A Product Line of
Diodes Incorporated

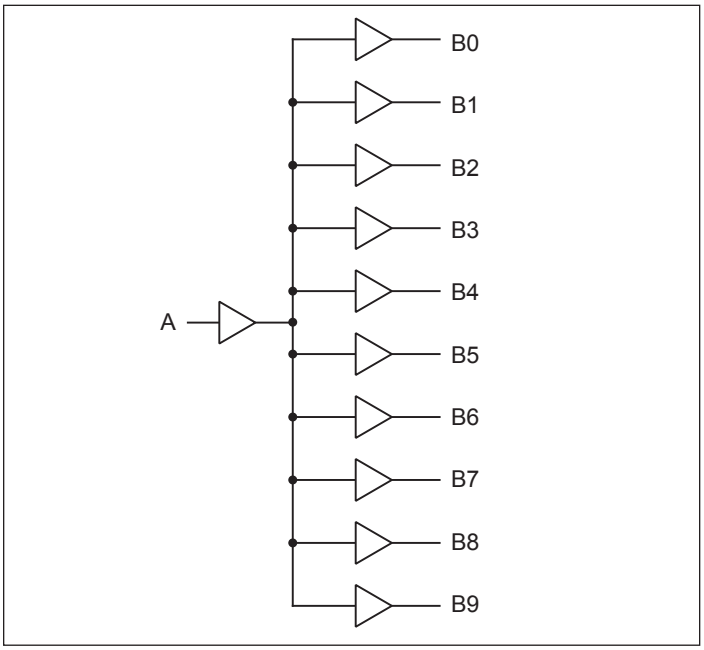
PI49FCT3807

3.3V Fast CMOS Clock Driver

Description

The DIODES PI49FCT3807 is a 3.3V 1-to-10 clock driver. This low skew clock driver features one input and ten outputs fanout. The large fanout from a single input line reduced loading on input clock. TTL level outputs reduce noise levels on the part. Typical applications are clock and signal distribution.

Block Diagram



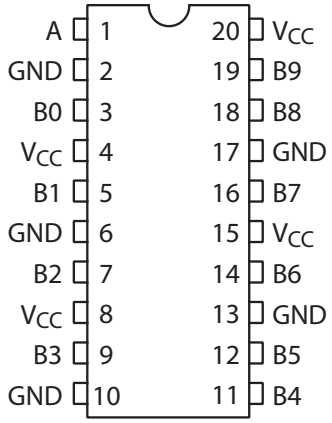
Features

- 3.3V Version of PI49FCT807
- Ultra Low Skew: 0.35ns
- Low Input Capacitance
- Minimum Duty Cycle Distortion
- 1:10 Fanout
- High Speed: 3.5ns Propagation
- TTL Input and CMOS Output Compatible
  - VOH = 3.3V (typical)
  - VOL = 0.3V (typical)
- Industrial Temperature: –40°C to +85°C
- 3.3V ±10% Operation
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. “Green” Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/
- Packaging (Pb-free & Green):
  - 20-pin 150-mil wide QSOP (Q)
  - 20-pin 209-mil wide SSOP (H)

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated’s definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

Pin Configuration



Pin Description

Pin #	Pin Name	Type	Description
1	A	I	Input Clock
3	B_0	O	Output Clock
5	B_1	O	Output Clock
7	B_2	O	Output Clock
9	B_3	O	Output Clock
11	B_4	O	Output Clock
12	B_5	O	Output Clock
14	B_6	O	Output Clock
16	B_7	O	Output Clock
18	B_8	O	Output Clock
19	B_9	O	Output Clock
2, 6, 10, 13, 17	GND	Ground	Ground Supply
4, 8, 15, 20	V_{CC}	Power	Power Supply

Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature	–65°C to +150°C
Ambient Temperature with Power Applied	–40°C to +85°C
Supply Voltage to Ground Potential (Inputs & V_{CC} Only)	–0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)	–0.5V to +7.0V
DC Input Voltage	–0.5V to +7.0V
DC Output Current	120mA
Power Dissipation	0.5W
Latchup	200mA
ESD Protection (Input)	2000V min (HBM)
Junction Temperature	125 °C max

