BLP15M9S30; BLP15M9S30G

Power LDMOS transistor

AMPLEON

Rev. 4 — 12 January 2023 **Product data sheet**

1. Product profile

1.1 General description

A 30 W general purpose LDMOS RF power transistor for broadcast and ISM applications in HF to 2 GHz band.

Table 1. Application performance

Test signal	f	P_L	G_p	η_D	RL_{in}
	(MHz)	(W)	(dB)	(%)	(dB)
pulsed CW	1400	30	19.3	72	–17
CW	30 to 520	25	20	55	–3
	915	35	17	78	–22

1.2 Features and benefits

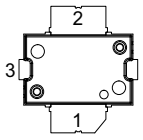
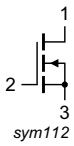
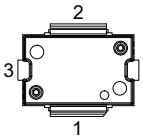
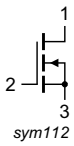
- High efficiency
- Integrated dual sided ESD protection
- Excellent ruggedness
- High power gain
- Excellent reliability
- Easy power control
- For RoHS compliance see the product details on the Ampleon website

1.3 Applications

- Industrial, scientific and medical applications
- Broadcast transmitter applications
- RF power amplifiers for CW applications

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
BLP15M9S30 (TO-270-2F-1)			
1	drain		
2	gate		
3	source [1]		
BLP15M9S30G (TO-270-2G-1)			
1	drain		
2	gate		
3	source [1]		

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

Package name	Orderable part number	12NC	Packing description	Min. orderable quantity (pieces)
TO-270-2F-1	BLP15M9S30Z	9349 602 46515	TR13; 500-fold; 24 mm; dry pack	500
	BLP15M9S30XY	9349 602 46538	TR7; 100-fold; 24 mm; dry pack	100
TO-270-2G-1	BLP15M9S30GZ	9349 602 45515	TR13; 500-fold; 24 mm; dry pack	500
	BLP15M9S30GXY	9349 602 45538	TR7; 100-fold; 24 mm; dry pack	100

4. Limiting values

Table 4. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage		-	65	V
V_{GS}	gate-source voltage		−6	+13	V
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature	[1]	-	225	°C

[1] Continuous use at maximum temperature will affect the reliability, for details refer to the online MTF calculator.

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5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	T_{case} = 85 °C; V_{DS} = 32 V; P_L = 30 W	1.9	K/W

6. Characteristics

Table 6. DC characteristics

T_j = 25 °C; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)DSS}$	drain-source breakdown voltage	V_{GS} = 0 V; I_D = 0.33 mA	65	70	-	V
$V_{GS(th)}$	gate-source threshold voltage	V_{DS} = 10 V; I_D = 33 mA	1.5	2	2.5	V
I_{DSS}	drain leakage current	V_{GS} = 0 V; V_{DS} = 32 V	-	-	1.4	µA
I_{DSX}	drain cut-off current	V_{GS} = $V_{GS(th)}$ + 3.75 V; V_{DS} = 10 V	-	6.2	-	A
I_{GSS}	gate leakage current	V_{GS} = 11 V; V_{DS} = 0 V	-	-	140	nA
$R_{DS(on)}$	drain-source on-state resistance	V_{GS} = $V_{GS(th)}$ + 3.75 V; I_D = 1.16 A	-	370	-	mΩ

Table 7. AC characteristics

T_j = 25 °C; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C_{iss}	input capacitance	V_{GS} = 0 V; V_{DS} = 32 V; f = 1 MHz	-	34.8	-	pF
C_{oss}	output capacitance	V_{GS} = 0 V; V_{DS} = 32 V; f = 1 MHz	-	11.8	-	pF
C_{rss}	reverse transfer capacitance	V_{GS} = 0 V; V_{DS} = 32 V; f = 1 MHz	-	0.39	-	pF

