
BC846		6.0	–	–	
BC847		6.0	–	–	
BC848		5.0	–	–	
Collector Cutoff Current	I_{CBO}				
(V_{CB} = 30 V)		–	–	15	nA
(V_{CB} = 30 V, T_A = 150°C)		–	–	5.0	μA
ON CHARACTERISTICS					
DC Current Gain	h_{FE}				–
(I_C = 10 μA, V_{CE} = 5.0 V)					
BC846B, BC847B		–	150	–	
BC847C, BC848C		–	270	–	
(I_C = 2.0 mA, V_{CE} = 5.0 V)					
BC846B, BC847B		200	290	450	
BC847C, BC848C		420	520	800	
Collector – Emitter Saturation Voltage	$V_{CE(sat)}$				V
(I_C = 10 mA, I_B = 0.5 mA)		–	–	0.25	
(I_C = 100 mA, I_B = 5.0 mA)		–	–	0.6	
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 Voltage	$V_{BE(on)}$				mV
(I_C = 2.0 mA, V_{CE} = 5.0 V)		580	660	700	
(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

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL CHARACTERISTICS – BC846BDW1

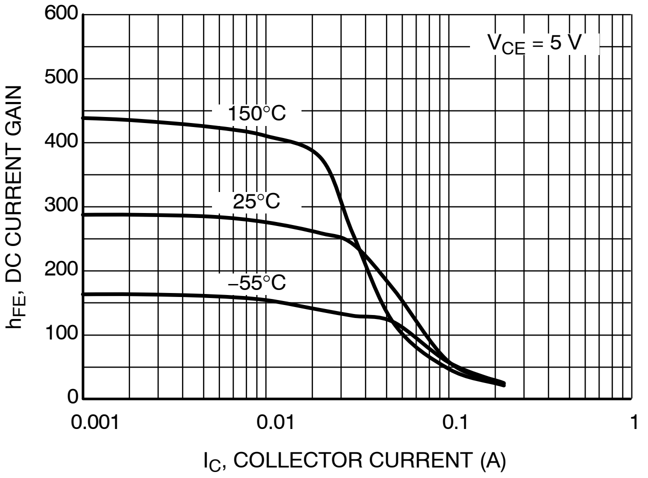


Figure 1. DC Current Gain at V_{CE} = 5 V

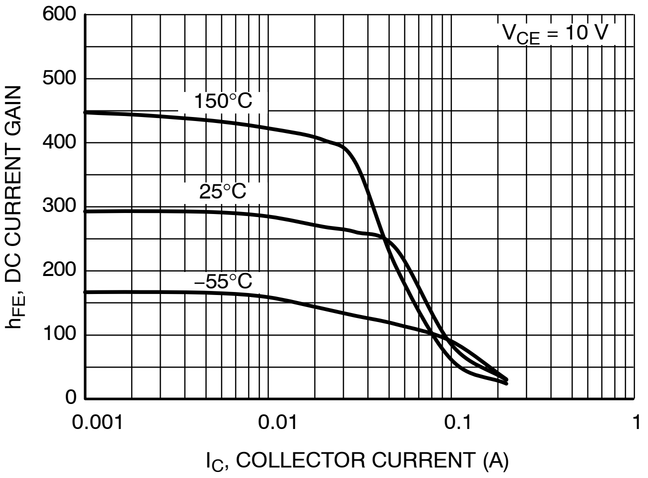


Figure 2. DC Current Gain at V_{CE} = 10 V

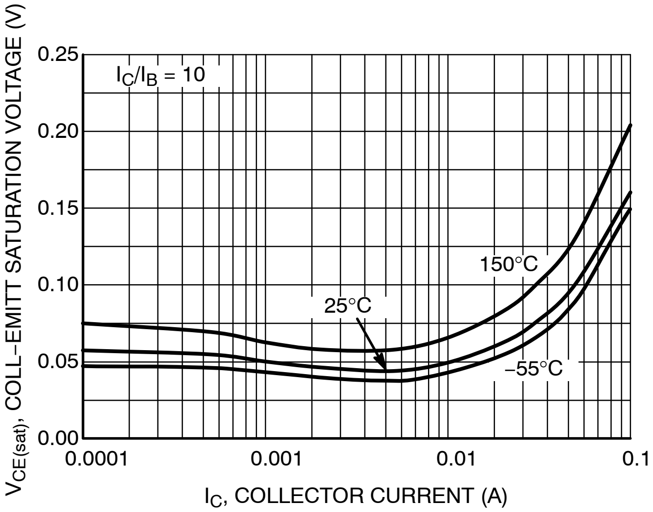


Figure 3. $V_{CE(sat)}$ at I_C/I_B = 10

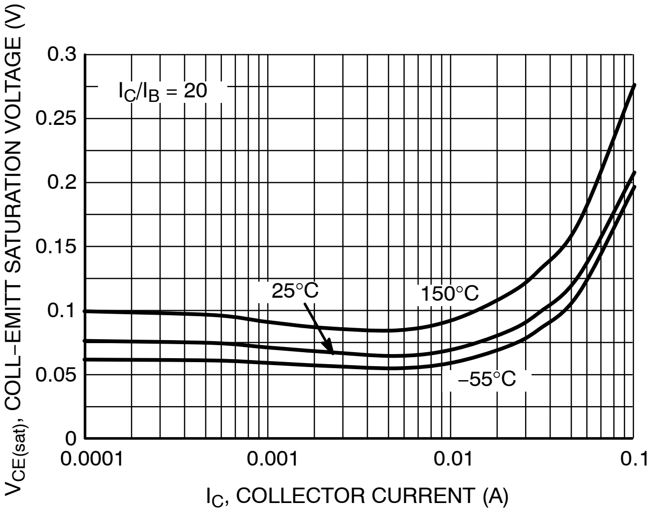


Figure 4. $V_{CE(sat)}$ at I_C/I_B = 20

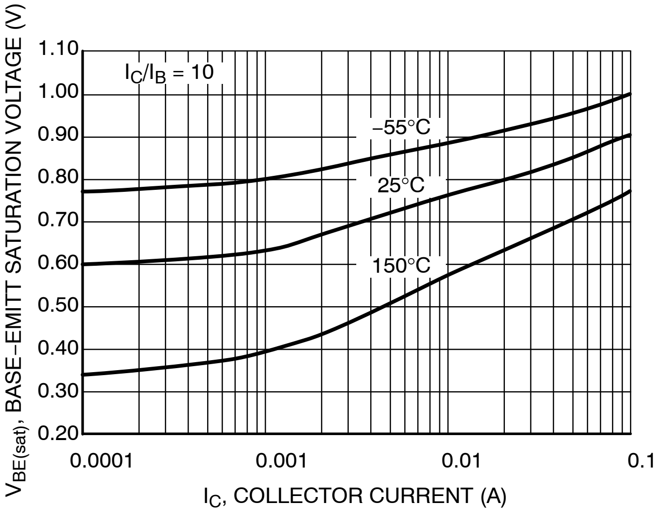


Figure 5. $V_{BE(sat)}$ at I_C/I_B = 10

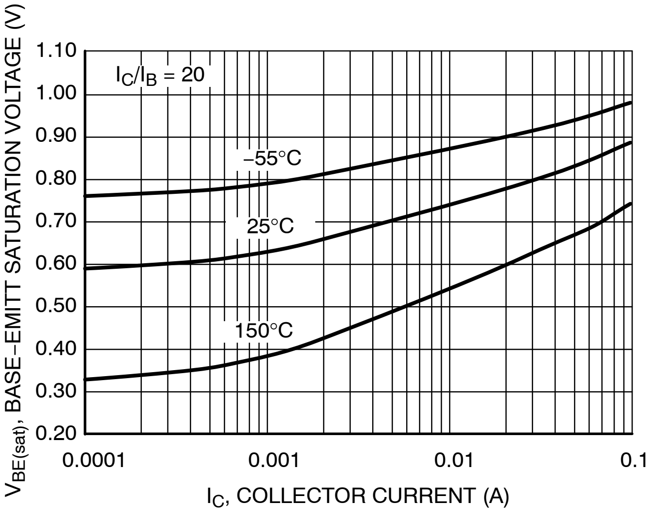


Figure 6. $V_{BE(sat)}$ at I_C/I_B = 20

TYPICAL CHARACTERISTICS – BC846BDW1

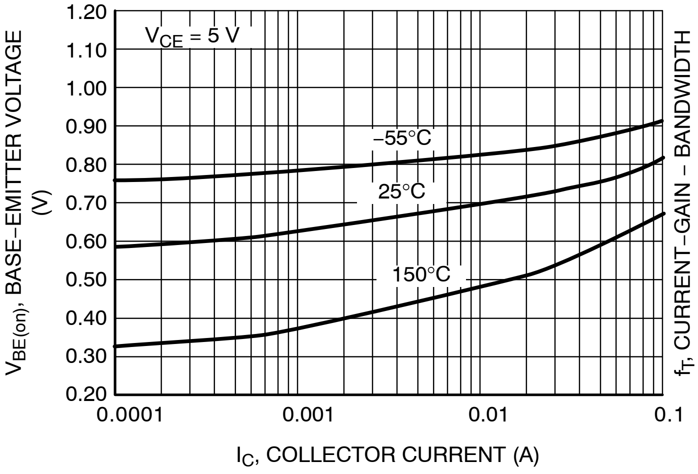


Figure 7. $V_{BE(on)}$ at V_{CE} = 5 V