Note:
Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

DC Electrical Characteristics

T_A = –40°C to +85°C V_{CC} = 3.3V ±0.3V

Symbol	Parameter	Test Condition(1)		Min.	Typ.	Max.	Units
V_{OH}	Output High Voltage	V_{CC} = Min., V_{IN} = V_{IL} or V_{IH}	I_{OH} = -0.1mA I_{OH} = -8mA	V_{CC} - 0.2 2.4	– 3.0		V
V_{OL}	Output Low Voltage	V_{CC} = Min., V_{IN} = V_{IL} or V_{IH}	I_{OH} = 0.1mA I_{OH} = 16mA I_{OH} = 24mA		– 0.2 0.3	0.2 0.4 0.5	
V_{IH}	Input High Voltage	Guaranteed Logic HIGH Level (Input pins)		2.0		5.5	
V_{IL}	Input Low Voltage	Guaranteed Logic LOW Level (Input pins)		-0.5		0.8	
I_{IH}	Input High Current	V_{CC} = Max.	V_{IN} = V_{CC}			1	µA
I_{IL}	Input Low Current	V_{CC} = Max.	V_{IN} = GND			-1	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = -18mA			-0.7	-1.2	V
I_{OH}	Output HIGH Current(4,5)	V_{OUT} = 1.5V, V_{IN} =V_{IL} or V_{IH}, V_{CC} = 3.3V		-35	-60	-110	mA
I_{OL}	Output LOW Current(4,5)	V_{OUT} = 1.5V, V_{IN} =V_{IL} or V_{IH}, V_{CC} = 3.3V		50	90	200	
I_{OS}	Short Circuit Current(4,5)	V_{CC} = Max., V_{OUT} = GND		-60	-135	-240	
V_H	Input Hysteresis				150		mV

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 3.3V, +25°C ambient and maximum loading.
3. V_{OH} = V_{CC} – 0.6V at rated current.
4. This parameter is determined by device characterization but is not production tested.
5. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.

Power Supply Characteristics

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}		3	30	µA
ΔI_{CC}	Supply Current per Inputs @ TTL HIGH	V_{CC} = Max.	V_{IN} = V_{CC} 0.6V[3]		2.0	300	
I_{CCD}	Supply Current per Input per MHz[4]	V_{CC} = Max., Outputs OpenPer Output Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND				mA/ MHz

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at V_{CC} = 3.3V, +25°C ambient.
3. Per TTL driven input (V_{IN} = V_{CC} – 0.6V); all other inputs at V_{CC} or GND.
4. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
5. Values for these conditions are examples of the I_C formula. These limits are guaranteed but not tested.

Capacitance

T_A = 25°C, f = 1 MHz

Parameters[1]	Description	Test Conditions	Typ	Max.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	4.5	6.0	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V	5.5	8.0	

Notes:
1. This parameter is determined by device characterization but is not production tested.

Maximum Switching Characteristics

Over operating range

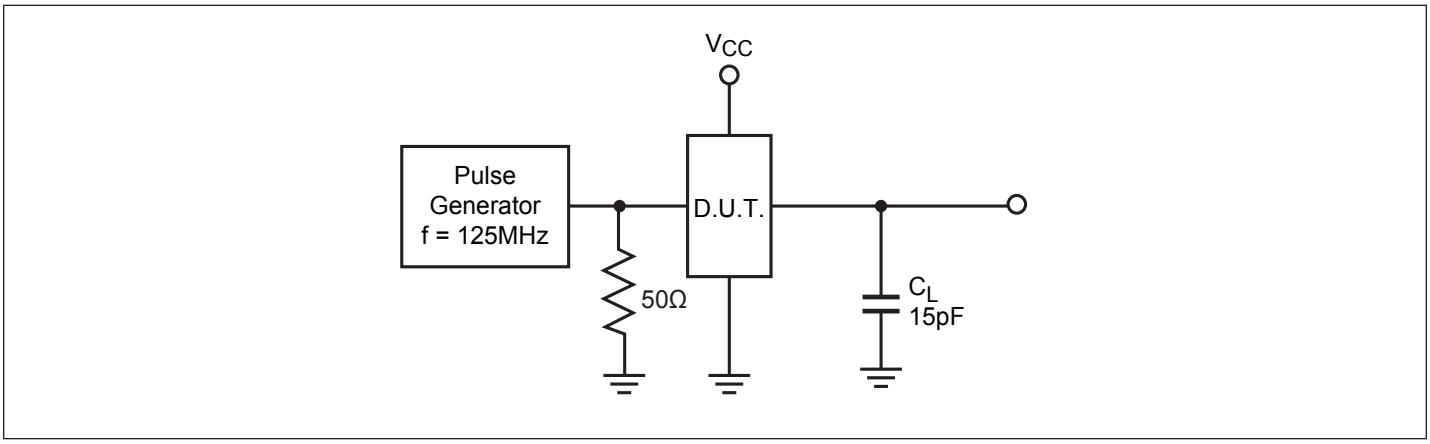
Symbol	Description	Test Conditions	3807 Com.		3087A Com.		3087B Com.		3807C Com.		Units
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
t_{PLH} t_{PHL}	Propagation Delay A to B_N	C_L = 15pF R_L = 500Ω	1.5	4.5	1.5	4.0	1.5	3.8	1.5	3.5	ns
$t_{SK(O)}$	Skew between two outputs of same package[3]			0.5		0.5		0.5		0.5	
$t_{SK(P)}$	Skew between opposite transitions of the same output (t_{PHL} - t_{PHL})[3]			0.5		0.5		0.35		0.35	
t_{DC}	Duty Cycle										
F_{IN}	Skew between outputs of different packages at the same power supply, temp. and speed grade[3]			1.0		1.0		0.75		0.75	

