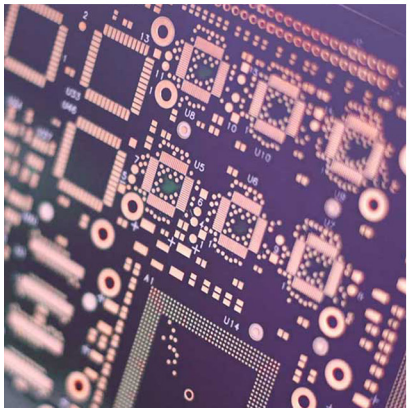
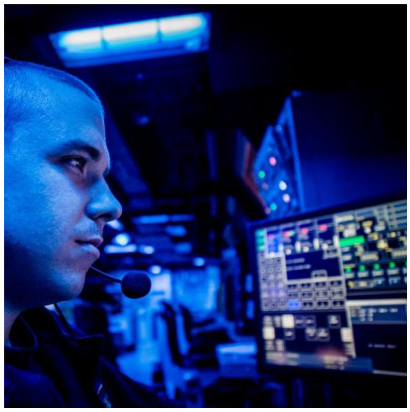
Diode Products Short Form Catalog





Tunnel Diodes

PLANAR BACK TUNNEL DIODE PRODUCTS MBD SERIES

Tunnel Diode Products

The Eclipse MBD series of Tunnel Diodes are fabricated on germanium substrates with passivated, planar construction and all gold metalization for reliable operation up to +110°C. Unlike the standard tunnel diode, I_p is minimized for detector operation and binned into five values, offering varying degrees of sensitivity and video impedance. The back detector is generally operated with zero bias and is known for its excellent temperature stability and fast video rise times.

CHIP ELECTRICAL SPECIFICATIONS

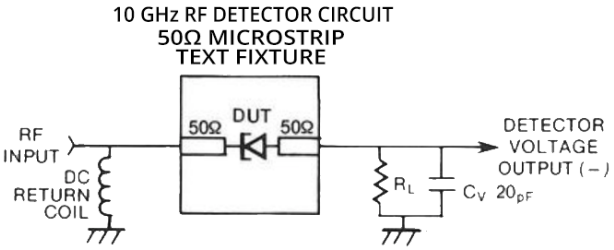
	I_p		Cj	Y	R_v	I_p/I_v	V_r	V_f	Package
Model Number	µA (Min.)	µA (Max.)	pF (Max.)	mV/mW (Typ.)	Ω (Typ.)	(Min.)	mV (Min.)	mV (Max.)	
MBD 1057-C18	100	200	0.30	1000	180	2.5	420	135	Bare die
MBD 2057-C18	200	300	0.30	750	130	2.5	410	130	Bare die
MBD 3057-C18	300	400	0.30	500	80	2.5	400	125	Bare die
MBD 4057-C18	400	500	0.30	275	65	2.5	400	120	Bare die
MBD 5057-C18	500	600	0.30	250	60	2.5	400	110	Bare die
Test Conditions			V_R = VV F = 100MHz	P_{IN} = -20dBm R_L = 10K Ω F = 10GHz			I_R = 500µA	I_F = 3 mA	

Features

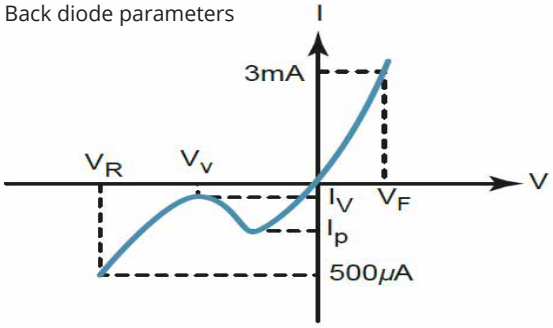
- Excellent Temperature Stability
- No DC Bias Required
- Low Video Impedance
- MIL-STD-190500 & 883 Capability

Maximum Ratings

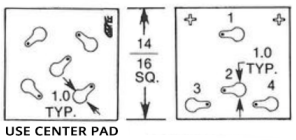
Storage Temperature.....-65 to +125°C
Operating Temperature.....-65 to +110°C
Input Power Handling.....+14dBm CW or pulsed in a tuned detector or 3 ERG spike
Soldering Temperature.....See assembly instructions.



Back diode parameters



CHIP CONFIGURATION



USE CENTER PAD

1. Dimensions in mils
2. Thickness 4 to 6 mils
3. Pads and backside are gold.

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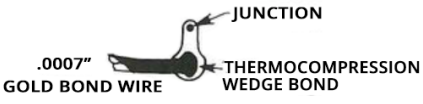
2. Thickness 4 to 6 mils.
3. Pads and backside are gold

CAUTION: STATIC SENSITIVE DEVICES



CHIP ASSEMBLY

The alloyed junction of the germanium planar diode (or back diode), is sensitive to mechanical pressure and high temperatures. Thus it must be handled as follows (as an example).