Table 8. RF characteristics

RF characteristics in Ampleon production test circuit; typical RF performance at T_{case} = 25 °C; V_{DS} = 32 V: I_{Dq} = 200 mA; t_p = 100 µs; δ = 10 %.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Pulsed RF, class-AB						
G_p	power gain	f = 1400 MHz: P_L = 30 W	16.5	19.3	-	dB
η_D	drain efficiency	f = 1400 MHz: P_L = 30 W	66	71	-	%
RL_{in}	input return loss	f = 1400 MHz: P_L = 30 W	-	–18	-	dB

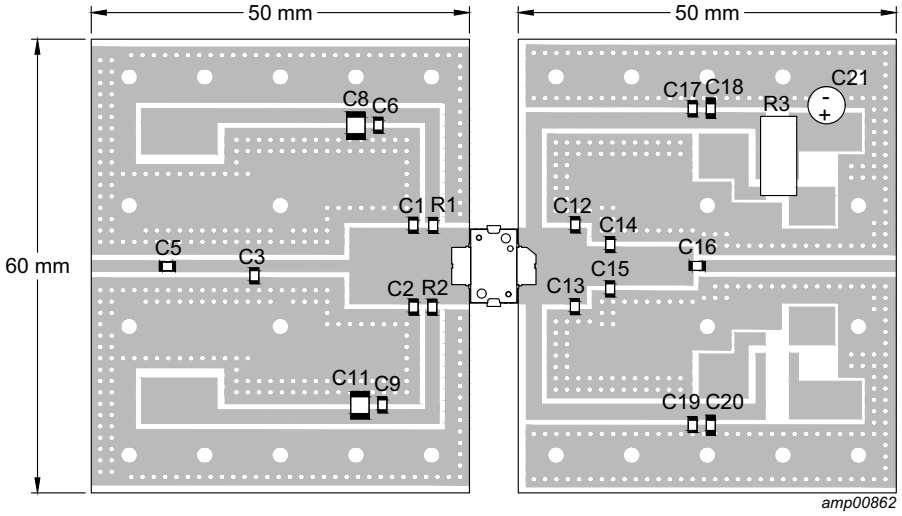
7. Test information

7.1 Ruggedness in class-AB operation

The BLP15M9S30 and BLP15M9S30G are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V_{DS} = 32 V; f = 1400 MHz at rated load power on RF development board using a pulsed CW RF signal which has ~150 ns rise and fall time.

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7.2 Test circuit



Printed-Circuit Board (PCB): Rogers RO4350B; ε_r = 3.66 F/m; height = 0.762 mm; Cu (top/bottom metallization); thickness copper plating = 35 μm.

See Table 9 for a list of components.

Fig 1. Component layout for production RF Test Circuit

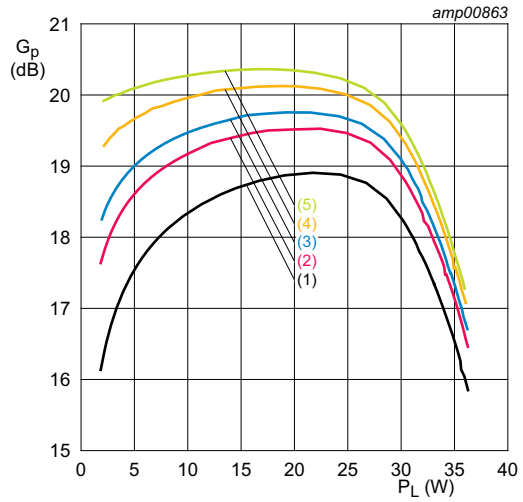
Table 9. List of components

See Figure 1 for component layout.

