60V NPN DARLINGTON TRANSISTOR IN SOT23

Description

This Darlington Transistor is designed to meet the stringent requirements of automotive applications.

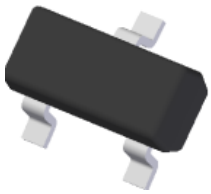
Features

- BV_{CEO} > 60V
- Darlington Transistor h_{FE} > 10k @ 100mA for High Gain
- I_C = 500mA High Continuous Collector Current
- Complementary Darlington PNP Type: BCV46Q
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The BCV47Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

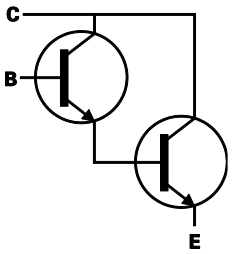
Mechanical Data

- 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)

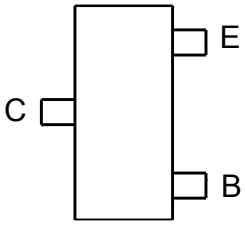
SOT23



Top View



Device Symbol



Top View
Pinout

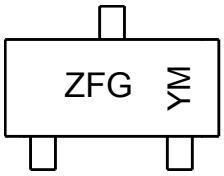
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
BCV47QTA	SOT23	ZFG	7	8	3,000	Reel
BCV47QTC	SOT23	ZFG	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



ZFG = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ or $\underline{Y}$ = Year (ex: M = 2025)
M or $\overline{M}$ = Month (ex: 9 = September)

Date Code Key

Year	2017	-	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	E	-	M	N	P	R	S	T	U	V	W	X

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°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	10	V
Continuous Collector Current	I_C	500	mA
Peak Pulse Current	I_{CM}	800	mA
Base Current	I_B	100	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	310	mW
	(Note 6)		350	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	403	°C/W
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	350	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	2,000	V	2
Electrostatic Discharge - Machine Model	ESD MM	200	V	B

Notes:
5. For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single-sided 1oz copper in still air condition; the device is measured when operating in a steady-state condition.
6. Same as Note 5, except the device is mounted on 15mm x 15mm FR4 PCB.
7. Thermal resistance from junction to solder-point (at the end of the leads).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information (@T_A = +25°C, unless otherwise specified.)