Die attach: Epoxy only: less than 125°C cure temperature recommended. **Wire bond:** 160°C base 160°C capillary temperature, pressure less than 20 grams. A wedge bond is done on an offset bonding pad. Bonding should not be done directly over the junction. Bond wire angle should leave small end of pad visually clear to assure junction is not bonded over.

Tunnel Diode Products

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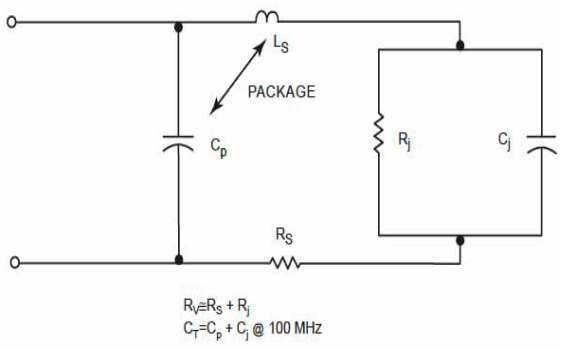
PACKAGE ELECTRICAL SPECIFICATIONS

	I_P		Cj	Y	R_V	I_V/I_P	V_r	V_f	Package
Model Number	µA (Min.)	µA (Max.)	pF (Max.)	mV/mW (Typ.)	Ω (Typ.)	(Min.)	mV (Min.)	mV (Max.)	
MBD1037-0805-2	50	100	0.30	1200	200	2.50	430	140	0805-2
MBD1037-E28/E28X	50	100	0.30	1200	200	2.50	430	140	E28/E28X
MBD1037-H20/H20X	50	100	0.30	1200	200	2.50	430	140	H20/H20X
MBD1047-0805-2	100	150	0.30	1000	180	2.50	420	135	0805-2
MBD1047-E28/E28X	100	150	0.30	1000	180	2.50	420	135	E28/E28X
MBD1047-H20/H20X	100	150	0.30	1000	180	2.50	420	135	H20/H20X
MBD1057-0805-2	100	200	0.30	1000	180	2.50	420	135	0805-2
MBD1057-E28/E28X	100	200	0.30	1000	180	2.50	420	135	E28/E28X
MBD1057-H20/H20X	100	200	0.30	1000	180	2.50	420	135	H20/H20X
MBD2037-0805-2	150	200	0.30	950	180	2.50	420	135	0805-2
MBD2037-E28/E28X	150	200	0.30	950	180	2.50	420	135	E28/E28X
MBD2037-H20/H20X	150	200	0.30	950	180	2.50	420	135	H20/H20X
MBD2047-0805-2	200	250	0.30	900	160	2.50	410	130	0805-2
MBD2047-E28/E28X	200	250	0.30	900	160	2.50	410	130	E28/E28X
MBD2047-H20/H20X	200	250	0.30	900	160	2.50	410	130	H20/H20X
MBD2057-0805-2	200	300	0.30	750	130	2.50	410	130	0805-2
MBD2057-E28/E28X	200	300	0.30	750	130	2.50	410	130	E28/E28X
MBD2057-H20/H20X	200	300	0.30	750	130	2.50	410	130	H20/H20X
MBD3037-0805-2	250	300	0.30	650	130	2.50	410	130	0805-2
MBD3037-E28/E28X	250	300	0.30	650	130	2.50	410	130	E28/E28X
MBD3037-H20/H20X	250	300	0.30	650	130	2.50	410	130	H20/H20X
Test Condition			$V_R = V_V$ F = 100 MHz	P_{IN} = -20dBm R_L = 10K Ω F = 10GHz			I_R = 500µA	I_p = 3 mA	

Diode equivalent circuit



$R_V \cong R_S + R_j$
$C_T = C_p + C_j$ @ 100 MHz

PLANAR BACK TUNNEL DIODE PRODUCTS MBD SERIES

Tunnel Diode Products

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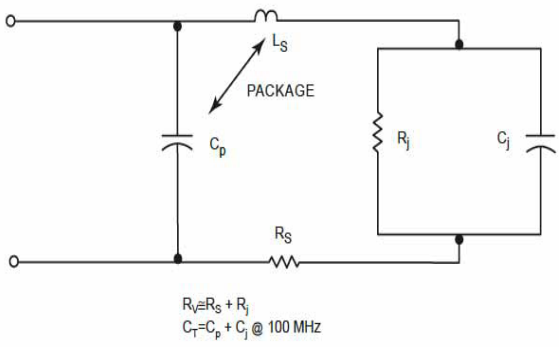
PACKAGE ELECTRICAL SPECIFICATIONS

