



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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# Thomas Research Products

Innovative & Energy Saving Lighting Controls

## LED DRIVERS SURGE PROTECTORS TRANSFORMERS



# Thomas Research Products

Innovative & Energy Saving Lighting Controls

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## THOMAS RESEARCH PRODUCTS PRODUCT OFFERING

Thomas Research Products is proud to present our line of **Black Magic** Thermally Advantaged and Long-Life LED Drivers. Our LED drivers represent the latest technology available and provide the following features:

- Single output with constant-current or constant-voltage mode
- UL1310, Class 2 compliant or UL8540 as appropriate
- Suitable for damp or dry locations; IP66 or IP67
- Designed for outdoor or indoor applications
- Compact, lightweight with UV-rated plastic or aluminum cases
- Output over-voltage protection, output over-current protection and output short-circuit protection
- Active Power Factor Correction

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Thomas Research Products is not affiliated  
with High-Perfection Technology

## CORPORATE HISTORY

Since its inception in 1997, Thomas Research Products has been an OEM supplier of electronic control devices for HID, fluorescent, and incandescent light sources.

Today, Thomas Research Products is an industry-leading supplier of LED drivers, with a comprehensive range of long-life constant-current, constant-voltage and dimmable drivers. The company's goal is to be the supplier of the best available LED drivers. Every design is optimized for quality and longevity. We are the only manufacturer of long-life LED Drivers.

Thomas Research Products has taken great pride in customer problem solving, analyzing needs, and producing unique products tailored to meet customer requirements. We have the ability to quickly design and deliver custom LED Drivers for your specific requirements. Contact us for details.

Visit our website for detailed specification sheets.



# LED DRIVER ESSENTIALS

## CHOOSING A DRIVER

- Identify whether a constant-current or constant-voltage source is required to operate the LEDs in your application.
- Identify the maximum wattage load the driver will encounter in your application.
  - Choose a driver that is rated at or slightly higher than your maximum rated load.
  - Make sure the drivers output will operate within its specified range (voltage range for a constant-current driver / current range for a constant-voltage driver)
- Specify a dimming capable driver if dimming is required.
- Chose a driver manufacturer who:
  - Offers a 5-year driver warranty
  - Has operations in the US with sales and engineering support a phone call away
  - Can supply all your manufacturing locations worldwide

## DESIGN NOTES

- Drivers MUST be loaded to a minimum of 50% of their rated maximum power output (wattage) to ensure proper operation
- Nearly all Drivers have Universal Input Voltage; 120 thru 277V
- All Drivers operate on either 50 or 60 Hz line-voltage frequency
- Outputs of 60W, 90W, and 100W Drivers can be factory-tuned for your specific application
- All Drivers are RoHS compliant
- All Drivers are IP66 or IP67 compliant
- Thomas Research Products offers a 5-year warranty on all LED Drivers

## ENERGY STAR

Nearly all Thomas Research Products LED Drivers meet or exceed the ENERGY STAR Program Requirements for SSL Luminaires – Version 1.1:

- Power factor  $\geq 0.90$
- Minimum Operating Temperature  $-20^{\circ}\text{C}$  or lower
- Operating Frequency  $\geq 120$  Hz
- Meets FCC CFR Part 15 Part A emission limits
- Complies with IEEE C.62.41-1991 transient protection requirements
- Class A sound rating
- 5-year warranty (exceeds Energy Star 3-year warranty requirement)

## DIMMING NOTES

- Dimming drivers are designed to allow LEDs to be dimmed down to 10% light output.
- Dimming drivers designed to be operated on 0-10Vdc dimmers only. They are not compatible with line-voltage dimmers.
- Dimming drivers include a 10V source lead for use with potentiometer dimmers. Cap off yellow lead when using a 0-10V dimmer.

## CUSTOM DRIVERS

Can't find a standard driver that meets the particular requirements of your application? Thomas Research Products can design a custom driver for your application. Some of our custom designs include:

- "Tuned" output drivers to meet requirements of your specific application. Outputs (constant-current or constant-voltage) of 60W, 90W, and 100W Drivers can be factory-tuned for your specific application.
- Multi-channel drivers. We can design high-wattage drivers with multiple output channels to keep groups of LEDs within a fixture operating independently of each other. This will ensure that a fixture continues to operate at a reduced light-output level in the unlikely event that an LED fails. Multi-channel drivers are also a good solution to avoid connecting multiple LED arrays in parallel, which could lead to "current hogging".

Contact our factory for details.

