

Thru and 2-, 3-, 4-, 5- and 6-dB Attenuator Array, DC to 22 GHz

Typical Applications

- Select at Test
- Space Hybrids
- Military Hybrids
- Microwave Radios
- Prototype Kits
- Test and Measurement Systems

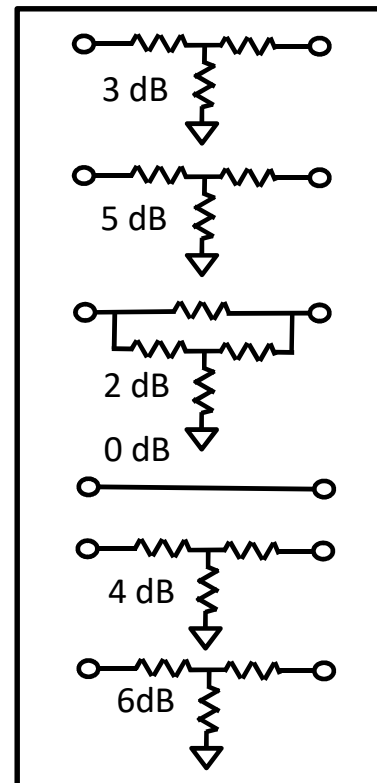
Description

The ENGAT00135 is a die with 5 attenuators, plus a thru path. The part is ideal for select-at-test applications. The signal path is selected by wire bond connections to the bond pads associated for attenuation of 2, 3, 4, 5 or 6 dB, while maintaining good impedance match to 50 Ohms. The die has a gold backside metallization and is designed to be silver epoxy attached. The RF interconnects are designed to account for wire bonds and external microstrip flares for optimal integrated return loss. Nichrome resistors with low temperature coefficients are set up to handle up to 0.5 Watt RF input power levels.

Features

- Ultra wideband performance
- Excellent return loss
 - > 18 dB typical
- RF Power handling: +27 dBm
- Die size: 1.39 x 2.76 x 0.10 mm
(0.055 x 0.109 x 0.004 inch)