Component	Description	Value	Remarks
C1, C2, C12, C13	multilayer ceramic chip capacitor	6.2 pF	ATC 800A
C3	multilayer ceramic chip capacitor	2 pF	ATC 800A
C5, C6, C9, C17, C19, C16	multilayer ceramic chip capacitor	100 pF	ATC 800A
C8, C11, C18, C20	multilayer ceramic chip capacitor	100 nF, 100 V	
C14, C15	multilayer ceramic chip capacitor	2.1 pF	ATC 800A
C21	electrolytic capacitor	220 μF, 63 V	
R1, R2	chip resistor	10 Ω	SMD 0805
R3	shunt resistor	10 mΩ	for current monitoring

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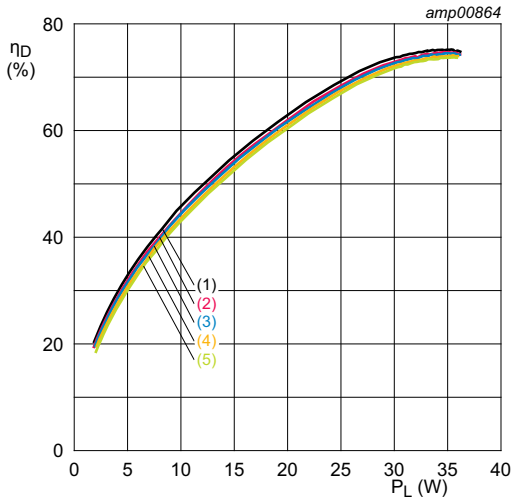
7.3 Graphical data



V_{DS} = 32 V; f = 1400 MHz; t_p = 100 µs; δ = 10 %.

(1) I_{Dq} = 5 mA
(2) I_{Dq} = 30 mA
(3) I_{Dq} = 50 mA
(4) I_{Dq} = 100 mA
(5) I_{Dq} = 150 mA

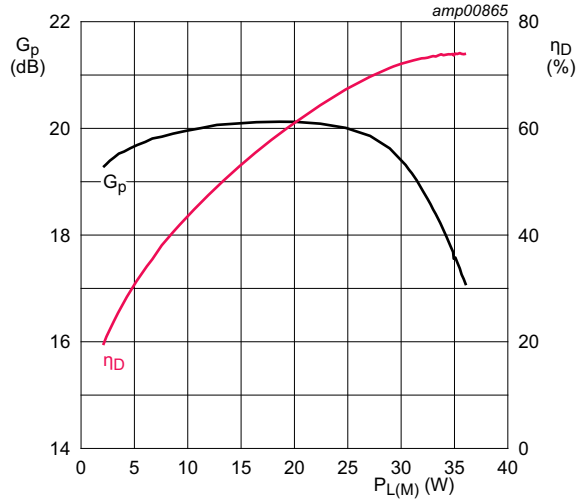
Fig 2. Power gain as a function of output power; typical values



V_{DS} = 32 V; f = 1400 MHz; t_p = 100 µs; δ = 10 %.

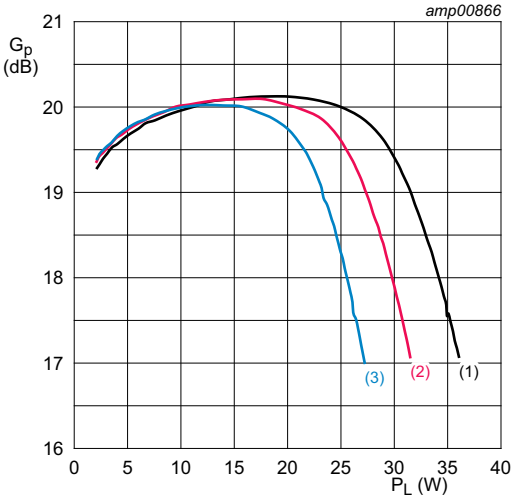
(1) I_{Dq} = 5 mA
(2) I_{Dq} = 30 mA
(3) I_{Dq} = 50 mA
(4) I_{Dq} = 100 mA
(5) I_{Dq} = 150 mA

Fig 3. Drain efficiency as a function of output power; typical values



V_{DS} = 32 V; I_{Dq} = 100 mA; f = 1400 MHz; t_p = 100 µs; δ = 10 %.