# LED DRIVERS: 12 - 40 WATTS

Catalog watts	Constant Current or Voltage	0-10V Dimming?	Output Current (mA) (range if CV)	Output Voltage (VDC) (range if CC)	Catalog Number	Nominal Input Voltage (VAC)	Max Output Power (Watts)	Expected Life (hours)	Efficiency	Ambient Operating Temp Range (°C)		Power Factor (min)	Typically in Stock			
										min	max					
12	C	N	250	24-48	LED12W-48-C0250	100-277	12	87,000	85%	-30	+60	0.94	•			
			350	18-36	LED12W-36-C0350		12.6		84%							
			500	12-24	LED12W-24-C0500		12		84%							
			700	8-16	LED12W-16-C0700		11.2		83%							
			800	8-16	LED12W-16-C0800		12.8		83%							
	V	N	1000	6-12	LED12W-12-C1000	12	83%									
			500-1000	12	LED12W-12	12	83%									
			400-800	16	LED12W-16	12.8	83%									
			250-500	24	LED12W-24	12	84%									
			175-350	36	LED12W-36	12.6	84%									
125-250	48	LED12W-48	12	85%												
17	C	N	470	18-36	LED17W-36-C0470	100-277	17	85,000	83%	-30	+60	0.94	•			
			700	12-24	LED17W-24-C0700				82%							
			1400	6-12	LED17W-12-C1400				82%							
	V	N	700-1400	12	LED17W-12	17	82%									
			350-700	24	LED17W-24	17	82%									
235-470	36	LED17W-36	17	83%												
20	C	N	550	18-36	LED20W-36-C0550	100-277	20	82,000	88%	-30	+60	0.92	•			
			700	12-24	LED20W-24-C0700		17		87%							
			830	12-24	LED20W-24-C0830		20		88%							
			910	12-22	LED20W-22-C0910		20		87%							
			1100	10-18	LED20W-18-C1100		20		86%							
			1250	9-17	LED20W-17-C1250		20		86%							
			1330	9-15	LED20W-15-C1330		20		86%							
			1540	7-13	LED20W-13-C1540		20		85%							
			1660	7-12	LED20W-12-C1660		20		85%							
	V	N	2000	7-10	LED20W-10-C2000	20	85%									
			1000-2000	10	LED20W-10	20	85%									
			830-1660	12	LED20W-12	20	85%									
			770-1540	13	LED20W-13	20	85%									
			665-1330	15	LED20W-15	20	86%									
			625-1250	17	LED20W-17	20	86%									
			550-1100	18	LED20W-18	20	86%									
			455-910	22	LED20W-22	20	87%									
			415-830	24	LED20W-24	20	87%									
275-550	36	LED20W-36	20	88%												
25	C	N	350	24-72	TRC-025S035PS	100-277	25	79,000	84%	-20	+70	0.92	•			
			450	19-56	TRC-025S045PS				84%							
			620	13-40	TRC-025S062PS				83%							
			700	12-36	TRC-025S070PS				83%							
			1050	8-24	TRC-025S105PS				82%							
			1400	6-18	TRC-025S140PS				81%							
			1750	5-14	TRC-025S175PS				81%							
			2080	4-12	TRC-025S208PS				80%							
			C	N	620				18-36					LED25W-36-C0620	23	87%
					700				18-36					LED25W-36-C0700	25	88%
	850	14-28			LED25W-28-C0850	25	87%									
	1040	12-24			LED25W-24-C1040	25	86%									
	1250	12-20			LED25W-20-C1250	25	85%									
	1560	8-16			LED25W-16-C1560	25	85%									
	2080	8-12			LED25W-12-C2080	25	85%									
	V	N	350	24-72	TRC-025S035DS	100-277	25	79,000	84%	-30	+60	0.90	•			
			450	19-56	TRC-025S045DS				84%							
			620	13-40	TRC-025S062DS				83%							
			700	12-36	TRC-025S070DS				83%							
			1050	8-24	TRC-025S105DS				82%							
			1400	6-18	TRC-025S140DS				81%							
1750			5-14	TRC-025S175DS	81%											
2080			4-12	TRC-025S208DS	80%											
1040-2080			12	LED25W-12	25				85%							
780-1560			16	LED25W-16	25				85%							
625-1250			20	LED25W-20	25				85%							
520-1040	24	LED25W-24	25	86%												
425-850	28	LED25W-28	25	87%												
350-700	36	LED25W-36	25	87%												

