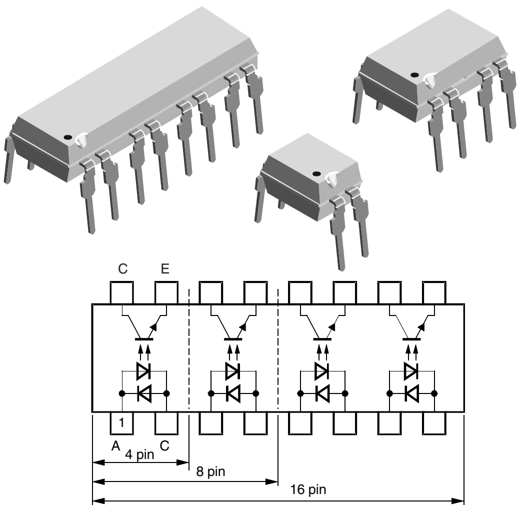
Optocoupler, Phototransistor Output, AC Input



17220_2

FEATURES

- Endstackable to 2.54 mm (0.1") spacing
- DC isolation test voltage V_{ISO} = 5000 V_{RMS}
- Low coupling capacitance of typical 0.3 pF
- Current transfer ratio (CTR) of typical 100 %
- Low temperature coefficient of CTR
- Wide ambient temperature range
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free
e3
RoHS
COMPLIANT

APPLICATIONS

- Feature phones
- Answering machines
- PBX
- Fax machines

AGENCY APPROVALS

- UL1577, file no. E76222 system code U, double protection
- C-UL CSA 22.2, bulletin 5A

DESCRIPTION

The K814P, K824P, K844P consist of a phototransistor optically coupled to 2 gallium arsenide infrared emitting diodes (reverse polarity) in 4 pin (single); 8 pin (dual) or 16-pin (quad) plastic dual inline package.
The elements are mounted on one leadframe providing a fixed distance between input and output for highest safety requirements.

ORDER INFORMATION	
PART	**REMARKS**
K814P	CTR > 20 %, single channel, DIP-4
K824P	CTR > 20 %, dual channel, DIP-8
K844P	CTR > 20 %, quad channel, DIP-16

ABSOLUTE MAXIMUM RATINGS (1)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Forward current		I_F	± 60	mA
Forward surge current	$t_p \leq 10$ µs	I_{FSM}	± 1.5	A
Power dissipation		P_{diss}	100	mW
Junction temperature		T_j	125	°C
OUTPUT				
Collector emitter voltage		V_{CEO}	70	V
Emitter collector voltage		V_{ECO}	7	V
Collector current		I_C	50	mA
Collector peak current	$t_p/T = 0.5$, $t_p \leq 10$ ms	I_{CM}	100	mA
Power dissipation		P_{diss}	150	mW
Junction temperature		T_j	125	°C

ABSOLUTE MAXIMUM RATINGS (1)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
AC isolation test voltage (RMS)	t = 1.0 min	V_{ISO}	5000	V_{RMS}
Total power dissipation		P_{tot}	250	mW
Operating ambient temperature range		T_{amb}	- 40 to +100	°C
Storage temperature range		T_{stg}	- 55 to + 125	°C
Soldering temperature (3)	2 mm from case, t ≤ 10 s	T_{sld}	260	°C

Notes

(1) T_{amb} = 25 °C, unless otherwise specified.
Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

(2) Refer to wave profile for soldering conditions for through hole devices.

ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward voltage	I_F = ± 50 mA	V_F		1.25	1.6	V
Reverse current	V_R = ± 6 V	I_R			10	µA
OUTPUT						
Collector emitter voltage	I_C = 100 µA	V_{CEO}	70			V
Emitter collector voltage	I_E = 100 µA	V_{ECO}	7			V
Collector dark current	V_{CE} = 20 V, I_F = 0, E = 0	I_{CEO}			100	nA
COUPLER						
Collector emitter saturation voltage	I_F = ± 10 mA, I_C = 1 mA	V_{CEsat}			0.3	V
Cut-off frequency	I_F = ± 10 mA, V_{CE} = 5 V, R_L = 100 Ω	f_c		100		kHz
Coupling capacitance	f = 1 MHz	C_k		0.3		pF

Note

T_{amb} = 25 °C, unless otherwise specified.
Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
I_C/I_F	V_{CE} = 5 V, I_F = ± 5 mA	K814P	CTR	20		300	%

