LED Drivers for Low Power LEDs

BCR205W

Ultra low dropout LED controller

Data Sheet

Revision 2.1, 2011-04-27

Industrial and Multimarket

Edition 2011-04-27

Published by
Infineon Technologies AG
81726 Munich, Germany

Revision History	
Page or Item	**Subjects (major changes since previous revision)**
Revision 2.1, 2011-04-27	
7	Features updated
Revision 2.0, 2011-03-30	
All	Preliminary status removed

Table of Contents

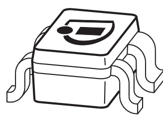
List of Figures

List of Tables

Ultra low dropout LED controller

1 Features

- Wide input voltage range 1.8 - 18 V
- Ultra low voltage overhead of only 0.2 V
- LED current 5 mA to 80 mA with external transistor
- Tailored to drive 0.1 W - 0.2 W LEDs
- Typical 3 % LED current accuracy
- Small Package: SOT343



SOT343-3D

RoHS

Applications

- Channel letters for advertising
- LED strips for decorative lighting
- Aircraft, train, ship illumination
- Refrigerator, white goods lighting
- Architectural lighting

Description

The BCR205W is an easy to use LED Controller requiring a minimum supply voltage that is only 0.2 V higher than the forward voltage of the LEDs. This enables the possibility to connect the maximum amount of LEDs in series with available supply voltage. The LED current is supplied via an external transistor and adjusted by a sense resistor.

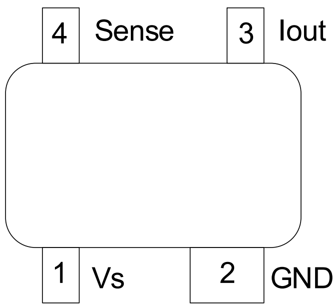


Figure 1 Pin out

Product Name	Package	Pin Configuration				Marking
BCR205W	SOT343	1 = Vs	2 = GND	3 = Iout	4 = Sense	W7s

2 Maximum Ratings

Table 1 Maximum Ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Supply voltage	V_s	–	–	18	V	–
Output current	I_{out}	–	–	0.5	mA	–
Total power dissipation, $T_s \leq 103°C$	P_{tot}	–	–	100	mW	–
Junction temperature	T_J	–	–	150	°C	–
Storage temperature range	T_{STG}	-65	–	150	°C	–

Attention: Stresses above the max. values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the integrated circuit.

3 Thermal Characteristics

Table 2 Maximum Thermal Resistance

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Junction - soldering point[1)]	R_{thJS}	–	–	470	K/W	–

1) For calculation of R_{thJA} please refer to application note AN077, “Thermal Resistance Calculation”

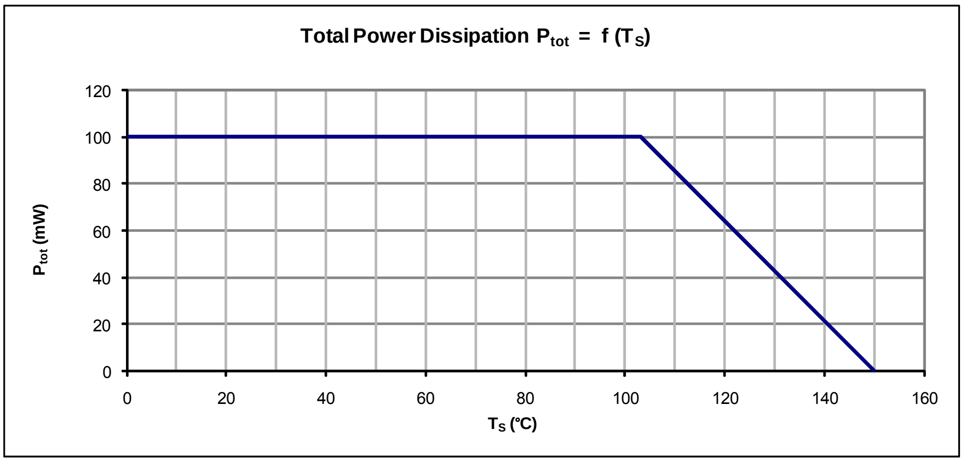


Figure 2 Total Power Dissipation

4 Electrical Characteristics

4.1 DC Characteristics

All parameters at T_A = 25 °C, unless otherwise specified.

