



AB-54003L-512

2 stages RF power amp: PD84001 + PD54003L-E + LPF
N-channel enhancement-mode lateral MOSFETs

Feature

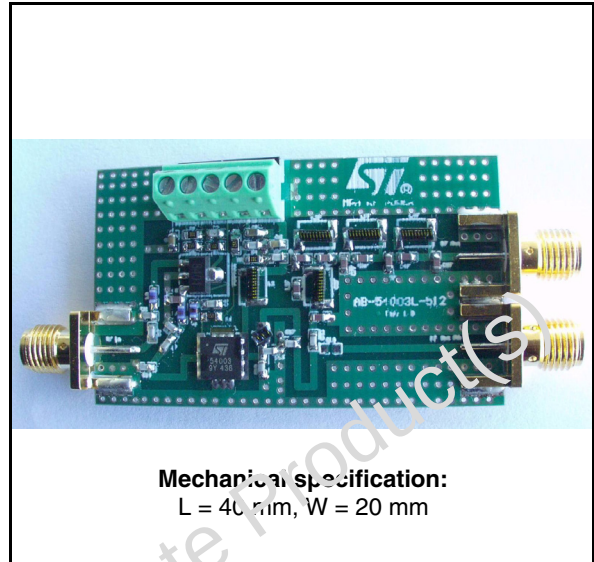
- Excellent thermal stability
- Frequency: 380 - 512 MHz
- Supply voltage: 7.2V
- Output power: 4W
- Current < 1.6A
- Input power < 10dBm
- Harmonics level < -70dBc
- Load mismatch 20:1
- V_{APC} 5V max
- Beo Free Amplifier
- RoHS compliant

Description

The AB-54003L-512 is a 2 stages RF power amplifier including output Low Pass Filter for harmonics rejection specifically designed for 2 Ways Comms VHF portable.

Order code

- STEVAL-TDR001V1



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1 Electrical data

1.1 Maximum ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	15	V
I_D	Drain current	2.5	A
T_{CASE}	Operating case temperature	-20 to +85	°C
T_A	Max. ambient temperature	+55	°C

2 Electrical characteristics

$T_A = +25\text{ °C}$, $V_{DD} = 7.2\text{ V}$, V_{APC} adjusted

Table 2. Electrical specification

Symbol	Test conditions	Min.	Typ.	Max.	Unit
Freq.	Frequency range	380		512	MHz
P_{IN}	@ $P_{OUT} = 4W$		10		dBm
I_{TOTAL}	@ $P_{OUT} = 4W$ and $P_{IN} = 10dBm$			1.6	A
PAE	@ $P_{OUT} = 4W$ and $P_{IN} = 10dBm$	36% - 40%			
VAPC	@ $P_{OUT} = 4W$ and $P_{IN} = 10dBm$		4.5	5	V
Harmonics	@ $P_{OUT} = 4W$			-70	dBc

