SiliconApps

Technical Data

CMS-825X Series

Surface Mount Zero Bias Schottky Detector Diodes

Description:

The CMS-825X line of zero bias Schottky detector diodes by SiliconApps have been engineered for use in small signal (P_{in}<-15 dBm) applications at frequencies below 2.0 GHz. The ideal applications are for RF/ID and RF Tags where primary (DC bias) power is not available.

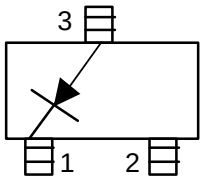
At SiliconApps, our commitment to quality components gives our customers a reliable source of RF products. Manufacturing techniques assure that when two diodes are mounted into a single package they are taken from adjacent sites on the wafer. The various package configurations available provide a low cost solution to a wide variety of design problems.

Features:

- **Surface Mount SOT-23 3 Pin Packages**
- **SOT-143 Packages 4 Pin Packages**
- **Miniature SOT-323/363 3 Pin and 6 Pin Packages**
- **High Detection Sensitivity: up to 50mV/µW at 915 MHz**
- **Low Flicker Noise: -165 dBV / Hz at 100Hz**
- **Low reverse leakage**
- **Matched Diodes**
- **High Thermal Conductivity for greater Power Dissipation**

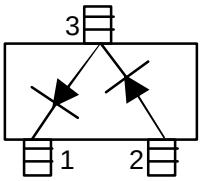
SOT-23/SOT-143 Package

SINGLE



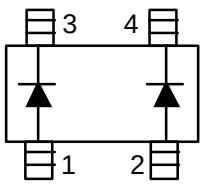
CMS 8250

SERIES



CMS 8252

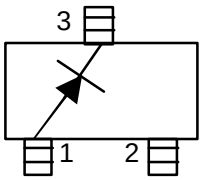
UNCONNECTED PAIR



CMS 8255

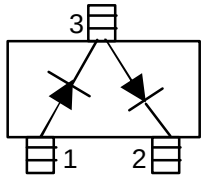
SOT-323 Package Lead Code Identification

SINGLE



CMS 8251

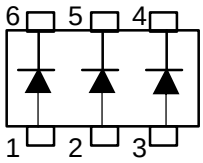
SERIES



CMSS8253

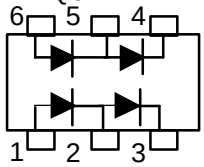
SOT-363 Package 6 Lead Code Identification

UNCONNECTED TRIO



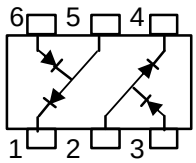
CMS 8256

BRIDGE QUAD



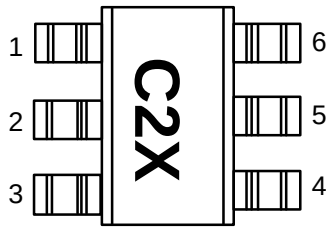
CMS 8254

DUAL SERIES CONNECTED PAIR



CMS 8252D

Pin Connections and Package Marking



Notes:

1. Package marking provides orientation and identification
2. See "Electrical Specifications" for appropriate package marking

RF Electrical Specifications, T_C = +25°C, Single Diode

Part Number CMS-	Typical Tangential Sensitivity TSS (dBm) @ f = 915 MHz	Typical Voltage Sensitivity G (mV/µW) @ f = 915 MHz	Typical Video Resistance RV (KO)
8250-825D	-57	40	8.0
Test Conditions	Video Bandwidth = 2 MHz Zero Bias	Power in = -40 dBm R_L = 100 KO, Zero Bias	Zero Bias

DC Electrical Specifications, T_C = +25°C, Single Diode

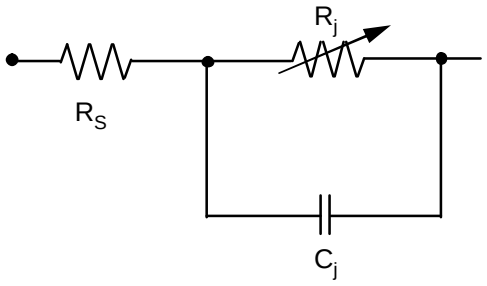
Part Number CMS-	Package Marking Code [1]	Configuration	Maximum Forward Voltage V_F (mV)		Typical Capacitance C_T (pF)
8250	C0H	Single	150	250	0.30
8251	C1H	Single			
8252	C2H	Series Pair[2,3]			
8253	C3H	Series Pair[2,3]			
8254	C4H	Bridge Quad			
8255	C5H	Unconnected Pair[2,3]			
8256	C6H	Unconnected Trio			
825D	C2D	Dual Series Connected Pair			
Test Conditions			I_F=0.1 mA	I_F=1.0 mA	V_F=-0.5V to -1.0V F=1 MHz

