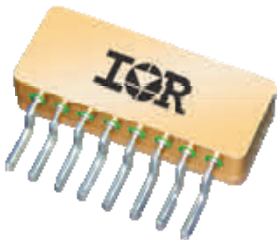
An Infineon Technologies Company

RDHB710SE20A2SX

RADIATION HARDENED BUFFERED INPUT SOLID STATE RELAY

Dual 200V, 10A



8 PIN SURFACE MOUNT

Product Summary

Part Number	Breakdown Voltage	Current	tr / tf	Logic Drive Voltage
RDHB710SE20A2SX	200V	10A	Controlled	3.3V

Description

The RDHB710SE20A2SX is part of the International Rectifier HiRel family of products. The RDHB710SE20A2SX is a radiation hardened dual solid-state relay in a hermetic package. It is configured as a dual, single-pole-single-throw (SPST) normally open relay with common input supply. This device is characterized for 100kRads(Si) total ionizing dose, and neutron fluence level of $1.8E^{12}n/cm^2$. The input and output MOSFETs utilize International Rectifier HiRel R6 technology. The RDHB710SE20A2SX is optically coupled and actuated by standard logic inputs.

Features

- Total Dose Capability to 100kRads(Si)
- Neutron Fluence Level of $1.8E^{12}n/cm^2$
- Optically Coupled
- Buffered Input Stage
- 3.3V Compatible Logic Level Input
- Controlled Switching Times
- $1000V_{DC}$ Input to Output Isolation
- Hermetically Sealed Package

Absolute Maximum Ratings per Channel @ T_J = 25°C (unless otherwise specified)

Parameter	Symbol	Value	Units
Output Maximum Voltage ⑤⑧	V_S	200	V
Output Current ④⑤	I_O	10	A
Input Buffer Voltage (Pins 4 & 6) ③	V_{IN}	±7.0	V
Input Buffer Current	I_{IN}	±10	mA
Input Supply Voltage (Pin 5) ⑦	V_{DD}	10	V
Input Supply Current ⑦	I_{DD}	25	mA
Power Dissipation ④⑤	P_{DISS}	73	W
Operating Junction Range	T_J	-55 to +150	°C
Storage Temperature Range	T_{STG}	-65 to +150	
Lead Temperature	T_L	300	

For Notes, refer to the page 3.

General Characteristics per Channel @ -55°C ≤ T_C ≤ +125°C (Unless Otherwise Specified)

Parameter	Group A Subgroups	Test Conditions	Symbol	Min.	Typ.	Max.	Units
Input Buffer Threshold Voltage ①③		V_{DD} = 5.0V, I_O = 10A	$V_{IN\ (TH)}$	3.0	——	——	V
Input-to-Output Leakage Current	1	V_{I-O} = 1.0kV_{DC}, dwell = 5.0s T_C = 25°C	I_{I-O}	——	——	1.0	µA
Output Capacitance ①		V_{IN} = 0.8V, f = 1.0MHz, V_S = 25V, T_C = 25°C	C_{OSS}	——	210	——	pF
Thermal Resistance ①		V_{IN} = 3.3V, V_{DD} = 5.0V ①④	R_{THJC}	——	——	1.4	°C/W
MTBF (Per Channel)		MIL-HDBK-217F, SF @ T_C = 25°C		6.0	——	——	MHrs
Weight			W	——	——	25	gms

Pre-Irradiation

Electrical Characteristics per Channel @ -55°C ≤ T_C ≤ +125°C (Unless Otherwise Specified)

