Preliminary Specification

High Reliability Semiconductor Schottky Detector Diodes

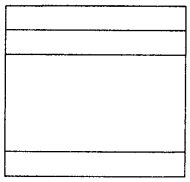
ML40215-S-120
ML40215-S-276

V1.00

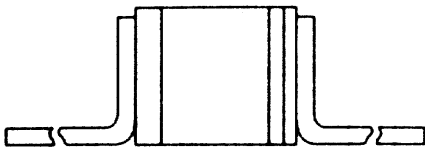
Features

- Low I/F Noise
- High Sensitivity
- Space Qualified

ODS 120 Outline



ODS 276 Outline



Description

The ML40215-S is a low barrier N type Silicon detector diode in the ODS 120 miniature ceramic pill type package, or in ODS 276 (the same package with leads attached).

These devices are suitable for use in detector applications at frequencies up to 18 GHz.

The test tables shown on this data sheet are presented in the same format as ESA/SCC 5010 detail specifications. These devices have been tested and screened to ESA/SCC 5010 Level B, Lot Acceptance Level 1, either by similarity with another diode type or as required by the project. A new wafer lot will normally require Lot Acceptance Level 2 testing; repeat production (assembly) lots may only require Level 3 testing.

Alternative cases styles are available, many of which are suitable for Space application.

M/A-COM can provide mixer and detector diodes for most applications. The Semiconductor Master Catalogue contains outline drawings for alternative case styles as well as information on the following devices:

- Surface Mount diodes SOT-23 and SOT-143.
- Beam Lead and Chip Diodes.
- Beamless Beam Lead Diodes (Surmount™).
- Tees and Anti-Parallel Pair diodes.
- Ring and Bridge Quad diodes.
- Axial Lead Diodes.
- P Type Detector Diodes.
- Gallium Arsenide Schottky Mixer Diodes.

Maximum Ratings (Tamb = 25°C)

No.	Characteristics	Symbol	Maximum Ratings	Units	Remarks
1.	Peak Incident R_F Power	P_{PK}	1.0	W	Frequency 2.6 to 12.4 GHz, 1µsec max. pulse length. See Note 1
2.	Peak Incident R_F Power	P_{PK}	0.5	W	Frequency 12.4 to 18.0 GHz, 1µsec max. pulse length. See Note 1
3.	CW RF Power	P_{CW}	150	mW	Frequency 2.6 to 12.4 GHz. See Note 1
4.	CW RF Power	P_{CW}	100	mW	Frequency 12.4 to 18.0 GHz. See Note 1
5.	DC Reverse Voltage	V_R	2.0	V	
6.	DC Forward Current	I_F	20	mA	See Note 1
7.	Operating Temperature	T_{OP}	-65 to +150	°C	
8.	Storage Temperature	T_{STO}	-65 to +150	°C	
9.	Soldering Temperature	T_{SOL}	230	°C	See Note 2

Notes: 1. Derate linearly to 0 mW from 25°C to 150°C
2. For a max duration of 5 seconds and at a distance greater than 1.5 mm from the body of the 276 package
3. For a duration of 5 seconds at a distance greater than 1.5 mm from the body.

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Electrical Measurements at Room Temperature d.c. and a.c. Parameters

No.	Characteristics	Symbol	MIL-STD-750 Test Method	Test Conditions	Limits		
					Min	Max	Units
1	Reverse Current	I_{R1}	4016	V_R = 1V	-	500	nA
2	Forward Voltage	V_F	4011	I_F = 1mA	-	0.4	V
3	Tangential Signal Sensitivity	T_{SS}	BS9300 1411	F = 16 GHz See Note 1	-52	—	dBm
4	Video Impedance	Z_V	BS9300 1404	F = 16 GHz see Note 2	1	2	kohm

Notes: 1. T_{SS} is measured with a video amplifier bandwidth of 2 MHz and a nominal amplifier noise figure of 3 dB. DC impedance is 10 kohms and DC forward bias is 20µA.

