TPS62852x-Q1 2.7V to 6V, 1A, 2A, 3A, Automotive, Step-Down Converters in a WSON Package

1 Features

- AEC-Q100 qualified for automotive applications
  - Device temperature grade 1: –40°C to +125°C T_A
- Wettable flanks
- Designed for low EMI requirements
  - Optional pseudo-random spread spectrum reduces peak emissions
- T_J = –40°C to +150°C
- Family of 1A, 2A, and 3A (continuous) converters
- Input voltage range: 2.7V to 6V
- Quiescent current: 21µA typical
- Shutdown current: 1.5µA typical
- Output voltage from 0.6V to 5.5V
- Output voltage accuracy ±1% (PWM operation)
- Options of forced PWM or PWM, PFM operation
- Switching frequency in PWM: 2.25MHz
- Adjustable soft start-up to 10ms
- Precise ENABLE input allows:
  - User-defined undervoltage lockout
  - Exact sequencing
- Active output discharge
- Foldback overcurrent protection – optional
- Power-good output with window comparator

2 Applications

- Advanced driver assistance systems (ADAS) camera
- ADAS sensor fusion and surround view ECU
- Hybrid and reconfigurable instrument cluster
- Head unit and telematics control unit
- External audio amplifier

3 Description

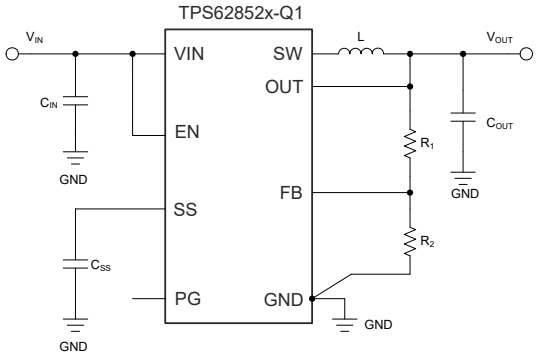
The TPS62852x-Q1 are a family of pin-to-pin, 1A, 2A, and 3A, high efficiency, easy-to-use, synchronous step-down DC/DC converters. These devices are based on a peak current mode control topology and support tight switching frequency variation. These devices are designed for automotive applications such as infotainment and advanced driver assistance systems. Low resistive switches allow up to 3A continuous output current. In the TPS62852x-Q1, the switching frequency is internally fixed at 2.25MHz. The TPS62852x-Q1 automatically selects pulse width modulation (PWM) for higher power demand and pulse frequency mode (PFM) for power saving operation. This selection maintains high efficiency across the whole load range. The device exists also in options with forced PWM in cases where frequency stability requirements dominate. The family provides a 1% output voltage accuracy over the full temperature range in PWM mode, which helps designing power supplies for devices with very tight supply voltage accuracy requirements.

The TPS62852x-Q1 is available in an 8-pin, 2.0mm × 1.5mm, WSON package.

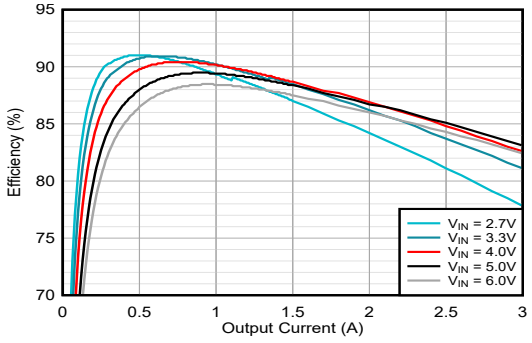
Device Information

PART NUMBER(3)	OUTPUT CURRENT	PACKAGE(1)	PACKAGE SIZE(2)
TPS628521-Q1	1A	DLS (WSON-HR, 8)	2mm × 1.5mm
TPS628522-Q1	2A		
TPS628523-Q1	3A		

(1) For more information, see Section 8.
(2) The package size (length × width) is a nominal value and includes pins, where applicable.
(3) See the *Device Comparison Table*.



