



GC4701 – GC4750

CONTROL DEVICES – LIMITER DIODES

RoHS Compliant

GENERAL DESCRIPTION

The GC4700 series diodes are specially processed PIN diodes designed for use in passive or active limiters at frequencies through Ku band.

Thirteen categories of devices are offered for flexibility in design of low, medium and high power limiters.

Low VB limiters have thinner I regions for faster turn-on time and better flat leakage. Microsemi also manufactures “gold doped” limiters for fastest turn on time. In addition, we manufacture high voltage dual junction limiters for superior peak and CW power handling.

This series of diodes meets RoHS requirements per EU Directive 2002/95/EC.

APPLICATIONS

A diode limiter is a power-sensitive variable attenuator that uses the non-linear properties of the diode to provide an impedance mismatch when sufficient amounts of RF power are incident on the device. The output power is reduced to a level that will not overdrive a receiver, burn out a mixer, etc. For varying input power levels in excess of the diode’s threshold level, the limiter’s output power tends to remain constant.

A passive limiter is one in which the limiter diodes are “turned on” by the RF signal itself. An active limiter is one in which the limiter diodes are “turned on” primarily by an external bias current typically supplied by a Schottky detector diode which senses the incident signal.

Since limiter diodes are not designed to dissipate large amounts of power, the limiter must reflect or divert the excess incident power back to the source or to another load (i.e. via a circulator, hybrid coupler, etc.).

Limiter diodes may be used in wave guides, coax, microstrip, stripline or other media. Single or cascaded devices may be used, depending on power levels.

KEY FEATURES

- Available as packaged devices or as chips for hybrid applications.
- Low Loss
- Suitable for applications to 18 GHz.
- Excellent flat leakage performance.
- Low 1 dB compression point.
- Gold Doped Diodes for Fast Turn On.
- RoHS Compliant ¹

1- Most of our devices are supplied with Gold plated terminations. Other terminal finishes are available upon request. Consult factory for details.

APPLICATION/BENEFITS

- Receiver protection circuits
- Amplifier Protection



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ABSOLUTE MAXIMUM RATINGS @ 25°C

Rating	Symbol	Value	Unit
Maximum Leakage Current @80% of minimum Rated V_B	I_R	0.5	μA
Operating Temperature	T_{OP}	-55 to +150	°C
Storage Temperature	T_{STG}	-65 to +150	°C

CHIP ELECTRICAL PARAMETERS AT 25°C

Model Number	V_b (Min) $I_R=10\mu A$ (Volts)	C_{j0} (Typ) @0V (pF)	C_{j-6} (Max) @-6V (pF)	C_{j-50} (Max) @-50V (pF)	R_s (Typ) @10mA (Ω)	T_L (Typ) (ns)	θP^1 (Typ) THERMAL RESISTANCE (°C/W)	θP^2 (Max) THERMAL RESISTANCE (°C/W)
GC4701-00	20	0.20	0.15	----	1.5	5	20	100
GC4702-00	20	0.50	0.30	----	1.2	10	12	80
GC4711-00	45	0.20	0.15	----	1.5	10	15	80
GC4712-00	45	0.50	0.30	----	1.2	15	10	60
GC4713-00	45	0.70	0.50	----	1.0	20	6	40
GC4721-00	120	0.20	0.15	----	1.5	50	1.2	40
GC4722-00	120	0.60	0.30	----	1.0	50	0.5.	20
GC4723-00	120	0.80	0.50	----	0.5	100	0.3	15
GC4731-00	15	0.15	0.12	----	2.0	5	30	120
GC4732-00	15	0.20	0.15	----	1.5	5	20	80
GC4741-00	30	0.12	0.10	----	2.0	7	20	100
GC4742-00	30	0.20	0.15	----	1.5	7	15	70
GC4750-002 ⁽³⁾	250	----	----	0.25 ⁽⁴⁾	3.0@50mA	300	4	10

Notes:

- 1) Pulse length 1 microsecond.
- 2) As measured in style 30 package.
- 3) Available in 002 style or 115-2 package styles.
- 4) C_j for 2 junctions in parallel @ $V_R=50V$.