Notes:
1. Other loading condition is described on page 4, “Test Circuits for All Outputs.”
2. These parameters are guaranteed by design.
3. Minimum propagation delay of 1.5ns is guaranteed by design.

Phase Jitter Measurement Data

Frequency Band	Input	Output	Additive Jitter	Unit
12kHz-10MHz	342	483	341	fs_{RMS}
12kHz-20MHz	493	642	411	fs_{RMS}

Tests Circuits for All Outputs

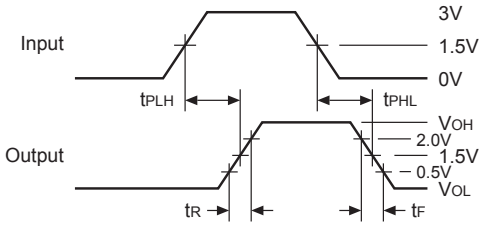


Switch Position

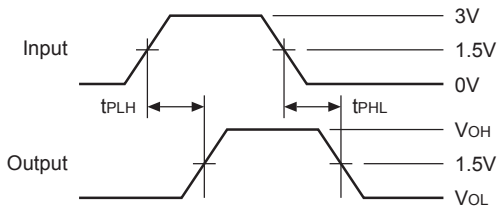
Test	Switch
Disable LOW Enable LOW	6V
Disable HIGH Enable HIGH	GND
All Other Inputs	Open