3 Typical performance

Figure 1. Current consumption vs frequency

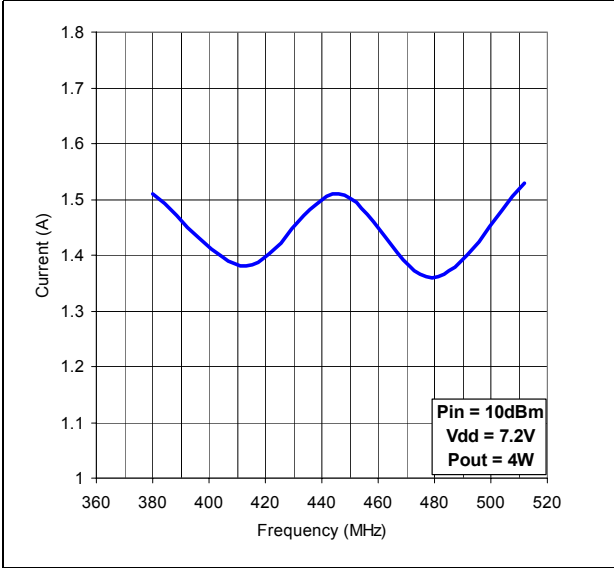


Figure 2. Output power vs frequency

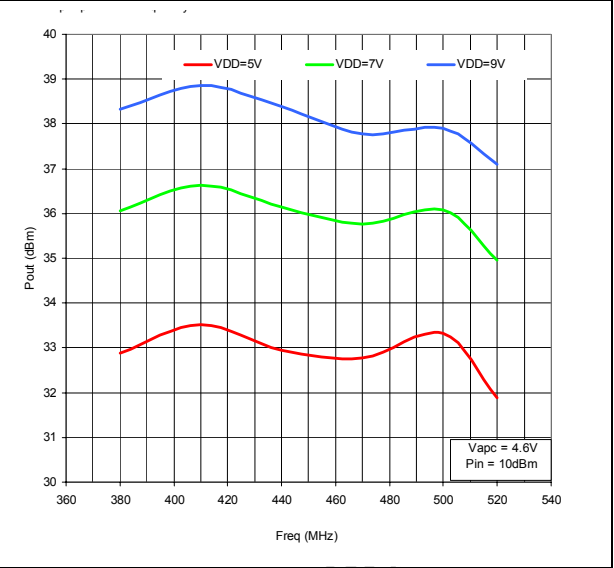


Figure 3. Gain vs frequency

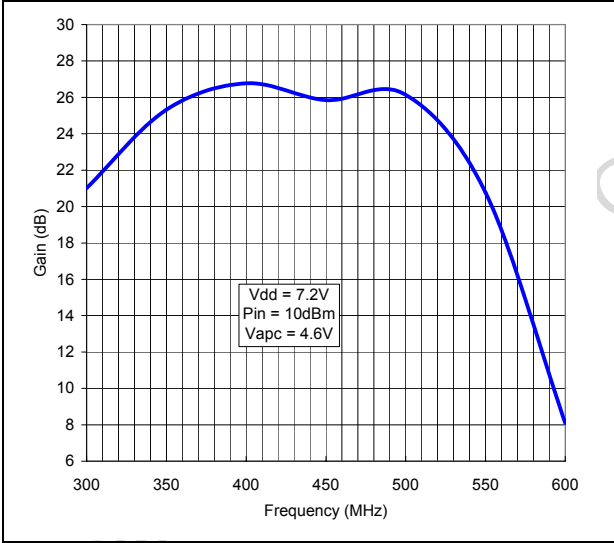


