



## TL1250 lens family 4K Resolution Day/Night lens for 1/1.7" sensors

- ✓ Ultra high resolution for 4K cameras, up to 12.4 megapixel
- ✓ Available with DC autoiris or P-iris for precise aperture control
- ✓ Fully motorized with zoom, focus, iris. Some models also have IR cut and limit switches
- ✓ Optional motor control board available for easy integration
- ✓ IR corrected for true Day/Night cameras
- ✓ Compact design to fit into domes as small as 4" mini-dome size
- ✓ CS-mount or D25 smooth mount
- ✓ Used for sensor sizes 1/2.5", 1/2.3", 1/2" 1/1.8", and up to 1/1.7" (Sony IMX178, Sony IMX226 for example)

### TL1250 lens specifications

Focal length (FL)	12-50mm
Image circle	Ø9.4mm at FL 12mm
Resolution	12.4 megapixel
F/#	F/1.8 @ 12mm - F/2.4 @ 50mm to close
IR Correction	440nm – 950nm (Day/Night)
Focus Range	2.0m - infinity
Lens length (TTL)	< 64mm TTL
Back focal length (BFL)	8.2mm (in air)
Chief ray angle (CRA)	< 7°
Geometric distortion	< 10% at 12mm, < 2% at 50mm
Relative illumination	>40%
Lens transmission	>80%
Weight	70g depending on model
Operating temperature	-20C to 60C (<70% humidity, non-condensing)
Storage temperature	-30C to 70C (<90% humidity, non-condensing)

### Field of view for sensor sizes (12mm – 50mm)

Sensor size	1/1.7"	1/1.8"	1/1.8" 4K*	1/2"	1/2.3"	1/2.5"
Horizontal	36° - 8.6°	36° - 8.6°	35° - 8.5°	30° - 7.4°	30° - 7.2°	27° - 6.7°
Vertical	26° - 6.5°	23° - 5.8°	17° - 4.3°	23° - 5.6°	22° - 5.5°	20° - 5.0°
Diagonal	46° - 11°	44° - 10°	40° - 9.5°	39° - 9.2°	38° - 9°	34° - 8.3°

\*4K format = 4000 x 2000 pixels



Visit Theia's website for more information about the lenses.

## Motor specifications

### Zoom, Focus motors for “-R#” versions

Drive	Stepper motor 2 phase bipolar drive
Operation voltage	3.3V (range 2.6-4.8V)
Maximum motor temperature*	Do not let motor temperature exceed 92°C
Coil resistance	28.5Ω (±7%)
Zoom number of steps	3256 steps between hard stops
Zoom speed range**	600-1000pps
Zoom cam rotation	75°
Focus number of steps	8467 steps between hard stops
Focus speed range**	600-1000pps
Focus cam rotation	195°

### Iris motor (p-iris)

Drive	Stepper motor 2 phase bipolar drive
Operating voltage	4V (+/-1)
Number of steps	75 (open to closed)
Maximum response freq.	200pps
Coil resistance	30Ω

### Iris motor (DC autoiris)

Drive	DC
Operation voltage	3V (2.5~5.0V)
Max current consumption	22mA
Drive coil resistance	190Ω
Damper coil resistance	855Ω

### IR cut (on some models)

Drive	DC
Operating voltage	4.0V
Drive coil resistance	130Ω
Connector type	Housing: Molex 51021-0200 Terminal: Molex 50058-8000

### IR cut optical versions

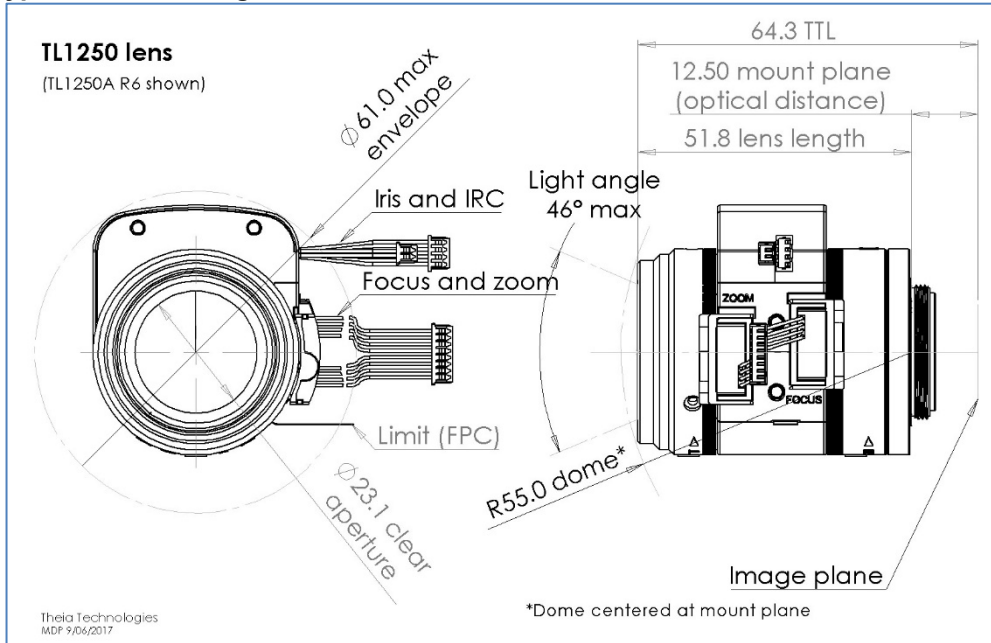
The IR cut will switch between two filters. Most lenses use visible bandpass (405-650nm) and clear glass (405-1100nm). There are some models that include filters for 940nm (long pass >880nm) with either visible or clear glass alternate filter.