2. Video Impedance is measured with RF power of -30dBm and a DC forward bias of 20 µA.

Electrical Measurements at High and Low Temperature, -55 and +150°C

No.	Characteristics	Symbol	MIL-STD-750 Test Method	Test Conditions	Limits		
					Min	Max	Units
1	Reverse Current	I_R	4016	V_R - 1V	-	100	µA

Parameter Drift Values

No.	Characteristics	Symbol	MIL-STD-750 Test Method	Test Conditions	Change Limits Δ
1	Forward Voltage	V_F	4011	I_F = 1 mA	± 10%

Conditions for High Temperature Reverse Bias Burn-In

No.	Characteristics	Symbol	Conditions	Units
1	Reverse Voltage	V_R	1.0	V
2	Ambient Temperature	T_{amb}	+ 150 (+0,-5)	°C

Conditions for Power Burn-In and Operating Life Tests

No.	Characteristics	Symbol	Conditions	Units
1	Forward Current	I_F	3.0	mA
2	Ambient Temperature	T_{amb}	+ 125 (+0,-5)	°C

Electrical Measurements at Intermediate Points and Completion of Endurance Testing

No.	Characteristics	Symbol	MIL-STD-750 Test Method	Test Conditions	Limits		
					Min	Max	Units
1	Forward Voltage	V_F	4011	I_F = 1 mA	—	0.4	V

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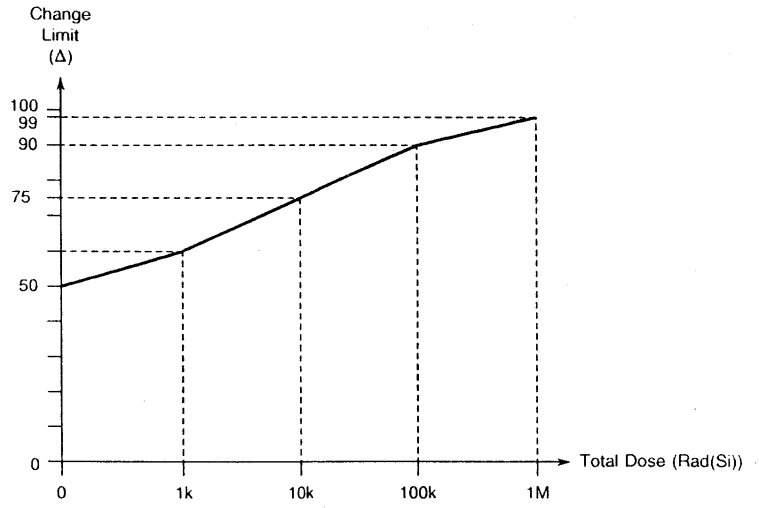
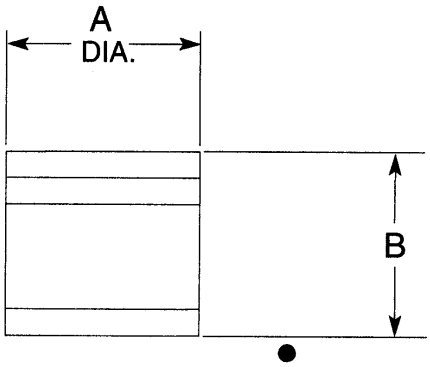
Electrical Measurements During and on Completion of Radiation Testing (only if required)

No.	Characteristics	Symbol	MIL-STD-750 Test Method	Test Conditions	Change Limits
1	Reverse Current	I_R	4016	V_R = 1V	See graph below.