Figure 4. Input return loss vs frequency

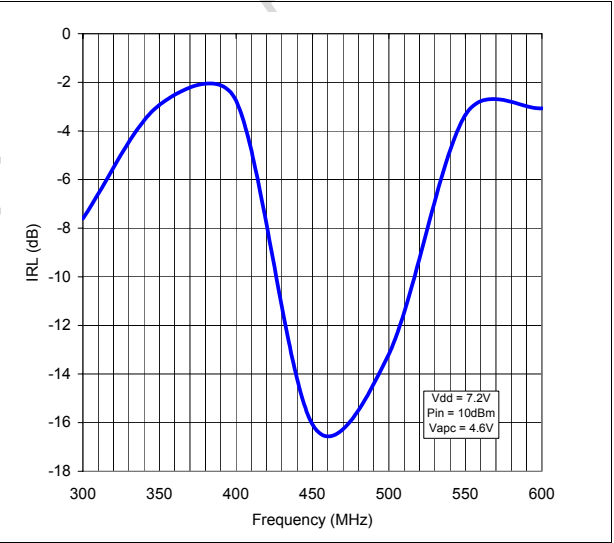


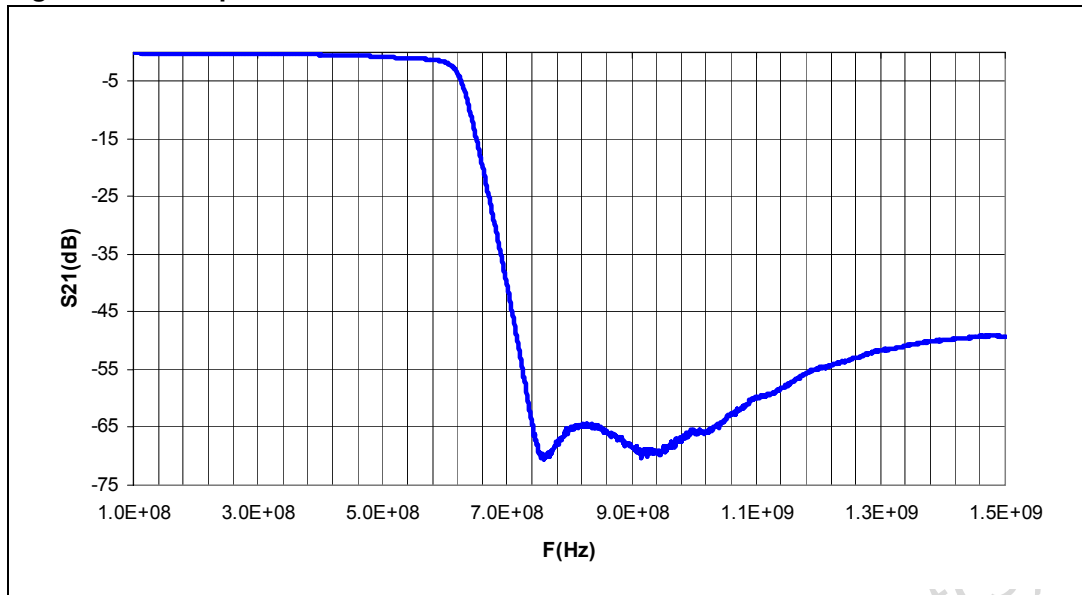
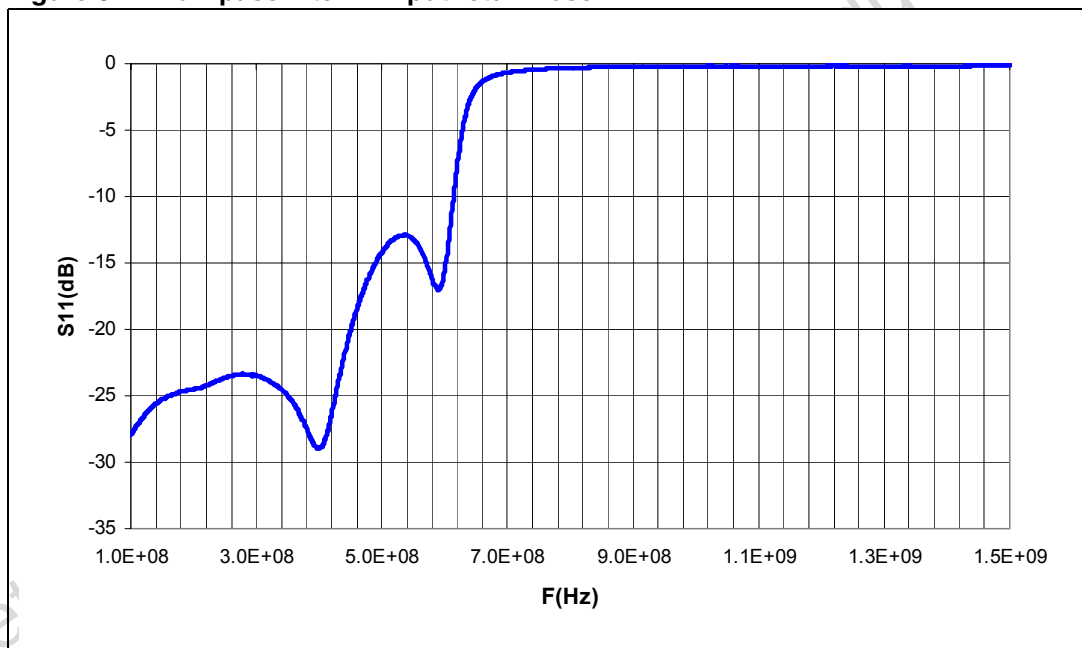
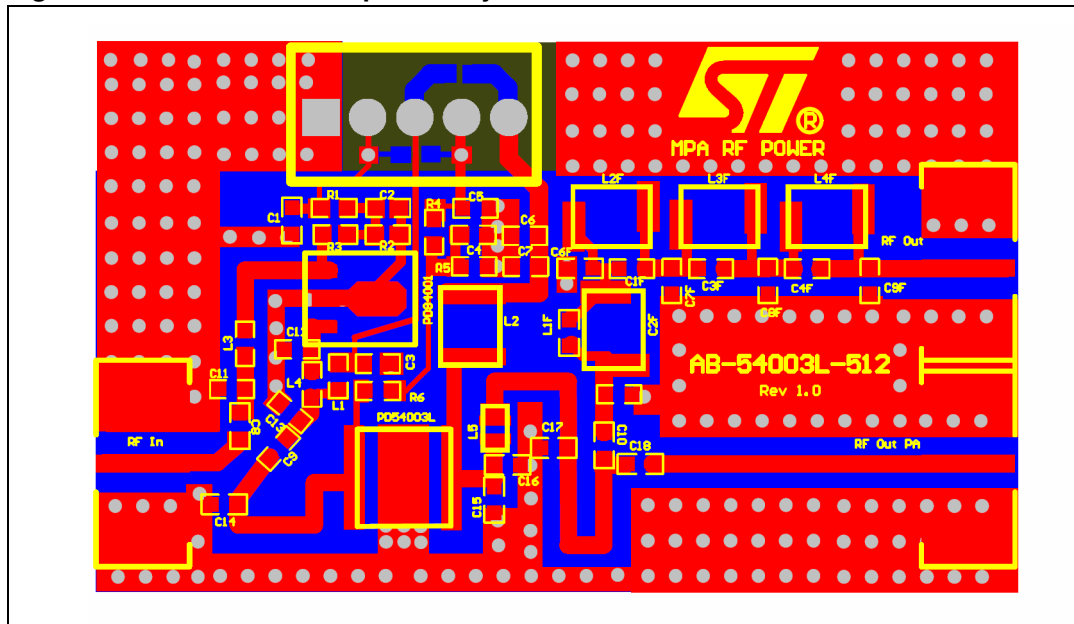
Figure 5. Low pass filter - insertion loss**Figure 6. Low pass filter - input return loss**

