

A 1.87-day minimum: TIC 430806628

Sean League

Tustin, California. Research note from the 1.005–1.105 degree ring around V345 Lac, 15 October 2026.
Nothing in this note has been submitted to VSX.

Abstract

TESS QLP photometry of TIC 430806628 shows one minimum every 1.86948 days. 72 times give an O–C scatter of 7 minutes. The minimum falls to 0.949 of the sector median, 0.06 mag. No second minimum is seen in the phase fold. The TIC contamination ratio is 0.11. The nearest stars have no QLP light curve, and the centroid shift is inside the scatter. The minimum is not yet assigned by a resolved observation. This note is not a VSX submission.

1. How the star was found

Public TESS Quick-Look Pipeline light curves around V345 Lacertae were searched on stars brighter than about $V = 12.5$. This star is 1.089° from V345 Lac, in the ring from 1.005° to 1.105° (241 stars). A dip was kept when quality-zero cadences fell about 1.2 percent or more below the local median, stayed down for several cadences, and did not bounce straight back. The same pass recovered known variables. Those are not given new notes here. Sectors 16 and 17 are 30-minute cadence and use KSPSAP_FLUX. Sectors 56, 57, 83 and 84 are 200-second cadence and use DET_FLUX where that column is present. Sectors 76 and 77 have no QLP v01 file for these TICs. Cadences with a nonzero quality flag were removed, including the QLP poor-quality bit. Each sector was divided by its own median. Catalog values are from the TESS Input Catalog, Gaia DR3, 2MASS and AllWISE. No new observations were obtained.

2. The star

TIC 430806628 is TYC 3982-00017-1, 2MASS J22153260+5341194, at 22h 15m 32.62s, $+53^\circ 41' 19.4''$. It is 65 arcmin southwest of V345 Lac. The TIC Gaia identifier 2004587272878440960 is not in Gaia DR3. The DR3 source on the coordinates is 2004587272882947072, 0.06 arcsec from the TIC position, $G = 10.28$, with parallax 1.67 ± 0.18 mas and RUWE = 6.3. That RUWE is too large for a distance, and the TIC lists a distance of 325 pc without a parallax, so no distance is adopted. The TIC lists $V = 10.32$, $T = 9.83$, $B = 10.76$, $T_{\text{eff}} = 7793$ K, radius 1.98 solar radii, and contamination ratio 0.11. 2MASS gives J, H, Ks = 9.296, 9.141, 9.058. AllWISE gives W1, W2 = 8.995, 9.001. The temperature and radius are copied as published.

3. The ephemeris

Minima below flux 0.975 were timed with a parabola and solved for a linear ephemeris. 72 minima give

$$\text{Min} = \text{BTJD } 2862.3671 + 1.86948 E$$

The period is 1.869478 ± 0.000002 d. The formal error on this epoch is 0.8 minutes. The rms residual is 6.8 minutes and the largest is 29 minutes. No minimum was rejected by the clip. Every predicted time that lands on quality-zero data is faint enough to be in the table. 10 other predicted times fall inside a sector but on too few quality-zero points to time. The median minimum is flux 0.949, 0.06 mag. The median halfway width is 1.7 hours and the outer width is 2.3 hours. Odd and even cycles are flux 0.949 and 0.948. The deepest phase bin away from phase 0 is flux 0.993 at phase 0.535. There is no second minimum. Twice this period predicts extra times when the star is not faint, so the clock used here is the spacing of the minima, 1.87 days, with one minimum per cycle.