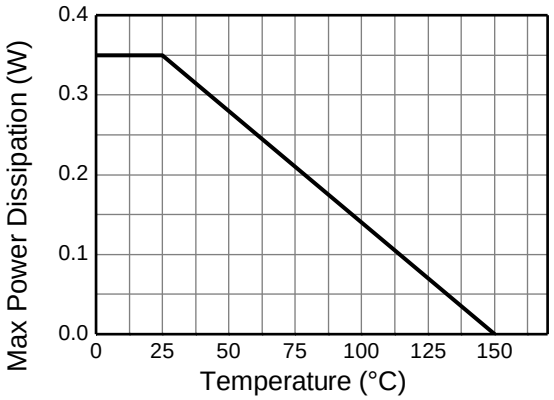


Figure 1. Derating Curve

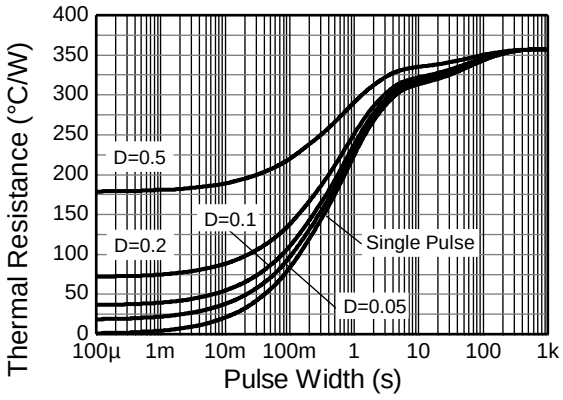


Figure 2. Transient Thermal Impedance

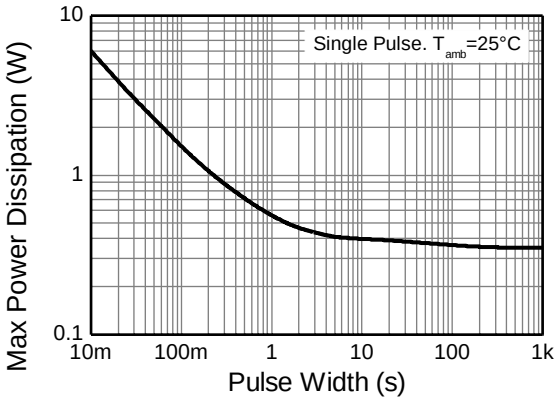


Figure 3. Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	80	—	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	—	—	V	I_{CEO} = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	10	—	—	V	I_{EBO} = 10µA
Collector Cutoff Current	I_{CBO}	— —	< 1 —	100 10	nA µA	V_{CB} = 60V V_{CB} = 60V, T_A = +150°C
Emitter-Base Cutoff Current	I_{EBO}	—	< 1	100	nA	V_{EB} = 4V
ON CHARACTERISTICS (Note 9)						
Static Forward Current Transfer Ratio	h_{FE}	2,000 4,000 10,000 2,000	—	—	—	I_C = 100µA, V_{CE} = 1V I_C = 10mA, V_{CE} = 5V I_C = 100mA, V_{CE} = 5V I_C = 500mA, V_{CE} = 5V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	1.0	V	I_C = 100mA, I_B = 0.1mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	—	1.5	V	I_C = 100mA, I_B = 0.1mA
SMALL-SIGNAL CHARACTERISTICS (Note 9)						
Transition Frequency	f_T	—	170	—	MHz	I_C = 50mA, V_{CE} = 5V f = 20MHz
Output Capacitance	C_{obo}	—	3.5	—	pF	V_{CB} = 10V, f = 1MHz