Table 3. Part list

Designator	Value	Quantity	Manufacturer	Part code	Size
C1	1 uF	1	Murata	GRM1885F51C105ZA01	603
C1F	2.2 pF	1	Murata	GRM1885C1H2R2CZ01	603
C2, C3, C4	120 pF	3	Murata	GRM1885C1H121JA01	603
C2F, C3F	3.3 pF	2	Murata	GRM1885C1H3R3CZ01	603
C4F, C5F	2.2 pF	2	Murata	GRM1885C1H2R2CZ01	603
C5, C6	1 uF	2	Murata	GRM1885F51C105ZA01	603
C6F	4.7 pF	1	Murata	GRM1885C1H4R7CZ01	603
C7	120 nF	1	Murata	GRM1885C1H121JA01	603
C7F, C8F	3.9 pF	2	Murata	GRM1885C1H3R9CZ01	603
C8, C10	470 pF	2	Murata	GRM1885C1H471JA01	603
C9	470 pF	1	Murata	GRM1885C1H471JA01	603
C9F	1.2 pF	1	Murata	GRM1885C1H1R2CZ01	603
C11	15 pF	1	Murata	GRM1885C1H150JA01	603
C12	4.7 pF	1	Murata	GRM1885C1H4R7CZ01	603
C13	18 pF	1	Murata	GRM1885C1H180JA01	603
C14	39 pF	1	Murata	GRM1885C1H390JA01	603
C15, C16	18 pF	2	Murata	GRM1885C1H180JA01	603
C17	15 pF	1	Murata	GRM1885C1H150JA01	603
C18	NC	1	Murata	GRM1885C1H471JA01	603
DC-Con		1	Phoenix Contact	1725685	2.54mm, 5 poli
L1	24 nH	1	Coilcraft	0603HC-24NX_BW	603
L1F, L2, L2F, L3F, L4F	12.55 nH	5	Coilcraft	1606-10_, 1606_10	1606
L3, L4	3.6 nH	2	Coilcraft	0603HC-3N6X_BW	603
L5	2.55 nH	1	Coilcraft	0906-3_	906
PD54003L		1	STMicroelectronics	PD54003L-E	
PD84001		1	STMicroelectronics	PD84001	
R1	300	1	Tyco/Electronics Neohn	CRG Series Thick Film Chip	603
R2, R5	3 K	2	Tyco/Electronics Neohn	CRG Series Thick Film Chip	603
R3, R6	15	2	Tyco/Electronics Neohn	CRG Series Thick Film Chip	603
R4	1.5 K	1	Tyco/Electronics Neohn	CRG Series Thick Film Chip	603
RF In, RF Out, RF Out PA		3			
SUB		1		FR-4	H=20mil h=10oz
TL1	50	1			L=6.88mm W=0.92mm
TL2	50	1			L=9.8mm W=0.92mm
TL3		1			L=9.8mm W=0.92mm
TL4		1			50 Ω

4 Circuit layout

Figure 7. Test fixture component layout



5 Circuit schematic

Figure 8. Circuit schematic

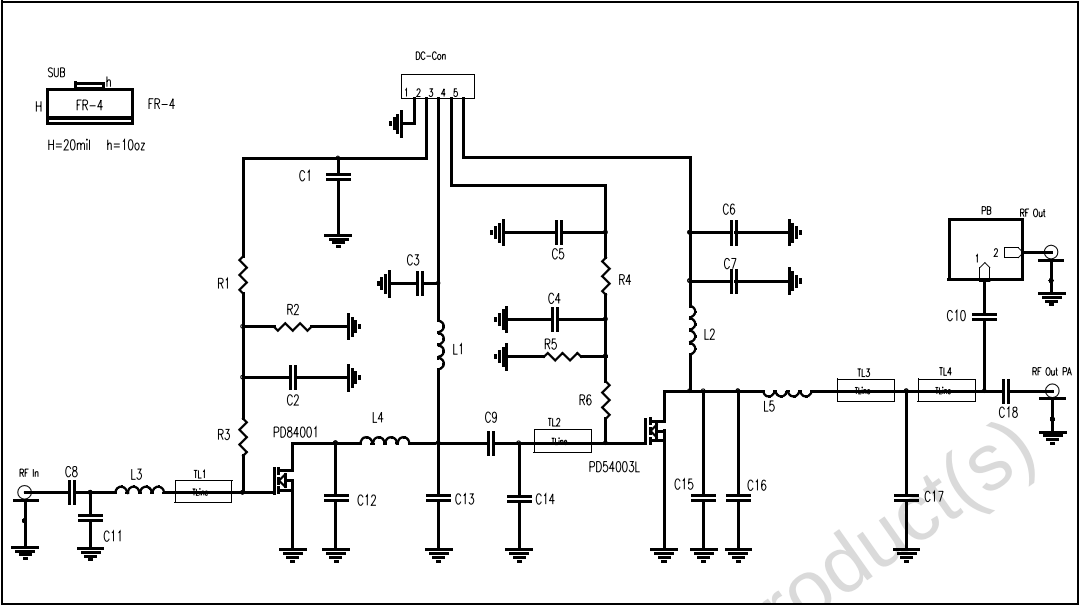
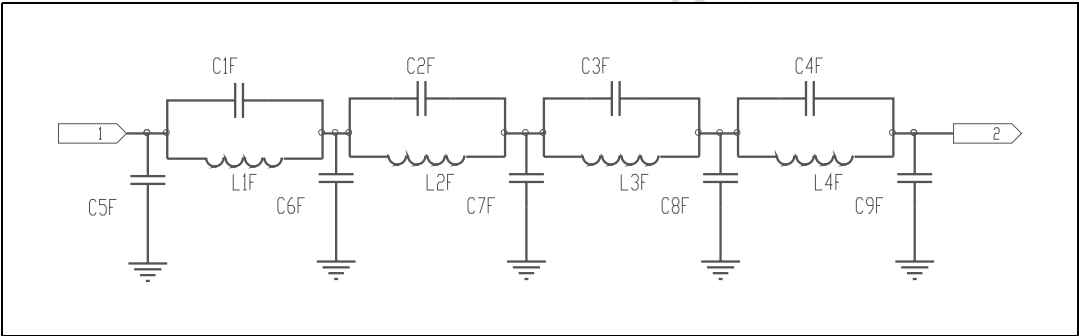