Fig 4. Power gain and drain efficiency as function of peak output power; typical values

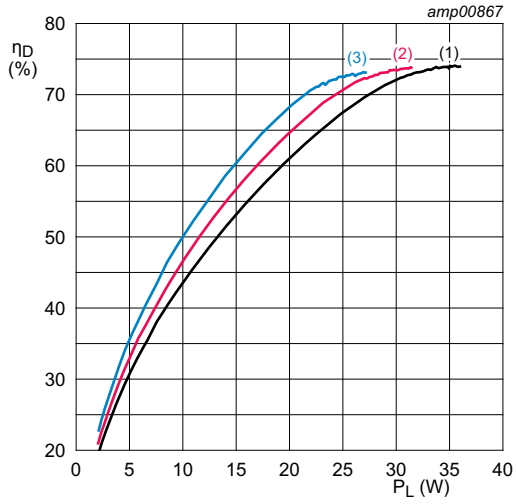


I_{Dq} = 100 mA; f = 1400 MHz; t_p = 100 µs; δ = 10 %.

(1) V_{DS} = 32 V
(2) V_{DS} = 30 V
(3) V_{DS} = 28 V

Fig 5. Power gain as a function of output power; typical values

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I_{Dq} = 100 mA; f = 1400 MHz; t_p = 100 μs; δ = 10 %.