Simplified Schematic



Efficiency vs I_{OUT}, V_{OUT} = 1.1V

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4 Device Comparison Table

DEVICE NUMBER	OUTPUT CURRENT	OPERATION MODE	SSC	FOLDBACK CURRENT LIMIT	TYPICAL OUTPUT CAPACITOR	INDUCTOR	OUTPUT VOLTAGE	PACKAGE TYPE
TPS628523SAWDLSRQ1	3A	FPWM	ON	OFF	1 × 22uF	470nH	Adjustable	WDLS(2)
TPS628523PAWDLSRQ1	3A	FPWM	ON	OFF	2 × 22uF	470nH	Adjustable	WDLS(2)
TPS628523HAWDLSRQ1	3A	FPWM	ON	OFF	2 × 22uF	200nH	Adjustable	WDLS(2)
TPS628522SAWDLSRQ1	2A	FPWM	ON	OFF	1 × 22uF	470nH	Adjustable	WDLS(2)
TPS628522PAWDLSRQ1	2A	FPWM	ON	OFF	2 × 22uF	470nH	Adjustable	WDLS(2)
TPS628522HAWDLSRQ1	2A	FPWM	ON	OFF	2 × 22uF	200nH	Adjustable	WDLS(2)
TPS628521SAWDLSRQ1	1A	FPWM	ON	OFF	1 × 22uF	470nH	Adjustable	WDLS(2)
TPS628523CAWDLSRQ1	3A	FPWM	ON	OFF	100uF	200nH	Adjustable	WDLS(2)
TPS628521LKWDLSRQ1(1)	1A	FPWM	ON	OFF	1 × 22uF	470nH	1.8V	WDLS(2)
TPS628523SADLSRQ1	3A	FPWM	OFF	OFF	1 × 22uF	470nH	Adjustable	DLS
TPS628523SDLSRQ1(1)	3A	PFM/PWM	OFF	OFF	1 × 22uF	470nH	Adjustable	DLS
TPS628523PADLSRQ1	3A	FPWM	OFF	OFF	2 × 22uF	470nH	Adjustable	DLS
TPS628523PDLSRQ1	3A	PFM/PWM	OFF	OFF	2 × 22uF	470nH	Adjustable	DLS
TPS628523HADLSRQ1	3A	FPWM	OFF	OFF	2 × 22uF	200nH	Adjustable	DLS
TPS628522SADLSRQ1	2A	FPWM	OFF	OFF	1 × 22uF	470nH	Adjustable	DLS
TPS628522PADLSRQ1(1)	2A	FPWM	OFF	OFF	2 × 22uF	470nH	Adjustable	DLS
TPS628522HADLSRQ1	2A	FPWM	OFF	OFF	2 × 22uF	200nH	Adjustable	DLS
TPS628521SADLSRQ1(1)	1A	FPWM	OFF	OFF	1 × 22uF	470nH	Adjustable	DLS

(1) Preview information (not Production Data)
(2) WDLS - wettable flanks

The TPS628523S and P versions use a 470nH inductor and can be used interchangeably with industry standard devices. The TPS628523H is an enhanced version for 200nH inductors with 2 × 22uF output capacitors. 200nH inductors have lower DC resistance and can have a smaller form factor compared to a 470nH inductor with the same current carrying capability. The TPS628523H also offers best transient behavior and can additionally support higher output capacitance for transient suppression down to very few mV. The TPS628523C also supports 200nH and has the compensation adapted for very large output capacitance for best transient response.

5 Pin Configuration and Functions

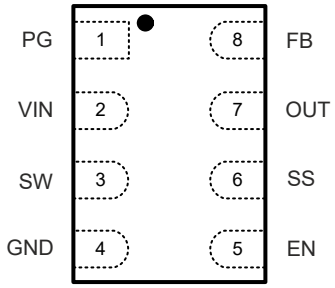

Figure 5-1. 8-Pin WSON-HR DLS (Top View)

Table 5-1. Pin Functions

PIN		TYPE(1)	DESCRIPTION
NAME	NO.		
PG	1	O	Open-drain power-good output
VIN	2	—	Power supply input. Make sure the input capacitor is connected as close as possible between the VIN and GND pins.
SW	3	—	This pin is the switch pin of the converter and is connected to the internal power MOSFETs.
GND	4	—	Ground pin
EN	5	I	This pin is the enable pin of the device. Connect to logic low to disable the device. Pull high to enable the device. Do not leave this pin unconnected.
SS	6	I	Soft-Start pin. An external capacitor connected from this pin to GND defines the rise time for the internal reference voltage.
OUT	7	I	Output voltage sense pin. Connect the positive terminal of the output capacitor closest to the load to this pin.
FB	8	I	Voltage feedback input. Connect the resistive output voltage divider to this pin. On device versions with fixed output voltage connect this pin directly to the positive terminal of the output capacitor closest to the inductor.

(1) I = input, O = output

6 Device and Documentation Support

6.1 Device Support

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This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

6.6 Glossary

TI Glossary — This glossary lists and explains terms, acronyms, and definitions.

7 Revision History

Changes from Revision B (May 2026) to Revision C (June 2026)	Page
• Changed status of TPS628523CAWDLSRQ1 in WDLS package from preview to production	3

Changes from Revision A (May 2025) to Revision B (May 2026)	Page
• Added devices in WDLS package for release to production and in DLS packages with status "Preview information (not production data)". Moved devices with "Advance Information" status to release for production	3
• Added description about how to connect the FB pin on devices with fixed output voltage	4

Changes from Revision * (February 2025) to Revision A (May 2025)	Page
• Changed the document status from Advance Information to Production Data	1
• Changed table from Preview Information to Production Data, added footnote for Advance information and added TPS628523HADLSRQ1	3

8 Mechanical, Packaging, and Orderable Information

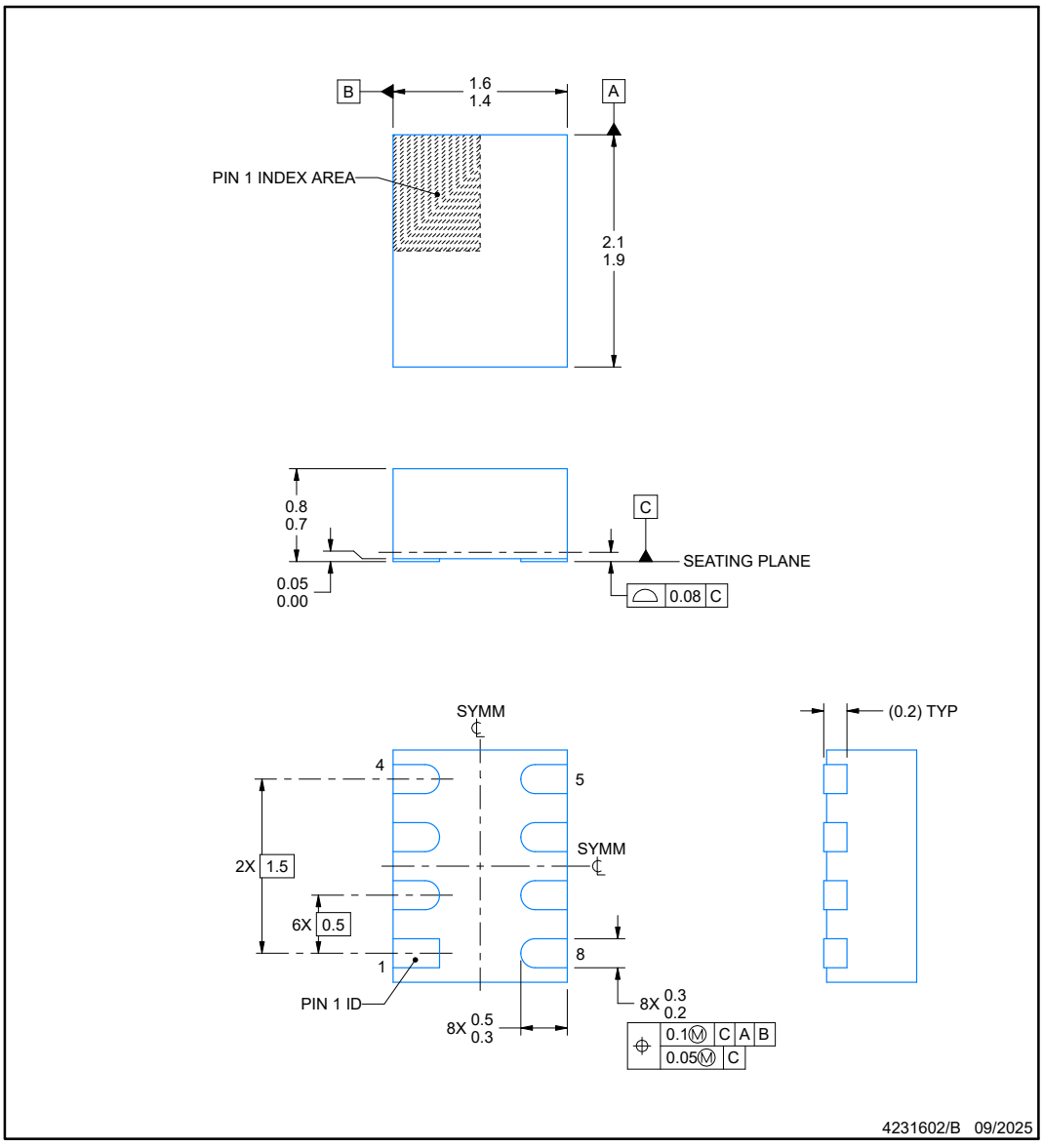
The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGE OUTLINE

