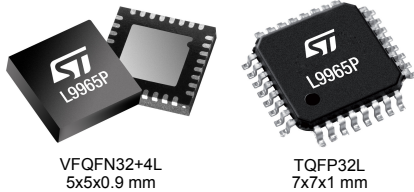


Automotive single channel pyro-fuse driver


 VFQFN32+4L
5x5x0.9 mm

 TQFP32L
7x7x1 mm

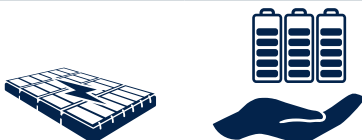
Product status link

[L9965P](#)

Product summary

Order code	Package	Packing
L9965P-FN	VFQFN32	Tray
L9965P-FN-TR		Tape and reel
L9965P-FP	TQFP32L	Tray
L9965P-FP-TR		Tape and reel

Product labels


STBMIC


Features



- AEC-Q100 grade 1 qualified
- Full ISO26262 compliant, ASIL-D systems ready
- Very low power consumption:
 - Less than 10 μ A in deep-sleep mode (only trigger detection enabled)
 - Less than 4 mA in low-power mode (trigger detection enabled, ER boost recharge active, cyclic diagnostics every 100 ms)
- Boost regulator to charge Energy Reserve (ER) with bang-bang control to reduce consumption
- FENH/FENL digital input triggers, compatible to level or PWM signals (16 kHz and 125 kHz), with line integrity check feature
- Autonomous cyclic diagnostic routine to ensure detection of all failures which may prevent safe deployment and/or cause inadvertent deployment
- Programmable deployment profile: current value and time duration can be adapted to different pyro-fuse igniters
- Firing strategy supporting multiple retry attempts based on user-selectable FIRE_GOOD signal
- Embedded NVM for configuration parameters storage and runtime configuration integrity check
- Easy integration with L9965C companion CSA, implementing many of the safety mechanisms needed to achieve ASIL targets, thus allowing easy L9965P plug and play in the system
- Pyro-fuse deployment available down to a minimum operating battery voltage of 6 V
- 24-bit peripheral SPI for direct MCU/L9965C interface
- Compatible with pyro-fuses certified according LV-16 and USCAR-28

Application

- High voltage battery packs for BEVs and PHEVs
- Backup energy storage systems and UPS

Description

L9965P is an automotive-grade single channel pyro-fuse driver capable to break high voltage battery line quickly and reliably in case of short circuit or car crash.

To accomplish this function, the device features a dual FET output stage made of a HS and a LS powerMOS. The stage is equipped with a closed loop current feedback and can be configured to deliver controlled firing profiles programming both current value and time duration.

Moreover, the power stage is able to perform a defined number of auto-retry attempts based on the success or not of the deployment.

The device embeds a programmable firing logic allowing to generate the trigger signal from two SPI commands or from two digital inputs (FENH/FENL).

The digital input triggers are compatible with both level and PWM encoding, supporting 16 kHz and 125 kHz encoded signals.

The device supports the charging of an external capacitor to be used as tank capacitor or as energy reserve (ER) in case of battery loss. An internal boost regulator can be used to control the ER cap voltage around a programmable setpoint. Boosting the input battery voltage allows using smaller ER capacitor values to store the energy needed for firing, even in case of ECU battery loss.

The device has been designed to deliver maximum safety and performance while still being energy efficient. A low-power operation strategy allows minimizing the idle consumption, keeping the device in an ultra low power state while still performing all the diagnostic sweeps needed for achieving the ASIL targets. The periodicity of the diagnostic sweeps can be programmed in order to comply with any FTTI. During such ultra low power state, the device is still sensitive to wake-up/trigger sources in order to be ready to fire.

Operation in conjunction with L9965C companion chip allows simplifying the software development, as many safety mechanisms are already implemented by L9965C.

1 Package information

To meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: www.st.com. ECOPACK is an ST trademark.