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Delay time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_d		3		µs
Rise time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_r		3		µs
Fall time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_f		4.7		µs
Storage time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_s		0.3		µs
Turn-on time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_{on}		6		µs
Turn-off time	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω (see figure 1)	t_{off}		5		µs
Turn-on time	V_S = 5 V, I_C = 10 mA, R_L = 1 kΩ (see figure 1)	t_{on}		9		µs
Turn-off time	V_S = 5 V, I_C = 10 mA, R_L = 1 kΩ (see figure 1)	t_{off}		18		µs

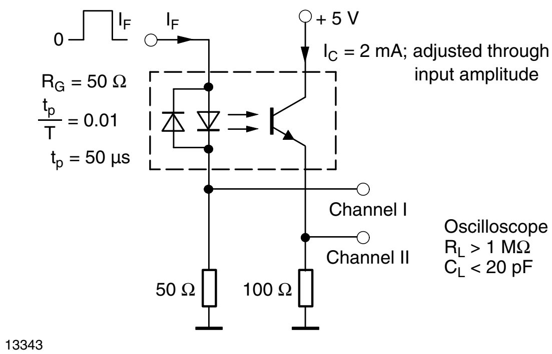


Fig. 1 - Test Circuit, Non-Saturated Operation

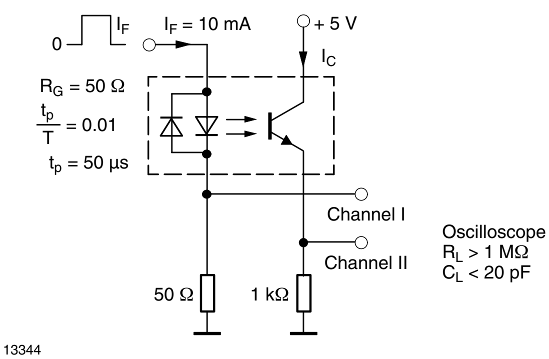


Fig. 2 - Test Circuit, Saturated Operation

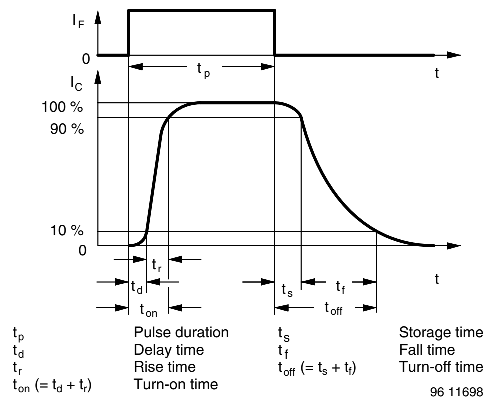


Fig. 3 - Switching Times

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

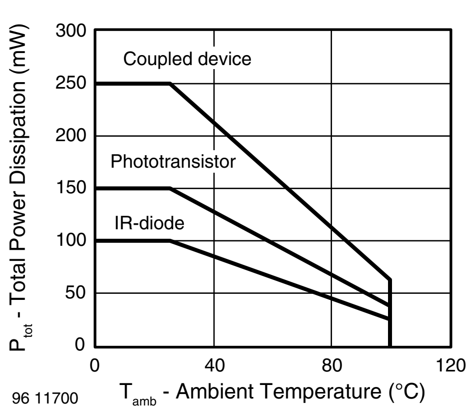


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

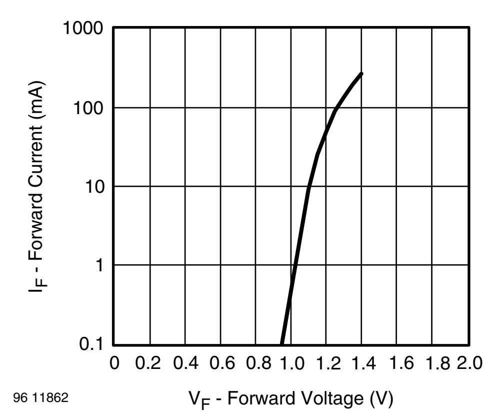


Fig. 5 - Forward Current vs. Forward Voltage

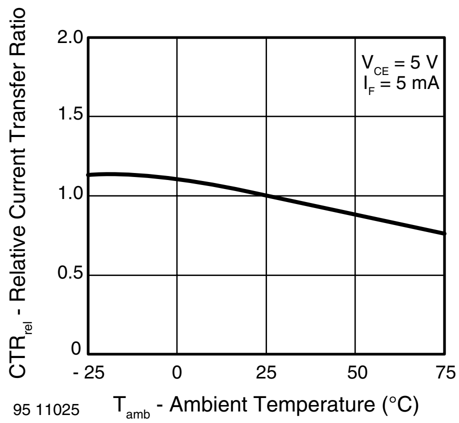


Fig. 6 - Relative Current Transfer Ratio vs. Ambient Temperature

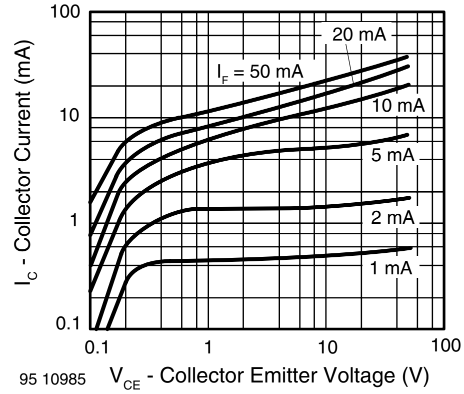