DC Electrical Specifications, T_C = +25°C, Diode Pairs

Part Number CMS-	Maximum Forward Voltage Difference V_F (mV)	Maximum Capacitance Difference C_T (pF)
8252 8253	15	-0.5
Test Conditions	I_F = 1.0mA	V_F = -0.5V F = 1 MHz

Equivalent Linear Circuit Model

CMS-825x chip



R_S=series resistance (see Table of SPICE parameters)
C_J = junction capacitance (see Table of SPICE parameters)
$R_J = \frac{8.33 \times 10^{-5} nT}{I_b + I_s}$

where
I_b = externally applied bias current in amps
I_s = saturation current (see table of SPICE parameters)
T = temperature, °K
n = ideality factor (see table of SPICE parameters)

SPICE Parameters

Parameter	Units	CMS-825x
B_V	V	5.0
C_{J0}	pF	0.175
E_G	eV	0.68
I_{BV}	A	2.9 E-4
I_S	A	2.9 E-6
N		1.03
R_S	O	26
P_B (V_J)	V	0.350
P_T (XTI)		1.95
M		0.49

Absolute Maximum Ratings, T_C = +25°C, Single Diode

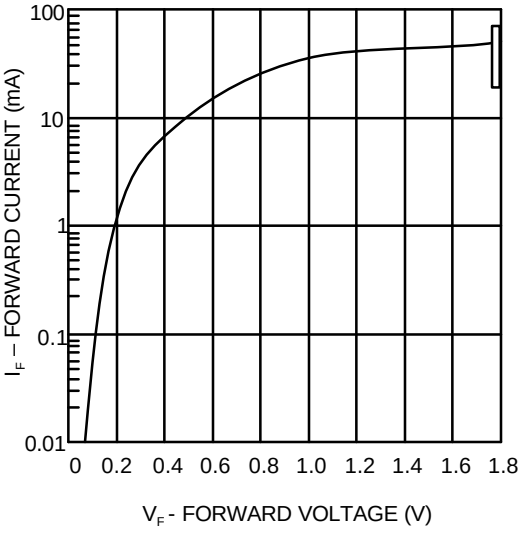
Symbol	Parameter	Unit	Absolute Maximum[1]	
			SOT-23/143	SOT-323
P_{IV}	Peak Inverse Voltage	V	2.0	2.0
T_J	Junction Temperature	°C	150	150
T_{STG}	Storage Temperature	°C	-65 to 150	-65 to 150
T_{OP}	Operating Temperature	°C	-65 to 150	-65 to 150
$?_{jc}$	Thermal Resistance[2]	°C/W	500	150

Notes:

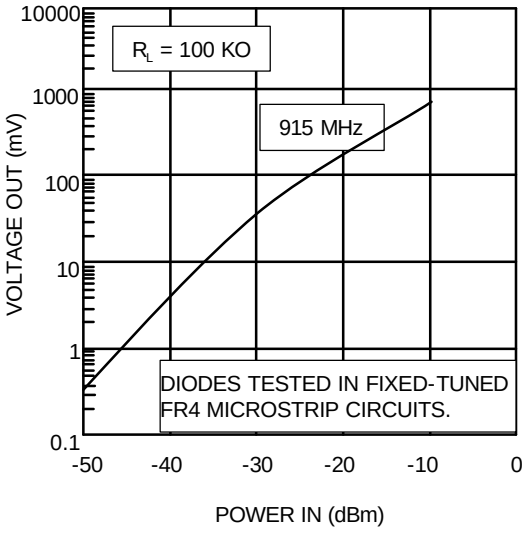
1. Operation in excess of any one of these conditions may result in permanent damage to the device
2. T_C = +25°C, where T_C is defined to be the temperature at the package pins where contact is made to the circuit board.

ESD WARNING: Handling Precautions Should Be Taken To Avoid Static Discharge.