DLS0008A-C01

WSON-HR - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



NOTES:

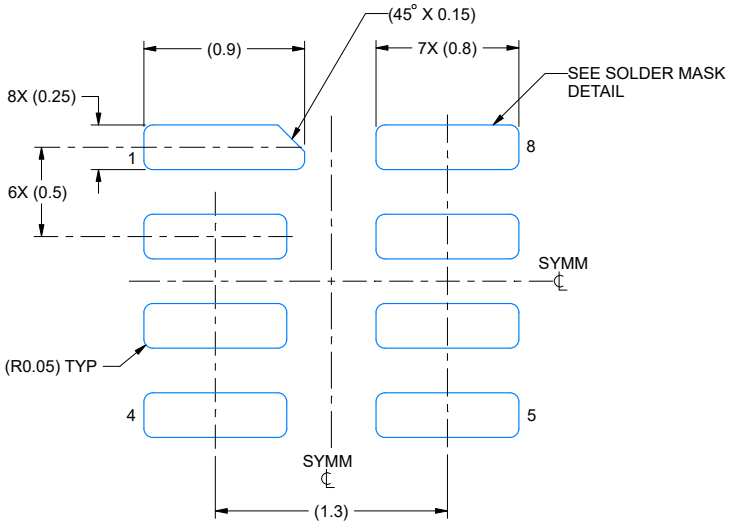
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

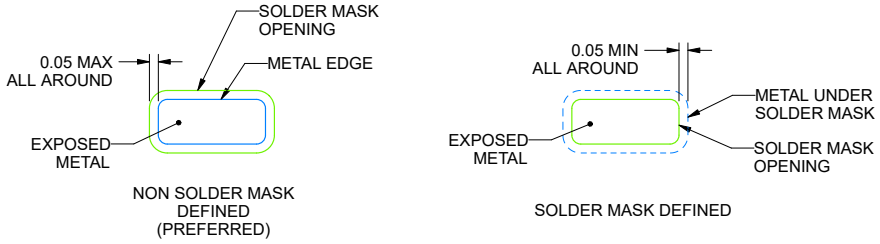
DLS0008A-C01

WSON-HR - 0.8 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 30X



SOLDER MASK DETAILS

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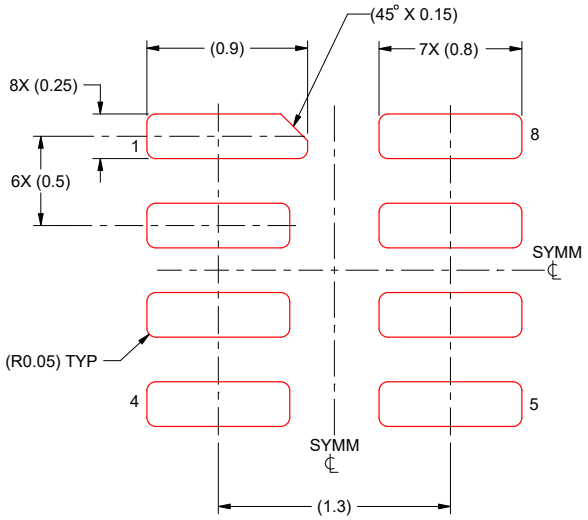
NOTES: (continued)

3. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).

EXAMPLE STENCIL DESIGN

DLS0008A-C01 **WSON-HR - 0.8 mm max height**

PLASTIC SMALL OUTLINE - NO LEAD



SOLDER PASTE EXAMPLE
BASED ON 0.1 mm THICK STENCIL
SCALE: 30X

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NOTES: (continued)

4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

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Last updated 10/2025