

# ***Engineering Bulletin***

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***ECLIPSE***  
**Engineering Bulletin**  
No: EB-0602

**Product : T150, T500 with RA30 and M series power modules**

**Topic : PCB version Vs Mitsubishi power modules**

**Date : 25/07/2006**

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The power modules in Eclipse T500, T150 exciters have been changed to RA30 series since Mitsubishi discontinued production of the M series power module.

As the new RA30H series power modules have different pin layout compared to the M series, new PCB revisions have been made for the RA series module.

The PCB revisions vs. Mitsubishi modules are indicated as following table:

Product	PA PCB revision	PA SCH revision	Mitsubishi Module
T150	30/9117/0002 or earlier	Version 5 or earlier	M series
	30/9117/0003 or later	Version 6 or later	RA30H series
T500	30/9149/0002 or earlier	Version 2 or earlier	M series
	30/9149/0003 or later	Version 3 or later	RA30H series

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# APPLICATION NOTE

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## SUBJECT: RECOMMENDATION of THERMAL COMPOUND APPLYING METHOD for RA series PRODUCTS

### GENERAL:

In order to keep high reliability of the equipment, it is better to keep the module temperature low. The case temperature of the module is recommended to keep lower than 90 deg. C under all conditions, and to keep lower than 60 deg. C under standard conditions.

Therefore, when the module is mounted onto a heat sink of equipment, thermal compound to get heat sinking should be applied between the module's fin and the heat sink. Following thermal compound is recommended. "G746 Shinetsu Chemical Industry Co., Ltd." or equivalent.

This Application note shows the applying method of thermal compound to MITSUBISHI RA series products.

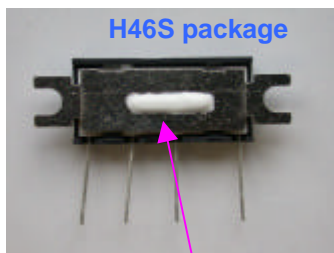
Please note, this method is only general recommendation. Each user can apply thermal compound by using each applying method as equivalent as ours.

### 1. Apply the Suitable Amount of Thermal Compound.

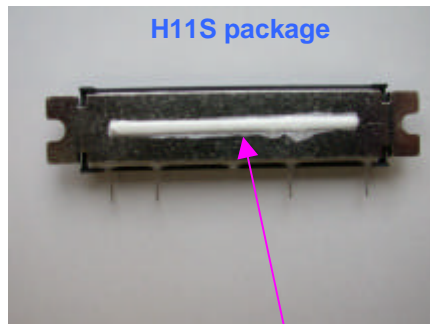
Apply thermal compound to the backside of module flange or mounted area of module on the chassis. Control the amount of compound for each module package size by using "screen mask" or alternative. (see following table)

Package type	Flange size (mm)	Minimum amount of compound (mm <sup>3</sup> )
H46S	30 x 7.4	7
H11S	60.5 x 11	50
H2S	66 x 17	77

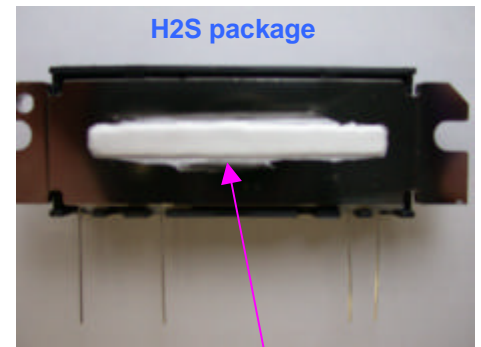
Examples of applying thermal compound



Thermal compound size:  
L10 x W1.5 x t 0.5mm



Thermal compound size:  
L40 x W2.5 x t 0.5mm



Thermal compound size:  
L40 x W4 x t 0.5mm

## 2. Tighten the Screw Alternately.

Mounting the modules should be given careful instruction and their procedures monitored at regular intervals. Since the flanges are punched from a roll of material, there can sometimes be a small “roll – up” at the end of the mounting flange. If the mounting hardware were tightened completely at one end first, it is easy to see that the other end could be “lifted” off the mounting surface well in excess of the allowable flange bending tolerance. And this method will also occur uneven thickness of thermal compound. This should be avoided by first lightly alternately snubbing down the mounting hardware “finger-tight.” Next, the hardware can be torqued to its final specification again in at least to sequential steps.

## 3. Keep the Pasted Area.

To get good (lower) thermal resistance between flange and chassis, pasted area of thermal compound should be keep more than 80% of dented area on back side of the flange. Please check the figure of thermal compound on the flange after tightened to chassis.

Examples of thermal compound figure



## Cross reference of using Mitsubishi M and RA series modules in Eclipse Exciters

Product	25W PA with M series module				25W PA with (Replaced by) RA series			
	PCB revision	SCH revision	Module used	Description	PCB revision	SCH revision	Module used	Description
T150	30/9117/0002 or earlier	V5 or earlier	M67741L	136-156MHz	30/9117/0003 or later	V6 or later	RA30H1317M	130-174MHz
			M67741H	154-174MHz				
T500	30/9149/0002 or earlier	V2 or earlier	M57704L	400-430MHz(10W)	30/9149/0003 or later	V3 or later	RA30H4452M	400-520MHz
			M57788L	400-430MHz(30W)				
			M57704M	430-450MHz(10W)				
			M57788M	430-450MHz(30W)				
			M57704H	450-470MHz(10W)				
			M57788H	450-470MHz(30W)				
			M57704UH	470-490MHz(10W)				
			M5788UH	470-490MHz(30W)				
			M57704SH	490-520MHz(10W)				
			M57788SH	490-520MHz(30W)				