	I_p		Cj	Y	R_v	$I_{p/}I_v$	V_r	V_f	Package
Model Number	µA (Min.)	µA (Max.)	pF (Min.)	mV/mW (Typ.)	Ω (Typ.)	(Min.)	mV (Min.)	mV (Max.)	
MBD3047-0805-2	300	350	0.30	550	110	2.50	400	125	0805-2
MBD3047-E28/E28X	300	350	0.30	550	110	2.50	400	125	E28/E28X
MBD3047-H20/H20X	300	350	0.30	550	110	2.50	400	125	H20/H20X
MBD3057-0805-2	300	400	0.30	500	80	2.50	400	125	0805-2
MBD3057-E28/E28X	300	400	0.30	500	80	2.50	400	125	E28/E28X
MBD3057-H20/H20X	300	400	0.30	500	80	2.50	400	125	H20/H20X
MBD4037-0805-2	350	400	0.30	450	75	2.50	400	125	0805-2
MBD4037-E28/E28X	350	400	0.30	450	75	2.50	400	125	E28/E28X
MBD4037-H20/H20X	350	400	0.30	450	75	2.50	400	125	H20/H20X
MBD4057-0805-2	400	500	0.30	275	65	2.50	400	120	0805-2
MBD4057-E28/E28X	400	500	0.30	275	65	2.50	400	120	E28/E28X
MBD4057-H20/H20X	400	500	0.30	275	65	2.50	400	120	H20/H20X
MBD5057-0805-2	500	600	0.30	250	60	2.50	400	110	0805-2
MBD5057-E28/E28X	500	600	0.30	250	60	2.50	400	110	E28/E28X
MBD5057-H20/H20X	500	600	0.30	250	60	2.50	400	110	H20/H20X
Test Condition			$V_R = V_V$ F = 100 MHz	P_{IN} = -20dBm R_L = 10K Ω F = 10GHz			I_R = 500µA	I_p = 3 mA	

Diode equivalent circuit



Chip Assembly

The germanium planar back (tunnel) diode is sensitive to mechanical pressure and high temperatures.

Die attach: Conductive epoxy only with maximum curing temperature of +125°C

Wire Bond: 0.7 mil Gold wire and thermo-compression wedge bond within the following:

Stage Temperature: +155 °C maximum for 20 seconds max
Tip Temperature: +160 °C maximum
Bonding Pressure: 20 grams maximum
Bonding is performed on the larger diameter offset bonding pad (see figure 1) and not over the junction.