Table 3 DC Characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Device supply current V_S = 3 V, I_{OUT} = 0 A	I_S	–	75	200	µA	–
Device supply current V_S = 18 V, I_{OUT} = 0 A	I_S	–	300	600	µA	–
Minimum supply voltage	V_{Smin}	–	1.8	–	V	–

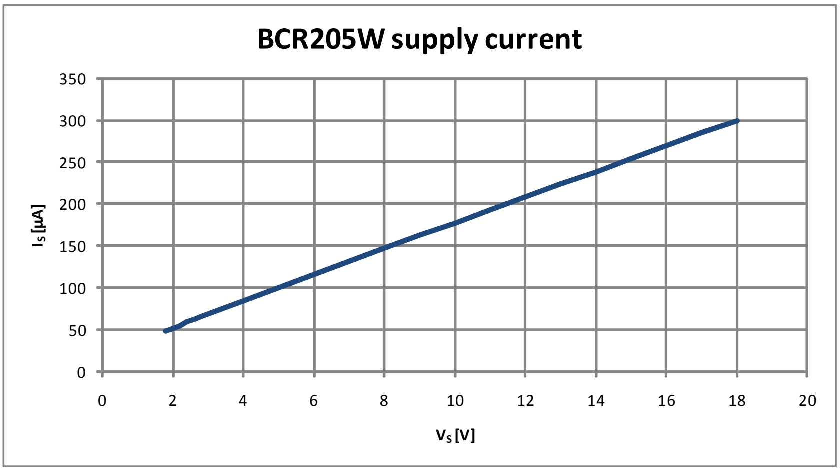


Figure 3 BCR205W supply current vs. supply voltage (T_A=25°C)

5 Basic Application Information

BCR205W is an easy to use LED Controller requiring just an external sense resistor and transistor to control the LED current. Subsequent application examples show the electrical measurement results of BCR205W controlling 1 respective 3 LEDs with an external transistor BCR108 or BC817K-40.

