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WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

Product / Process Change Notification (PCN)

☒ Major Change
☐ Minor Change

PCN Number:	PCN_WPME-FISM_1779205311_20250120
Affected Series:	WPME-FISM
Affected Part Number:	1779205311
PCN Date:	2024-12-20 (YYYY-MM-DD)
Effective Date:	2025-01-20 (YYYY-MM-DD)

Change Category:

☒ Equipment/Location
☒ General Data
☒ Material
☐ Process
☒ Product Design
☒ Shipping/Packaging
☒ Supplier
☐ Software

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Datasheet Change:
☒ Yes ☐ No

Attachment:
☒ Yes ☐ No

DESCRIPTION OF CHANGE:

Due to an improvement of the production capability, Würth Elektronik eiSos has shifted the production of the affected part number to a new factory location.
With the aim of an extended product applicability, Würth Elektronik eiSos has updated the BOM used in the module to ensure the best performance and the electrical specifications.
There will be no change in fit or quality of the product.
The new revision of the affected part number will be sent out after the previous revision is out of stock (according to FIFO - first-in, first-out).

DETAILS OF CHANGE:

All changes indicated below apply to the part number in this PCN.

Previous production line	New production line
Lot number beginning with: 489xxxxxxxxxxx Country of origin: China	Lot number beginning with: 676xxxxxxxxxxx Country of origin: China

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The part numbers of the FISM series are now distributed in single datasheets instead of the previous family datasheet approach

Before Change

1769205x41
MagI³C Power Module
WPME-FISM - Fixed Isolated SIP/SMT Module

3.3V, 5V, 12V or 24V Input / 1W / 3kV Functional Isolated / Unregulated 5V Output

DESCRIPTION

The FISM 1769205x41 MagI³C power module series are unregulated, functionally isolated, fully integrated DC/DC converters.

The modules integrate the switching power stage, control circuitry, transformer and input/output capacitors.

The modules require no external components for operation thus reducing design effort and complexity to a minimum.

The FISM family ensures fast time to market and low development costs.

The 1769205x41 series of the FISM family achieves an efficiency of 84% to 90.5%.

FEATURES

- 3kV DC functional isolation for 60s
- Nominal input voltage rails: 3.3V /5V / 12V / 24V
- Output voltage: 5V unregulated
- Low output voltage ripple: Typ. 55mV at full load
- Output voltage accuracy: Typ. -2.5% at full load
- Output power: 1W (0.2A)
- Dynamic power boost up to 0.3A for 0.5s
- Continuous short-circuit protection
- Isolation capacitance of typ. 20pF
- Integrated C_{IN}, C_{OUT} and transformer
- Operating ambient temperature range: -40°C to 105°C
- RoHS & REACh compliant
- Complies with EN55032 (CISPR-32) class B conducted and radiated emissions standard
- UL62368-1 approved

After Change

1779205311
MagI³C Power Module
WPME-FISM - Fixed Isolated SIP/SMT Module

24V Input / 1W / 3kV Functional Isolated / Unregulated 5V Output

DESCRIPTION

The FISM 1779205311 MagI³C power module is an unregulated, functionally isolated, fully integrated DC/DC converter.

The module integrates the switching power stage, control circuitry, transformer and input/output capacitors.

The module requires no external components for operation thus reducing design effort and complexity to a minimum.

The FISM module ensures fast time to market and low development costs.

The 1779205311 module achieves an efficiency up to 87%.

FEATURES

- 3kV DC functional isolation for 1s
- 1.5kV DC functional isolation for 60s
- Nominal input voltage rail: 24V
- Output voltage: 5V unregulated
- Low output voltage ripple: Typ. 55mV at full load
- Output voltage accuracy: Typ. -0.4% at full load
- Output power: 1W (0.2A)
- Dynamic power boost up to 0.3A for 0.5s
- Continuous short-circuit protection
- Isolation capacitance of typ. 20pF
- Integrated C_{IN}, C_{OUT} and transformer
- Operating ambient temperature range: -40°C to 105°C
- RoHS & REACH compliant
- Complies with EN55032 (CISPR-32) class B conducted and radiated emissions standard
- UL62368-1 recognized

The datasheet electrical specifications (absolute maximum / electrical) have been adjusted based on the new design.