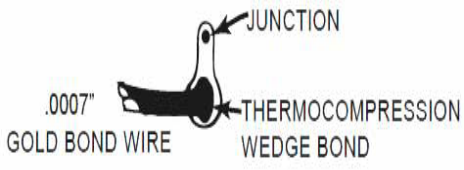
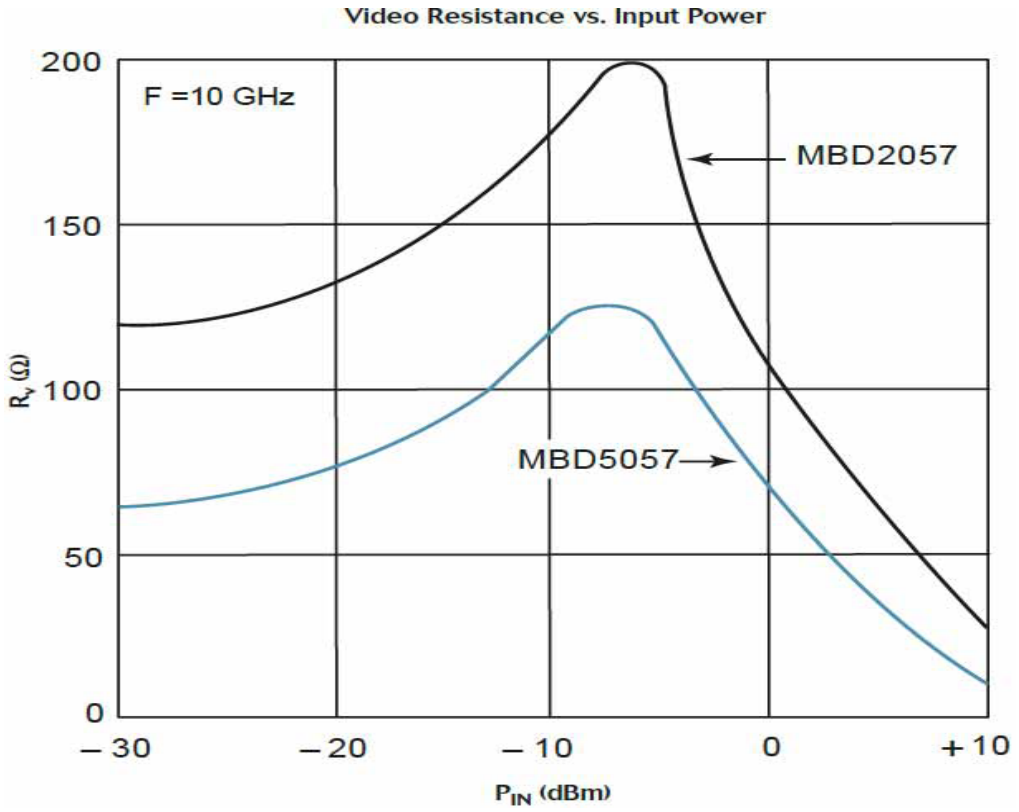
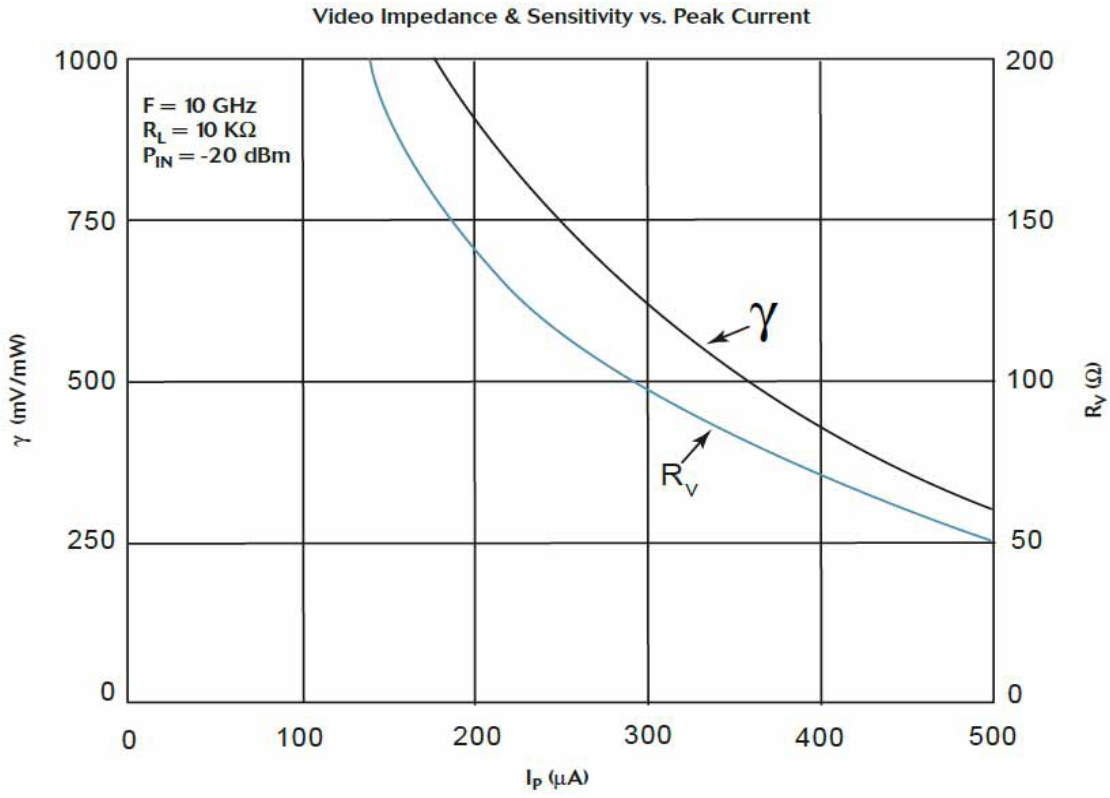


