ACPM-7868

5 x 5 mm Power Amplifier Module
Linear Quad-Band GSM/EDGE

Data Sheet

Description

The ACPM-7868 is a linear quad-band / multi-mode power amplifier module for both GMSK and 8-PSK modulation schemes. There are two amplifier chains, one is to support GSM850/900 bands, and the other is to support DCS1800/ PCS1900 bands.

CoolPAM technology, which is Avago Technologies' Power Amplifier technology provides extended talk time with extremely low quiescent current and enhanced efficiency at low and medium power modes.

The ACPM-7868 module adopted sixth generation of CoolPAM technology and is designed to enhance power efficiency by using digital power mode control. Two mode control pins provide four power modes for low band and three power modes for high band.

Input and output terminals are internally matched to 50 Ω. The PA also contains internal DC blocking capacitors for RF input and output ports. The power amplifier is manufactured on an advanced InGaP HBT technology offering state-of-the-art reliability, temperature stability and ruggedness. This module is housed in a cost effective, extremely small and thin 5 x 5 mm package.

Features

- Quad Band GSM / Linear EDGE PA
- Small Size, Low Profile (5 x 5 x 0.9 mm)
- Extremely low quiescent current
- Digital power mode control for higher efficiency
- 4 modes for Low Band (HPM, MPM, LPM, and ULPM)
- 3 modes for High Band (HPM, LPM and ULPM)
- 16-pin surface mounting package
- Internal 50 Ω matching networks for both RF input and output
- Green (Lead-free and RoHS compliant)

Applications

- Quad-band GSM and EDGE

Ordering Information

Part Number	Number of Devices	Container
ACPM-7868-TR1	1000	178 mm (7") Tape/Reel
ACPM-7868-BLK	100	Bulk

Absolute Maximum Ratings

Description	Min	Typ	Max	Unit	Associated Pins
RF Input Power *	–		15	dBm	RFIn_LB, RFIn_HB
DC Supply Voltage	0		5.5	V	Vbatt, Vcc
Enable Voltage	0		3.3	V	Ven_LB, Ven_HL
Mode Control Voltage	0		3.3	V	Vmode0, Vmod1
Storage Temperature	-55		+125	°C	

* under 50 Ω

Notes:
1. No damage assuming only one parameter is set at limit at a time with all other parameters set at within recommended operating condition.
2. Operation of any single parameter outside these conditions may cause permanent damage or affect device reliability.

Operating Condition

Description	Symbol	Min	Typ.	Max	Unit
DC Supply Voltage		3.0	3.5	4.8	V
Enable Voltage (Ven)	LOW	0		0.5	V
	HIGH	1.35	1.8	2.9	V
Mode Control Voltage (Vmode0, Vmode1)	LOW	0		0.5	V
	HIGH	1.35	1.8	2.9	V
Case Temperature		-25		+90	°C

Control Logic Table for each Modes of Operation

Power Mode	Ven_LB	Ven_HB	Vmode0	Vmode1
Power Down	Low	Low	X	X
Low Band – High Power Mode (HPM)	High	Low	Low	Low
Low Band – Medium Power Mode (MPM)	High	Low	Low	High
Low Band – Low Power Mode (LPM)	High	Low	High	Low
Low Band – Ultra Low Power Mode (ULPM)	High	Low	High	High
High Band – High Power Mode (HPM)	Low	High	Low	Low
High Band – Low Power Mode (LPM)	Low	High	High	Low
High Band – Ultra Low Power Mode (ULPM)	Low	High	High	High

Recommended Power Levels for each Modes of Operation

Power Mode	GMSK	EDGE
Low Band – High Power Mode	30.5 dBm < Pout ≤ Psat	23 dBm < Pout ≤ 29 dBm
Low Band – Medium Power Mode	16 dBm < Pout ≤ 30.5 dBm	10 dBm < Pout ≤ 23 dBm
Low Band – Low Power Mode	Pout ≤ 16 dBm	Pout ≤ 10 dBm
Low Band – Ultra Low Power Mode	Pout ≤ 16 dBm	–
High Band – High Power Mode	17 dBm < Pout ≤ Psat	16dBm < Pout ≤ 28 dBm
High Band – Low Power Mode	11 dBm < Pout ≤ 17 dBm	Pout ≤ 16 dBm
High Band – Ultra Low Power Mode	Pout ≤ 11 dBm	–

GSM850/GSM900 PA performance specifications

– Conditions: Vbatt and Vcc = 3.5 V, pulse width = 1154 µs, duty cycle = 25%, Ven_LB = High, T = 25° C other wise specified

