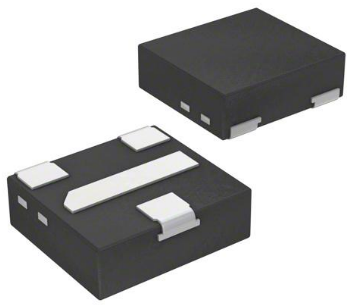
PMBT2907AQAZ Datasheet



https://www.DiGi-Electronics.com

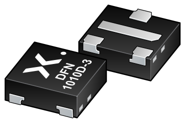
DiGi Electronics Part Number	PMBT2907AQAZ-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	PMBT2907AQAZ
Description	PMBT2907AQA/SOT1215/DFN1010D-3
Detailed Description	Bipolar (BJT) Transistor PNP 60 V 600 mA 210MHz 325 mW Surface Mount DFN1010D-3

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
PMBT2907AQAZ	Nexperia USA Inc.
Series:	Product Status:
-	Active
Transistor Type:	Current - Collector (Ic) (Max):
PNP	600 mA
Voltage - Collector Emitter Breakdown (Max):	Vce Saturation (Max) @ Ib, Ic:
60 V	1.6V @ 50mA, 500mA
Current - Collector Cutoff (Max):	DC Current Gain (hFE) (Min) @ Ic, Vce:
10nA (ICBO)	100 @ 150mA, 10V
Power - Max:	Frequency - Transition:
325 mW	210MHz
Operating Temperature:	Grade:
150°C (TJ)	Automotive
Qualification:	Mounting Type:
AEC-Q101	Surface Mount
Package / Case:	Supplier Device Package:
3-XDFN Exposed Pad	DFN1010D-3
Base Product Number:	
PMBT2907	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.21.0075	



PMBT2907AQA

60V, 600 mA PNP switching transistor

21 September 2018 — Product data sheet

1. General description

PNP switching transistor in an ultra small DFN1010D-3 (SOT1215) leadless Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

NPN complement: PMBT2222AQA

2. Features and benefits

- High current (max. 600 mA)
- Low voltage (max. 60V)
- Leadless ultra small SMD plastic package
- Low package height of 0.37 mm
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- AEC-Q101 qualified

3. Applications

- Switching and linear applications
- Mobile applications

4. Quick reference data

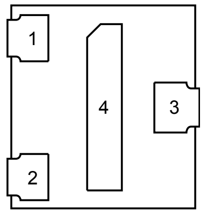
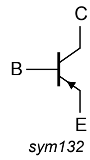
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	-60	V
I_C	collector current			-	-	-600	mA
I_{CM}	peak collector current	single pulse; $t_p \leq$ 1 ms		-	-	-800	mA
h_{FE}	DC current gain	V_{CE} = -10 V; I_C = -150 mA	[1]	100	-	300	
		V_{CE} = -10 V; I_C = -500 mA	[1]	50	-	-	

[1] Pulsed test: $t_p \leq 300$ µs; $\delta \leq 0.02$

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 Transparent top view DFN1010D-3 (SOT1215)	
2	E	emitter		
3	C	collector		
4	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBT2907AQA	DFN1010D-3	plastic, leadless thermal enhanced ultra thin small outline package; 3 terminals; 0.75 mm pitch; 1.1 mm x 1 mm x 0.37 mm body	SOT1215

