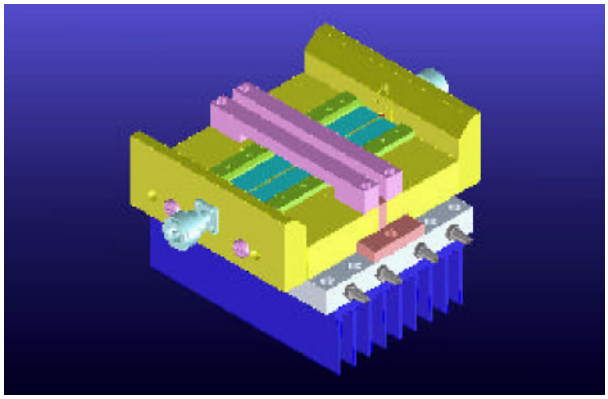
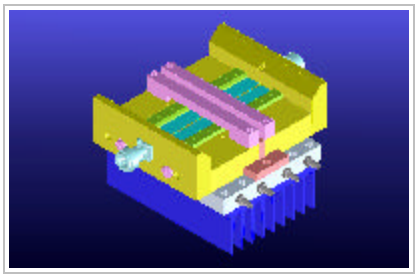
High Power Test Fixture System

Product Note B6140418A



6501 W. Frye Road, Chandler, AZ 85226
Tel: (480) 940-0740 Fax: (480) 961-4754
E-mail: sales@icmicrowave.com Website: icmicrowave.com

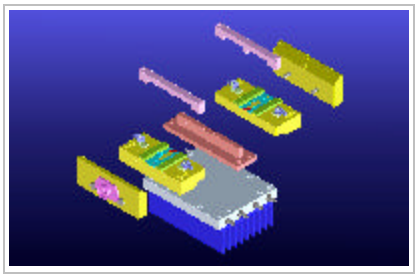
Introduction to the ICM High Power Test Fixture System



ICM High Power Test Fixture System Assembled

The ICM High Power Test Fixture is very flexible and is able to test many different package sizes quickly and economically. Individual components can be interchanged to accommodate specific test applications. The launch sections can be in 50 ohms or can have pre-matching circuitry. The fixture can be operated with air or liquid cooling. The Heatsink can be removed in order to mount the test fixture onto a hot-cold plate for environmental control.

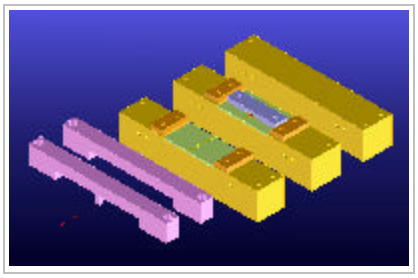
(Click on the picture above for a full page view)



High Power Test Fixture System Exploded

The ICM High Power Test Fixture is assembled from individual components which are chosen for the specific test application. In order to test different packages, only the midsection has to be changed if the transistor has the same tab width. The microstrip launch sections can be interchanged in order to accommodate different tab widths. Different connector options are available for the transition assemblies. All components are mounted onto the base & Heatsink assembly.

(Click on the picture above for a full page view)



TRL Calibration Standards

Calibration should be done inside the fixture in order to eliminate the influence of the test fixture (de-embedding). The TRL Standards are available for 50 ohm and lower impedances such as 11.3 ohms. The standards have to be compatible with the tab width of the DUT and the microstrip launches in order to get a good calibration. Different materials must be considered in order to physically realize the microstrip launches and the calibration standards. Complete calibration coefficients are supplied with every fixture.

(Click on the picture above for a full page view)

Overview

High Power Test Fixture System

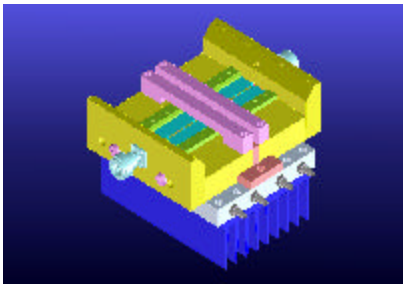
High power test fixtures are used in several different configurations:

First, the Transistor packages have to be measured in a 50-ohm environment in order to establish the parasitic elements of the package.