Class 2: US/Canada US Only

# LED DRIVERS: 12 - 40 WATTS

Catalog watts	Constant Current or Voltage	0-10V Dimming?	Output Current (mA) (range if CV)	Output Voltage (VDC) (range if CC)	Catalog Number	Nominal Input Voltage (VAC)	Max Output Power (Watts)	Expected Life (hours)	Efficiency	Ambient Operating Temp Range (°C)		Power Factor (min)	Typically in Stock							
										min	max									
30	C	N	350	43-86	TWC-030S035SS	100-240	30	177,000	87%	-35	+60	0.84								
			450	33-66	TWC-030S045SS				86%											
			700	21-42	TWC-030S070SS				86%											
			830	18-36	TWC-030S083SS				86%											
			1250	13-24	TWC-030S125SS				85%											
			1660	9-18	TWC-030S166SS				84%											
			2500	7-12	TWC-030S250SS				83%											
35	C	N	350	33-100	TRC-035S035ST	100-277	35	87,000	88%	-35	+55	0.92								
			450	26-78	TRC-035S045ST				87%											
			700	17-50	TRC-035S070ST				86%											
			1050	11-33	TRC-035S105ST				86%											
			1400	8-24	TRC-035S140ST				85%											
			1750	7-20	TRC-035S175ST				84%											
			2100	6-18	TRC-035S210ST				84%											
			2450	5-15	TRC-035S245ST				83%											
			2900	4-12	TRC-035S290ST				82%											
			350	33-100	TRC-035S035DT				100-277					35	87,000	88%	-35	+55	0.92	
			450	26-78	TRC-035S045DT											87%				
			700	17-50	TRC-035S070DT											86%				
			1050	11-33	TRC-035S105DT											86%				
			1400	8-24	TRC-035S140DT											85%				
	1750	7-20	TRC-035S175DT	84%																
	2100	6-18	TRC-035S210DT	84%																
	2450	5-15	TRC-035S245DT	83%																
	2900	4-12	TRC-035S290DT	82%																
	C	V	N	1450-2900	12	TRV-035S012ST	100-277	35	87,000	82%	-35	+55	0.92							
				950-1900	18	TRV-035S018ST				83%										
				730-1460	24	TRV-035S024ST				85%										
485-970				36	TRV-035S036ST	86%														
365-730				48	TRV-035S048ST	86%														
700				18-36	LED40W-36-C0700	100-277				26					77,000	87%	-30	+60	0.92	
1100				18-36	LED40W-36-C1100					40						88%				
1200	12-24	LED40W-24-C1200	40	87%																
1280	12-24	LED40W-24-C1280	34	87%																
1400	12-24	LED40W-24-C1400	34	87%																
1670	12-24	LED40W-24-C1670	40	88%																
1820	12-22	LED40W-22-C1820	40	87%																
2000	10-18	LED40W-18-C2000	36	85%																
2200	10-18	LED40W-18-C2200	40	86%																
2680	9-15	LED40W-15-C2680	40	86%																
3080	7-13	LED40W-13-C3080	40	86%																
3330	7-12	LED40W-12-C3300	40	85%																
4000	6-10	LED40W-10-C4000	40	85%																
4450	6-9	LED40W-09-C4450	40	85%																
C	N	350	38-114	TRC-040S035PS	100-277	40	77,000	88%	-20	+60	0.92									
		450	30-89	TRC-040S045PS				40					88%							
		700	18-54	TRC-040S070PS				38					87%							
		1050	12-36	TRC-040S105PS				38					87%							
		1200	10-25	TRC-040S120PS				36					87%							
		1280	10-29	TRC-040S128PS				38					87%							
		1400	10-25	TRC-040S140PS				36					87%							
		1660	8-23	TRC-040S166PS				38					86%							
		2220	6-16	TRC-040S222PS				36					85%							
		3330	4-11	TRC-040S333PS				35					84%							
		350	38-114	TRC-040S035DS				100-277					40	77,000	88%	-20	+60	0.92		
		450	30-89	TRC-040S045DS											40					88%
		700	18-54	TRC-040S070DS											38					87%
		1050	12-36	TRC-040S105DS											38					87%
1280	10-29	TRC-040S128DS	38	87%																
1400	10-29	TRC-040S140DS	36	87%																
1660	8-24	TRC-040S166DS	38	86%																
2220	6-18	TRC-040S222DS	36	85%																
3330	4-12	TRC-040S333DS	35	84%																
V	N	2225-4450	9	LED40W-09	100-277	40	77,000	85%	-30	+60	0.92									
		2000-4000	10	LED40W-10				85%												
		1665-3330	12	LED40W-12				85%												
		1540-3080	13	LED40W-13				86%												
		1340-2680	15	LED40W-15				86%												
		1100-2200	18	LED40W-18				86%												
		910-1820	22	LED40W-22				87%												
		835-1670	24	LED40W-24				87%												
550-1100	36	LED40W-36	88%																	

Class 2: US/Canada US Only

# LED DRIVERS: 50 - 75 WATTS

Catalog watts	Constant Current or Voltage	0-10V Dimming?	Output Current (mA) (range if CV)	Output Voltage (VDC) (range if CC)	Catalog Number	Nominal Input Voltage (VAC)	Max Output Power (Watts)	Expected Life (hours)	Efficiency	Ambient Operating Temp Range (°C)		Power Factor (min)	Typically in Stock	
										min	max			
50	C	N	350	71-142	TWC-050S035SS	100-240	36	107,000	88%	-35	+60	0.86	•	
			450	56-111	TWC-050S045SS				88%					
			700	36-72	TWC-050S070SS				88%					
			1050	24-48	TWC-050S105SS				88%					
			1100	23-45.5	TWC-050S110SS				87%					
			1400	18-36	TWC-050S140SS				87%					
			2100	13-24	TWC-050S210SS				86%					
			2770	9-18	TWC-050S277SS				85%					
		3000	6-12	TWC-050S300SS	84%									
		N	350	47-142	TRC-050S035ST	100-277	50	66,000	89%	-35	+55	0.92	•	
			450	36-110	TRC-050S045ST				88%					
			700	24-72	TRC-050S070ST				87%					
			1100	16-48	TRC-050S110ST				87%					
			1400	12-36	TRC-050S140ST				87%					
			1750	9-29	TRC-050S175ST				87%					
			2100	8-24	TRC-050S210ST				86%					
	2800		6-18	TRC-050S280ST	84%									
	Y	350	47-142	TRC-050S035DT	100-277	50	66,000	89%	-35	+55	0.92	•		
		450	36-110	TRC-050S045DT				88%						
		700	24-72	TRC-050S070DT				87%						
		1100	16-48	TRC-050S110DT				87%						
		1400	12-36	TRC-050S140DT				87%						
		1750	9-29	TRC-050S175DT				87%						
		2100	8-24	TRC-050S210DT				86%						
		2800	6-18	TRC-050S280DT				84%						
	V	N	2100-4200	12	TRV-050S012ST	100-277	50	66,000	82%	-35	+55	0.92	•	
			1390-2780	18	TRV-050S018ST				84%					
			1050-2100	24	TRV-050S024ST				84%					
			700-1400	36	TRV-050S036ST				86%					
			525-1050	48	TRV-050S048ST				87%					
	60	C	N	350	85-170	TRC-060S035ST	100-277	60	80,000	91%	-35	+70	0.95	•
				450	67-134	TRC-060S045ST				91%				
700				43-86	TRC-060S070ST	91%								
1050				29-58	TRC-060S105ST	90%								
1400				21-43	TRC-060S140ST	90%								
1700				18-36	TRC-060S170ST	90%								
2300				13-27	TRC-060S230ST	89%								
3300				9-18	TRC-060S330ST	89%								
5000		6-12	TRC-060S500ST	88%										
N		350	85-170	LED60W-170-C0350	100-277	60	100,000	87%	-30	+60	0.92	•		
		400	67-134	LED60W-134-C0400				86%						
		700	43-86	LED60W-086-C0700				86%						
		1050	29-58	LED60W-058-C1050				85%						
		1250	24-48	LED60W-048-C1250				85%						
		1670	18-36	LED60W-036-C1650				84%						
		2300	13-27	LED60W-027-C2300				84%						
		2500	12-24	LED60W-024-C2500				84%						
		2720	11-22	LED60W-022-C2720				83%						
		3000	10-20	LED60W-020-C3000				82%						
		3330	9-18	LED60W-018-C3330				82%						
	4000	8-15	LED60W-015-C4000	80%										
5000	6-12	LED60W-012-C5000	80%											