7. Marking

Table 4. Marking codes

Type number	Marking code
PMBT2907AQA	X 101

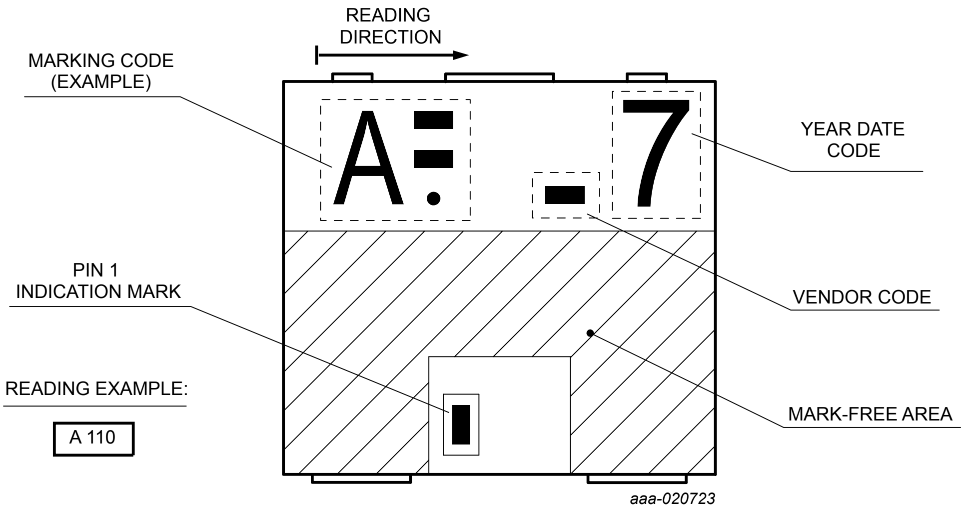


Fig. 1. DFN1010D-3 (SOT1215) binary marking code description

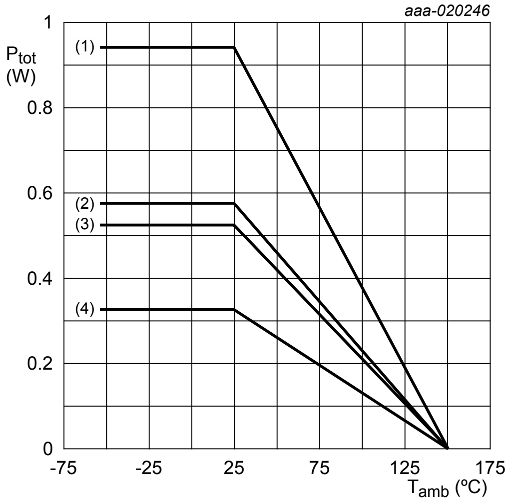
8. Limiting values

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		-	-60	V
V_{CEO}	collector-emitter voltage	open base		-	-60	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I_C	collector current			-	-600	mA
I_{CM}	peak collector current	single pulse; $t_p \leq$ 1 ms		-	-800	mA
I_{BM}	peak base current			-	-200	mA
P_{tot}	total power dissipation	$T_{amb} \leq$ 25 °C	[1]	-	325	mW
			[2]	-	575	mW
			[3]	-	525	mW
			[4]	-	940	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	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.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated; mounting pad for collector 1 cm^2.
[3] Device mounted on an FR4 Printed-Circuit Board (PCB), 4-layer copper, tin-plated and standard footprint.
[4] Device mounted on an FR4 Printed-Circuit Board (PCB), 4-layer copper, tin-plated; mounting pad for collector 1 cm^2.



(1) FR4 PCB, 4-layer copper, 1 cm^2
(2) FR4 PCB,single sided copper, 1 cm^2
(3) FR4 PCB, 4-layer copper, standard footprint
(4) FR4 PCB, single sided copper, standard footprint

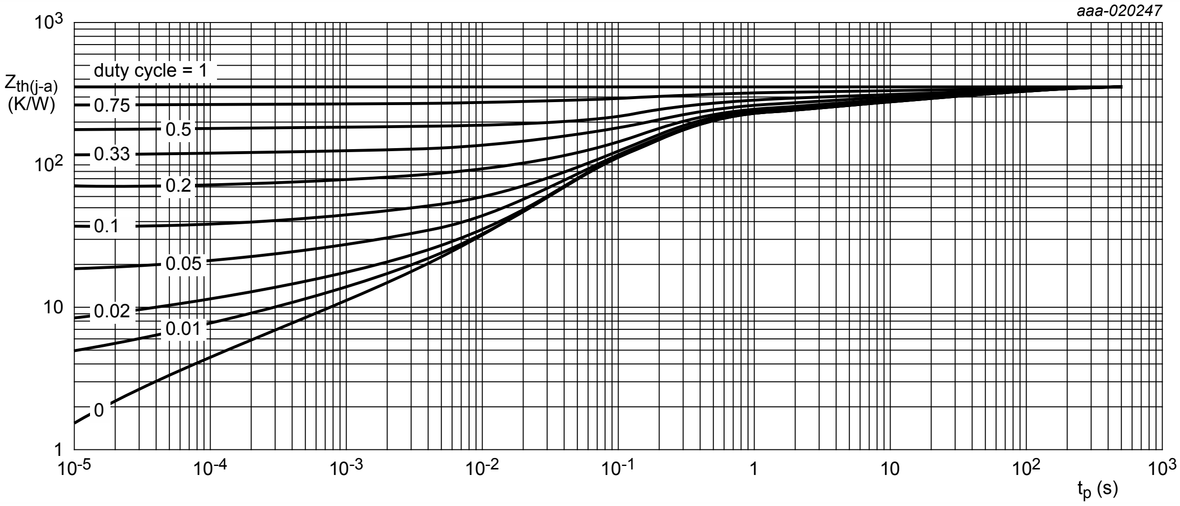
Fig. 2. Power derating curve DFN1010D-3 (SOT1215)

