

### CMS-825X Series

### Surface Mount Zero Bias Schottky Detector Diodes

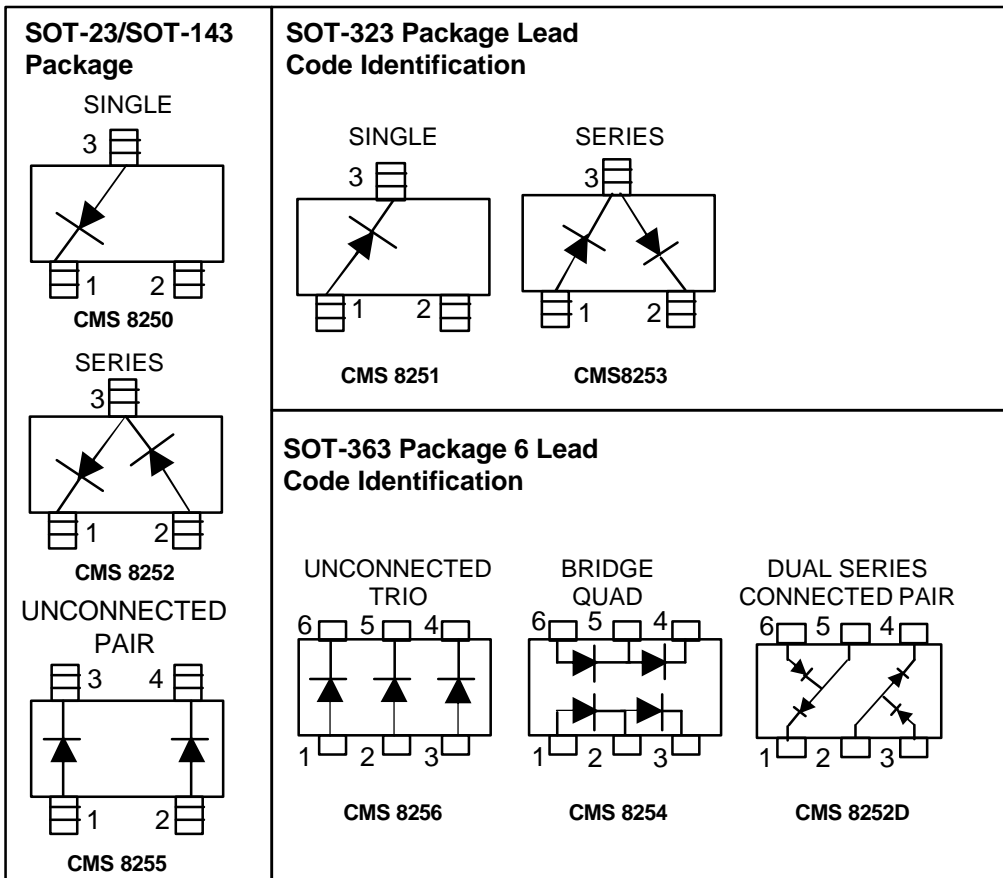
#### Description:

The CMS-825X line of zero bias Schottky detector diodes by Calmos 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.

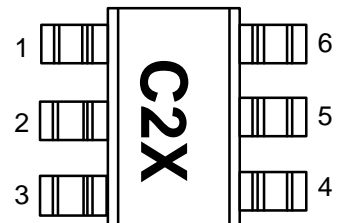
At Calmos Technology, our commitment to quality components gives our customers a reliable source of RF products. Manufacturing techniques assure that when two diodes are mounted into a single package they are taken from adjacent sites on the wafer. The various package configurations available provide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



#### Pin Connections and Package Marking



#### Notes:

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

## RF Electrical Specifications, $T_C = +25^\circ\text{C}$ , Single Diode

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

## DC Electrical Specifications, $T_C = +25^\circ\text{C}$ , Single Diode

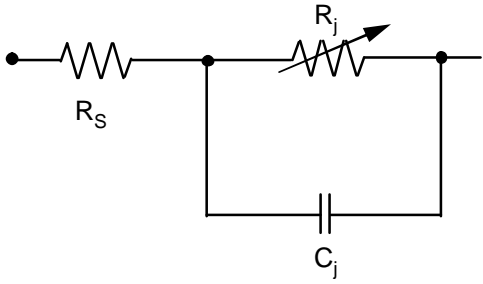
Part Number CMS-	Package Marking Code <sup>[1]</sup>	Configuration	Maximum Forward Voltage $V_F$ (mV)		Typical Capacitance $C_T$ (pF)
			150	250	
8250	C0H	Single	150	250	0.30
8251	C1H	Single			
8252	C2H	Series Pair <sup>[2,3]</sup>			
8253	C3H	Series Pair <sup>[2,3]</sup>			
8254	C4H	Bridge Quad			
8255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