Typical Performance Curves



ODS 120 Outline Drawing

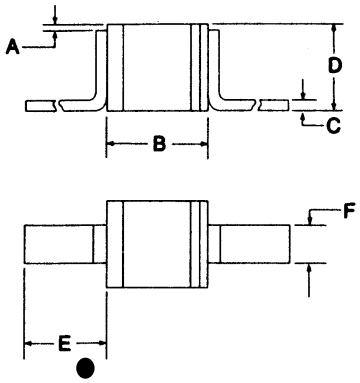


DIM.	INCHES		MILLIMETER	
	MIN.	MAX.	MIN.	MAX.
A	0.051	0.055	0.30	1.40
B	0.040	0.050	1.02	1.27

Notes: C_P = 0.13 pF Typical
L_S = 0.40 nH Typical

● Black dot denotes Cathode

ODS 276 Outline Drawing



DIM.	INCHES		MILLIMETER	
	MIN.	MAX.	MIN.	MAX.
A	0.010	0.020	0.254	0.058
B	0.040	0.050	1.020	1.270
C	---	0.005	---	0.127
D	0.051	0.055	1.290	1.390
E	0.200	---	5.060	---
F	0.019	0.021	0.483	0.533

Notes: C_P = 0.13 pF Typical L_S = 0.40 nH Typical

● Black dot denotes Cathode

The Preliminary Specifications Data Sheet Contain Typical Electrical Specifications Which May Change Prior to Final Introduction.

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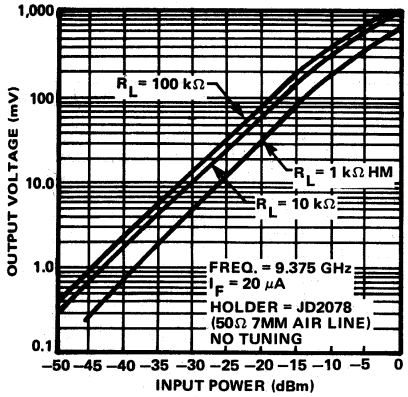
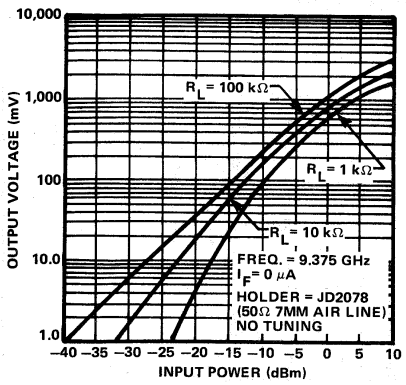
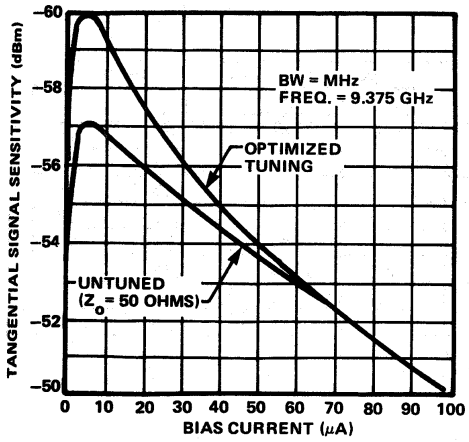
Typical Performance Curves



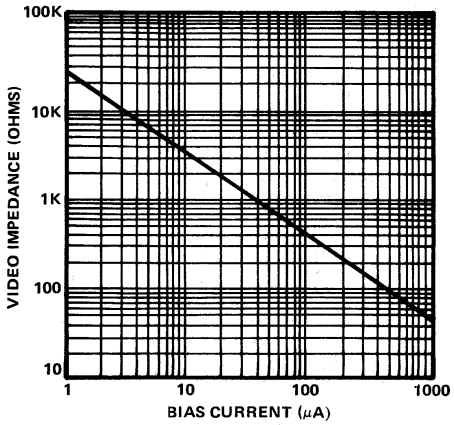
Nominal Output Voltage at X-Band (With Forward Bias)



Nominal Output Voltage at X-Band (With Zero Bias)_



Nominal Tangential Signal Sensitivity Vs Bias Current at X-Band



Nominal Video Impedance Vs Bias Current