AN2027
Application note

Mounting recommendations for ceramic DMOS packages

Introduction

This application note provides mounting recommendations for ceramic packages used in the assembly of DMOS radio frequency transistors suitable for applications such as ISM and FM broadcasting.

1 Mounting recommendations for M174, M177 and M244

1.1 Mounting recommendations

- Ensure holes in heatsinks are free from burrs
- Minimum depth of tapped holes in heatsinks is 6 mm
- Use 4-40 UNC-2A cheese-head screws with a flat washer to spread the joint pressure
- The minimum flatness of the mounting area is 0.02 mm
- Mounting area roughness should be less than 0.5 µm (micro)
- Avoid, as much as possible, use of flux or flux solutions because flux can penetrate even when hermetically sealed ceramic-capped transistors. Tin and wash the printed-circuit board BEFORE mounting the power transistors, then solder the transistor leads without using flux
- Transistor leads may be tinned by dipping them full-length into a solder bath at a temperature of about 230°C. No flux should be used during tinning
- Recommended heatsink compounds : WPSII (silicon free) from Austerlitz Electronics, 340 from Dow Corning etc.

1.2 Mounting sequence

- Apply a thin layer of evenly distributed heatsink compound to the flange
- Position the device with flat washers in place
- Tighten the screws until finger tight (0.05 Nm)
- Further tighten the screws until the specified torque is reached
- For M174, M177 & M244 type of packages, torque should be minimum 0.6 Nm and 0.75 Nm max.

Table 1. DMOS packages - list of materials

Package type	Description	Flange	Leadframe	Ceramic insulator	Plating		Torque (Nm)	
					Leads	Flange	Min.	Max.
M174	0.500 DIA 4L non herm w/flange	Cu	ALLOY 42 (Fe58 / Ni42)	BeO (99.5% min)	Au (100µ min) over Ni (100µ min / 350µ max)	Ni (100µ min) + Pd (10µ min)	0.6	0.75
M174 (Moly disk)	0.500 DIA 4L non herm w/flange (moly disk	Cu-Mo-Cu	ALLOY 42 (Fe58 / Ni42)	BeO (99.5% min)	Au (100µ min) over Ni (100µ min / 350µ max)	Ni (100µ min) + Pd (10µ min)	0.6	0.75

Table 1. DMOS packages - list of materials (continued)

Package type	Description	Flange	Leadframe	Ceramic insulator	Plating		Torque (Nm)	
					Leads	Flange	Min.	Max.
M177	0.550 DIA 4L non herm w/flange	Cu-Mo-Cu	ALLOY 42 (Fe58 / Ni42)	BeO (99.5% min)	Au (60μ min) over Ni (100μ min / 350μ max)	Au (100μ min) over Ni (100μ min / 350μ max)	0.6	0.75
M244	2x 0.400x0.425 wide 2l lap n/h flange	W (85%) - Cu (15%)	ALLOY 42 (Fe58 / Ni42)	BeO(99.5% min)	Au (60μ min) over Ni (100μ min / 350μ max)		0.6	0.75

2 Revision history

Table 2. Document revision history

Date	Revision	Changes
27-Sep-2004	1	Initial release.
08-Jun-2011	2	Document reworked to improve readability, no technical changes.

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