



# MM WAVE GaAs VARACTOR DIODE

**ND3139-5S**  
**ND3139-5M**  
**ND3139-5N**

## FEATURES

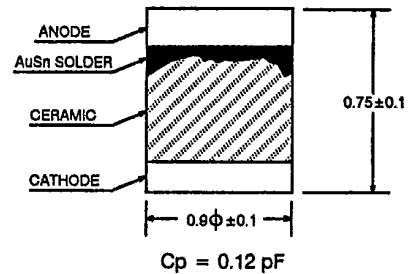
- **LOW CONVERSION LOSS:**  $L_o = 7.5$  dB TYP at  $f = 20$  GHz to 40 GHz,  $P_{IN} = +16$  dBm
- **HIGH CUTOFF FREQUENCY:**  $f_c = 300$  GHz TYP
- **LOW THERMAL RESISTANCE:**  
 $R_{TH} (\mu-C) = 500^\circ\text{C/W MAX}$
- **SMALL SIZE**
- **HIGH RELIABILITY**

## DESCRIPTION

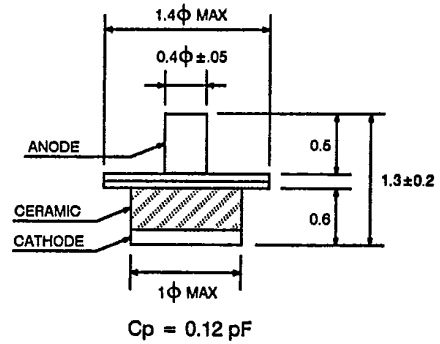
These GaAs Varactor Diodes are especially designed for millimeter wave multiplier applications such as a doubler from 20 GHz to 40 GHz. These diodes feature low conversion loss, high cutoff frequency, low thermal resistance, small size and high reliability. They are available in three package types: 5S, 5M and 5N.

## OUTLINE DIMENSIONS (Units In mm)

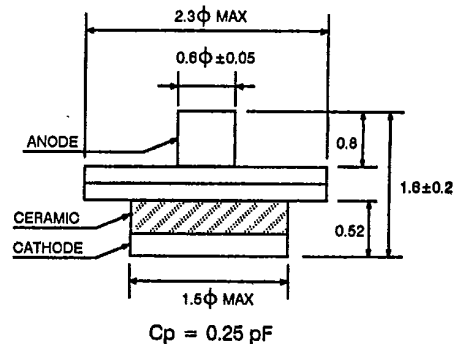
OUTLINE 5S



OUTLINE 5M



OUTLINE 5N



## ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V <sub>R</sub>	Reverse Voltage	V	15
P <sub>D</sub>	Power Dissipation	mW	200
T <sub>OP</sub>	Operating Temperature	°C	-65 to +125
T <sub>STG</sub>	Storage Temperature	°C	-65 to +125
T <sub>SDR</sub>	Soldering Temperature	°C	+230*

\*One time within 10 seconds.

**ELECTRICAL CHARACTERISTICS** (TA = 25°C)

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V <sub>R</sub>	Reverse Voltage at I <sub>R</sub> = 10 μA	V	15		
I <sub>R</sub>	Reverse Current at V <sub>R</sub> = +11 V	nA			10
V <sub>F</sub>	Forward Voltage at I <sub>F</sub> = 10 mA	V			1.3
C <sub>jo</sub>	Junction Capacitance at V <sub>R</sub> = 0 V, f = 1 MHz	pF	0.15	0.20	0.25
R <sub>TH (J-C)</sub>	Thermal Resistance: Small Signal Method I <sub>OP</sub> = 5 mA f (high) = 5 MHz, f (low) = 30 Hz	°C/W			500
f <sub>co</sub>	Cutoff Frequency* at V <sub>R</sub> = 0 V, f = 20 GHz	GHz	90	110	
f <sub>c-4</sub>	Cutoff Frequency* at V <sub>R</sub> = 4 V, f = 20 GHz	GHz	260	300	
L <sub>c</sub>	Conversion Loss as a doubler, f <sub>IN</sub> = 20 GHz, at P <sub>IN</sub> = +16 dBm	dB		7.5	

\*Sampling basis of LTPD 10% (n = 22, accept; 0 reject; 1)