## DC Electrical Specifications, $T_C = +25^\circ\text{C}$ , 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	$I_F = 1.0\text{mA}$	$V_F = -0.5\text{V}$ $F = 1\text{ MHz}$

# 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
$R_S$	Ω	26
$P_B (V_J)$	V	0.350
$P_T (XTI)$		1.95
M		0.49

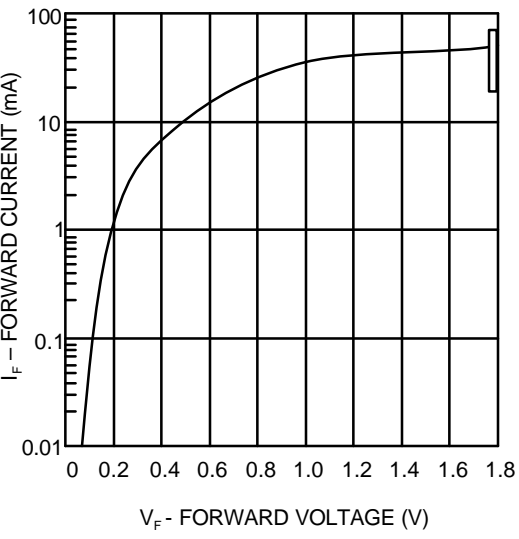
## Absolute Maximum Ratings, $T_C = +25^\circ\text{C}$ , Single Diode

Symbol	Parameter	Unit	Absolute Maximum <sup>[1]</sup>	
			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
$\theta_{jc}$	Thermal Resistance <sup>[2]</sup>	°C/W	500	150

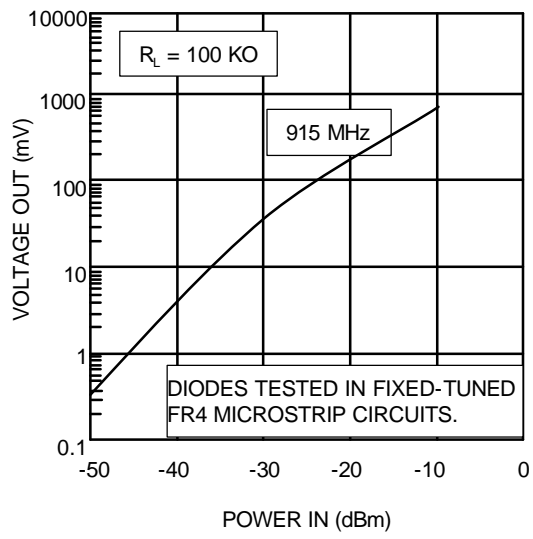
- Notes:
- Operation in excess of any one of these conditions may result in permanent damage to the device
  - $T_C = +25^\circ\text{C}$ , where  $T_C$  is defined to be the temperature at the package pins where contact is made to the circuit board.