Functional Block Diagram



Electrical Specifications, T = 25 °C, Typical data

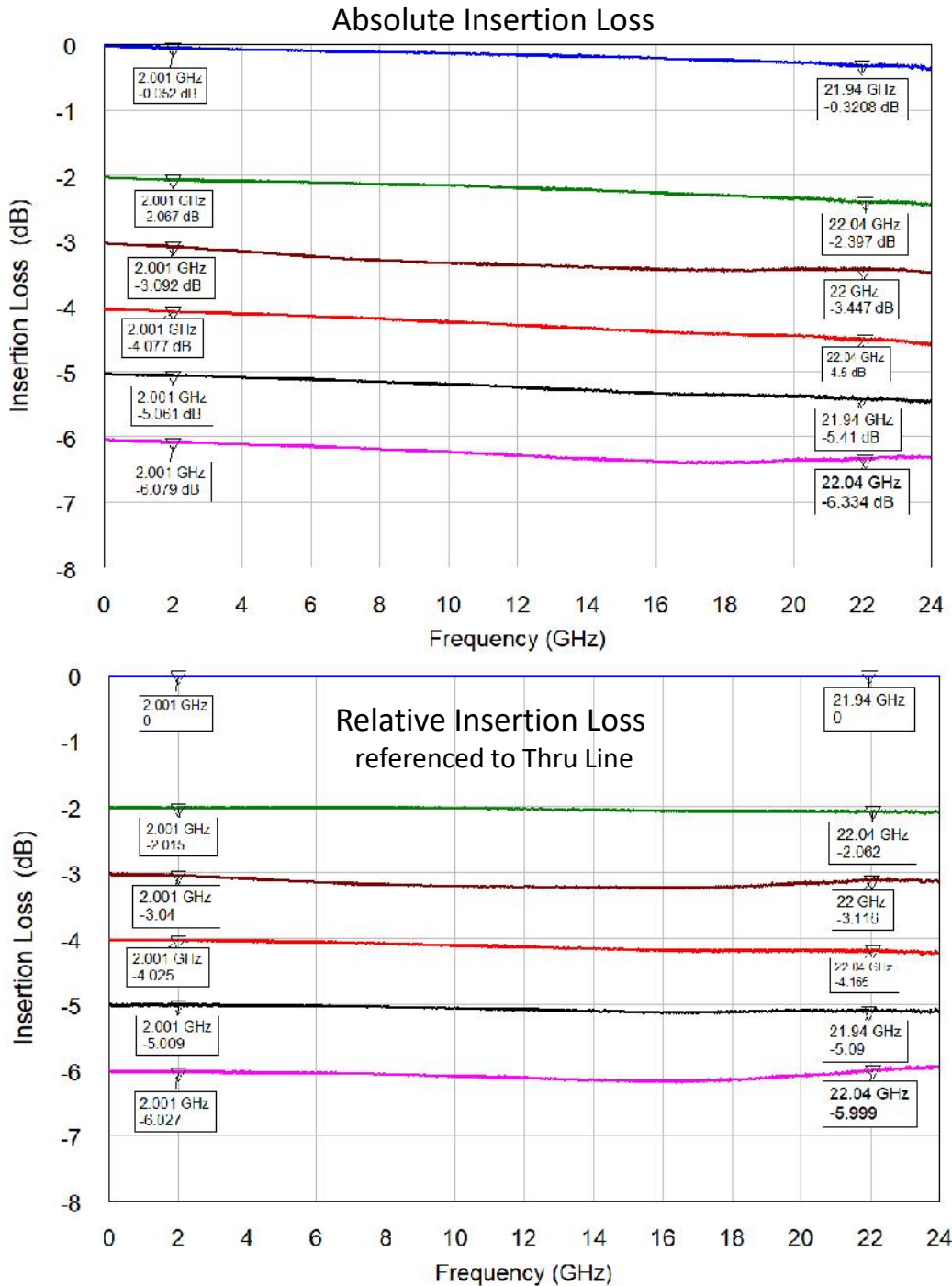
Parameter	Path	Freq (GHz)	Min	Typical	Max	Units
Insertion Loss	Thru	2		0.1		dB
		22		0.3		dB
	2 dB	2		2.1		dB
		22		2.4		dB
	3 dB	2		3.1		dB
		22		3.5		dB
	4 dB	2		4.1		dB
		22		4.5		dB
	5 dB	2		5.1		dB
		22		5.4		dB
	6 dB	2		6.1		dB
		22		6.3		dB
In/Out Return Loss	3 dB	DC - 22		> 18		dB
	All others	DC - 22		> 20		dB
Power Handling	All	DC - 22		27		dBm

Absolute Maximum Ratings

Parameter	Max level
RF Power (assuming no DC power applied)	+29 dBm
Storage Temperature	-65 °C to +150 °C
Operating Temperature	-55 °C to +125 °C
Max DC Voltage applied to one port (assuming no RF power applied)	6.3 V

