



# PDTC115EU-Q

50 V, 20 mA NPN resistor-equipped transistor;

R1 = 100 k $\Omega$ , R2 = 100 k $\Omega$

10 October 2024

Product data sheet

## 1. General description

NPN Resistor-Equipped Transistor (RET) in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

PNP complement: PDTA115EU-Q

## 2. Features and benefits

- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- General purpose switching and amplification
- Inverter and interface circuits
- Circuit driver

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>CEO</sub>	collector-emitter voltage	open base	-	-	50	V
I <sub>O</sub>	output current		-	-	20	mA
R1	bias resistor 1 (input)	T <sub>amb</sub> = 25 °C	70	100	130	k $\Omega$
R2/R1	bias resistor ratio		0.8	1	1.2	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	I	input (base)	<p>SC-70 (SOT323)</p>	<p>sym007</p>
2	GND	ground (emitter)		
3	O	output (collector)		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">PDTC115EU-Q</a>	SC-70	plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body	<a href="#">SOT323</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PDTC115EU-Q	%15

[1] % = placeholder for manufacturing site code

## 8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CBO}$	collector-base voltage	open emitter	-	50	V
$V_{CEO}$	collector-emitter voltage	open base	-	50	V
$V_{EBO}$	emitter-base voltage	open collector	-	10	V
$V_I$	input voltage		-10	40	V
$I_O$	output current		-	20	mA
$I_{CM}$	peak collector current	$t_p \leq 1$ ms; single pulse	-	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1]	200	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	150	°C
$T_{stg}$	storage temperature		-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	625	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 50\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	100	nA
$I_{CEO}$	collector-emitter cut-off current	$V_{CE} = 30\text{ V}; I_B = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	100	nA
		$V_{CE} = 30\text{ V}; I_B = 0\text{ A}; T_j = 150\text{ °C}$	-	-	5	μA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ °C}$	-	-	50	μA
$h_{FE}$	DC current gain	$V_{CE} = 5\text{ V}; I_C = 5\text{ mA}; T_{amb} = 25\text{ °C}$	80	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 5\text{ mA}; I_B = 0.25\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	150	mV
$V_{I(off)}$	off-state input voltage	$V_{CE} = 5\text{ V}; I_C = 100\text{ μA}; T_{amb} = 25\text{ °C}$	-	1.1	0.5	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = 0.3\text{ V}; I_C = 1\text{ mA}; T_{amb} = 25\text{ °C}$	3	1.5	-	V
R1	bias resistor 1 (input)	$T_{amb} = 25\text{ °C}$	70	100	130	kΩ
R2/R1	bias resistor ratio		0.8	1	1.2	
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$	-	-	2.5	pF

## 11. Test information

### Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

## 12. Package outline

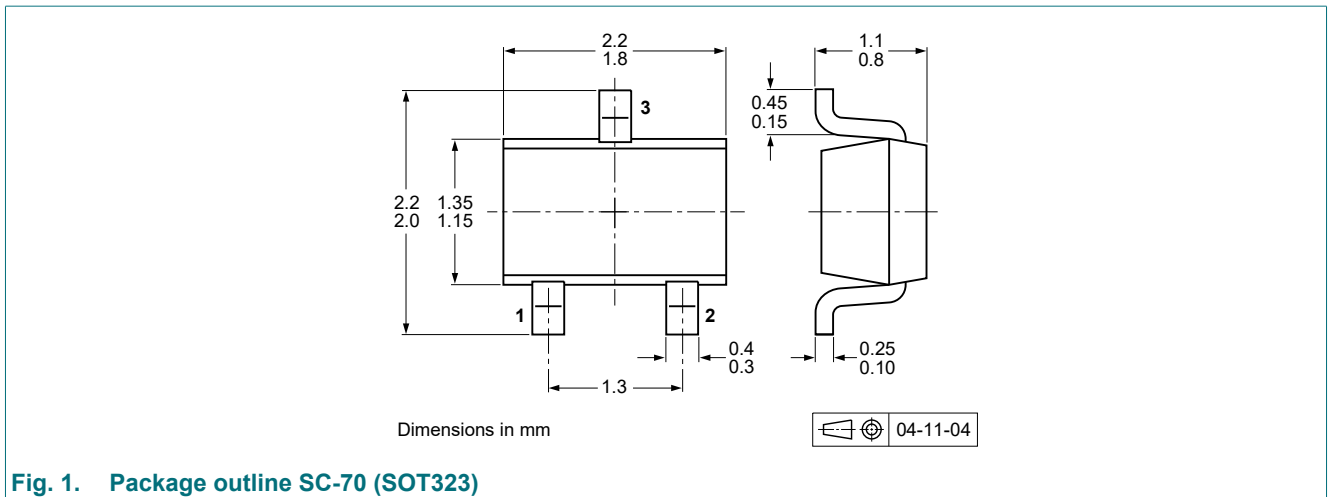


Fig. 1. Package outline SC-70 (SOT323)