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

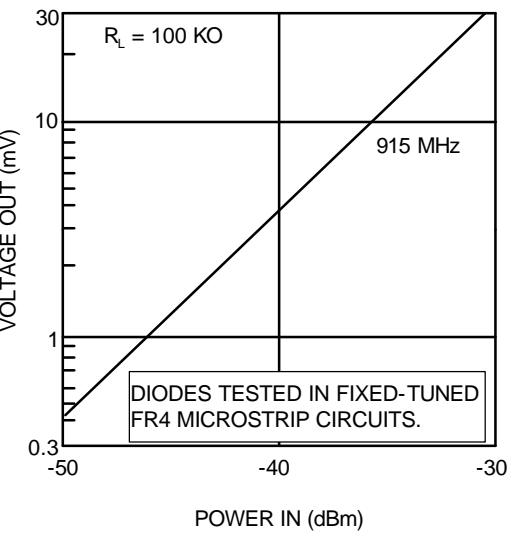
# Typical Parameters, Single Diode



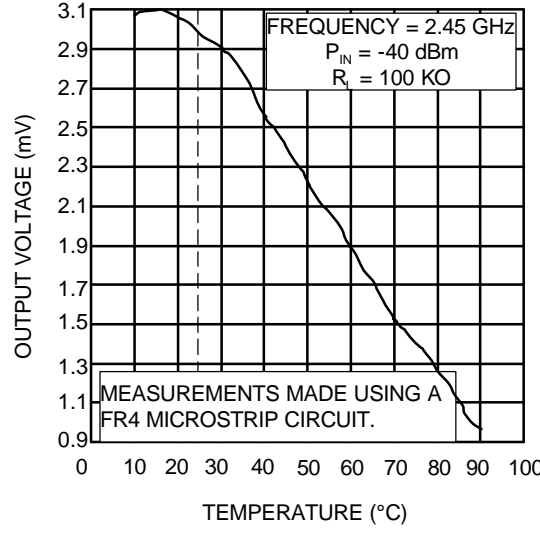
**Graph 1: Typical Forward Current vs. Forward Voltage**



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



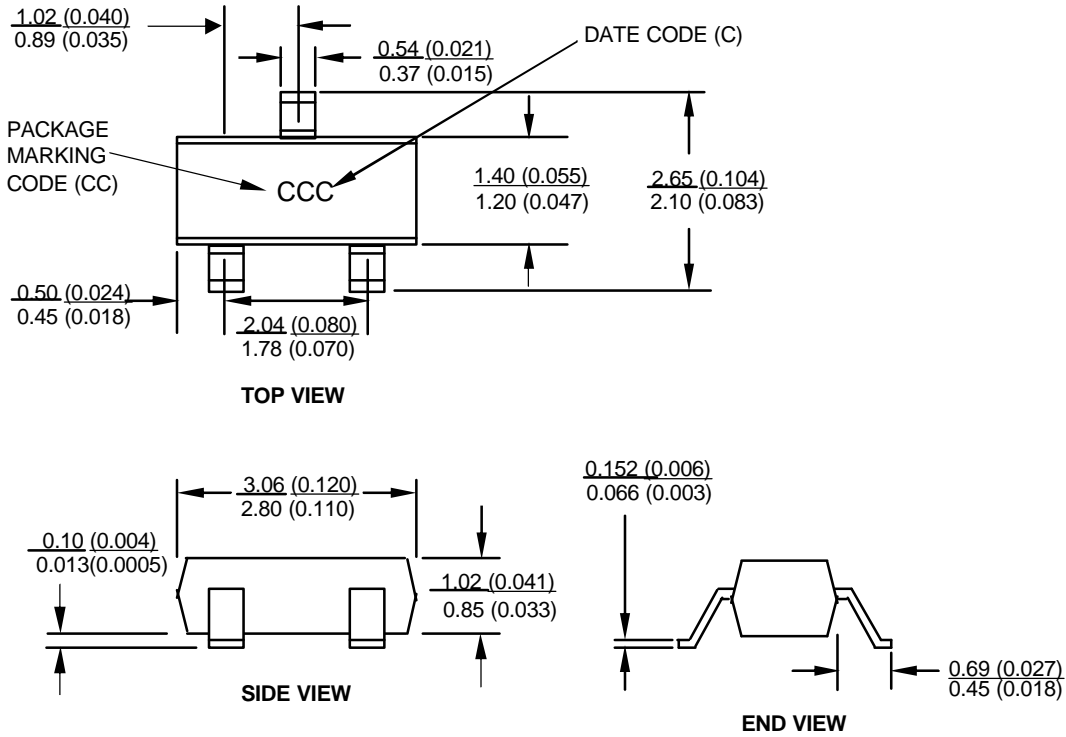
**Graph 3: +25°C Expanded Output Voltage vs. Input Power. See Figure 2.**