(1) V_{DS} = 32 V

(2) V_{DS} = 30 V

(3) V_{DS} = 28 V

Fig 6. Drain efficiency as a function of output power; typical values

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8. Package outline

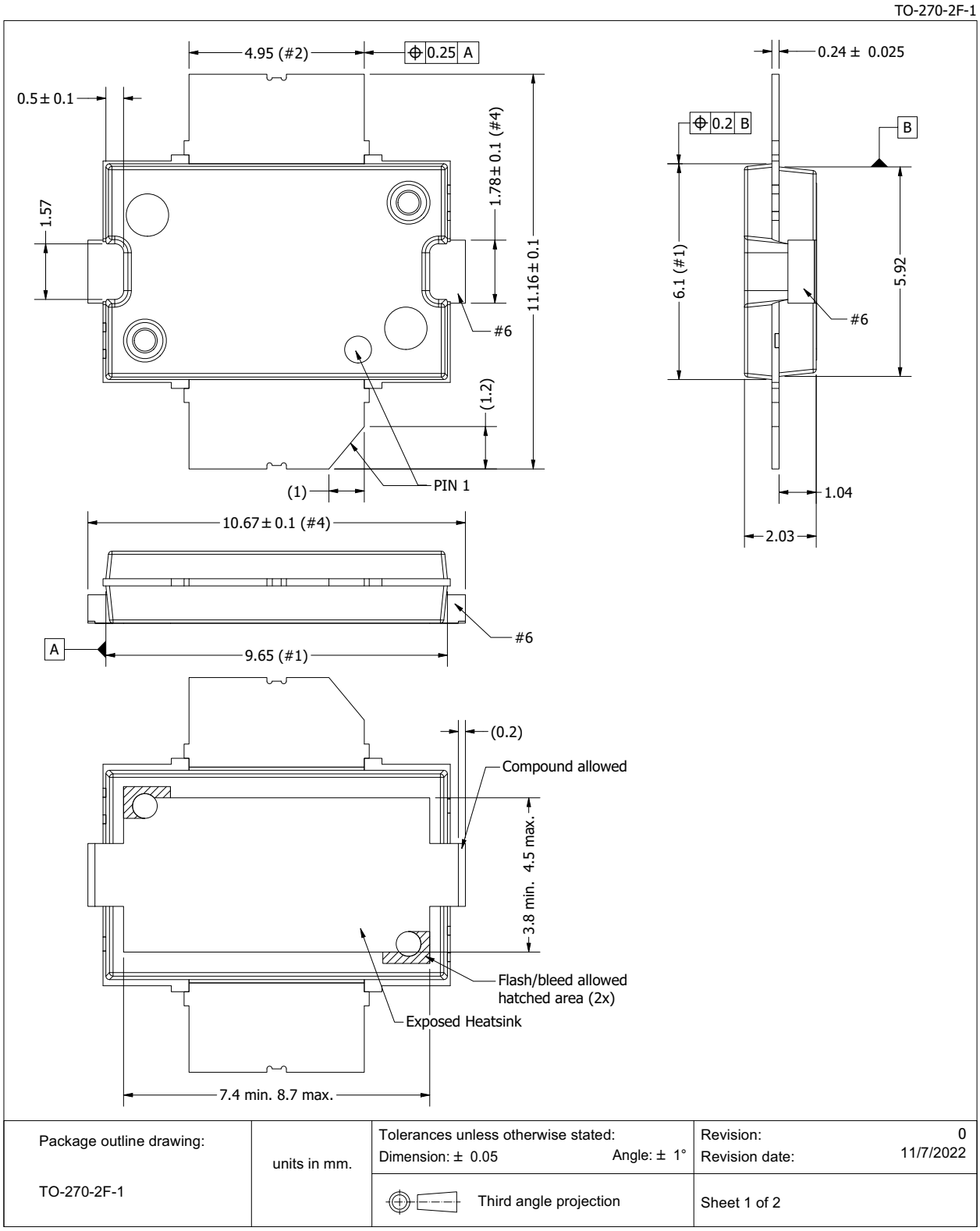
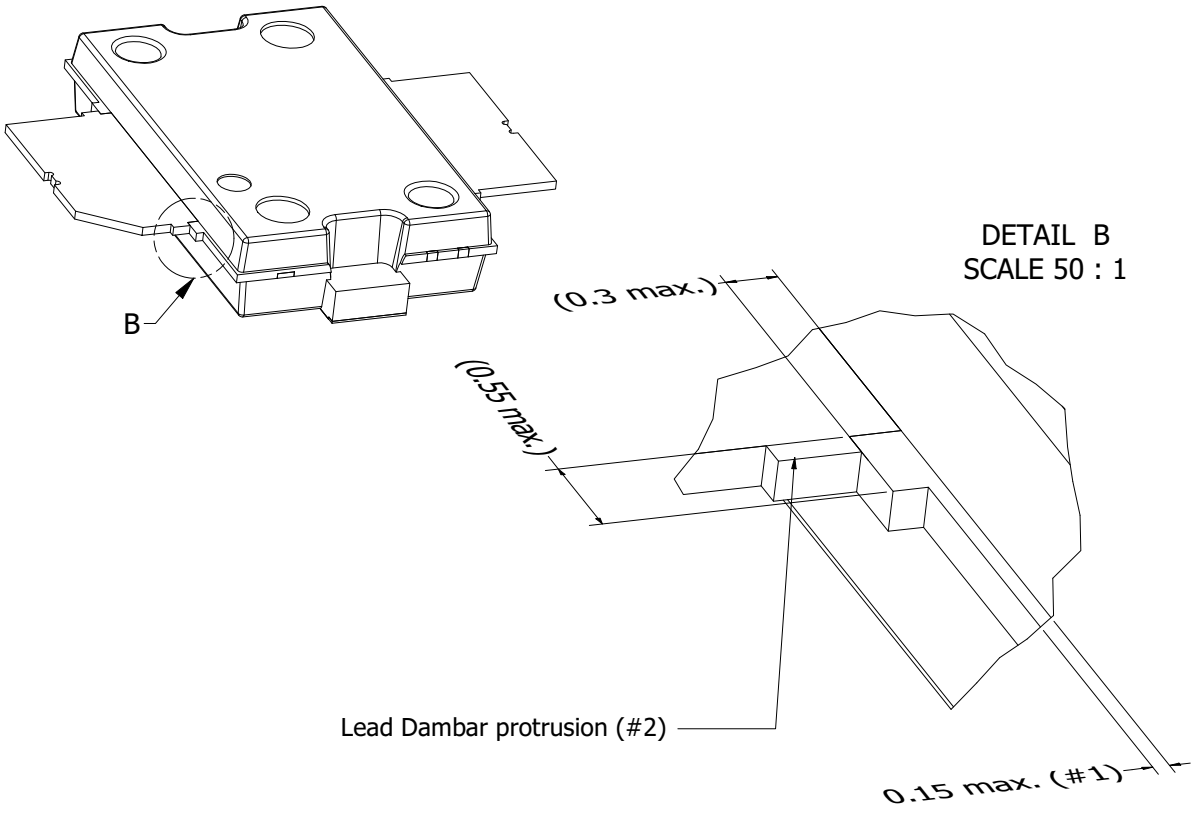