RF Data with wirebonds and external microstrip flare pads

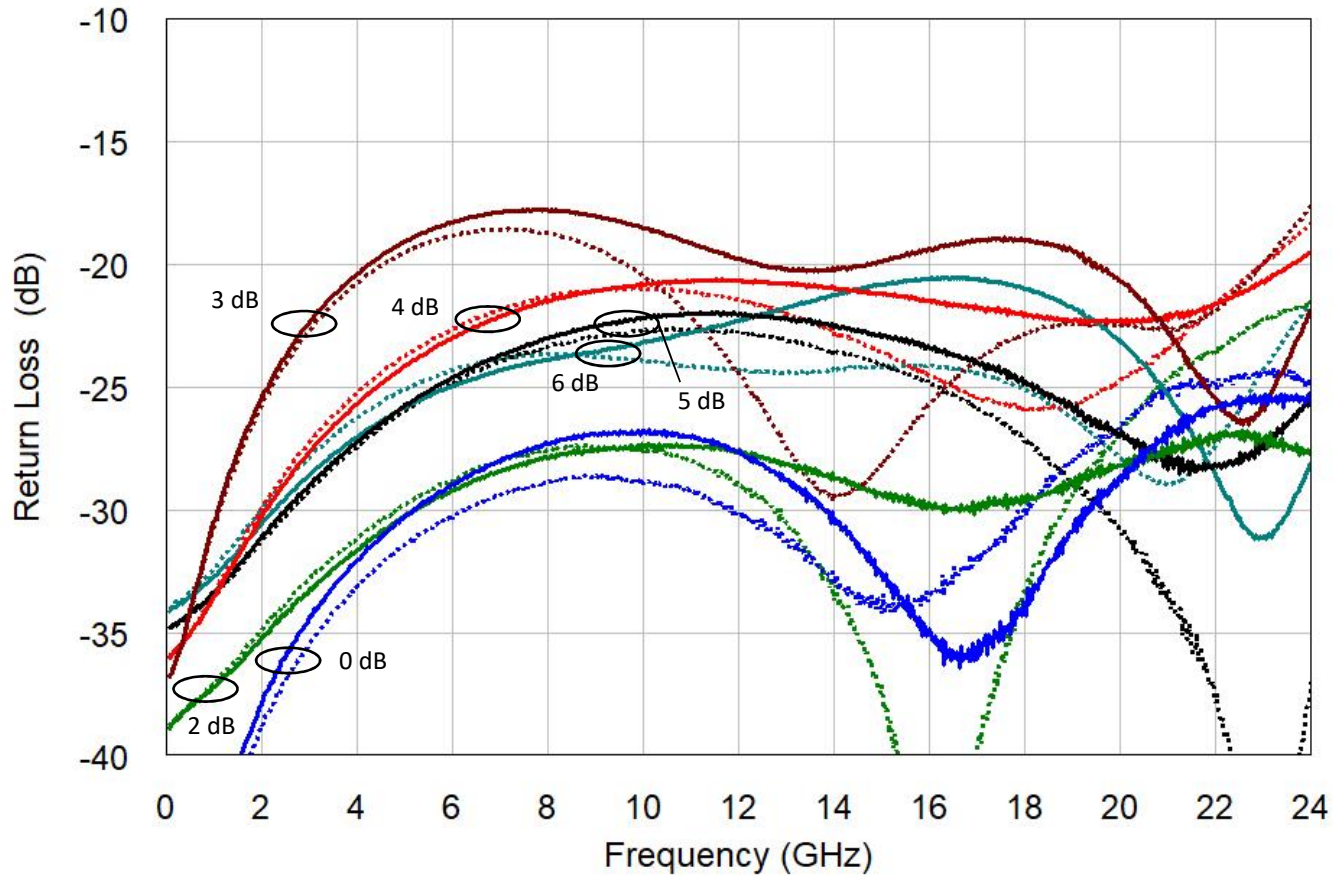
Measured Insertion Loss



RF Data with wirebonds and external microstrip flare pads

Measured Return Loss (dB)

Input RL Solid, Output RL Dotted

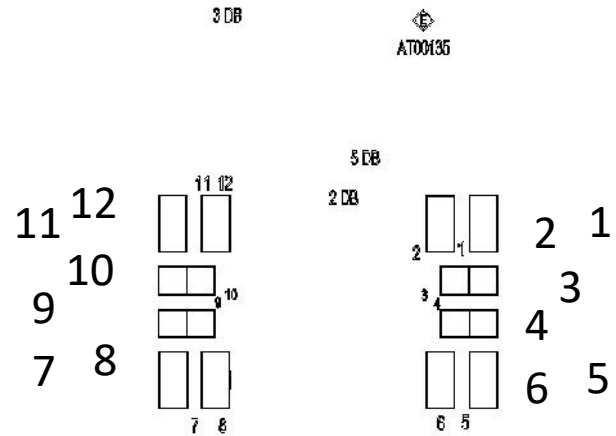


Outline Drawing

2760 —————
(.109)

Notes:

1. All dimensions are in μm (inches).
2. Substrate thickness: 100 μm (0.004").
3. Backside metallization is gold.
4. Bond pad metallization is gold.