Parameter		Condition	Min	Typ	Max	Unit
Operating Frequency Range		GSM850 GSM900	824 880		849 915	MHz MHz
Quiescent Current		High power mode	120	150	180	mA
		Medium power mode	70	90	110	mA
		Low Power mode	6	8.5	11	mA
		Ultra low power mode	6	8.5	11	mA
Maximum Output Power		GMSK High power mode	34.5	35		dBm
		GMSK High power mode (degraded power for over Vcc, over Temp)	32.5			dBm
		EDGE High power mode (RMS power)	29	29.5		dBm
		GMSK Medium power mode	30.5	31		dBm
		GMSK Medium power mode (over Vcc, over Temp)	28.5			dBm
		EDGE Medium power mode (RMS power)	23			dBm
		GMSK Low power mode (over Vcc, over Temp)	14	16		dBm
		EDGE Low power mode (RMS power)	10			dBm
		GMSK Ultra low power mode (over Vcc, over Temp)	14	16		dBm
Power Added Efficiency		GMSK High power mode, Po = max	48	52		%
		EDGE high power mode, Po = 29 dBm	25	28		%
		GMSK medium power mode, Po = 30.5 dBm	33	36		%
		Low Power mode , Po = 10 dBm	5	8		%
		Ultra low power mode, Po = 8 dBm	4	6		%
Gain		High power mode, Po = 34.5 dBm	25.5		32	dB
		High power mode, Po = 33.5 dBm	27		32	dB
		Medium power mode, Po = 30.5 dBm	23.5		31	dB
		Medium power mode, Po = 28.5 dBm	26.5		31	dB
		Low Power mode, Po = 10 dBm	10		17	dB
		Ultra low power mode, Po = 8 dBm	10		17	dB
Gain Compression		High power mode, Po = 23.5 dBm ~ 33.5 dBm		0.8	1.3	dB
Gain Variation – Tc and Vbatt (all modes of operation)		-25 ≤ Tc ≤ 90 Ω 3.2 V ≤ Vbatt ≤ 4.2 V (fixed Pin at 3.5 V, 25° C condition)	-2.5		+2.5	dB
EDGE ACPR High Power Mode Po ≤ 25 dBm** Medium Power Mode Po ≤ 23 dBm Low Power Mode Po ≤ 10 dBm	±400 kHz dBc or dBm*				-57 -40	dBc/30 kHz dBm/30 kHz
	±600 kHz dBc or dBm*				-64 -55	dBc/30 kHz dBm/30 kHz
	±3000 kHz dBc or dBm*				-68 -50	dBc/100 kHz dBm/100 kHz
	±6000 kHz dBc or dBm*				-74 -59	dBc/100 kHz dBm/100 kHz

GSM850/GSM900 PA performance specifications (Continued)

Parameter	Condition	Min	Typ	Max	Unit
EDGE EVM High Power Mode Po ≤ 25 dBm** Medium Power Mode Po ≤ 23 dBm Low Power Mode Po ≤ 10 dBm			2	3	%
Output power Noise High power mode Medium power mode	Rx = 869-882 MHz, Tx = 837 MHz		-85	-84	dBm/100 kHz
	Rx = 882-894 MHz, Tx = 837 MHz		-86	-85	dBm/100 kHz
	Rx = 925-935 MHz, Tx = 898 MHz			-79	dBm/100 kHz
	Rx = 935-960 MHz, Tx = 898 MHz			-85	dBm/100 kHz
Harmonics Po < 35 dBm	2 fo			-10	dBm
	3 ~13 fo			-15	dBm
Stability	F<1 GHz; 8:1 VSWR			-36	dBm
	F>2 GHz, 8:1 VSWR			-30	dBm
Ruggedness	All load phases	10:1			
Input Impedance	High power mode, Medium power mode			2:1	
	Low power mode, Ultra low power mode			3:1	
Current under mismatch condition	VSWR = 5:1, all phase angles, post PA loss = 1.5 dB, Pin = 9 dBm, Vcc = 3.7 V		2.7	3.3	A
Forward Isolation	Ven_LB = Low, Pin = -10 dBm			-30	dBm
Cross Isolation	Spurious at HB Output, Low Band signal (fundamental) Ven_LB = High			-15 2	dBm dBm

* Note 1: If the dBc specification is tighter than the dBm limit, then the dBm limit shall be applied instead.

** Note 2: EDGE operation at high power mode can be extended up to 29 dBm in combination with the pre-distortion scheme of transceiver.

DCS1800/PCS1900 PA performance specifications

– Conditions: Vbatt and Vcc = 3.5 V, pulse width = 1154 µs, duty cycle = 25%, Ven_HB = High, T = 25° C other wise specified

Parameter		Condition	Min	Typ	Max	Unit
Operating Frequency Range		DCS1800 PCS1900	1710 1850		1785 1910	MHz MHz
Quiescent Current		High power mode	130	170	210	mA
		Low power mode	30	45	60	mA
		Ultra Low Power mode	12	15	20	mA
Maximum Output Power		GMSK High power mode	32.5	33		dBm
		GMSK High power mode (degraded power for over Vcc, over Temp)	30.5			dBm
		EDGE High power mode (RMS power)	28	28.5		dBm
		GMSK Low power mode (over Vcc, over Temp)	17.8	19.8		dBm
		EDGE Low power mode (RMS power)	16			dBm
		GMSK Ultra low power mode (over Vcc, over Temp)	11.8	13.8		dBm
Power Added Efficiency		GMSK High power mode, Po = Pmax	48	53		%
		EDGE high power mode, Po = 28.5 dBm	28.5	30		%
		Low Power mode , Po = 16 dBm	8	10		%
		Ultra low power mode, Po = 8 dBm	4	6		%
Gain		High power mode, Po = 32 dBm	25.5		31	dB
		High power mode, Po = 28.5 dBm	26.5		32	dB
		Low Power mode, Po = 16 dBm	13		22	dB
		Ultra low power mode, Po = 8 dBm	10		20	dB
Gain Variation – Tc and Vbatt (all modes of operation)		-25 ≤ Tc ≤ 90 Ω 3.2 V ≤ Vbatt ≤ 4.2 V (fixed Pin at 3.5 V, 25° C condition)	-2.5		+2.5	dB
EDGE ACPR High Power Mode Po ≤ 24 dBm** Low Power Mode Po ≤ 16 dBm	±400 kHz dBc or dBm*				-57 -40	dBc/30 kHz dBm/30 kHz
	±600 kHz dBc or dBm*				-64 -60	dBc/30 kHz dBm/30 kHz
	±1800 kHz dBc or dBm*				-65 -55	dBc/100 kHz dBm/100 kHz
	±3000 kHz dBc or dBm*				-68 -55	dBc/100 kHz dBm/100 kHz
	±6000 kHz dBc or dBm*				-76 -55	dBc/100 kHz dBm/100 kHz
EDGE EVM High Power Mode Po ≤ 24 dBm** Low Power Mode Po ≤ 16 dBm				2	3	%