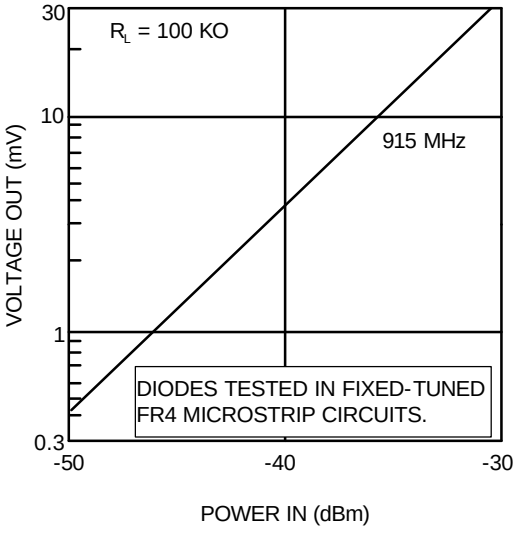
Typical Parameters, Single Diode



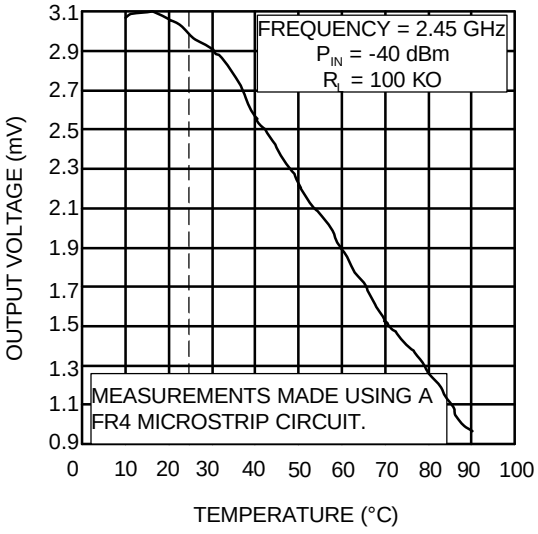
Graph 1: Typical Forward Current vs. Forward Voltage



Graph 2: +25°C Output Voltage vs. Input Power at Zero Bias



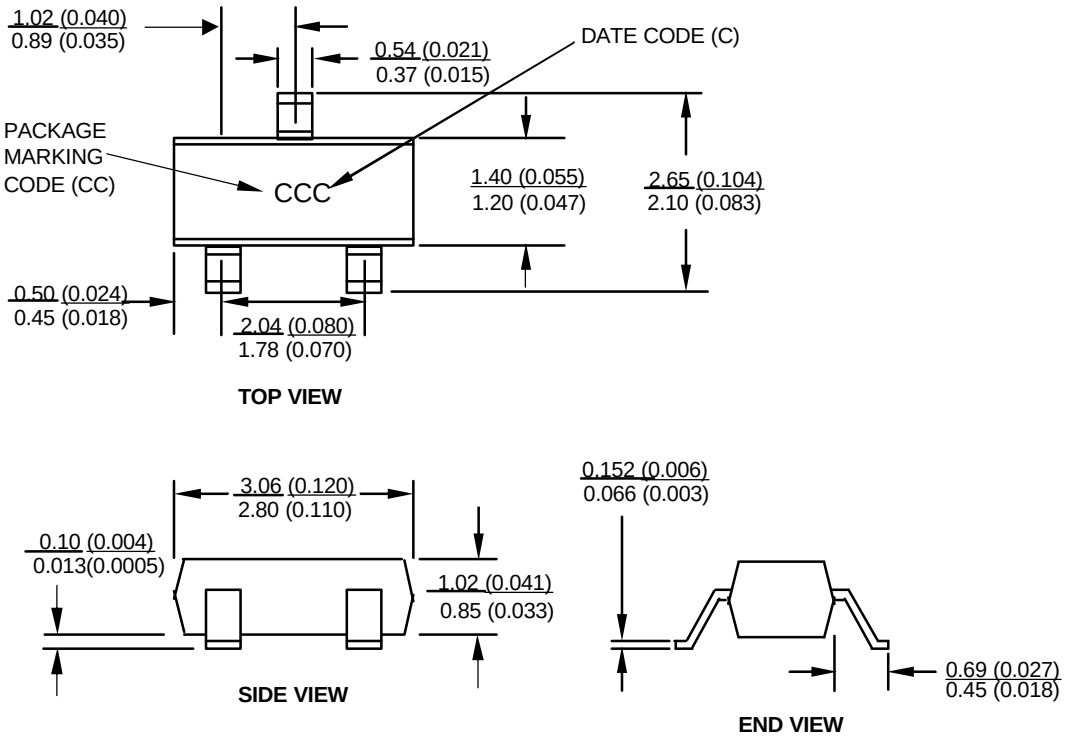
Graph 3: +25°C Expanded Output Voltage vs. Input Power. See Figure 2.



