



PIMN31

50 V, 500 mA NPN/NPN double resistor-equipped transistor;
R1 = 1 k Ω , R2 = 10 k Ω

17 February 2026

Product data sheet

1. General description

50 V, 500 mA NPN/NPN double Resistor-Equipped Transistor (RET) in a small SOT457 (SC-74) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- 500 mA output current capability
- Built-in bias resistors
- Simplifies circuit design
- Reduces component count
- Reduces pick and place costs
- AEC-Q101 qualified

3. Applications

- Digital application in automotive and industrial segments
- Switching loads

4. Quick reference data

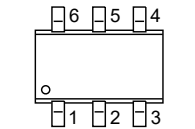
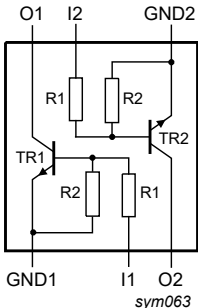
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
V _{CEO}	collector-emitter voltage	open base	-	-	50	V
I _O	output current		-	-	500	mA
R1	bias resistor 1 (input)	T _{amb} = 25 °C	0.7	1	1.3	k Ω
R2/R1	bias resistor ratio		9	10	11	

50 V, 500 mA NPN/NPN double resistor-equipped transistor; R1 = 1 kΩ, R2 = 10 kΩ

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	GND1	GND (emitter) TR1	 TSOP6 (SOT457)	
2	I1	input (base) TR1		
3	O2	output (collector) TR2		
4	GND2	GND (emitter) TR2		
5	I2	input (base) TR2		
6	O1	output (collector) TR1		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PIMN31	TSOP6	plastic, surface-mounted package (SC-74; TSOP6); 6 leads	SOT457

7. Marking

Table 4. Marking codes

Type number	Marking code
PIMN31	4E

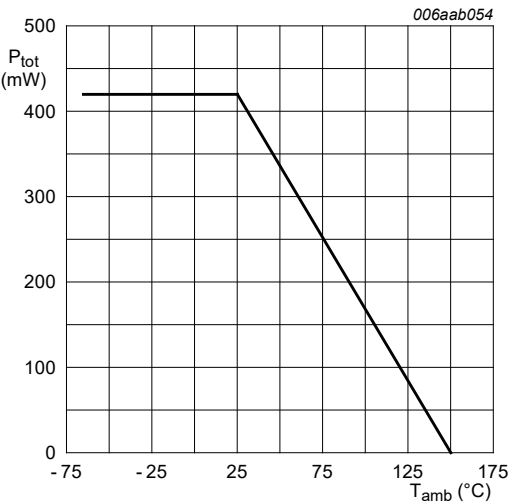
8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per transistor						
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		-	5	V
V _I	input voltage			-5	12	V
I _O	output current			-	500	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	290	mW
Per device						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	420	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.



FR4 PCB, single-sided, copper, tin-plated and standard footprint

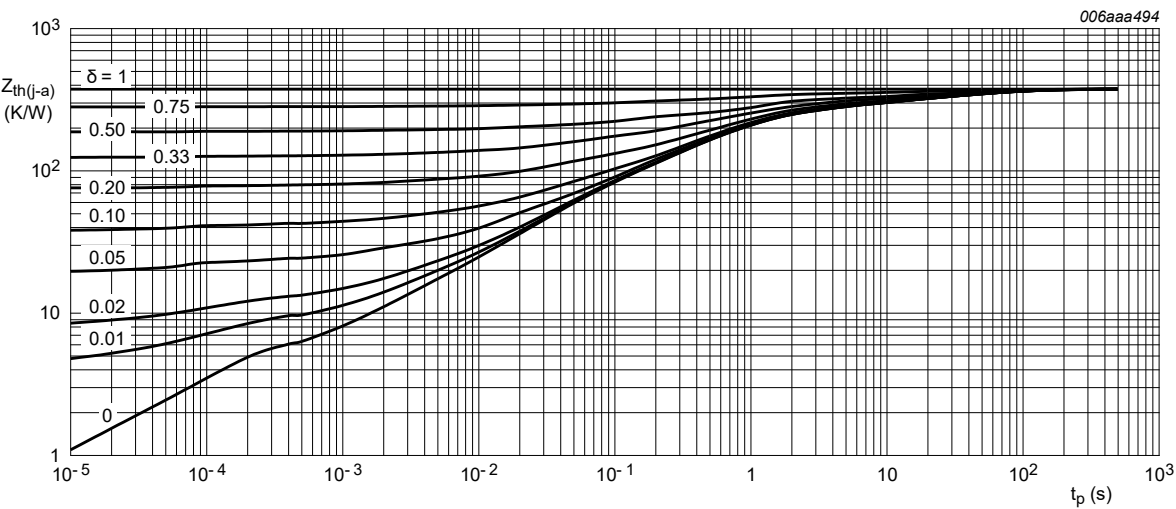
Fig. 1. Per device: Power derating curve