Internally matched transistors are also measured in a 50-ohm microstrip environment.

Power transistors are measured in Load Pull Systems to establish the desired parameters.

Another application is to measure packaged devices with matching circuits at the input and the output. Quarter wavelength matching circuits are used to present a lower impedance to the device under test (DUT).



High Power Test Fixture System Exploded

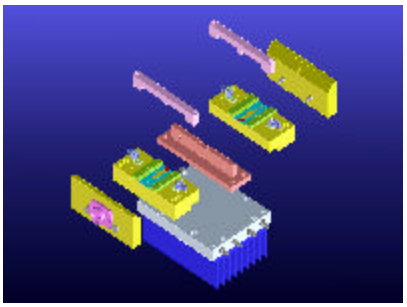
The ICM High Power Test Fixture is assembled from individual components which can be chosen for the specific test application.

The Midsection Assembly is chosen for the specific transistor package.

The width of the transistor tabs influence the input and output Microstrip Launches.

Different connector options are available for the Transition Assemblies.

All components are mounted onto the Base & Heatsink Assembly.

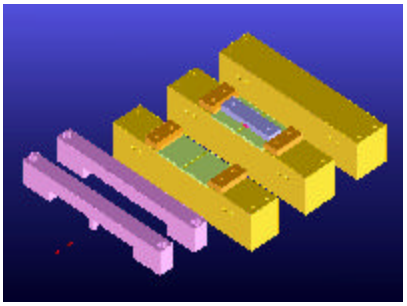


TRL Calibration Kits

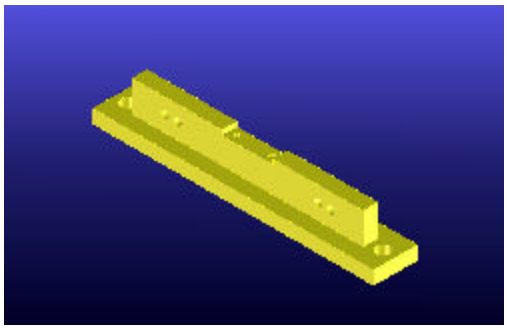
Calibration should be done inside the fixture in order to eliminate the influence of the test fixture (de-embedding). TRL Calibration standards are available for 50 ohms and for lower impedances such as 11.3 ohm.

Different standards are needed for different package lead widths (e.g., lead width of 500 mil, 225 mil, etc.)

Different materials have to be considered in order to physically realize the desired microstrip launch.