Fig. 9 - Collector Current vs. Collector Emitter Voltage

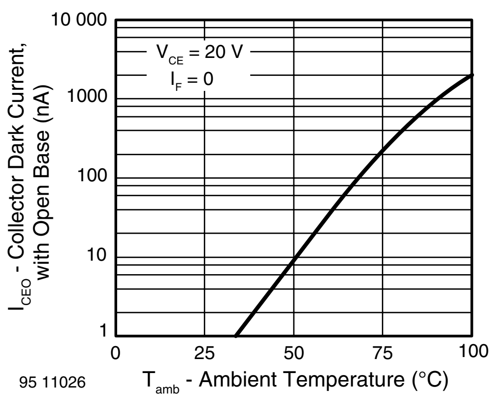


Fig. 7 - Collector Dark Current vs. Ambient Temperature

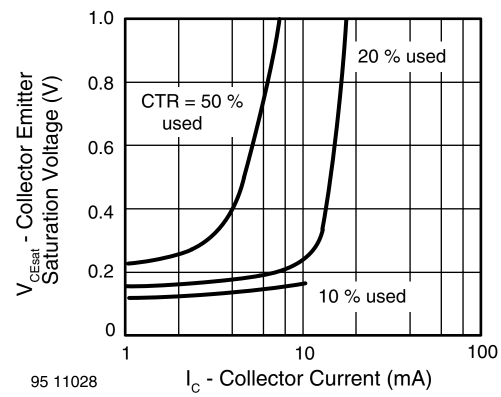


Fig. 10 - Collector Emitter Saturation Voltage vs. Collector Current

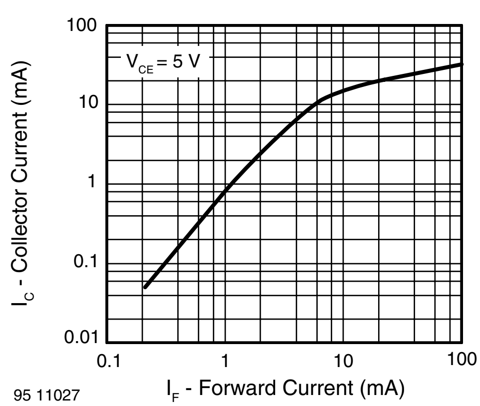


Fig. 8 - Collector Current vs. Forward Current

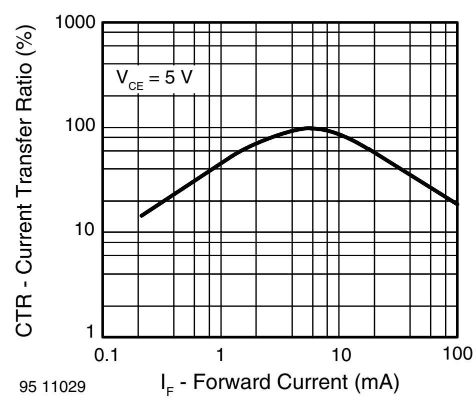


Fig. 11 - Current Transfer Ratio vs. Forward Current

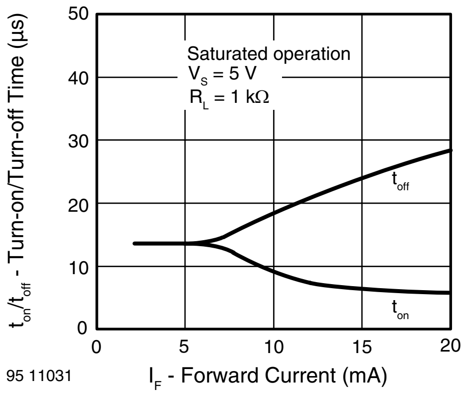


Fig. 12 - Turn-on/Turn-off Time vs. Forward Current

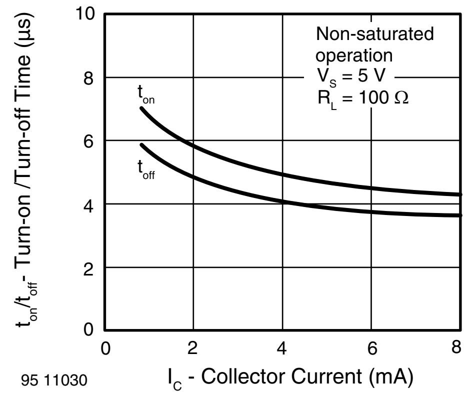
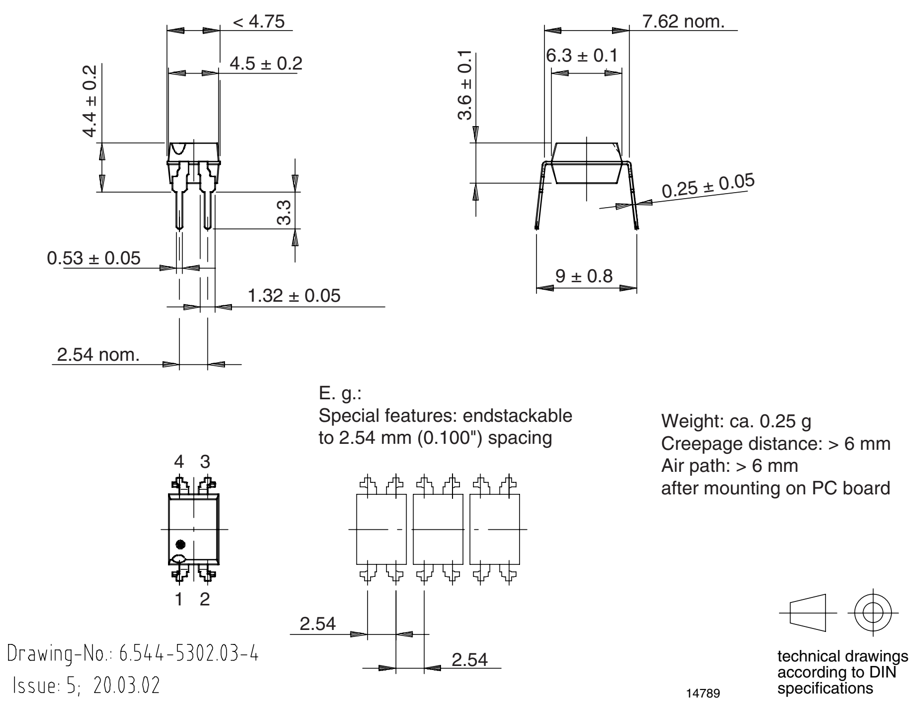
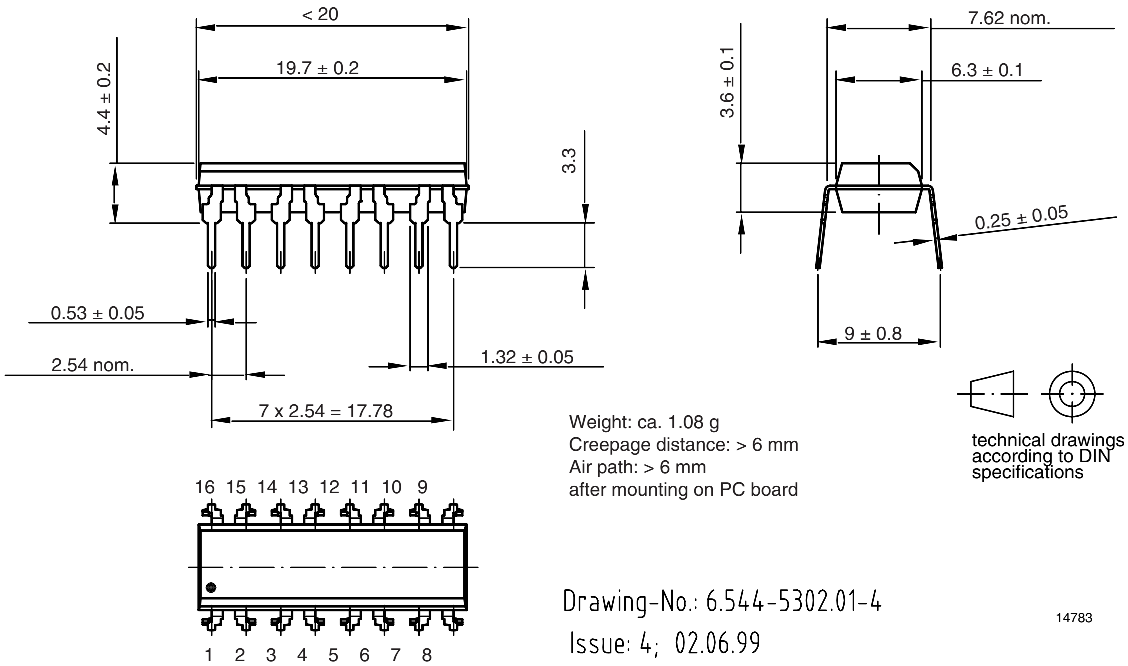


