

Table 1. Median values and 68% confidence interval for OGLE-TR-1009.

Parameter	Units	Values
Stellar Parameters:		
M_*	Mass (M_\odot)	$4.19^{+0.56}_{-0.52}$
R_*	Radius (R_\odot)	$2.185^{+0.098}_{-0.094}$
$R_{*,SED}$	Radius ¹ (R_\odot)	$2.29^{+0.14}_{-0.13}$
L_*	Luminosity (L_\odot)	940^{+440}_{-350}
F_{Bol}	Bolometric Flux (cgs)	$0.0000000299^{+0.0000000081}_{-0.0000000077}$
ρ_*	Density (cgs)	$0.568^{+0.033}_{-0.035}$
$\log g$	Surface gravity (cgs)	$4.382^{+0.027}_{-0.030}$
T_{eff}	Effective Temperature (K)	21600^{+1800}_{-2100}
$T_{eff,SED}$	Effective Temperature ¹ (K)	21200^{+1900}_{-2200}
[Fe/H]	Metallicity (dex)	$-3.13^{+1.0}_{-0.57}$
[Fe/H] ₀	Initial Metallicity ²	$-3.14^{+1.0}_{-0.57}$
Age	Age (Gyr)	$0.094^{+0.033}_{-0.026}$
EEP	Equal Evolutionary Phase ³	388^{+16}_{-30}
A_V	V-band extinction (mag)	$3.183^{+0.067}_{-0.075}$
σ_{SED}	SED photometry error scaling	$9.4^{+1.4}_{-1.1}$
ϖ	Parallax (mas)	$0.316^{+0.031}_{-0.027}$
d	Distance (pc)	3160^{+300}_{-280}
Planetary Parameters:		
		b
P	Period (days)	$29.549047^{+0.000068}_{-0.000066}$
R_P	Radius (R_J)	$2.218^{+0.099}_{-0.096}$
M_P	Mass ⁴ (M_J)	$0.4068^{+0.0054}_{-0.011}$
T_C	Time of conjunction ⁵ (BJD _{TDB})	2455398.1766 ± 0.0035
T_T	Time of minimum projected separation ⁶ (BJD _{TDB})	2455398.1766 ± 0.0035
T_0	Optimal conjunction Time ⁷ (BJD _{TDB})	2456609.6876 ± 0.0022
a	Semi-major axis (AU)	0.302 ± 0.013
i	Inclination (Degrees)	$89.80^{+0.14}_{-0.21}$
T_{eq}	Equilibrium temperature ⁸ (K)	2800^{+230}_{-260}
τ_{circ}	Tidal circularization timescale (Gyr)	140^{+23}_{-20}
K	RV semi-amplitude ⁴ (m/s)	$10.21^{+0.95}_{-0.83}$
R_P/R_*	Radius of planet in stellar radii	$0.1043^{+0.0015}_{-0.0016}$
a/R_*	Semi-major axis in stellar radii	$29.71^{+0.56}_{-0.63}$
δ	$(R_P/R_*)^2$	0.01088 ± 0.00032
δ_I	Transit depth in I (fraction)	$0.01141^{+0.00037}_{-0.00036}$
δ_V	Transit depth in V (fraction)	$0.01151^{+0.00045}_{-0.00044}$
τ	Ingress/egress transit duration (days)	$0.03325^{+0.0012}_{-0.00076}$
T_{14}	Total transit duration (days)	0.3472 ± 0.0056

Table 1 continued on next page

Table 1 (continued)

Parameter	Units	Values	
T_{FWHM} ..	FWHM transit duration (days)	0.3137 ± 0.0052	
b	Transit Impact parameter	0.102 ^{+0.11} _{-0.071}	
$\delta_{S,2.5\mu m}$..	Blackbody eclipse depth at 2.5 μm (ppm)	488 ⁺⁴⁹ ₋₅₆	
$\delta_{S,5.0\mu m}$..	Blackbody eclipse depth at 5.0 μm (ppm)	863 ⁺⁴³ ₋₄₈	
$\delta_{S,7.5\mu m}$..	Blackbody eclipse depth at 7.5 μm (ppm)	1025 ⁺⁴⁰ ₋₄₂	
ρ_P	Density ⁴ (cgs)	0.0459 ^{+0.0065} _{-0.0056}	
$\log g_P$	Surface gravity ⁴	2.309 ^{+0.039} _{-0.038}	
Θ	Safronov Number	0.0262 ^{+0.0036} _{-0.0030}	
$\langle F \rangle$	Incident Flux (10 ⁹ erg s ⁻¹ cm ⁻²)	14.0 ^{+5.3} _{-4.5}	
T_P	Time of Periastron (BJD _{TDB})	2455398.1766 ± 0.0035	
T_S	Time of eclipse (BJD _{TDB})	2455383.4021 ± 0.0035	
T_A	Time of Ascending Node (BJD _{TDB})	2455420.3384 ^{+0.0034} _{-0.0035}	
T_D	Time of Descending Node (BJD _{TDB})	2455405.5639 ^{+0.0034} _{-0.0035}	
V_c/V_e	1.00	
$M_P \sin i$..	Minimum mass ⁴ (M_J)	0.4068 ^{+0.0054} _{-0.011}	
M_P/M_*	Mass ratio ⁴	0.000092 ^{+0.000013} _{-0.000011}	
d/R_*	Separation at mid transit	29.71 ^{+0.56} _{-0.63}	
P_T	A priori non-grazing transit prob	0.03015 ^{+0.00067} _{-0.00058}	
$P_{T,G}$	A priori transit prob	0.03717 ^{+0.00079} _{-0.00067}	
Wavelength Parameters:		I	V
u_1	linear limb-darkening coeff	0.093 ^{+0.048} _{-0.046}	0.113 ^{+0.050} _{-0.049}
u_2	quadratic limb-darkening coeff	0.204 ± 0.050	0.270 ± 0.050
Transit Parameters:		OGLE UT 2010-07-20 (I)	OGLE UT 2010-07-20 (V)
σ^2	Added Variance	0.00000634 ± 0.00000016	0.0000039 ^{+0.0000012} _{-0.0000011}
F_0	Baseline flux	1.000199 ± 0.000031	0.99977 ± 0.00023

See Table 3 in Eastman, J. et al., 2019, arXiv:1907.09480 for a detailed description of all parameters

¹This value ignores the systematic error and is for reference only

²The metallicity of the star at birth

³Corresponds to static points in a star's evolutionary history. See §2 in Dotter, A., 2016, ApJS, 222, 8

⁴Uses measured radius and estimated mass from Chen, J., & Kipping, D. 2017, ApJ, 834, 17

⁵Time of conjunction is commonly reported as the "transit time"

⁶Time of minimum projected separation is a more correct "transit time"

⁷Optimal time of conjunction minimizes the covariance between T_C and Period

⁸Assumes no albedo and perfect redistribution