Class 2: US/Canada US Only

# LED DRIVERS: 50 - 75 WATTS

Catalog watts	Constant Current or Voltage	0-10V Dimming?	Output Current (mA) (range if CV)	Output Voltage (VDC) (range if CC)	Catalog Number	Nominal Input Voltage (VAC)	Max Output Power (Watts)	Expected Life (hours)	Efficiency	Ambient Operating Temp Range (°C)		Power Factor (min)	Typically in Stock							
										min	max									
60	C	Y	350	85-170	LED60W-170-C0350-RD	100-277	60	100,000	87%	-30	+60	0.92								
			400	67-134	LED60W-134-C0400-RD				86%											
			700	43-86	LED60W-086-C0700-RD				86%											
			1050	29-58	LED60W-058-C1050-RD				85%											
			1250	24-48	LED60W-048-C1250-RD				85%											
			1670	18-36	LED60W-036-C1650-RD				84%											
			2300	13-27	LED60W-027-C2300-RD				84%											
			2500	12-24	LED60W-024-C2500-RD				84%											
			2720	11-22	LED60W-022-C2720-RD				83%											
			3000	10-20	LED60W-020-C3000-RD				82%											
			3330	9-18	LED60W-018-C3330-RD				82%											
			4000	8-15	LED60W-015-C4000-RD				80%											
	5000	6-12	LED60W-012-C5000-RD	80%																
	V	N	2500-5000	12	LED60W-012	100-277	60	100,000	80%	-30	+60	0.92								
			2000-4000	15	LED60W-015				80%											
			1665-3330	18	LED60W-018				82%											
			1500-3000	20	LED60W-020				82%											
			1360-2720	22	LED60W-022				83%											
			1250-2500	24	LED60W-024				84%											
			1150-2300	27	LED60W-027				84%											
			835-1670	36	LED60W-036				84%											
			625-1250	48	LED60W-048				85%											
			525-1050	58	LED60W-058				85%											
			350-700	86	LED60W-086				86%											
			200-400	134	LED60W-134				86%											
		175-350	170	LED60W-170	87%															
		Y	2500-5000	12	LED60W-012-RD	100-277	60	100,000	80%	-30	+60	0.92								
			2000-4000	15	LED60W-015-RD				80%											
			1665-3330	18	LED60W-018-RD				82%											
			1500-3000	20	LED60W-020-RD				82%											
			1360-2720	22	LED60W-022-RD				83%											
			1250-2500	24	LED60W-024-RD				84%											
1150-2300			27	LED60W-027-RD	84%															
835-1670			36	LED60W-036-RD	84%															
625-1250			48	LED60W-048-RD	85%															
525-1050			58	LED60W-058-RD	85%															
350-700			86	LED60W-086-RD	86%															
200-400	134		LED60W-134-RD	86%																
175-350	170	LED60W-170-RD	87%																	
75	C	N	350	107-214	TRC-075S035ST	100-277	75	65,000	92%	-35	+70	0.96								
			450	83-166	TRC-075S045ST				92%											
			700	55-108	TRC-075S070ST				91%											
			1050	36-72	TRC-075S105ST				90%											
			1400	27-54	TRC-075S140ST				90%											
			2100	18-36	TRC-075S210ST				89%											
			2800	13-27	TRC-075S280ST				89%											
			3750	10-20	TRC-075S375ST				88%											
			5000	7-15	TRC-075S500ST				88%											
			Y	350	107-214				TRC-075S035DT				100-277	75	60,000	92%	-35	+70	0.96	•
				450	83-166				TRC-075S045DT							92%				
				700	54-108				TRC-075S070DT							91%				
	1050	36-72		TRC-075S105DT	90%															
	1400	27-54		TRC-075S140DT	90%															
	2100	18-36		TRC-075S210DT	89%															
	2800	13-27		TRC-075S280DT	89%															
	3750	10-20		TRC-075S375DT	88%															
	5000	7-15		TRC-075S500DT	88%															
	V	N		3125-6250	12	TRV-075S012ST	100-277	75	83,000	90%	-35	+70				0.95				•
				1565-3130	24	TRV-075S024ST				92%										
				1040-2080	36	TRV-075S036ST				92%										
			895-1790	42	TRV-075S042ST	92%														
			780-1560	48	TRV-075S048ST	92%														
			695-1390	54	TRV-075S054ST	92%														
465-930			81	TRV-075S081ST	92%															
355-710			105	TRV-075S105ST	92%															