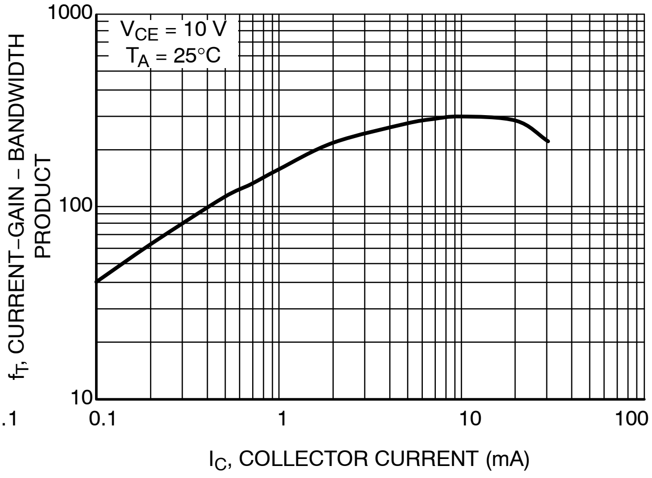


Figure 8. Current – Gain – Bandwidth Product

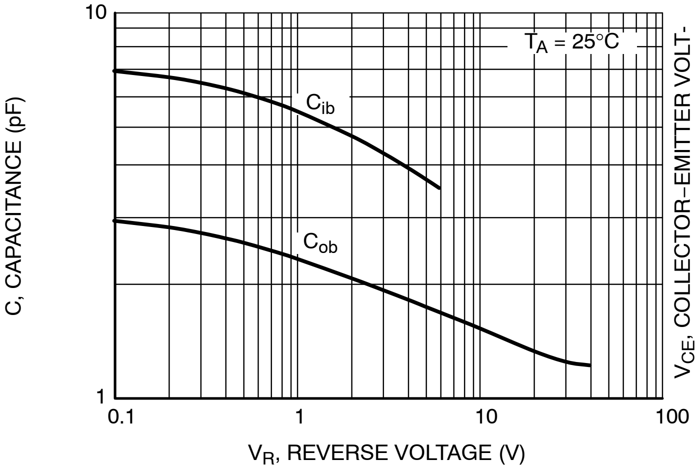


Figure 9. Capacitances

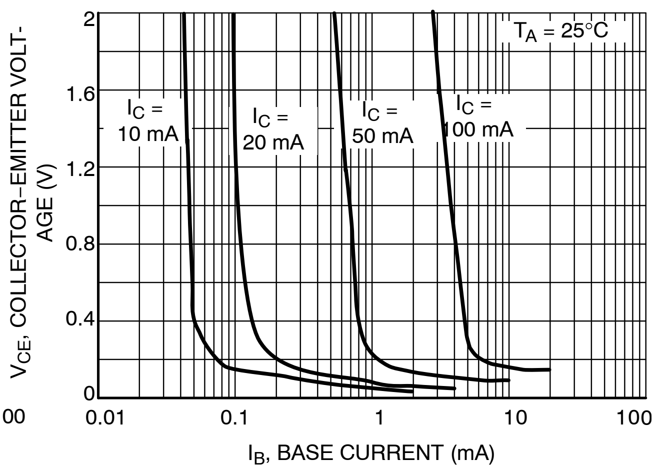


Figure 10. Collector Saturation Region

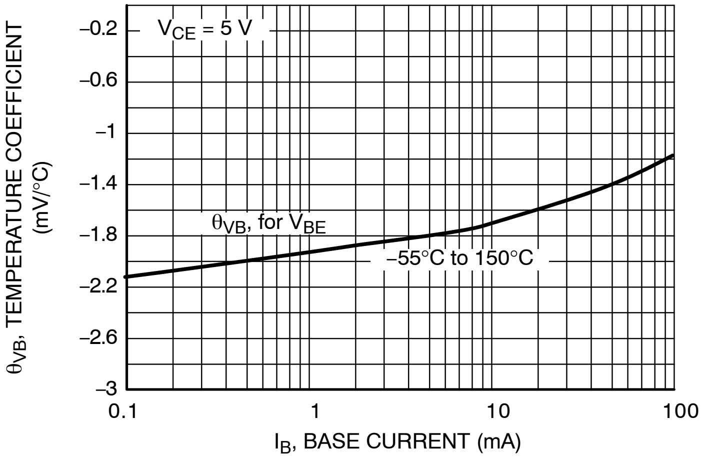


Figure 11. Base–Emitter Temperature Coefficient

TYPICAL CHARACTERISTICS – BC847BDW1

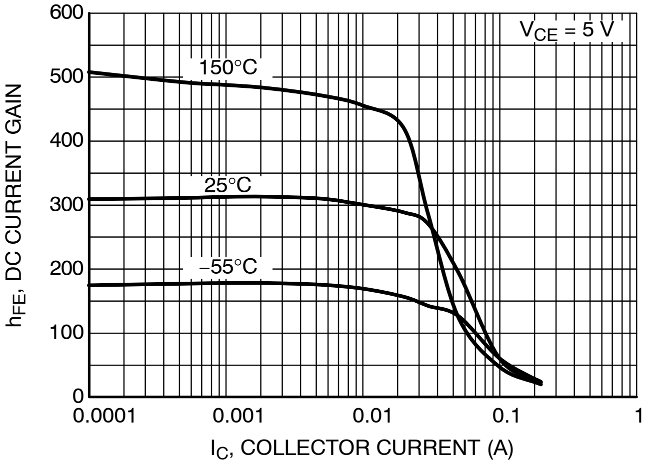


Figure 12. DC Current Gain at V_{CE} = 5 V

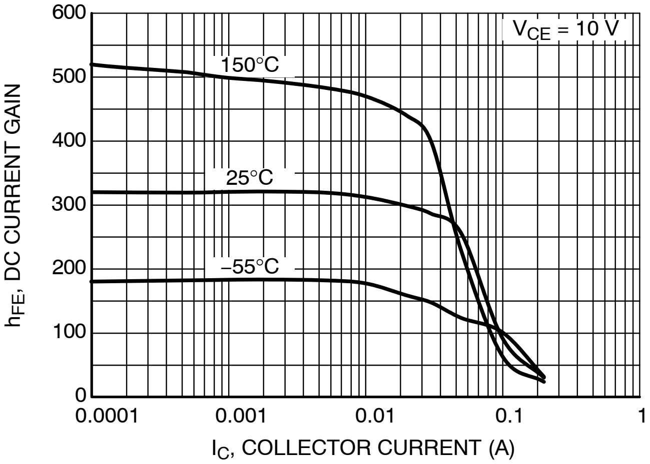


Figure 13. DC Current Gain at V_{CE} = 10 V

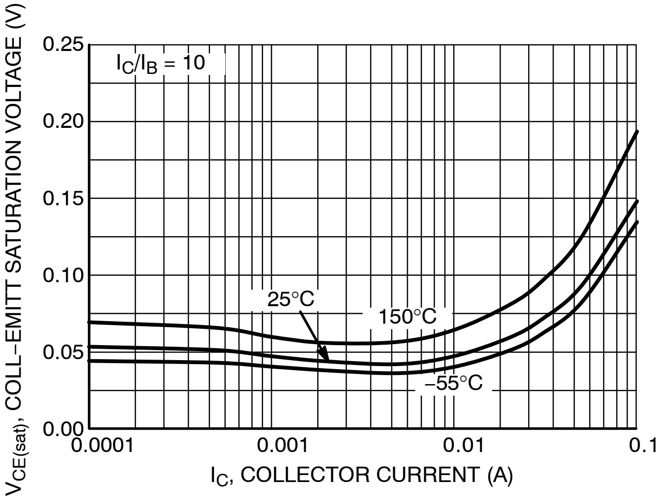


Figure 14. V_{CE} at I_C/I_B = 10

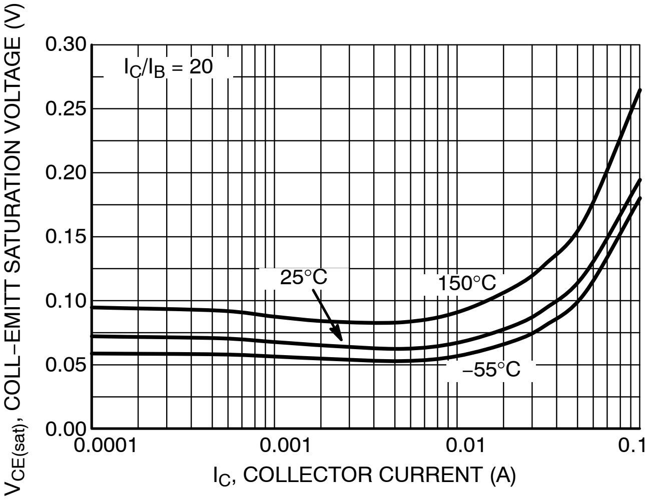


Figure 15. V_{CE} at I_C/I_B = 20

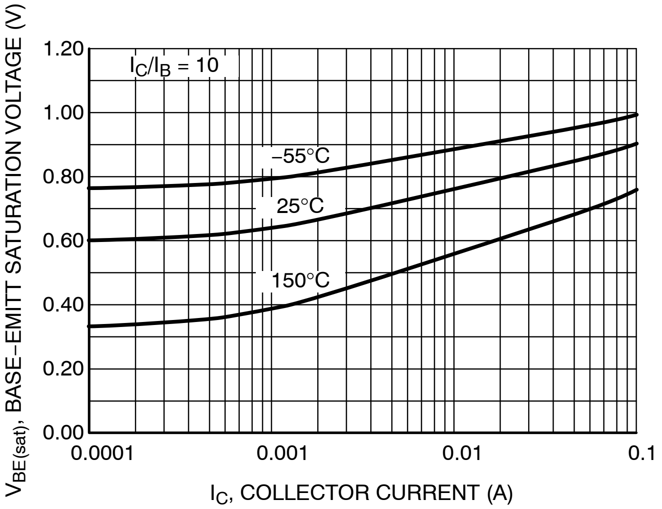