Parameter	Group A Subgroups	Test Conditions	Symbol	Min.	Typ.	Max.	Units
Output On-Resistance	1	V_{IN} = 3.3V, V_{DD} = 5.0V I_O = 10A	$R_{DS(ON)}$	——	——	0.15	Ω
	2			——	——	0.29	
Output Leakage Current	1	V_{IN} = 0.1V, V_S = 200V	I_O	——	——	25	µA
	2	V_{IN} = 0.1V, V_S = 150V		——	——	250	
Input Supply Current	1, 2, 3	V_{DD} = 5.0V, I_O = 10A	I_{DD}	——	10	15	mA
		V_{DD} = 10V, I_O = 10A ① ⑦		——	——	25	
Input Buffer Current	1	V_{IN} = 3.3V	I_{IN}	——	——	1.0	µA
	2, 3			——	——	3.0	
Turn-On Delay ⑥	9, 10, 11	V_{IN} = 3.3V, V_{DD} = 5.0V, V_S = 50V R_L = 5Ω, PW = 50ms	t_{on}	——	——	1.5	ms
Turn-Off Delay ⑥	9, 10, 11	V_{IN} = 0.1V, V_{DD} = 5.0V, V_S = 50V R_L = 5Ω, PW = 50ms	t_{off}	——	——	10	
Rise Time ②⑥	9, 10, 11	V_{IN} = 3.3V, V_{DD} = 5.0V, V_S = 50V R_L = 5Ω, PW = 50ms	t_r	——	——	1.5	
Fall Time ②⑥	9, 10, 11	V_{IN} = 0.1V, V_{DD} = 5.0V, V_S = 50V R_L = 5Ω, PW = 50ms	t_f	——	——	3.5	

For Notes, refer to the page 3

Post Total Dose Irradiation ⑨ ⑩ ⑪

Electrical Characteristics per Channel @ 25°C (Unless Otherwise Specified)

Parameter	Group A Subgroups	Test Conditions	Symbol	Min.	Typ.	Max.	Units
Output On-Resistance	1	V_{IN} = 3.3V, V_{DD} = 5.0V, I_O = 10A	$R_{DS(ON)}$	——	——	0.15	Ω
Input Supply Current	1	V_{IN} = 3.3V, V_{DD} = 5.0V, I_O = 10A	I_{DD}	——	10	15	mA
Output Leakage Current	1	V_{IN} = 0.1V, V_S = 200V	I_O	——	——	25	μA
Input Buffer Current	1	V_{IN} = 3.3V	I_{IN}	——	——	1.0	
Turn-On Delay ⑥	9	V_{IN} = 3.3V, V_{DD} = 5.0V, V_S = 50V R_L = 5Ω, PW = 50ms	t_{on}	——	——	1.5	ms
Turn-Off Delay ⑥	9	V_{IN} = 0.1V, V_{DD} = 5.0V, V_S = 50V R_L = 5Ω, PW = 50ms	t_{off}	——	——	10	
Rise Time ②⑥	9	V_{IN} = 3.3V, V_{DD} = 5.0V, V_S = 50V R_L = 5Ω, PW = 50ms	t_r	——	——	1.5	
Fall Time ②⑥	9	V_{IN} = 0.1V, V_{DD} = 5.0V, V_S = 50V R_L = 5Ω, PW = 50ms	t_f	——	——	3.5	

Notes for Maximum Ratings, General and Electrical Characteristics Tables:

① Specification is guaranteed by design.

② Rise and fall time are controlled internally.

③ Inputs protected by V_{IN} < 1.0V and V_{IN} > 7.0V.

④ Optically coupled Solid State Relays (SSRs) have relatively slow turn on and turn off times. Care must be taken to ensure that transient currents do not cause a violation of SOA. If transient conditions are present, IR HiRel recommends a complete simulation to be performed by the end user to ensure compliance with SOA requirements as specified in the IRHNJ67230 datasheet.

⑤ While the SSR design meets the design requirements specified in MIL-PRF-38534, the end user is responsible for product derating as applicable for the application.

⑥ Reference Fig. 3 and 4 for Switching Test Circuits and Wave Forms: Output Voltage (V_OUT) of Fig 4, Switching Test Waveform is representative of the Output MOSFET and Drain-to-Source.

⑦ Input Supply voltage shall not exceed 5.25V @ Tc ≥ 70°C.

⑧ Breakdown voltage (BV_{DSS}) of Output MOSFET @ -55°C shall be derated to 80% of Maximum Rated Voltage.

⑨ Total Dose Irradiation with Input Bias: 10mA I_{DD} applied and V_{DS} = 0 during Irradiation.

⑩ Total Dose Irradiation with Output Bias: 160Volts V_{DS} applied and I_{DD} = 0 during Irradiation.

⑪ IR HiRel does not currently have a DLA Certified Radiation Hardness Assurance Program.

Radiation Performance:

IR HiRel Radiation Hardened SSRs are tested to verify their hardness capability. The hardness assurance program at IR HiRel uses a Cobalt-60(^{60}Co) source and heavy ion irradiation. Both pre– and post– irradiation performance are tested and specified using the same drive circuitry and test conditions to provide a direct comparison.