Class 2: US/Canada US Only



# LED DRIVERS: 90 - 120 WATTS

Catalog watts	Constant Current or Voltage	0-10V Dimming?	Output Current (mA) (range if CV)	Output Voltage (VDC) (range if CC)	Catalog Number	Nominal Input Voltage (VAC)	Max Output Power (Watts)	Expected Life (hours)	Efficiency	Ambient Operating Temp Range (°C)		Power Factor (min)	Typically in Stock
										min	max		
90	C	N	350	130-257	LED90W-257-C0350	100-277	90	100,000	88%	-30	+60	0.92	
			450	100-200	LED90W-200-C0450				87%				
			700	64-128	LED90W-128-C0700				86%				
			1050	43-85	LED90W-085-C1050				86%				
			1400	32-64	LED90W-064-C1400				86%				
			1600	28-56	LED90W-056-C1600				85%				
			1875	24-48	LED90W-048-C1875				85%				
			2500	18-36	LED90W-036-C2500				84%				
			3000	15-30	LED90W-030-C3000				84%				
			3500	13-25	LED90W-025-C3500				84%				
			4090	11-22	LED90W-022-C4090				83%				
			4500	10-20	LED90W-020-C4500				82%				
		5000	9-18	LED90W-018-C5000	82%								
		6000	8-15	LED90W-015-C6000	80%								
		350	130-257	LED90W-257-C0350-RD	100-277	90	100,000	88%	-30	+60	0.92		
		450	100-200	LED90W-200-C0450-RD				87%					
		700	64-128	LED90W-128-C0700-RD				86%					
		1050	43-85	LED90W-085-C1050-RD				86%					
		1400	32-64	LED90W-064-C1400-RD				86%					
		1600	28-56	LED90W-056-C1600-RD				85%					
		1875	24-48	LED90W-048-C1875-RD				85%					
		2500	18-36	LED90W-036-C2500-RD				84%					
		3000	15-30	LED90W-030-C3000-RD				84%					
		3500	13-25	LED90W-025-C3500-RD				84%					
	4090	11-22	LED90W-022-C4090-RD	83%									
	4500	10-20	LED90W-020-C4500-RD	82%									
	5000	9-18	LED90W-018-C5000-RD	82%									
	6000	8-15	LED90W-015-C6000-RD	80%									
	3000-6000	15	LED90W-015	100-277	90	100,000	80%	-30	+60	0.92			
	2500-5000	18	LED90W-018				82%						
	2250-4500	20	LED90W-020				82%						
	2045-4090	22	LED90W-022				83%						
	1750-3500	25	LED90W-025				84%						
	1500-3000	30	LED90W-030				84%						
	1250-2500	36	LED90W-036				84%						
	940-1875	48	LED90W-048				85%						
	800-1600	56	LED90W-056				85%						
	700-1400	64	LED90W-064				86%						
	525-1050	85	LED90W-085				86%						
	350-700	128	LED90W-128				86%						
	225-450	200	LED90W-200	87%									
	175-350	257	LED90W-257	88%									
	3000-6000	15	LED90W-015-RD	100-277	90	100,000	80%	-30	+60	0.92			
	2500-5000	18	LED90W-018-RD				82%						
	2250-4500	20	LED90W-020-RD				82%						
	2045-4090	22	LED90W-022-RD				83%						
	1750-3500	25	LED90W-025-RD				84%						
	1500-3000	30	LED90W-030-RD				84%						
1250-2500	36	LED90W-036-RD	84%										
940-1875	48	LED90W-048-RD	85%										
800-1600	56	LED90W-056-RD	85%										
700-1400	64	LED90W-064-RD	86%										
525-1050	85	LED90W-085-RD	86%										
350-700	128	LED90W-128-RD	86%										
225-450	200	LED90W-200-RD	87%										
175-350	257	LED90W-257-RD	88%										
100	C	N	350	172-286	TRC-100S035ST	100-277	100	100,000	92%	-35	+70	0.96	
			450	132-222	TRC-100S045ST				92%				
			700	86-143	TRC-100S070ST				91%				
			1050	57-95	TRC-100S105ST				91%				
			1400	43-71	TRC-100S140ST				91%				
			1750	34-57	TRC-100S175ST				91%				
			2100	29-48	TRC-100S210ST				91%				
			2450	25-41	TRC-100S245ST				91%				
			2800	22-36	TRC-100S280ST				90%				
			3150	19-32	TRC-100S315ST				90%				
			3570	17-28	TRC-100S357ST				90%				
			4200	14-24	TRC-100S420ST				90%				
	350	172-286	LED100W-286-C0350	100-277	100	100,000	88%	-30	+60	0.92			
	450	132-222	LED100W-222-C0450				88%						
	700	86-143	LED100W-143-C0700				87%						
	1050	57-95	LED100W-095-C1050				86%						
	1400	43-71	LED100W-071-C1400				86%						
	1750	32-57	LED100W-057-C1750				85%						
	2100	28-48	LED100W-048-C2100				85%						
	2450	24-41	LED100W-041-C2450				84%						
	2800	22-36	LED100W-036-C2800				84%						
	3150	19-32	LED100W-031-C3150				84%						
	3570	17-28	LED100W-028-C3570				83%						
	4200	14-24	LED100W-024-C4200				83%						
5000	12-20	LED100W-020-C5000	81%										
5550	11-18	LED100W-018-C5500	80%										

