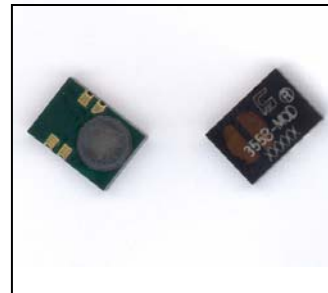


D355B Module Electroluminescent Lamp Driver IC

Features

- Turn-key Solution
- Integrated External Components
- Low Profile Leadless Package
- Small Footprint
- Lead-Free (Pb-free) and Green
- High Efficiency
- Low Voltage Operation
- Controlled Current Discharge for Low EMI



5X7 QFN

Applications

- Watches
- Data Organizer / PDAs
- Pagers
- Handsets
- LCD and Keypad Backlighting
- MP3/GPS/Remote control

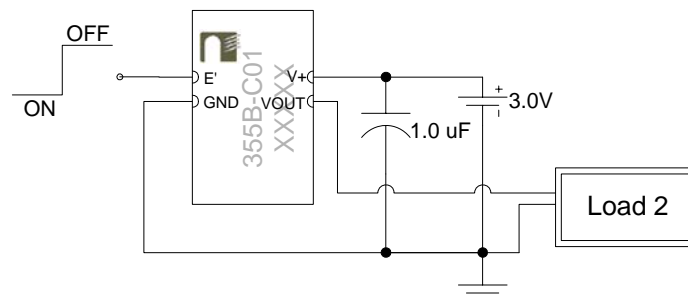
Rogers DUREL® D355B IC module is part of a family of highly integrated EL drivers based on Rogers' patented three-port (3P) topology, which offers built-in EMI shielding. This high efficiency device is well suited for backlighting most timepieces and liquid crystal displays for portable electronic applications. The module offers a fully integrated EL driver with a low profile and a small footprint.

Lamp Driver Specifications:

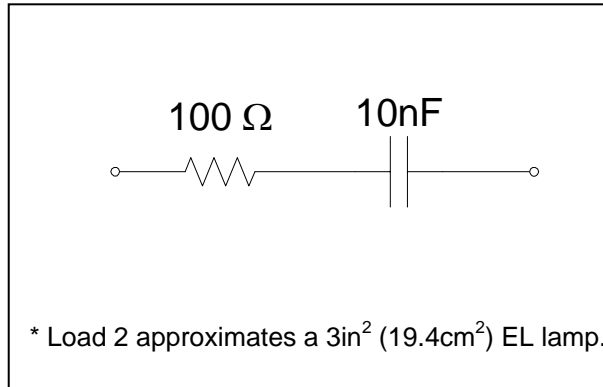
(Using Standard Test Circuit at Ta=25°C unless otherwise specified. Specified values and ranges represent allowable product variability at standard test but overall functionality is not limited.)

Parameter	Symbol	Minimum	Typical	Maximum	Units	Conditions
Standby Current			10	1000	nA	E' = 3.0V
Supply Current	I		18	30	mA	E' = GND
Enable Current			-10	-35	uA	E' = GND
Output Voltage	Vout	145	170	200	Vpp	E' = GND
Lamp Frequency	LF	170	240	300	Hz	
Inductor Frequency	HF	10	16	23	kHz	

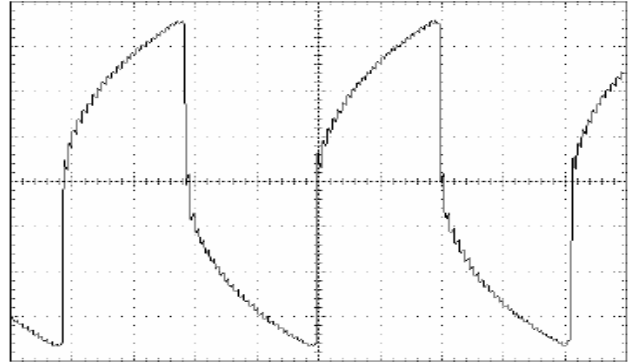
Standard Test Circuit



Load 2*



Typical Output Waveform

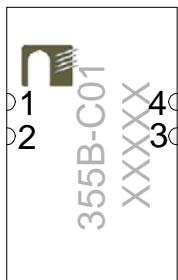


Absolute Maximum Ratings:

Parameter	Symbol	Minimum	Maximum	Unit	Comments
Supply voltage Operating Range Withstand Range	V+	1.0 -0.5	7.0 10.0	V	E' = GND E' = V+
Enable voltage Enable on Enable off	E' E' _{ON} E' _{OFF}	-0.5 0.8	(V+) + 0.5 0.6	V	
Output Voltage	V _{OUT}		220	V _{pp}	Peak-to-peak Voltage
Operating temperature	T _a	-40	85	°C	
Storage temperature	T _s	-65	150	°C	
Lamp Resistance	R _{lamp}	100		Ohm	

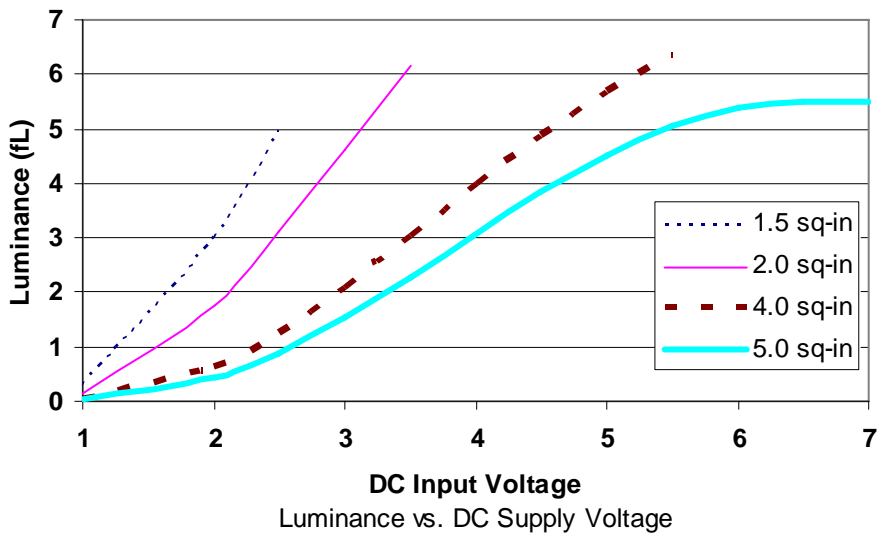
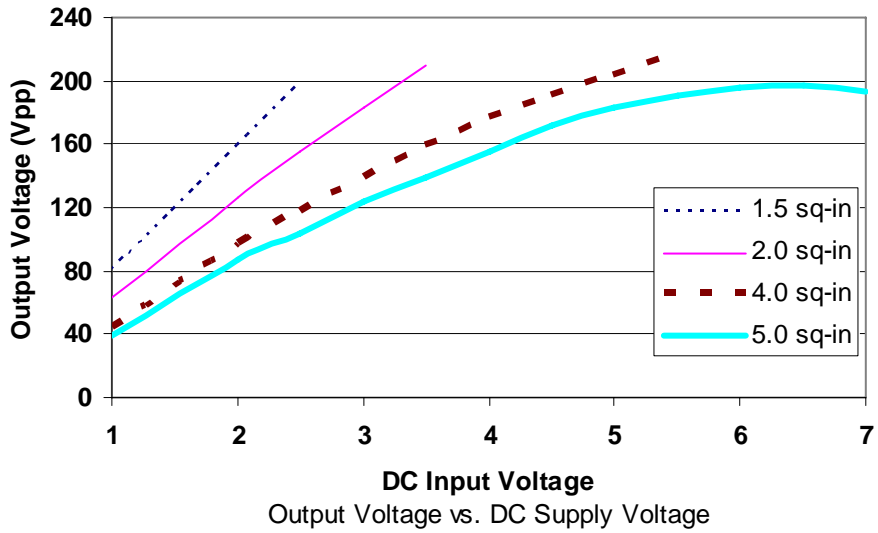
Note: The above table reflects ratings only. Functional operation of the device at these ratings or any other above those indicated in the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