1.1 VFQFN32 (5x5x0.9 mm 32+4L WETT. FLANKS) package information

Figure 1. VFQFN32 (5x5x0.9 mm 32+4L WETT. FLANKS) package outline

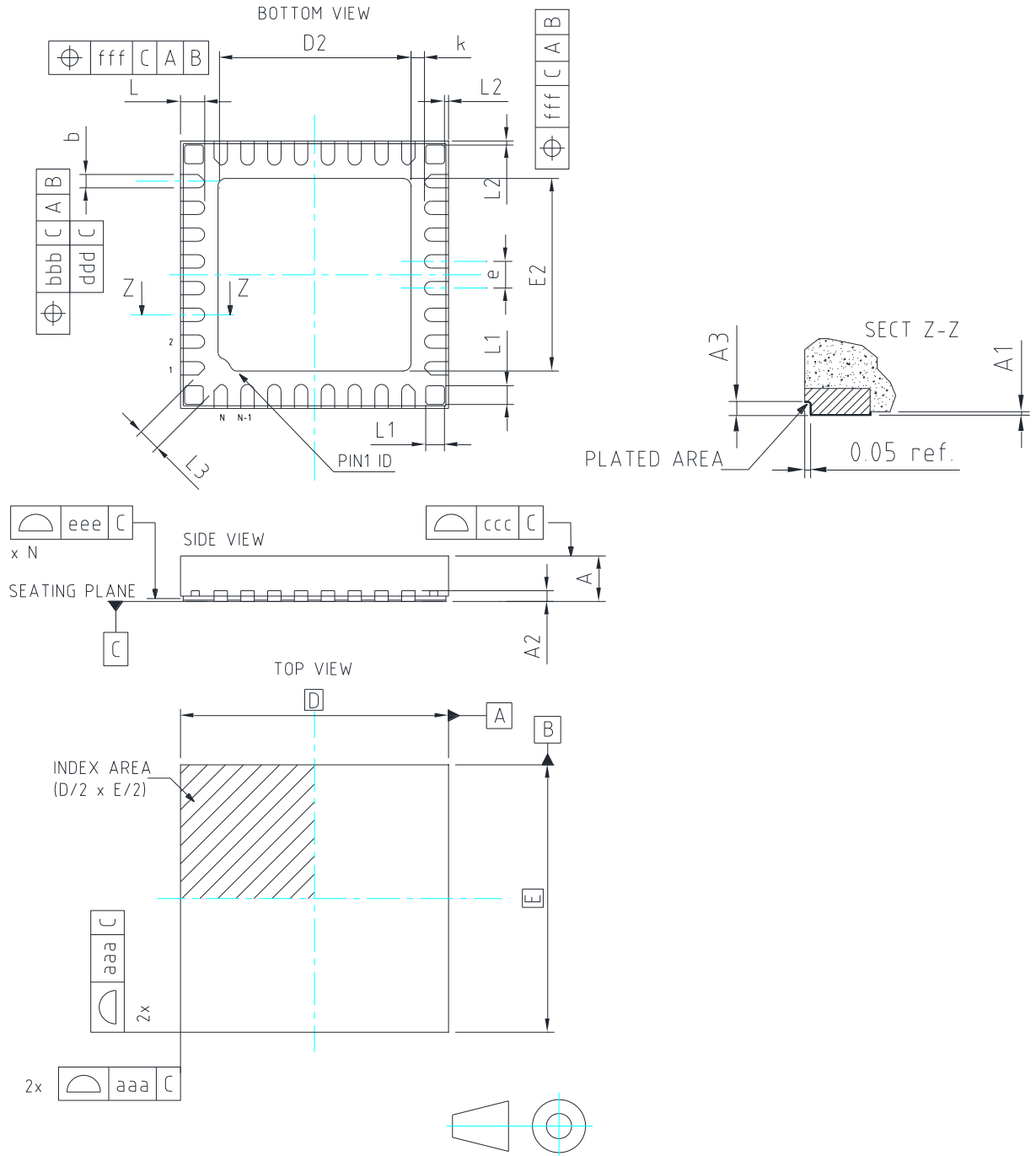


Table 1. VFQFN32 (5x5x0.9 mm 32+4L WETT. FLANKS) package mechanical data

Symbol	Dimensions in mm		
	Min.	Typ.	Max.
A	0.80	0.90	1.00
A1	0.00	0.02	0.05
A2	0.2 REF		
A3	0.10	-	-
b	0.20	0.25	0.30
D	-	5.00	-
D2	3.55	3.60	3.65
e	-	0.5	-
E	-	5.00	-
E2	3.55	3.60	3.65
L	0.35	0.45	0.55
L1	-	0.35	-
L2	-	0.075	-
L3	-	0.42	-
k	0.20	-	-
N	32+4		
Tolerance of form and position			
aaa	0.10		
bbb	0.10		
ccc	0.08		
ddd	0.05		
eee	0.08		
fff	0.10		