Figure 9. Filter schematic



6 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

Obsolete Product(s) - Obsolete Product(s)

6.1 PowerFLAT™ Mechanical data

Table 4. PowerFLAT™ Mechanical data

Dim.	mm			inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		0.90	1.00		0.035	0.039
A1		0.02	0.05		0.001	0.002
A3		0.24			0.009	
AA	0.15	0.25	0.35	0.006	0.01	0.014
b	0.43	0.51	0.58	0.017	0.020	0.023
c	0.64	0.71	0.79	0.025	0.028	0.031
D		5.00			0.197	
d		0.30			0.011	
E		5.00			0.197	
E2	2.49	2.57	2.64	0.098	0.101	0.104
e		1.27			0.050	
f		3.37			0.132	
g		0.74			0.03	
h		0.21			0.008	

Figure 10. PowerFLAT™ Package dimensions

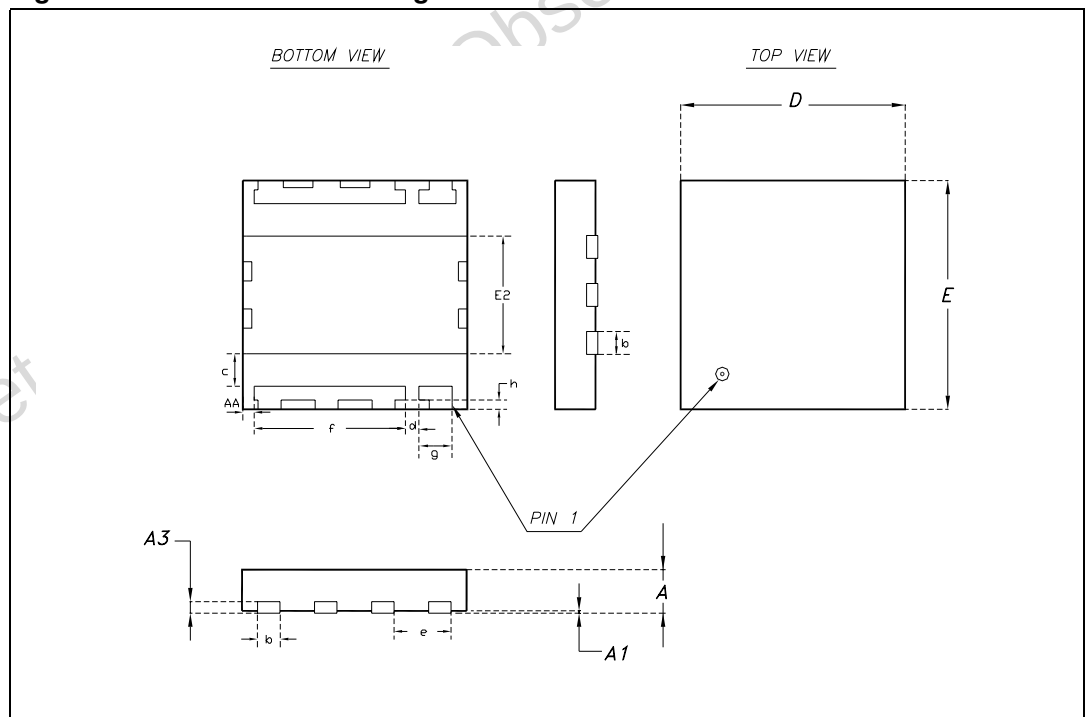
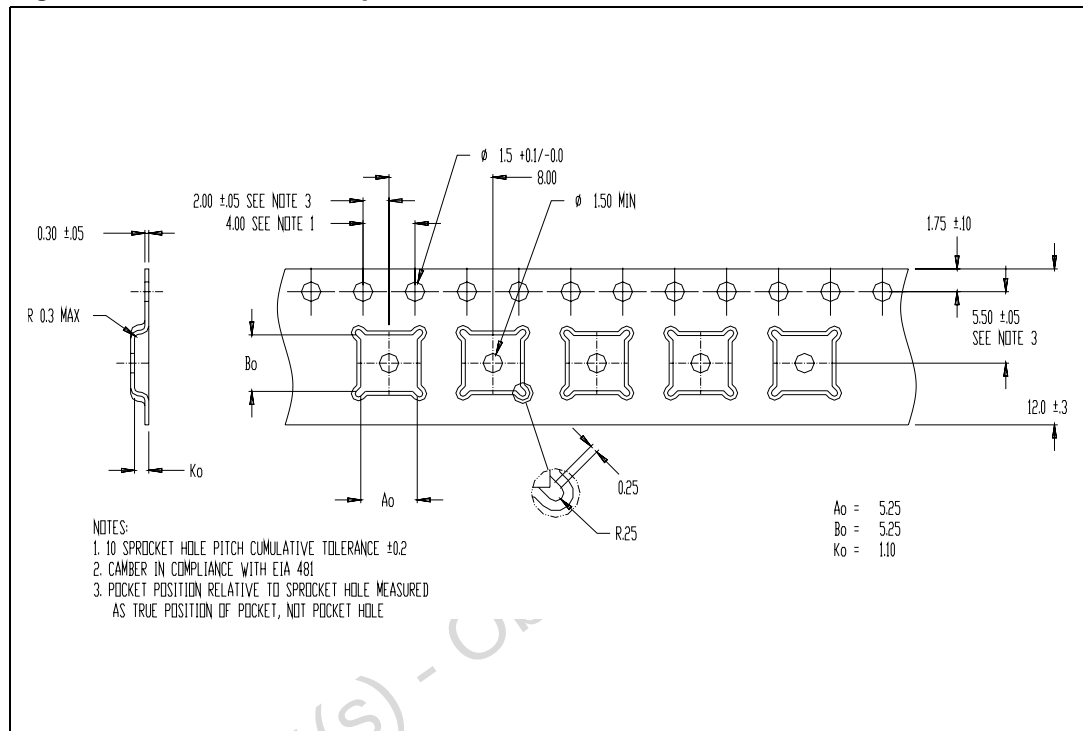