### Limit switches (on some models)

Type	Photo interrupter Phototransistor (open emitter)
Part model	Sharp GP1S396HCPSF
Operating voltage	3.3V
Output level	>2.2V HIGH <0.6V LOW
Connector type	FPC cable

Limit switches allow the driver to find the home position without driving the motor against the hard stop. From this home position, the motor steps can be monitored to prevent the motor from hitting the hard stop on the opposite side.

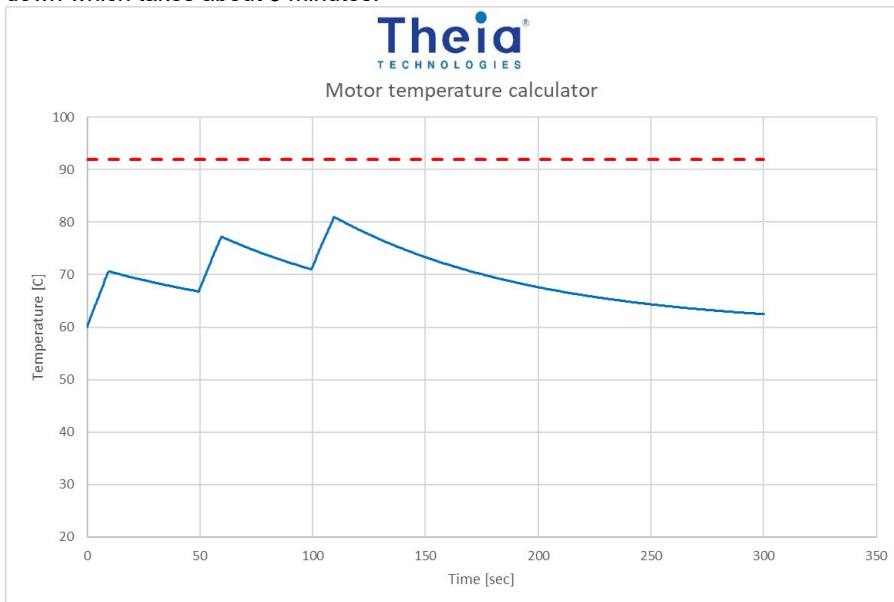
## Typical lens drawing



CAD models can be downloaded from  
[TheiaTech.com/1250CAD](http://TheiaTech.com/1250CAD)

## Motor temperature model

The example below shows 60C ambient temperature and 4.0V motor. The motor is driven for 10 seconds (which would generally be longer than normal) with 40 seconds cool down between moves. After 3 moves, the motor is allowed to cool down which takes about 3 minutes.



Motor temperature calculator  
[TheiaTech.com/calculators](http://TheiaTech.com/calculators)

## Lens models

The options listed in the table below may or may not be available. More detailed specifications can be found on Theia's website for the available lens models. Please visit [www.theiatech.com](http://www.theiatech.com) to learn more about our other lens options.

### TL1250x-###x Rx -xx

Lens	Iris type	IR wavelength	Alternate filter type	Motor configuration	Mount type
TL1250	A: DC autoiris P: P-iris	(blank): visible + clear glass IRC 850: notch filter 940: long wave pass filter	V: IR blocking, visible transmitting C: clear glass, visible and IR transmitting	R3 R4 R5 R6	(blank): CS mount CS: CS mount D25: Ø25mm board mount

Theia® PN	Varifocal	Mount type	Mount slip ring	Iris type	CCTV iris con.	Molex iris con.	IR corrected (day/night)	Filter switch (vis/clear)	Filter switch (vis/940nm)	Filter switch (clear/940nm)	Zoom motor	Focus motor	PI limits	Focal length	MP rating	f/#	Image circle	Biggest sensor format	MOD [m]	Lens Length (to mount)	Lens Length (TTL)	Weight [g]
TL1250A R6	✓	CS	✓	A	✓	✓	✓				✓	✓	PI	12-50	12 (4K)	F/1.8	9.4	1/1.7"	2	52	64.5	72
TL1250A R5	✓	CS	✓	A	✓	✓				✓	✓	PI	75									
TL1250A R4	✓	CS	✓	A	✓	✓	✓			✓	✓		71									
TL1250P R6	✓	CS	✓	P	✓	✓	✓			✓	✓	PI	68									
TL1250P R6 25	✓	D25		P	✓	✓	✓			✓	✓	PI	70									
TL1250P R5	✓	CS	✓	P	✓	✓				✓	✓	PI	71									
TL1250P R4	✓	CS	✓	P	✓	✓	✓			✓	✓		67									
TL1250A-940V R6	✓	CS	✓	A	✓	✓		✓		✓	✓	PI	72									
TL1250P-940V R6	✓	CS	✓	P	✓	✓		✓		✓	✓	PI	72									
TL1250P-940C R6	✓	CS	✓	P	✓	✓			✓	✓	✓	PI	72									
Related versions without motorized zoom and focus																						
SL1250M	✓	CS	✓	M		✓								12-50	12 (4K)	F/1.8	9.4	1/1.7"	2	52	64.5	65
SL1250P	✓	CS	✓	P	✓	✓							69									
SL1250A	✓	CS	✓	A	✓	✓							70									

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**Revisions:**

<b>Version</b>	<b>Change</b>	<b>Reason</b>
220510	Templated spec sheet	Family spec sheet can be reduced for each lens model to simplify spec sheet
220516	Lens model names	Corrected missing motor configurations