1.2 TQFP32L (7x7x1 mm 32+4L exposed pad down) package information

Figure 2. TQFP32L (7x7x1 mm 32+4L exposed pad down) package outline

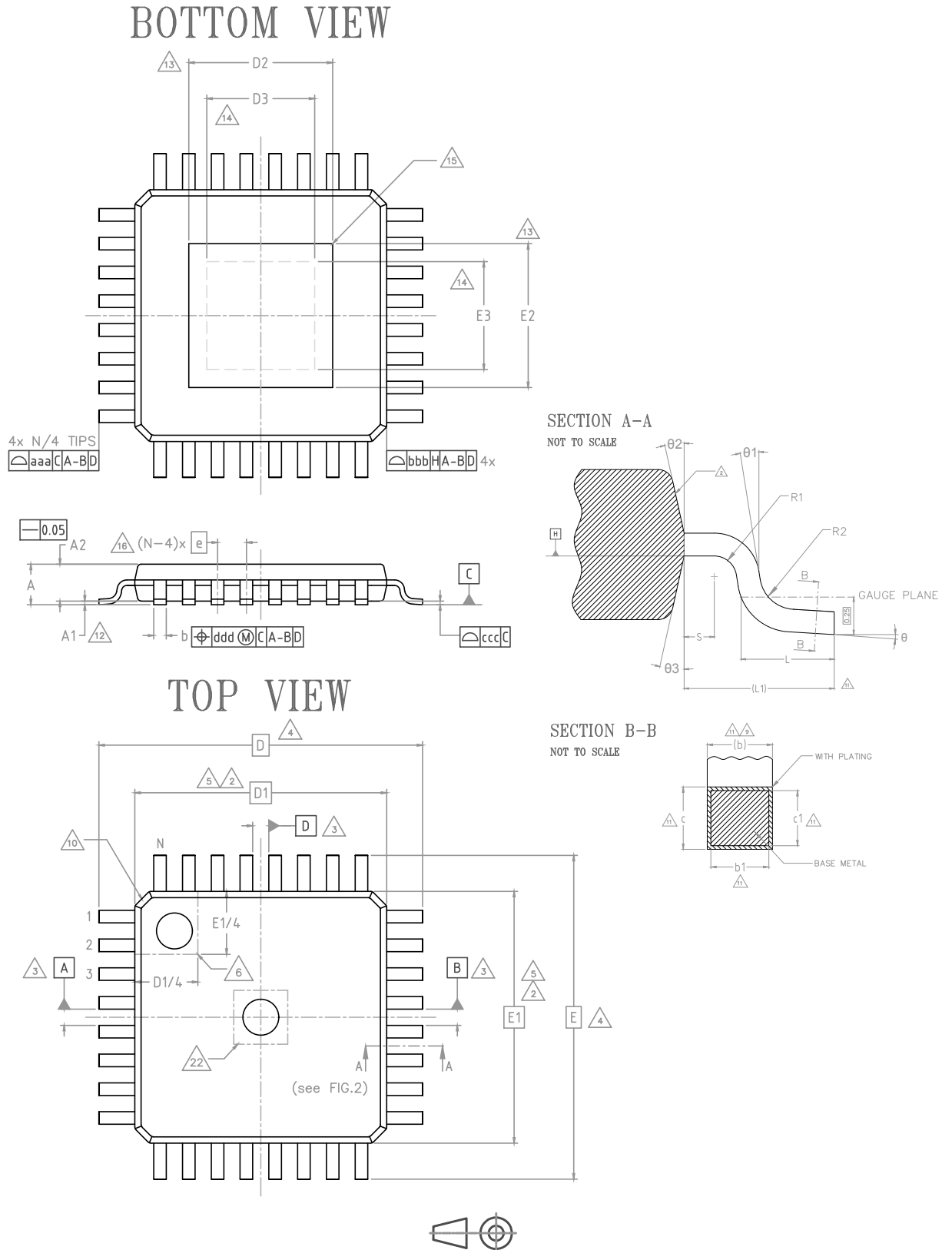


Table 2. TQFP32L (7x7x1 mm 32+4L exposed pad down) package mechanical data

Symbol	Dimensions in mm		
	Min.	Typ.	Max.
θ	0°	3.5°	7°
$\theta 1$	0°	-	-
$\theta 2$	10°	12°	14°
$\theta 3$	10°	12°	14°
A	-	-	1.20
A1	0.05	-	0.15
A2	0.95	1.00	1.05
b	0.30	0.37	0.45
b1	0.30	0.35	0.40
c	0.09	-	0.20
c1	0.09	-	0.16
D	9.00 BSC		
D1	7.00 BSC		
D2	-	-	5.37
D3	3.40	-	-
e	0.80 BSC		
E	9.00 BSC		
E1	7.00 BSC		
E2	-	-	5.37
E3	3.40	-	-
L	0.45	0.60	0.75
L1	1.00 REF		
N	32+4		
R1	0.08	-	-
R2	0.08	-	0.20
S	0.20	-	-
Tolerance of form and position			
aaa	0.20		
bbb	0.20		
ccc	0.10		
ddd	0.20		

Revision history

Table 3. Document revision history

Date	Version	Changes
06-Nov-2024	1	Initial release.

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