For the most current data, consult MICROSEMI's website: www.MICROSEMI.com
Specifications are subject to change, consult the RFIS factory at (978) 442-5600 for the latest information.



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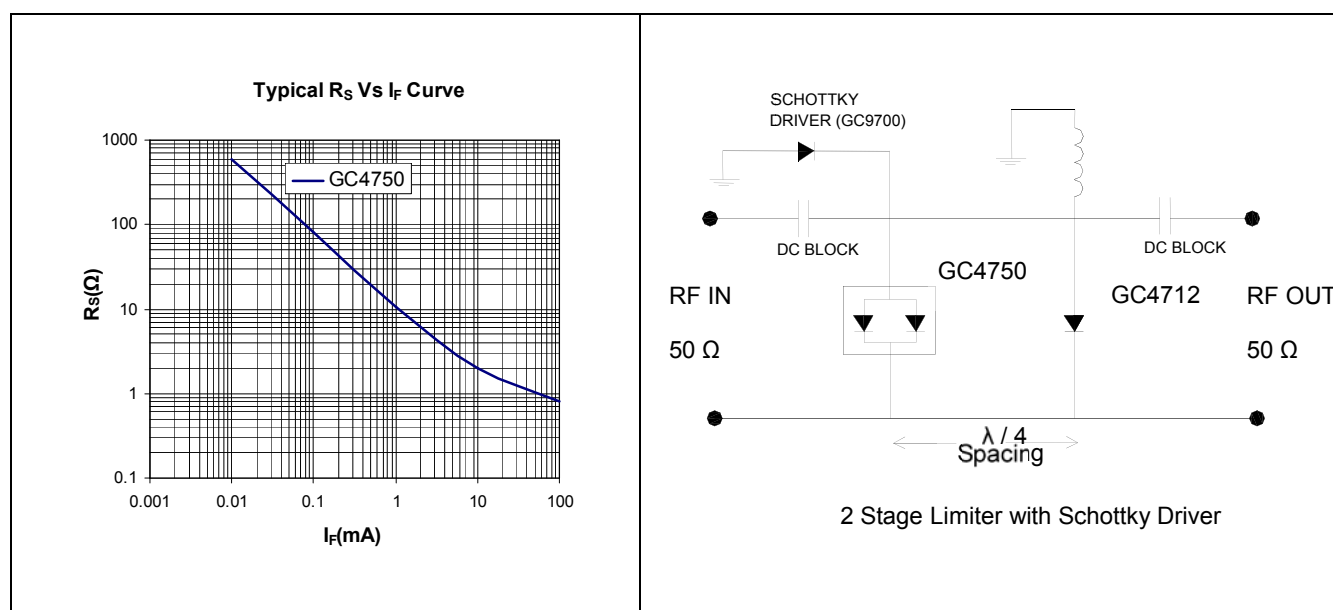
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TYPICAL RF PERFORMANCE AT 25°C

Model Number	V _b (Min)	PEAK POWER P _{IN} @ 1 μ S (dBm)	TYPICAL LEAKAGE P _{out} (dBm)	TYPICAL THRESHOLD (dBm)	TYPICAL INS. LOSS I _L (dB)	MAXIMUM CW POWER (Watts)
GC4701	20	+50	+22	+10	0.1	2
GC4702	20	+53	+24	+10	0.2	3
GC4711	45	+53	+27	+15	0.1	3
GC4712	45	+56	+29	+15	0.2	4
GC4713	45	+59	+31	+15	0.2	5
GC4721	120	+60	+39	+20	0.1	5
GC4722	120	+63	+41	+20	0.2	10
GC4723	120	+66	+44	+20	0.2	15
GC4731	15	+47	+19	+7	0.1	2
GC4732	15	+50	+22	+4	0.2	3
GC4741	30	+47	+24	+12	0.1	3
GC4742	30	+50	+27	+12	0.1	4
GC4750	250	+56 @10 μS	+44	+31	0.2	50