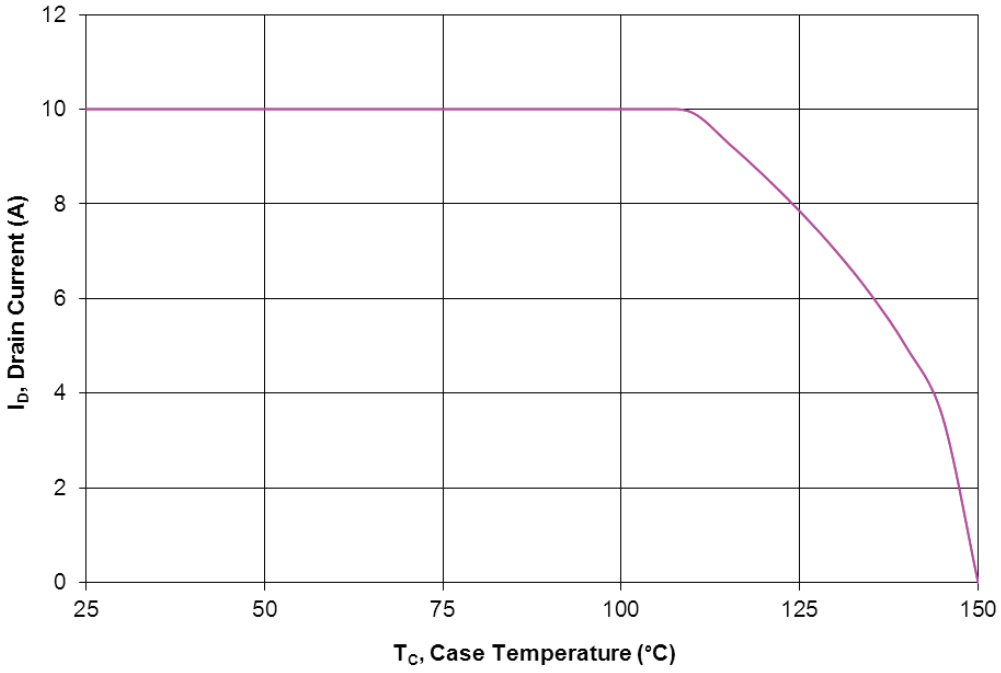


Fig 1. Maximum Drain Current Vs Case Temperature per Channel

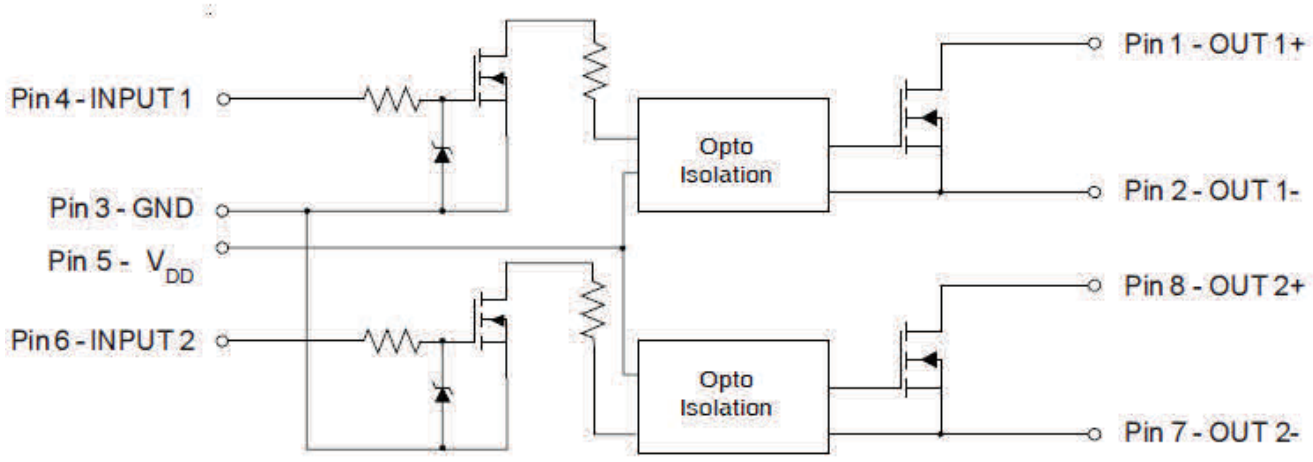


