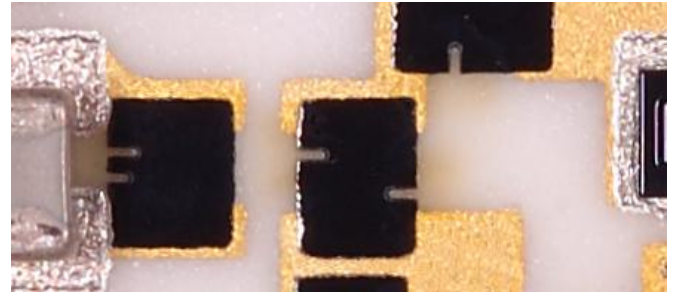


## LASER IN-CIRCUIT FUNCTIONAL TRIMMING

- Cheap and reliable alternative to trimmers or close tolerance components
- Save volume and weight
- Excellent long-term stability
- No drift by vibration and shock
- Trimming on chip components is offered



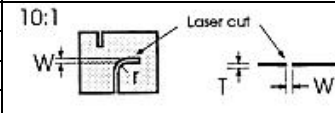
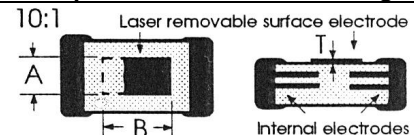
### Electrical Data

Function dependent on a printed resistor		Standard size resistors	Notes
Dynamic range of trimming	%	50	Standard resistors size is 2.0 x 1.3 mm, equivalent to IEC 0805 size
Resistive range of pre-trimmed resistors	Ohm	1K – 1M	
End-tolerance of trimmed function	%	1, 2, 5	
Function dependent on a printed resistor		Larger-sized resistors	Notes
Dynamic range of trimming	%	250	Area of resistor equivalent to IEC 1206
Resistive range of pre-trimmed resistors	Ohm	1– 10 G	Area of resistor equivalent to IEC 1812
End-tolerance of trimmed function	%	0.1	Area of resistor equivalent to IEC 1210

Function dependent on a chip resistor			Notes
Dynamic range of trimming	%	10	Figures are valid for chip 2.0 x 1.3 mm (IEC 0805)
Resistive range of pre-trimmed resistors	Ohm	1 - 100M	
End-tolerance of trimmed function	%	0.5, 1, 2.5	

Function dependent on a chip capacitor			Notes
Dynamic range of trimming	%	-75 to -85	Figures are valid for chip 3.1 x 1.5 mm (IEC 1206)
Capacitance range	pF	2 - 21	
End-tolerance of trimmed function	pF	0.1	

### Physical Data

Type of trimming	Dimensions (mm)					Resistive functional trimming	Capacitive functional trimming
	A	B	r	T	W		
Resistive	Nom	Nom	Nom	Nom	Nom		
Capacitive	1.60	0.80		0.015			

#### Resistive functional trimming

The function is detected, and while it is continuously detected, trimming is started. The trimming continues until the requested function and tolerance of function is reached.

#### Capacitive functional trimming

The function is detected, and while it is continuously detected, trimming is started. The trimming continues with decreasing capacitance until the requested function and tolerance of function is reached.

# LASER IN-CIRCUIT FUNCTIONAL TRIMMING

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## Performance Data

		Resistive trimming	Capacitive trimming	Notes
		Maximum	Maximum	
Load life stability	%	0.2	0.1	1000 hours at 70°C at rated power
Load life stability	%	0.1	0.1	Shelf life one year
Long-term damp heat	%	0.2	0.1	40°C/93%RH/56 days
Temperature cycling	%	0.2	0.1	100 cycles -55 to 125°C
Resistance to solder heat	%	0.2	0.1	260°C in 10seconds
Vibration	%	No drift	No drift	20G in 2hours

## Application Notes

The typical applications for resistive functional trimming are matching of two or more resistors to adjust a gain, an amplification, a linearity of a converter or a balance of a bridge.

Also cut-off frequencies can be tuned fast and cheap by resistive functional trimming.

The frequency of an RC-circuit is measure, followed by functional trimming of the resistor.

With capacitive functional trimming frequency tuning can be improved and often cost-reduced.

## Circuit simulation

To ensure the optimum choice of component values, tolerances, Hybrico has the capability to run simulations of critical circuits.

The simulation can also involve thermal properties.

## Testing

All circuits are 100% tested for all relevant functions either on pc-based test system or by specially made go no-go test boxes

### Quality

All procedures from design to final inspection and shipment are described and monitored. The quality system correspond to ISO 9001

## Packaging

The modules are anti-statically handled and packed in cardboard or plastic boxes. The quantity per box depends on the size of the circuits.

The chip circuits can be supplied on tape and reel. Size of tape and quantity per reel depend on the size of the circuits.

### Ordering procedure

Specify all dimension, the circuit diagram, the requested terminal style and positions and the test specification.

First-orders will have a tooling charge.

When reordering, please specify the manufacturing reference M-number of your circuit.

Any quantity can be ordered, but the cost of production start will make small quantities expensive

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