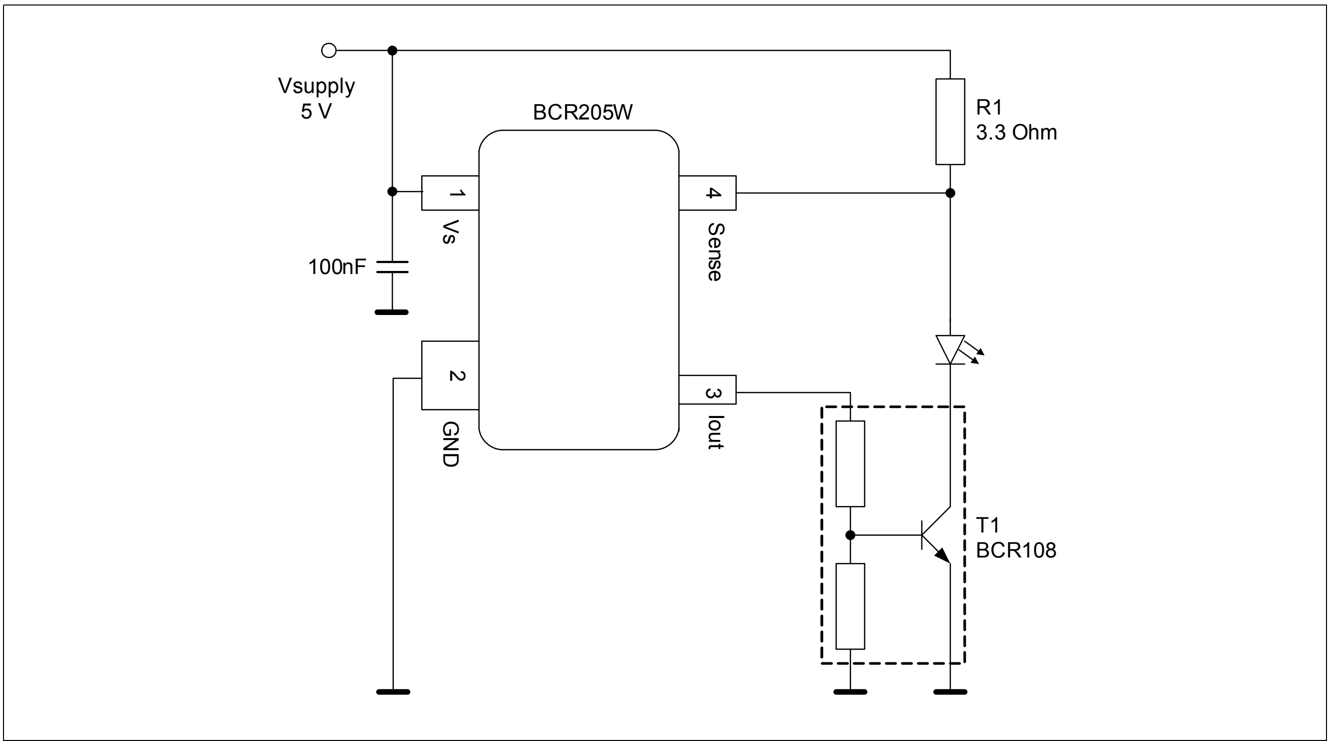


Figure 4 30 mA Application using BCR108

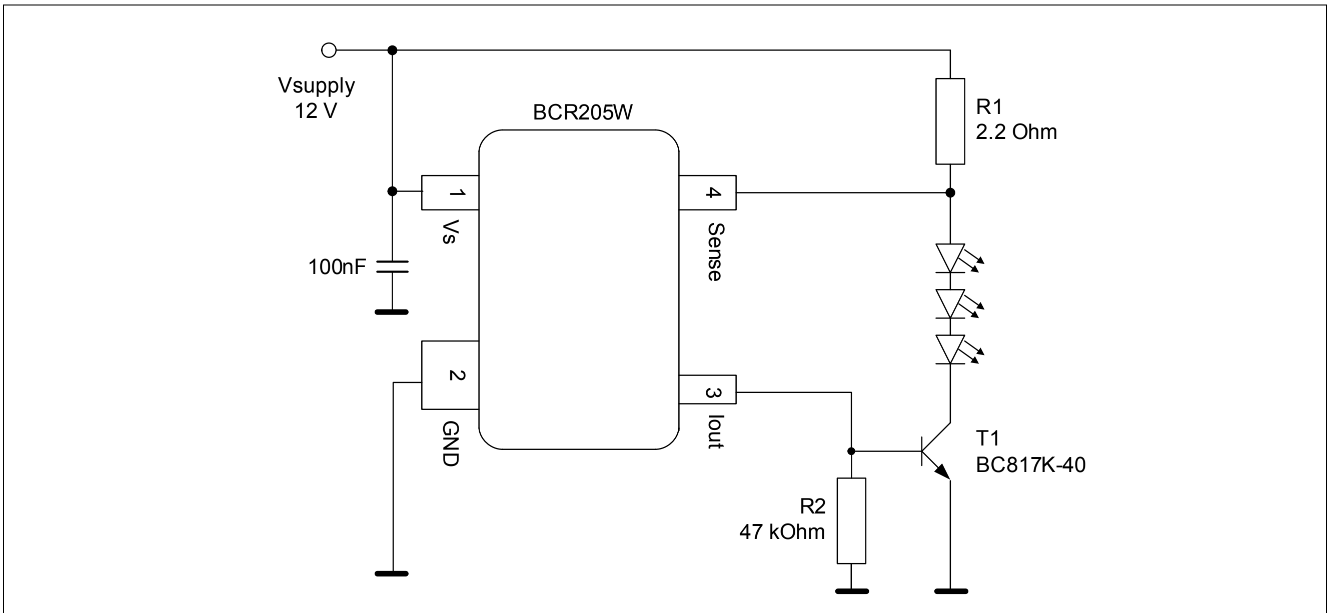


Figure 5 50 mA Application using BC817K-40

Table 4 DC Characteristics with BCR108

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
LED current R_1 = 3.3 Ω, V_S = 5 V	I_{LED}	–	32	–	mA	
Voltage drop at resistor R_1 R_1 = 3.3 Ω, V_S = 5 V	V_{drop}	–	104	–	mV	
Change of I_{LED} versus V_S R_1 = 3.3 Ω, V_S = 5 V	$\Delta I_C/\Delta V_S$	–	2.4	–	%/V	
Change of I_{LED} versus T_A R_1 = 3.3 Ω, V_S = 5 V	$\Delta I_C/\Delta T_A$	–	0.4	–	%/K	

Table 5 DC Characteristics with BC817K-40

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
LED current R_1 = 2.2 Ω, V_S = 12 V	I_{LED}	–	48	–	mA	
Voltage drop at resistor R_1 R_1 = 2.2 Ω, V_S = 12 V	V_{drop}	–	107	–	mV	
Change of I_C versus V_S R_1 = 2.2 Ω, V_S = 12 V	$\Delta I_C/\Delta V_S$	–	1.4	–	%/V	
Change of I_C versus T_A R_1 = 2.2 Ω, V_S = 12 V	$\Delta I_C/\Delta T_A$	–	0.4	–	%/K	

