

# *OSRAM Halogen Lamps for Rapid Thermal and Heat Treatment Processes*



SEE THE WORLD IN A NEW LIGHT

**OSRAM**



# Introduction

## WHAT?

Single and double-ended quartz halogen lamps used in RTP (Rapid Thermal Process) or CVD (Chemical Vapor Deposit) applications. Quartz infrared lamps efficiently convert electrical energy into radiated heat.

## WHERE?

Semiconductor processing equipment manufactured by OEMs such as Applied Materials and AG Associates utilize heat sources to irradiate wafer surfaces.

## WHY?

Halogen quartz lamps designed into systems for heat applications allow for high heat transfer operations to be performed in short duty cycles. Quartz halogen filament lamps also allow flexibility for temperature variability as needed for the process because power can be varied.

## Rapid Thermal Processing (RTP)

Irradiation process where infrared light is used to perform material changes on a chip substrate or silicon wafer.

Lamps normally are arranged in groups within the thermal system in close proximity to the wafer.

Most systems are serviced with a 'group relamping' after a number of wafer processing cycles usually 50,000 or so dependent on the system and processes used.

## Process/Lamp Parameters

- Thermal cycle is about 30 seconds including rise, hold, cool
- Halogen lamp output, control, and compactness are important factors in accomplishing process quickly and consistently
- Thermal uniformity within and between wafers is extremely important. Process can usually self adapt to a limited number of failed lamps (dependent on relative positions in the array).
- Infant mortality is highly undesirable

# Halogen Lamps for Rapid Thermal and Heat Treatment Processes



Halogen Infrared lamp

## Advantages compared to other heating methods

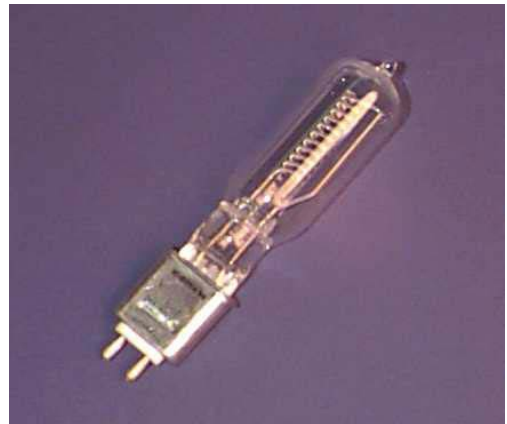
- Heating is quicker than with convection
- Very efficient conversion of electrical energy into infrared energy
- Higher productivity, shorter process cycles
- Temperatures can be precisely controlled via feedback loop system
- Process is reproduced reliably
- Improved electrical contact and excellent reliability
- Quick thermal ramp up
- Robust coil design that converts roughly 90% of electrical energy into radiant heat
- Lamp power and irradiation intensity fully controllable
- Easy to adjust and to replace

## Types of infrared lamps

- RTP (Rapid Thermal Processing) lamps
- Double-ended quartz IR lamps

## Other Applications

- Rapid Thermal Processing (RTP)
- Chemical Vapor Deposition (CVD)
- Wood processing
- Ink drying
- Food warming
- Heat sterilizing
- Compound melting
- Paint drying

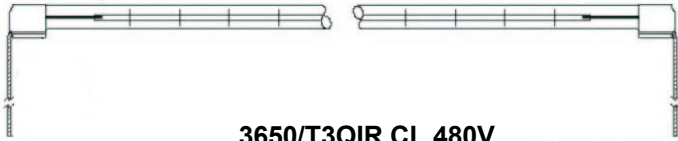


RTP Lamp

## Specification

- The wattage of the available lamps vary between 500W and 3800W
- The range for voltage begins at 80V and goes up to 575V
- For further technical information see the attached Product Information Bulletins (PIBs) and specification sheets

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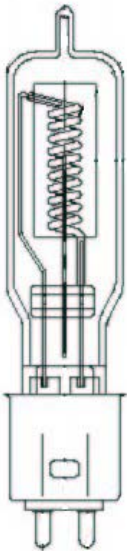
**3650/T3QIR CL 480V**

**Naed 59859**



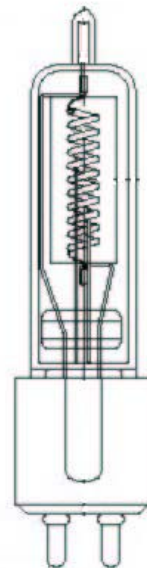
**500T3QIR/7 120 V**

**Naed 59822**



**64773 (2000 T8Q FRN)**

**Naed 54588**



**FEP/240V**

**Naed 54515**

# RTP/IR Halogen Product Line

NAED Code	Description	Watts	Volts	Base	Std. Case Qty
54584	64743 HT (1000 T6Q FS)	1000	120	G9.5 Medium Bipin	12
54588	64773 (2000 T8Q FRN)	2000	120	G9.5 Medium Bipin	12
59850	500T3/QIR 120V	500	120	Flexible Nickel Lead Wires	12
59822	500T3QIR/7 120V	500	120	Recessed Single Contact	12
59860	1000T3/QIR 240V	1000	240	Flexible Nickel Lead Wires	12
59934	1200T3/QIR/CL/HT 144 V	1200	144	Flexible Nickel Lead Wires	12
59841	1600T3/QIR/7 240V	1600	240	Recessed Single Contact	12
59864	1600T3/QIR 240V	1600	240	Flexible Nickel Lead Wires	12
59936	1600T3/QIR 277V	1600	277	Flexible Nickel Lead Wires	12
59803	2500T3/QIR/7 480V	2500	480	Recessed Single Contact	12
59867	2500T3/QIR 480V	2500	480	Flexible Nickel Lead Wires	12
59859	3650T3/QIR/CL 480V	3650	480	Flexible Nickel Lead Wires	12
59870	3800T3/QIR 570V	3800	570	Flexible Nickel Lead Wires	12
54515	FEP/240V	1000	240	G9.5 Medium Bipin	12

Full case quantities required on all lamps.  
Stock available on all items.