POWER LEAKAGE PERFORMANCE

TRANSFER CHARACTERISTICS



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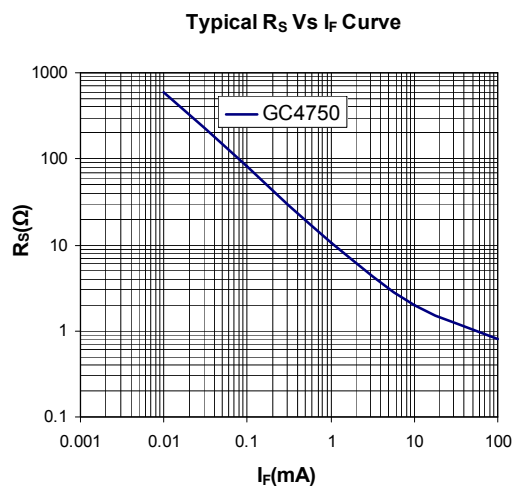


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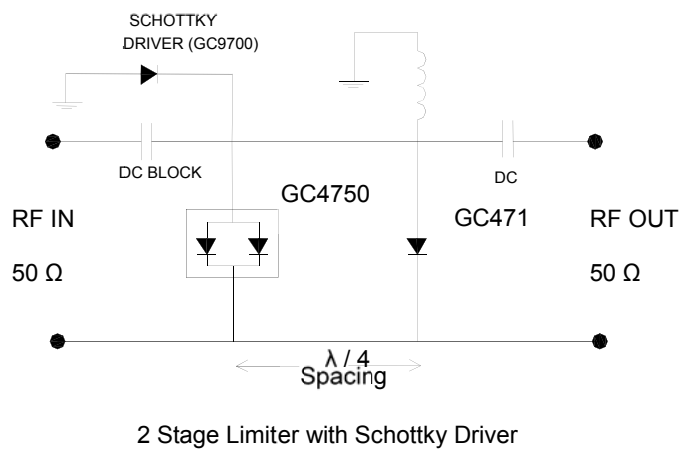
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SERIES RESISTANCE



HIGH POWER DUAL LIMITER DESIGN





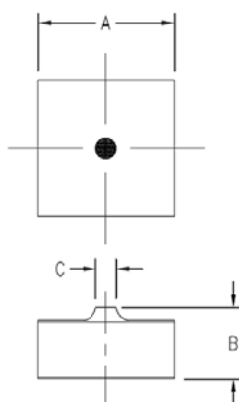
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CONTROL DEVICES – LIMITER DIODES

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PACKAGE STYLES

PACKAGE STYLE 00



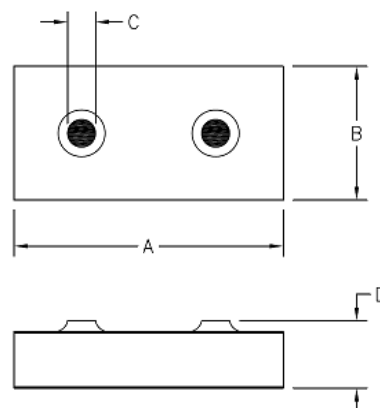
DIM	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.015	0.050	0.381	1.270
B	–	0.005 TYP	–	0.127 TYP
C	SEE NOTES		–	–

NOTES

1. TOP CONTACT, CHIP SIZE AND CHIP THICKNESS DEPENDS ON DIODE PARAMETERS. CONSULT FACTORY.
2. TOP AND BOTTOM CONTACTS GOLD.

ORDER AS GC47xx-00

DUAL CHIP STYLE 002



DIM	INCHES			MM		
	MIN	TYP	MAX	MIN	TYP	MAX
A	SEE NOTES			–	–	–
B	SEE NOTES			–	–	–
C	SEE NOTES			–	–	–
D	–	0.005	–	–	0.127	–

NOTES

1. MATERIAL: SILICON
2. TOP CONTACT, CHIP SIZE AND CHIP THICKNESS DEPENDS ON DIODE PARAMETERS. CONSULT FACTORY.
3. TOP AND BOTTOM CONTACTS GOLD (Au).