9. Thermal characteristics

Table 6. Thermal characteristics

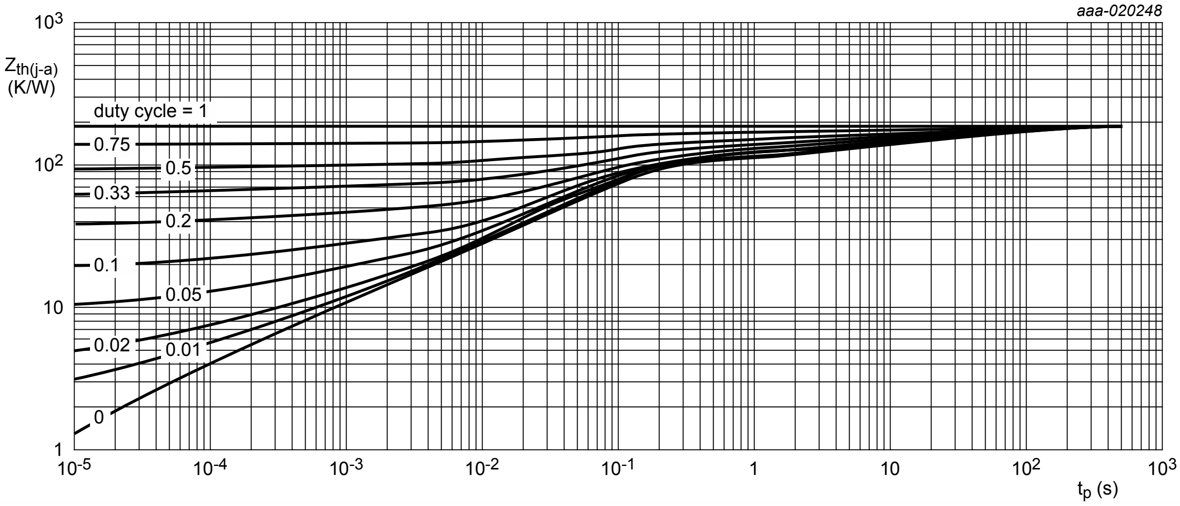
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	385	K/W
			[2]	-	-	218	K/W
			[3]	-	-	239	K/W
			[4]	-	-	133	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated; mounting pad for collector 1 cm^2.
[3] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
[4] Device mounted on an FR4 Printed-Circuit Board (PCB), 4-layer copper, tin-plated; mounting pad for collector 1 cm^2.



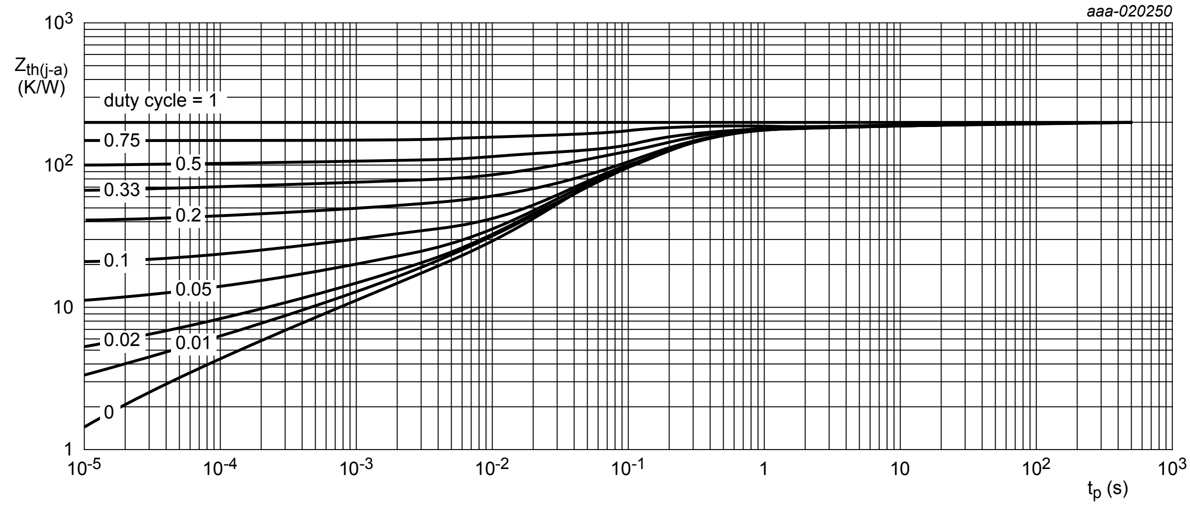
FR4 PCB, single-sided copper, tin-plated and standard footprint

Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



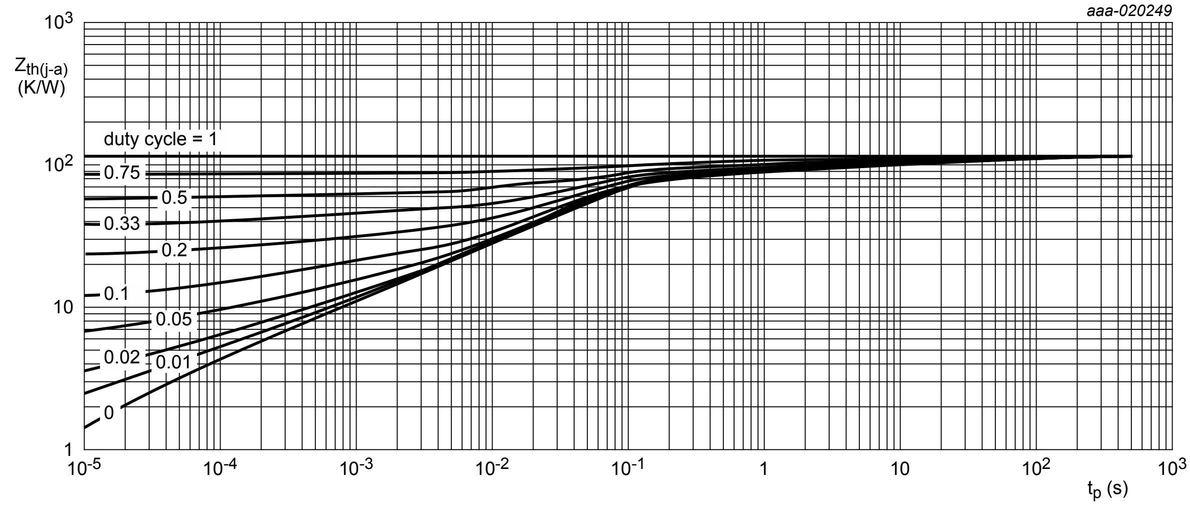
FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 1 cm^2

Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, 4-layer copper, tin-plated and standard footprint

Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, 4-layer copper, tin-plated; mounting pad for collector 1 cm^2

Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

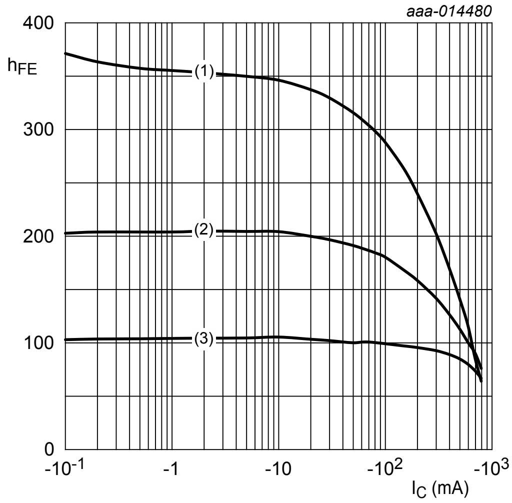
10. Characteristics

Table 7. Characteristics

T_{amb} = 25 °C unless otherwise specified

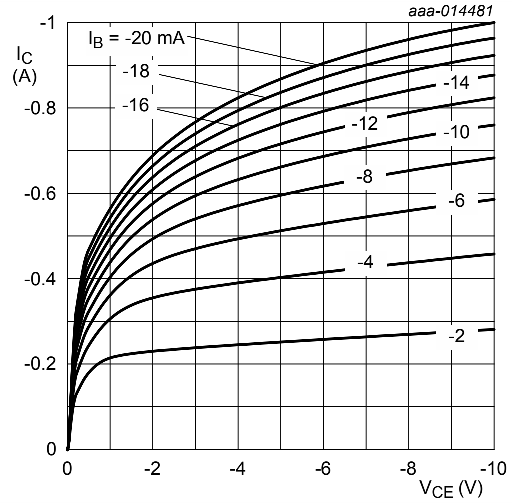
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	I_C = -100 µA; I_E = 0 A		-60	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	I_C = -2 mA; I_B = 0 A		-60	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	I_C = 0 A; I_E = -100 µA		-5	-	-	V
I_{CBO}	collector-base cut-off current	V_{CB} = -50 V; I_E = 0 A		-	-	-10	nA
		V_{CB} = -50 V; I_E = 0 A; T_j = 125 °C		-	-	-10	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = -5 V; I_C = 0 A		-	-	-50	nA
h_{FE}	DC current gain	V_{CE} = -10 V; I_C = -100 µA		75	-	-	
		V_{CE} = -10 V; I_C = -1 mA		100	-	-	
		V_{CE} = -10 V; I_C = -10 mA		100	-	-	
		V_{CE} = -10 V; I_C = -150 mA	[1]	100	-	300	
		V_{CE} = -10 V; I_C = -500 mA	[1]	50	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = -150 mA; I_B = -15 mA	[1]	-	-	-400	mV
		I_C = -500 mA; I_B = -50 mA	[1]	-	-	-1.6	V
V_{BEsat}	base-emitter saturation voltage	I_C = -150 mA; I_B = -15 mA	[1]	-	-	-1.3	V
		I_C = -500 mA; I_B = -50 mA	[1]	-	-	-2.6	V
t_d	delay time	I_C = -150 mA; I_{Bon} = -15 mA; I_{Boff} = 15 mA		-	-	15	ns
t_r	rise time			-	-	30	ns
t_{on}	turn-on time			-	-	45	ns
t_s	storage time			-	-	300	ns
t_f	fall time			-	-	65	ns
t_{off}	turn-off time			-	-	365	ns
C_c	collector capacitance	V_{CB} = -10 V; I_E = 0 A; i_e = 0 A; f = 1 MHz		-	-	8	pF
C_e	emitter capacitance	V_{EB} = -2 V; I_C = 0 A; i_c = 0 A; f = 1 MHz		-	-	30	pF
f_T	transition frequency	V_{CE} = -20 V; I_C = -50 mA; f = 100 MHz	[1]	-	210	-	MHz