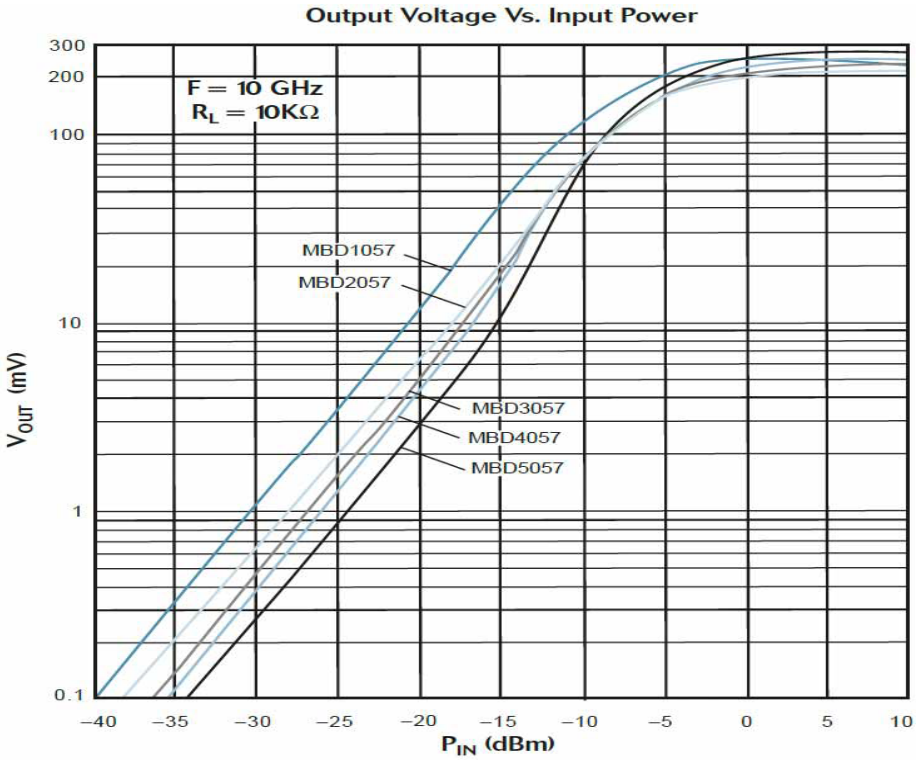
figure 1

Typical performance, T_A = 25 °C, MBD2057/MBD5057

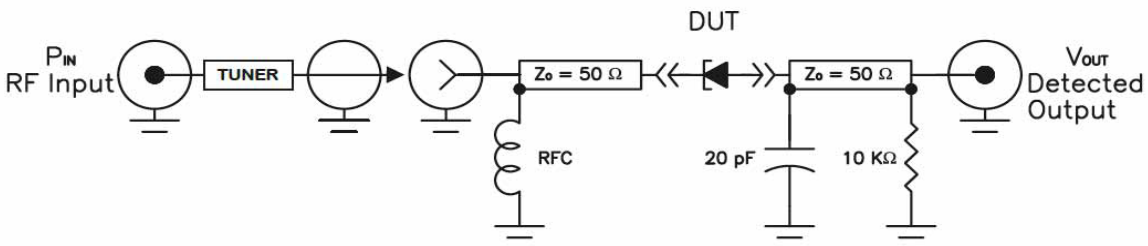




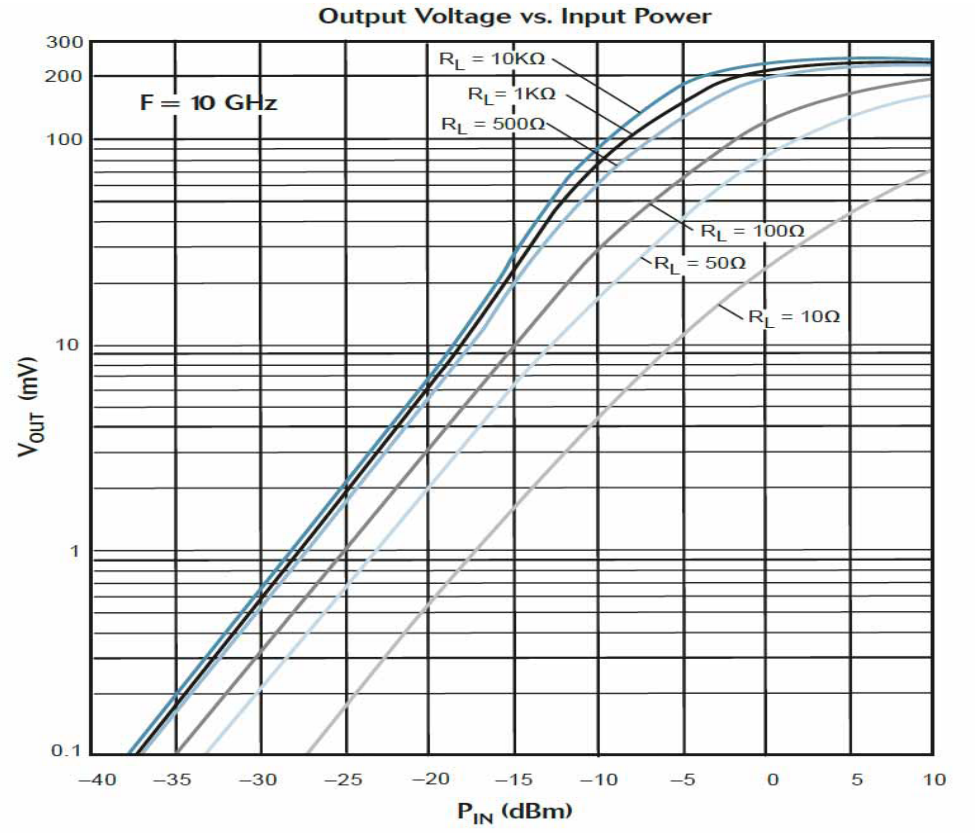
Typical performance, T_A = 25 °C, MBD-x057