Physical Data:

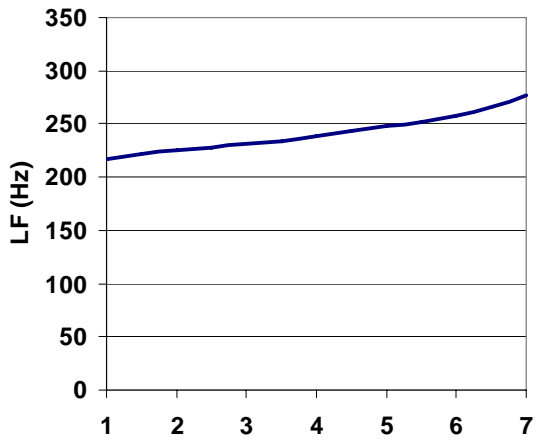


PIN #	NAME	FUNCTION
1	E'	System enable
2	GND	System ground connection
3	VOOUT	High voltage AC output to lamp
4	V+	DC power supply input

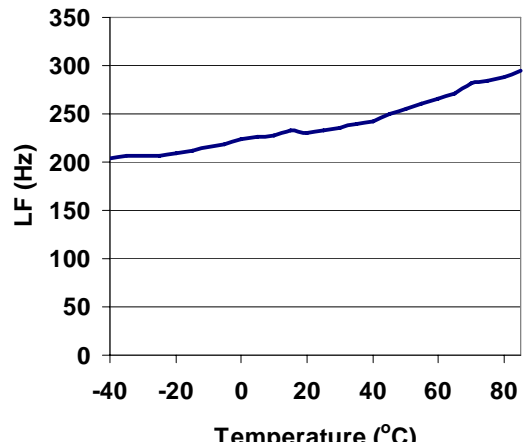
Typical Performance Characteristics with Durel Green EL Lamp Load