[1] Pulsed test: $t_p \leq 300$ µs; $\delta \leq 0.02$



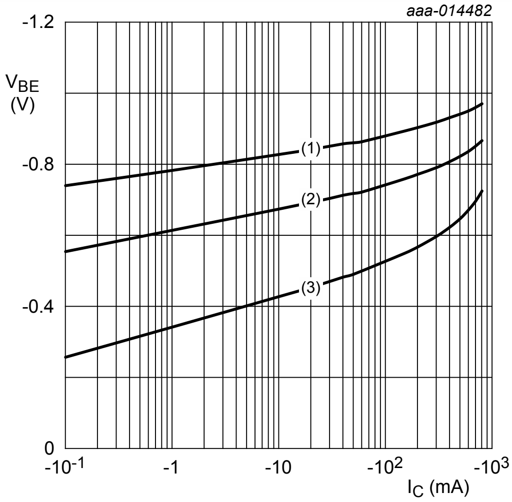
V_{CE} = -10 V
(1) T_{amb} = 150 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = −55 °C

Fig. 7. DC current gain as a function of collector current; typical values



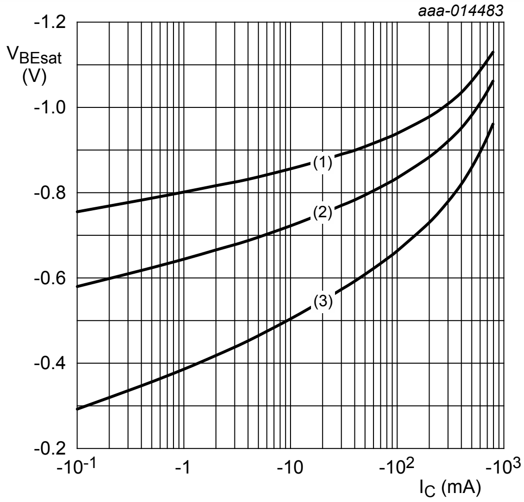
T_{amb} = 25 °C

Fig. 8. Collector current as a function of collector-emitter voltage; typical values



V_{CE} = -10 V
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Fig. 9. Base-emitter voltage as a function of collector current; typical values



I_C/I_B = 10
(1) T_{amb} = −55 °C
(2) T_{amb} = 25 °C
(3) T_{amb} = 150 °C

Fig. 10. Base-emitter saturation voltage as a function of collector current; typical values

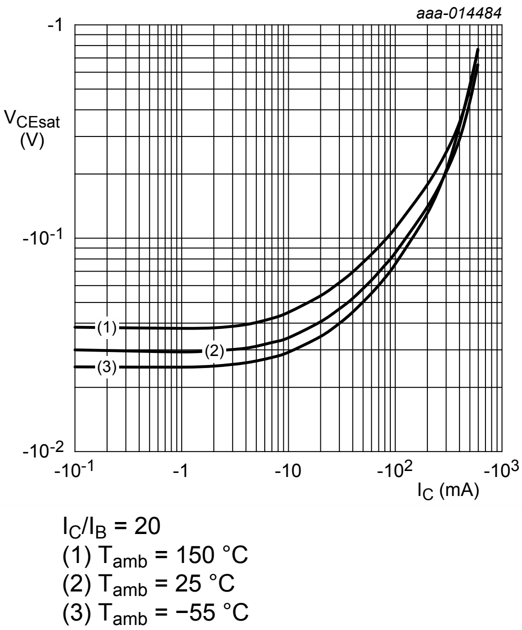


Fig. 11. Collector-emitter saturation voltage as a function of collector current; typical values