Midsections for High Power Transistors

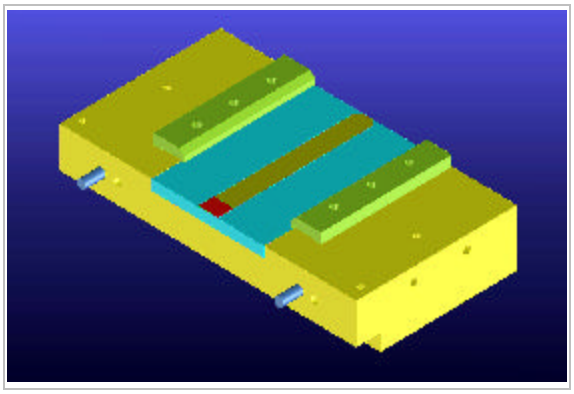
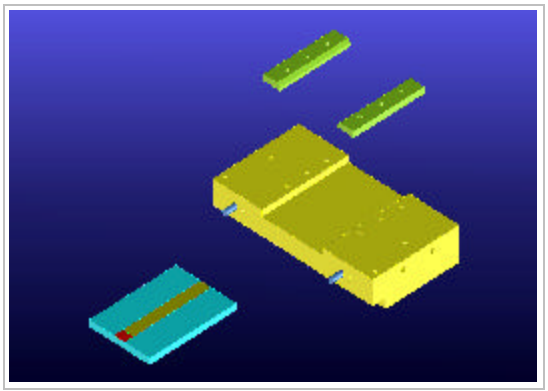
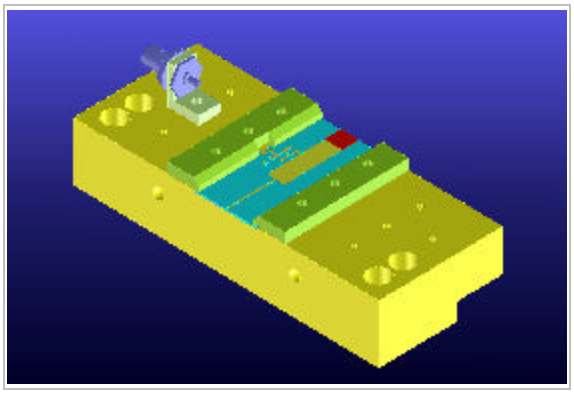
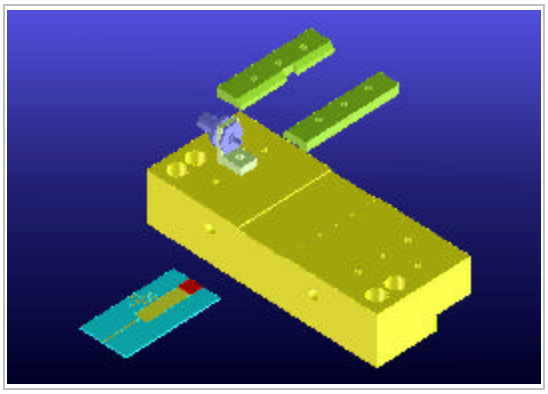
	A = Width of package including tolerance, (RF-in to RF-out) B = Length of package (perpendicular to "A") Depth = Bottom of package to underside of RF-tab including tolerance C = center to center of mounting holes
Typical Midsection	Dimensions on midsection

Midsections

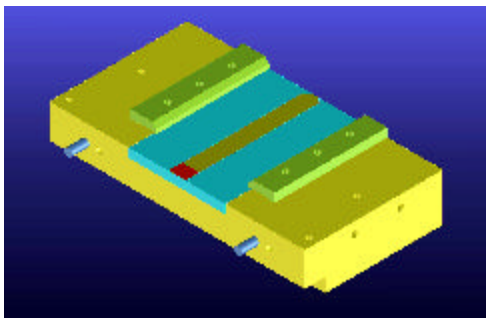
DUT Package Number	ICM p/n	A	B	Depth	C	Special Note	Manufacturer	Tab Width
20250	A0132956	0.400**	2.170	0.084	1.400 offset	Dual		
20237	A0132955	0.400**	1.080	0.100	0.830	-	Ericsson	
20252	A0132954	0.400**	1.080	0.100	0.870		Ericsson	
20248	A0132953	0.385**	1.350	0.064	1.100		Ericsson	
465-04, issue D, style 101	A0133305	?	0.565	0.060	0.375	MRF 18060A	Motorola	
465-02, issue A	A0133660	0.546	1.355	0.057	1.100			
465-04, issue D	A0133661	0.392	1.355	0.055	1.100	S/A A0133727	Motorola	500 mil
Style 101	A0133305	0.166	0.565	0.06	0.375		Tropian	
360B-03, issue D	A0133811	0.242	0.820	0.077	0.562		Motorola	
CS-12	A0133812	0.237	0.990	0.162	0.725	2RF,4 GRD	Kyocera	
P001 (type 465 pkg)	A0133894	0.387	1.350	0.057	1.100		Kyocera	
465C-01, issue O	A0133877	0.547	0.925	0.057	-	no flange	Motorola	500 mil
465-06, issue F	A0135643	0.392	1.355	0.057	1.100		Motorola	500 mil
395C-01, issue A	A0135644	0.262	0.760	0.079	0.560		Motorola	225 mil
SOT502A	A0135910	0.392	1.355	0.057	1.100	BLF0810-180	Philips	500 mil