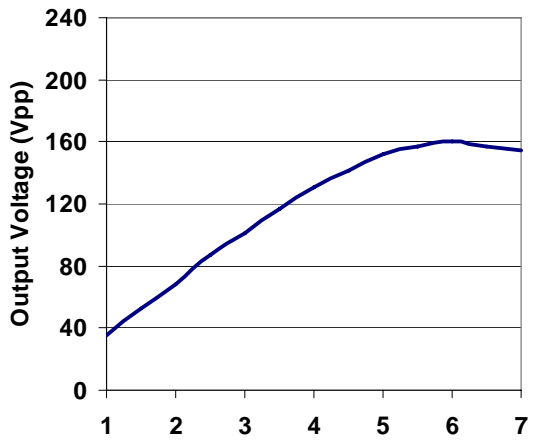
Typical Performance Characteristics



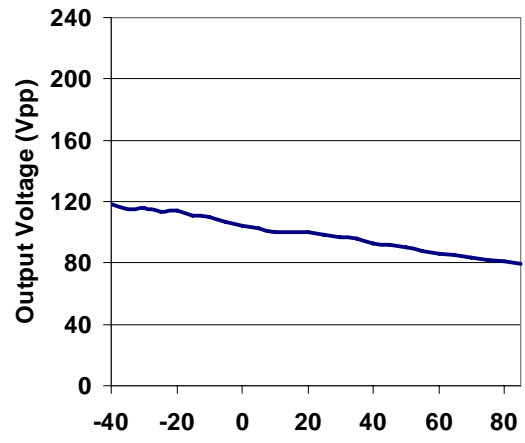
Output Frequency vs. DC Supply Voltage



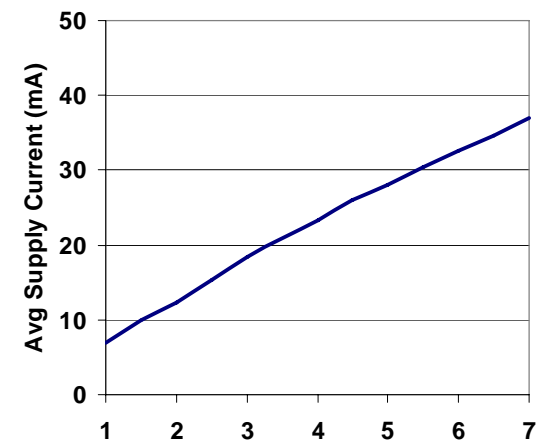
Output Frequency vs. Ambient Temperature



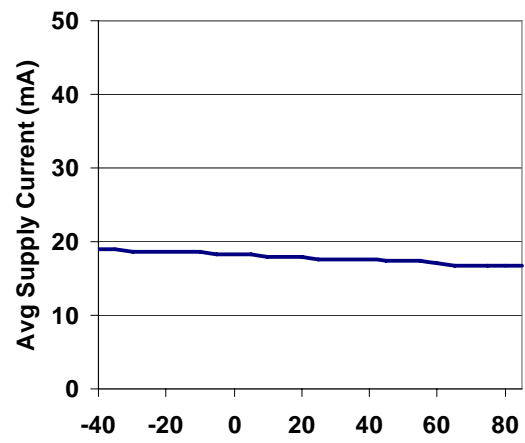
Output Voltage vs. DC Supply Voltage



Output Voltage vs. Ambient Temperature

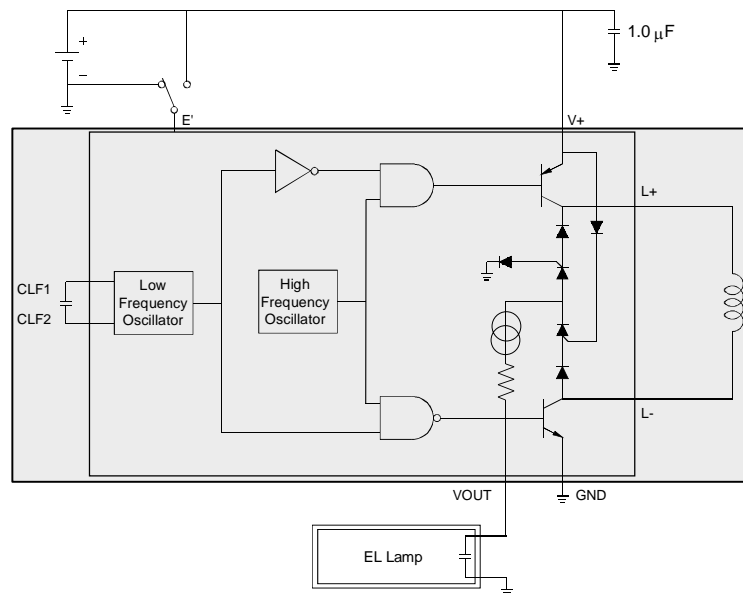


Supply Current vs. DC Supply Voltage



Supply Current vs. Ambient Temperature

Block Diagram of the Inverter Circuitry



Theory of Operation

Electroluminescent (EL) lamps are essentially capacitors with one transparent electrode and a special phosphor material in the dielectric. The phosphor glows when a strong AC voltage is applied across the EL lamp electrodes, the required AC voltage is typically not present in most systems and must be generated from a low voltage DC source. Rogers developed its patented three-port (3P) switch-mode inverter circuit to convert the available DC supply to an optimal drive signal for high brightness and low-noise EL lamp applications. The Rogers 3P topology offers the simplicity of a single DC input, single AC output, and a shared common ground that provides an integrated EMI shielding.

