Changes of materials for TFBS4xxx IRDC Product Series

For further information, please contact your regional Vishay office.

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Description of Change: -Introduction of a new in-house designed IRDC IC. The Chaldene IC provides 20 percent longer distance (in meters) and improved ESD robustness from current 1kV to 2kV.
-Introduction of a new Surface Emitting Technology Chip.
-Changeover of the Au wire Diameter from 30um to 25um.
We recommend to test the product in customers application.

Classification of Change: - New IC:
The existing external IC Supplier will end the production. In order to assure a long-term product availability of IRDC products, Vishay developed an inhouse IC in cooperation with the worlds leading Chip Foundry.
-New Emitter Chip:
Changeover to latest Surface Emitting Technology to assure long-term product availability.
-Au wire Diameter reduction:
In order to streamline the production and optimize the material supply chain, Vishay introduces a new Standardization of Au wire Diameter.
The material is qualified to high Standards.

Expected Influence on Quality/Reliability/Performance: No change on Quality/Reliability. Similar electrical and optical characteristics.

Part Numbers/Series/Families Affected: Please see materials list on the succeeding page.

Vishay Brand(S): Vishay Semiconductors

Time Schedule:

Start Shipment Date: Mon Jan 1, 2024

Sample Availability: Samples are available ww13 2023.

Product Change Notification

Product Group: OPT/Mon Mar 20, 2023/PCN-OPT-1233-2022-REV-0

Product Identification: via date code

Qualification Data: Qual pack is available

This PCN is considered approved, without further notification, unless we receive specific customer concerns before Sun Apr 30, 2023 or as specified by contract.

Issued By: Rainer Hauschildt, rainer.hauschildt@vishay.com

TFBS4650E-TR1	TFBS4650E-TR3	TFBS4650E-TR3	TFBS4650E-TT1	TFBS4650E-TT3
TFBS4650-TR1	TFBS4650-TR3	TFBS4650-TR4	TFBS4650-TT3	TFBS4652E-TR1
TFBS4652E-TR3	TFBS4652E-TT1	TFBS4652E-TT3	TFBS4652K-TT1	TFBS4652-TR1
TFBS4652-TR3	TFBS4652-TT1	TFBS4711D-TT1	TFBS4711E-TR1	TFBS4711E-TR3
TFBS4711E-TT1	TFBS4711E-TT3	TFBS4711H-TR1	TFBS4711-TR1	TFBS4711-TR3
TFBS4711-TT1				

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Changes of materials for TFBS4xxx IRDC Series

Vishay Opto has published a PCN announcing materials changes for the IRDC Transceiver products:
-Introduction of a new in-house designed IRDC IC. The Chaldene IC provides 20 percent longer distance (in meters) and improved ESD robustness from current 1kV to 2kV.
-Introduction of a new Surface Emitting Technology Chip.
-Changeover of the Au wire Diameter from 30um to 25um.
We recommend to order samples and test the products in customers application.

FAQ:
Q: Are there any technical differences (form/fit/function) expected?
A: Mechanically there are no changes.
Electrically/Optically the performance of the Transmitter changes in the following way:

TFBS465x
Before PCN:

TRANSMITTER						
IRED operating current, current controlled	The IRED current is internally controlled but also can be reduced by an external resistor R1	I_D	200	300	400	mA
Forward voltage of built-in IRED	I_F = 300 mA	V_F	1.4	1.8	1.9	V
Output leakage IRED current	T_{amb} = 85 °C	I_{IRED}	-	-	1	µA
Output radiant intensity (5)	a = 0°, 15°, TXD = high, SD = low, V_{CC1} = 3 V, V_{CC2} = 3 V, R1 = 30 Ω (resulting in about 50 mA drive current)	I_e	5	10	25	mW/sr
Output radiant intensity (5)	a = 0°, 15°, TXD = high, SD = low, V_{CC1} = 3 V, V_{CC2} = 3 V, R1 = 0 Ω, I_F = 300 mA	I_e	30	65	150	mW/sr
Output radiant intensity (5)	V_{CC1} = 5 V, a = 0°, 15° TXD = low or SD = high (receiver is inactive as long as SD = high)	I_e	-	-	0.04	mW/sr
Saturation voltage of IRED driver	V_{CC} = 3 V, I_F = 50 mA	V_{CEsat}	-	0.4	-	V
Peak - emission wavelength		λ_p	880	886	900	nm
Spectral bandwidth		$\Delta\lambda$	-	45	-	nm
Optical rise time, optical fall time		t_{ropt}, t_{fopt}	20	-	100	ns
Optical output pulse duration	Input pulse width t < 30 µs Input pulse width t ≥ 30 µs	t_{opt} t_{opt}	 30	t 50	 300	µs µs
Optical output pulse duration	Input pulse width t = 1.63 µs	t_{opt}	1.45	1.61	2.2	µs
Optical overshoot			-	-	20	%

After Surface Emitter implementation:

TRANSMITTER (new surface emitter values introduced via PCN)						
IRED operating current limitation	No external resistor for current limitation (4)	I_D	200	300	430	mA
Forward voltage of built-in IRED	I_f = 300 mA	V_f	1.4	1.8	1.9	V
Output leakage IRED current	TXD = 0 V, 0 < V_{CC1} < 5.5 V	I_{IRED}	-1	0.01	1	µA
Output radiant intensity	α = 0°, 15°, TXD = high, SD = low	I_e	40	250	400	mW/sr
	V_{CC1} = 5 V, α = 0°, 15°, TXD = low or SD = high (receiver is inactive as long as SD = high)	I_e	-	-	0.04	mW/sr
Output radiant intensity, angle of half intensity		α	-	± 30	-	°
Peak - emission wavelength (5)		λ_p	870	-	910	nm
Spectral bandwidth		Δλ	-	45	-	nm
Optical rise time, fall time		t_{ropt}, t_{fopt}	10	50	300	ns
Optical output pulse duration	Input pulse width 1.6 < t_{TXD} < 23 µs	t_{opt}	t_{TXD} - 0.15	-	t_{TXD} + 0.15	µs
	Input pulse width t_{TXD} ≥ 23 µs	t_{opt}	23	50	100	µs
Optical overshoot			-	-	25	%

TFBS4711xx
Before PCN:

TRANSMITTER (new surface emitter values introduced via PCN)						
IRED operating current limitation	No external resistor for current limitation (5)	I_D	200	300	430	mA
Forward voltage of built-in IRED	I_F = 300 mA	V_f	1.4	1.8	1.9	V
Output leakage IRED current	TXD = 0 V, 0 < V_{CC1} < 5.5 V	I_{IRED}	-1	0.01	1	µA
Output radiant intensity	α = 0°, 15° TXD = high, SD = low	I_e	40	140	300	mW/sr
	V_{CC1} = 5 V, α = 0°, 15°, TXD = low or SD = high (receiver is inactive as long as SD = high)	I_e	-	-	0.04	mW/sr
Output radiant intensity, angle of half intensity		α	-	± 24	-	deg
Peak-emission wavelength (5)		λ_p	870	-	910	nm
Spectral bandwidth		Δλ	-	45	-	nm
Optical rise time		t_{ropt}	10	50	300	ns
Optical fall time		t_{fopt}	10	50	300	ns
Optical output pulse duration	Input pulse width 1.6 < t_{TXD} < 23 µs	t_{opt}	t_{TXD} - 0.15	-	t_{TXD} + 0.15	µs
	Input pulse width t_{TXD} ≥ 23 µs	t_{opt}	23	50	100	µs
Optical overshoot			-	-	25	%

After Surface Emitter implementation:

OPTOELECTRONIC CHARACTERISTICS (T_{amb} = 25 °C, V_{CC1} = V_{CC2} = 2.4 V to 5.5 V unless otherwise noted)						
PARAMETER	**TEST CONDITIONS**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
TRANSMITTER						
IRED operating current limitation	No external resistor for current limitation (5)	I_D	200	300	430	mA
Forward voltage of built-in IRED	I_F = 300 mA	V_f	1.4	1.8	1.9	V
Output leakage IRED current	TXD = 0 V, 0 < V_{CC1} < 5.5 V	I_{IRED}	-1	0.01	1	µA
Output radiant intensity	α = 0°, 15° TXD = high, SD = low	I_e	40	140	300	mW/sr
	V_{CC1} = 5 V, α = 0°, 15°, TXD = low or SD = high (receiver is inactive as long as SD = high)	I_e	-	-	0.04	mW/sr
Output radiant intensity, angle of half intensity		α	-	± 24	-	deg
Peak-emission wavelength (5)		λ_p	870	-	910	nm
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Optical rise time		t_{ropt}	10	50	300	ns
Optical fall time		t_{fopt}	10	50	300	ns
Optical output pulse duration	Input pulse width 1.6 < t_{TXD} < 23 µs	t_{opt}	t_{TXD} - 0.15	-	t_{TXD} + 0.15	µs
	Input pulse width t_{TXD} ≥ 23 µs	t_{opt}	23	50	100	µs
Optical overshoot			-	-	25	%

For all details, please check the latest datasheet on www.vishay.com .

Q: When do we plan to implement the new materials in production?
A: In Vishay production work week 1 2024.

Q: How can the customer distinguish products including these changes?
A: The PCN announces a changeover date (production work week). The standard bar code label contains the production week as shown below (Batch 202222PH19 produced in ww22 2022). A green sticker will be added to the box label for shipments which include the changes:

Q: Why has Vishay introduced these changes?
A: - New IC:
The existing external IC Supplier will end the production. In order to assure a long-term product availability of IRDC products, Vishay developed an inhouse IC in cooperation with the worlds leading Chip Foundry.
-New Emitter Chip:
Changeover to latest Surface Emitting Technology to assure long-term product availability.
-Au wire Diameter reduction:
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The material is qualified to high Standards.

Q: Are datasheets available?
A: Yes. The updated datasheets are available on our website 27th Mar 2023.
The header will state that the datasheet content is in accordance with this PCN.

Q: Are samples of TFBS4xxx Series available?
A: Yes, samples can be ordered by contacting me or our Regional Marketing colleagues.

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