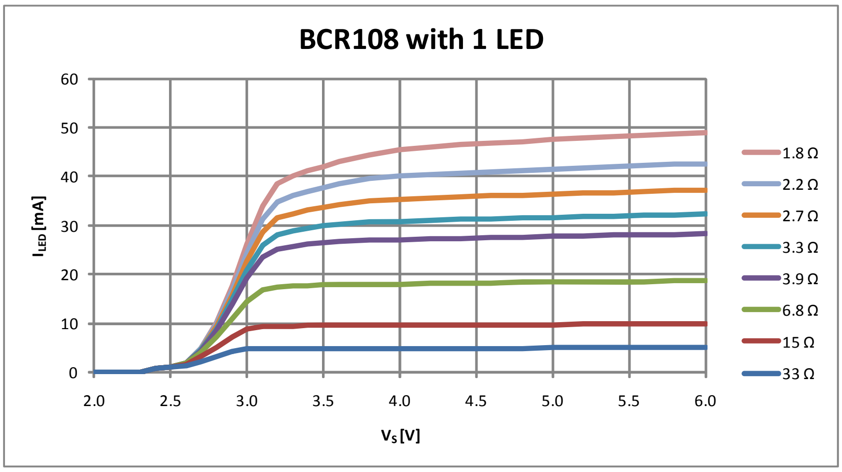


Figure 6 LED Current vs. Supply Voltage in 1 LED Application with BCR108

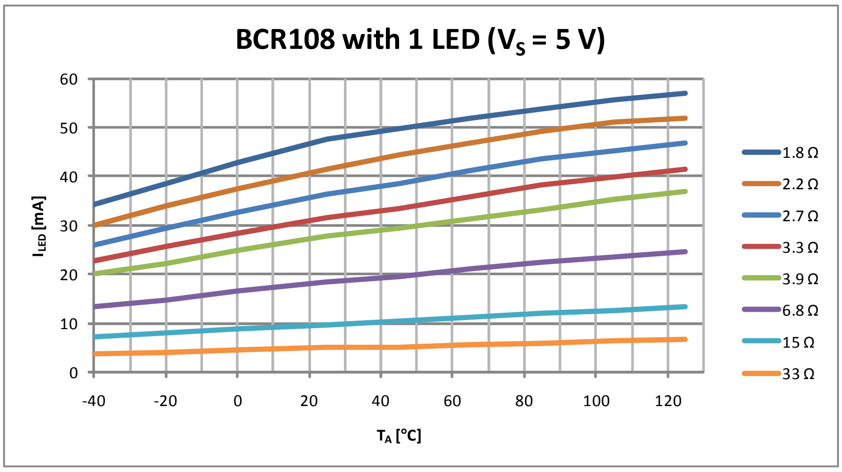


Figure 7 LED Current vs. Ambient Temperature in 1 LED Application with BCR108

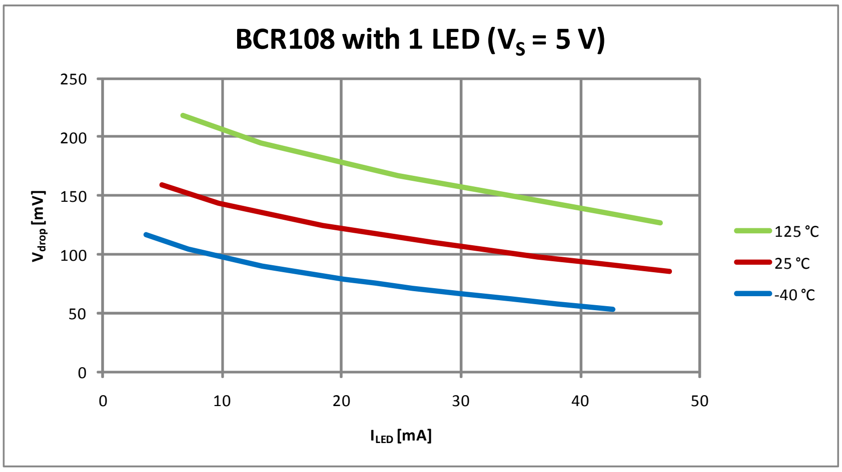


