

# High Speed Fiber Optic LED Driver

## GENERAL DESCRIPTION

The ML6633 is a high speed fiber optic LED driver suited for networking applications up to 200 Mbps. The part is capable of driving up to 82mA of current through a fiber optic LED from an ECL level input signal. Its efficient output stage provides a high current that can be programmed for accurate absolute output level which insures precise launch power.

The LED driver's output stage provides a fast well matched rise and fall time through a unique differential output stage.

The ML6633 high speed fiber optic LED driver is implemented in BiCMOS process and is available in an 8-pin SOIC package.

## FEATURES

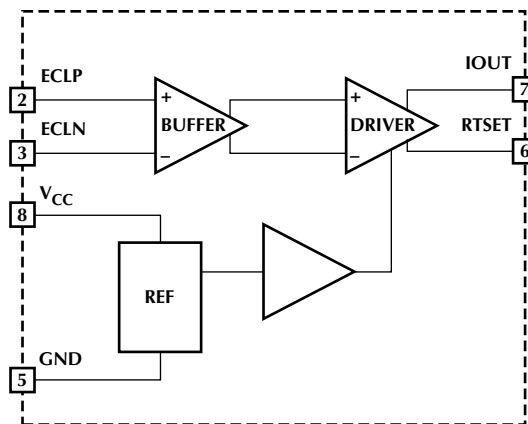
- Data rates up to 200Mbps
- Current driven output for accurate launch power
- Programmable output current from 20mA to 82mA
- High Efficiency Output Stage
- Low EMI/RFI Noise
- ECL inputs
- Industrial temperature version available
- May be used with ML6622 quantizer

## APPLICATIONS

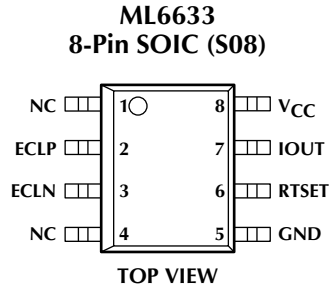
- FDDI
- Fast Ethernet, 100BASE-FX
- ATM (SONET), 155Mbps
- Proprietary high-speed fiber optic data links

## BLOCK DIAGRAM

*\*Some Packages Are Obsolete*



## PIN CONNECTION



## PIN DESCRIPTION

PIN	NAME	DESCRIPTION	PIN	NAME	DESCRIPTION
1	NC	No Connect	6	RTSET	Output current programming pin. Connect a resistor of value $2/I_{LED}$ from this pin to ground to set the high LED output current
2	ECLP	Positive ECL data input controls signal to the LED	7	IOOUT	Fiber optic LED drive pin. Connect the LED between this pin and $V_{CC}$
3	ECLN	Negative ECL data input	8	$V_{CC}$	5V power supply
4	NC	No Connect			
5	GND	Negative power supply ground			

## ABSOLUTE MAXIMUM RATINGS

Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

$V_{CC}$  ..... GND -0.3V to 6V  
 Input Pin Voltages ..... GND -0.3V to  $V_{CC}$  +0.3V  
 LED Output Current (IOUT) ..... 82mA  
 Peak DC Output Current (IOUT) ..... 82mA

Storage Temperature ..... -65°C to +150°C  
 Lead Temperature (Soldering 10 sec) ..... 260°C  
 Thermal Resistance ( $\theta_{JA}$ ) ..... 160°C/W

## OPERATING CONDITIONS

Temperature Range  
 ML6633CS ..... 0°C to 70°C  
 ML6633IS ..... -40°C to 85°C

## ELECTRICAL CHARACTERISTICS

Unless otherwise specified,  $V_{CC} = 5V \pm 5\%$ ,  $RTSET = 26.1\Omega \pm 1\%$ ,  $T_A$  = Operating Temperature Range, (Note 1)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
$I_{CC}$	Supply Current				$40 + I_{OUT}$	mA
$I_{LEDH}$	LED Current Accuracy (IOUT) High	C Suffix	70	75	82	mA
		I Suffix	65	75	82	mA
$I_{LEDL}$	Low				0.1	mA
$t_R$	Rise Time (IOUT)				2	ns
$t_F$	Fall Time (IOUT)				2	ns
$t_{PLH}$	Propagation Delay (IOUT)	Low to High			10	ns
$t_{PHL}$		High to Low			10	ns
$t_{PWD}$	Pulse Width Distortion (IOUT)				0.5	ns
$I_{ECL}$	ECL Input Current				20	$\mu A$

Note 1: Limits are guaranteed by 100% testing, sampling, or correlation with worst-case test conditions.