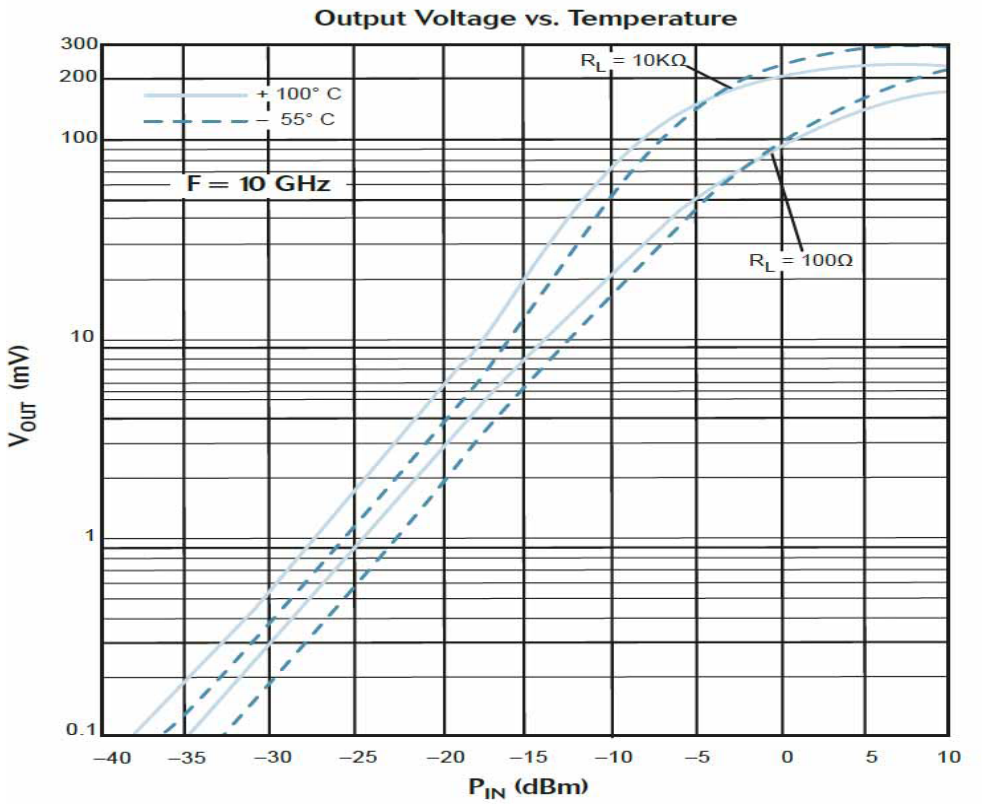


10 GHz RF Detector Test Circuit

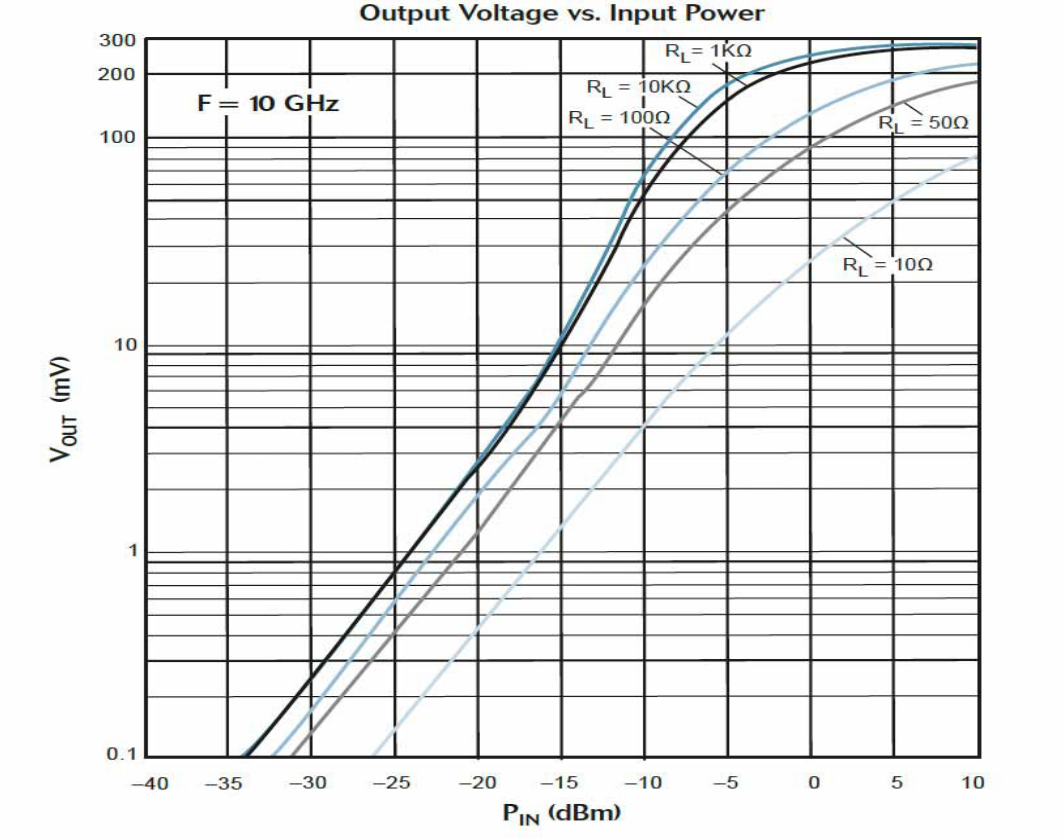


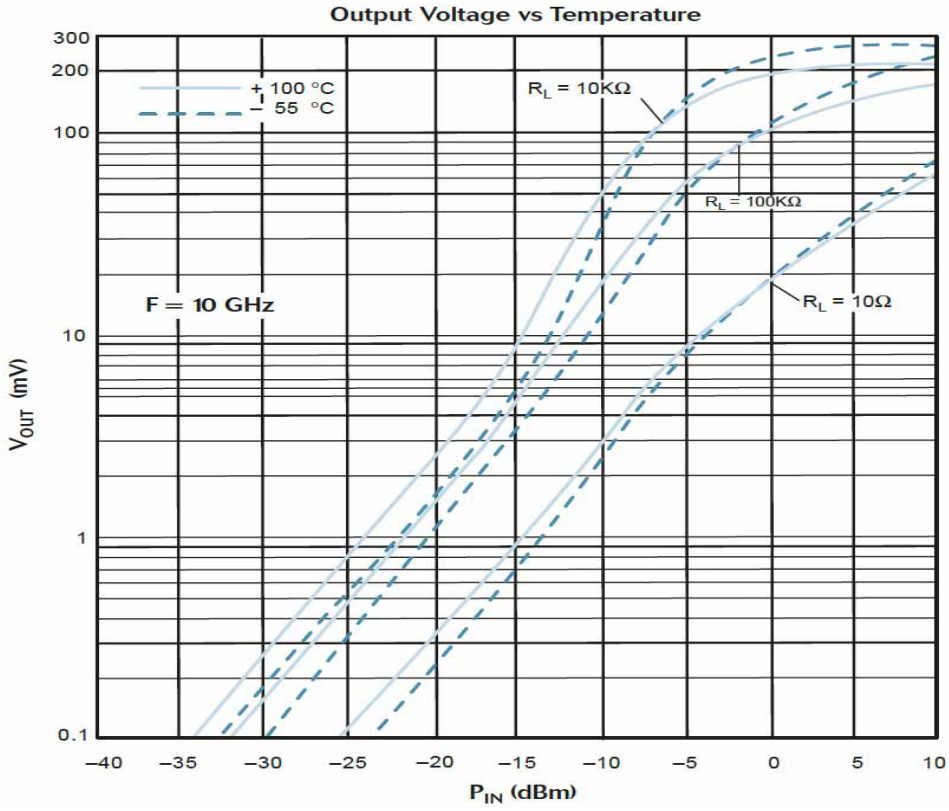
Typical performance, T_A = 25 °C, MBD2057





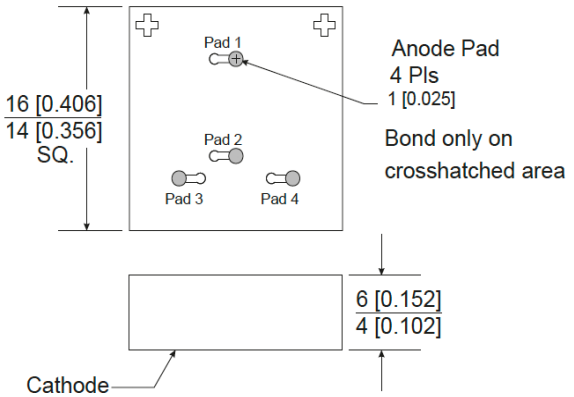
Typical performance, T_A = 25 °C, MBD5057