Before Change

ABSOLUTE MAXIMUM RATINGS

Caution:
Exceeding the listed absolute maximum ratings may affect the device negatively and may cause permanent damage. These are stress ratings only, which do not imply functional operation of the device at these or any other condition beyond those indicated under Operating Conditions.

SYMBOL	PARAMETER		LIMIT MIN[1]	LIMIT MAX[1]	UNIT
VIN	Input pin voltage	$3.3V_{IN}$ / $5V_{OUT}$ version (1779205011)	-0.4	9	V
		$5V_{IN}$ / $5V_{OUT}$ version (1779205111)	-0.4	6	V
		$12V_{IN}$ / $5V_{OUT}$ version (1779205211)	-0.4	25	V
		$24V_{IN}$ / $5V_{OUT}$ version (1779205311)	-0.4	50	V
VOUT	Output pin voltage	$3.3V_{IN}$ / $5V_{OUT}$ version (1779205011)	-0.7	16	V
		$5V_{IN}$ / $5V_{OUT}$ version (1779205111)	-0.7	11	V
		$12V_{IN}$ / $5V_{OUT}$ version (1779205211)	-0.7	16	V
		$24V_{IN}$ / $5V_{OUT}$ version (1779205311)	-0.7	16	V
V_{ISO}	Isolation voltage input to output for 1s[6]		-	3000	V
	Isolation voltage input to output, 100% tested for 60s[2]		-	1500	V
$T_{storage}$	Assembled, non-operating storage temperature		-55	125	°C
V_{ESD}	ESD Voltage (HBM), according to EN61000-4-2[10]		-4	4	kV

After Change

5 ABSOLUTE MAXIMUM RATINGS

Caution:
Exceeding the listed absolute maximum ratings may affect the device negatively and may cause permanent damage.

Table 6: Absolute maxiumum ratings.

SYMBOL	PARAMETER	LIMIT MIN[4]	LIMIT MAX[4]	UNIT
VIN	Input pin voltage	-0.3	10	V
VOUT	Output pin voltage	-0.3	25	V
V_{ISO}	Isolation voltage input to output for 60s[6]	—	1.5	kV
	Isolation voltage input to output, 100% tested for 1s[7]	—	3	kV
$T_{storage}$	Assembled, non-operating storage temperature	-55	125	°C
V_{ESD}	ESD Voltage (HBM), according to EN61000-4-2[4]	-4	4	kV

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WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

ELECTRICAL SPECIFICATIONS

MIN and MAX limits are valid for the recommended ambient temperature range of **-40 °C to 105 °C**. Typical values represent statistically the utmost probable values at the following conditions: T_A = 25 °C, unless otherwise noted.