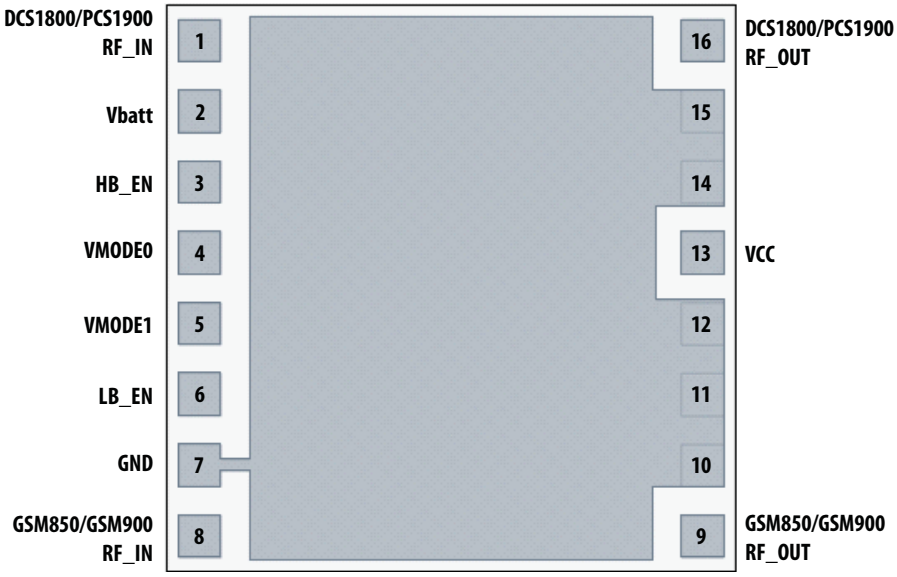
DCS1800/PCS1900 PA performance specifications (Continued)

Parameter	Condition	Min	Typ	Max	Unit
Output power Noise Po > 28 dBm	Rx = 1805-1880 MHz			-83	dBm/100 kHz
	Rx = 1930-1990 MHz			-83	dBm/100 kHz
Harmonics Po ≤ 32.5 dBm	2 fo			-10	dBm
	3 – 7 fo			-15	dBm
Stability	F<1 GHz; 8:1 VSWR			-36	dBm
	F>2 GHz, 8:1 VSWR			-30	dBm
Ruggedness	All load phases	10:1			
Input Impedance	High power mode, Ultra low power mode			2:1	
	Low power mode			3:1	
Current under mismatch condition	VSWR = 5:1, all phase angles, post PA loss = 1.5 dB, Pin = 9 dBm, Vcc = 3.7 V		2	2.5	A
Forward Isolation	Ven_HB = Low, Pin = -10 dBm			-30	dBm
Cross Isolation	Spurious at LB Output, Low Band signal (fundamental) Ven_HB = High			-20 5	dBm dBm

* Note 1: If the dBc specification is tighter than the dBm limit, then the dBm limit shall be applied instead.

** Note 2: EDGE operation at high power mode can be extended up to 28dBm in combination with the pre-distortion scheme of transceiver.