Figure 16. $V_{BE(sat)}$ at I_C/I_B = 10

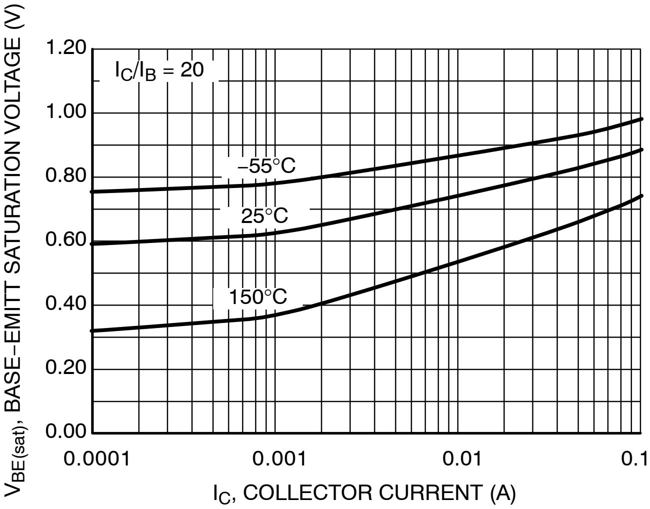


Figure 17. $V_{BE(sat)}$ at I_C/I_B = 20

TYPICAL CHARACTERISTICS – BC847BDW1

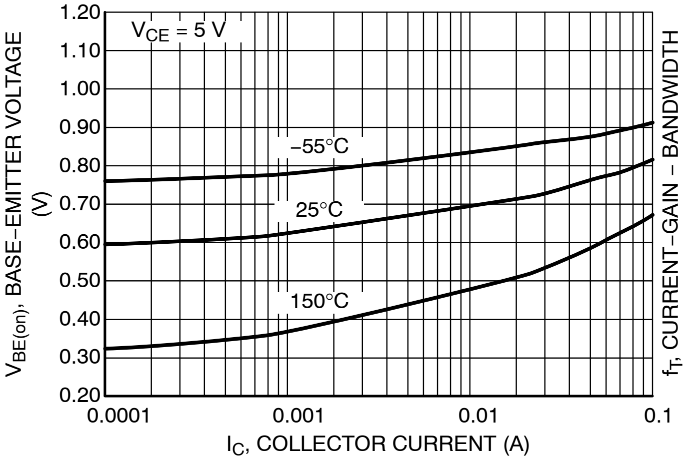


Figure 18. $V_{BE(on)}$ at V_{CE} = 5 V

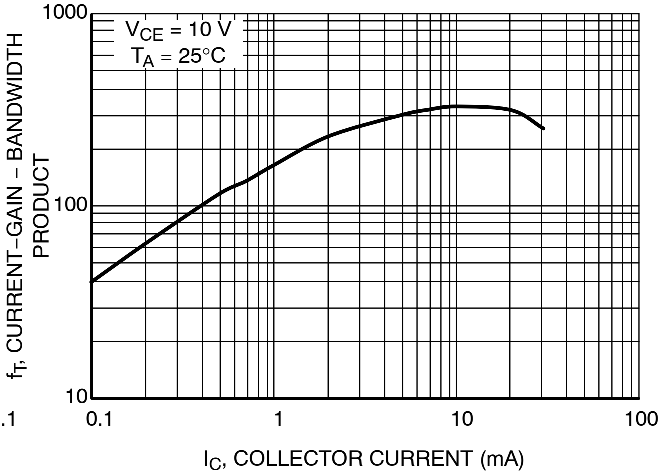


Figure 19. Current – Gain – Bandwidth Product

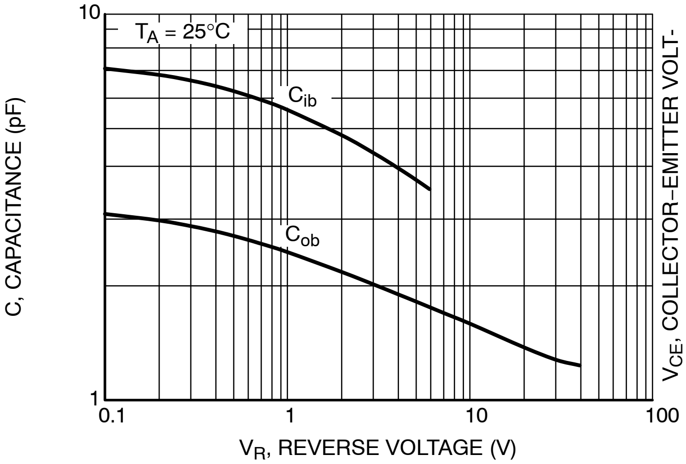


Figure 20. Capacitances

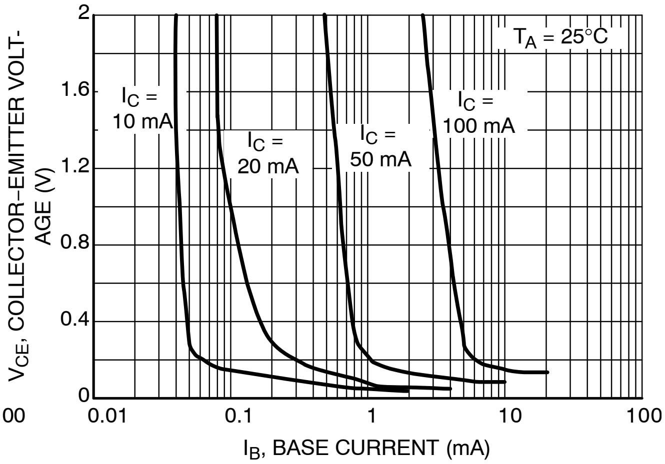


Figure 21. Collector Saturation Region

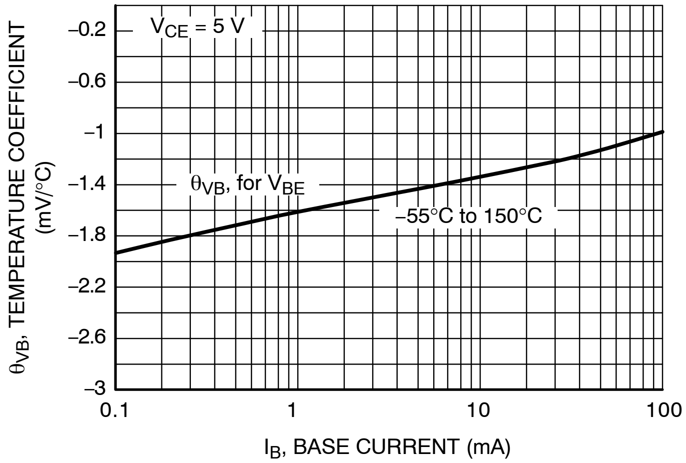


Figure 22. Base–Emitter Temperature Coefficient

TYPICAL CHARACTERISTICS – BC848CDW1

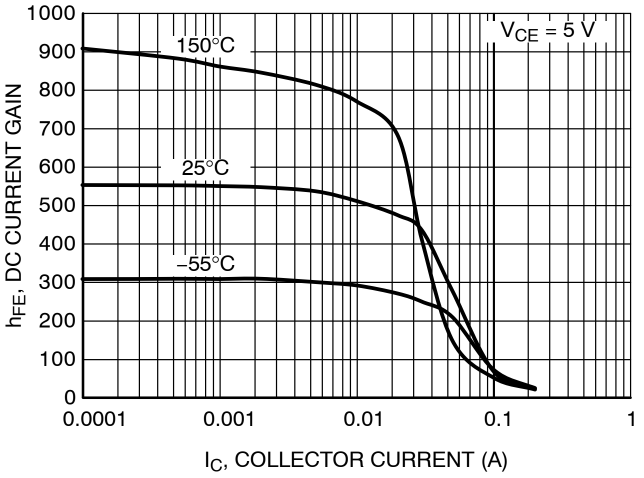


Figure 23. DC Current Gain at V_{CE} = 5 V

