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DUREL® Backlight IC Driver Product Selector Guide

Applying its extensive knowledge of electroluminescent lamp technology, Rogers Corporation-Durel Division developed a portfolio of driver ICs for a wide range of applications using EL backlighting systems. Most DUREL® EL drivers are based on Rogers' patented three-port (3P) circuit topology, which offers designers the simplicity of a single DC input, single AC output, and a shared common ground that provides an integrated EMI shielding. The addition of a patented controlled discharge circuitry in most DUREL® EL drivers extends the noise reduction capability of these devices for acoustic noise sensitive applications such as handsets and other portable electronic products without sacrificing efficiency. Rogers has extended its backlight IC product family with new products that combine the EL lamp driver functionality with an efficient high-brightness light-emitting diode (HBLED) driver to backlight color displays. Rogers IC family now includes an IC driver for liquid lens focusing. All DUREL® backlight drivers demand very low standby current for longer battery life in portable electronic products.

D307

Intended for signage, instrumentation displays and other large electroluminescent backlighting uses, the D307 IC driver can drive EL lamps as large as 225.8 cm^2. The D307 IC driver is a powerful device that can convert a wide and high input voltage range from 6.0V_{DC} to 16.0 V_{DC} and logic voltage from 4.5V_{DC} to 5.5V_{DC} to an output voltage as high as 440V peak-to-peak. For reducing audible noise, this IC is also equipped with patented wave-shaping programmability. Dual on-chip oscillators allow for independent selection of inductor switching, lamp output frequency optimization through the choice of external capacitor values or with separate external clock signals, and control of lamp brightness. The D307 IC driver features over-voltage-protection and open-load-protection circuitry. The D307 IC driver is available in a square-body surface mount QFN-16 package in tape and reel. A D307 IC Driver Designer's Kit is available as a tool for optimizing the driver circuit for your application.

D355

The D355 IC driver offers superior efficiency over a wide range of applications such as two-way pagers, MP3 players, other handheld electronics, and timepieces. Based on Rogers' patented 3P topology, the D355 IC driver requires only one inductor and one capacitor to complete a driver circuit that will drive EL lamps and other devices, such as piezoelectric actuators. The D355 IC driver operates with supply voltages of 1.0 - 7.0 V_{DC}, and features internally controlled current discharge for built-in EMI shielding. The D355 IC driver is offered in 8-pin MSOP in tape/reel and in die form by wafer or waffle pack.

The D355 IC driver is also available as a "stand-alone" EL driver module solution that combines all required external discrete components, including a power inductor, into a small, 5mm X 7mm X 1.5mm lead-free (Pb-free) package. A D355 IC Driver Designer's Kit is available as a tool for optimizing the circuit for your application.

D356

The D356 IC driver provides system performance similar to that of the D355 IC driver. Their designs differ only in that the D356 IC driver uses an enable high system while the D355 IC driver functions with enable low. Both devices offer built-in EMI shielding based on Rogers' patented 3P circuit. The D356 IC driver is offered in the MSOP-8 package by tape/reel and in die form by wafer or waffle pack. A D356 IC Driver Designer's Kit is available as a tool for optimizing the circuit for your application.

D371

The D371 IC driver is a high performance EL driver based on Rogers' patented 3P circuit. It uses a patented circuit design for programmable wave-shaping providing low-noise performance in applications that are sensitive to audible and electrical noise, such as handsets. This EL driver operates very efficiently over a supply voltage range of 2.0 – 6.5 V_{DC}. External capacitors or clock signals may be used to set the lamp output and inductor frequencies. The D371 IC driver is offered in 10-pin MSOP in tape/reel and in die form by wafer or waffle pack. A D371 IC Driver Designer's Kit is available as a tool for optimizing the circuit.

D372

The D372 IC driver delivers a regulated high voltage AC signal for use in backlighting EL lamps with areas up to 12 in^2 (80 cm^2). It also features programmable wave-shaping for low-noise performance in applications that are sensitive to audible and electrical noise. This EL driver operates efficiently over a supply voltage range of 2.0 - 6.5 V_{DC}. External capacitors or clock signals may be used to set the lamp output and inductor switching frequencies. The D372 IC driver is offered in 10-pin MSOP in tape/reel and in die form by wafer or waffle pack. A D372 IC Driver Designer's Kit is available as a tool for optimizing the circuit.