SYMBOL	PARAMETER	TEST CONDITIONS	MIN(1)	TYP(3)	MAX(1)	UNIT
		Output Current				
I_{MOC}	Maximum overload current		-	-	300(7)	mA
		Accuracy				
V_{OUT}	Line regulation	per 1.0% change in input voltage(8)	-	-	1.2	%
	Load Regulation	V_{IN} nominal, V_{OUT} = 5V I_{OUT} = 20mA to 200mA	-	5	-	%
	Output voltage accuracy	V_{IN} nominal, I_{OUT} = 200mA	-7.5	-	8	%
	Output voltage at no load	V_{IN} nominal	-	5.5	-	V
	Output voltage ripple & noise	V_{IN} nominal, V_{OUT} = 5V 20MHz BWL	-	55	-	mV_{PP}
		Switching Frequency				
f_{SW}	Switching frequency	V_{IN} = 3.3V, I_{OUT} = 200mA(1779205011)	-	600	-	kHz
		V_{IN} = 5V,I_{OUT} = 200mA (1779205111)	-	300	-	kHz
		V_{IN} = 12V,I_{OUT} = 200mA (1779205211)	-	600	-	kHz
		V_{IN} = 24V,I_{OUT} = 200mA (1779205311)	-	600	-	kHz
		Input Current				
I_{IN}	No load input current (operating, switching)	V_{IN}= 3.3V, I_{OUT} = 0mA (1779205111)	-	11	-	mA
		V_{IN}= 5V, I_{OUT} = 0mA (1779205111)	-	11	-	mA
		V_{IN}= 12V, I_{OUT} = 0mA (1779205211)	-	3	-	mA
		V_{IN}= 24V, I_{OUT} = 0mA (1779205311)	-	3	-	mA
		Efficiency				
η	Efficiency	V_{IN}= 3.3V, I_{OUT} = 200mA (1779205011)	-	83	-	%
		V_{IN}= 5V, I_{OUT} = 200mA (1779205111)	-	85	-	%
		V_{IN}= 12V, I_{OUT} = 200mA (1779205211)	-	85	-	%
		V_{IN}= 24V, I_{OUT} = 200mA (1779205311)	-	82	-	%
		Isolation Characteristics				
C_{ISO}	Isolation capacitance	100kHz/0.1V	-	20	-	pF
R_{ISO}	Isolation resistance	500VDC	1	-	-	GΩ

8 ELECTRICAL SPECIFICATIONS

Caution:
MIN and MAX limits are valid for the recommended ambient temperature range of -40°C to 105°C. Typical values represent statistically the utmost probable values at the following conditions: T_A = 25°C, unless otherwise noted.

Table 9: Electrical specifications.

SYMBOL	PARAMETER	TEST CONDITIONS	MIN(1)	TYP(3)	MAX(1)	UNIT
		Output Current				
I_{MOC}	Maximum overload current		—	—	0.3(9)	A
		Accuracy				
V_{OUT}	Line regulation	per 1.0% change in input voltage(8)	—	1.2	—	%
	Load Regulation	V_{IN} nominal, V_{OUT} = 5V I_{OUT} = 0.02A to 0.2A	—	10	15	%
	Output voltage accuracy	V_{IN} nominal, I_{OUT} = 0.2A	—	-0.4	—	%
	Output voltage at no load	V_{IN} nominal	—	5.5	—	V
	Output voltage ripple & noise	V_{IN} nominal, V_{OUT} = 5V 20MHz BWL	—	55	—	mV_{PP}
		Switching Frequency				
f_{SW}	Switching frequency, internal clock	V_{IN} nominal, I_{OUT} = 0.2A	—	250	—	kHz
	Switching frequency, input current	V_{IN} nominal, I_{OUT} = 0.2A	—	500(10)	—	kHz
		Input Current				
I_{IN}	No load input current	V_{IN}= 24V, I_{OUT} = 0A	—	2.5	—	mA
		Efficiency				
η_1	Efficiency	V_{IN} = 24V, I_{OUT} = 0.2A	—	87	—	%
		Isolation Characteristics				
C_{ISO}	Isolation capacitance	100kHz/0.1V	—	20	—	pF
R_{ISO}	Isolation resistance	500VDC	1	—	—	GΩ

Due to the change in production line the isolation voltage test specification has changed. The modules are now 100% production tested for 1 second. Therefore, the specified isolation voltage has been increased to the 1 second value.

Before Change

3.3V, 5V, 12V or 24V Input Voltage / 1W 1.5kV Functional Isolated Unregulated 5V Output

DESCRIPTION

The FISM power module family is an unregulated, functional isolated, fully integrated DC/DC converter.

The module integrates the switching power stage, control circuitry, transformer and input/output capacitors.

The module requires no external components for operation thus reducing design effort and complexity to a minimum.

The FISM ensures fast time to market and low development costs.

The 1779205x11 series of the FISM family achieves typically an efficiency of 82% up to 86%.

The series is available in a SIP-4 package (11.60 x 6 x 10.16mm).

FEATURES

- 1.5kV DC functional isolation for 60s
- Continuous short-circuit protection
- Current capability up to 0.2A
- Nominal input voltage rails: 3.3V / 5V / 12V / 24V
- Output voltage: 5V unregulated
- No minimum load required
- Continuous output power: 1W
- Integrated C_{IN}, C_{OUT} and transformer
- Dynamic power boost up to 300mA for 0.5s
- Low output voltage ripple: Typ. 55mV at full load
- Output voltage accuracy: Typ. +3% / -4.3%
- Operating switching frequency:
  300kHz (1779205111)
  600kHz (1779205011,1779205211,1779205311)
- Operating ambient temperature range: -40°C to 105°C
- RoHS & REACh compliant
- Complies with EN55032 (CISPR-32) class B conducted and radiated emissions standard
- UL62368-1 approved

After Change

24V Input / W / 3kV Functional Isolated / Unregulated 5V Output

DESCRIPTION

The FISM 1779205311 MagI³C power module is an unregulated, functionally isolated, fully integrated DC/DC converter.

The module integrates the switching power stage, control circuitry, transformer and input/output capacitors.

The module requires no external components for operation thus reducing design effort and complexity to a minimum.

The FISM module ensures fast time to market and low development costs.

The 1779205311 module achieves an efficiency up to 87%.

FEATURES

- 3kV DC functional isolation for 1s
- ~~1.5kV DC functional isolation for 60s~~
- Nominal input voltage rail: 24V
- Output voltage: 5V unregulated
- Low output voltage ripple: Typ. 55mV at full load
- Output voltage accuracy: Typ. -0.4% at full load
- Output power: 1W (0.2A)
- Dynamic power boost up to 0.3A for 0.5s
- Continuous short-circuit protection
- Isolation capacitance of typ. 20pF
- Integrated C_{IN}, C_{OUT} and transformer
- Operating ambient temperature range: -40°C to 105°C
- RoHS & REACH compliant
- Complies with EN55032 (CISPR-32) class B conducted and radiated emissions standard
- UL62368-1 recognized

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ABSOLUTE MAXIMUM RATINGS

Caution:
Exceeding the listed absolute maximum ratings may affect the device negatively and may cause permanent damage. These are stress ratings only, which do not imply functional operation of the device at these or any other condition beyond those indicated under Operating Conditions.

SYMBOL	PARAMETER		LIMIT MIN[1]	LIMIT MAX[1]	UNIT
VIN	Input pin voltage	3.3V_{IN} / 5V_{OUT} version (1779205011)	-0.4	9	V
		5V_{IN} / 5V_{OUT} version (1779205111)	-0.4	6	V
		12V_{IN} / 5V_{OUT} version (1779205211)	-0.4	25	V
		24V_{IN} / 5V_{OUT} version (1779205311)	-0.4	50	V
VOUT	Output pin voltage	3.3V_{IN} / 5V_{OUT} version (1779205011)	-0.7	16	V
		5V_{IN} / 5V_{OUT} version (1779205111)	-0.7	11	V
		12V_{IN} / 5V_{OUT} version (1779205211)	-0.7	16	V
		24V_{IN} / 5V_{OUT} version (1779205311)	-0.7	16	V
V_{ISO}	Isolation voltage input to output for 1s[6]		-	3000	V
	Isolation voltage input to output, 100% tested for 60s[2]		-	1500	V
$T_{storage}$	Assembled, non-operating storage temperature		-55	125	°C
V_{ESD}	ESD Voltage (HBM), according to EN61000-4-2[10]		-4	4	kV

5 ABSOLUTE MAXIMUM RATINGS

Caution:
Exceeding the listed absolute maximum ratings may affect the device negatively and may cause permanent damage.

Table 6: Absolute maxiumum ratings.

SYMBOL	PARAMETER	LIMIT MIN[1]	LIMIT MAX[1]	UNIT
VIN	Input pin voltage	-0.3	10	V
VOUT	Output pin voltage	-0.3	25	V
V_{ISO}	Isolation voltage input to output for 60s[6]	—	1.5	kV
	Isolation voltage input to output, 100% tested for 1s[7]	—	3	kV
$T_{storage}$	Assembled, non-operating storage temperature	-55	125	°C
V_{ESD}	ESD Voltage (HBM), according to EN61000-4-2[4]	-4	4	kV

The datasheet package specifications have been adjusted based on the new design.

Before Change

PACKAGE SPECIFICATIONS

ITEM	PARAMETER	TYP[3]	UNIT
Case	UL94V-0 (Refer to UL approval E150608)	-	-
φ(RH)	Operating humidity	5-95	%
Weight		1.3	g
Vibration	MIL-STD-202G: 5g for 1 minute, 120 cycles each of 3 orientation, test from 10Hz-55Hz		
IP	Degree of protection according to IEC/EC 60529	X0	
Washing	Washing compatible with standard industrial water based washers.		

After Change

11 PACKAGE SPECIFICATIONS

Table 12: Package specifications.

ITEM	PARAMETER	TYP[3]	UNIT
Case	UL94V-0 (Refer to UL approval E150608)	—	—
φ(RH)	Maximum storage humidity (see HANDLING RECOMMENDATIONS for soldering requirements)	95	%
Weight		1.5	g
Vibration	MIL-STD-202G: 5g for 1 minute, 120 cycles each of 3 orientation, test from 10Hz-55Hz		
IP	Degree of protection according to IEC/EC 60529	X0	
Washing	Washing compatible with standard industrial water based washers.		

The datasheet MTBF specifications have been adjusted based on the new internal design.

Before Change

RELIABILITY

SYMBOL	PARAMETER	TEST CONDITIONS	TYP[3]	UNIT
MTBF[9]	Mean Time Between Failures	+25°C: Ground Benign	5200 · 10^3	h
		+100°C: Ground Benign	950 · 10^3	h

After Change

12 RELIABILITY

Table 13: Reliability.

SYMBOL	PARAMETER	TEST CONDITIONS	TYP[3]	UNIT
MTBF[11]	Mean Time Between Failures	+25°C: Ground Benign	7941 · 10^3	h
		+85°C: Ground Benign	2360 · 10^3	h

The diagrams shown in chapter TYPICAL PERFORMANCE CURVES are updated based on new electrical specifications. The used test conditions stay the same as before.

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Due to internal BOM change the recommendation for the filter components to comply with EN55032 have been adjusted.

Before Change

19.3 Bill of Materials

Table 14: Design example bill of materials.

DESIGNATOR	DESCRIPTION	FUNCTION	QUANTITY	ORDER CODE	MANUFACTURER
U1	MagI³C Power Module	Power supply	1	1779205311	WE
L_1	Filter inductor, 1µH, PD2 family, I_{SAT} = 5.72A, I_R = 4A	Input Filter	1	7447730	WE
C_1	Ceramic chip capacitor 4.7µF/50V X7R, 1210	Input Filter	1	885012209048	WE
C_2	Ceramic chip capacitor 4.7µF/50V X7R, 1210	Input Filter / Electrical Performance	1	885012209048	WE
C_3	Ceramic chip capacitor 10µF/16V X7R, 1210	Output Filter / Electrical Performance	1	885012109009	WE
C_4	Ceramic chip capacitor 1nF/2kV 1808 X7R	Y-Cap	1	885342210001	WE

After Change

19.3 Bill of Materials

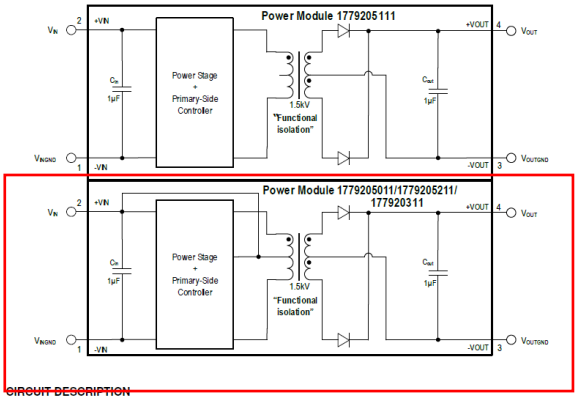
Table 14: Design example bill of materials.

DESIGNATOR	DESCRIPTION	FUNCTION	QUANTITY	ORDER CODE	MANUFACTURER
U1	MagI³C Power Module	Power supply	1	1779405311	WE
L_1	Filter inductor, 6.8µH, PD2 family, I_{SAT} = 2.1A, I_R = 1.54A	Input Filter	1	744773068	WE
C_1	Ceramic chip capacitor 4.7µF/50V X7R, 1210	Input Filter	1	885012209048	WE
C_2	Ceramic chip capacitor 4.7µF/50V X7R, 1210	Input Filter / Electrical Performance	1	885012209048	WE
C_3	Ceramic chip capacitor 10µF/16V X7R, 1210	Output Filter / Electrical Performance	1	885012209014	WE
C_4	Ceramic chip capacitor 2.2nF/2kV 1808 X7R	Y-Cap	1	885342210002	WE

The modules still are based on either a full bridge or a push-pull topology. In some cases the single part number topology switched from previous full bridge topology to a push-pull topology or vice versa. The topology change is indicated in the BLOCK DIAGRAM chapter.

Before Change

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

The MagI³C power module 1779205111 is based on full bridge topology whereas the MagI³C power modules 1779205011 / 1779205211 / 1779205311 are based on a push-pull converter. All modules have an integrated IC, rectifying diodes, input and output capacitors and a transformer.

Since there is no feedback path from the output to the input, the duty cycle is fixed at 50% and is independent of the load (zero load to full load). The output voltage is unregulated and defined by the turns ratio of the transformer.

After Change

16 BLOCK DIAGRAM

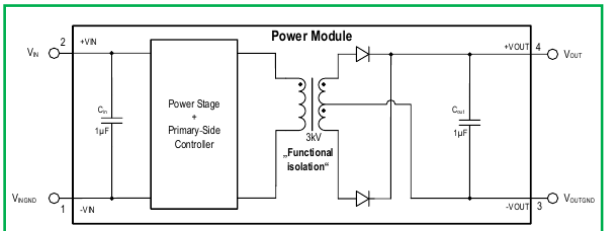


Figure 10: Block diagram.

17 CIRCUIT DESCRIPTION

The MagI³C power module 1779205311 is based on a full bridge topology. The module has an integrated IC, rectifying diodes, input and output capacitors and a transformer.

Since there is no feedback path from the output to the input, the duty cycle is fixed at 50% and is independent of the load (zero load to full load). The output voltage is unregulated and defined by the turns ratio of the transformer.

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The handling recommendations for the wave solder profile have been expanded to include the maximum allowable time for each wave.

Before Change

18.1 Solder Profile

Table 10: Wave solder profile.

Profile Feature	Old standard (Pb)	New (Pb-free)
Time within peak temperature t_p	10s	10s
Average ramp-up rate between T_s and T_p	200°C/s	200°C/s
Final preheat temperature Ts	130°C/s	130°C/s
Peak temperature T_p	+235°C/s	+260°C/s
Ramp-down rate	-5°C/s	-5°C/s
Heating rate during preheat	4°C/s	4°C/s

After Change

19.1 Soldering Profile

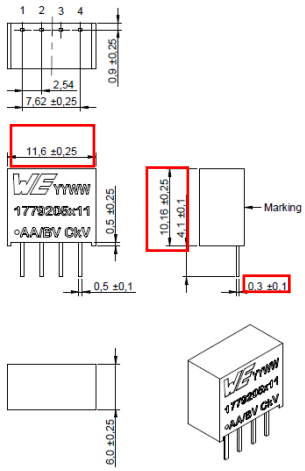
Table 12: Wave solder profile.