## FUNCTIONAL DESCRIPTION

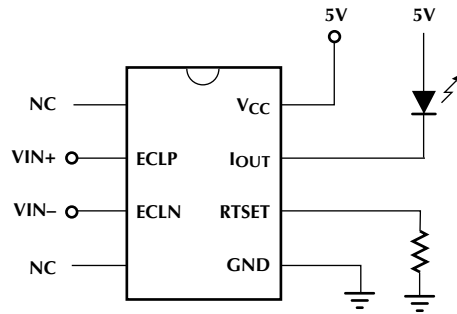
The ML6633 accepts ECL input signals and generates a high speed, high accuracy output current which is independent of supply voltage variations. The output current is programmable up to 82mA.

The ECL input stage is a standard NPN differential pair with a common mode range of between 1V and 4.5V with a +5V supply. With this common mode range it is possible to convert the ECL inputs into TTL. If the ECLN input is biased up to the TTL switching level, the ECLP pin can be driven by a TTL or CMOS output. Figure 1b shows a circuit implementing this technique. This circuit may degrade pulse width distortion and should be checked for acceptable performance in this configuration.

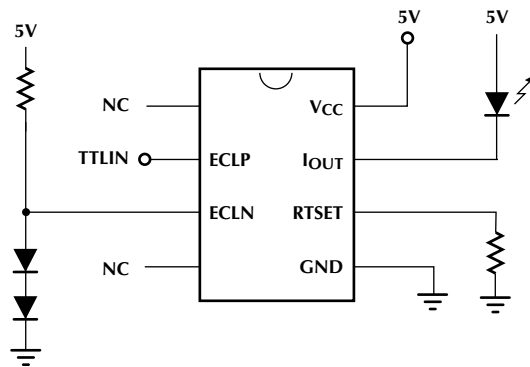
Output current to the LED is set by connecting the appropriate resistance from RTSET to ground. The high level output voltage at RTSET will be 2.0V. The current in the external resistor will be equal to the current through the LED. The output current with RTSET set to 26.1Ω will be:

$$I_{LED(HIGH)} = \frac{2V}{RTSET} \quad (1)$$

$$I_{LED(HIGH)} = \frac{2V}{26.1\Omega} = 75mA$$



a)  $I_{OUT} = 75mA$

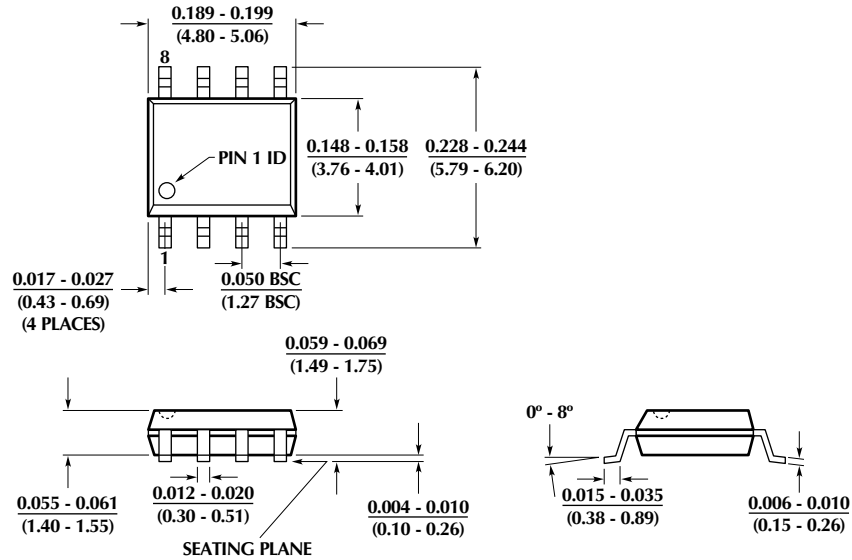


b) ECL-to-TTL Conversion

Figure 1. Typical Applications

## PHYSICAL DIMENSIONS inches (millimeters)

Package: S08  
8-Pin SOIC



## ORDERING INFORMATION

PART NUMBER	TEMPERATURE RANGE	PACKAGE
ML6633CS	0°C to 70°C	8-Pin SOIC (S08)
ML6633IS	-40°C to 85°C	8-Pin SOIC (S08) (Obolsete)

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Products described herein may be covered by one or more of the following U.S. patents: 4,897,611; 4,964,026; 5,027,116; 5,281,862; 5,283,483; 5,418,502; 5,508,570; 5,510,727; 5,523,940; 5,546,017; 5,559,470; 5,565,761; 5,592,128; 5,594,376; 5,652,479; 5,661,427; 5,663,874; 5,672,959; 5,689,167; 5,714,897; 5,717,798; 5,742,151; 5,747,977; 5,754,012; 5,757,174; 5,767,653; 5,777,514. Japan: 2,598,946; 2,619,299; 2,704,176. Other patents are pending.

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2092 Concourse Drive  
San Jose, CA 95131  
Tel: (408) 433-5200  
Fax: (408) 432-0295  
www.microlinear.com