

Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of automotive applications.

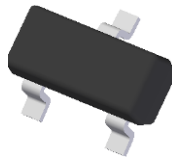
Features

- $BV_{CEO} > 45V$
- $I_C = 0.5A$ Continuous Collector Current
- $I_{CM} = 1A$ Peak Pulse Current
- Complementary PNP Types: [BC807-40Q](#)
- Ideally Suited for Automatic Insertion
- Epitaxial Planar Die Construction
- For Switching and AF Amplifier Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The BC817-16Q/-25Q/-40Q are suitable for automotive applications requiring specific change control; these parts are AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
<https://www.diodes.com/quality/product-definitions/>

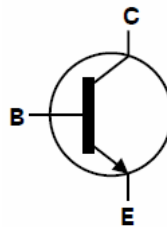
Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E3)
- Weight 0.008 grams (Approximate)

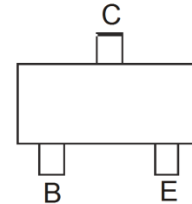
SOT23



Top View



Device Symbol



Top View
Pinout

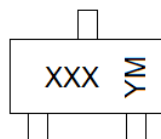
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BC817-16Q-7-F	SOT23	K6A	7	8	3,000	Reel
BC817-25Q-7-F	SOT23	K6B	7	8	3,000	Reel
BC817-40Q-7-F	SOT23	K6C	7	8	3,000	Reel
BC817-40Q-13-F	SOT23	K6C	13	8	10,000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

SOT23



XXX = Product Type Marking Code (See *Ordering Information*)
 YM = Date Code Marking
 Y or $\bar{Y}$ = Year (ex: N = 2026)
 M = Month (ex: 5 = May)

Date Code Key

Year	2016	-	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Code	D	-	N	P	R	S	T	U	V	W	X	Y

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	5.0	V
Collector Current	I_C	0.5	A
Peak Pulse Collector Current (Single Pulse)	I_{CM}	1.0	A
Peak Pulse Base Current (Single Pulse)	I_{BM}	200	mA

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation	P_D	310	mW
		350	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	403	$^\circ\text{C/W}$
		357	
Thermal Resistance, Junction to Leads	$R_{\theta JL}$	350	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	112	$^\circ\text{C/W}$
		104	
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to 150	$^\circ\text{C}$

ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C
Electrostatic Discharge – Charged Device Model	ESD CDM	1000	V	3C

- Notes:
5. For a device mounted on minimum recommended pad layout FR-4 PCB with high coverage of single-sided 1oz copper; device is measured under still air conditions whilst operating in a steady state.
 6. Same as Note 5, except mounted on 15mm x 15mm 1oz copper.
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
 8. Refer to JEDEC specifications JESD22-A114, JESD22-A115 and JS-002.