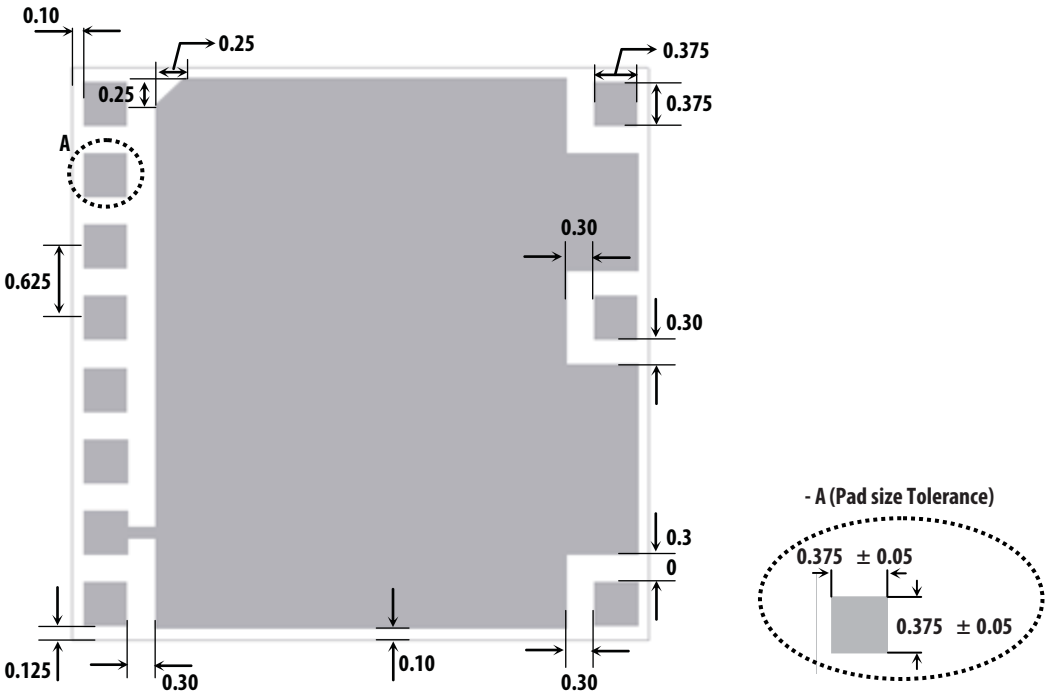
Footprint



5 mm X 5 mm Package Footprint, X-Ray Top View

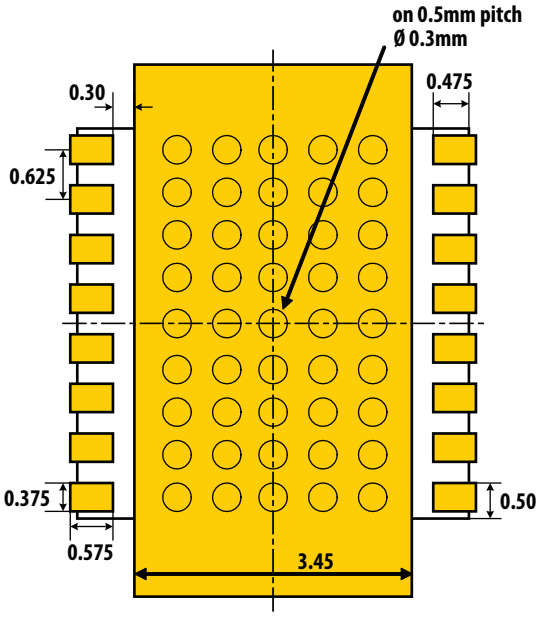
Package Dimension Details

(All dimensions are in millimeters)