The D355B IC module drives the EL lamp by repeatedly pumping charge through an external inductor with current from a DC source and discharging into the capacitance of the EL lamp load. With each high frequency (HF) cycle the voltage on the lamp is increased. At a period specified by the lamp frequency (LF) oscillator, the voltage on the lamp is discharged to ground and the polarity of the inductive charging is reversed. By this means, an alternating positive and negative voltage is developed at the single output lead of the device to one of the electrodes of the EL lamp. The other lamp electrode is commonly connected to a ground plane, which can then be considered as electrical shielding for any underlying circuitry in the application.

The EL driving system is divided into several parts: on-chip logic and control, on-chip high voltage output circuitry, discharge logic circuitry, and off-chip components. The on-chip logic controls the lamp operating frequency (LF), as well as the inductor switching frequency (HF), and HF and LF duty cycles. These signals are combined and buffered to regulate the high voltage output circuitry. The output circuitry handles the power through the inductor and delivers the high voltage to the lamp. The integrated discharge logic circuit enables the low-noise functionality of this EL driver with four levels of discharge slopes on the output waveform. Since a key objective for EL driver systems is to save space and cost, required off-chip components were integrated into the module.

Rogers provides a D355B IC Designer's Kit, which includes a printed circuit evaluation board intended to aid you in developing an EL lamp driver configuration that meets your requirements.

D355B Module Design

I. Storage Recommendations

1. In order to avoid the absorption of moisture, it is recommended to store the module (in bulk or in tape) in a dry box. The module is normally packed in an anti-static envelope.

2. The following environment is recommended for storing:

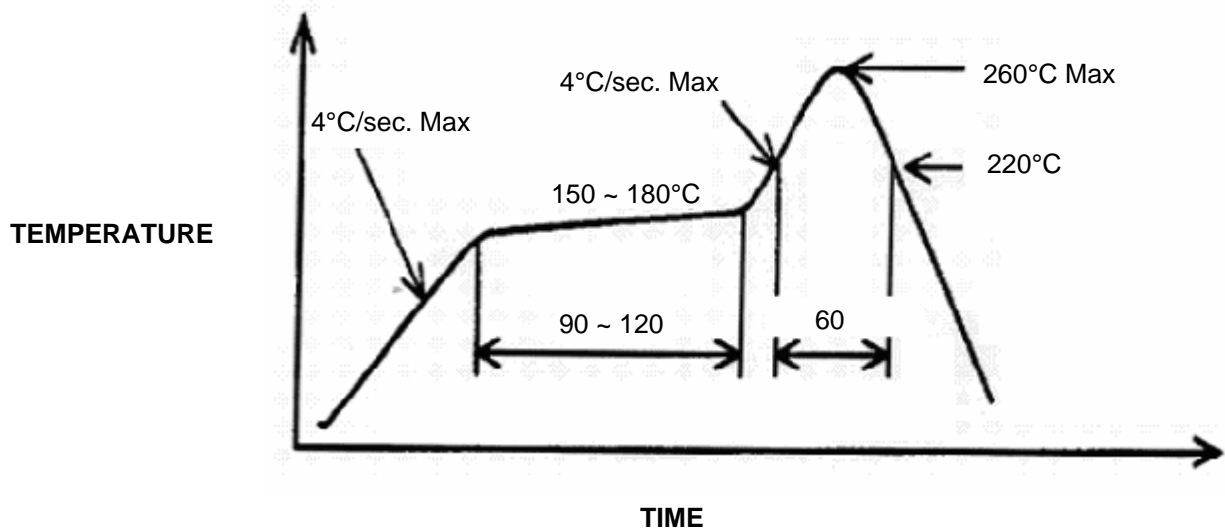
- Temperature: 10-30°C (50-60°F)
- Humidity: 60% maximum relative humidity