ORDER AS GC47xx-002

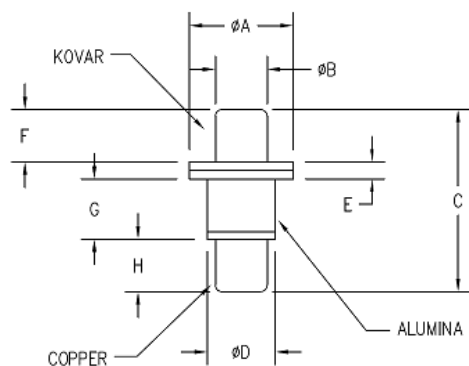


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CONTROL DEVICES – LIMITER DIODES

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PACKAGE STYLE 30

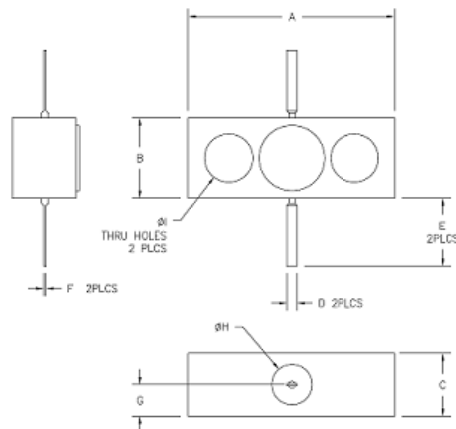


DIM	INCHES		MM	
	MIN.	MAX.	MIN.	MAX.
A	0.119	0.127	3.02	3.23
B	0.060	0.064	1.52	1.63
C	0.205	0.225	5.21	5.72
D	0.079	0.083	2.01	2.11
E	0.016	0.024	0.41	0.61
F	0.060	0.064	1.52	1.63
G	0.069	0.073	1.75	1.85
H	0.060	0.064	1.52	1.63

$L_p = 0.42 \text{ nH typ.}$ $C_p = 0.18 \text{ pF typ.}$

ORDER AS GC47xx-30

PACKAGE STYLE 115-2



DIM	INCHES			MM		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.405	0.410	0.415	10.287	10.414	10.541
B	0.155	0.160	0.165	3.937	4.064	4.191
C	0.120	0.125	0.130	3.048	3.175	3.302
D	0.015	0.020	0.025	0.381	0.508	0.635
E	0.125	0.135	0.145	3.175	3.429	3.683
F	0.004	—	—	0.102	—	—
G	—	0.063	—	—	1.600	—
ØH	0.075	0.080	0.085	1.905	2.032	2.159
ØI	0.093	0.096	0.099	2.362	2.438	2.515

ORDER AS GC47xx-115-2

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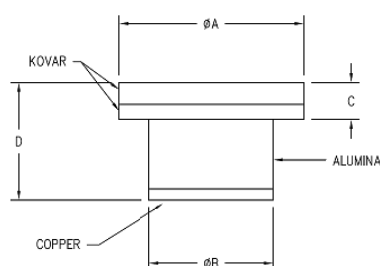


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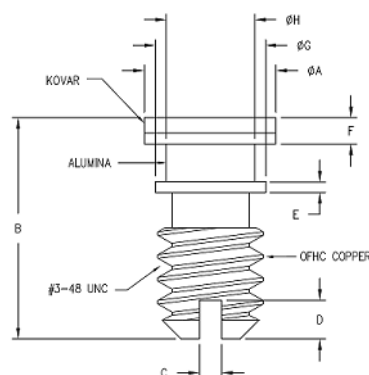
PACKAGE STYLE 35



DIM	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.119	0.124	3.02	3.15
B	0.077	0.083	1.96	2.11
C	-	0.027	-	0.69
D	0.085	0.097	2.16	2.46
Lp = 0.42 nH typ. Cp = 0.15 pF typ.				

ORDER AS GC47xx-35

PACKAGE STYLE 42



DIM	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.119	0.127	3.023	3.226
B	0.185	0.212	4.699	5.385
C	0.015	0.025	0.381	0.635
D	0.030	0.040	0.762	1.016
E	0.009	0.011	0.229	0.279
F	-	0.027	-	0.686
G	0.098	0.102	2.489	2.591
H	0.075	0.085	1.905	2.159
Lp= 0.40 nH typ. Cp= 0.20 pF typ.				

ORDER AS GC47xx-42

OTHER PACKAGE STYLES AVAILABLE ON REQUEST - CONSULT FACTORY

Revision History

Revision Level / Date	Para. Affected	Description
2009-01-19	-	Initial Release
2014-02-25	-	Reformat & change Cj values on GC4731-00

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