Table 5. PowerFLAT™ Tape & reel dimensions

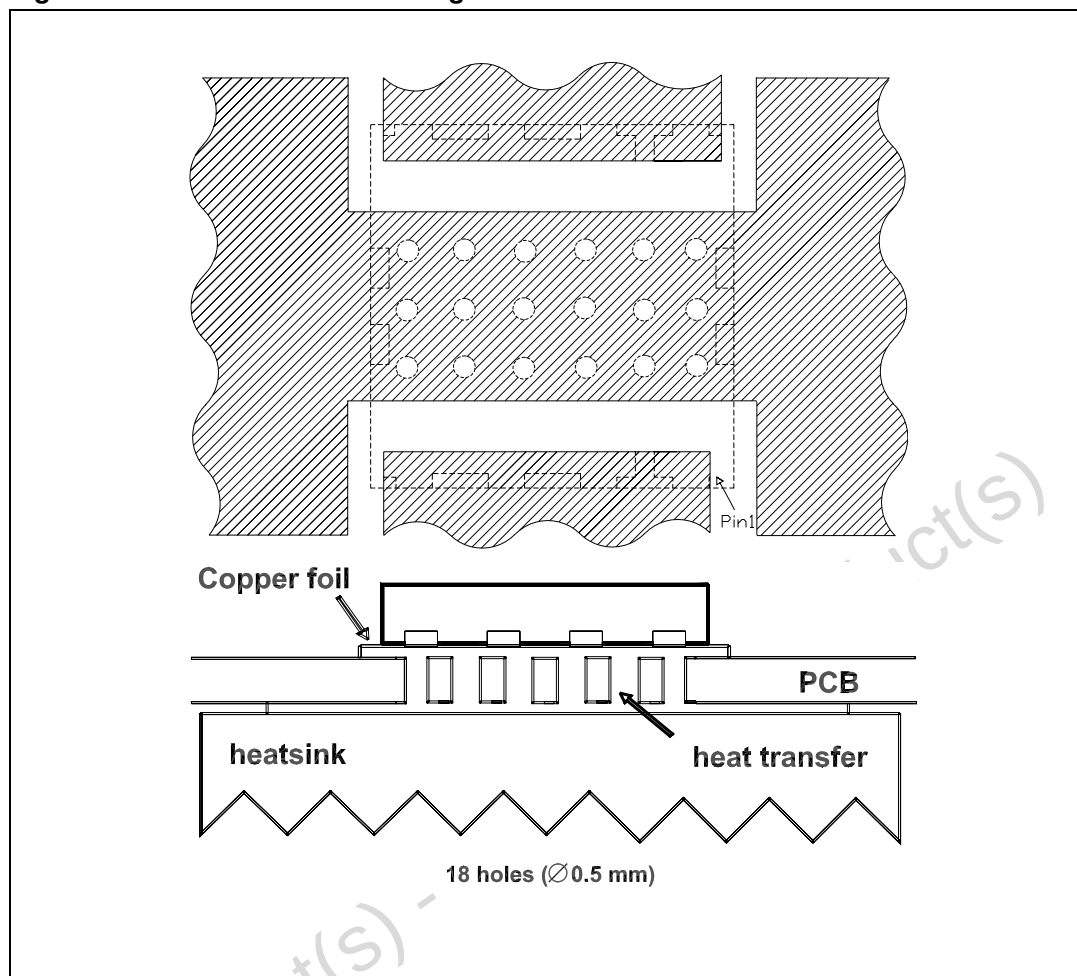
Dim.	mm.			inch		
	Min.	Typ	Max.	Min.	Typ	Max.
Ao	5.15	5.25	5.35	0.12	0.13	0.13
Bo	5.15	5.25	5.35	0.12	0.13	0.13
Ko	1.0	1.1	1.2	0.02	0.02	0.02

