Century Semiconductor Inc.

CS6707

200Mbps Fiber-Optic LED driver

GENERAL DESCRIPTION

The CS6707 is a high-speed fiber optic LED driver ideally suited for applications up to 200Mbps. The CS6707 accepts differential PECL inputs which can be shaped, if desired, by pins PWAI (Pulse Width Adjust Increase) or PWAD (Pulse Width Adjust Decrease).

Simply leave these two pins unconnected if no adjustment is needed, then default mark/space ratio is about 42/58. To improve LED "on and off" time, a peaking and clamp circuit is included in the CS6707 which may be set via a RC network.

The temperature independent drive current of the CS6707 can be set via an external resistor using the RMOD pin. An external resistor at pin RMOD1 is used to compensate the drive current for temperature changes. Normally the CS6707 is direct coupled to PECL inputs, however if AC coupling is desired, a $1/3V_{DD}$ bias point is recommended. Please refer to the application circuit schematic for more details.
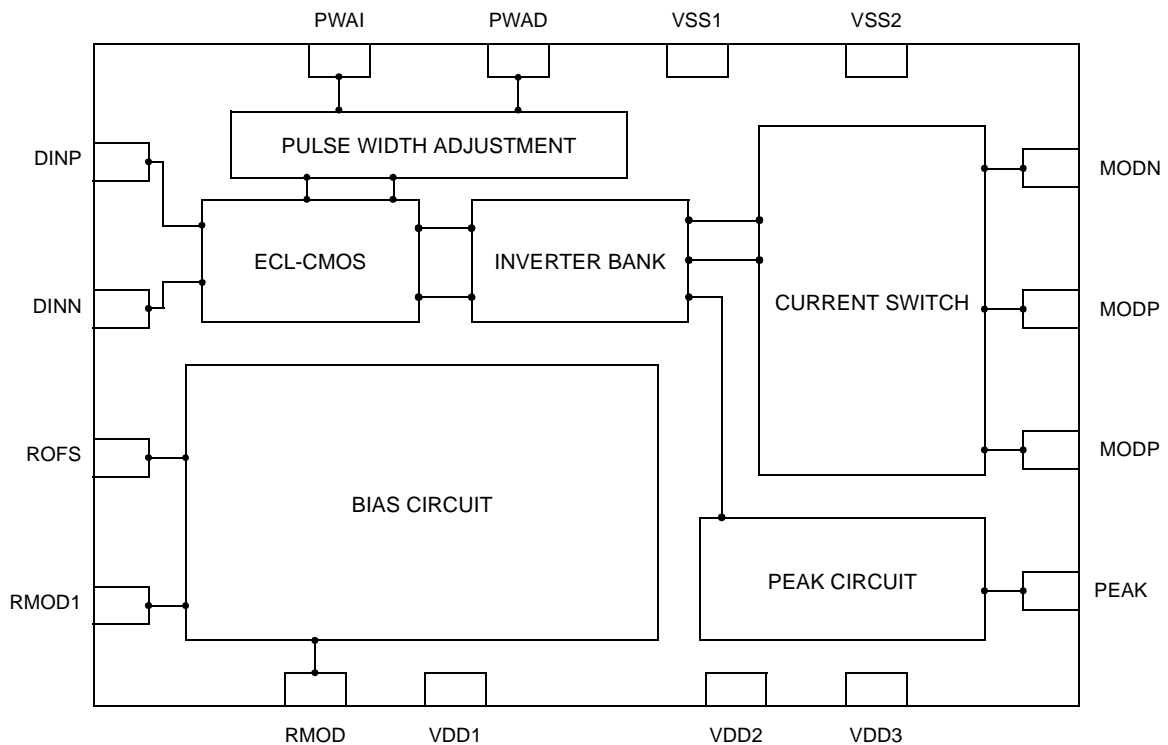
FEATURES

- Rise/fall time < 800ps, suited for applications up to 200Mbps.
- Maximum programmable 100mA LED drive current.
- Maximum 2V LED forward voltage.
- Differential PECL inputs with optional pulse width adjust feature.
- Drive current compensation for temperature dependence of LED output power.
- Supports both 3.3 and 5 Volt operation.
- Available as die or in QSOP-16/TSSOP-20 packages.