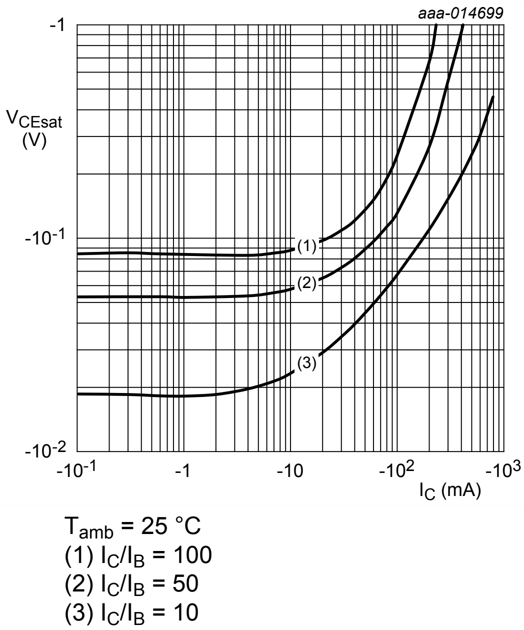


Fig. 12. Collector-emitter saturation voltage as a function of collector current; typical values

11. Test information

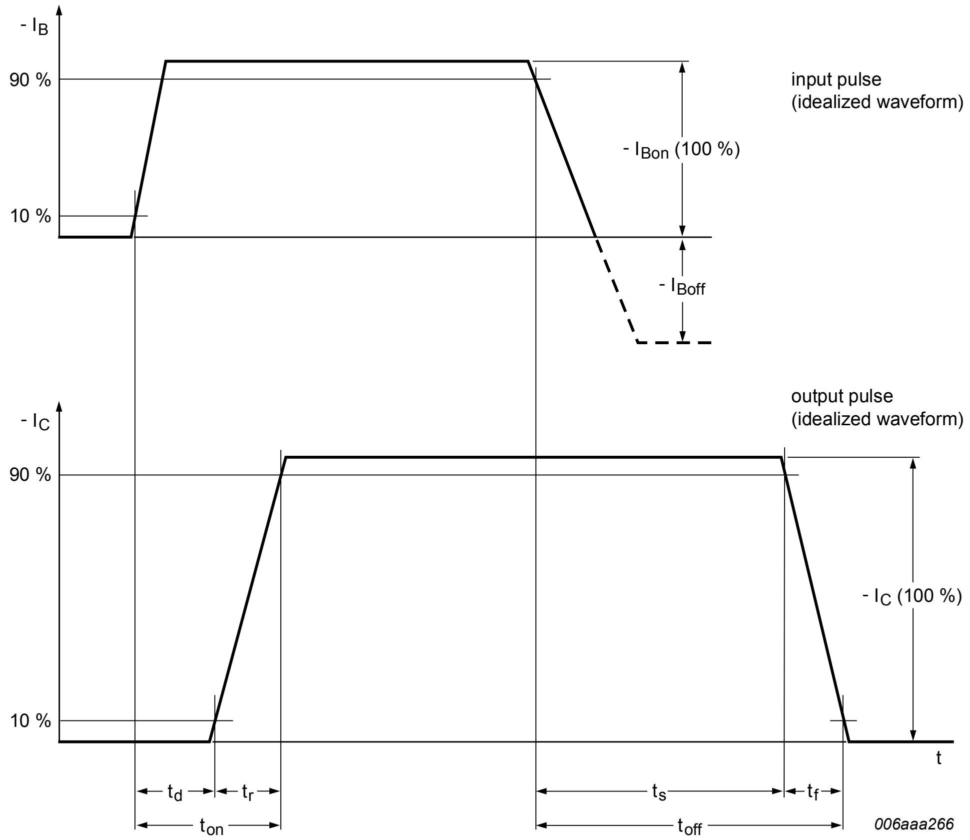


Fig. 13. Transistor switching time definition

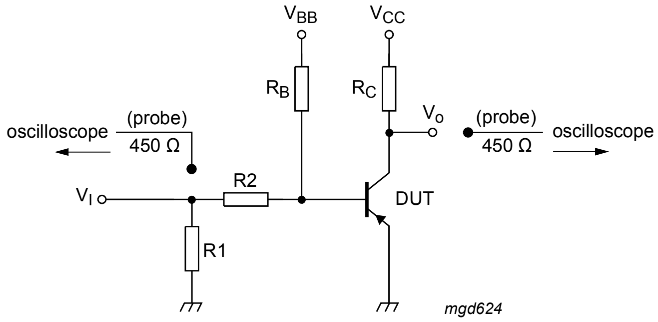