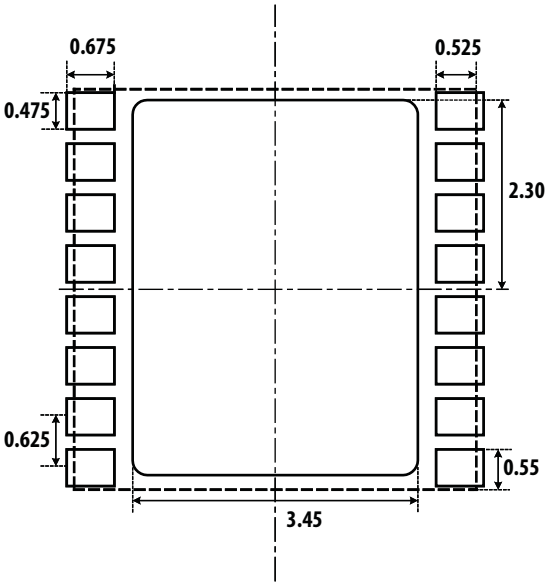


X-Ray Top View

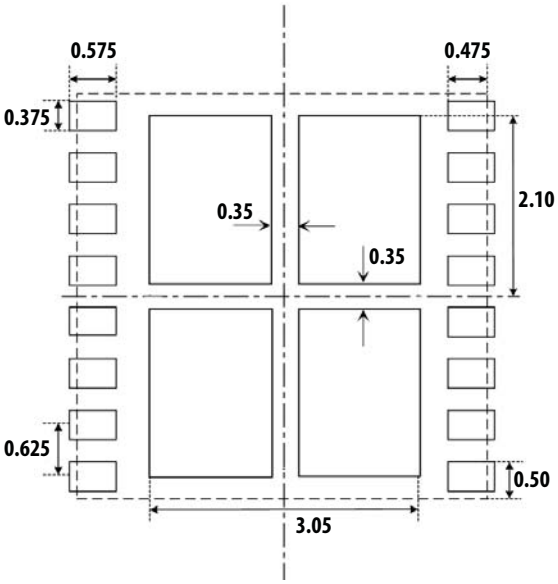
Land Pattern Recommendations



Metallization

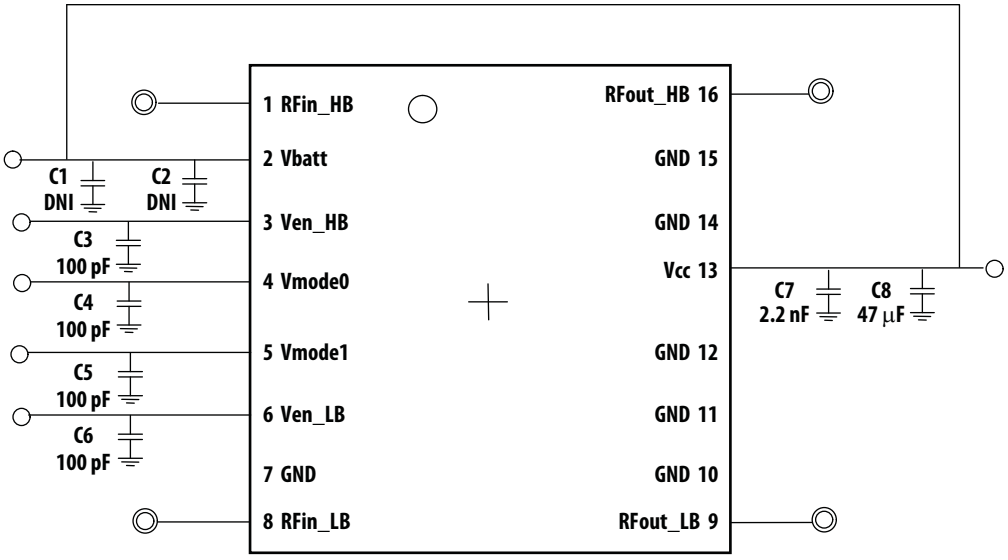


Solder Mask Opening

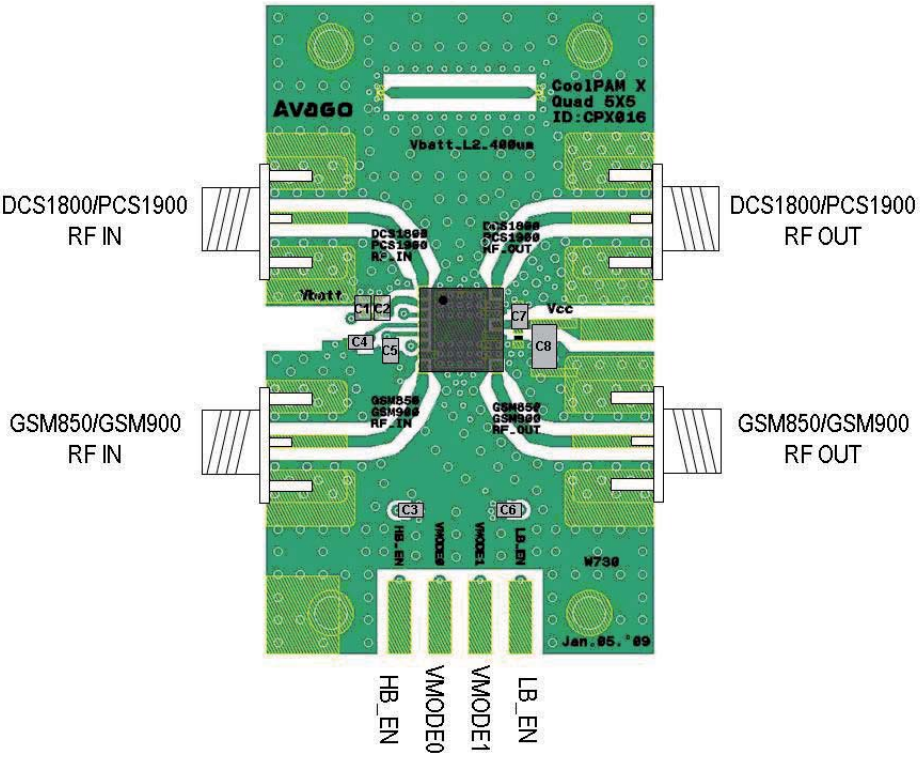


Solder Paste Stencil Aperture

Evaluation Board Schematic

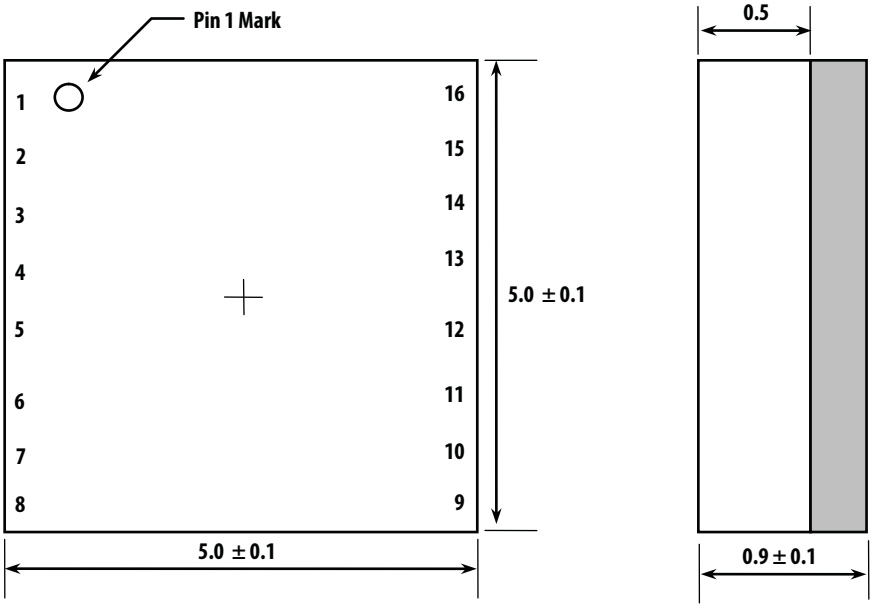


Evaluation Board Assembly Diagram

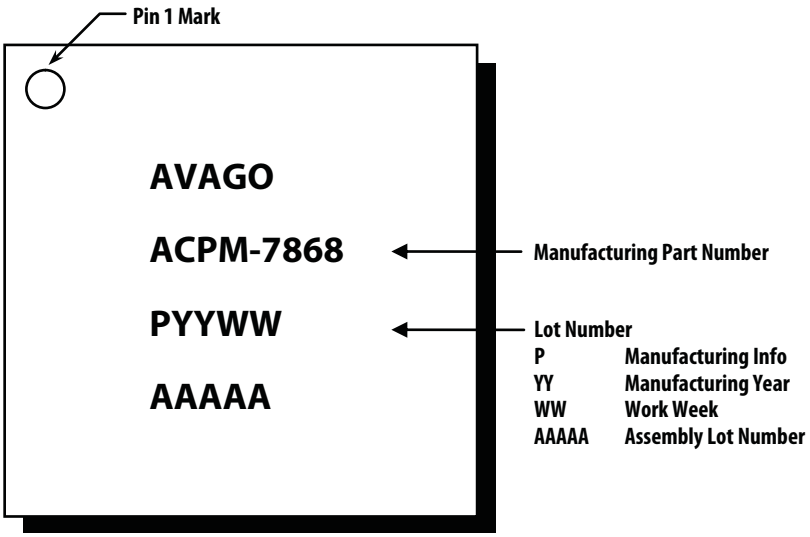


Package Dimensions

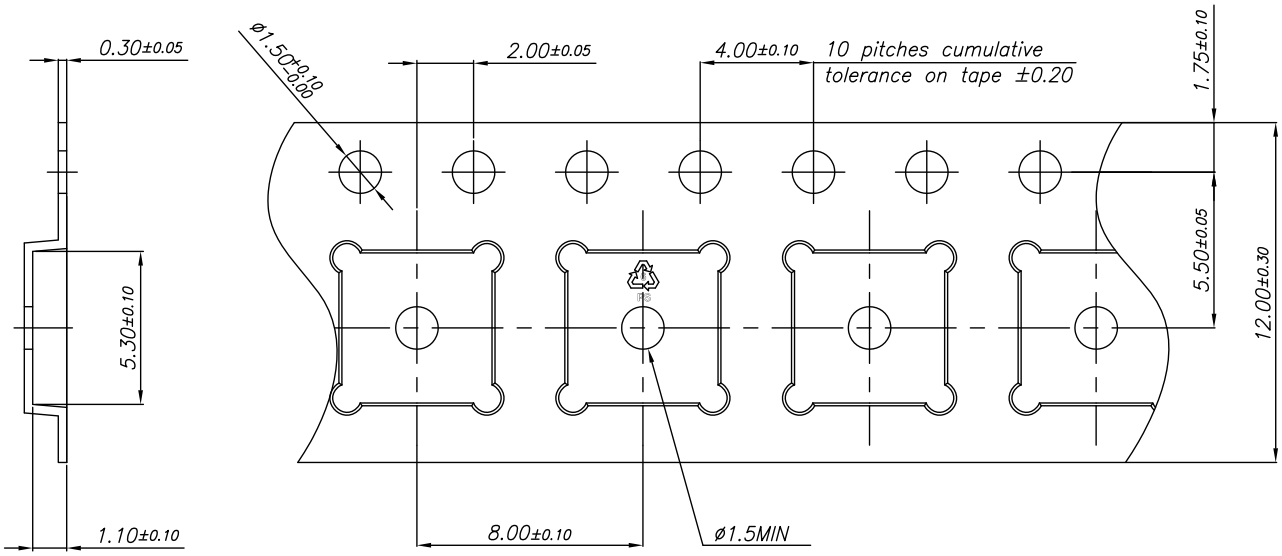
All dimensions are in millimeters

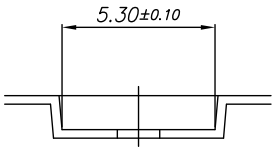


Marking Specification



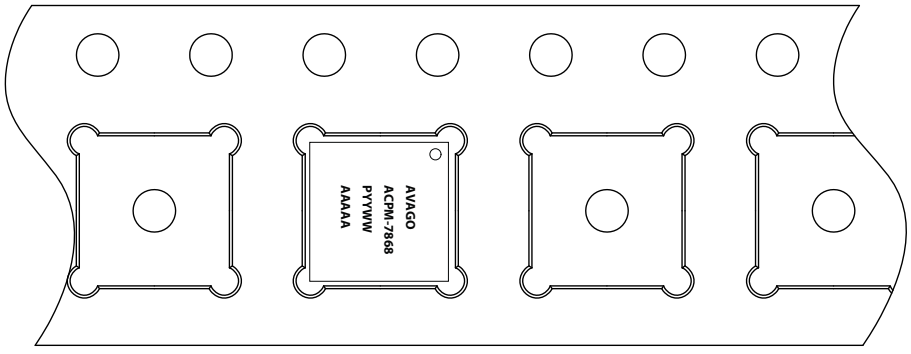
Tape and Reel Information





Notes:
1. 10 sprocket hot pitch cumulative tolerance ±0.2
2. Camber not to exceed 1 mm in 100 mm.
3. Material: Black conductive Polystyrene.
4. Ao and Bo measured on a plane 0.3 mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
7. All dimensions are in millimeters.

Component Orientation



Handling and Storage

ESD (Electrostatic Discharge)

Electrostatic discharge occurs naturally in the environment. With the increase in voltage potential, the outlet of neutralization or discharge will be sought. If the acquired discharge route is through a semiconductor device, destructive damage will result.

ESD countermeasure methods should be developed and used to control potential ESD damage during handling in a factory environment at each manufacturing site.

MSL (Moisture Sensitivity Level)

Plastic encapsulated surface mount package is sensitive to damage induced by absorbed moisture and temperature.

Avago Technologies follows JEDEC Standard J-STD 020B. Each component and package type is classified for moisture sensitivity by soaking a known dry package at various temperatures and relative humidity, and times. After soak, the components are subjected to three consecutive simulated reflows.

The out of bag exposure time maximum limits are determined by the classification test describe below which corresponds to a MSL classification level 6 to 1 according to the JEDEC standard IPC/JEDEC J-STD-020B and J-STD-033.