Figure 11. PowerFLAT™ Tape & reel



6.1.1 Mounting indications

Figure 12. Standard SMD mounting

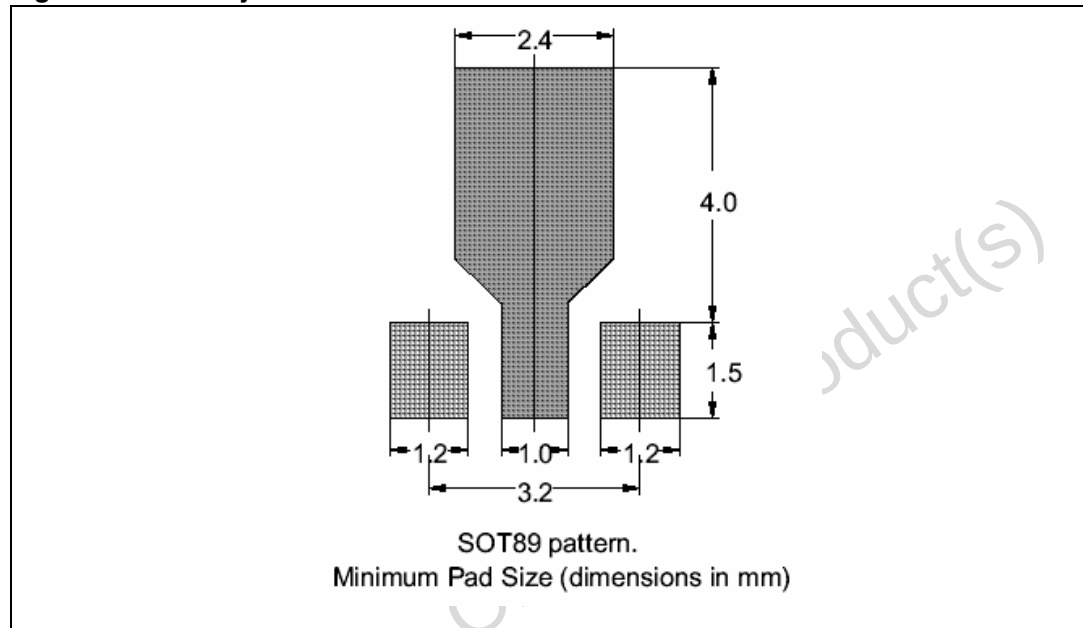


6.2 Thermal Pad and Via design SOT-89

Thermal vias are required in the PCB layout to effectively conduct heat away from the package. The via pattern has been designed to address thermal, power dissipation and electrical requirements of the device.

The via pattern is based on thru-hole vias with 0.203mm to 0.330mm finished hole size on a 0.5mm to 1.2mm grid pattern with 0.025 plating on via walls. If micro vias are used in a design, it is suggested that the quantity of vias be increased by a 4:1 ratio to achieve similar results.

Figure 13. Pad layout details



6.2.1 Soldering profile

Figure 14 shows the recommended solder for devices that have Pb-free terminal plating and where a Pb-free solder is used.

Figure 14. Recommended solder profile

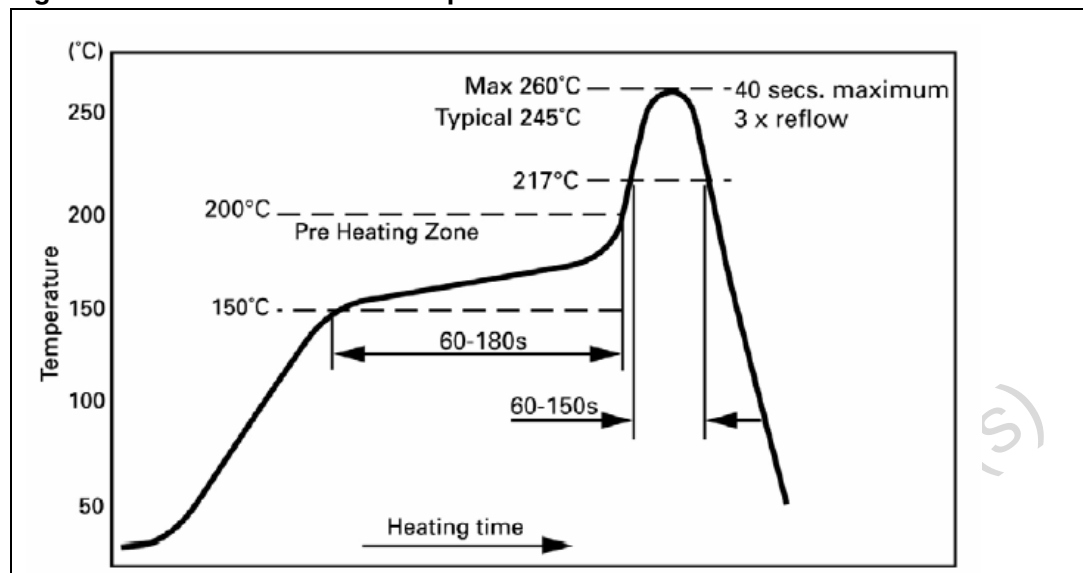


Figure 15 shows the recommended solder for devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with a leaded solder.