Fig 7. Package outline TO-270-2F-1 (sheet 1 of 2)

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TO-270-2F-1

Drawing Notes	
Items	Description
(1)	Dimensions are excluding mold protrusion. The mold protrusion is maximum 0.15 mm per side. See also detail B. In the dambar area max. protrusion is 0.55 mm. max. in length and 0.3 mm. max. in width (4x). See also detail B.
(2)	The lead dambar (metal) protrusions are not included. Add 0.14 mm max to the total lead dimension at the dambar location.
(3)	The leads and exposed heatsink are plated with matte Tin (Sn).
(4)	Dimensions (Heatsink ears) 10,67 and 1,78 do not include mouldprotrusion. Overall Max. dimensions incl. mould protrusions is 10.92 mm. (max.) and 2.03 mm. (max.).
(5)	Lead coplanarity over the leads is 0,1 mm. maximum.
(6)	Surfaces may remain unplated (not solderable surfaces).

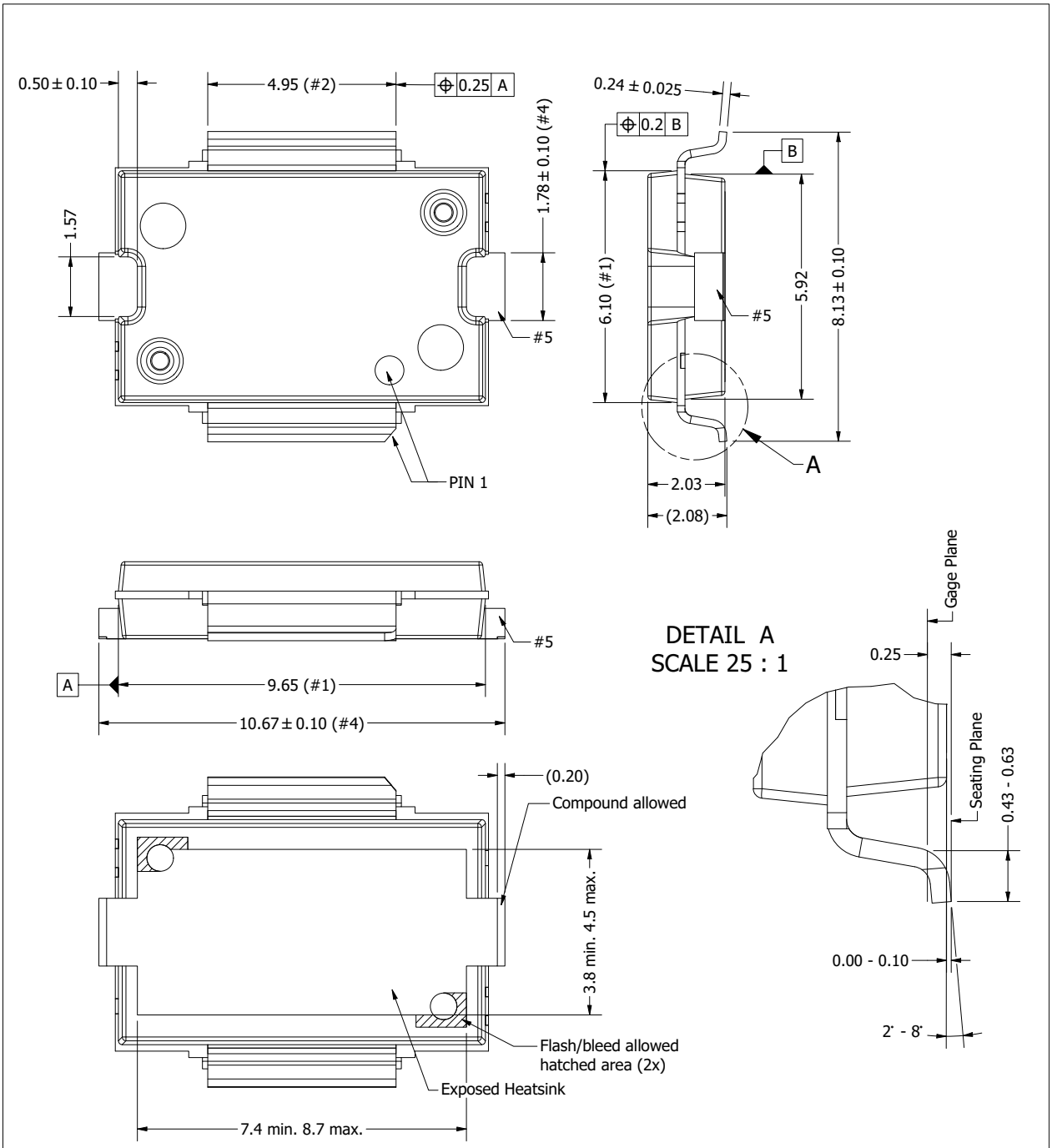


Package outline drawing: TO-270-2F-1	units in mm.	Tolerances unless otherwise stated: Dimension: ± 0.05 Angle: ± 1° Third angle projection	Revision: 0 Revision date: 11/7/2022 Sheet 2 of 2

Fig 8. Package outline TO-270-2F-1 (sheet 2 of 2)

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TO-270-2G-1



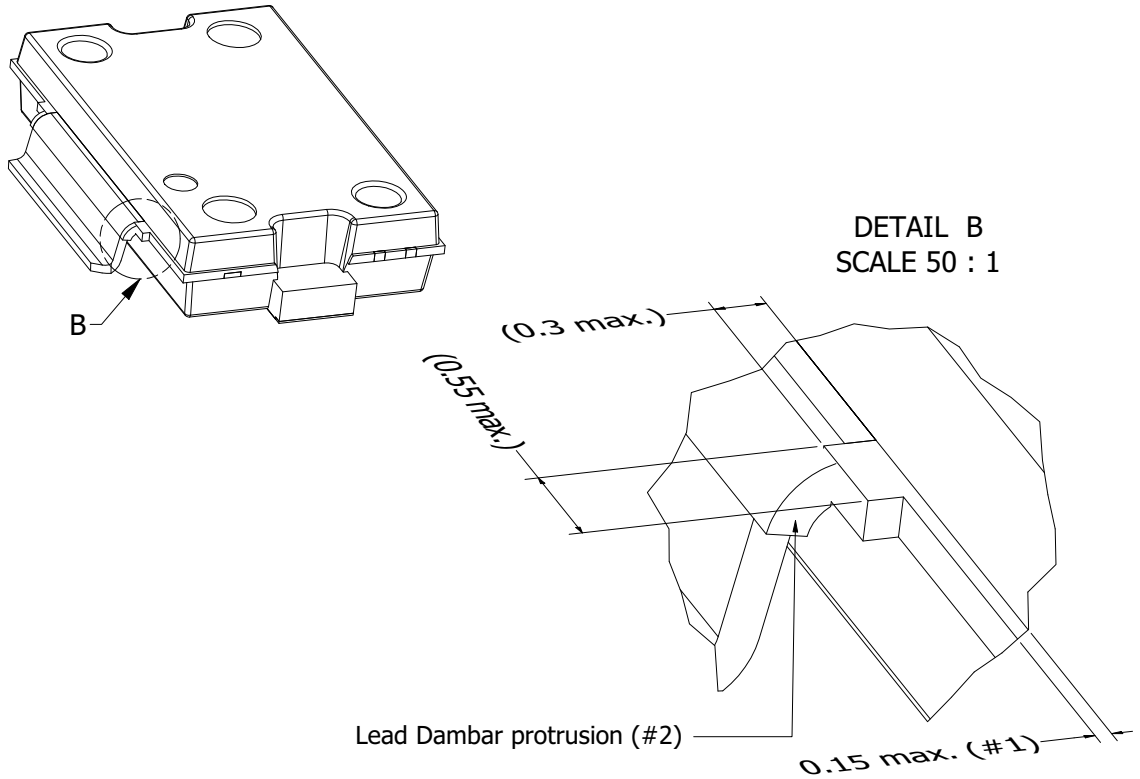
Package outline drawing: TO-270-2G-1	units in mm.	Tolerances unless otherwise stated: Dimension: ± 0.05 Angle: ± 1° Third angle projection	Revision: 0 Revision date: 11/7/2022 Sheet 1 of 2