APPLICATIONS

- FDDI
- SDH STM-1
- SONET OC-3
- Fiber Channel
- 100BaseF Ethernet
- LED Driver Transmitters

BLOCK DIAGRAM

DIE CONNECTION DIAGRAM

PWAI   PWAD   GND   GND

DINP   MODN

DINN   MODP

1.550 mm   ROFS   MODP

RMOD1   PEAK

RMOD   V_DD1   V_DD2 V_DD3

1.690 mm

Figure-1

PIN CONNECTION DIAGRAM

Figure-2 QSOP-16:

PWAD	1	16 GND
PWAI	2	15 GND
DINP	3	14 MODN
DINN	4	13 MODP
ROFS	5	12 MODP
RMOD1	6	11 PEAK
RMOD	7	10 V_DD3
V_DD1	8	9 V_DD2

CS6707

Figure-3 TSSOP-20:

NC	1	20 NC
PWAD	2	19 GND
PWAI	3	18 GND
DINP	4	17 MODN
DINN	5	16 MODP
ROFS	6	15 MODP
RMOD1	7	14 PEAK
RMOD	8	13 V_DD3
V_DD1	9	12 V_DD2
NC	10	11 NC

CS6707
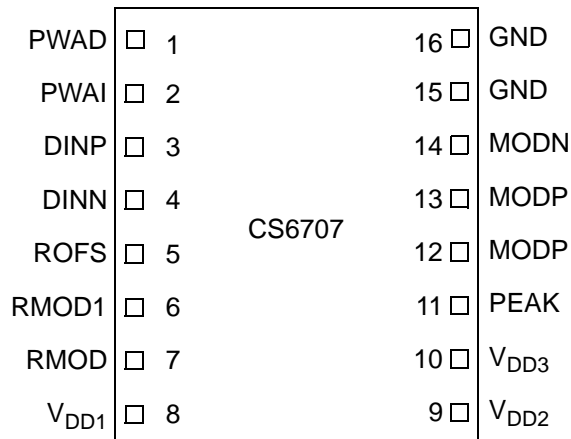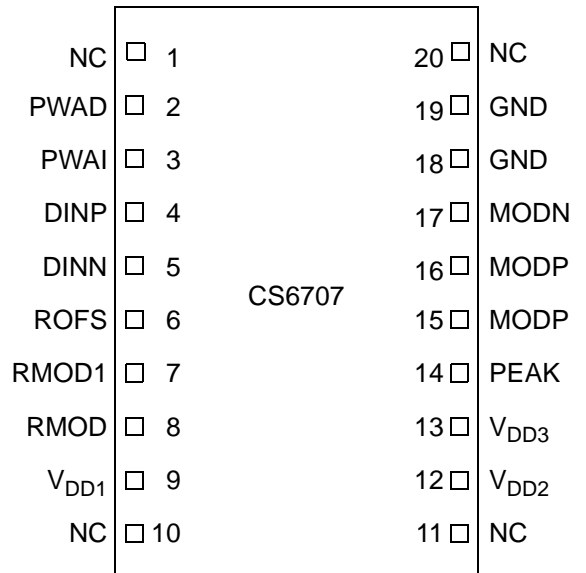
Figure-2 QSOP-16   **Figure-3 TSSOP-20**

PIN DESCRIPTION

Name	Pin QSOP-16	Pin TSSOP-20	Die Pad	Description
PWAD	1	2	1	Pulse width adjustment decrease pin.
PWAI	2	3	2	Pulse width adjustment increase pin.
DINP	3	4	3	Differential data input pin. Complementary to DINN.
DINN	4	5	4	Inverse differential data input pin. Complementary to DINP.
ROFS	5	6	5	ECL to CMOS bias current set pin.
RMOD1	6	7	6	Temperature compensation adjustment pin.
RMOD	7	8	7	Temperature independent drive current set pin.
V_{DD1}	8	9	8	Analog power Pin. Connect to most positive supply voltage.
V_{DD2}	9	12	9	Digital power pin. Connect to most positive supply voltage.
V_{DD3}	10	13	10	LED pin. Connect to most positive supply voltage to speed 'off' time of LED, f undershirt, simply leave this pin unconnected.
PEAK	11	14	11	Connection for peaking circuit. Please refer to application schematic.
MODP	12	15	12	Driver output pin. Connect LED between this pin and V_{DD}.
MODP	13	16	13	Driver output pin. Connect LED between this pin and V_{DD}.
MODN	14	17	14	Logical inverse of pins 15/16. Connect a resistor of approximately the same value as LED between this pin and V_{DD}.
GND	15	18	15	Ground Pin. Connect to the most negative supply voltage.
GND	16	19	16	Ground Pin. Connect to the most negative supply voltage.
N.C.		1,10, 11,20		No connection.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Unit
V_{CC}	Power supply (V_{CC} - Gnd)	6	V
T_a	Operating ambient	-40 to +85	°C
T_{stg}	Storage temperature	-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Rating	Unit
V_{CC}	Power supply (V_{CC} - Gnd)	3 to 5.5	V
T_a	Operating ambient temperature	-40 to +85	°C

ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Min	Typ	Max	Unit
Imod	Range of programmable drive current @200MHz	40	-	110	mA
Vih	PECL input high	-	V_{DD} - 1.75	V_{DD} - 1.6	V
Vil	PECL input low	V_{DD} - 1.05	V_{DD} - 0.95	-	V
I_{CC}	Supply current without modulation current	-	25	45	mA
Vled	LED forward voltage	-	-	2	V
Tr/Tf	Rise/fall time	-	700	1000	ps
Jr	Jitter	-	400	800	ps

PACKAGE OUTLINE (16-pin QSOP)
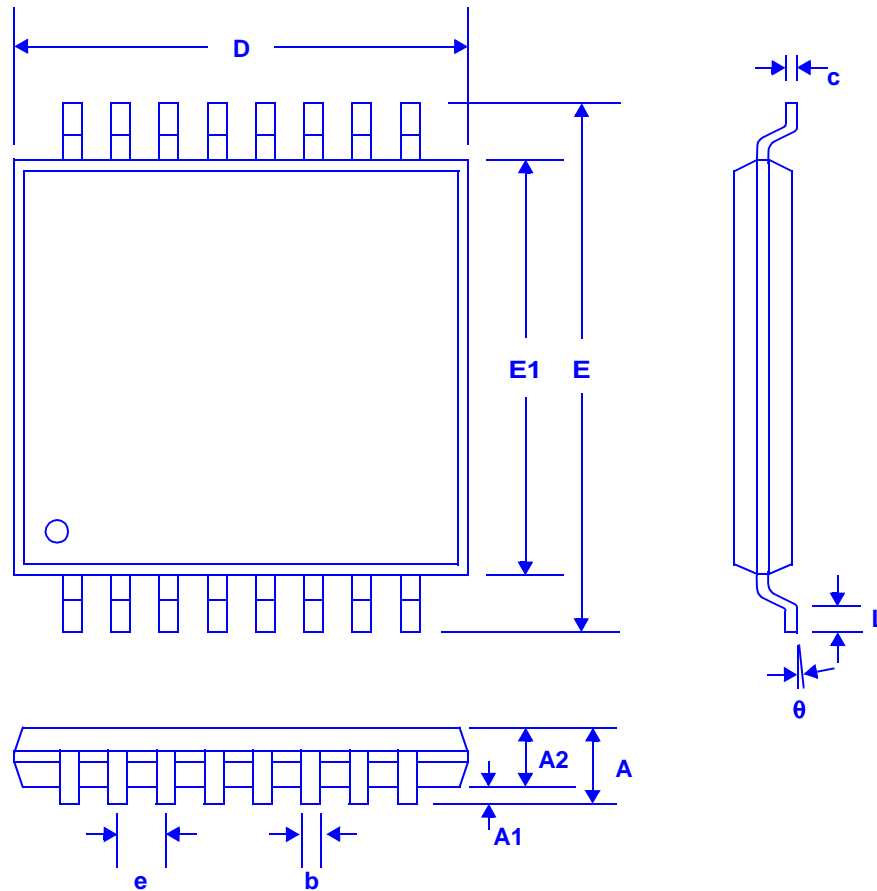
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.346	1.626	1.753	0.053	0.064	0.069
A1	0.102	0.152	0.254	0.004	0.006	0.010
A2	-	-	1.499	-	-	0.059
b	0.203	-	0.305	0.008	-	0.012
c	0.178	-	0.254	0.007	-	0.010
D	4.801	4.902	5.004	0.189	0.193	0.197
E	5.791	5.994	6.198	0.228	0.236	0.244
E1	3.810	3.912	3.988	0.150	0.154	0.157
e	-	0.635	-	-	0.025	-
L	0.406	0.635	1.270	0.016	0.025	0.050
θ	0°	-	8°	0°	-	8°