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	-	431	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point			-	-	105	K/W
Per device							
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	-	298	K/W

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



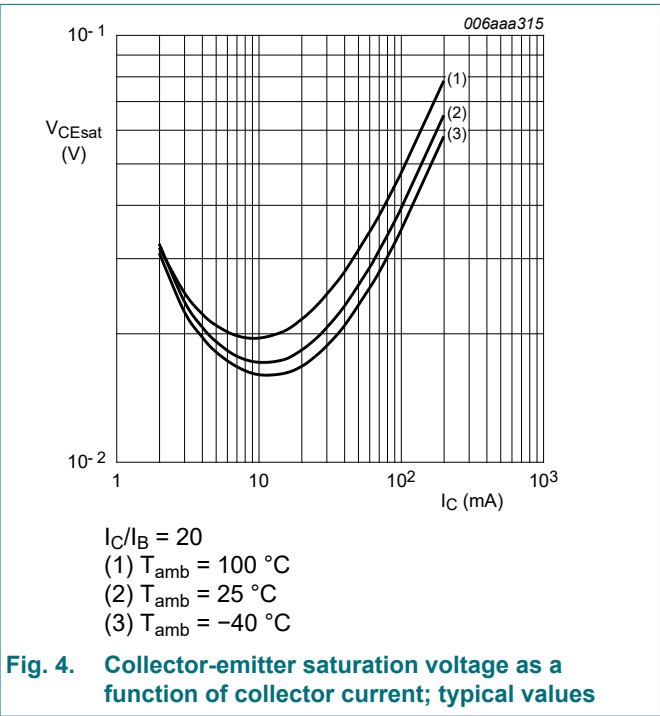
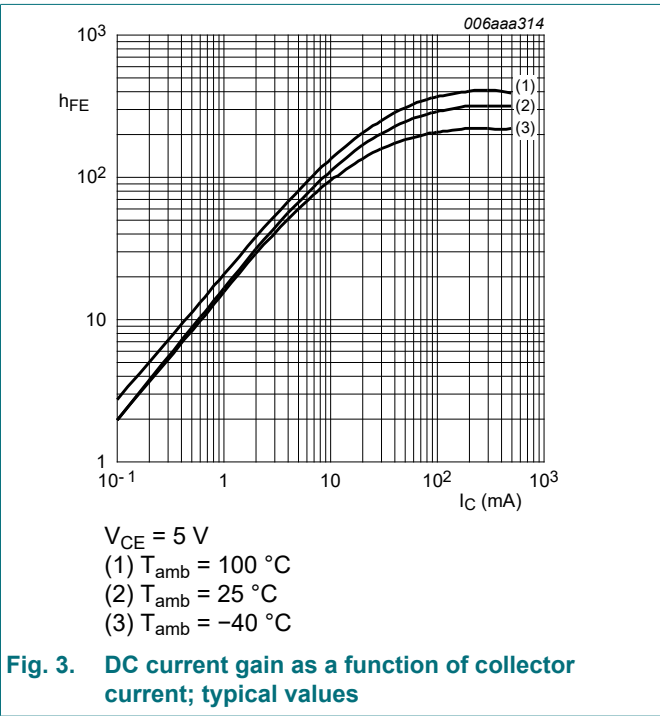
FR4 PCB, standard footprint

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
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	$V_{CE} = 50\text{ V}$; $I_B = 0\text{ A}$; $T_{amb} = 25\text{ °C}$	-	-	0.5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}$; $I_C = 0\text{ A}$; $T_{amb} = 25\text{ °C}$	-	-	0.72	mA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}$; $I_C = 50\text{ mA}$; $T_{amb} = 25\text{ °C}$	70	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 50\text{ mA}$; $I_B = 2.5\text{ mA}$; $T_{amb} = 25\text{ °C}$	-	-	0.3	V
$V_{I(off)}$	off-state input voltage	$V_{CE} = 5\text{ V}$; $I_C = 100\text{ μA}$; $T_{amb} = 25\text{ °C}$	0.3	0.6	1	V
$V_{I(on)}$	on-state input voltage	$V_{CE} = 0.3\text{ V}$; $I_C = 20\text{ mA}$; $T_{amb} = 25\text{ °C}$	0.4	0.8	1.4	V
R1	bias resistor 1 (input)	$T_{amb} = 25\text{ °C}$	0.7	1	1.3	kΩ
R2/R1	bias resistor ratio		9	10	11	
C_c	collector capacitance	$V_{CB} = 10\text{ V}$; $I_E = 0\text{ A}$; $i_e = 0\text{ A}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ °C}$	-	7	-	pF



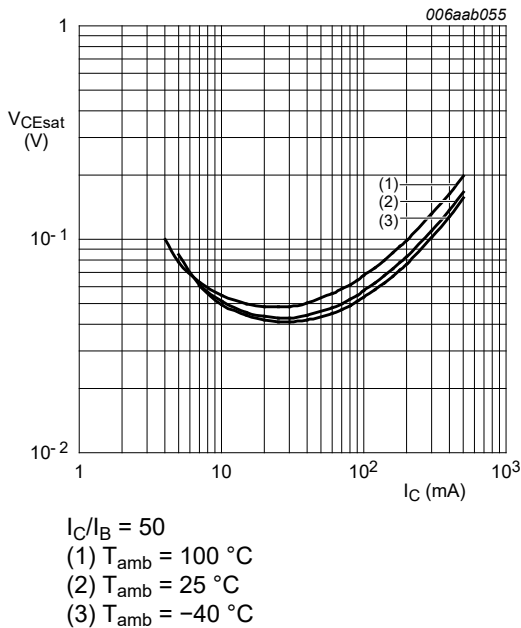


Fig. 5. Collector-emitter saturation voltage as a function of collector current; typical values

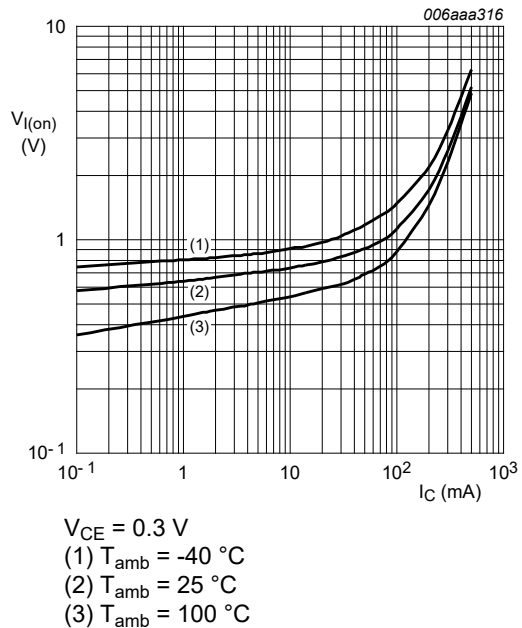


Fig. 6. On-state input voltage as a function of collector current; typical values