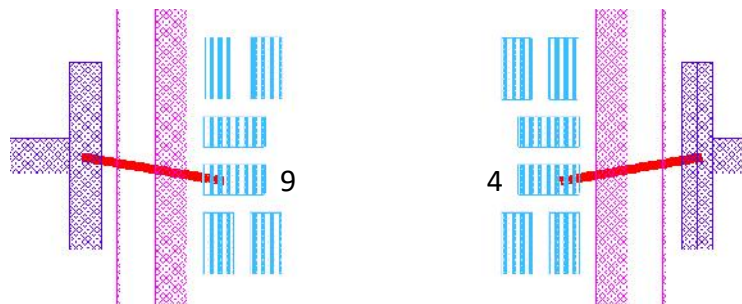
Bondpad Label	Signal	Bondpad Dimensions		Bondpad Center	
		X-dim. (um)	Y-Dim. (um)	X-dim. (um)	Y-dim. (um)
1	3 dB Output	100	200	1241	1655
2	5 dB Output	100	200	1091	1655
3	2 dB Output	200	100	1191	1455
4	Thru Output	200	100	1191	1305
5	6 dB Output	100	200	1241	1105
6	4 dB Output	100	200	1091	1105
7	6 dB Input	100	200	150	1105
8	4 dB Input	100	200	300	1105
9	Thru Input	200	100	200	1305
10	2 dB Input	200	100	200	1455
11	3 dB Input	100	200	150	1655
12	5 dB Input	100	200	300	1655

Wire Bond Configurations and Suggested Microstrip Flares

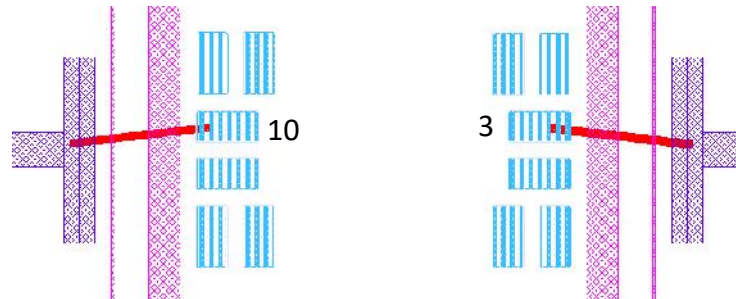
1 mil dia. Gold wire

X-dimension wire length 380um (15 mils)

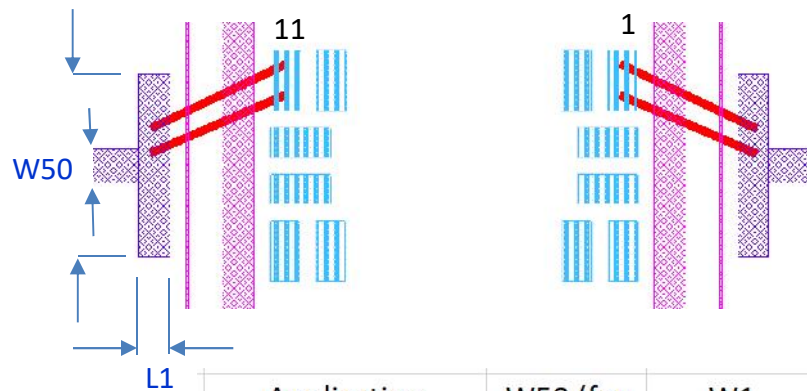
Wire Bond
(2 places) as
shown for Thru Line