* Depth between bottom of DUT to under leads (minimum value)
For other models or custom designs, please contact the factory

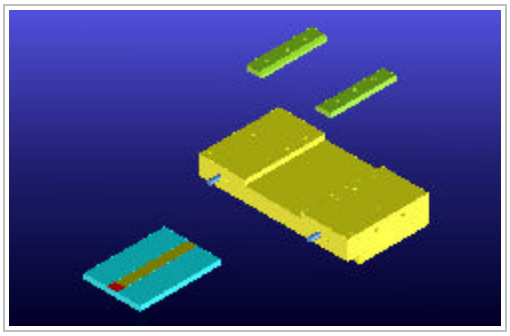
Microstrip Launches for High Power Test Fixture

	
500 mil wide microstrip launch assembled	500 mil wide microstrip launch exploded
	
50 to 11 Ohm launch on 25 mil Alumina	50 to 11 Ohm launch on 25 mil Alumina exploded

50 Ohm Input / Output Launch Assemblies



50 ohm Launch (assembled)



50 ohm Launch (exploded)

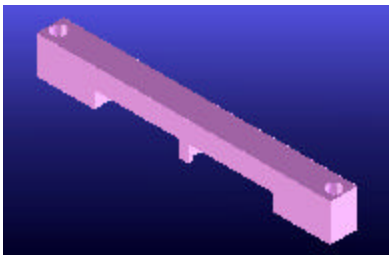
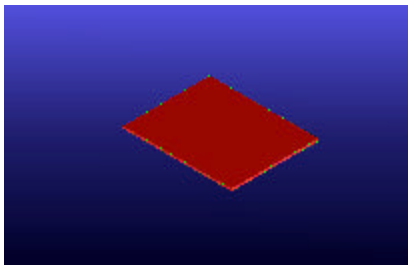
50 Ohm Launch Assemblies

Microstrip Width	Material	ICM p/n	Substrate Length (inch)	Substrate Width (inch)	Contacts	Pusher Assembly	Tab p/n	Remarks
500 mil	0.25" FR-4	A0132952a	2.000	1.400	DURA	A0132957	72133366	
250 mil	0.125" FR-4	A0133701a	2.000	1.400	DURA	A0133705	72134002	
125 mil	0.062" FR-4	A0133702	2.000	1.400	DURA	A0133706	72134003	
62 mil	0.031" FR-4	A0133703	2.000	1.400	DURA	A0133707		
125 mil	0.062" FR-4	A0133813	2.000	1.400	1 RF, 2 GRD	A0133814	72134003	CS-12 Pkg
25 mil	25 mil Alumina	A0131067	2.000	0.200	DURA			
50 mil	50 mil Alumina	A0133704	1.420	3.000	DURA	A0133708		
66 mil	32 mil RO4003	A0135348	2.000	1.400	DURA	A0133706		

For other models or custom designs, please contact the factory

For non - 50 ohm, see Input Match Assemblies or Output Match Assemblies

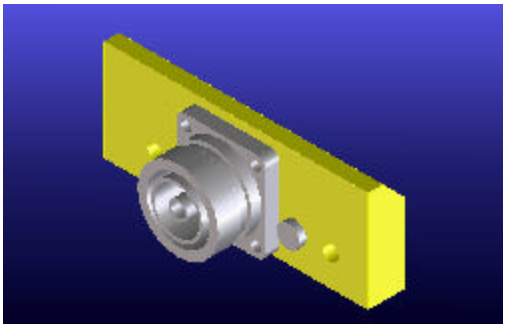
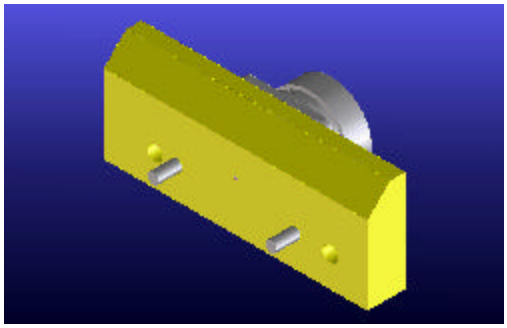
Pusher Assemblies