Thermal Characteristics and Derating Information

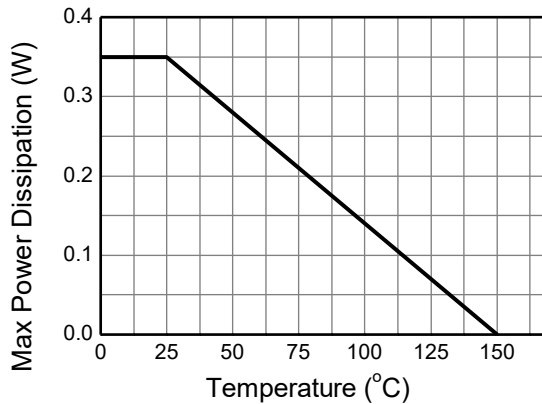


Figure 1. Derating Curve

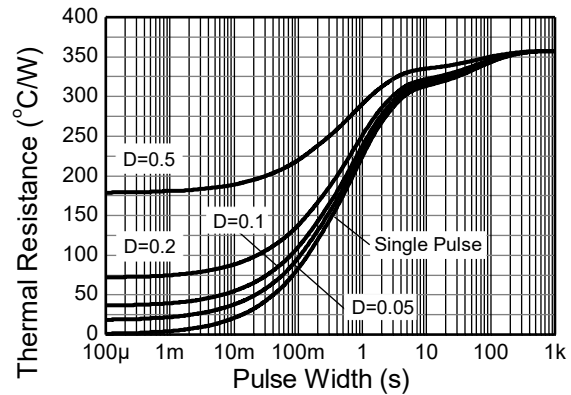


Figure 2. Transient Thermal Impedance

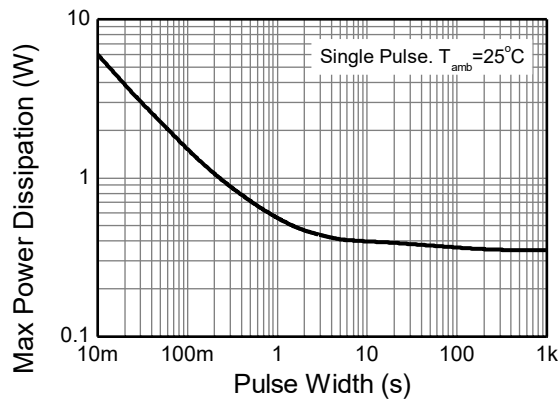


Figure 3. Pulse Power Dissipation

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage		BV_{CBO}	50	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)		BV_{CEO}	45	—	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage		BV_{EBO}	5	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Cutoff Current		I_{CES}	—	—	100 5.0	nA μA	$V_{CE} = 45\text{V}$ $V_{CE} = 25\text{V}, T_J = 150^\circ\text{C}$
Emitter-Base Cutoff Current		I_{EBO}	—	—	100	nA	$V_{EB} = 5.0\text{V}$
DC Current Gain (Note 9)	BC817-16Q	h_{FE}	100	—	250	—	$V_{CE} = 1.0\text{V}, I_C = 100\text{mA}$
	BC817-25Q		160		400		
	BC817-40Q		250		600		
	BC817-16Q		60		—		$V_{CE} = 1.0\text{V}, I_C = 300\text{mA}$
Collector-Emitter Saturation Voltage (Note 9)		$V_{CE(sat)}$	—	—	0.7	V	
Base-Emitter Voltage (Note 9)		V_{BE}	—	—	1.2	V	
Transition frequency		f_T	100	—	—	MHz	$V_{CE} = 5.0\text{V}, I_C = 10\text{mA}$ $f = 50\text{MHz}$
Collector-Base Capacitance		C_{CBO}	—	—	12	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$

Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

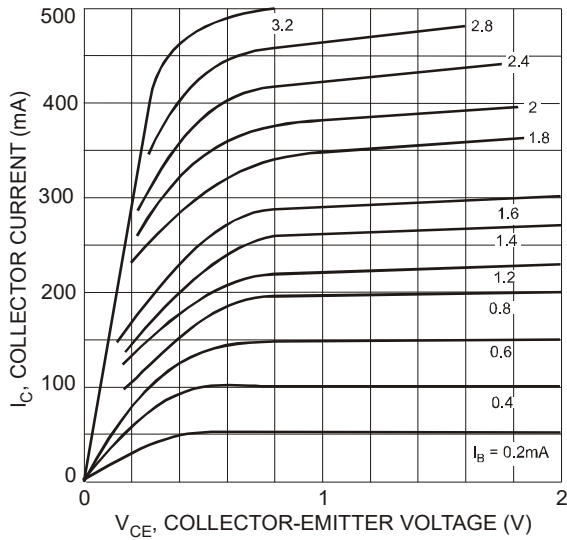


Figure 4. I_C v V_{CE}

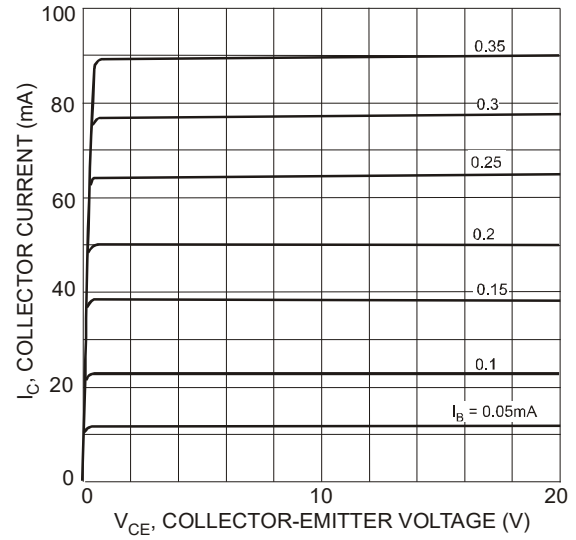


Figure 5. I_C v V_{CE}

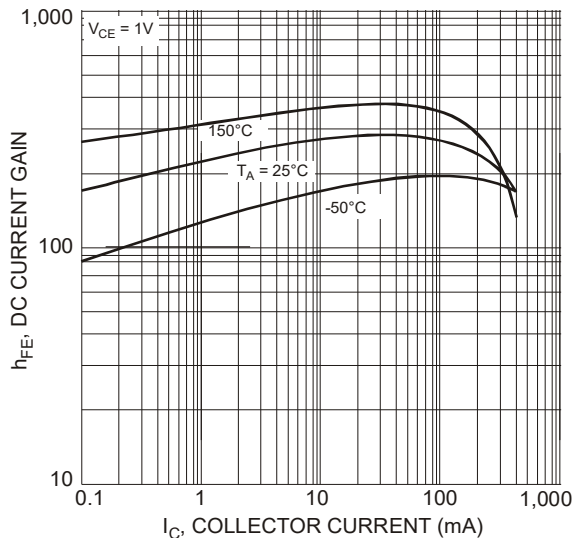


Figure 6. h_{FE} v I_C

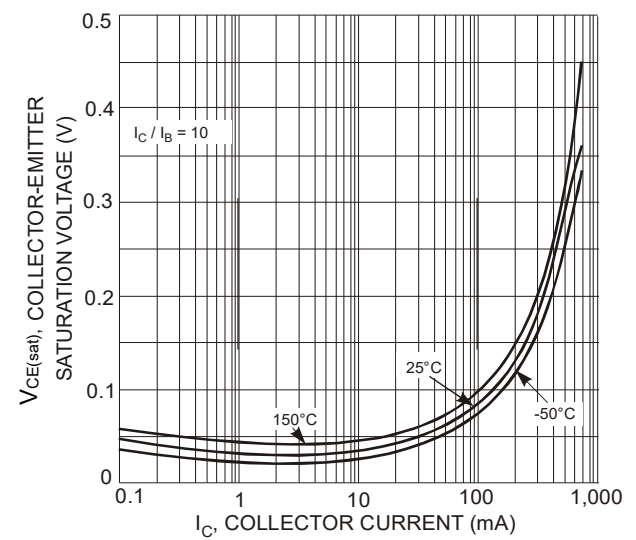


Figure 7. $V_{CE(sat)}$ v I_C

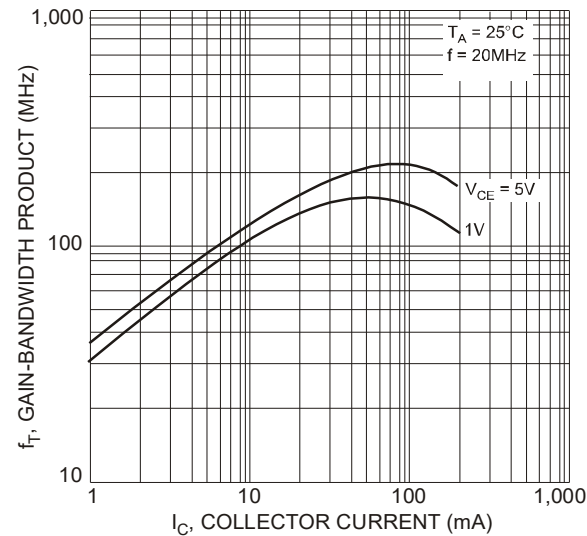
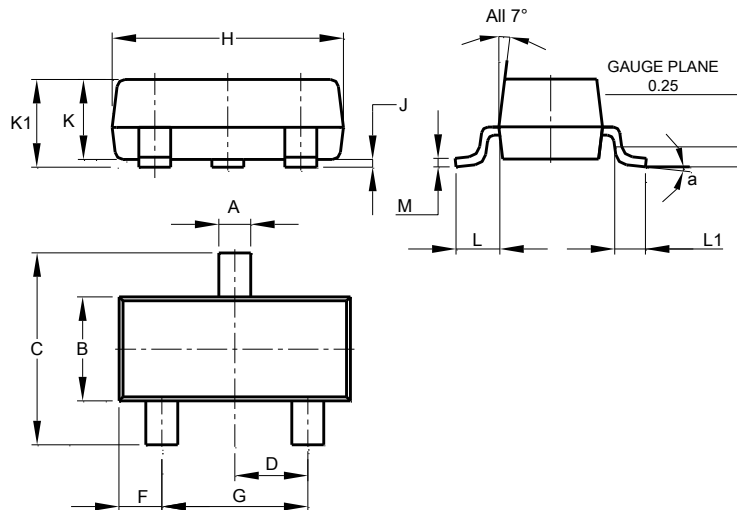


Figure 8. f_T v I_C

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23

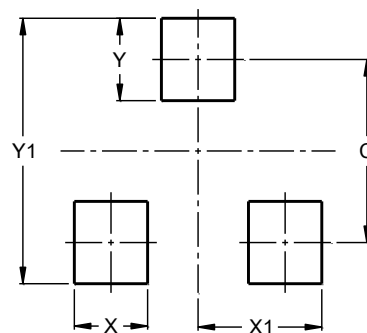


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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