PACKAGE OUTLINE (20-pin TSSOP)
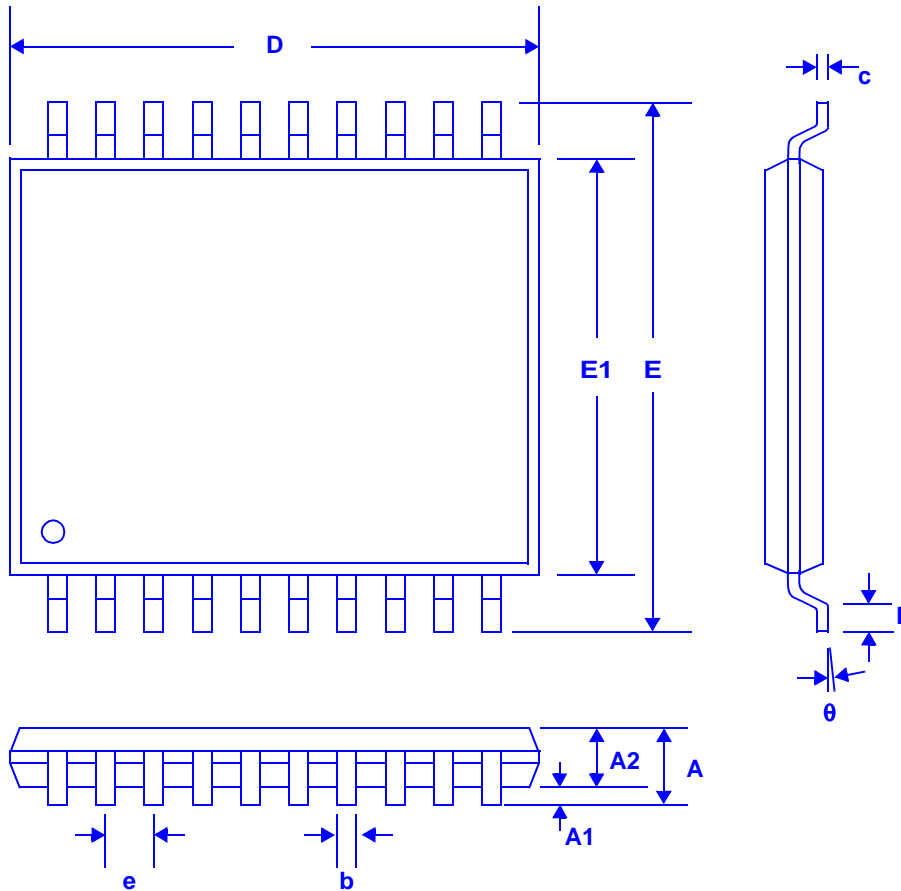
Symbol	Dimensions in Millimeters			Dimensions in Inches		
	MIN	**NOM**	**MAX**	**MIN**	**NOM**	**MAX**
A	-	-	1.2	-	-	0.48
A1	0.05	-	0.15	0.002	-	0.006
A2	0.80	1.00	1.05	0.031	0.039	0.041
b	0.19	-	0.30	0.007	-	0.012
c	0.09	-	0.20	0.004	-	0.008
D	6.40	6.50	6.60	0.252	0.256	0.260
E	-	6.40	-	-	0.252	-
E1	4.30	4.40	4.50	0.169	0.173	0.177
e	-	0.65	-	-	0.026	-
L	0.45	0.60	0.75	0.018	-	0.030
θ	0°	-	8°	0°	-	8°

APPLICATION CIRCUIT SCHEMATICS

VCC=5V APPLICATION CIRCUIT
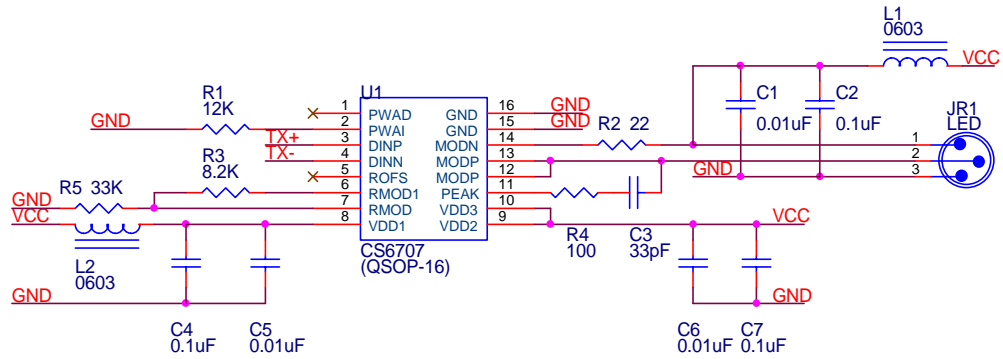
VCC=3.3V APPLICATION CIRCUIT