Pusher Assemblies are used to clamp the DUT leads securely to the microstrip		
		
Pusher Assembly	Pusher center matches the width of the tab and the microstrip	Tab for calibration kit (to bridge from microstrip to microstrip)

Pusher Assemblies			
ICM p/n	**Pusher Tab Width**	**Tab**	**Notes**
A0133706	0.125"	72134003	n/a
A0133705	0.250"	72134002	n/a
A0132957B	0.500"	72134515	n/a
A0136023	0.500"	72134515	for A0133729A

Transition Assemblies

Transition Assemblies for High Power Test Fixtures

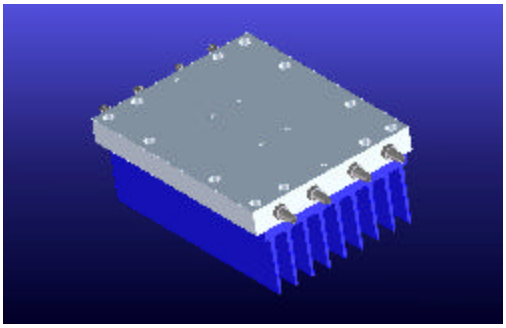
	
Transition with 7/16 Conn.	RF-Pin for microstrip interface

Transition Assemblies

Connector Style	Microstrip Launch Pin Interface	ICM p/n	Notes
APC-7	18 mil	A0133732	for 25 mil Alumina
APC-7	50 mil	A0140320	for 50 mil Alumina
APC-7	109 mil	A0133733	for 250 & 500 mil trace on FR4
N (f)	109 mil	A0132951	for 250 & 500 mil trace on FR4
7/16" (14mm) (f)	18 mil	A0134300A	for 25 & 50 mil Alumina
7/16" (14mm) (m)	18 mil	A0135843	for 25 & 50 mil Alumina
7/16" (14mm) (f)	109 mil	A0133882A	for 250 & 500 mil trace on FR4
APC-3.5	109 mil	A0134325	for 250 & 500 mil trace on FR4
Super-SMA (3.5 mm) (f)	18 mil	A0131203	for 25 & 50 mil Alumina

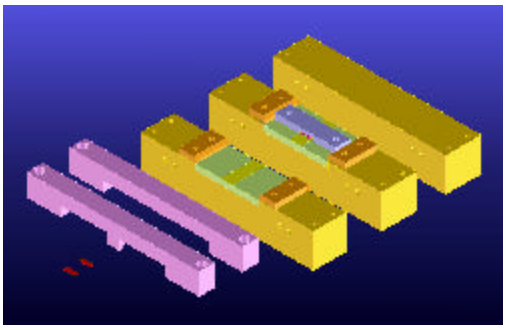
For other models or custom designs, please contact the factory

Base and Heatsink Assemblies

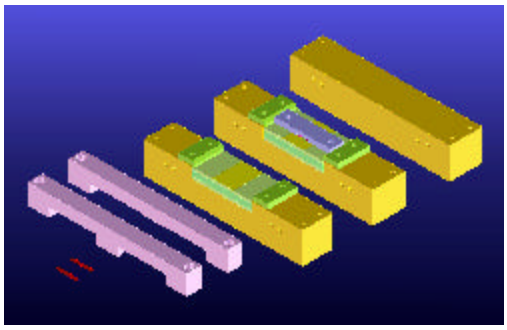


Version	ICM p/n
Standard	A0132958
For custom versions, please contact the factory.	