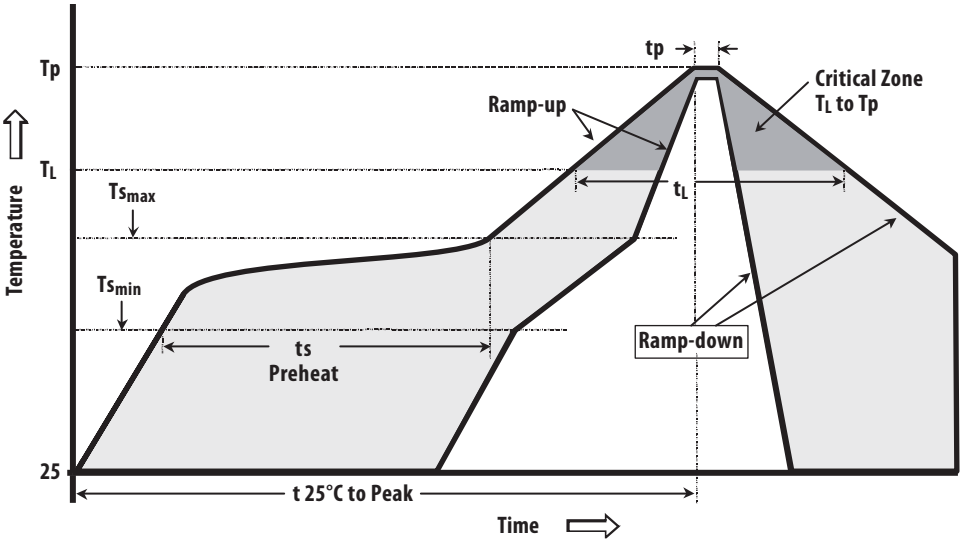
ACPM-7868 is MSL3. Thus, according to the J-STD-033 p.10, the maximum Manufacturers Exposure Time (MET) for this part is 168 hours. After this time period, the part would need to be removed from the reel, de-taped and then re-baked. MSL classification reflow temperature for the ACPM-7868 is targeted at 260°C +0/-5°C. Figure and table on next page show typical SMT profile for maximum temperature of 260 +0/-5°C.

Moisture Classification Level and Floor Life

MSL Level	Floor Life (out of bag) at factory ambient =< 30°C/60% RH or as stated
1	Unlimited at =< 30°C/85% RH
2	1 year
2a	4 weeks
3	168 hours
4	72 hours
5	48 hours
5a	24 hours
6	Mandatory bake before use. After bake, must be reflowed within the time limit specified on the label

Note :
1. The MSL Level is marked on the MSL Label on each shipping bag.

Reflow Profile Recommendations



Typical SMT Reflow Profile for Maximum Temperature = 260 +0/-5°C

Typical SMT Reflow Profile for Maximum Temperature = 260 +0/-5°C

Profile Feature	Sn-Pb Solder	Pb-Free Solder
Average ramp-up rate (TL to TP)	3°C/sec max	3°C/sec max
Preheat – Temperature Min (Tsmin) – Temperature Max (Tsmax) – Time (min to max) (ts)	 100°C 150°C 60-120 sec	 150°C 200°C 60-120 sec
Tsmax to TL – Ramp-up Rate		3°C/sec max
Time maintained above: – Temperature (TL) – Time (TL)	 183°C 60-150 sec	 217°C 60-150 sec
Peak temperature (Tp)	240 +0/-5°C	260 +0/-5°C
Time within 5°C of actual Peak Temperature (tp)	10-30 sec	20-40 sec
Ramp-down Rate	6°C/sec max	6°C/sec max
Time 25°C to Peak Temperature	6 min max.	8 min max.

Storage Condition

Packages described in this document must be stored in sealed moisture barrier, antistatic bags. Shelf life in a sealed moisture barrier bag is 12 months at <40°C and 90% relative humidity (RH) J-STD-033 p.6.

Out-of-Bag Time Duration

After unpacking the device must be soldered to the PCB within 168 hours with factory conditions <30°C and 60% RH as listed in the Table 5-1 on the J-STD-020D p.6.

Baking

It is not necessary to re-bake the part if both conditions (storage conditions and out-of bag conditions) have been satisfied. Baking must be done if at least one of the conditions above has not been satisfied. The baking conditions are listed in the Table 4-1 on the J-STD-033 p.8.

CAUTION

Tape and reel materials typically cannot be baked at the temperature described above. If out-of-bag exposure time is exceeded, parts must be baked for a longer time at low temperatures, or the parts must be de-reeled, de-taped, re-baked and then put back on tape and reel. (See moisture sensitive warning label on each shipping bag for information of baking).

Board Rework
Component Removal, Rework and Remount

If a component is to be removed from the board, it is recommended that localized heating be used and the maximum body temperatures of any surface mount component on the board not exceed 200°C. This method will minimize moisture related component damage. If any component temperature exceeds 200°C, the board must be baked dry per 4-2 prior to rework and/or component removal. Component temperatures shall be measured at the top center of the package body. Any SMD packages that have not exceeded their floor life can be exposed to a maximum body temperature as high as their specified maximum reflow temperature.

Removal for Failure Analysis

Not following the above requirements may cause moisture/reflow damage that could hinder or completely prevent the determination of the original failure mechanism.

Baking of Populated Boards

Some SMD packages and board materials are not able to withstand long duration bakes at 125°C. Examples of this are some FR-4 materials, which cannot withstand a 24 hr bake at 125°C. Batteries and electrolytic capacitors are also temperature sensitive. With component and board temperature restrictions in mind, choose a bake temperature from Table 4-1 in J-STD 033; then determine the appropriate bake duration based on the component to be removed. For additional considerations see IPC-7711 andIPC-7721.

Derating due to Factory Environmental Conditions

Factory floor life exposures for SMD packages removed from the dry bags will be a function of the ambient environmental conditions. A safe, yet conservative, handling approach is to expose the SMD packages only up to the maximum time limits for each moisture sensitivity level as shown in table of Moisture Classification Level and Floor Life. This approach, however, does not work if the factory humidity or temperature is greater than the testing conditions of 30°C/60% RH. A solution for addressing this problem is to derate the exposure times based on the knowledge of moisture diffusion in the component package materials ref. JESD22-A120). Recommended equivalent total floor life exposures can be estimated for a range of humidities and temperatures based on the nominal plastic thickness for each device.

Table on follwoing page lists equivalent derated floor lives for humidities ranging from 20-90% RH for three temperature, 20°C, 25°C, and 30°C.