Graph 4: +25°C Output Voltage vs. Temperature.

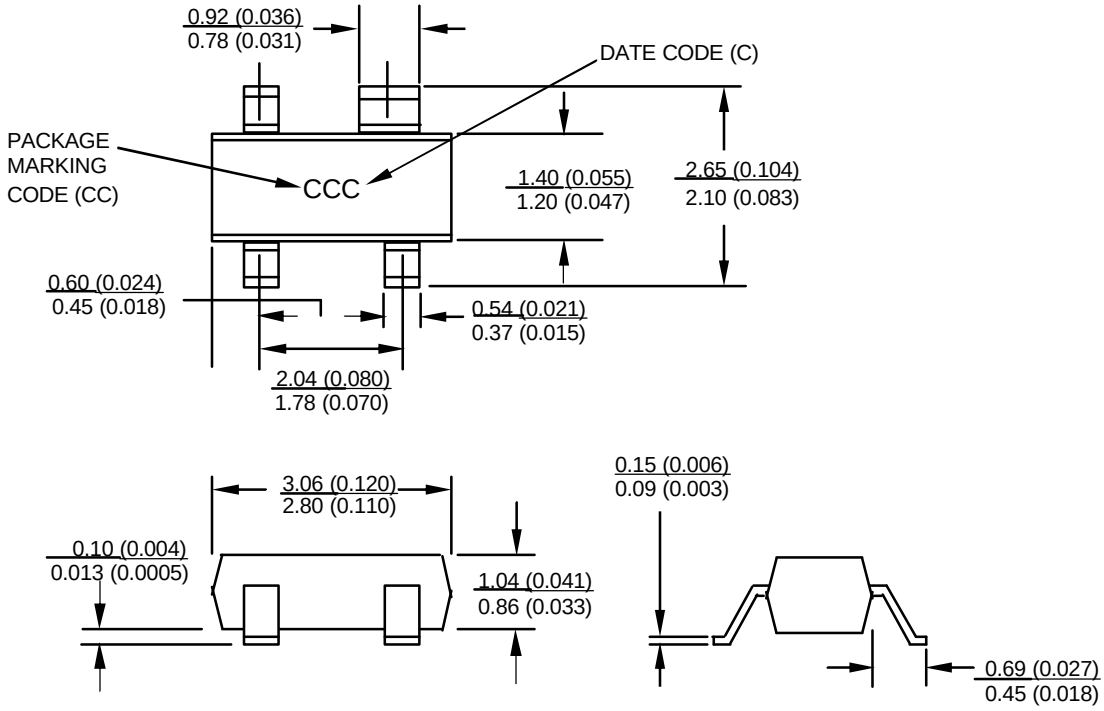
Package Dimensions

Outline 23 (SOT-23)