TRL Calibration Kits



125 mil FR-4 TRL Cal Kit A0133709A



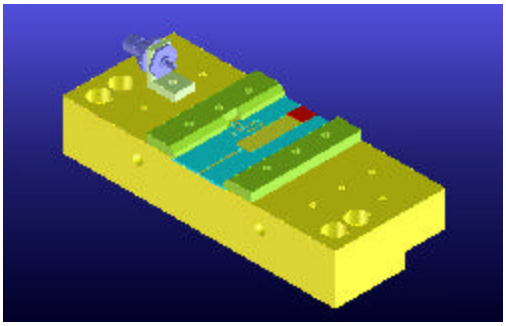
250 mil FR-4 TRL Cal Kit A0132971

TRL Calibration Kits

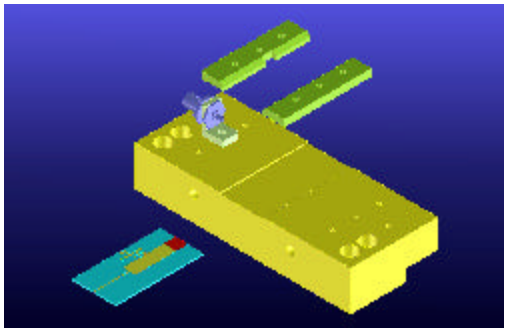
ICM p/n	Material	Thickness	Frequency Range	Impedance	Trace Width
A0133711	FR-4	0.031"	DC - 4 GHz	50 ohm	approx. 62 mil
A0133710	FR-4	0.062"	DC - 3 GHz	50 ohm	approx. 125 mil
A0133709A	FR-4	0.125"	DC - 3 GHz	50 ohm	approx. 250 mil
A0132971	FR-4	0.250"	DC - 4 GHz	50 ohm	approx. 500 mil
A0134326	FR-4	0.062"	DC - 8 GHz	50 ohm	approx. 125 mil
A0135996	FR-4	0.125"	0.8 - 4 GHz	50 ohm	approx. 250 mil
A0135997	FR-4	0.250"	0.8 - 4 GHz	50 ohm	approx. 500 mil
A0130721	Alumina	25 mil	DC - 26.5 GHz	50 ohm	25 mil
A0133712A	Alumina	50 mil	DC - 10 GHz	50 ohm	50 mil
A0136024	Alumina	50 mil	DC - 10 GHz	approx. 11 ohm	500 mil
A0135829	Alumina	50 mil	0.8 - 8.0 GHz	approx. 11 ohm	500 mil
A0133728A	Alumina	50 mil	0.8 - 2.5 GHz	approx. 11 ohm	500 mil
A0135828	Alumina	25 mil	0.8 - 8.0 GHz	approx. 11 ohm	250 mil
A0134305	Alumina	25 mil	0.8 - 2.5 GHz	approx. 11 ohm	250 mil
A0135346	RO4003	0.032"	DC - 4.0 GHz	50 ohm	approx. 66 mil

For other models or custom designs, please contact the factory

Input Match Assemblies
(with Matching Circuit)



Input Launch Assembly with matching circuit



Input Launch Assembly with matching circuit (exploded)

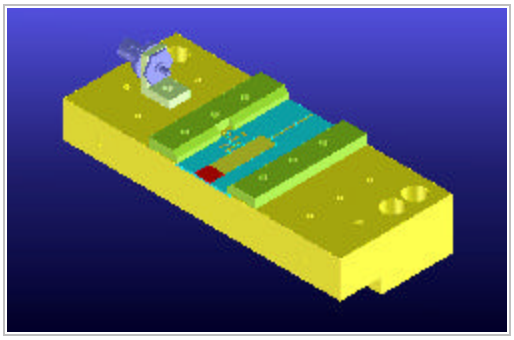
Microstrip Width	Material	ICM p/n	Substrate Length (inch)	Substrate Width (inch)	Contacts	Pusher Assembly	Tab p/n	Remarks
25 / 250 mil	25 mil Alumina	A0134303	1.500	0.750	DURA	A0133705	72129510	input section 50 to 11 ohm
50 / 500 mil	50 mil Alumina	A0133726	1.299	3.000	DURA	A0132957	72133366	input section 50 to 11 ohm
50 / 500 mil	50 mil Alumina	A0133729A	4.075	4.000	DURA	A0132957	72133366	custom taper 50 to 11 ohm