Profile Feature	Old standard (Pb)	New (Pb-free)
Time within peak temperature t_p	max. 10s max. 5s each wave	max. 10s max. 5s each wave
Average ramp-up rate	200°C/s	200°C/s
Final preheat temperature Ts	130°C/s	130°C/s
Peak temperature T_p	+235°C/s	+260°C/s
Ramp-down rate	-5°C/s	-5°C/s
Heating rate during preheat	4°C/s	4°C/s

The mechanical dimensions have been updated based on new production. SIP-4 package shapes stay the same but with slightly deviated package length and height. Production tolerances have been changed based on new production line.

Before Change

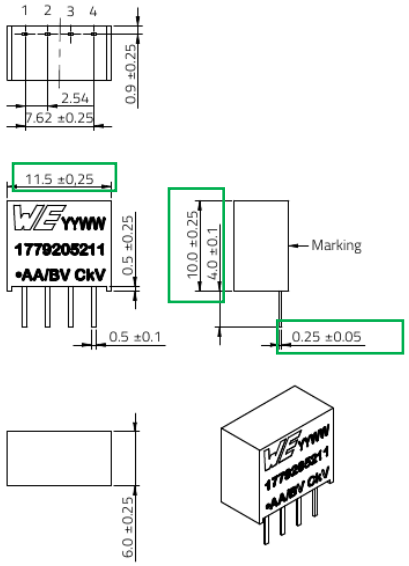
PHYSICAL DIMENSIONS



After Change

22 PHYSICAL DIMENSIONS

22.1 Component



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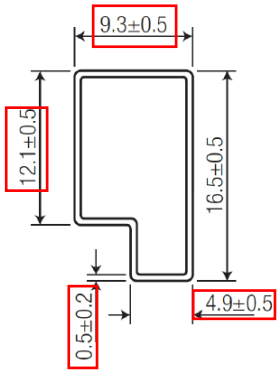
The packaging specifications have been adjusted.

Before Change	After Change
PACKAGING **TUBE (mm)**  Tolerance: xx.x =±0.5mm ; xx.xx = ±0.25mm unless othweise noted	**22.3 Packaging** **Tube (mm)**  Figure 21: Packaging dimensions. Table 16: Packaging dimensions. Dimension / L / W / H Tolerance / typ. / typ. / typ. Value / 522mm / 16.5mm / 9.5mm

RELIABILITY / QUALIFICATION OF CHANGE:

An additional reliability testing was performed and approved. Sample size is valid for every single partnumber stated in this PCN unless otherwise noted.

Additional details of the tests can be found in the table below:

Test Item	Sample Size	Reference	Test Conditions	Acceptance
Temperature Cycling	25	JESD22 Method JA-104	Temperature: -40°C to 85°C Testing Time: 500 cycles Test Cycles/h: 3 Min. soak time: 1 min	Approved
Electrical Characterization	30	User Spec.	Measure electrical DC performance @25 °C, - 40 °C, 105 °C Transient performance tests @25°C Thermal derating measurement.	Approved
Low Temperature Storage Life	25	JESD22-A119	500hrs @ -40°C	Approved

High Temperature Storage Life	25	JESD22-A119	500hrs @ 125°C	Approved
Steady State Humidity	25	MIL-STD-202, Method 106	Temperature: 65± 2°C Testing Time: 504h Humidity: 95%RH	Approved
High Pot Test	5	UL62368-1	Specified isolation voltage value tested for 60s. Given design parameter tested for 1s	Approved
Mechanical Shock	30	MIL-STD-202-213	3 shocks in each direction (x, -x, y, -y, z, -z), peak value of 100 g, duration 6 ms, half-sine, velocity change 12.3 ft/s.	Approved
Vibration	30	MIL-STD-202-204	5 g for 20 min, 12 cycles each of 3 orientations. Test from 10 Hz to 2000 Hz.	Approved