Sector	Cycle	Mid-eclipse	UTC	Min. flux	O–C (min)
16	-600	1740.682	2019-09-14 04:16	0.950	+3.4
16	-599	1742.549	2019-09-16 01:05	0.951	-0.8
16	-598	1744.421	2019-09-17 22:00	0.949	+2.6
16	-594	1751.900	2019-09-25 09:30	0.960	+4.1
16	-593	1753.767	2019-09-27 06:18	0.952	+0.7
16	-592	1755.639	2019-09-29 03:14	0.955	+4.4

Sector	Cycle	Mid-eclipse	UTC	Min. flux	O–C (min)
16	-591	1757.507	2019-10-01 00:04	0.953	+1.7
16	-590	1759.378	2019-10-02 20:58	0.953	+3.9
16	-589	1761.246	2019-10-04 17:48	0.952	+1.6
17	-586	1766.857	2019-10-10 08:28	0.957	+5.4
17	-585	1768.724	2019-10-12 05:17	0.956	+3.0
17	-584	1770.594	2019-10-14 02:09	0.949	+3.6
17	-582	1774.333	2019-10-17 19:54	0.952	+3.8
17	-579	1779.942	2019-10-23 10:31	0.951	+3.9
17	-577	1783.680	2019-10-27 04:14	0.953	+3.1
17	-576	1785.552	2019-10-29 01:09	0.949	+5.8
17	-575	1787.419	2019-10-30 21:58	0.953	+2.7
56	-19	2826.844	2022-09-04 08:10	0.947	-4.5
56	-18	2828.717	2022-09-06 05:07	0.947	+0.3
56	-17	2830.587	2022-09-08 01:59	0.951	+1.3
56	-16	2832.451	2022-09-09 22:44	0.948	-6.6
56	-15	2834.319	2022-09-11 19:33	0.948	-8.3
56	-14	2836.183	2022-09-13 16:18	0.949	-16.7
56	-13	2838.043	2022-09-15 12:56	0.956	-29.5
56	-12	2839.926	2022-09-17 10:07	0.948	-10.6
56	-11	2841.807	2022-09-19 07:16	0.950	+6.5
56	-10	2843.674	2022-09-21 04:05	0.951	+3.1
56	-9	2845.537	2022-09-23 00:47	0.949	-6.9
56	-8	2847.416	2022-09-24 21:53	0.947	+6.2
56	-7	2849.275	2022-09-26 18:30	0.946	-8.0
56	-6	2851.150	2022-09-28 15:30	0.948	-0.2
56	-5	2853.009	2022-09-30 12:07	0.954	-15.7
57	-4	2854.884	2022-10-02 09:07	0.945	-8.1
57	-3	2856.748	2022-10-04 05:51	0.949	-16.0
57	-2	2858.627	2022-10-06 02:57	0.949	-2.2
57	-1	2860.503	2022-10-07 23:58	0.948	+7.8
57	0	2862.370	2022-10-09 20:47	0.948	+4.5
57	3	2867.976	2022-10-15 11:19	0.948	+0.8
57	4	2869.840	2022-10-17 08:04	0.945	-7.3
57	5	2871.717	2022-10-19 05:07	0.952	+3.3
57	6	2873.582	2022-10-21 01:52	0.949	-2.8
57	7	2875.447	2022-10-22 22:38	0.951	-9.9
57	8	2877.324	2022-10-24 19:41	0.953	+1.1
57	9	2879.188	2022-10-26 16:26	0.948	-5.9
57	10	2881.058	2022-10-28 13:18	0.950	-5.5
83	373	3559.682	2024-09-06 04:16	0.950	-1.2
83	374	3561.553	2024-09-08 01:11	0.947	+1.8
83	375	3563.422	2024-09-09 22:02	0.947	+0.8
83	376	3565.292	2024-09-11 18:55	0.948	+1.0
83	377	3567.155	2024-09-13 15:37	0.945	-7.7
83	378	3569.034	2024-09-15 12:43	0.946	+6.2
83	379	3570.899	2024-09-17 09:29	0.947	-1.3
83	380	3572.768	2024-09-19 06:20	0.947	-1.5
83	381	3574.638	2024-09-21 03:13	0.944	-0.6
83	382	3576.509	2024-09-23 00:07	0.946	+1.9
83	383	3578.380	2024-09-24 21:01	0.949	+3.8
83	384	3580.247	2024-09-26 17:50	0.947	+0.2
83	385	3582.120	2024-09-28 14:47	0.948	+5.9
83	386	3583.992	2024-09-30 11:42	0.949	+9.0
84	387	3585.861	2024-10-02 08:34	0.949	+8.5
84	388	3587.728	2024-10-04 05:22	0.950	+4.3
84	389	3589.593	2024-10-06 02:08	0.948	-1.7
84	390	3591.468	2024-10-07 23:08	0.947	+5.9
84	391	3593.336	2024-10-09 19:58	0.954	+4.7
84	392	3595.205	2024-10-11 16:49	0.948	+2.8

