

Sampling Phase Detectors

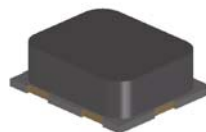
MSPD1011, MSPD1012, MSPD1013 Series

Datasheet



Features

- Operating frequency 10 MHz - 20 GHz
- RoHS Compliant
- Surface Mount Phase Detector in Compact Outline:
3.3 mm L x 2.8 mm W x 1.5 mm H
- Low Parasitic Beam Lead Components



Maximum Ratings

Rating	Limits	Units
Incident power (C.W.)	27	dBm
Operating temperature	-65 to +125	°C
Storage Temperature	-65 to +150	°C
ESD human body model	Class 0	-

Description

The MSPD series Surface Mount Phase Detectors are manufactured using Aeroflex / Metelics' proven hybrid manufacturing process incorporating PIN, Schottky Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (3.3 mm L x 2.8 mm W x 1.5 mm H) offers superior RF and microwave signal performance to comparable chip & wire discrete devices in leaded packages. The beam lead components (Silicon PIN Step Recovery Diodes, Silicon Schottky Mixer Diodes, and passive capacitors) are designed to optimize microwave frequency \gt 20 GHz and IF output voltage performance in a compact, surface mount package.

Applications

This Sampling Phase Detector is ideal for wideband (10 MHz – 20 GHz) applications, requiring high volume, surface mount, solder re-flow manufacturing. These products are durable, reliable, and capable of meeting all military, commercial, and industrial environments. The devices are fully RoHS compliant and are available in tube, tape-reel, or waffle packaging.

Environmental Capabilities

The devices are capable of meeting the environmental requirements of MIL-STD-750 and MIL-STD-202.

ESD Rating

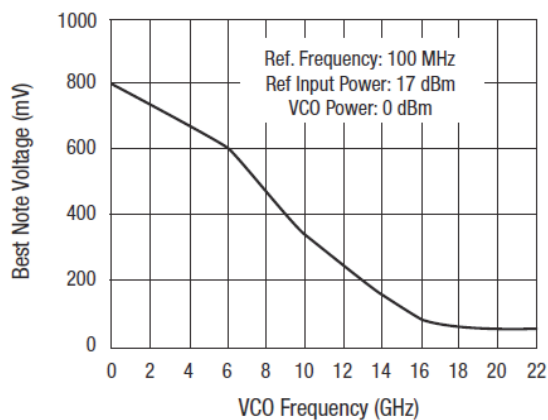
PIN and Schottky diodes are susceptible to ESD conditions as with all semiconductors. The ESD rating for these devices is Class 0, HBM, the moisture sensitivity level rating is MSL 1.



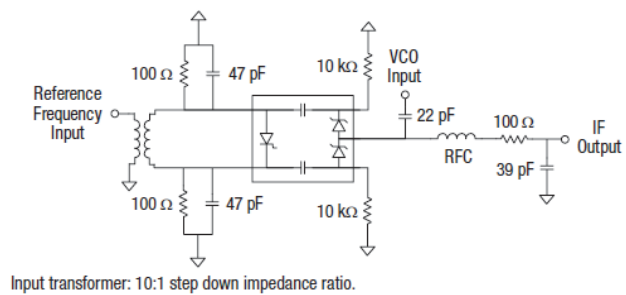
Electrical Specifications @ $T_A = +25\text{ }^\circ\text{C}$ (Unless Otherwise Defined)

Part Number	Microwave Signal Drive Level (dBm)	Schottky Diode				Capacitor	Step Recovery Diode		
		Barrier	$V_F @ 1\text{mA}$ (mV)	$C_J @ 0\text{V}$ (pF)	$R_T @ 5\text{mA}$ (ohm)	CC (pF)	$C_J @ 6\text{V}$ (pF)	TL (nS)	TT (ps)
		Typ		Max	Max	Typ	Max	Typ	Typ
MSPD1011-121	-3 to 0	Low	270 - 350	0.1	24	0.5	0.25	10	70
MSPD1012-121	0 to +3	Medium	370 - 550	0.1	24	0.5	0.25	10	70
MSPD1013-121	0 to +13	High	600 - 700	0.1	24	0.5	0.25	10	70