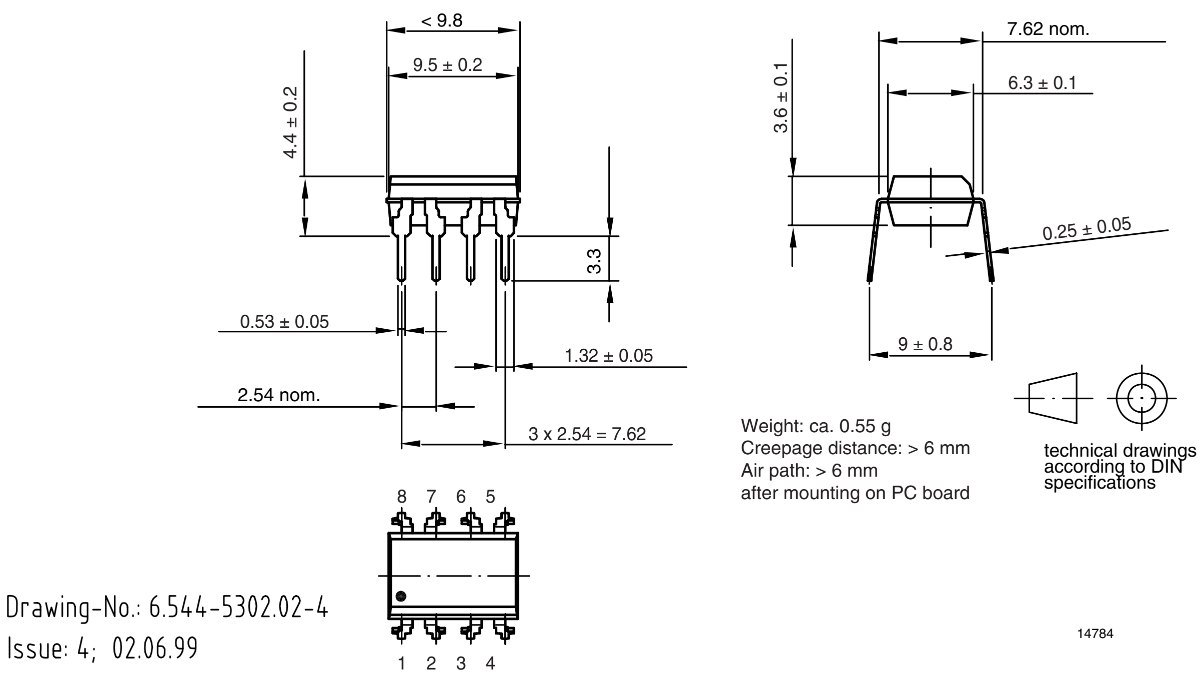
Fig. 13 - Turn-on/Turn-off Time vs. Collector Current

PACKAGE DIMENSIONS in millimeters





< 20
19.7 ± 0.2
4.4 ± 0.2
3.3
0.53 ± 0.05
2.54 nom.
1.32 ± 0.05
7 x 2.54 = 17.78
7.62 nom.
6.3 ± 0.1
3.6 ± 0.1
0.25 ± 0.05
9 ± 0.8
Weight: ca. 1.08 g
Creepage distance: > 6 mm
Air path: > 6 mm
after mounting on PC board
technical drawings according to DIN specifications
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
Drawing-No.: 6.544-5302.01-4
Issue: 4; 02.06.99
14783



< 9.8
9.5 ± 0.2
4.4 ± 0.2
3.3
0.53 ± 0.05
1.32 ± 0.05
2.54 nom.
3 x 2.54 = 7.62
7.62 nom.
6.3 ± 0.1
3.6 ± 0.1
0.25 ± 0.05
9 ± 0.8
Weight: ca. 0.55 g
Creepage distance: > 6 mm
Air path: > 6 mm
after mounting on PC board
technical drawings according to DIN specifications
8 7 6 5
1 2 3 4
Drawing-No.: 6.544-5302.02-4
Issue: 4; 02.06.99
14784

OZONE DEPLETING SUBSTANCES POLICY STATEMENT

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA.
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.
Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

© 2021 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED