Final Product/Process Change Notification

Document #: FPCN23824ZB
Issue Date: 18 Aug 2021

Title of Change:	Gresham Devices as Drop-In Replacements for Current FAB2 Devices - NCV8508B
Proposed Changed Material First Ship Date:	24 Jun 2022 or earlier if approved by customer
Current Material Last Order Date:	31 Aug 2021 *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:	23 Jun 2022, unless otherwise mutually agreed. *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 PCN.Support@onsemi.com
PCN Samples Contact:	Contact your local onsemi Sales Office to place sample order or <PCN.samples@onsemi.com>. 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:	31 Aug 2021
PPAP Availability Date:	14 Sep 2021
Additional Reliability Data:	Contact your local onsemi Sales Office or Tomas.Vajter@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
Design	Design Change in Active Elements
Process - Wafer Production	Change in process technology (e. g. process changes like lithography, etch, oxide deposition, diffusion, die back surface preparation/backgrind, ...), Move of all or part of wafer fab to a different location/site/subcontractor, New wafer diameter
Data Sheet	Change of datasheet parameters/electrical specification (min./max./typ. values) and/or AC/DC specification
Process - Assembly	Change of mold compound, Change of lead frame finishing material / area (internal), Change of wire bonding, Change of lead and heat slug plating material/plating thickness (external), Change of product marking

Description and Purpose:

Change of design to new wafer technology to support new wafer technology. Change of wafer processing technology from PS5B currently manufactured in Fab2, Oudenaarde, Belgium (150 mm fab) to I3T50 in Gresham, Oregon, USA (200 mm fab). Old PS5B technology replaced by the more advanced I3T50 wafer process. PS5B wafer technology is nearing end of life and cannot support future production needs.
These changes are also related to the Fab2 manufacturing site sale.
In addition, package changes were done to improve delamination performance.

	Before Change Description	After Change Description
OPN	NCV85081BPD50R2G	NCV8508CPD501R2G
Wafer Fab location	Fab2, Oudenaarde, Belgium	Gresham, Oregon, USA
Wafer Technology	PS5B (1.5um)	I3T50 (0.35um)
Wafer Diameter	150mm	200mm
LeadFrame	Standard (Sn lead finish)	Roughened/Preplated (NiPdAu lead finish)
Bond Wire	1.3 mil	1.2 mil
Mold Compound	G600	G700LS

	From	To
Product marking change	Line1: 5081B5	Line1: 5081C5

Reason / Motivation for Change:	**Benefit of the change:** More modern wafer technology that will supported long term with improved wafer fab capacity. Improved package BOM. Improved parametric performance. **Risk for Late Release:** Possible supply disruptions. **Quality Improvement:** Yes. Lower die defectivity, improved package delamination performance.
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. Datasheet comparison as shown in Electrical Characteristic Summary below.

Sites Affected:

onsemi Sites	External Foundry/Subcon Sites
onsemi Gresham, Oregon, USA	ATP1 - Amkor Technology Philippines P1
onsemi Oudenaarde, Belgium	

Marking of Parts/ Traceability of Change:	New OPN will have new package topside marking: NCV8508CPD501R2G - Line1: 5081C5

Reliability Data Summary:

QV DEVICE NAME : NCV8508CPD501R2G
RMS : O73016
PACKAGE : SOIC 8 EP

Test	Specification	Condition	Interval	Results
HTOL	JESD22-A108	Ta = 125°C, Vcc = 40V	2016 hrs	0/240
HTSL	JESD22-A103	Ta = 150°C	2016 hrs	0/80
TC	JESD22-A104	Ta = -65°C to+150°C	1000 cyc	0/68
PTC	JESD22 A105	Ta = -40°C to+125°C	1000 cyc	0/75
HAST	JESD22-A110	Ta = 110°C, 85% RH, 18.8psig, Vcc = 40V	528 hrs	0/80
uHAST	JESD22-A118	Ta = 130°C, 85% RH, 18.8psig, unbiased	192 hrs	0/80
PC	J-STD-020 JESD-A113	MSL= 2 @ 260°C		

NOTE: AEC-Q100 1-pager 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:

Comparison of Maximum Ratings

		NCV8508B		NCV8508C		
Rating	**Symbol**	**Min**	**Max**	**Min**	**Max**	**Unit**
Input Voltage						
DC	V_{in}	-0.3	45	-0.3	40	V
Suppressed	U_S*	-	60	-	45	V
Output Voltage	V_{out}	-0.3	18	-0.3	7	V
Reset Output Voltage	V_{RESET}	- -0.3	- 7	-0.3 -0.3	V_{OUT} 7	V
Wake Up Voltage	V_{WU}	- -0.3	- 7	-0.3 -0.3	V_{OUT} 7	V
Watchdog Voltage	V_{WDI}	-0.3	7	-0.3	7	V
Reset Delay Voltage	V_{Delay}	-	-	-0.3	3.6	V
Junction Temperature	T_J	-40	150	-40	150	°C
Storage Temperate	T_{STG}	-55	150	-55	150	°C
ESD Susceptibility						
Human Body Model	ESD_{HBM}	-2	2	-2	2	kV
Machine Model	ESD_{MM}	-200	200	-	-	V
Charge Device Model	ESD_{CDM}	-1	1	-1	1	kV

Comparison of ELECTRICAL CHARACTERISTICS

		NCV8508B				NCV8508C				
ELECTRICAL CHARACTERISTICS		−40°C ≤ TJ≤ 125°C; 6.0V ≤ V_{IN}≤ 28 V, 0.1 mA ≤ I_{OUT}≤150 mA, C_{out} = 1 µF, R_{Delay} = 60 kΩ unless otherwise specified				V_{in} = 13.5 V, C_{in} = 0.1 µF, C_{out} = 1 µF, Min and Max values are valid for temperature range −40°C ≤ T_J ≤ 150°C unless noted otherwise and are guaranteed by test, design or statistical correlation. Typical values are referenced to T_J = 25°C				
Parameter	**Symbol**	**Test Conditions**	**Min**	**Typ**	**Max**	**Test Conditions**	**Min**	**Typ**	**Max**	**Unit**
Output Voltage	V_{OUT}		4.85	5.0	5.15	V_{IN} 6 V to 28 V, I_{out} = 0.1 mA to 150 mA	4.9	5.0	5.1	V
Line Regulation	Reg_{Line}	6.0V ≤ V_{IN}≤ 28 V, I_{out} = 5 mA	-	5	50	V_{in} = 6 V to 28 V, I_{out} = 5 mA	−20	-	20	mV
Load Regulation	Reg_{Load}	V_{IN} = 14 V, 1 mA ≤ I_{out} ≤ 150 mA	-	5	30	I_{out} = 0.1 mA to 150 mA	−30	-	30	mV
Current Limit	I_{LIM}	-	250	400	-	V_{OUT} = 96% of V_{OUT_nom}	255	505	800	mA
Dropout Voltage (Note 1)	V_{DO}	I_{out} = 150 mA	-	450	900	I_{out} = 150 mA	–	355	700	mV
Quiescent Current (I_q = I_{in} - I_{out})	I_q	- - V_{IN} = 12 V, I_{out} = 150 mA	- - -	- - 100	- - 150	I_{out} = 0 mA I_{out} = 0.1 mA -	- - -	74 76 -	83 85 -	µA
Output Voltage Reset Threshold	$V_{th(RO)}$		4.50 V	4.65 V	4.80 V		90%	93%	95%	
Reset Output Low Voltage	V_{ROL}	R_{load} = 10 kΩ to V_{OUT}, V_{OUT} ≥ 1.0 V R_{load} = 5.1 kΩ to V_{OUT}, V_{OUT} ≥ 1.0 V	- -	0.2 0.4	0.4 0.8	R_{load} = 10 kΩ to V_{OUT}, V_{OUT} = 1.0 V -	- -	0.025 -	0.4 -	V
Reset Output High Voltage	V_{ROH}	R_{load} = 10 kΩ to GND R_{load} = 5.1 kΩ to GND	V_{OUT} - 0.5 V_{OUT} - 1.0	V_{OUT} - 0.25 V_{OUT} - 0.5	- -	R_{load} = 10 kΩ to GND -	4.50 -	4.86 -	- -	V
Delay Output Voltage	V_{Delay}	I_{DELAY} = 50 µA	-	1.25	-	R_{Delay} = 60 kΩ, 120 kΩ, 500 kΩ	-	0.48	-	V
Power On Reset Delay Time	t_{RD}	V_{IN} = 14 V, R_{Delay} = 60 kΩ, I_{OUT} = 5 mA V_{IN} = 14 V, R_{Delay} = 120 kΩ, I_{OUT} = 5 mA -	2 - -	3 - -	4 - -	R_{Delay} = 60 kΩ, I_{OUT} = 5 mA R_{Delay} = 120 kΩ, I_{OUT} = 5 mA R_{Delay} = 500 kΩ, I_{OUT} = 5 mA	2 - -	3.1 6.2 26	4 - -	ms
Reset Reaction Time	t_{RR}	-	-	-	-		-	20	-	µs
Watchdog Input Threshold Voltage	WDI_{high}		-	-	-		30	50	70	% V_{OUT}
Watchdog Input Threshold Voltage High			70	-	-		-	-	-	% V_{OUT}
Watchdog Input Threshold Voltage Low			-	-	30		-	-	-	% V_{OUT}
Watchdog Input Hysteresis	WDI_{hys}		-	100	-		25	100	-	mV
Watchdog Input Current	I_{LIM}		-	0.1	10	WDI = 6 V	-	1.1	2	µA

Wake Up Duty Cycle Nominal	t_{DC}		45	50	55		45	50	55	%
Wake Up Period	T_{WUP}									ms
		R_{Delay} = 60 kΩ	18	25	32	R_{Delay} = 60 kΩ	18	24	32	
		R_{Delay} = 120 kΩ	-	50	-	R_{Delay} = 120 kΩ	-	47	-	
		-	-	-	-	R_{Delay} = 500 kΩ	-	197	-	
RESET HIGH to Wakeup Rising Delay Tim	t_{RHWU}									ms
		R_{Delay} = 60 kΩ	9	12.5	16	R_{Delay} = 60 kΩ	9	12	16	
		R_{Delay} = 120 kΩ	-	25	-	R_{Delay} = 120 kΩ	-	23.5	-	
		-	-	-	-	R_{Delay} = 500 kΩ	-	97	-	
Wake Up Response to Watchdog Input	t_{WUWH}	50% WDI falling edge to 50% Wake Up falling edge	-	0.1	5	50% WDI falling edge to 50% Wake Up falling edge	-	0.80	2	µs
Wake Up Response to RESET	t_{WURT}	50% RESET falling edge to 50% Wake Up falling edge V_{OUT} = $V_{OUT, nom}$ → 90% of $V_{OUT, nom}$	-	0.1	5	50% RESET falling edge to 50% Wake Up falling edge V_{OUT} = $V_{OUT, nom}$ → 90% of $V_{OUT, nom}$	-	0.012	1	µs
Wake Up Output Low Voltage	V_{WUL}									V
		R_{load} = 10 kΩ to V_{OUT}, V_{OUT} ≥ 1.0 V	-	0.2	0.4	R_{load} = 10 kΩ to V_{OUT}, V_{OUT} = 1.0 V	-	0.085	0.4	
		R_{load} = 5.1 kΩ to V_{OUT}, V_{OUT} ≥ 1.0 V	-	0.4	0.8	-	-	-	-	
Wake Up Output High Voltage	V_{WUH}									V
		R_{load} = 10 kΩ to GND	V_{OUT} - 0.5	V_{OUT} - 0.25	-	R_{load} = 10 kΩ to GND	4.50	4.86	-	
		R_{load} = 5.1 kΩ to GND	V_{OUT} - 1.0	V_{OUT} - 0.5	-	-	-	-	-	
Thermal Shutdown Threshold	T_{SD}		-	-	-		150	175	195	°C
Thermal Shutdown Hysteresis	T_{SH}		-	-	-		-	10	-	°C

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
NCV85081BPD50R2G	NCV8508CPD501R2G	NCV8508CPD501R2G