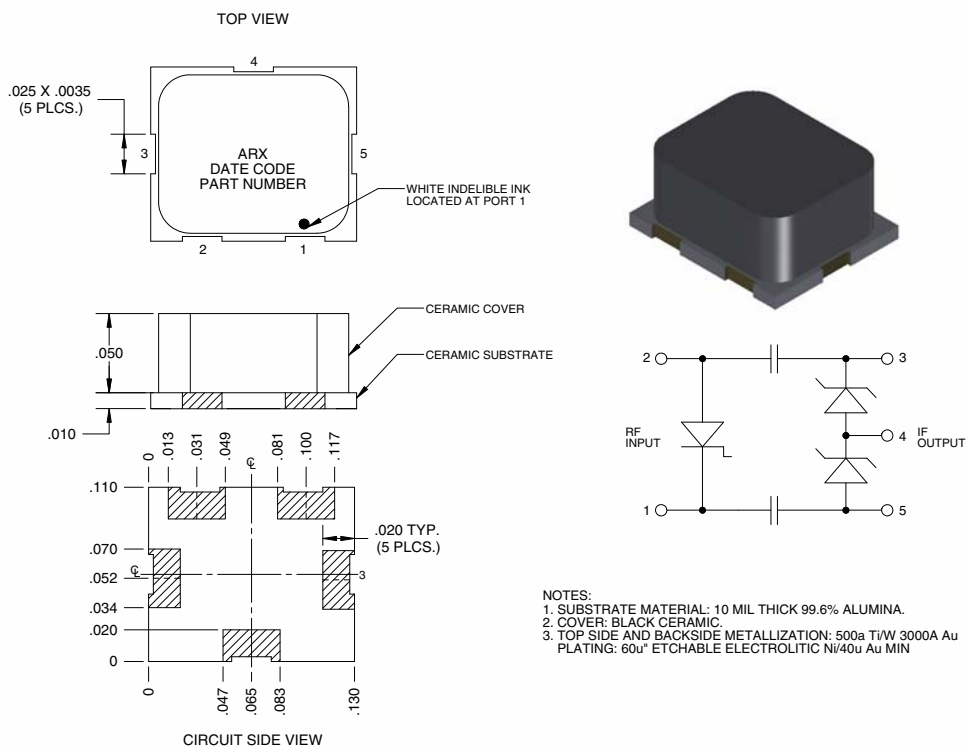
Typical Performance



Recommended Circuit



Outline Drawing Case Style 121 (S121)



MSPD1011, MSPD1012, MSPD1013 Sampling Phase Detectors



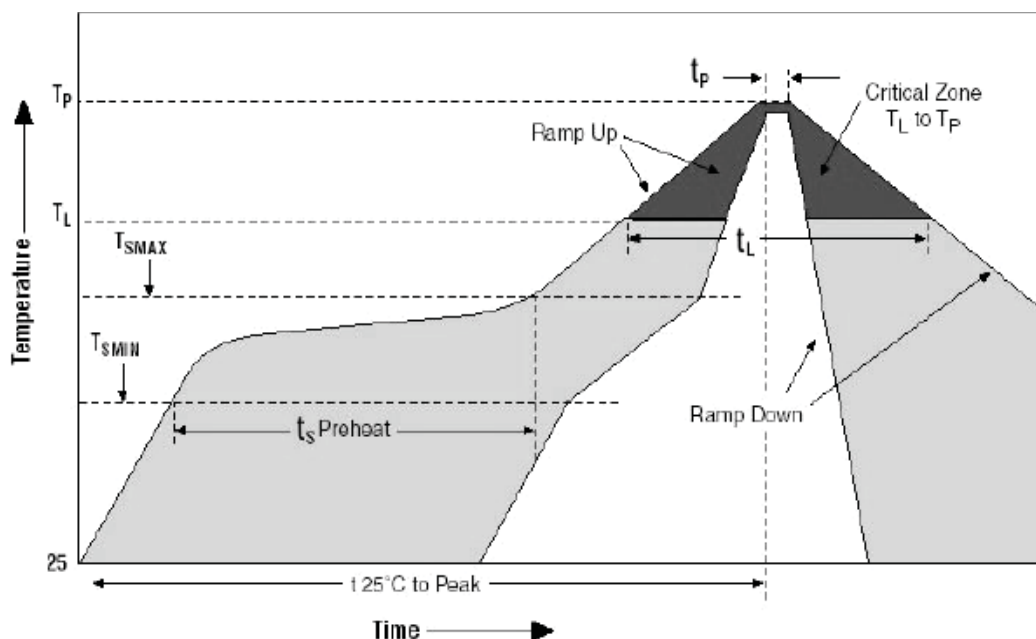
Assembly Instructions

The MSPD Series Sampling Phase Detectors are capable of being placed onto circuit boards with pick and place manufacturing equipment from tube or tape-reel dispensing. The devices are attached to the circuit board using conventional solder re-flow or wave soldering procedures with RoHS type or Sn 63 / Pb 37 type solders per Table I and Graph I Time-Temperature recommended profile.

Table 1: Time-Temperature Profile for Sn 60/Pb40 or RoHS Type Solders

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Preheat - Temperature Minimum (T_{SMIN}) - Temperature Maximum (T_{SMAX}) - Time (Minimum to maximum) (t_S)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
T_{SMAX} to T_L - Ramp-up Rate		3°C/second maximum
Time Maintained above: - Temperature (T_L) - Time (t_L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature (T_P)	225 +0 / -5°C	245 +0/-5°C
Time within 5°C of actual Peak Temperature (T_P)	10-30 seconds	20-40 seconds
Ramp-down Rate	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

Graph1: Solder Re-Flow Time-Temperature Function



Part Number Ordering Information:

Part Number	Packaging
MSPD1011-121-T	Tube Packaging
MSPD1012-121-T	
MSPD1013-121-T	
MSPD1011-121-R	Tape-Reel Packaging (Quantities of 250 or 500)
MSPD1012-121-R	
MSPD1013-121-R	
MSPD1011-121-W	Waffle Packaging
MSPD1012-121-W	
MSPD1013-121-W	

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