Sector	Cycle	Mid-eclipse	UTC	Min. flux	O-C (min)
84	394	3598.944	2024-10-15 10:33	0.946	+4.2
84	395	3600.817	2024-10-17 07:31	0.946	+8.3
84	396	3602.685	2024-10-19 04:21	0.945	+7.1
84	397	3604.558	2024-10-21 01:18	0.951	+11.2
84	398	3606.421	2024-10-22 22:00	0.947	+1.7
84	399	3608.288	2024-10-24 18:49	0.948	-0.7
84	400	3610.160	2024-10-26 15:45	0.955	+2.2

Table 1. Minima used in the fit.

TIC 430806628 · QLP, sector median, quality flag zero

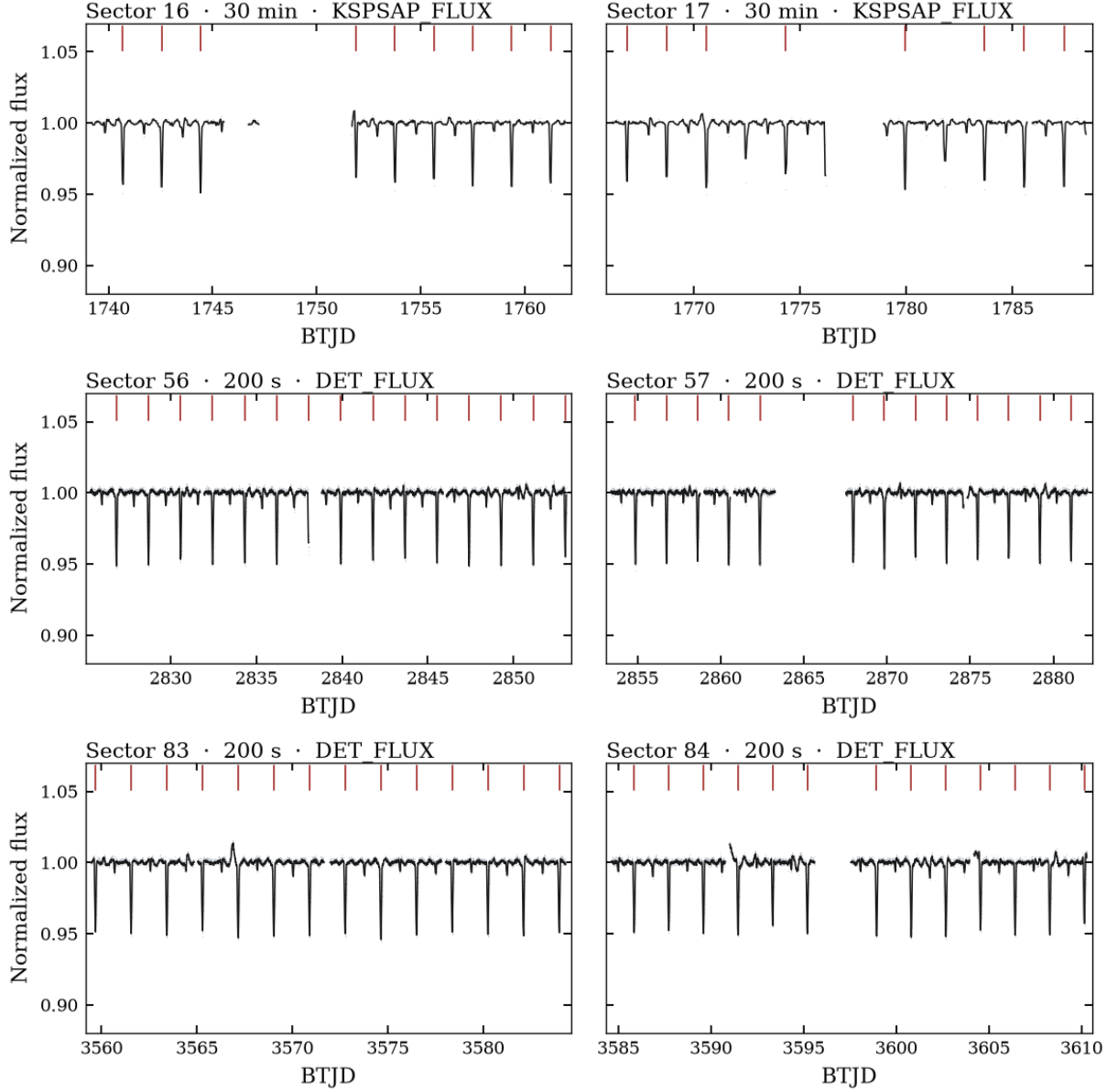


Figure 1. Six sectors. Red ticks are the minima in Table 1.

TIC 430806628. The nearest catalogued neighbors have no QLP file.

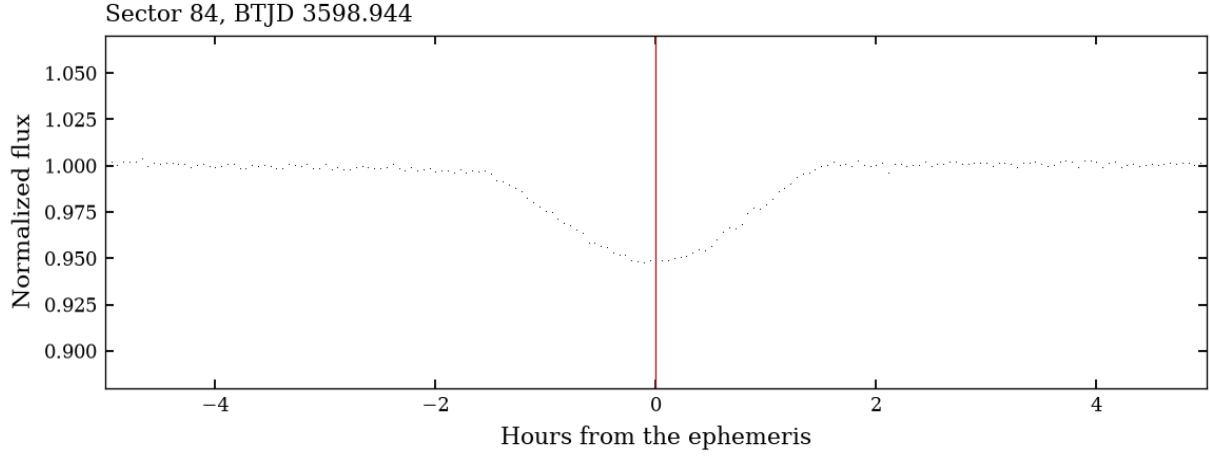


Figure 2. One minimum at 200-second cadence.