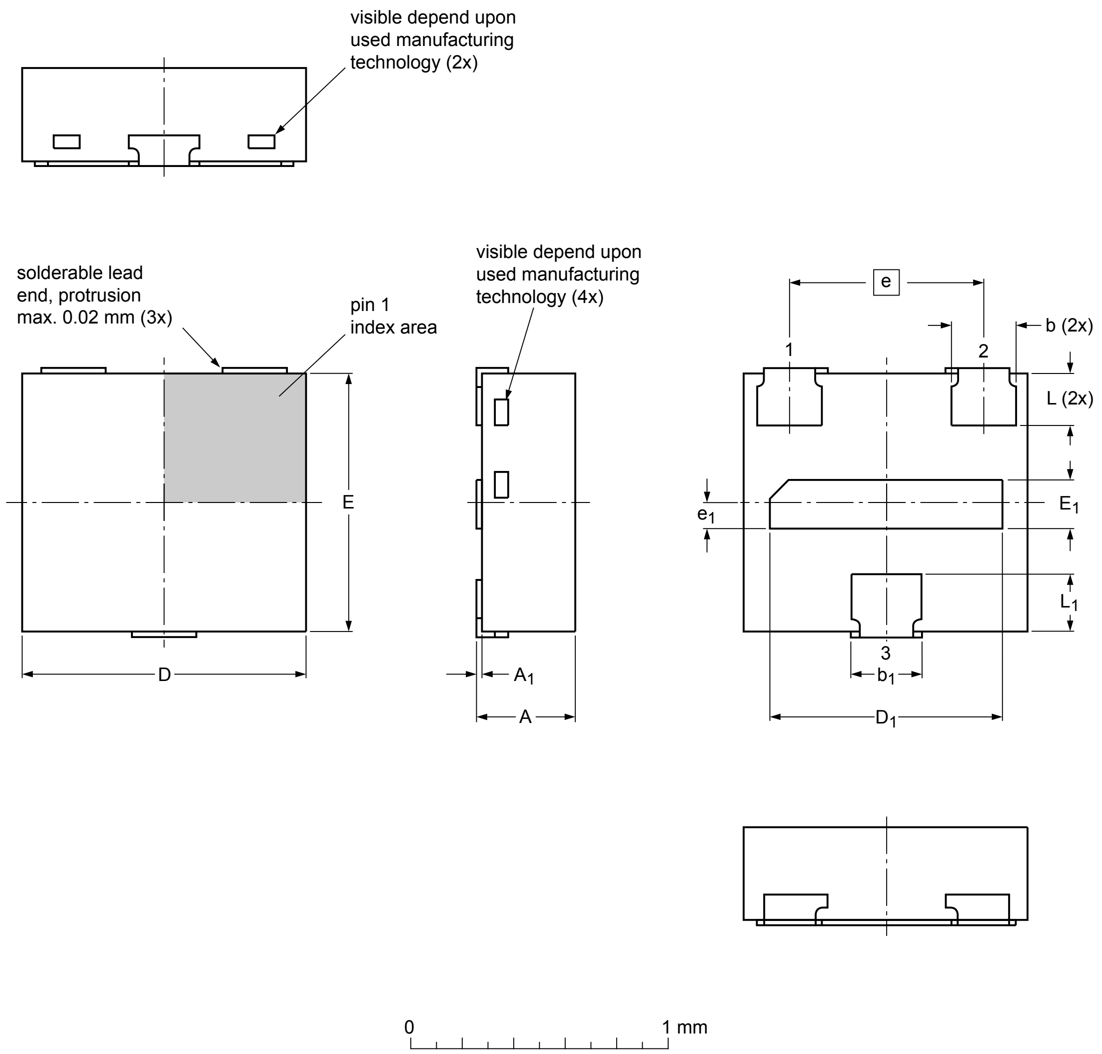
Fig. 14. Test circuit for switching times

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

DFN1010D-3: plastic thermal enhanced ultra thin small outline package; no leads; 3 terminals; body: 1.1 x 1.0 x 0.37 mm **SOT1215**



Dimensions (mm are the original dimensions)