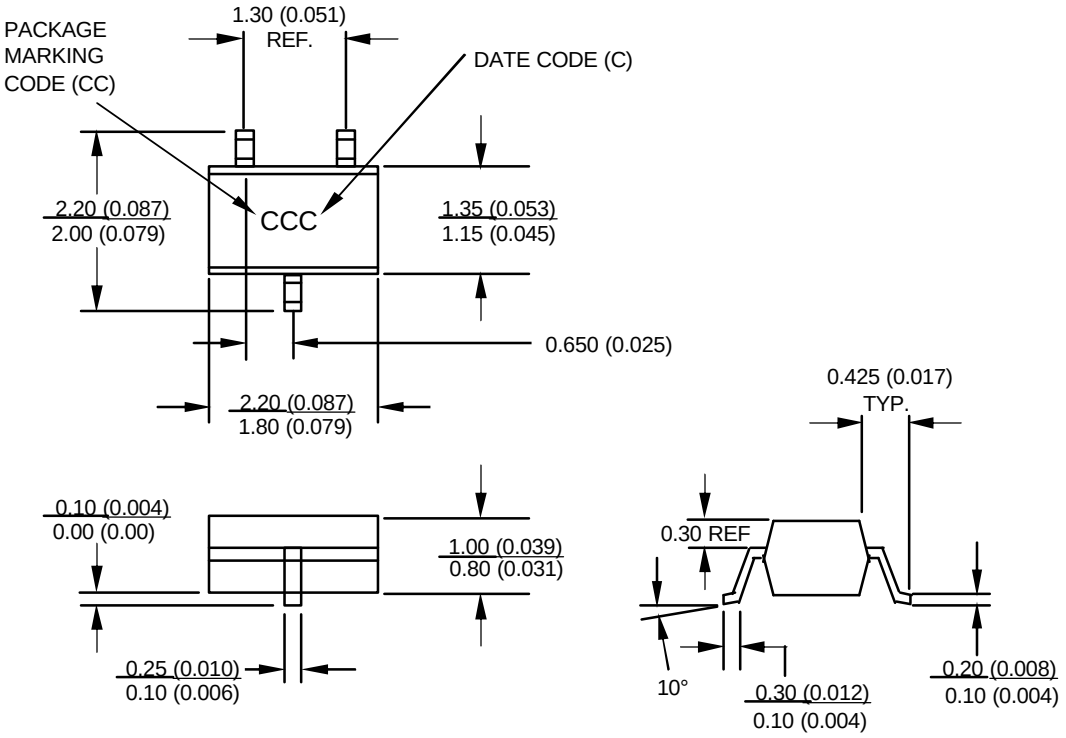


DIMENSIONS ARE IN MILLIMETERS (INCHES)

Outline 143 (SOT-143)

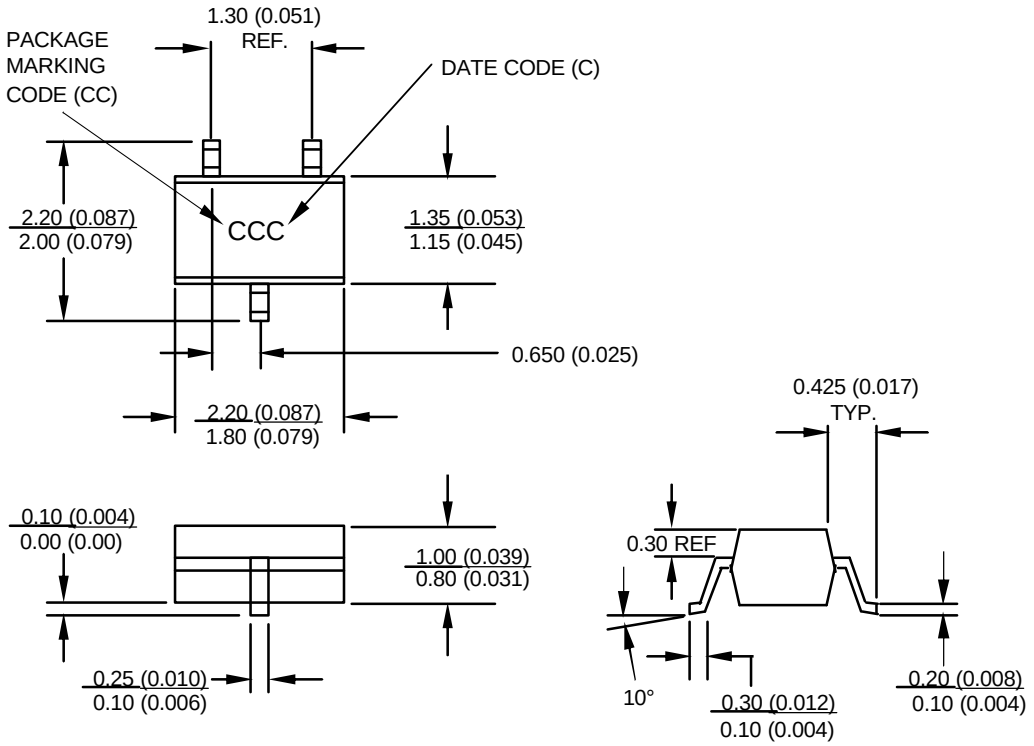


Outline SOT-323 (SC-70)



DIMENSIONS ARE IN MILLIMETERS (INCHES)

Outline SOT-363 (SC70, 6 Lead)



Cross Reference Guide

SiliconApps Part Number	Agilent Part Number
CMS8250	HSMS2850
CMS8251	HSMS285B
CMS8252	HSMS2852
CMS8253	HSMS285C
CMS8254	HSMS285P
CMS8255	HSMS2855
CMS8256	HSMS285L

Part Number Ordering Information

PART NUMBER	NO. OF DEVICES	CONTAINER
CMS-825X-TR2	10,000	13” Reel
CMS-825X-TR1	2500	7” Reel
CMS-825X-BLK	100	Antistatic bag

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Revised 05/28/03

Data subject to change