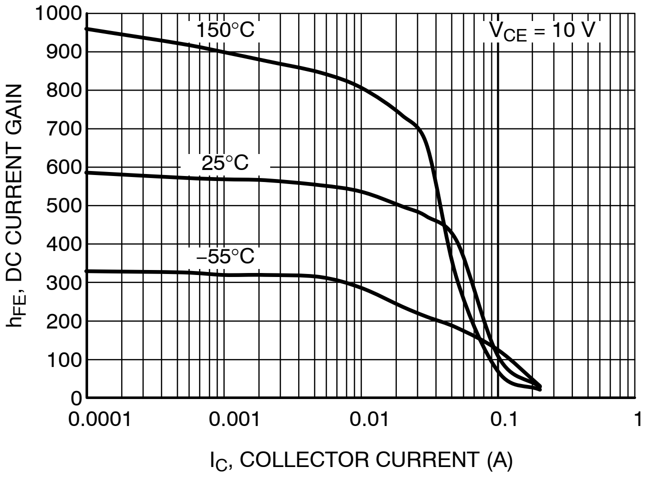


Figure 24. DC Current Gain at V_{CE} = 10 V

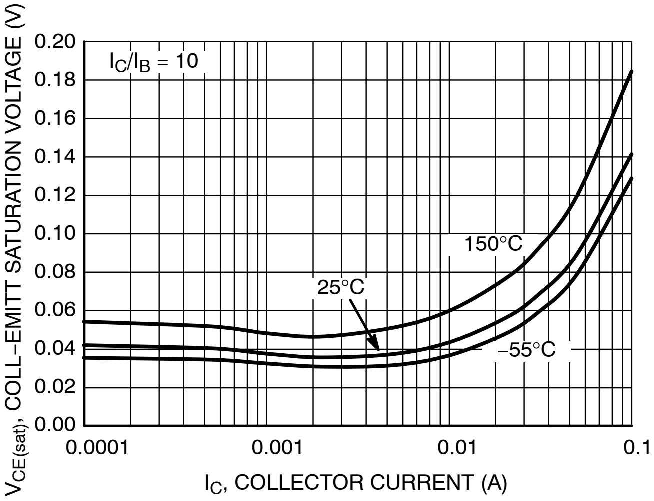


Figure 25. V_{CE} at I_C/I_B = 10

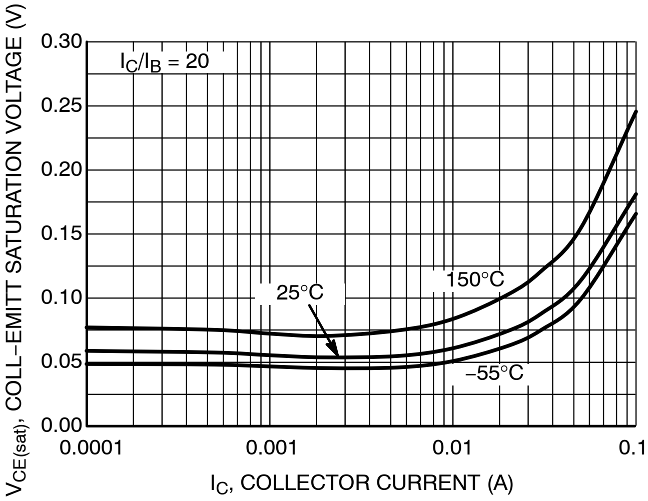


Figure 26. V_{CE} at I_C/I_B = 20

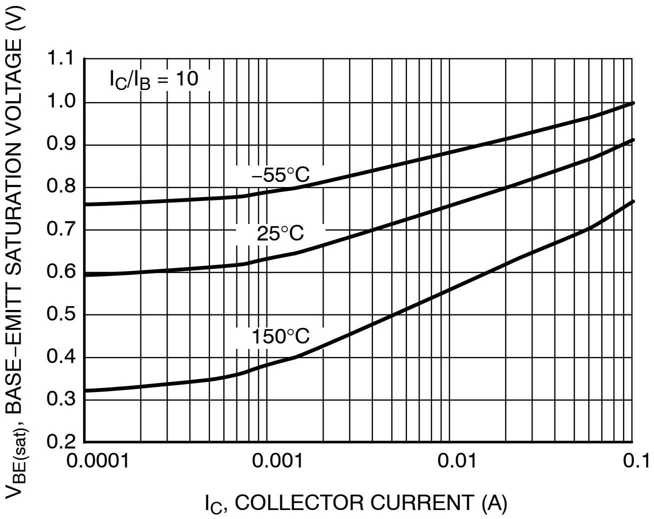


Figure 27. $V_{BE(sat)}$ at I_C/I_B = 10

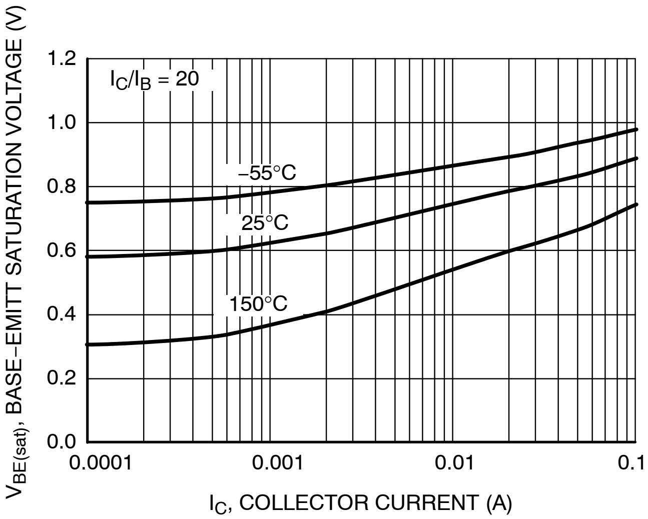


Figure 28. $V_{BE(sat)}$ at I_C/I_B = 20

TYPICAL CHARACTERISTICS – BC848CDW1

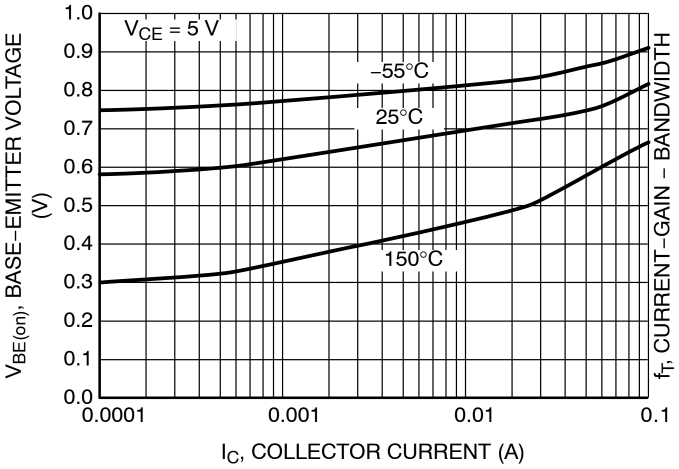


Figure 29. $V_{BE(on)}$ at V_{CE} = 5 V

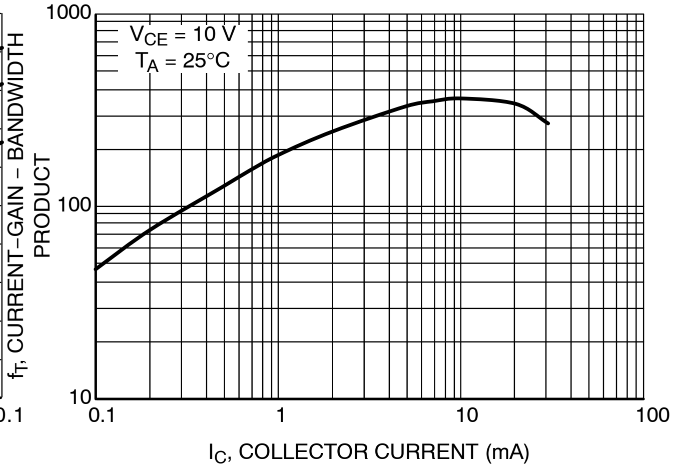


Figure 30. Current – Gain – Bandwidth Product

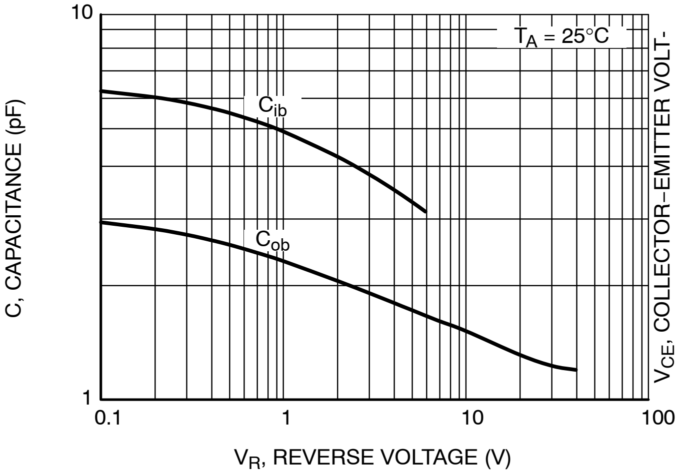


Figure 31. Capacitances