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

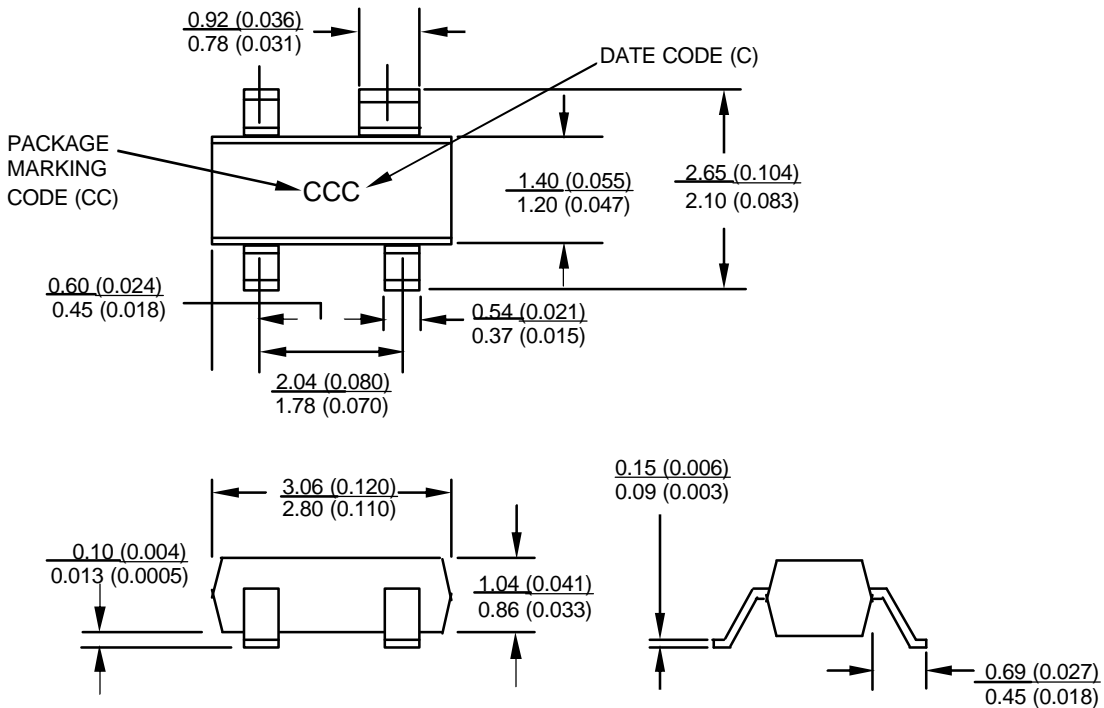
# Package Dimensions

## Outline 23 (SOT-23)

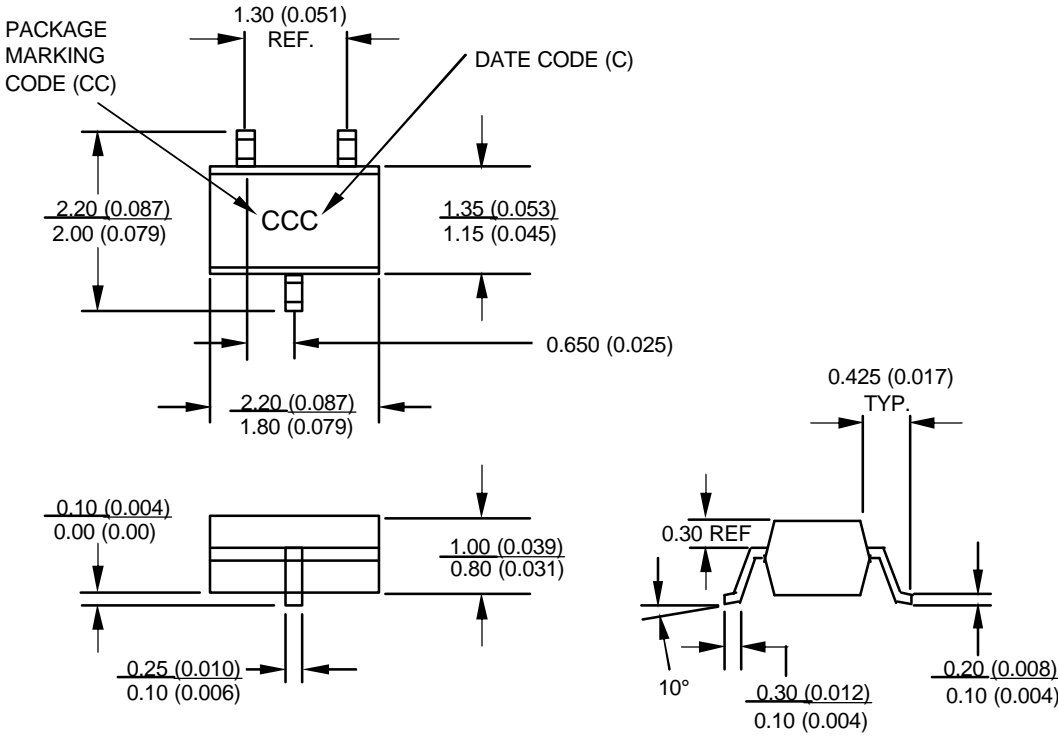


DIMENSIONS ARE IN MILLIMETERS (INCHES)

## Outline 143 (SOT-143)

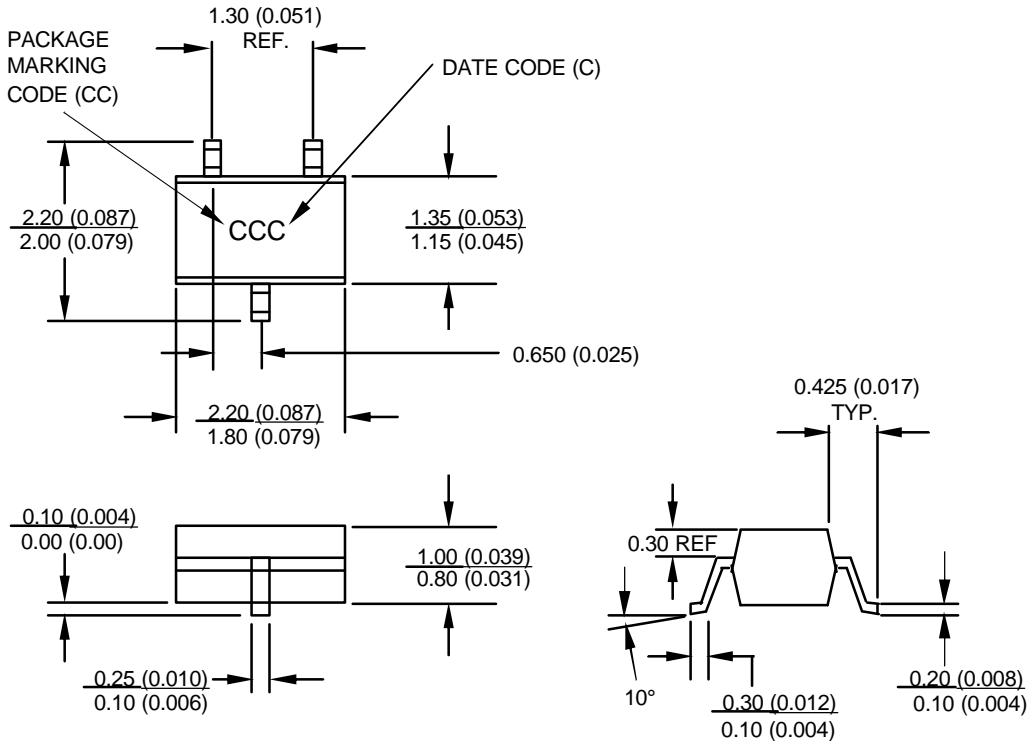


# Outline SOT-323 (SC-70)



**DIMENSIONS ARE IN MILLIMETERS (INCHES)**

# Outline SOT-363 (SC70, 6 Lead)



## Cross Reference Guide

<b>CALMOS PART NUMBER</b>	<b>AGILENT PART NUMBER</b>
CMS8250	HSMS2850
CMS8251	HSMS285B
CMS8252	HSMS2852
CMS8253	HSMS285C
CMS8254	HSMS285P
CMS8255	HSMS2855
CMS8256	HSMS285L

## Part Number Ordering Information

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

[www.calmotech.com](http://www.calmotech.com)

Revised 05/28/03

Data subject to change

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