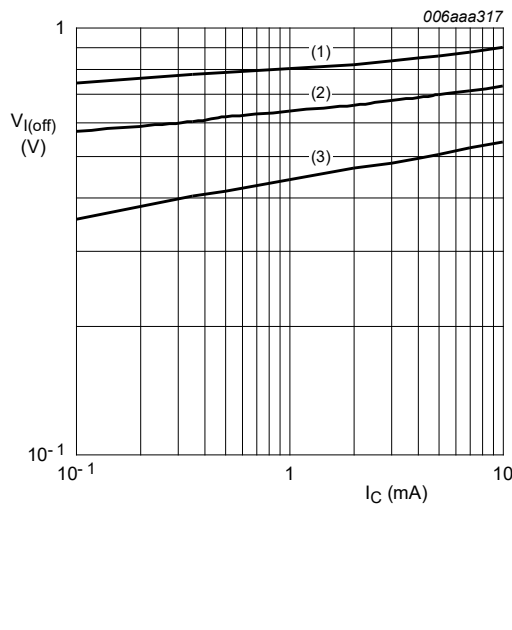


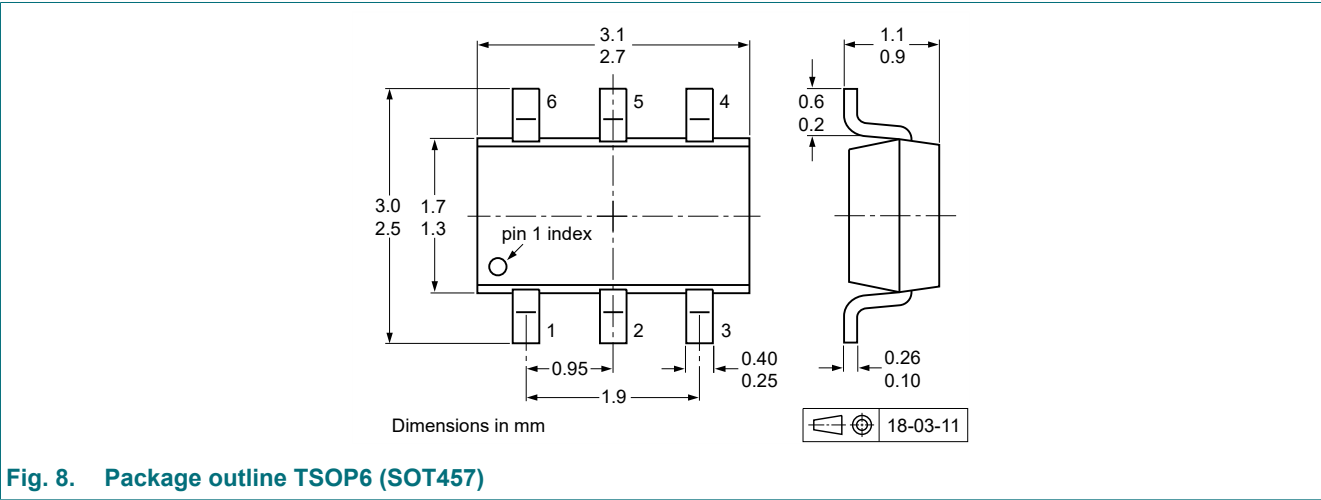
Fig. 7. Off-state input voltage as a function of collector current; typical values