# LED DRIVERS: 90 - 120 WATTS

Catalog watts	Constant Current or Voltage	0-10V Dimming?	Output Current (mA) (range if CV)	Output Voltage (VDC) (range if CC)	Catalog Number	Nominal Input Voltage (VAC)	Max Output Power (Watts)	Expected Life (hours)	Efficiency	Ambient Operating Temp Range (°C)		Power Factor (min)	Typically in Stock		
										min	max				
100	C	Y	350	172-286	TRC-100S035DT	100-277	100	100,000	92%	-35	+65	0.96			
			450	132-222	TRC-100S045DT				92%						
			700	86-143	TRC-100S070DT				91%						
			1050	57-95	TRC-100S105DT				91%						
			1400	43-71	TRC-100S140DT				91%						
			1750	34-57	TRC-100S175DT				91%						
			2100	29-48	TRC-100S210DT				91%						
			2450	25-41	TRC-100S245DT				91%						
			2800	22-36	TRC-100S280DT				90%						
			3150	19-32	TRC-100S315DT				90%						
			3570	17-28	TRC-100S357DT				90%						
			4200	14-24	TRC-100S420DT				90%						
			350	172-286	LED100W-286-C0350-RD				88%						
			450	132-222	LED100W-222-C0450-RD				88%						
			700	86-143	LED100W-143-C0700-RD				87%						
			1050	57-95	LED100W-095-C1050-RD				86%						
			1400	43-71	LED100W-071-C1400-RD				86%						
			1750	32-57	LED100W-057-C1750-RD				85%						
			2100	28-48	LED100W-048-C2100-RD				85%						
			2450	24-41	LED100W-041-C2450-RD				84%						
			2800	22-36	LED100W-036-C2800-RD				84%						
			3150	19-32	LED100W-031-C3150-RD				84%						
			3570	17-28	LED100W-028-C3570-RD				83%						
			4200	14-24	LED100W-024-C4200-RD				83%						
			5000	12-20	LED100W-020-C5000-RD				81%						
			5550	11-18	LED100W-018-C5500-RD				80%						
			4165-8330	12	TRV-100S012ST				91%						
			2025-4050	24	TRV-100S024ST				93%						
			1375-2750	36	TRV-100S036ST				93%						
			1175-2350	42	TRV-100S042ST				93%						
	1040-2080	48	TRV-100S048ST	93%											
	975-1950	54	TRV-100S054ST	93%											
	615-1230	81	TRV-100S081ST	93%											
	475-950	105	TRV-100S105ST	93%											
	2775-5550	18	LED100W-018	80%											
	2500-5000	20	LED100W-020	81%											
	2100-4200	24	LED100W-024	83%											
	1785-3570	28	LED100W-028	83%											
	1575-3150	32	LED100W-032	84%											
	1400-2800	36	LED100W-036	84%											
	1225-2450	41	LED100W-041	84%											
	1050-2100	48	LED100W-048	85%											
	875-1750	57	LED100W-057	85%											
	700-1400	71	LED100W-071	86%											
	525-1050	95	LED100W-095	86%											
	350-700	143	LED100W-143	87%											
	225-450	222	LED100W-222	88%											
	175-350	286	LED100W-286	88%											
	2775-5550	18	LED100W-018-RD	80%											
	2500-5000	20	LED100W-020-RD	81%											
	2100-4200	24	LED100W-024-RD	83%											
	1785-3570	28	LED100W-028-RD	83%											
	1575-3150	32	LED100W-032-RD	84%											
	1400-2800	36	LED100W-036-RD	84%											
	1225-2450	41	LED100W-041-RD	84%											
	1050-2100	48	LED100W-048-RD	85%											
	875-1750	57	LED100W-057-RD	85%											
	700-1400	71	LED100W-071-RD	86%											
	525-1050	95	LED100W-095-RD	86%											
	350-700	143	LED100W-143-RD	87%											
225-450	222	LED100W-222-RD	88%												
175-350	286	LED100W-286-RD	88%												
350	206-343	TRC-120S035ST	92%												
450	160-266	TRC-120S045ST	92%												
700	103-171	TRC-120S070ST	92%												
1050	68-114	TRC-120S105ST	91%												
1400	52-86	TRC-120S140ST	91%												
1750	41-68	TRC-120S175ST	91%												
2100	34-57	TRC-120S210ST	91%												
2450	29-49	TRC-120S245ST	91%												
2800	26-43	TRC-120S280ST	91%												
3150	23-38	TRC-120S315ST	90%												
3500	20-34	TRC-120S350ST	90%												
4200	17-28	TRC-120S420ST	90%												
4900	14-24	TRC-120S490ST	90%												
350	206-343	TRC-120S035DT	91%												
450	160-266	TRC-120S045DT	91%												
700	103-171	TRC-120S070DT	91%												
1050	68-114	TRC-120S105DT	91%												
1400	52-86	TRC-120S140DT	91%												
1750	41-68	TRC-120S175DT	91%												
2100	34-57	TRC-120S210DT	91%												
2450	29-49	TRC-120S245DT	91%												
2800	26-43	TRC-120S280DT	91%												
3150	23-38	TRC-120S315DT	90%												
3500	20-34	TRC-120S350DT	90%												
4200	17-28	TRC-120S420DT	90%												
4900	14-24	TRC-120S490DT	90%												
120	C	N	350	206-343	TRC-120S035ST	100-277	120	80,000	92%	-25	+70	0.96			
			450	160-266	TRC-120S045ST				92%						
			700	103-171	TRC-120S070ST				92%						
			1050	68-114	TRC-120S105ST				91%						
			1400	52-86	TRC-120S140ST				91%						
			1750	41-68	TRC-120S175ST				91%						
			2100	34-57	TRC-120S210ST				91%						
			2450	29-49	TRC-120S245ST				91%						
			2800	26-43	TRC-120S280ST				91%						
			3150	23-38	TRC-120S315ST				90%						
			3500	20-34	TRC-120S350ST				90%						
			4200	17-28	TRC-120S420ST				90%						
			4900	14-24	TRC-120S490ST				90%						
			350	206-343	TRC-120S035DT				91%						
			450	160-266	TRC-120S045DT				91%						
		700	103-171	TRC-120S070DT	91%										
		1050	68-114	TRC-120S105DT	91%										
		1400	52-86	TRC-120S140DT	91%										
		1750	41-68	TRC-120S175DT	91%										
		2100	34-57	TRC-120S210DT	91%										
		2450	29-49	TRC-120S245DT	91%										
		2800	26-43	TRC-120S280DT	91%										
		3150	23-38	TRC-120S315DT	90%										
		3500	20-34	TRC-120S350DT	90%										
		4200	17-28	TRC-120S420DT	90%										
		4900	14-24	TRC-120S490DT	90%										