### 13. Soldering

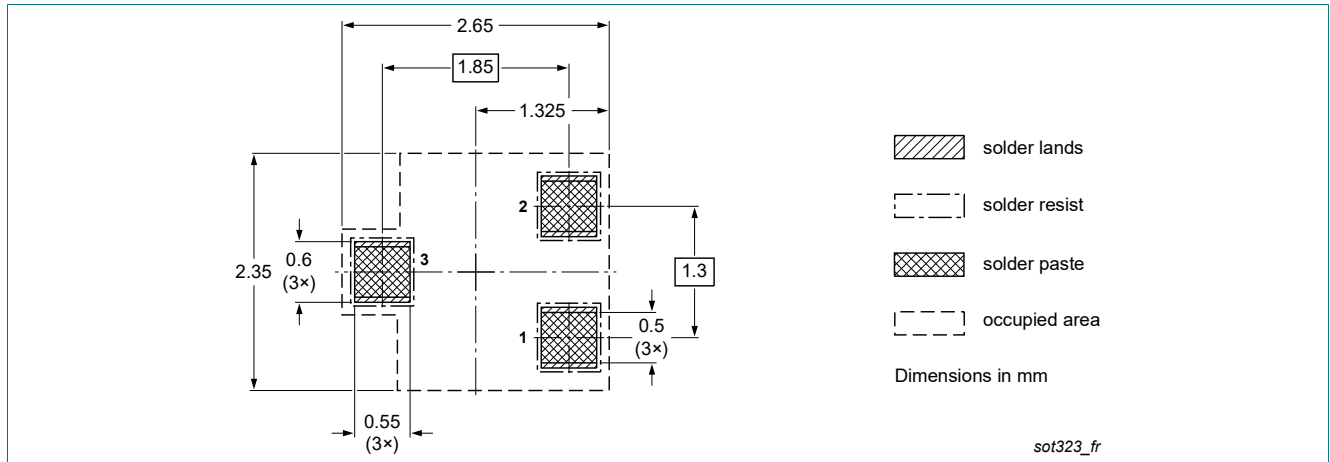


Fig. 2. Reflow soldering footprint for SC-70 (SOT323)

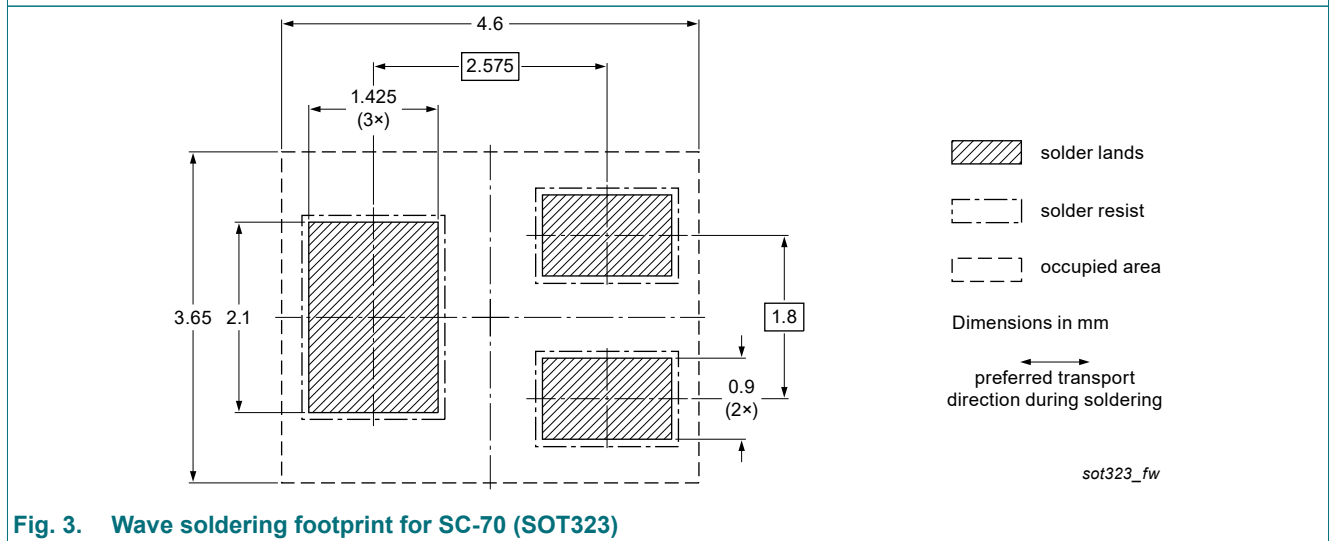


Fig. 3. Wave soldering footprint for SC-70 (SOT323)

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PDTC115EU-Q v.1	20241010	Product data sheet	-	-

## 15. Legal information

### Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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