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D381

The D381 IC driver is a very efficient power device based on Rogers' patented 3P topology for driving EL lamps in PDAs, keypads and large LCDS in handsets. It can drive other devices, such as piezoelectric actuators, requiring a high voltage AC signal as well. The D381 IC driver features a patented programmable wave-shaping option for low noise performance, and external capacitors or independent clock signals may be used to control the output frequency and inductor switching frequency of the device. The D381 IC driver operates with a 2.0-7.0 V_{DC} supply voltage. In the MSOP-10 package, it is configured compatibly with the D371 IC driver; it is also available in the 8-pin MSOP, and DFN-10 packaging in tape/reel. A D381 IC Driver Designer's Kit is available as a tool for optimizing the circuit.

The D381 IC driver is also available as a "stand-alone" EL driver module solution that combines all required external discrete components, including a power inductor, into a small, 5mm X 7mm X 1.5mm lead-free (Pb-free) package. A D381 IC Driver Designer's Kit is available as a tool for optimizing the circuit for your application.

D388

The D388 IC driver combines the functionality of a high performance EL lamp driver for backlighting monochrome displays and keypads with an efficient HBLED driver to backlight color displays. It has a wide input voltage range from 2.5 V_{DC} to 7.0 V_{DC} to fit many types of applications and battery technologies. Operating at high switching frequencies, it uses a single low profile inductor to drive up to 4 HBLEDs and up to 20 cm^2 EL lamp simultaneously with separate enable controls. This dual driver features independent EL voltage control and LED current control for constant light output and dimming options to reduce power consumption. The D388 IC driver includes a patented circuit design for programmable wave-shaping of the high voltage AC output to the EL lamp providing low-noise performance in applications that are sensitive to audible and electrical noise. The D388 IC driver is offered in the Pb-free, leadless QFN-16 package in tape/reel. A D388 IC Driver Designer's Kit is available as a tool for optimizing the circuit for your particular application.

D391

The D391 IC driver is a very efficient power device based on Rogers' patented 3P topology for driving EL lamps in PDAs, keypads and large LCDS in handsets. It can also drive other devices requiring a high voltage AC signal as well (e.g. piezoelectric actuators). The D391 IC driver features patented flexible wave-shaping capability for low noise performance. The output frequency and inductor switching frequency can be controlled with either external capacitors or independent clock signals. The D391 IC driver operates with a 2.0-7.0 V_{DC} supply voltage with a minimum enable voltage of 1.3V.

In the MSOP-10 package the D391 is pin-compatible with the D381. This allows for a simple upgrade path when higher luminance or higher efficiency is required. It is also available in the DFN-10 packaging in tape and reel. A D391 IC Driver Designer's Kit is available as a tool for optimizing the circuit.

D504 durELplex™ driver

The D504 IC driver combines the efficiency of the D391 with the flexibility of four output channels. The D504 is based on Rogers' patented 3P topology for driving EL lamps in a wide range of applications. The four channel output is controlled through i^2c, an industry standard communication protocol. This allows the luminance level of each channel to be independently and dynamically controlled.

An example application is a modern cellular phone. Most modern cellular phones have several possible modes of operation, for example Phone Mode, Camera Mode and Music Player Mode. Based on these modes the EL Lamp could be divided into four segments: Number keys, Navigation key, Camera Key, and Music Key. The segments would be activated for each mode as shown in the table below.

Mode	Segments
Phone	Number keys and Navigation Key
Camera	Camera Key and Navigation Key
Music Player	Music Key and Navigation Key

It would also be possible to have the segments fade on or off during mode switching. So, if the user were to switch from phone mode to camera mode, the number keys would fade off at the same time the camera key would fade on. This dynamic control of the output luminance opens up many possibilities to the interface designer. Coupling these capabilities with the features of the D391 yields a very efficient device which can be used to create eye-catching user interfaces. The D504 is offered in a Pb-free, leadless QFN-20 package in tape/reel.

