Final Product/Process Change Notification

Document #:FPCN23658ZS
Issue Date:28 Feb 2022

Title of Change:	Wafer fab transfer to onsemi Gresham, Oregon USA from onsemi Fab2, Oudenaarde, Belgium related to Fab2 sale
Proposed Changed Material First Ship Date:	01 Sep 2022 or earlier if approved by customer
Current Material Last Order Date:	31 Mar 2022 #PD24322Z *Orders received after the Current Material Last Order Date expiration are to be considered as orders for new changed material as described in this PCN. Orders for current (unchanged) material after this date will be per mutual agreement and current material inventory availability*.
Current Material Last Delivery Date:	31 Aug 2022 *The Current Material Last Delivery Date may be subject to change based on build and depletion of the current (unchanged) material inventory*
Product Category:	Active components – Integrated circuits
Contact information:	Contact your local onsemi Sales Office or Jelle.Genne@onsemi.com
PCN Samples Contact:	Contact your local onsemi Sales Office to place sample order. Sample requests are to be submitted no later than 45 days after publication of this change notification. Samples delivery timing will be subject to request date, sample quantity and special customer packing/label requirements.
Sample Availability Date:	07 Mar 2022
PPAP Availability Date:	18 Apr 2022
Additional Reliability Data:	Contact your local onsemi Sales Office or Catherine.DeKeukeleire@onsemi.com
Type of Notification:	This is a Final Product/Process Change Notification (FPCN) sent to customers. The change will be implemented at 'Proposed Change Material First Ship Date' in compliance to J-STD-46 or ZVEI, or earlier upon customer approval, or per our signed agreements. onsemi will consider this proposed change and it's conditions acceptable, unless an inquiry is made in writing within 45 days of delivery of this notice. To do so, contact PCN.Support@onsemi.com.

Change Category

Category	**Type of Change**
Process - Wafer Production	Move of all or part of wafer fab to a different location/site/subcontractor, New wafer diameter
Equipment	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool) without change of process.
Data Sheet	Change of datasheet parameters/electrical specification (min./max./typ. values) and/or AC/DC specification

Description and Purpose:

Wafer fab transfer to onsemi Gresham, Oregon USA from onsemi Fab2, Oudenaarde, Belgium related to Fab2 sale. This change also includes data sheet updates.

	Before Change Description	**After Change Description**
Fab Site transfer	onsemi Fab2, Oudenaarde, Belgium 6inch	onsemi Gresham, Oregon USA 8inch
Data Sheet	Revision 3	Revision 4 (See changes below)

Data Sheet updates (1/11)

Table 5 – V_{BB} POR levels:

- Split symbol to distinguish V_{BB} POR rising and falling levels
- Update limits of V_{BB_PORL} to reflect actual device performance
- Remove $V_{BB\_POR\_HYST}$ from table
- Split V_{BB_WARN} for rising and falling V_{BB} and add $V_{BB\_WARN\_HYST}$

Table 5. ELECTRICAL CHARACTERISTICS
V_{BB} = 5.5 V to 42 V; C_{IN_VBB} = 100 nF; C_{OUT_VCC1} = 4.7 µF, C_{OUT_VCC2} = 4.7 µF; for typical values T_A = 25°C, for min/max values T_J = −40°C to 150°C; R_{LT} = 60 Ω; unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{BB} SUPPLY						
~~V_{BB_POR}~~	~~V_{BB} POR level for entering Power−up/Shutdown mode~~	~~V_{BB} rising~~	~~4.5~~	~~4.8~~	~~5~~	~~V~~
		~~V_{BB} falling~~	~~4.4~~	~~4.65~~	~~4.9~~	~~V~~
V_{BB_PORH}	**V_{BB} POR level for entering Power−up/Shutdown mode**	**V_{BB} rising**	**4.5**	**4.8**	**5**	**V**
V_{BB_PORL}	**V_{BB} POR level for entering Power−up/Shutdown mode**	**V_{BB} falling**	**3.0**	**3.5**	**4.0**	**V**
~~$V_{BB\_POR\_HYST}$~~	~~V_{BB} POR hysteresis~~		~~120~~	~~150~~	~~180~~	~~mV~~
$V_{BB\_POR\_PD}$	propagation delay of the V_{BB} power−on−reset		5.0	15	25	µs
~~V_{BB_WARN}~~	~~V_{BB} warning level~~		~~6~~		~~7~~	~~V~~
V_{BB_WARN}	**V_{BB} warning level**	**V_{BB} rising**	**6.0**	**6.65**	**7.0**	**V**
		V_{BB} falling	**6.0**	**6.5**	**7.0**	**V**
$V_{BB\_WARN\_HYST}$	**V_{BB} warning level hysteresis**		**120**	**150**	**180**	**mV**

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Data Sheet updates (2/11)

Table 5 – $I_{BB\_STANDBY}$:

- Update max value for second condition from [140µA + 1.05x I_{VCC1}] to [180µA + 1.05x I_{VCC1}]

Table 5. ELECTRICAL CHARACTERISTICS
V_{BB} = 5.5 V to 42 V; C_{IN_VBB} = 100 nF; C_{OUT_VCC1} = 4.7 µF, C_{OUT_VCC2} = 4.7 µF; for typical values T_A = 25°C, for min/max values T_J = −40°C to 150°C; R_{LT} = 60 Ω; unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{BB} SUPPLY						
$I_{BB\_STANDBY}$	V_{BB} current consumption in Standby mode	V_{BB} = 14 V; $T_J \le 85°C$ WAKE pin floating; INH off; No SPI activity; No CAN activity No V_{CC1} load (Note 15)		60	90	µA
		WAKE pin floating No CAN activity	30 µA +1.01x I_{VCC1}	62 µA +1.03x I_{VCC1}	~~140 µA~~ **180 µA** +1.05x I_{VCC1}	
I_{BB_NORMAL}	V_{BB} current consumption in Normal mode	Recessive on CAN. No V_{CC1} load	3	7	18	mA
		Dominant on CAN transmitted. R_L = 60 Ω. No V_{CC1} load	20	53	75	mA

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Data Sheet updates (3/11)

Table 5 – V_{CC1} undervoltage levels:

- Split into undervoltage detection and recovery thresholds. Previously only detection levels were reported
- Update typical values for undervoltage detection thresholds
- Update the limits for the undervoltage detection hysteresis

Table 5. ELECTRICAL CHARACTERISTICS
V_{BB} = 5.5 V to 42 V; C_{IN_VBB} = 100 nF; C_{OUT_VCC1} = 4.7 µF, C_{OUT_VCC2} = 4.7 µF; for typical values T_A = 25°C, for min/max values T_J = −40°C to 150°C; R_{LT} = 60 Ω; unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC1} REGULATOR						
~~V_{CC1_UV0}~~	~~V_{CC1} undervoltage level 0~~	~~SPI code = 000~~	~~91.5~~	~~93.5~~	~~95.5~~	~~% V_{CC1}~~
~~V_{CC1_UV1}~~	~~V_{CC1} undervoltage level 1~~	~~SPI code = 001~~	~~87.1~~	~~89.1~~	~~91.1~~	~~% V_{CC1}~~
~~V_{CC1_UV2}~~	~~V_{CC1} undervoltage level 2~~	~~SPI code = 010~~	~~82.7~~	~~84.7~~	~~86.7~~	~~% V_{CC1}~~
~~V_{CC1_UV3}~~	~~V_{CC1} undervoltage level 3~~	~~SPI code = 011~~	~~78.3~~	~~80.3~~	~~82.3~~	~~% V_{CC1}~~
~~V_{CC1_UV4}~~	~~V_{CC1} undervoltage level 4~~	~~SPI code = 100~~	~~73.9~~	~~75.9~~	~~77.9~~	~~% V_{CC1}~~
~~V_{CC1_UV5}~~	~~V_{CC1} undervoltage level 5~~	~~SPI code = 101~~	~~69.5~~	~~71.5~~	~~73.5~~	~~% V_{CC1}~~
~~V_{CC1_UV6}~~	~~V_{CC1} undervoltage level 6~~	~~SPI code = 110~~	~~65.1~~	~~67.1~~	~~69.1~~	~~% V_{CC1}~~
~~V_{CC1_UV7}~~	~~V_{CC1} undervoltage level 7~~	~~SPI code = 111~~	~~61.6~~	~~63.6~~	~~65.6~~	~~% V_{CC1}~~
V_{CC1_UV0}	V_{CC1} Undervoltage detection thresholds	Register2.VCC1_UV[2:0] = 000	91.5	93.1	95.5	% V_{CC1}
V_{CC1_UV1}		Register2.VCC1_UV[2:0] = 001	87.1	88.7	91.1	% V_{CC1}
V_{CC1_UV2}		Register2.VCC1_UV[2:0] = 010	82.7	84.3	86.7	% V_{CC1}
V_{CC1_UV3}		Register2.VCC1_UV[2:0] = 011	78.3	79.9	82.3	% V_{CC1}
V_{CC1_UV4}		Register2.VCC1_UV[2:0] = 100	73.9	75.5	77.9	% V_{CC1}
V_{CC1_UV5}		Register2.VCC1_UV[2:0] = 101	69.5	71.1	73.5	% V_{CC1}
V_{CC1_UV6}		Register2.VCC1_UV[2:0] = 110	65.1	66.7	69.1	% V_{CC1}
V_{CC1_UV7}		Register2.VCC1_UV[2:0] = 111	61.6	63.2	65.6	% V_{CC1}
V_{CC1_UVR0}	V_{CC1} Undervoltage recovery thresholds	Register2.VCC1_UV[2:0] = 000	93.0	95.5	97.5	% V_{CC1}
V_{CC1_UVR1}		Register2.VCC1_UV[2:0] = 001	88.7	91.1	93.2	% V_{CC1}
V_{CC1_UVR2}		Register2.VCC1_UV[2:0] = 010	84.5	86.7	89.0	% V_{CC1}
V_{CC1_UVR3}		Register2.VCC1_UV[2:0] = 011	80.2	82.3	84.7	% V_{CC1}
V_{CC1_UVR4}		Register2.VCC1_UV[2:0] = 100	75.9	77.9	80.4	% V_{CC1}
V_{CC1_UVR5}		Register2.VCC1_UV[2:0] = 101	71.7	73.5	76.2	% V_{CC1}
V_{CC1_UVR6}		Register2.VCC1_UV[2:0] = 110	67.5	69.1	72.0	% V_{CC1}
V_{CC1_UVR7}		Register2.VCC1_UV[2:0] = 111	63.5	65.6	68.0	% V_{CC1}
$V_{CC1\_UV\_HYST}$	Undervoltage detection hysteresis	V_{CC1_UVRx} - V_{CC1_UVDx}; "x" = 0 to 7	80 100	125	170 150	mV

Data Sheet updates (4/11)

Table 5 – Mode control and watchdog:

- Add min and maximum values for $t_{VCC1\_STARTUP}$, $t_{VCC2\_STARTUP}$, t_{RESET}, t_{2ND_RESET} and $t_{IRQ\_RESPONSE}$
- Update symbols $t_{VCC1\_STARTUP}$, $t_{VCC2\_STARTUP}$, t_{RESET}, t_{2ND_RESET} and $t_{FAILSAFE}$

Table 5. ELECTRICAL CHARACTERISTICS
V_{BB} = 5.5 V to 42 V; C_{IN_VBB} = 100 nF; C_{OUT_VCC1} = 4.7 µF, C_{OUT_VCC2} = 4.7 µF; for typical values T_A = 25°C, for min/max values T_J = −40°C to 150°C; R_{LT} = 60 Ω; unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
MODE CONTROL AND WATCHDOG – DYNAMIC ELECTRICAL CHARACTERISTICS						
t_{WD_tol}	Tolerance of watchdog timing		−10		+10	%
$t_{WD\_tol\_LP}$	Tolerance of timer	Standby or Sleep mode	−20		+20	%
~~$t_{VCC1\_Startup}$~~ **$t_{VCC1\_STARTUP}$**	V_{CC1} start−up timeout		**180**	200	**225**	ms
~~$t_{VCC2\_Startup}$~~ **$t_{VCC2\_STARTUP}$**	V_{CC2} start−up timeout		**180**	200	**225**	ms
~~t_{VCC1_Reset}~~ **t_{RESET}**	Reset low−level duration	Reset mode	**1.8**	2	**2.25**	ms
~~$t_{VCC1\_2nd\_Reset}$~~ **t_{2ND_RESET}**	Reset low−level duration	2nd Reset mode	**3.6**	4	**4.5**	ms
~~$t_{FailSafe}$~~ **$t_{FAILSAFE}$**	Fail−Safe mode timeout		1.80	2.0	2.25	s
$t_{IRQ\_Response}$	Timeout for IRQ service		**180**	200	**225**	ms

Data Sheet updates (5/11)

- V_{CC1} low−drop voltage regulator – 5 V
  - Can deliver up to ~~150 mA~~ **125 mA** with accuracy of ±2%
  - Dedicated to supply an external load – typically the ECU's microcontroller

Table 5 – $I_{BB\_STANDBY}$:
- Update I_{OUT_VCC1} max value and update conditions for other parameters for accordingly
- Remove V_{OUT_VCC1} for 1mA load condition

Page 2 – Features: Update description V_{CC1} low−drop voltage regulator

Table 5. ELECTRICAL CHARACTERISTICS
V_{BB} = 5.5 V to 42 V; C_{IN_VBB} = 100 nF; C_{OUT_VCC1} = 4.7 μF, C_{OUT_VCC2} = 4.7 μF; for typical values T_A = 25°C, for min/max values T_J = −40°C to 150°C; R_{LT} = 60 Ω; unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC1} REGULATOR						
V_{OUT_VCC1}	V_{CC1} output voltage	Load ≤ ~~150~~ **125** mA	4.9	5.0	5.1	V
		~~Load 1 mA~~	~~4.9~~	~~5.0~~	~~5.1~~	~~V~~
$V_{OUT\_VCC1\_DYN}$	V_{CC1} dynamic range	Load step ≤ 100 mA	4.5		5.5	V
I_{OUT_VCC1}	V_{CC1} external DC current load		0		~~150~~ **125**	mA
I_{LIM_VCC1}	V_{CC1} current limitation		170	260	310	mA
I_{SINK_VCC1}	V_{CC1} sinking capability	V_{CC1} on; V_{BB} > 6 V; V_{CC1} forced to 5.5 V	0.1	0.4	1	mA
C_{OUT_VCC1}	stabilizing capacitor on V_{CC1} pin	(Notes 10, 11)	2.2	4.7		uF
$ESR\_C_{OUT\_VCC1}$	ESR of the V_{CC1} stabilizing capacitor				1	Ω
$V_{DO\_VCC1\_reg}$	minimal drop in regulation	V_{BB} > 5.5 V			0.5	V
$V_{DO\_VCC1\_lin}$	maximal drop in linear mode	I_{CC1} = ~~150~~ **125** mA, V_{BB} < 5.5 V		0.25	0.5	V
REG_{LOAD_VCC1}	load regulation	Load 0−~~150~~ **125** mA		10	30	mV

Data Sheet updates (6/11)

Figure 4 – CAN Timing parameters:
- Correct V_{CC2} to V_{CC1}

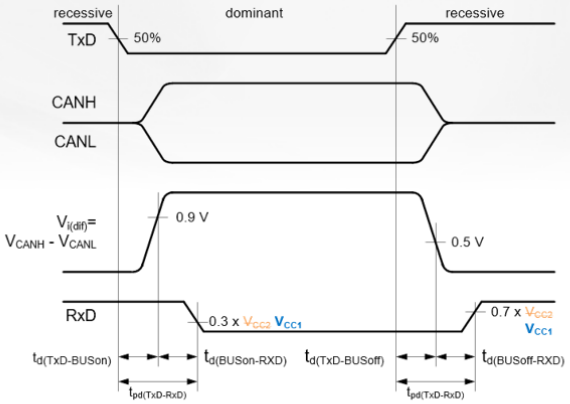
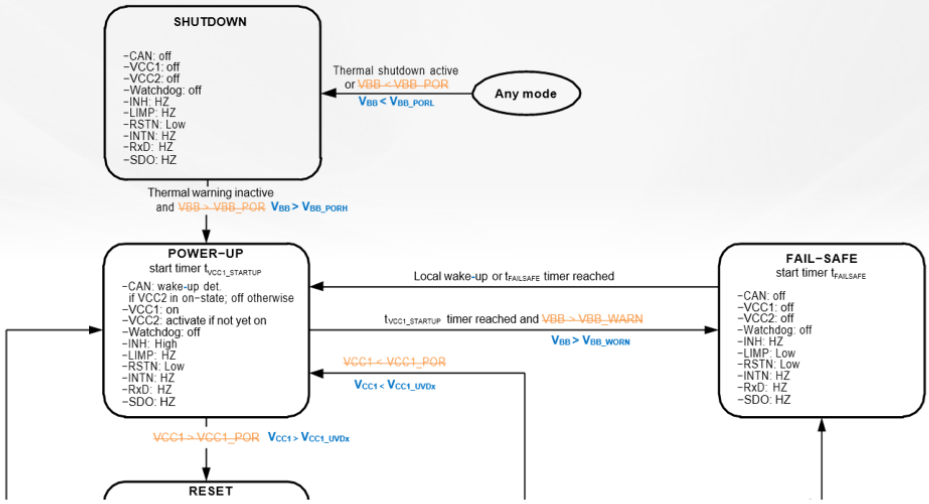


Figure 4. CAN Timing Parameters

Data Sheet updates (7/11)

Figure 6 – State Diagram of the Functional Operating Modes:

- Refer to correct threshold levels / names
- Typo corrections | • Replace t_{VCC1_RESET} and $t_{VCC1\_2ND\_RESET}$ by t_{RESET} and t_{2ND_RESET}



Data Sheet updates (8/11)

Figure 7 – State Diagram of the Special Operating Modes – Flash Mode:

- Refer to correct threshold levels / names | • Typo correction (wakeup -> wake-up)

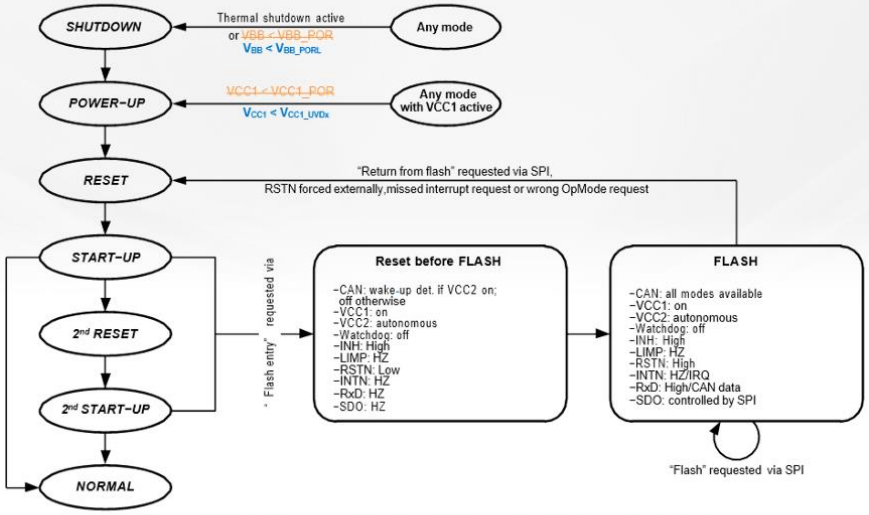


Figure 7. State Diagram of the Special Operating Modes – Flash Mode

Data Sheet updates (9/11)

Figure 8 – State Diagram of the Special Operating Modes – Software Development and Factory Flashing mode:

- Refer to correct threshold levels / names

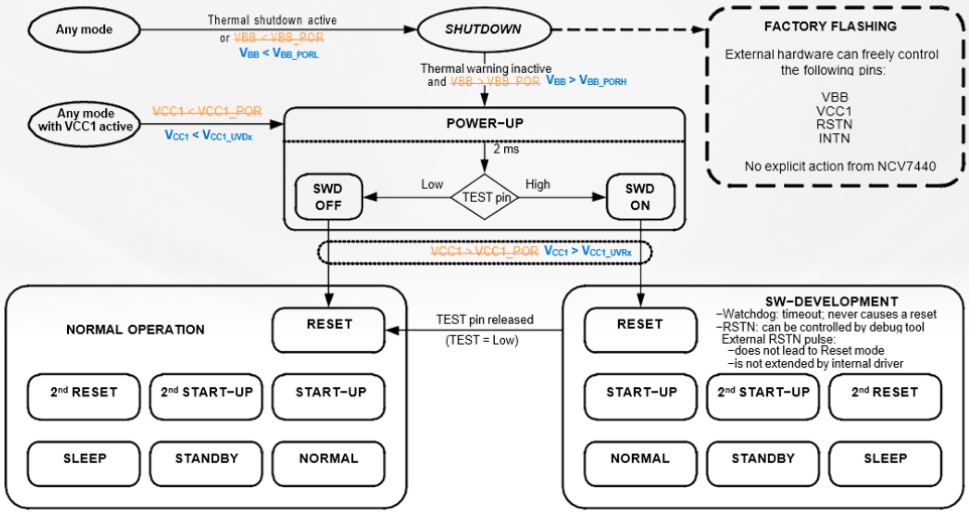


Figure 8. State Diagram of the Special Operating Modes – Software Development and Factory Flashing mode

Data Sheet updates (10/11)

Figure 10 - State Diagram of the V_{CC2} Regulator Control:

- Refer to correct threshold levels / names | • Typo correction (in green)

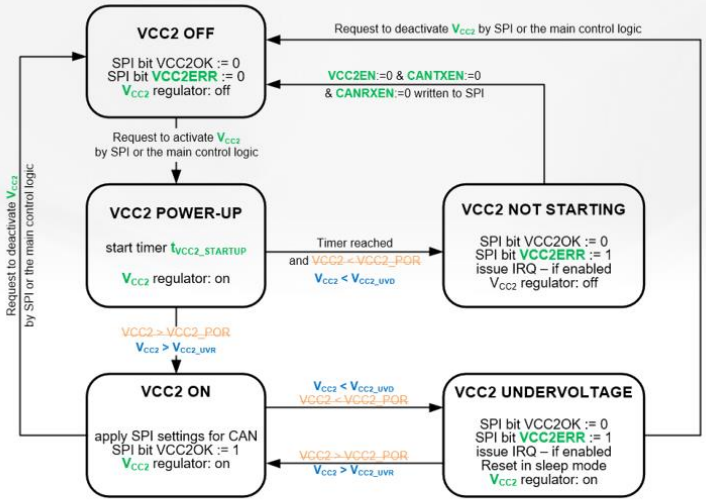
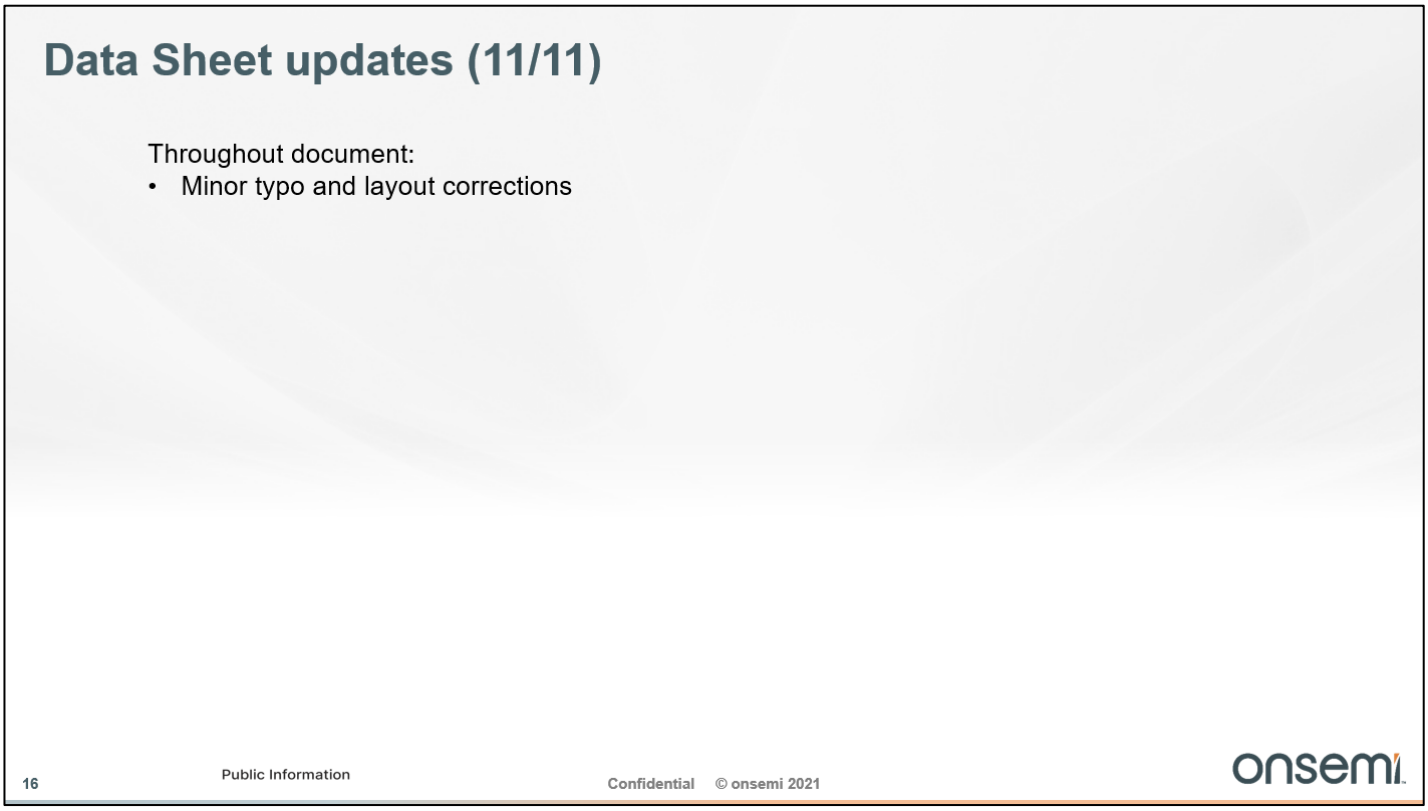


Figure 10. State Diagram of the V_{CC2} Regulator Control



Reason / Motivation for Change:	Source/Supply/Capacity Changes
Anticipated impact on fit, form, function, reliability, product safety or manufacturability:	The device has been qualified and validated based on the same Product Specification. The device has successfully passed the qualification tests. Potential impacts can be identified, but due to testing performed by onsemi in relation to the PCN, associated risks are verified and excluded. No anticipated impacts.

Sites Affected:

onsemi Sites	**External Foundry/Subcon Sites**
onsemi Oudenaarde, Belgium	None
onsemi, Gresham United States	

Marking of Parts/ Traceability of Change:	Traceability guaranteed by datecode

Reliability Data Summary:

NOTE: AEC-1pager is attached.
To view attachments:
1. Download pdf copy of the PCN to your computer
2. Open the downloaded pdf copy of the PCN
3. Click on the paper clip icon available on the menu provided in the left/bottom portion of the screen to reveal the Attachment field
4. Then click on the attached file

Electrical Characteristics Summary:

Electrical characteristics are not impacted.

List of Affected Parts:

Note: *Only the standard (off the shelf) part numbers are listed in the parts list. Any custom parts affected by this PCN are shown in the customer specific PCN addendum in the PCN email notification, or on the* ***PCN Customized Portal.***

Current Part Number	New Part Number	Qualification Vehicle
NCV7440C1	NA	0SBCA-600