Fig 2. Typical Application

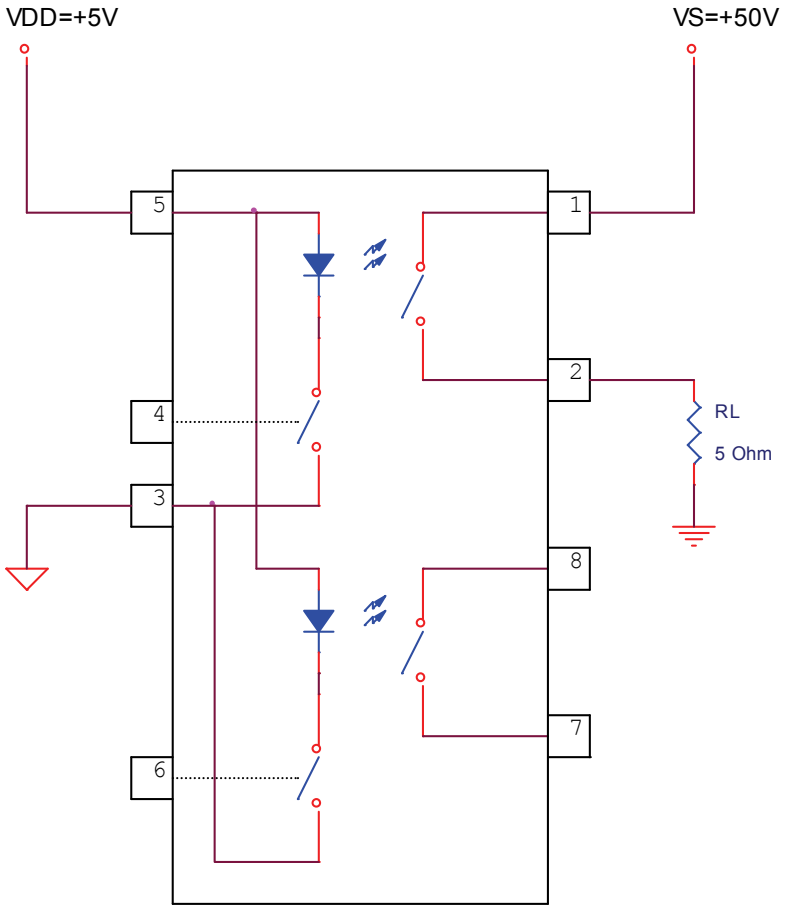


Fig 3. Switching Test Circuit (Only one Channel shown)