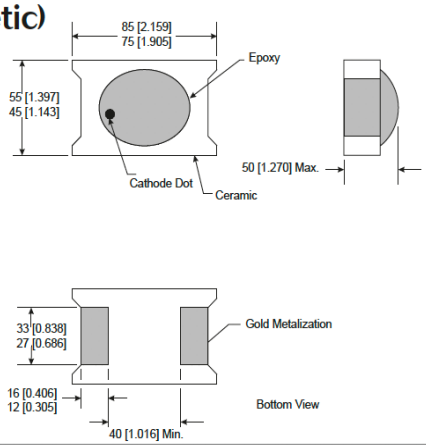


Outline Drawings

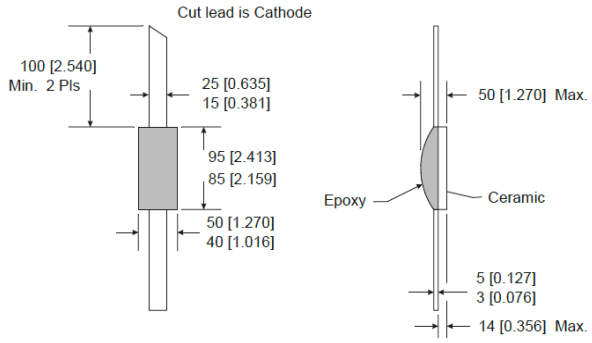
C18



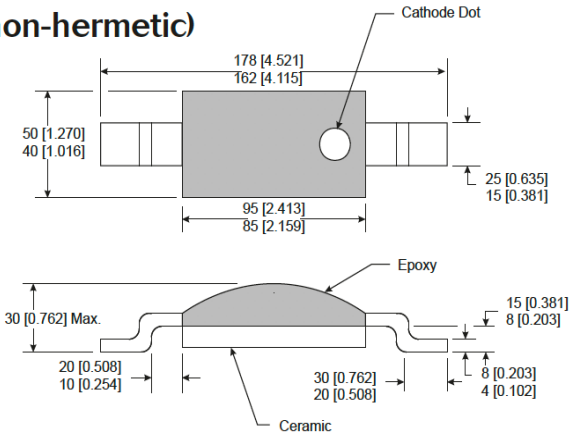
0805-2
(non-hermetic)



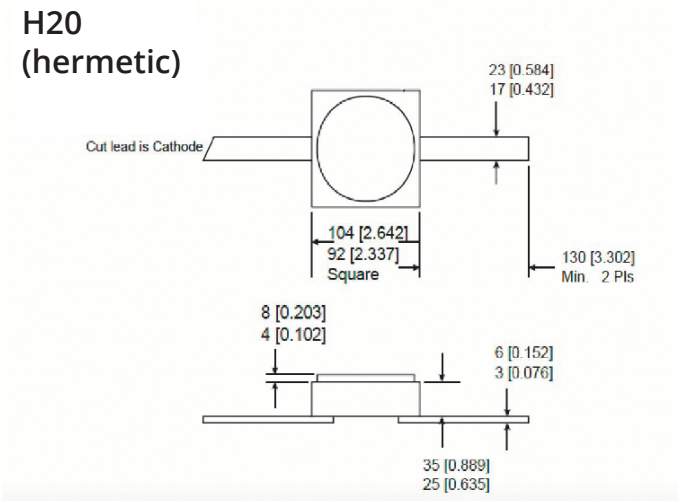
E28
(non-hermetic)



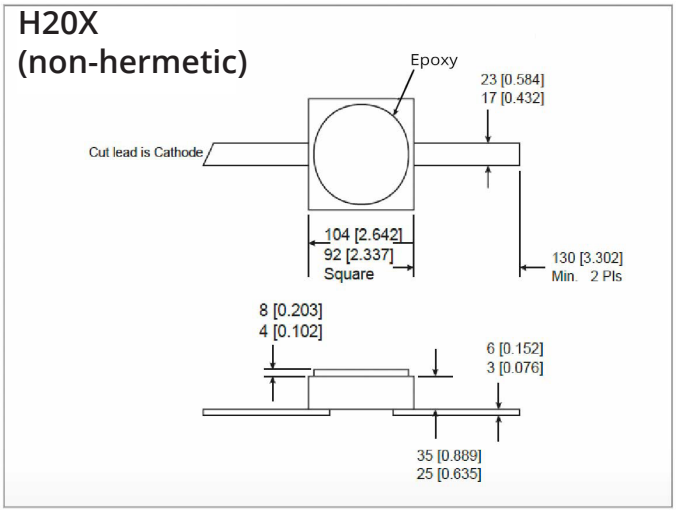
E28X
(non-hermetic)



H20
(hermetic)



H20X
(non-hermetic)



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TUNNEL DIODES