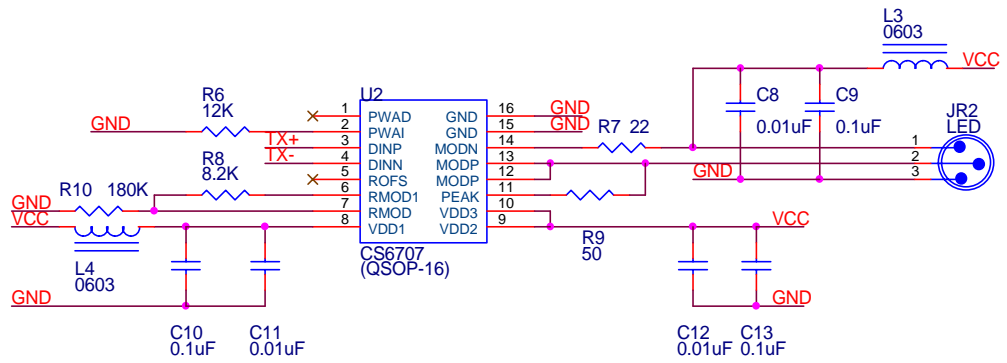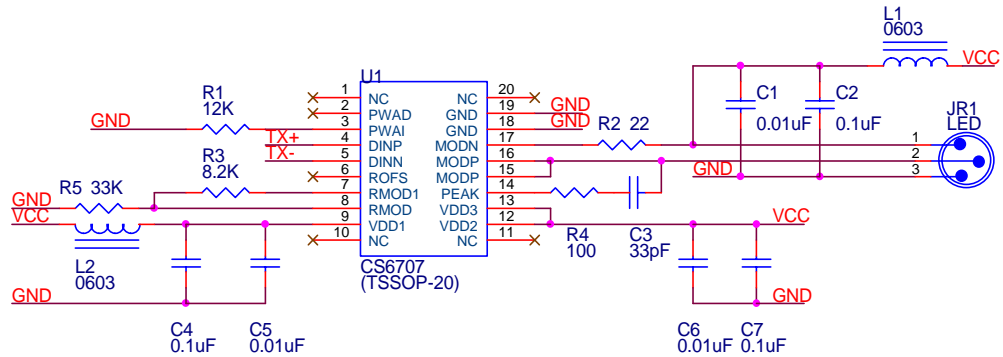**Figure-4 Using QSOP-16 package**

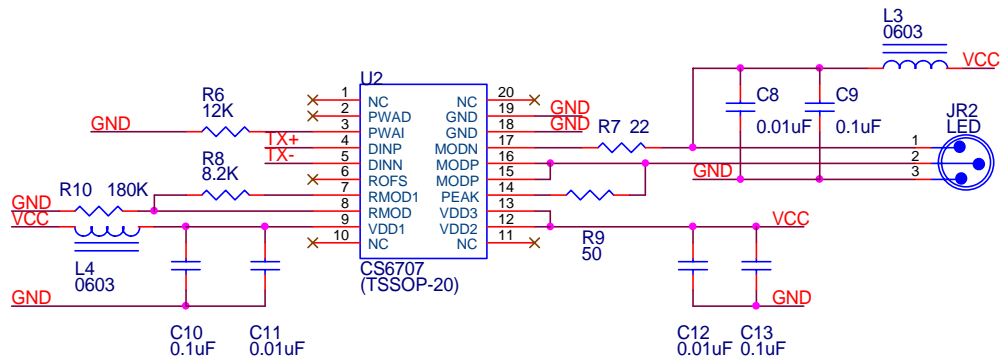**APPLICATION CIRCUIT SCHEMATICS**

VCC=5V APPLICATION CIRCUIT

VCC=3.3V APPLICATION CIRCUIT

Figure-5 Using TSSOP-20 package