3. It is recommended to solder the module as soon as possible after unpacking the anti-static envelope. In cases where module is unpacked, it is recommended that module be stored in a dry box or sealed in an anti-static envelope again and the baking conditions be followed. If the modules in an anti-static envelope are stored over 6 months or if it is opened for more than 48 hours, it is recommended that the modules be baked under the following conditions:

- 60°C (140°F) for 48 hours or more for tape and reel modules
- 80°C (176°F) for 8 hours or more for loose modules

II. Solder Re-Flow Recommendations

The soldering temperature profile for the module is shown below. The recommended melting temperature is 216°C to 220°C (420°F to 428°F). Maximum peak reflow is 260°C (500°F) for 5 seconds.



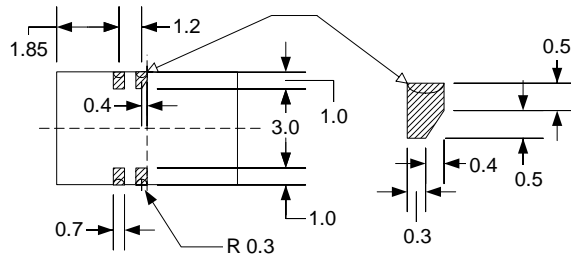
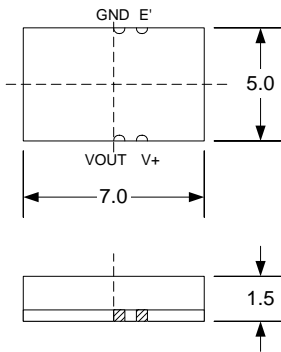
III. Manual Soldering

The use of a soldering iron of less than 25W is recommended. It is recommended that the tip of the soldering iron be kept at or below 300°C (572°F). The maximum soldering time for each pad is 3 seconds and it is recommended that the modules not be handled until the temperature has reached normal room temperature.

Ordering Information

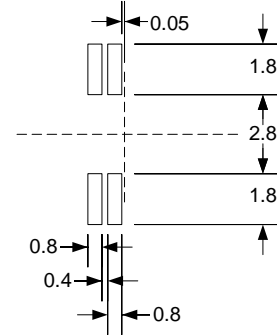
The D355B IC module is available in a plastic thermal enhanced very thin quad flat package with no protruding leads. Rogers' engineers provide full support to customers including application retrofits. The QFN body is 5 x 7 x 1.5mm nominal. All tolerances are +/- 0.1mm.

Module Dimensions



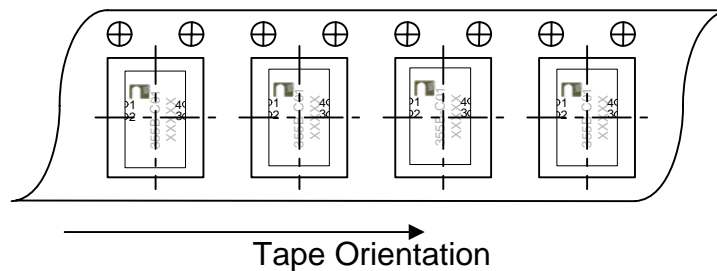
Unit:mm

Recommended Pad Layout



The recommended depth of the metal on the PCB is between 0.2mm and 0.25mm.

D355B Module in Tape and Reel: 1DDD355BB-C01



Embossed tape on 360 mm diameter reel per JIS 0806.
3000 units per reel. Quantity marked on reel label.

ISO 9001:2000, ISO/TS 16949:2002, and ISO 14001:2004 Certified

The information contained in this data sheet is intended to assist you in designing with Rogers EL systems. It is not intended to and does not create any warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose or that the results shown on the data sheet will be achieved by a user for a particular purpose. The user should determine the suitability of Rogers EL drivers for each application.

Rogers EL drivers are covered by one or more of the following U.S. patents: #5,313,141; #5,347,198; #5,677,599; #5,789,870; #6,043,610. Corresponding foreign patents are issued or pending.

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