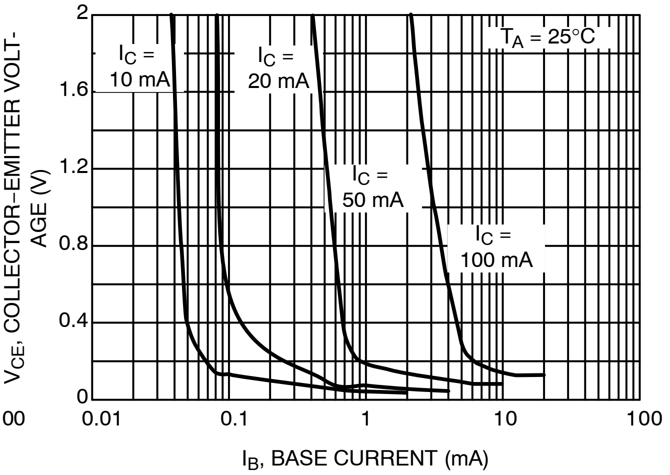


Figure 32. Collector Saturation Region

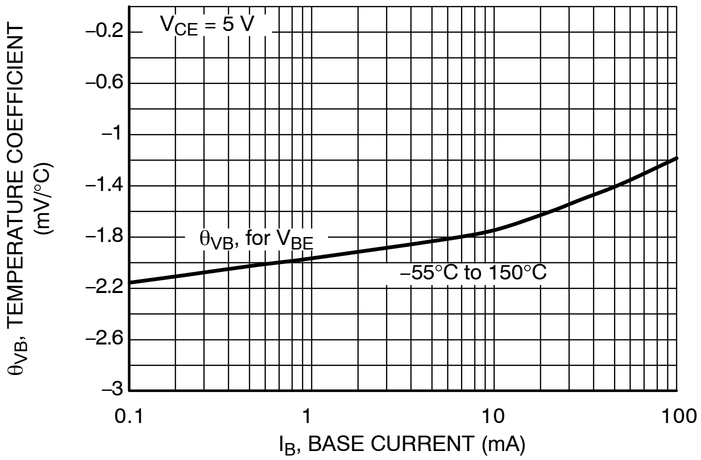


Figure 33. Base–Emitter Temperature Coefficient

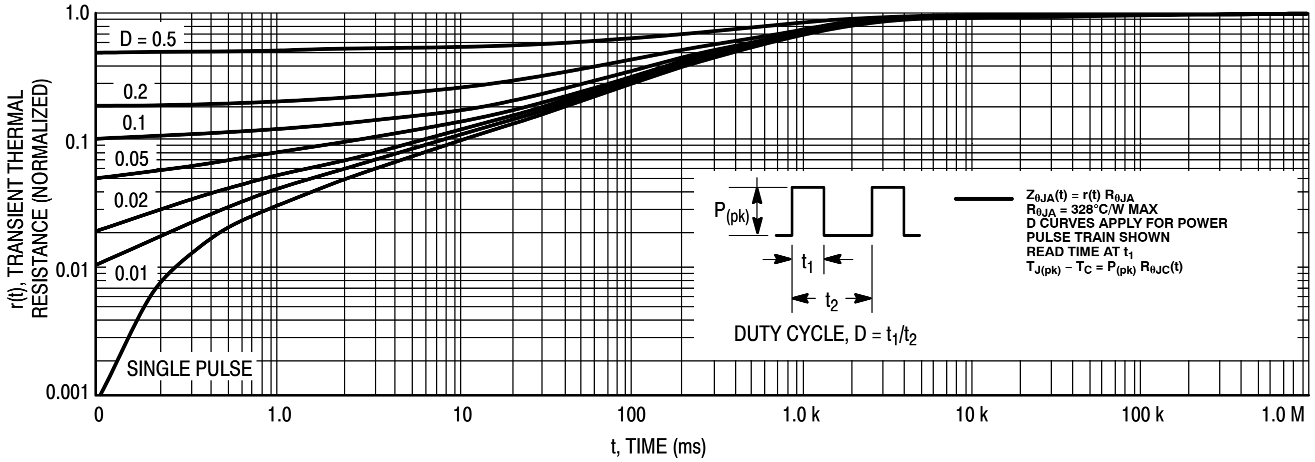


Figure 34. Thermal Response

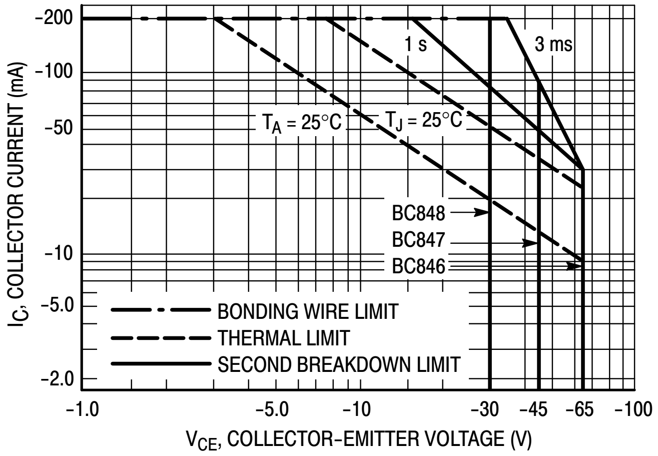


Figure 35. Active Region Safe Operating Area

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 35 is based upon $T_{J(pk)} = 150°C$; T_C or T_A is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150°C$. $T_{J(pk)}$ may be calculated from the data in Figure 34. 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.

ORDERING INFORMATION

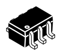
Device	Markings	Package	Shipping†
BC846BDW1T1G	1B	SOT−363 (Pb−Free)	3,000 / Tape & Reel
SBC846BDW1T1G*	1B	SOT−363 (Pb−Free)	3,000 / Tape & Reel
BC847BDW1T1G	1F	SOT−363 (Pb−Free)	3,000 / Tape & Reel
SBC847BDW1T1G*	1F	SOT−363 (Pb−Free)	3,000 / Tape & Reel
BC847BDW1T3G	1F	SOT−363 (Pb−Free)	10,000 / Tape & Reel
SBC847BDW1T3G*	1F	SOT−363 (Pb−Free)	10,000 / Tape & Reel
NSVBC847BDW1T2G*	1F	SOT−363 (Pb−Free)	10,000 / Tape & Reel
BC847CDW1T1G	1G	SOT−363 (Pb−Free)	3,000 / Tape & Reel
SBC847CDW1T1G*	1G	SOT−363 (Pb−Free)	3,000 / Tape & Reel
BC848CDW1T1G	1L	SOT−363 (Pb−Free)	3,000 / Tape & Reel
NSVBC848CDW1T1G*	1L	SOT−363 (Pb−Free)	3,000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*S and NSV Prefixes for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable.