# LED DRIVERS: 150 - 300 WATTS

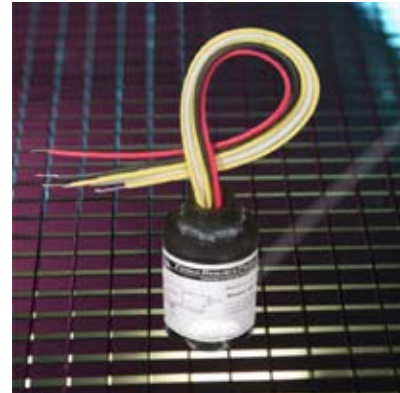
Catalog watts	Constant Current or Voltage	0-10V Dimming?	Output Current (mA) (range if CV)	Output Voltage (VDC) (range if CC)	Catalog Number	Nominal Input Voltage (VAC)	Max Output Power (Watts)	Expected Life (hours)	Efficiency	Ambient Operating Temp Range (°C)		Power Factor (min)	Typically in Stock									
										min	max											
150	C	N	350	256-428	TRC-150S035ST	100-277	150	87,000	92%	-35	+70	0.96										
			450	200-333	TRC-150S045ST				92%													
			700	128-214	TRC-150S070ST				92%													
			1050	85-142	TRC-150S105ST				92%													
			1400	64-107	TRC-150S140ST				91%													
			1750	51-85	TRC-150S175ST				91%													
			2100	42-71	TRC-150S210ST				91%													
			2450	36-61	TRC-150S245ST				91%													
			2800	31-53	TRC-150S280ST				91%													
			3150	28-47	TRC-150S315ST				91%													
			3500	25-42	TRC-150S350ST				91%													
			4200	21-35	TRC-150S420ST				90%													
			4900	18-30	TRC-150S490ST				90%													
			5950	15-25	TRC-150S595ST				90%													
	Y	350	214-428	TRC-150S035DT	100-277	150	100,000	94%	-35	+70	0.96											
		450	166-233	TRC-150S045DT				93%														
		700	107-214	TRC-150S070DT				93%														
	V	N	6.25-12.50	12	TRV-150S012ST	100-277	150	74,000	92%	-35	+70	0.96										
			3.12-6.25	24	TRV-150S024ST				93%													
			2.08-4.17	36	TRV-150S036ST				93%													
			1.78-3.57	42	TRV-150S042ST				94%													
1.56-3.13			48	TRV-150S048ST	93%																	
1.39-2.78			54	TRV-150S054ST	93%																	
0.92-1.85			81	TRV-150S081ST	94%																	
0.71-1.42			105	TRV-150S105ST	94%																	
200	C	N	450	267-445	TRC-200S045ST	100-277	200	78,000	92%	-35	+70	0.96										
			700	171-285	TRC-200S070ST				92%													
			1050	114-190	TRC-200S105ST				92%													
			1400	85-142	TRC-200S140ST				92%													
			1750	68-114	TRC-200S175ST				91%													
			2100	57-95	TRC-200S210ST				91%													
			2450	48-81	TRC-200S245ST				91%													
			2800	42-71	TRC-200S280ST				91%													
			3150	38-63	TRC-200S315ST				91%													
			3500	34-57	TRC-200S350ST				91%													
			4200	28-47	TRC-200S420ST				91%													
			4900	24-40	TRC-200S490ST				91%													
			5600	21-35	TRC-200S560ST				91%													
			6300	19-32	TRC-200S630ST				91%													
	8330	14-24	TRC-200S833ST	90%																		
	Y	450	233-445	TRC-200S045DT	100-277	200	78,000	94%	-35	+70	0.96											
		700	143-285	TRC-200S070DT				93%														
		1050	95-190	TRC-200S105DT				93%														
	V	N	7.50-15.00	12	TRV-200S012ST	100-277	200	55,000	91%	-35	+70	0.97										
			4.16-8.33	24	TRV-200S024ST				180				92%									
			2.78-5.56	36	TRV-200S036ST				200				93%									
2.38-4.76			42	TRV-200S042ST	200				93%													
2.09-4.17			48	TRV-200S048ST	200				93%													
2.00-4.00			50	TRV-200S050ST	200				93%													
1.92-3.84			52	TRV-200S052ST	200				93%													
1.85-3.70			54	TRV-200S054ST	200				93%													
1.24-2.47			81	TRV-200S081ST	200				93%													
0.95-1.90			105	TRV-200S105ST	200				93%													
250	V	N	9.17-18.33	12	TRV-250S012ST	100-277	250	173,000	92%	-35	+70	0.96										
			5.21-10.41	24	TRV-250S024ST				220				93%									
			3.47-6.94	36	TRV-250S036ST				250				94%									
			2.98- 5.95	42	TRV-250S042ST				250				94%									
			2.60-5.20	48	TRV-250S048ST				250				94%									
			2.40-4.80	52	TRV-250S052ST				250				94%									
			2.31-4.62	54	TRV-250S054ST				250				94%									
			2.23-4.46	56	TRV-250S056ST				250				94%									
			2.08-4.16	60	TRV-250S060ST				250				94%									
			1.49-2.97	84	TRV-250S084ST				250				94%									
			1.19-2.38	105	TRV-250S105ST				250				94%									
			0.83-1.66	150	TRV-250S150ST				250				94%									
			300	V	N				11.45-22.90				12	TRV-300S012ST	100-277	300	149,000	92%	-25	+70	0.96	
									6.25-12.50				24	TRV-300S024ST				275				93%
4.17-8.33	36	TRV-300S036ST				300	93%															
3.57-7.14	42	TRV-300S042ST				300	94%															
3.13-6.25	48	TRV-300S048ST				300	94%															
2.78-5.55	54	TRV-300S054ST				300	94%															
1.43-2.85	105	TRV-300S105ST				300	94%															
1.00-2.00	150	TRV-300S150ST				300	94%															