Figure 8 Drop Voltage vs. LED current in 1 LED Application with BCR108

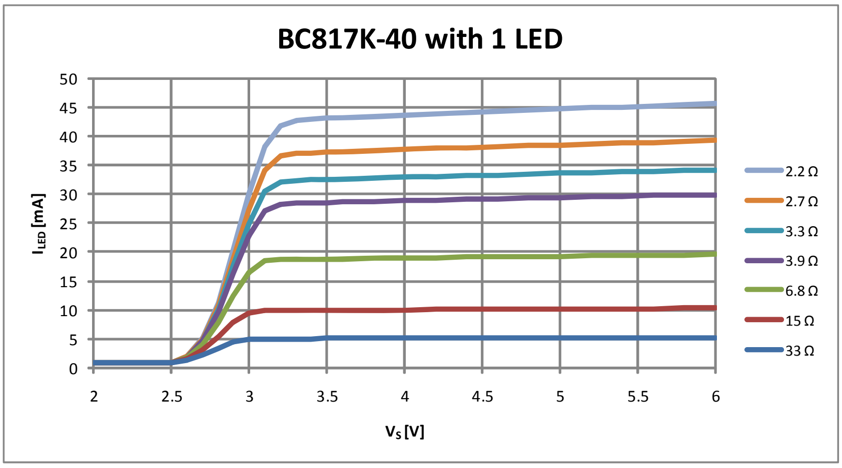


Figure 9 LED Current vs. Supply Voltage in 1 LED Application with BC817K-40

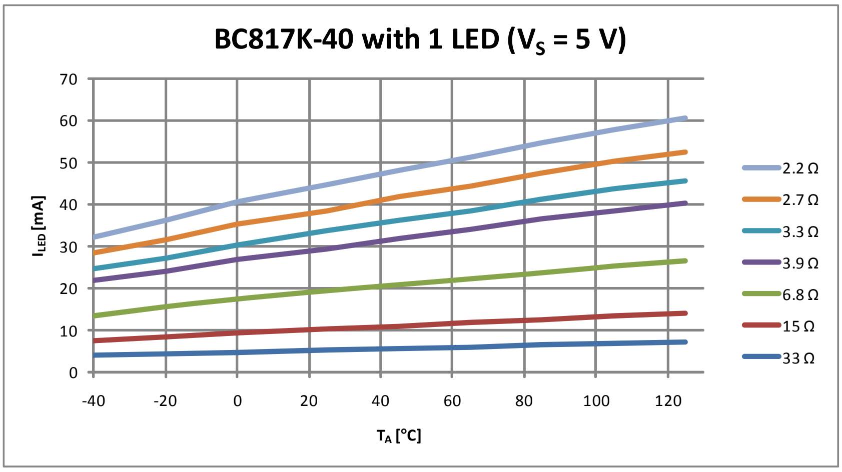


Figure 10 LED Current vs. Ambient Temperature in 1 LED Application with BC817K-40