Customer to supply DXF-file for matching circuit

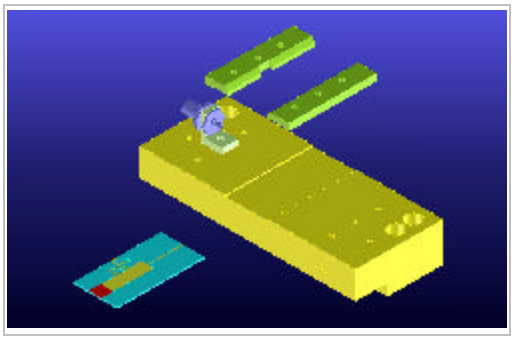
For other models or custom designs, please contact the factory

For 50 ohm Input and Output launches, see Input / Output Launches

Output Match Assemblies
(with Matching Circuit)



Output Launch Assembly with matching circuit



Output Launch Assembly with matching circuit (exploded)

Microstrip Width	Material	ICM p/n	Substrate Length (inch)	Substrate Width (inch)	Contacts	Pusher Assembly	Tab p/n	Remarks
250 / 25 mil	25 mil Alumina	A0134304	1.500	0.750	DURA	A0133705	72129510	output section 11 to 50 ohm
500 / 50 mil	50 mil Alumina	A0136022	1.299	3.000	DURA	A0132957	72133366	output section 11 to 50 ohm
500 / 50 mil	50 mil Alumina	A0133729A	4.075	4.000	DURA	A0132957	72133366	custom taper 11 to 50 ohm

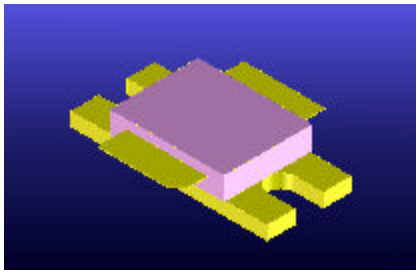
Customer to supply DXF-file for matching circuit

For other models or custom designs, please contact the factory

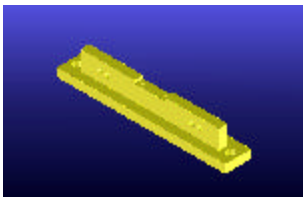
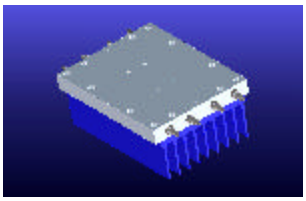
For 50 ohm Input and Output launches, see Input / Output Launches

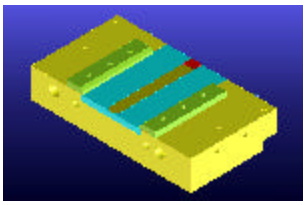
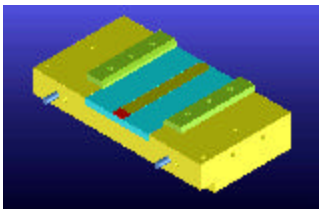
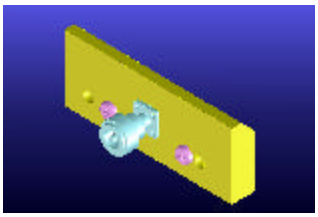
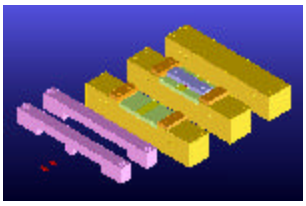
High Power Test Fixture Example #1

Task:	Measure Transistor Package in 50 Ohm Environment
DUT:	Case 465-06, Issue F
Condition:	50 Ohm
Transistor Tab Width:	215 mil
Dielectric Material:	FR-4



Components Selected

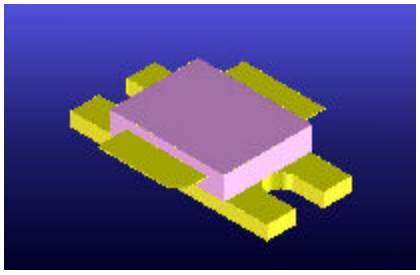
Midsection Assembly ICM p/n: A0135643 (Select dimensions A, B, C and depth for package to be tested)		Base and Heatsink Assembly ICM p/n: A0132958 (Heatsink can be removed to mount base onto Hot/Cold plate)	