Wire Bond
(2 places) as
shown for 2 dB



Wire Bond
(4 places) as
shown for 3 dB



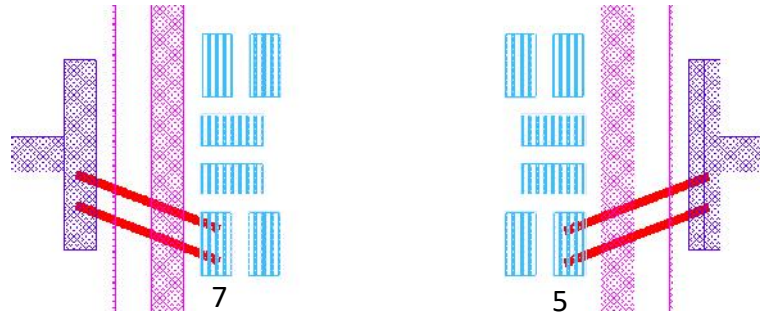
Application Substrate	W50 (for 50 Ohms) (um)	W1 flare width (um)	L1 flare length (um)
5 mil Alumina	120	590	100
10 mil Alumina	240	590	160
8 mil Rogers 4003	438	452	185

Wire Bond Configurations and Suggested Microstrip Flares

1 mil dia. Gold wire

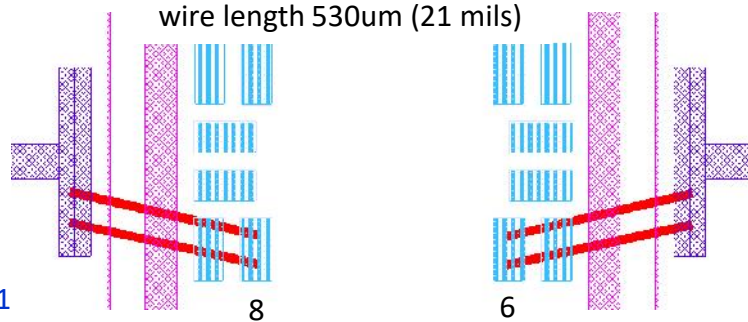
X-dimension wire length 380um (15 mils)

Wire Bond
(4 places) as
shown for 6 dB

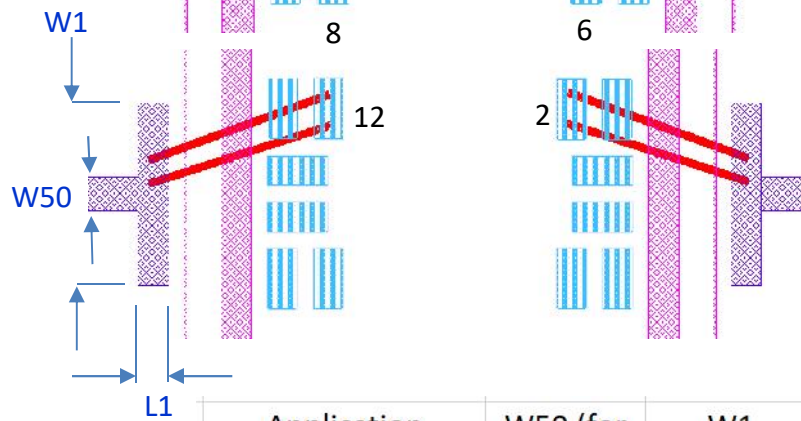


Wire Bond
(4 places) as
shown for 4 dB

For 4 and 5 dB, X-dimension
wire length 530um (21 mils)



Wire Bond
(4 places) as
shown for 5 dB



Application	W50 (for 50 Ohms)	W1 flare width	L1 flare length
Substrate	(um)	(um)	(um)
5 mil Alumina	120	590	100
10 mil Alumina	240	590	160
8 mil Rogers 4003	438	452	185