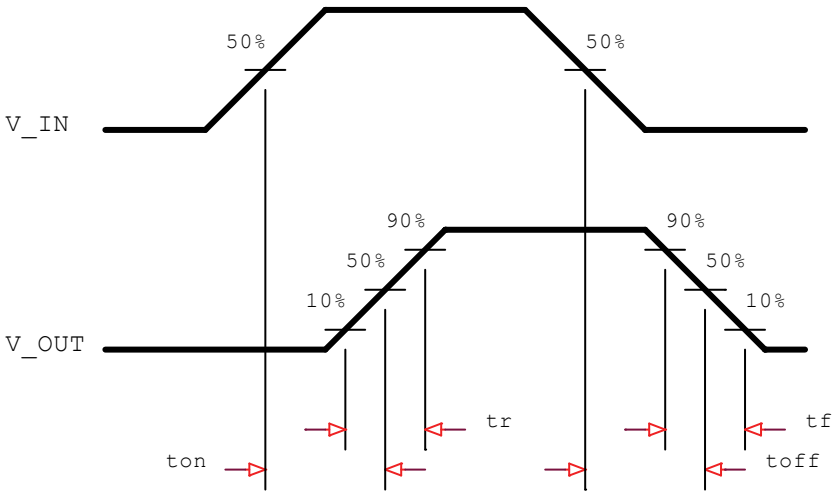
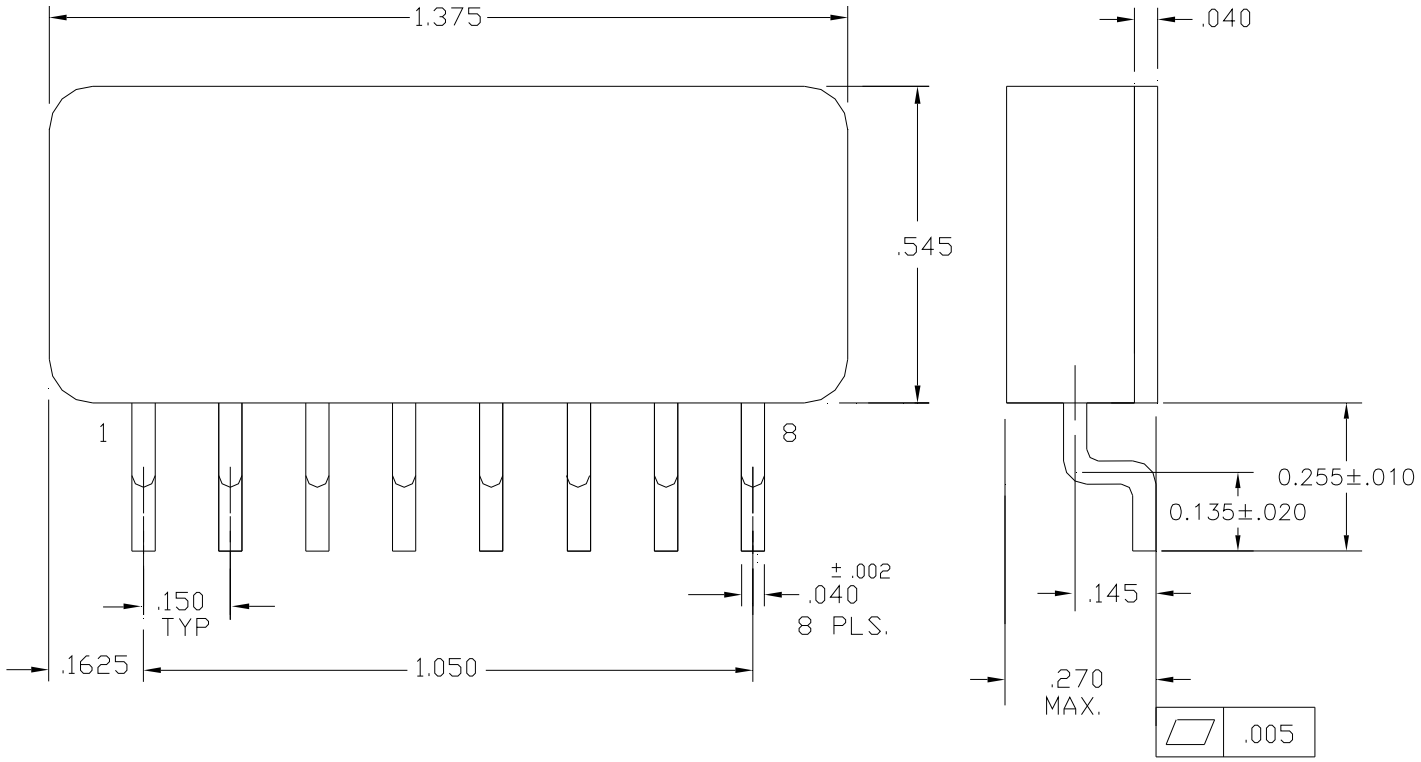


Fig 4. Switching Test Waveforms

Case Outline and Dimensions - 8 Pin Surface Mount Package



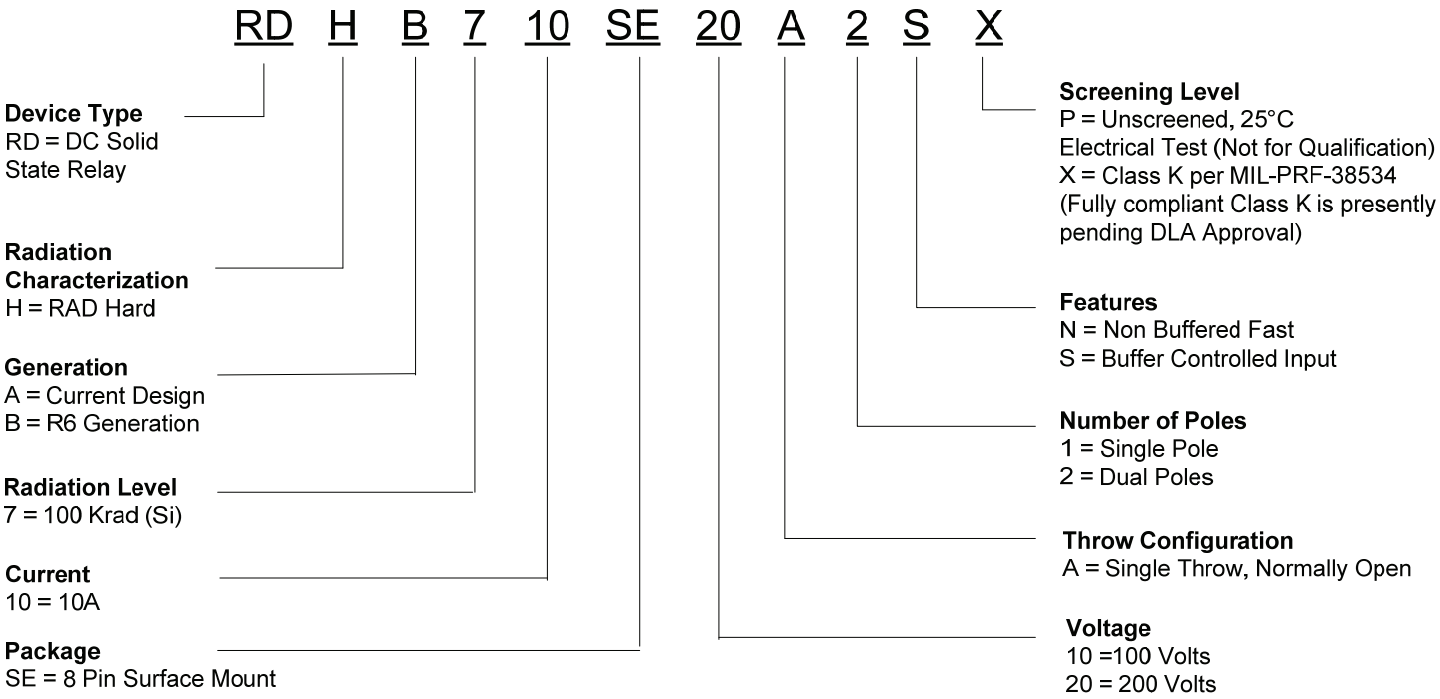
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.53M–1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS SHOWN IN INCHES.
4. UNLESS NOTED, TOLERANCES ARE ±0.005 UOS.
5. LEAD DIMENSIONS ARE PRIOR TO HOT SOLDER DIP.
6. LEAD FINISH PER MIL–PRF–38534, FINISH A, HOT SOLDER DIP (Sn63Pb37).

Pin Designation

Pin No.	Designation
1	OUT 1+
2	OUT 1-
3	GND
4	INPUT 1
5	V_{DD}
6	INPUT 2
7	OUT 2-
8	OUT 2+

Note: Refer to Fig. 2 – Typical Application

Part Numbering Nomenclature



An Infineon Technologies Company
www.infineon.com/irhirel

101 N. Sepulveda Boulevard, El Segundo, California 90245, USA Tel: +1 (310) 252-7105
2520 Junction Avenue, San Jose, California 95134, USA Tel: +1 (408) 434-5000
205 Crawford Street, Leominster, Massachusetts 01453, USA Tel: +1 (978) 534-5776

IMPORTANT NOTICE

The information given in this document shall be in no event regarded as guarantee of conditions or characteristic. The data contained herein is a characterization of the component based on internal standards and is intended to demonstrate and provide guidance for typical part performance. It will require further evaluation, qualification and analysis to determine suitability in the application environment to confirm compliance to your system requirements.

With respect to any example hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind including without limitation warranties on non- infringement of intellectual property rights and any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's product and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of any customer's technical departments to evaluate the suitability of the product for the intended applications and the completeness of the product information given in this document with respect to applications.

For further information on the product, technology, delivery terms and conditions and prices, please contact your local sales representative or go to (www.infineon.com/hirel).

WARNING

Due to technical requirements products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.