Input Microstrip Launch ICM p/n: A0133701 (Microstrip trace width should match the width of the DUT Leads)		Pusher Assembly (input side) ICM p/n: A0133705 (The width of the pusher assembly should be the same as the microstrip width or wider)	
Output Microstrip Launch ICM p/n: A0133702 (Microstrip trace width should match the width of the DUT Leads)		Pusher Assembly (output side) ICM p/n: A0133705 (The width of the pusher assembly should be the same as the microstrip width or wider)	
Transition Assembly ICM p/n: A0133882 (Select transition assembly with desired RF-Connector and correct RF-pin for interface to microstrip launches)		Calibration Kit ICM p/n: A0133709A (Select TRL Calibration kit for desired impedance, microstrip launch material, microstrip thickness and frequency range)	

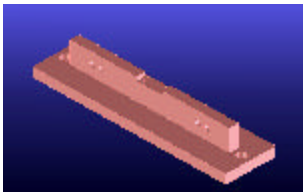
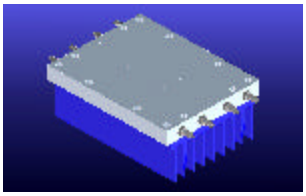
For other models or custom designs, please contact the factory

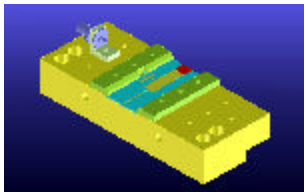
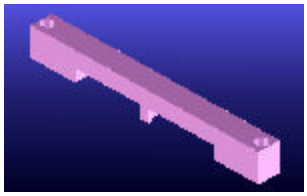
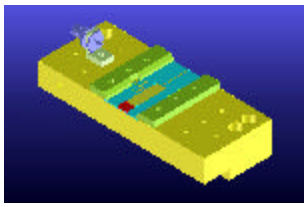
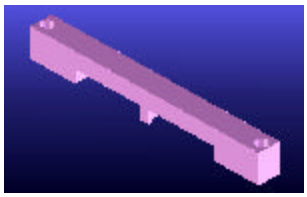
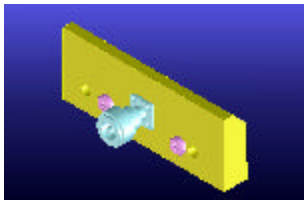
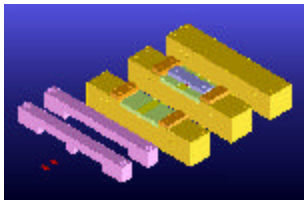
High Power Test Fixture Example #2
(with 10 Ohm pre-matching)

Task:	Measure Transistor Package in 10 Ohm Environment
Device to be Tested:	Case 465-06, Issue F
Condition:	Approx. 10 Ohm
Transistor Tab Width:	215 mil
Dielectric Material:	25 mil Alumina



Components Selected

Midsection Assembly ICM p/n: A0135643 (Select dimensions A, B, C and depth for package to be tested)		Base and Heatsink Assembly ICM p/n: A0132958 (Heatsink can be removed to mount base onto Hot/Cold plate)	

Input Microstrip Launch ICM p/n: A0134303 (Microstrip trace width should match the width of the DUT Leads)		Pusher Assembly (input side) ICM p/n: A0133705 (The width of the pusher assembly should be the same as the microstrip width or wider)	
Output Microstrip Launch ICM p/n: A0134304 (Microstrip trace width should match the width of the DUT Leads)		Pusher Assembly (output side) ICM p/n: A0133705 (The width of the pusher assembly should be the same as the microstrip width or wider)	
Transition Assembly ICM p/n: A0134300 (Select transition assembly with desired RF-Connector and correct RF-pin for interface to microstrip launches)		Calibration Kit ICM p/n: A0135828 (Select TRL Calibration kit for desired impedance, microstrip launch material, microstrip thickness and frequency range)	

For other models or custom designs, please contact the factory