Switching Waveforms

Propagation Delay

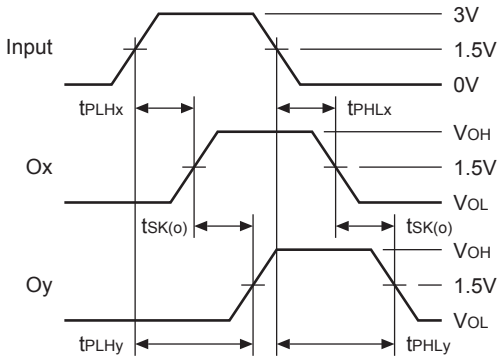


Pulse Skew – $t_{SK(p)}$



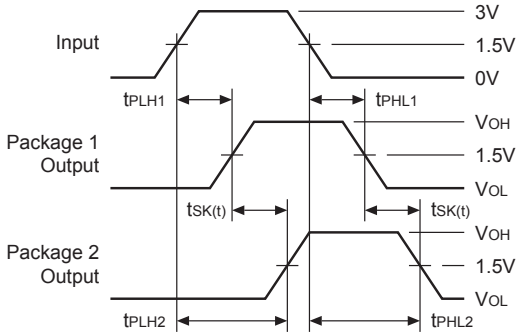
$t_{SK(p)} = | t_{PHL} - t_{PLH} |$

Output Skew – $t_{SK(o)}$



$t_{SK(o)} = | t_{PLHy} - t_{PLHx} |$ or $| t_{PHLy} - t_{PHLx} |$

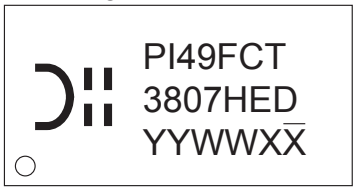
Package Skew – $t_{SK(t)}$



$t_{SK(t)} = | t_{PLH2} - t_{PLH1} |$ or $| t_{PHL2} - t_{PHL1} |$

Part Marking

H Package



D: Speed Code
YY: Year
WW: Workweek
1st X: Assembly Code
2nd X: Fab Code

Q Package

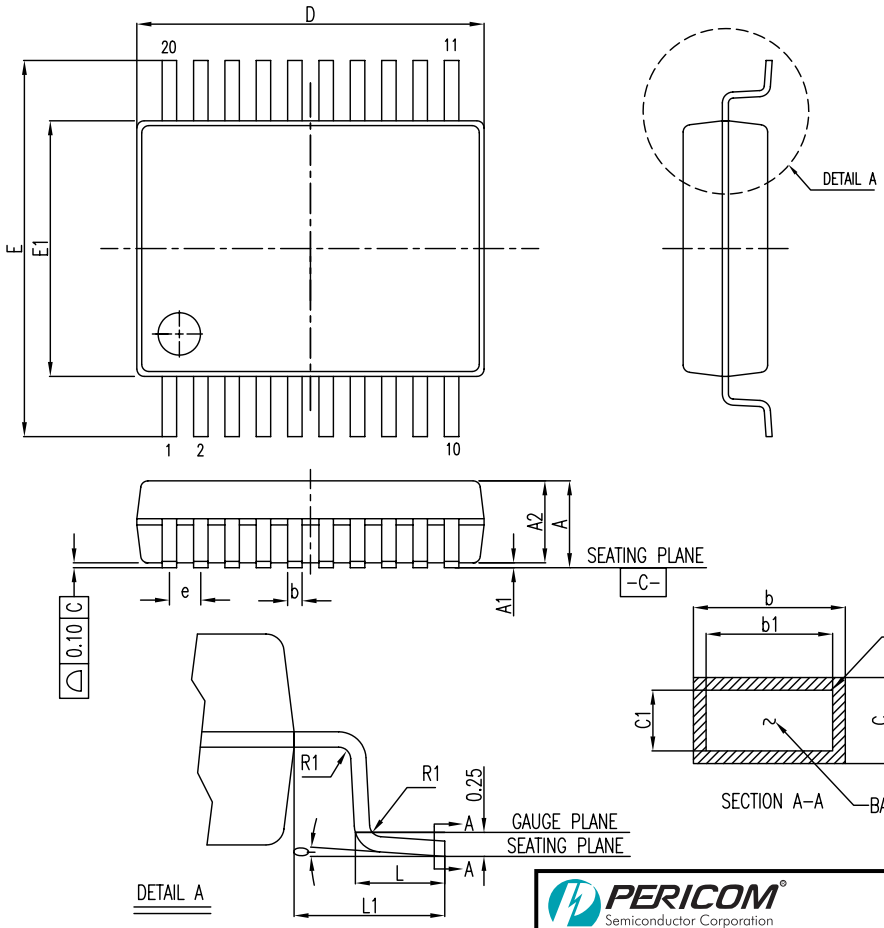
YY: Year
WW: Workweek
1st X: Assembly Code
2nd X: Fab Code

B: Speed Code
YY: Year
WW: Workweek
1st X: Assembly Code
2nd X: Fab Code

C: Speed Code
YY: Year
WW: Workweek
1st X: Assembly Code
2nd X: Fab Code

Packaging Mechanical

20-SSOP (H)



SYMBOL	COMMON DIMENSION MILLIMETERS		
	MIN.	NOM.	MAX.
A	--	--	2.0
A1	0.05	--	--
A2	1.65	1.75	1.85
b	0.22	--	0.38
b1	0.22	0.30	0.33
c	0.09	--	0.25
c1	0.09	0.15	0.21
E	7.40	7.80	8.20
E1	5.00	5.30	5.60
D	6.90	7.20	7.50
e	0.65 BSC		
L	0.55	0.75	0.95
L1	1.25 REF.		
R1	0.09	--	--
θ	0°	4°	8°

NOTE:
1. Controlling dimensions in millimeters
2. Ref.: JEDEC MO-150B/AE
3. Package Outline Exclusive of Mold Flash and Metal Burr