Unit		A	A1	b	b1	D	D1	E	E1	e	e1	L	L1
mm	min	0.34		0.22	0.245	1.05	0.87	0.95	0.16			0.17	0.195
	nom	0.37		0.25	0.275	1.10	0.90	1.00	0.19	0.75	0.1	0.20	0.225
	max	0.40	0.04	0.30	0.325	1.15	0.95	1.05	0.24			0.25	0.275

Note
1. Dimension A is including plating thickness.

sot1215_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1215						~~13-03-05~~ 13-03-06

Fig. 15. Package outline DFN1010D-3 (SOT1215)

13. Soldering

Footprint information for reflow soldering of DFN1010D-3 package **SOT1215**

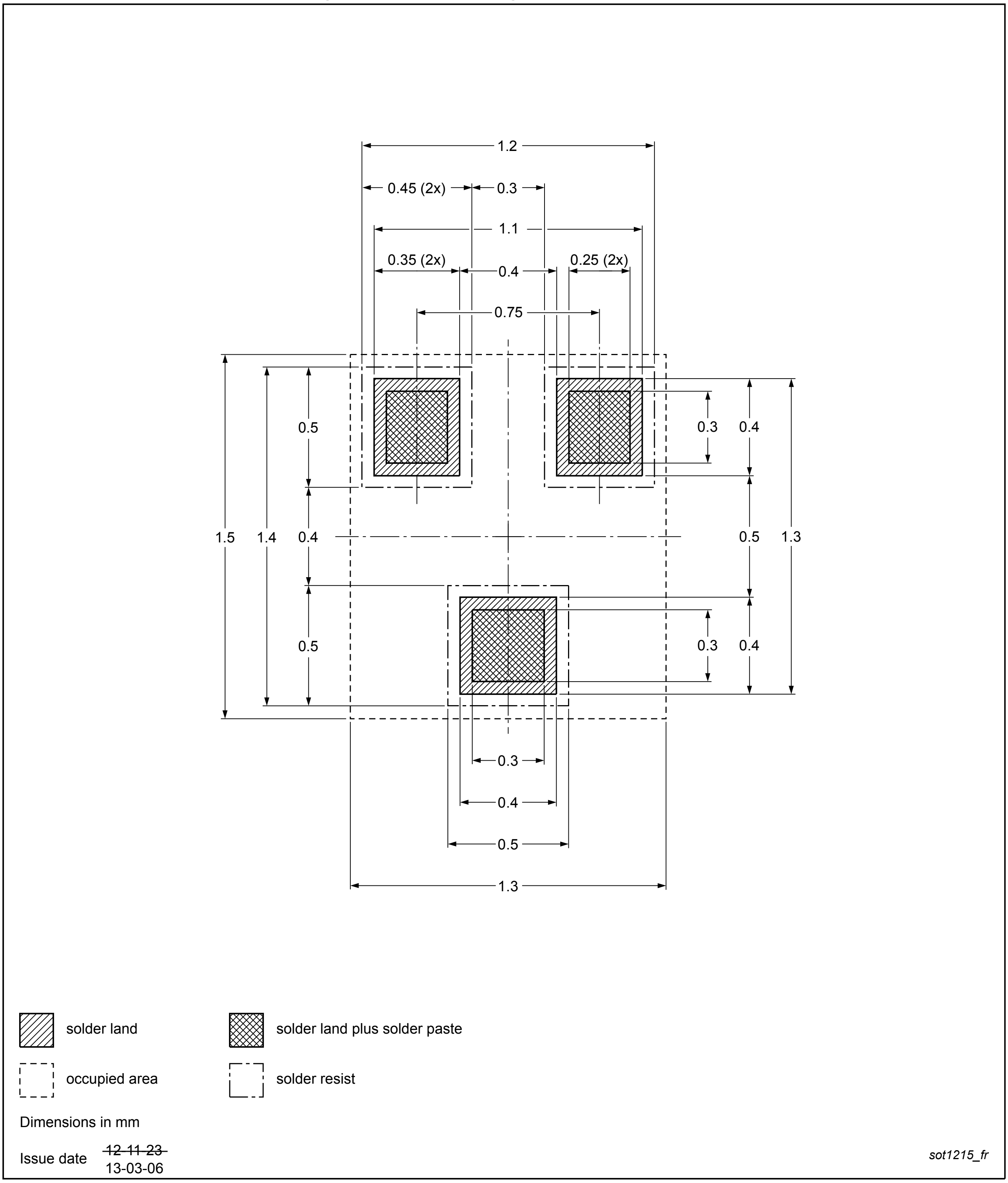


Fig. 16. Reflow soldering footprint for DFN1010D-3 (SOT1215)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBT2907AQA v.1	20180921	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".
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Date of release: 21 September 2018

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