11. Test information

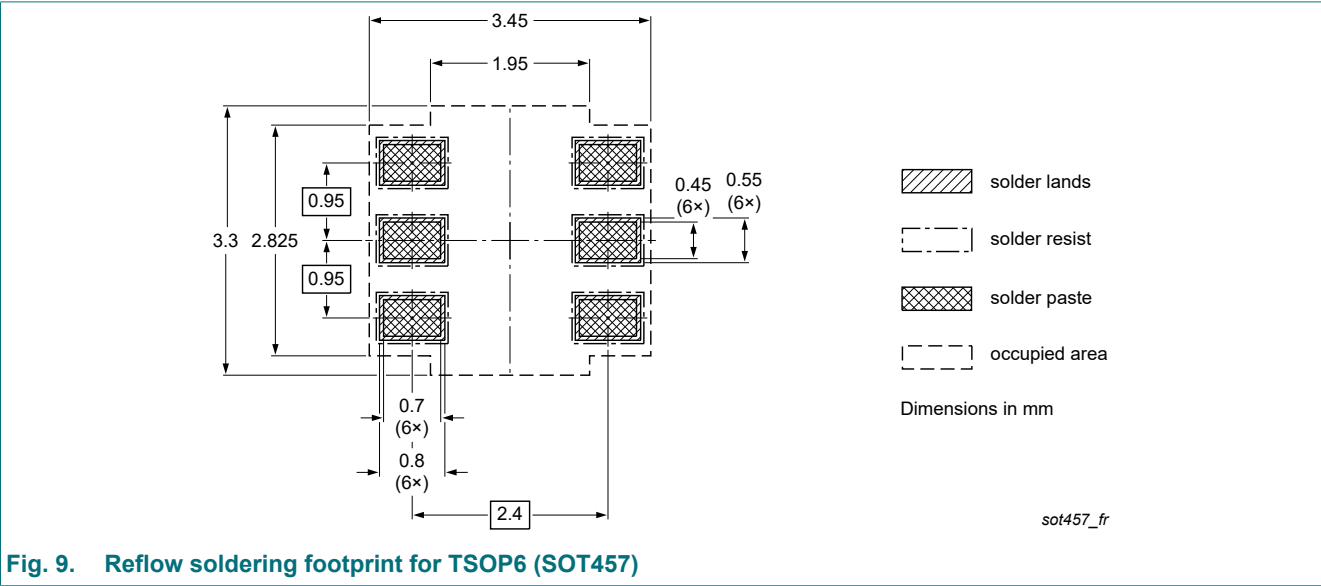
Quality information

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



13. Soldering



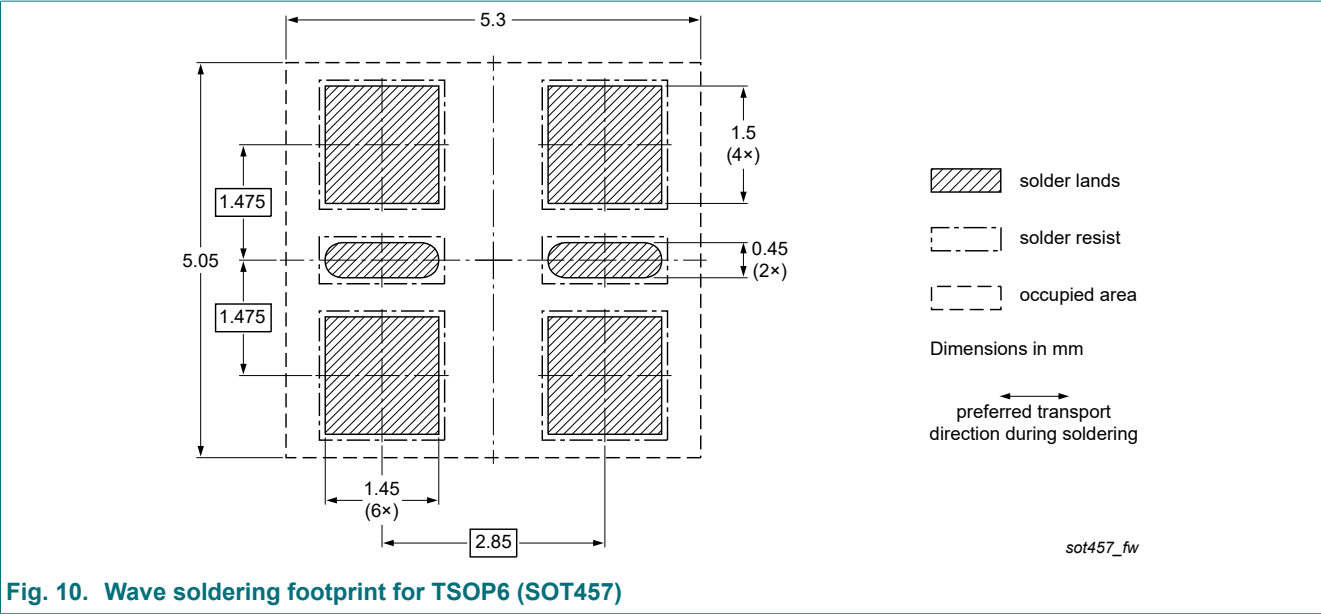


Fig. 10. Wave soldering footprint for TSOP6 (SOT457)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PIMN31 v.2	20260217	Product data sheet	-	PIMN31 v.1
Modifications:	- The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. - Legal texts have been adapted to the new company name where appropriate. - Section "Packing information" removed.			
PIMN31 v.1	20070619	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.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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