DLL3

The DLL3 IC driver applies the D388 technology to drive a liquid lens. By using the EL driver portion of the D388 driver the DLL3 IC driver is able to vary between $10V_{RMS}$ to $65V_{RMS}$ at the lens by either a PWM or I^2C (requires digital to analog converter (DAC)) signal. This driver technology uses only 8 external components and uses an input voltage range from $2.8V_{DC}$ to $5.5V_{DC}$. The DLL3 IC driver is offered in the Pb-free, leadless QFN-16 package in tape/reel. A DLL3 IC Driver Kit Board is available for sampling and testing.

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DUREL® EL Lamp Drivers:

Product	Package	Supply Voltage Logic Voltage	Features	# External Components	Applications	Lamp Area
D307A	QFN-16	9.0 – 16.0V_{DC} 4.5 – 5.5V_{DC}	High Vout to 440Vpp, Wave-shaping, Regulated Output, Open Load Protected	10-13	Large Graphic Displays, Signage Backlighting, Automotive	<35 in^2 <225.8 cm^2
D355B	MSOP-8	1.0 - 7.0V_{DC}	3P, ENA Low, Low current discharge; LF Control	1-2	Watches, PDAs, Pagers, MP3, GPS, Remote Controls	<6 in^2 <40 cm^2
D356B	MSOP-8	1.0 - 7.0V_{DC}	3P, ENA High, Low current draw, LF control	1-2	Watches, PDAs, Pagers, MP3, GPS, Remote Controls	<6 in^2 <40 cm^2
D371A	MSOP-10	2.0 – 6.5V_{DC}	3P, Low noise Wave-shaping, HF and LF control	1-4	Handsets, PDAs, Monochrome LCDs, DFLX® EL Keypad Lamps	<10 in^2 <65 cm^2
D372A	MSOP-10	2.0 – 6.5V_{DC} 2.0 – 6.5V_{DC}	Low noise Wave-shaping, Regulated Output, HF and LF control	3-5	Handsets, PDAs, Monochrome LCDs, Remote Controls, DFLX EL Keypad Lamps	<12 in^2 <80 cm^2
D381B	MSOP-10 MSOP-8 DFN-10	2.0 – 7.0V_{DC}	3P, Low noise Wave-shaping, High Efficiency, HF and LF Control	1-4	Handsets, PDAs, Monochrome LCDs, Remote Controls, DFLX EL Keypad Lamps	<12 in^2 <80 cm^2
D391A	MSOP-10 DFN-10	2.0 – 7.0V_{DC}	3P, Low noise Wave-shape, High Efficiency, HF and LF Control, Output Voltage Regulation, Over Voltage Protection	1-4	Handsets, PDAs, Monochrome LCDs, Remote Controls, DFLX EL Keypad Lamps	<12 in^2 <80 cm^2
D504A	QFN-20	2.1 – 7.0V_{DC}	Four Channel, 3P, Low noise Wave-shape, High Efficiency, HF and LF Control, Output Voltage Regulation, Over Voltage Protection	2-6	Handsets, PDAs, Monochrome LCDs, Remote Controls, DFLX EL Keypad Lamps	<12 in^2 <80 cm^2

DUREL® EL Lamp Driver Modules:

D381B	Custom 5x7x1.5 Module	1.0 - 6.0V_{DC}	3P, Low noise, Wave-shaping, High Efficiency	0	Handsets, PDAs, Monochrome LCDs, Remote Controls, DFLX EL Keypad Lamps	<12 in^2 <80 cm^2

DUREL® Combination EL Lamp and White LED Driver:

D388A	QFN-16	2.5 – 7.0V_{DC} 2.5 – 7.0V_{DC}	Independent EL and LED enable control; Regulated EL voltage and LED current; Separate EL and LED dimming controls; Low noise EL Wave-shaping, High Efficiency	6-8	Color Handsets Displays and, DFLX EL Keypad Lamps, PDAs, GPS, Other Handheld Electronics; See DLL3A	<3 in^2 (<20 cm^2) and/or up to 6 white LEDs in series

DUREL® Liquid Lens Driver:

DLL3A	QFN-16	2.8 – 5.5V_{DC}	Interface with PWM or I^2C (DAC required), 2.8 to 5.5V_{DC} Operation, High Efficiency	6-8	Liquid Lens	Up to 500pF Lens

ISO 9001:2000, ISO/TS 16949:2002, and ISO 14001:1996 Certified

Revised 06/2008 Publication #LIT-B9002 A20