This table is applicable to SMDs molded with novolac, biphenyl or multifunctional epoxy mold compounds. The following assumptions were used in calculating this table:

1. Activation Energy for diffusion = 0.35eV (smallest known value).
2. For ≤60% RH, use Diffusivity = 0.121exp (-0.35eV/kT) mm2/s (this used smallest known Diffusivity @ 30°C).
3. For >60% RH, use Diffusivity = 1.320exp (-0.35eV/kT) mm2/s (this used largest known Diffusivity @ 30°C).

Recommended Equivalent Total Floor Life (days) @ 20°C, 25°C & 30°C, 35°C

For ICs with Novolac, Biphenyl and Multifunctional Epoxies (Reflow at same temperature at which the component was classified) Maximum Percent Relative Humidity

Maximum Percent Relative Humidity												
Package Type and Body Thickness	**Moisture Sensitivity Level**	**5%**	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	
Body Thickness ≥3.1 mm Including PQFPs >84 pin, PLCCs (square) All MQFPs or All BGAs ≥1 mm	Level 2a	∞	∞	94	44	32	26	16	7	5	4	35°C
		∞	∞	124	60	41	33	28	10	7	6	30°C
		∞	∞	167	78	53	42	36	14	10	8	25°C
		∞	∞	231	103	69	57	47	19	13	10	20°C
	Level 3	∞	∞	8	7	6	6	6	4	3	3	35°C
		∞	∞	10	9	8	7	7	5	4	4	30°C
		∞	∞	13	11	10	9	9	7	6	5	25°C
		∞	∞	17	14	13	12	12	10	8	7	20°C
	Level 4	∞	3	3	3	2	2	2	2	1	1	35°C
		∞	5	4	4	4	3	3	3	2	2	30°C
		∞	6	5	5	5	5	4	3	3	3	25°C
		∞	8	7	7	7	7	6	5	4	4	20°C
	Level 5	∞	2	2	2	2	1	1	1	1	1	35°C
		∞	4	3	3	2	2	2	2	1	1	30°C
		∞	5	5	4	4	3	3	2	2	2	25°C
		∞	7	7	6	5	5	4	3	3	3	20°C
	Level 5a	∞	1	1	1	1	1	1	1	1	1	35°C
		∞	2	1	1	1	1	1	1	1	1	30°C
		∞	3	2	2	2	2	2	1	1	1	25°C
		∞	5	4	3	3	3	2	2	2	2	20°C
Body 2.1 mm ≤ Thickness <3.1 mm including PLCCs (rectangular) 18-32 pin SOICs (wide body) SOICs ≥20 pins, PQFPs ≤80 pins	Level 2a	∞	∞	∞	∞	58	30	22	3	2	1	35°C
		∞	∞	∞	∞	86	39	28	4	3	2	30°C
		∞	∞	∞	∞	148	51	37	6	4	3	25°C
		∞	∞	∞	∞	∞	69	49	8	5	4	20°C
	Level 3	∞	∞	12	9	7	6	5	2	2	1	35°C
		∞	∞	19	12	9	8	7	3	2	2	30°C
		∞	∞	25	15	12	10	9	5	3	3	25°C
		∞	∞	32	19	15	13	12	7	5	4	20°C
	Level 4	∞	5	4	3	3	2	2	1	1	1	35°C
		∞	7	5	4	4	3	3	2	2	1	30°C
		∞	9	7	5	5	4	4	3	2	2	25°C
		∞	11	9	7	6	6	5	4	3	3	20°C
	Level 5	∞	3	2	2	2	2	1	1	1	1	35°C
		∞	4	3	3	2	2	2	1	1	1	30°C
		∞	5	4	3	3	3	3	2	1	1	25°C
		∞	6	5	5	4	4	4	3	3	2	20°C
	Level 5a	∞	1	1	1	1	1	1	1	0.5	0.5	35°C
		∞	2	1	1	1	1	1	1	0.5	0.5	30°C
		∞	2	2	2	2	2	2	1	1	1	25°C
		∞	3	2	2	2	2	2	2	2	1	20°C
Body Thickness <2.1 mm including SOICs <18 pin All TQFPs, TSOPs or All BGAs <1 mm body thickness	Level 2a	∞	∞	∞	∞	∞	∞	17	1	0.5	0.5	35°C
		∞	∞	∞	∞	∞	∞	28	1	1	1	30°C
		∞	∞	∞	∞	∞	∞	∞	2	1	1	25°C
		∞	∞	∞	∞	∞	∞	∞	2	2	1	20°C
	Level 3	∞	∞	∞	∞	∞	8	5	1	0.5	0.5	35°C
		∞	∞	∞	∞	∞	11	7	1	1	1	30°C
		∞	∞	∞	∞	∞	14	10	2	1	1	25°C
		∞	∞	∞	∞	∞	20	13	2	2	1	20°C
	Level 4	∞	∞	∞	7	4	3	2	1	0.5	0.5	35°C
		∞	∞	∞	9	5	4	3	1	1	1	30°C
		∞	∞	∞	12	7	5	4	2	1	1	25°C
		∞	∞	∞	17	9	7	6	2	2	1	20°C
	Level 5	∞	∞	7	3	2	2	1	1	0.5	0.5	35°C
		∞	∞	13	5	3	2	2	1	1	1	30°C
		∞	∞	18	6	4	3	3	2	1	1	25°C
		∞	∞	26	8	6	5	4	2	2	1	20°C
	Level 5a	∞	7	2	1	1	1	1	1	0.5	0.5	35°C
		∞	10	3	2	1	1	1	1	1	0.5	30°C
		∞	13	5	3	2	2	2	1	1	1	25°C
		∞	18	6	4	3	2	2	2	2	1	20°C

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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