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

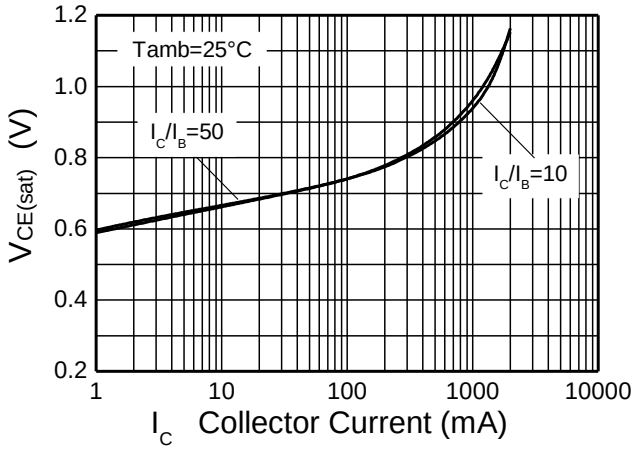


Figure 4. $V_{CE(sat)}$ vs. I_C

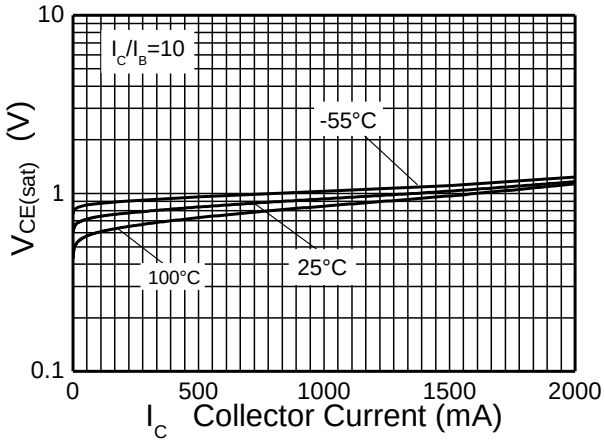


Figure 5. $V_{CE(sat)}$ vs. I_C

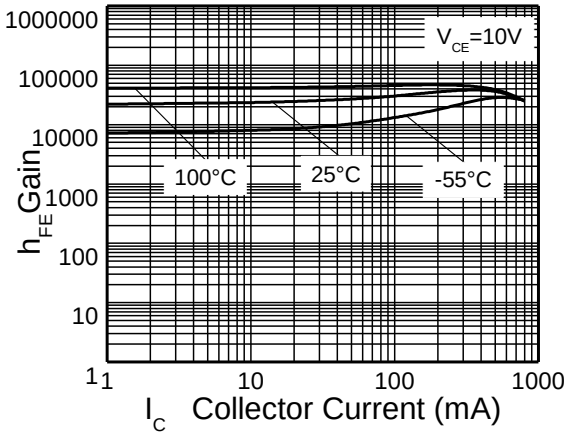


Figure 6. h_{FE} vs. I_C

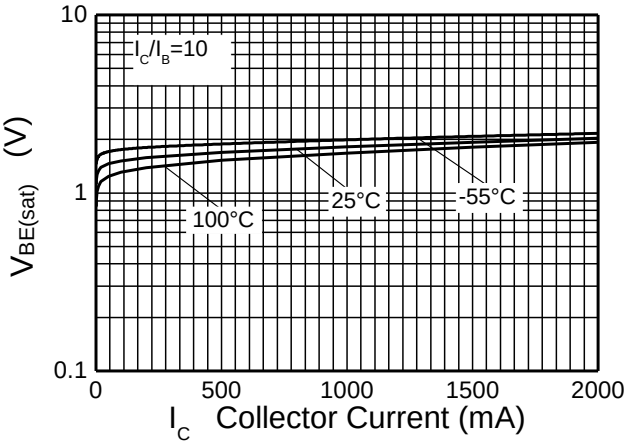


Figure 7. $V_{BE(sat)}$ vs. I_C

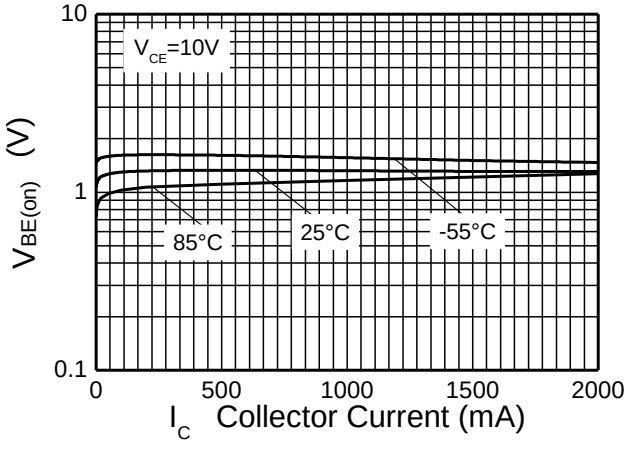
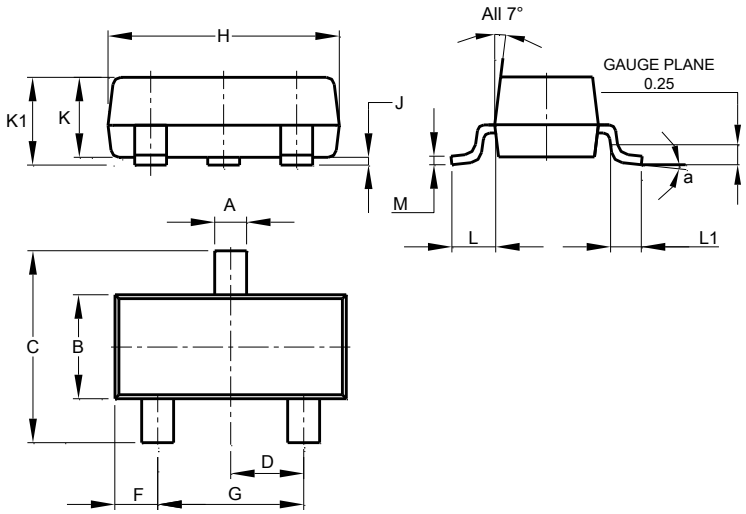


Figure 8. $V_{BE(on)}$ vs. I_C

Package Outline Dimensions

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

SOT23

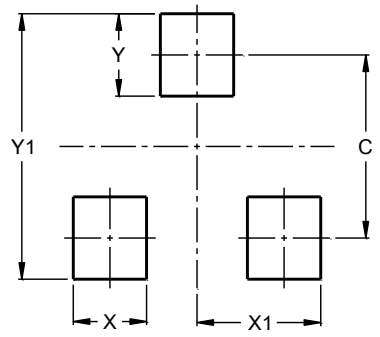


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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