# SURGE PROTECTORS AND TRANSFORMERS

Thomas Research Products surge protectors are designed to be used in conjunction with LED Drivers, electronic fluorescent ballasts and HID ballasts to provide an additional level of surge and transient protection in industrial and commercial applications.

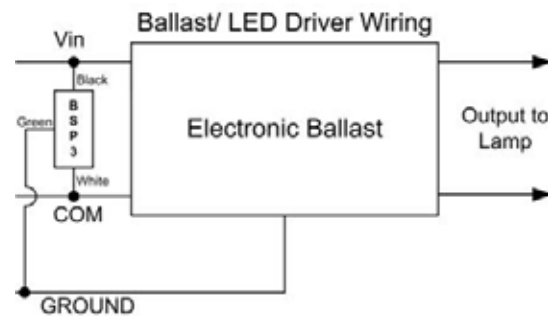
## BSP3 SERIES SURGE PROTECTOR

- The BSP3 Series are 3-leaded devices that protect Line-Ground, Line-Neutral, and Neutral-Ground in accordance with IEEE / ANSI C62.41.2 guidelines
- Surge current rating = 10,500 Amps using industry standard 8/20 uSec waveform
- High-temperature, flameproof plastic enclosure
- 85°C maximum surface temp rating
- Thermally Protected Transient Overvoltage Circuit
- UL Recognized Component for United States and Canada



## BSP3 Series Wiring

Model Number	Clamping Voltage	Surge Rating 2mS
BSP3-120	150	120 Joules
BSP3-208/240	275	190 Joules
BSP3-277	320	273 Joules
BSP3-347	420	320 Joules
BSP3-480	550	360 Joules



## SPECIALTY TRANSFORMERS

Thomas Research is proud to present our line of Specialty Transformers. These autotransformers are designed especially for lighting applications, typically used in conjunction with 277V T8 or T5 Electronic Fluorescent Ballasts or Electronic HID Ballasts in Industrial and Commercial applications.

Input Voltage	Output Voltage	VA Rating	Catalog Number
480 or 347	277	125	480-347-277-125VA
480 or 347	277	245	480-347-277-245VA
480 or 347	277	460	480-347-277-460VA



# Thomas Research Products

Innovative & Energy Saving Lighting Controls

## GO THE DISTANCE WITH TRP!

### THOMAS RESEARCH PRODUCTS LIMITED WARRANTY

Thomas Research Products warrants to the Purchaser that its LED drivers and lighting transformers will be free from defects in material and workmanship and will be of the designated kind and quality for five years from the date of manufacture. All other electronic circuits will be free from defects in material and workmanship and will be of the designated kind and quality for two years from the date of manufacture.

This warranty is not applicable to any circuit not installed and operated in accordance with the current edition of National Electrical Code and Underwriters Laboratories, Inc. Standards for Safety.

If it appears within our circuit warranty period that any circuit does not meet the warranty specified above, the Purchaser must notify in writing by United States mail of its warranty claim and return the circuits promptly at Purchaser's expense to Thomas Research Products. Thomas Research Products shall thereupon at Thomas Research Products expense, make available a repaired or new replacement part.

NO IMPLIED STATUTORY WARRANTY OR IMPLIED STATUTORY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY BEYOND THE AFOREMENTIONED CIRCUIT WARRANTY PERIOD. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

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