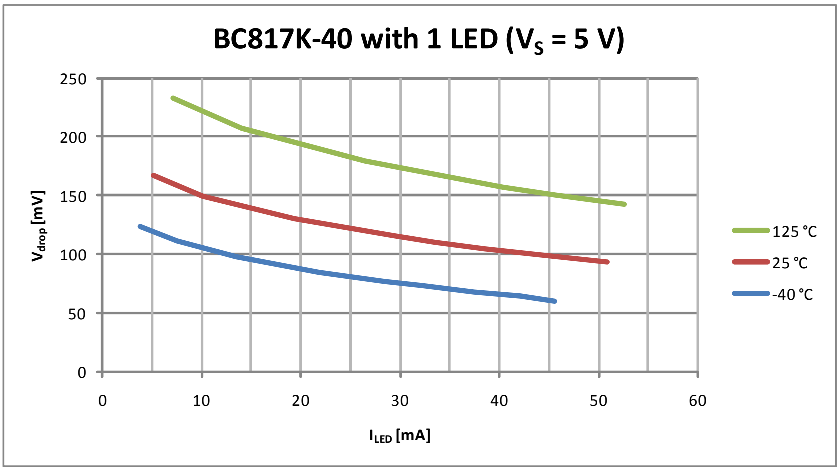


Figure 11 Drop Voltage vs. LED current in 1 LED Application with BC817K-40

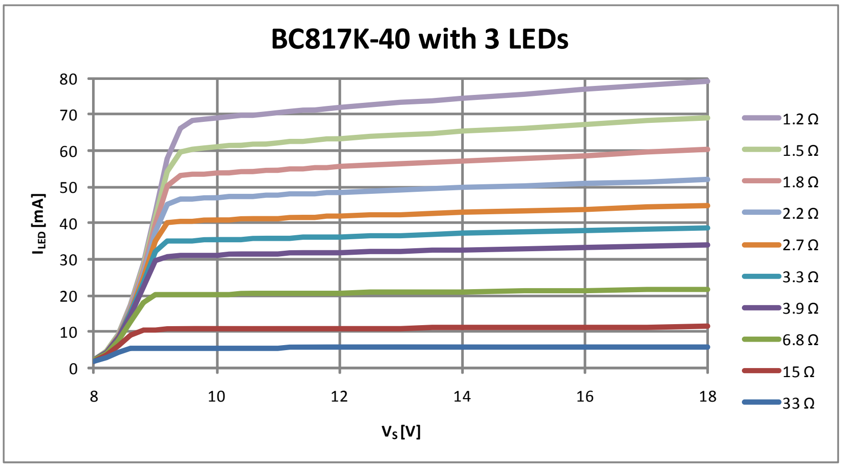


Figure 12 LED Current vs. Supply Voltage in 3 LED Application with BC817K-40

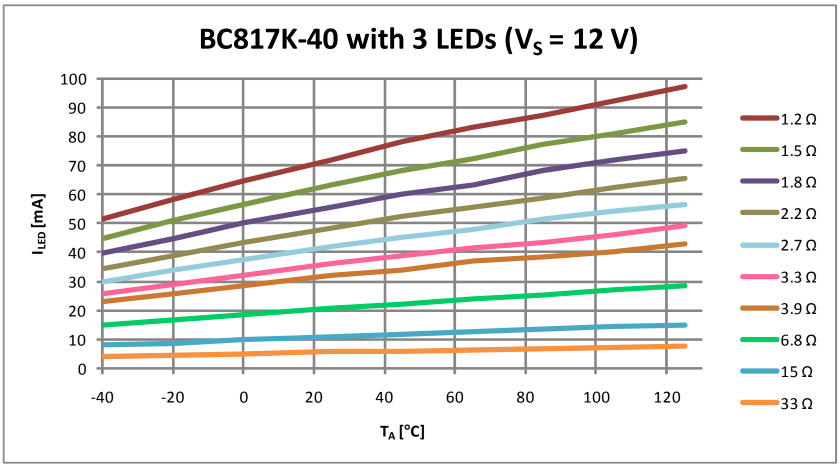


Figure 13 LED Current vs. Ambient Temperature in 3 LED Application with BC817K-40

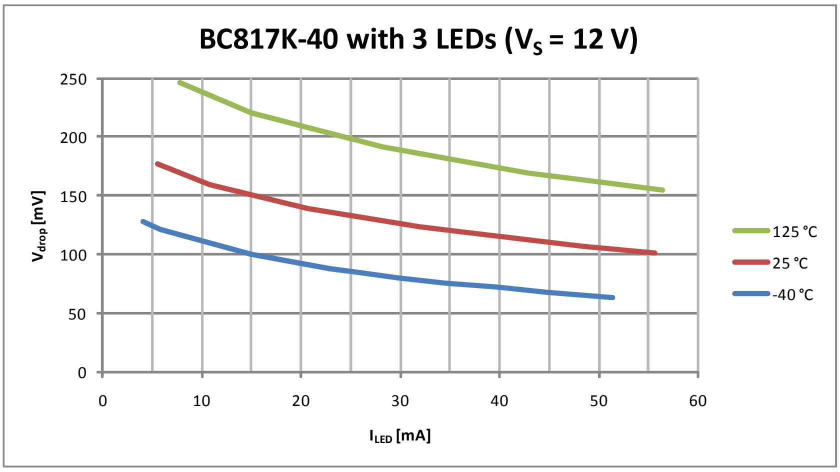


Figure 14 Drop Voltage vs. LED current in 3 LED Application with BC817K-40

6 Package Information

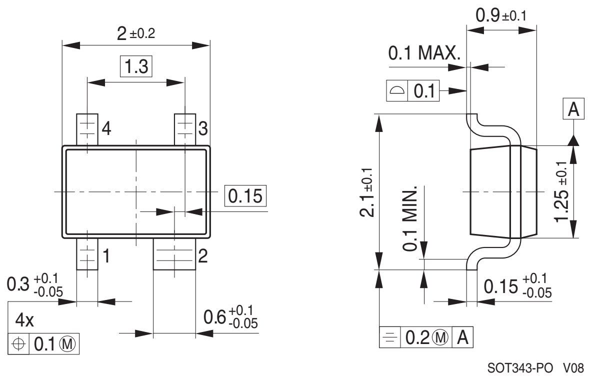


Figure 15 Package outline

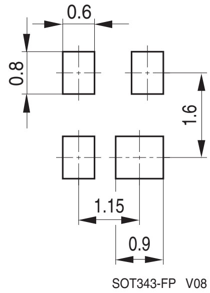


Figure 16 Recommended PCB Footprint for Reflow Soldering

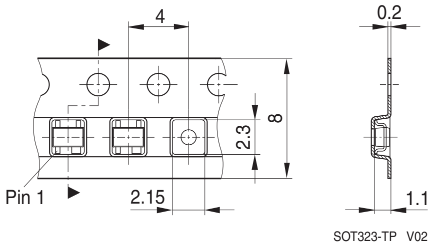


Figure 17 Tape Loading

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