Fig 9. Package outline TO-270-2G-1 (sheet 1 of 2)

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TO-270-2G-1

Drawing Notes	
Items	Description
(1)	Dimensions are excluding mold protrusion. The mold protrusion is maximum 0.15 mm per side. See also detail B. In the dambar area max. protrusion is 0.55mm max. in lenght and 0.3 mm max. in width (4x) See also detail B.
(2)	The lead dambar (metal) protrusions are not included. Add 0.14 mm max to the total lead dimension at the dambar location.
(3)	The leads and exposed heatsink are plated with matte Tin (Sn).
(4)	Dimensions (Heatsink ears) 10,67 and 1,78 do not include mouldprotrusion. Overall Max. dimensions incl. mould protrusions is 10,92 mm. (max.) and 2,03 mm. (max.).
(5)	Surfaces may remain unplated (not solderable surfaces).



Package outline drawing: TO-270-2G-1	units in mm.	Tolerances unless otherwise stated: Dimension: ± 0.05 Angle: ± 1° Third angle projection	Revision: 0 Revision date: 11/7/2022 Sheet 2 of 2

Fig 10. Package outline TO-270-2G-1 (sheet 2 of 2)

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9. Handling information

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.

Such precautions are described in the *ANSI/ESD S20.20*, *IEC/ST 61340-5*, *JESD625-A* or equivalent standards.

Table 10. ESD sensitivity

ESD model	Class
Charged Device Model (CDM); According to ANSI/ESDA/JEDEC standard JS-002	C2A [1]
Human Body Model (HBM); According to ANSI/ESDA/JEDEC standard JS-001	2 [2]

[1] CDM classification C2A is granted to any part that passes after exposure to an ESD pulse of 500 V.

[2] HBM classification 2 is granted to any part that passes after exposure to an ESD pulse of 2000 V.

10. Abbreviations

Table 11. Abbreviations

Acronym	Description
CW	Continuous Wave
ESD	ElectroStatic Discharge
ISM	Industrial, Scientific and Medical
LDMOS	Laterally Diffused Metal-Oxide Semiconductor
MTF	Median Time to Failure
RoHS	Restriction of Hazardous Substances
SMD	Surface Mounted Device
VSWR	Voltage Standing Wave Ratio

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11. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BLP15M9S30_BLP15M9S30G v.4	20230112	Product data sheet	-	BLP15M9S30_BLP15M9S30G v.3
Modifications:	• Table 2 on page 2: package names changed from SOT1482-1 to TO-270-2F-1 and from SOT1483-1 to TO-270-2G-1 • Table 3 on page 2: package names changed from SOT1482-1 to TO-270-2F-1 and from SOT1483-1 to TO-270-2G-1 • Table 5 on page 3: value changed from 2.84 K/W to 1.9 K/W • Section 8 on page 7: package outline drawing changed from SOT1482-1 to TO-270-2F-1 and from SOT1483-1 to TO-270-2G-1 • Section 12 on page 13: updated section			
BLP15M9S30_BLP15M9S30G v.3	20210716	Product data sheet	-	BLP15M9S30_BLP15M9S30G v.2
BLP15M9S30_BLP15M9S30G v.2	20210223	Product data sheet	-	BLP15M9S30_BLP15M9S30G v.1
BLP15M9S30_BLP15M9S30G v.1	20191015	Product data sheet	-	-

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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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Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

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Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

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Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

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