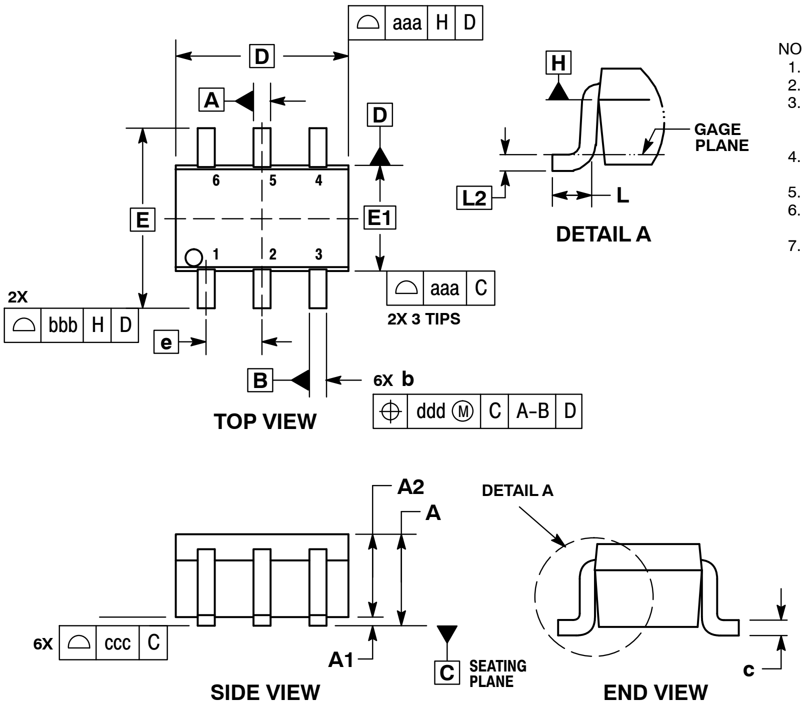
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

ON Semiconductor®


1
SCALE 2:1

SC−88/SC70−6/SOT−363
CASE 419B−02
ISSUE Y

DATE 11 DEC 2012



TOP VIEW

DETAIL A

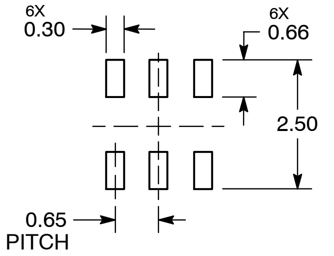
SIDE VIEW

END VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
7. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	−−−	−−−	1.10	−−−	−−−	0.043
A1	0.00	−−−	0.10	0.000	−−−	0.004
A2	0.70	0.90	1.00	0.027	0.035	0.039
b	0.15	0.20	0.25	0.006	0.008	0.010
C	0.08	0.15	0.22	0.003	0.006	0.009
D	1.80	2.00	2.20	0.070	0.078	0.086
E	2.00	2.10	2.20	0.078	0.082	0.086
E1	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.26	0.36	0.46	0.010	0.014	0.018
L2	0.15 BSC			0.006 BSC		
aaa	0.15			0.006		
bbb	0.30			0.012		
ccc	0.10			0.004		
ddd	0.10			0.004		

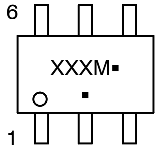
RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

STYLES ON PAGE 2

DOCUMENT NUMBER:	**98ASB42985B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**SC−88/SC70−6/SOT−363**	**PAGE 1 OF 2**

SC−88/SC70−6/SOT−363

CASE 419B−02
ISSUE Y

DATE 11 DEC 2012

STYLE 1:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

STYLE 2:
CANCELLED

STYLE 3:
CANCELLED

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. COLLECTOR
4. EMITTER
5. BASE
6. ANODE

STYLE 5:
PIN 1. ANODE
2. ANODE
3. COLLECTOR
4. EMITTER
5. BASE
6. CATHODE

STYLE 6:
PIN 1. ANODE 2
2. N/C
3. CATHODE 1
4. ANODE 1
5. N/C
6. CATHODE 2

STYLE 7:
PIN 1. SOURCE 2
2. DRAIN 2
3. GATE 1
4. SOURCE 1
5. DRAIN 1
6. GATE 2

STYLE 8:
CANCELLED

STYLE 9:
PIN 1. EMITTER 2
2. EMITTER 1
3. COLLECTOR 1
4. BASE 1
5. BASE 2
6. COLLECTOR 2

STYLE 10:
PIN 1. SOURCE 2
2. SOURCE 1
3. GATE 1
4. DRAIN 1
5. DRAIN 2
6. GATE 2

STYLE 11:
PIN 1. CATHODE 2
2. CATHODE 2
3. ANODE 1
4. CATHODE 1
5. CATHODE 1
6. ANODE 2

STYLE 12:
PIN 1. ANODE 2
2. ANODE 2
3. CATHODE 1
4. ANODE 1
5. ANODE 1
6. CATHODE 2

STYLE 13:
PIN 1. ANODE
2. N/C
3. COLLECTOR
4. EMITTER
5. BASE
6. CATHODE

STYLE 14:
PIN 1. VREF
2. GND
3. GND
4. IOUT
5. VEN
6. VCC

STYLE 15:
PIN 1. ANODE 1
2. ANODE 2
3. ANODE 3
4. CATHODE 3
5. CATHODE 2
6. CATHODE 1

STYLE 16:
PIN 1. BASE 1
2. EMITTER 2
3. COLLECTOR 2
4. BASE 2
5. EMITTER 1
6. COLLECTOR 1

STYLE 17:
PIN 1. BASE 1
2. EMITTER 1
3. COLLECTOR 2
4. BASE 2
5. EMITTER 2
6. COLLECTOR 1

STYLE 18:
PIN 1. VIN1
2. VCC
3. VOUT2
4. VIN2
5. GND
6. VOUT1

STYLE 19:
PIN 1. I OUT
2. GND
3. GND
4. V CC
5. V EN
6. V REF

STYLE 20:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

STYLE 21:
PIN 1. ANODE 1
2. N/C
3. ANODE 2
4. CATHODE 2
5. N/C
6. CATHODE 1

STYLE 22:
PIN 1. D1 (i)
2. GND
3. D2 (i)
4. D2 (c)
5. VBUS
6. D1 (c)

STYLE 23:
PIN 1. Vn
2. CH1
3. Vp
4. N/C
5. CH2
6. N/C

STYLE 24:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 25:
PIN 1. BASE 1
2. CATHODE
3. COLLECTOR 2
4. BASE 2
5. EMITTER
6. COLLECTOR 1

STYLE 26:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 27:
PIN 1. BASE 2
2. BASE 1
3. COLLECTOR 1
4. EMITTER 1
5. EMITTER 2
6. COLLECTOR 2

STYLE 28:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 29:
PIN 1. ANODE
2. ANODE
3. COLLECTOR
4. EMITTER
5. BASE/ANODE
6. CATHODE

STYLE 30:
PIN 1. SOURCE 1
2. DRAIN 2
3. DRAIN 2
4. SOURCE 2
5. GATE 1
6. DRAIN 1

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

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