IS-1009RH, IS-1009EH

Radiation Hardened 2.5V Reference

The Radiation Hardened IS-1009RH, IS-1009EH are a 2.5V shunt regulator diode is designed to provide a stable 2.5V reference over a wide current range.

These devices are designed to maintain stability over the full military temperature range and over time. The 0.2% reference tolerance is achieved by on-chip trimming.

An adjustment terminal is provided to allow for the calibration of system errors. The use of this terminal to adjust the reference voltage does not effect the temperature coefficient.

Constructed with the dielectrically isolated EBHF process, these devices are immune to single event latch-up and have been specifically designed to provide highly reliable performance in harsh radiation environments.

The IS-1009EH replaces the obsoleted IS-1009RH.

Applications

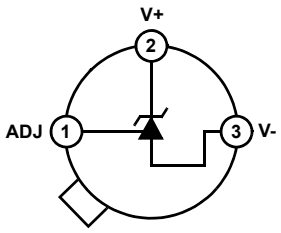
- Power supply monitoring
- Reference for 5V systems
- A/D and D/A reference

Features

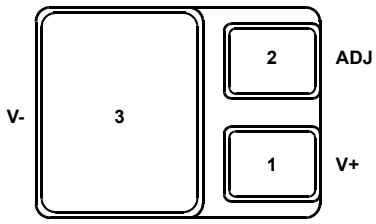
- Electrically screened to SMD #5962-00523
- QML qualified per MIL-PRF-38535 requirements
- EH version acceptance tested to 50krad(Si) (LDR)
- Radiation environment - IS-1009EH
  - High dose rate (50-300rad(Si)/s). . . . . 300 krad(Si)
  - Low dose rate (0.01rad(Si)/s) . . . . . 50krad(Si)
- Radiation environment - IS-1009RH
  - High dose rate (50-300rad(Si)/s). . . . . 300 krad(Si)
- Latch-up immune. . . . . dielectrically isolated
- Reverse breakdown voltage (V_Z) 2.5V
- Change in V_Z vs current (400µA to 10mA). 6mV
- Change in V_Z vs temperature (-55°C to +125°C) 15mV
- Maximum reverse breakdown current 20mA
- Stability Criteria
  - Optimum stability is achieved with C_L = 10µF between V+ and V- for heavy loads
  - Instability region with self-sustaining oscillations is from CL = 1nF to 3µF
- Interchangeable with 1009 and 136 industry types

Pin Configurations

IS2-1009RH, IS2-1009EH
(TO-206AB CAN)
BOTTOM VIEW



ISYE-1009RH, ISYE-1009EH
(SMD.5)
BOTTOM VIEW



Ordering Information

ORDERING SMD NUMBER (Note 2)	INTERNAL MKT. NUMBER (Note 1)	RADIATION HARDNESS (Total Ionizing Dose)	PACKAGE DESCRIPTION (RoHS Compliant)	PKG. DWG.#	CARRIER TYPE	TEMP. RANGE
5962F0052302VXC	IS2-1009EH-Q	HDR to 300krad(Si), LDR to 50krad(Si)	3 Lead Metal Can package TO-206AB (T0-46)	T3.B	Tray	-55 to +125°C
5962F0052302VYC	ISYE-1009EH-Q		3 Pad Hermetic CLCC	J3.A	Tube	
5962F0052302V9A	IS0-1009EH-Q (Note 3)		Die	-	-	
N/A	IS2-1009EH/PROTO (Note 4)	N/A	3 Lead Metal Can package TO-206AB (T0-46)	T3.B	Tray	
	ISYE-1009EH/PROTO (Note 4)		3 Pad Hermetic CLCC	J3.A	Tube	
	IS0-1009EH/SAMPLE (Notes 3, 4)		Die	-	-	
5962F0052301VXC	IS2-1009RH-Q **No longer available or supported**	HDR to 300krad(Si)	3 Lead Metal Can package TO-206AB (T0-46)	T3.B	Tray	
5962F0052301QXC	IS2-1009RH-8 **No longer available or supported**					
5962F0052301VYC	ISYE-1009RH-Q **No longer available or supported**		3 Pad Hermetic CLCC	J3.A	Tube	
5962F0052301QYC	ISYE-1009RH-8 **No longer available or supported**					
5962F0052301V9A	IS0-1009RH-Q (Note 3) **No longer available or supported**		Die	-	-	
N/A	IS2-1009RH/PROTO (Note 4) **No longer available or supported**	N/A	3 Lead Metal Can package TO-206AB (T0-46)	T3.B	Tray	
	ISYE-1009RH/PROTO (Note 4) **No longer available or supported**		3 Pad Hermetic CLCC	J3.A	Tube	
IS0-1009RH/SAMPLE	IS0-1009RH/SAMPLE (Notes 3, 4) **No longer available or supported**		Die	-	-	

NOTES:

1. These Pb-free Hermetic packaged products employ 100% Au plate - e4 termination finish, which is RoHS compliant and compatible with both SnPb and Pb-free soldering operations.
2. Specifications for Rad Hard QML devices are controlled by the Defense Logistics Agency Land and Maritime (DLA). The SMD numbers listed must be used when ordering.
3. Die product tested at T_A = + 25°C. The wafer probe test includes functional and parametric testing sufficient to make the die capable of meeting the electrical performance outlined in the SMD.
4. The /PROTO and /SAMPLE are not rated or certified for Total Ionizing Dose (TID) or Single Event Effect (SEE) immunity. These parts are intended for engineering evaluation purposes only. The /PROTO parts meet the electrical limits and conditions across temperature specified in the DLA SMD and are in the same form and fit as the qualified device. The /SAMPLE parts are capable of meeting the electrical limits and conditions specified in the DLA SMD. The /SAMPLE parts do not receive 100% screening across temperature to the DLA SMD electrical limits. These part types do not come with a Certificate of Conformance because they are not DLA qualified devices.

Die Characteristics

DIE DIMENSIONS

1270µm x 1778µm (50 mils x 70 mils)
Thickness: 356µm ±25.4µm (14 mils ±1 mil)

INTERFACE MATERIALS

Glassivation

Type: Silox (SiO2) 1:6:1
Thickness: 8kÅ ±0.8kÅ (1kÅ undopped, 6kÅ dopped, cap 1kÅ undopped)

Top Metallization

Type: Al Si Cu
Thickness: 16.0kÅ ±2kÅ

Substrate

EFSTDB: Single-poly dielectrically isolated complementary bipolar

Backside Finish

Silicon

ASSEMBLY RELATED INFORMATION

Substrate Potential

Unbiased (DI)

ADDITIONAL INFORMATION

Worst Case Current Density

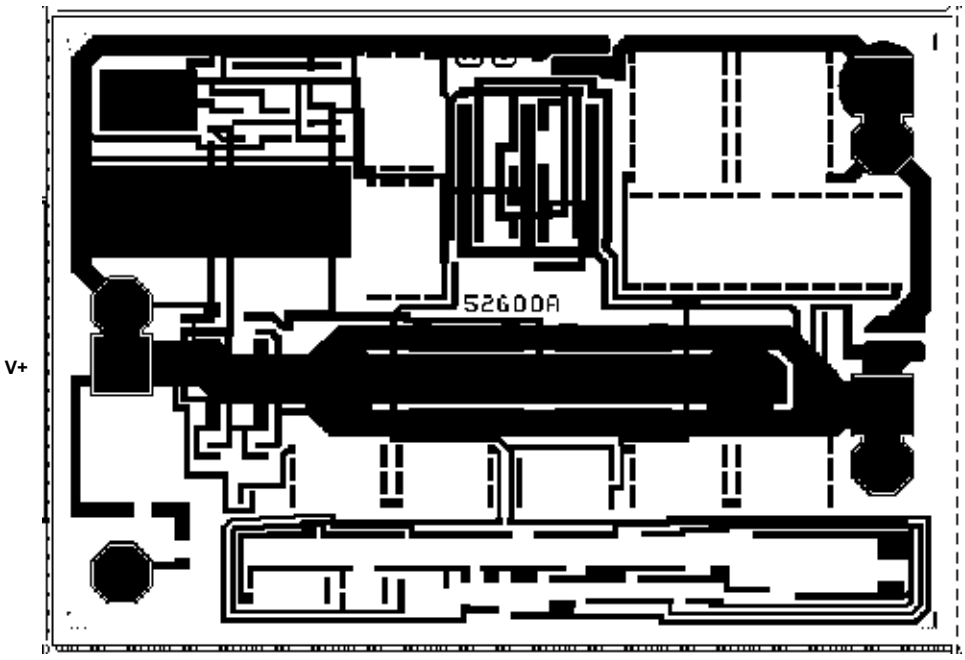
$<1.0 \times 10^5$ A/cm^2

Transistor Count

26

Metallization Mask Layout

IS-1009RH, IS-1009EH



Revision History

The revision history provided is for informational purposes only and is believed to be accurate, but not warranted. Please go to the web to make sure that you have the latest revision.

DATE	REVISION	CHANGE
Jun 25, 2025	8.01	Updated stability feature bullet.
May 18, 2021	8.0	Updated Radiation Acceptance testing features bullets. Updated the Ordering Information table. Updated Die Characteristics for Glassivation and Substrate to match information in the SMD. Removed About Intersil section.
Nov 19, 2015	7.0	Added Rev History and About Intersil verbiage. Added to page 1 introduction “The IS-1009EH replaces the obsoleted IS-1009RH.” Updated Ordering Information on page 2 as follows: Marked RH obsolete parts “No longer available or supported” Added EH Proto and Sample parts.

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