PERICOM Semiconductor Corporation

DATE: 10/31/13

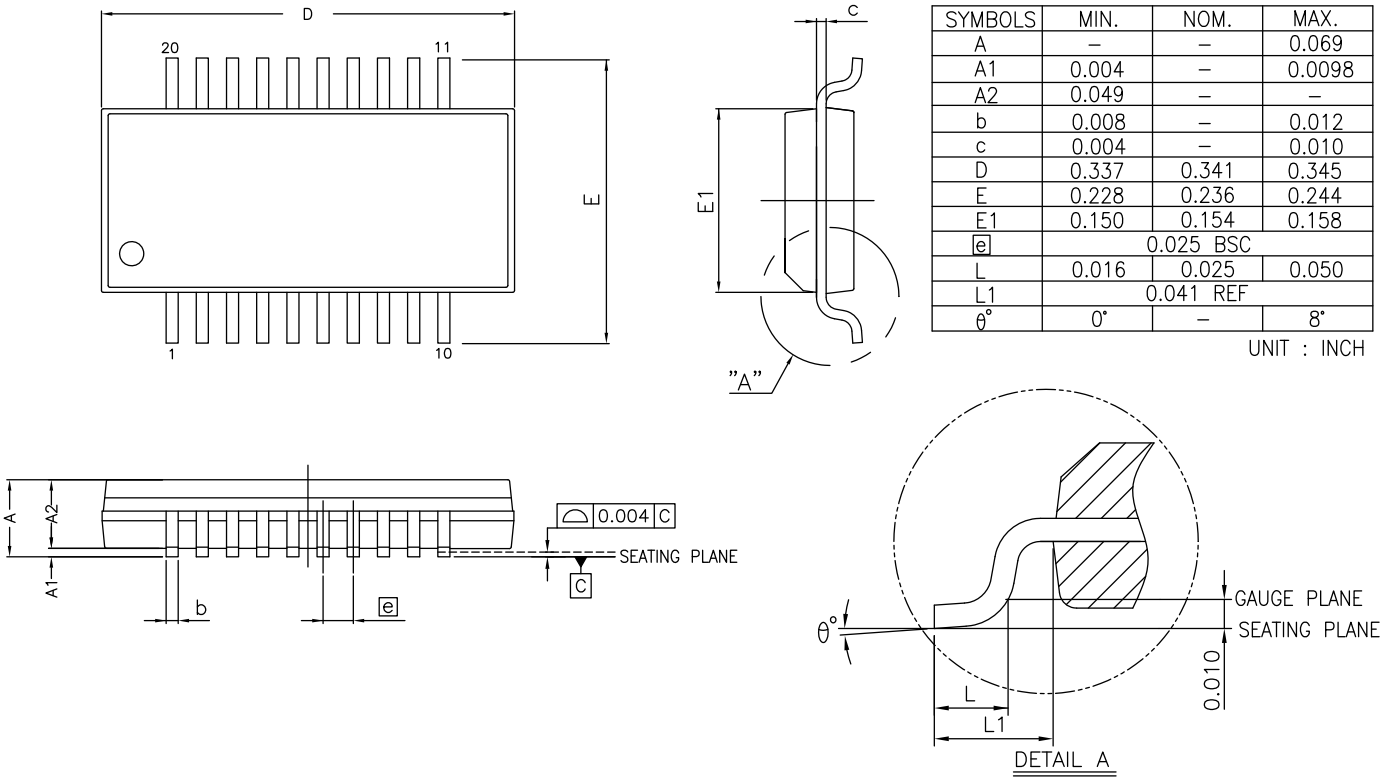
DESCRIPTION: 20-Pin, 209-Mil Wide, SSOP

PACKAGE CODE: H20

DOCUMENT CONTROL #: PD-1240 REVISION: F

13-0214

20-QSOP (Q)



SYMBOLS	MIN.	NOM.	MAX.
A	–	–	0.069
A1	0.004	–	0.0098
A2	0.049	–	–
b	0.008	–	0.012
c	0.004	–	0.010
D	0.337	0.341	0.345
E	0.228	0.236	0.244
E1	0.150	0.154	0.158
e	0.025 BSC		
L	0.016	0.025	0.050
L1	0.041 REF		
θ°	0°	–	8°

UNIT : INCH

NOTES:
1. ALL DIMENSIONS IN INCH. ANGLES IN DEGREES.
2. JEDEC MO-137E
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

16-0057

PERICOM Enabling Serial Connectivity

DATE: 03/24/16

DESCRIPTION: 20-PIn, 150mIl WIde QSOP

PACKAGE CODE: Q (Q20)

DOCUMENT CONTROL #: PD-1202 REVISION: I

For latest package info.

please check: http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/

Ordering Information

Ordering Code	Package Code	Speed Grade	Package Description
PI49FCT3807BQEX	Q	B	20-pin 150-mil QSOP
PI49FCT3807CQEX	Q	C	20-pin 150-mil QSOP
PI49FCT3807DHEX	H	D	20-pin 209-mil SSOP
PI49FCT3807DQEX	Q	D	20-pin 150-mil QSOP
PI49FCT3807QEX	Q	Blank	20-pin 150-mil QSOP

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. E = Pb-free and Green
5. X suffix = Tape/Reel

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