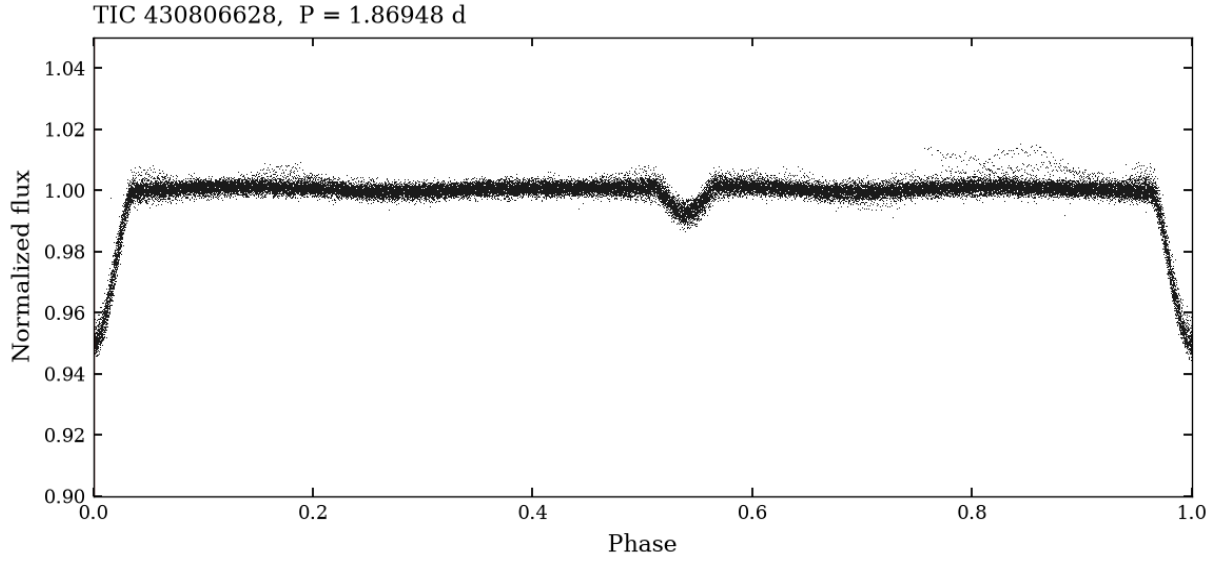


Figure 3. All six sectors folded on the period in section 3.

4. Neighbors

The TIC contamination ratio is 0.11, so other stars are about a tenth of this star's light in the catalog aperture. A five-percent dip is smaller than a total eclipse of all of that contamination would be, and it is also small enough that a neighbor could still produce it. The three nearest TIC stars inside 40 arcsec, TIC 430806604 (15 arcsec, $V = 16.1$), TIC 430806617 (18 arcsec, $V = 14.5$) and TIC 430806579 (40 arcsec, $V = 15.2$), have no QLP v01 file (430806604: no file, 430806617: no file, 430806579: no file). They were not tested. The centroid shifts are sector 16: -12, +3 millipixels (scatter 7, 26), sector 17: +9, -9 millipixels (scatter 16, 9), sector 56: +12, +0 millipixels (scatter 20, 21), sector 57: +13, -6 millipixels (scatter 29, 24), sector 83: +4, +1 millipixels (scatter 18, 14), sector 84: +9, -2 millipixels (scatter 12, 14). Those shifts sit inside the sector-to-sector scatter. The centroid does not assign the dip.

5. Catalogs, and what was not done

Queried on 15 October 2026. VSX has no object on these coordinates. The nearest entries are Gaia DR3 2004587375957649792, type ROT, 52 arcsec away, $G = 14.89$ to 14.92 , and ASASSN-V

J221540.91+534140.4, type SR, period 312 days, 77 arcsec away. Neither is this star. This note has not been submitted to VSX. The period is measured and the star has not been checked from the ground. The next two minima are BTJD 4329.908, 2026-10-16 09:42 UTC, and BTJD 4331.777, 2026-10-18 06:39 UTC. The largest residual in Table 1 is 29 minutes. The outer width of the fade is 2.3 hours. A resolved aperture is what would show that this star, and not a neighbor 15 arcsec away, is the one that fades.

References

- Cutri R. M. et al., 2003, 2MASS All-Sky Catalog of Point Sources, VizieR II/246
Cutri R. M. et al., 2013, AllWISE Data Release, VizieR II/328
ESA, 1997, The Hipparcos and Tycho Catalogues, ESA SP-1200
Gaia Collaboration, 2023, Astron. Astrophys., 674, A1 (DR3)
Huang C. X. et al., 2020, Research Notes of the AAS, 4, 204 (QLP)
Jayasinghe T. et al., 2021, Mon. Not. R. Astron. Soc., 503, 200 (ASAS-SN II)
Kunimoto M. et al., 2021, Research Notes of the AAS, 5, 234
Stassun K. G. et al., 2019, Astron. J., 158, 138 (TIC)
Watson C., Henden A., Price A., 2006-, AAVSO International Variable Star Index (VSX)