Figure 15. Recommended solder profile for leaded devices

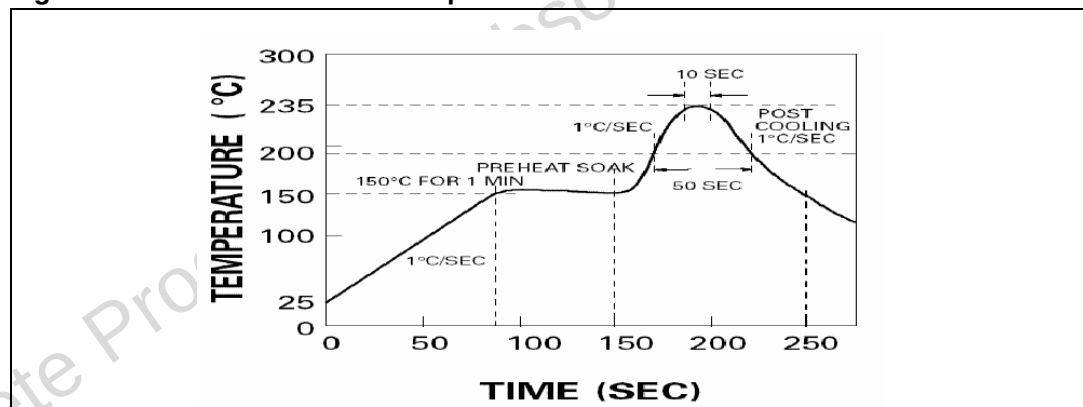
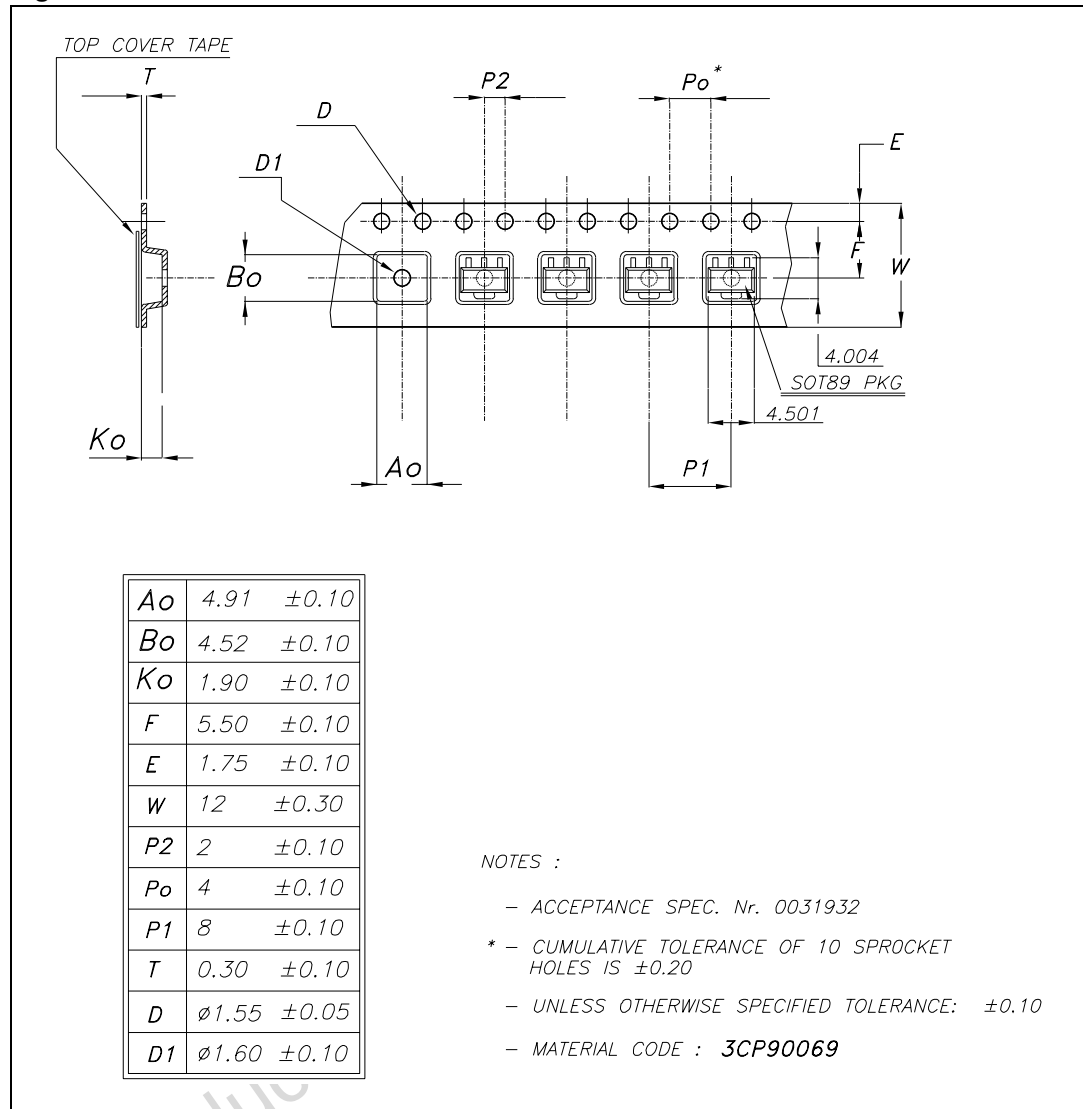


Figure 16. Reel information



7 Revision history

Table 6. Revision history

Date	Revision	Changes
18-Jul-2007	1	Initial release.

Obsolete Product(s) - Obsolete Product(s)

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