CS1107

Single Relay Driver IC

This ASIC provides up to 350 mA of drive current for driving a relay. On–chip diagnostic features include open and short circuit detection in the on state, duty cycle current limit control, and thermal shutdown. Faults are reported on the Fault lead. Fault is an active–low output. An on–chip zener provides protection from flyback pulses from the relay. Internal pull–down circuitry is provided to ensure the output pin turns off when the Control pin is floating.

Features

- Fault Detection
 - Open Circuit
 - Short Circuit
 - Overtemperature
- On-Chip Flyback Protection
- Low Standby Current
- Internally Fused Leads in SO-8 Package

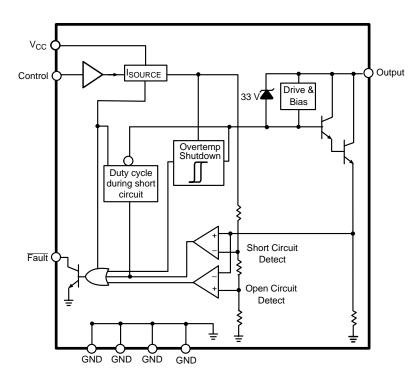


Figure 1. Block Diagram



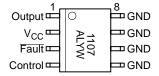
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SO-8 DF SUFFIX CASE 751

PIN CONNECTIONS AND MARKING DIAGRAM



A = Assembly Location

WL, L = Wafer Lot YY, Y = Year WW, W = Work Week

ORDERING INFORMATION

Device	Package	Shipping
CS1107EDF8	SO-8	95 Units/Rail
CS1107EDFR8	SO-8	2500 Tape & Reel

CS1107

MAXIMUM RATINGS*

Rating			Unit
Storage Temperature		-65 to +150	°C
V _{CC} , Fault, Control		-0.5 to 6.0	V
ESD Capability (Human Body Model)		2.0	kV
Peak Transient Voltage (output off mode, output pin only)	(26 V Load Dump @ 14 V V _{BAT})	40	V
Lead Temperature Soldering:	Reflow: (SMD styles only) (Note 1)	230 peak	°C

^{1. 60} second maximum above 183°C.

ELECTRICAL CHARACTERISTICS $(4.75 \le V_{CC} \le 5.25 \text{ V}, -40^{\circ}\text{C} \le T_{A} \le 85^{\circ}\text{C}, -40^{\circ}\text{C} \le T_{J} \le 150^{\circ}\text{C}; \text{ unless otherwise specified.})$

Characteristic	Test Conditions	Min	Тур	Max	Unit
Supply Requirements					
V _{CC} Quiescent Current	Output ON	-	3.0	6.0	mA
V _{CC} Quiescent Current	Output OFF	-	70	250	μΑ
Output					
Leakage Current	V _{BAT} = 14 V	-	0	100	μΑ
Saturation Voltage	I _{OUTPUT} = 350 mA I _{OUTPUT} = 180 mA	_ _	1.1 0.9	1.5 1.3	V V
V _{CLAMP}	V _{CC} < 4.5 V, I _{OUTPUT} = 180 mA	29	33	36	V
Current Sense	•				
Short Circuit Current	-	350	500	650	mA
Open Circuit Current	Output in the ON state	20	40	60	mA
Control-Input	•				
Input Voltage	Logic = High Logic = Low	2.0	_ _	0.8	V
Input Current	Control = V _{CC}	_	40	80	μΑ
Fault Output – (Open Collector)					
Output Low Voltage	I _{FAULT} = 250 μA (sink)	-	0.24	0.40	V
Overtemperature Shutdown					
T _J Output Disable Threshold	(Guaranteed by Design)	150	180	_	°C
T _J Hysteresis	(Guaranteed by Design)	5.0	_	_	°C

PACKAGE PIN DESCRIPTION

PACKAGE PIN #		
8 Lead SO Narrow	PIN SYMBOL	FUNCTION
1	Output	Open collector output.
2	Vcc	5.0 V regulated supply input.
3	Fault	Open collector diagnostic output low during open load, short circuit and overtemperature conditions.
4	Control	TTL compatible input. A high on this pin turns the output on.
5, 6, 7, 8	Ground	Signal ground.

^{*}The maximum package power dissipation must be observed.

CS1107

CIRCUIT DESCRIPTION

The CS1107 relay driver IC provides up to 350 mA of drive current in a low–side configuration. The Output driver pin is controlled through the TTL compatible Control input pin. A high condition on the Control pin turns the output pin on.

The Fault pin reports short circuit, open circuit, and overtemperature conditions on the IC. If a fault is present, the open collector output Fault pin will be low. Typical numbers for faults are: exceeding 500 mA of drive current will report a short circuit. Less than 40 mA (typical) will report an open circuit. A temperature fault will be reported when the die temperature exceeds 180°C (typical). Faults

are only reported when the Control pin is high, due to the low quiescent current when the Control pin is low and the output device is turned off.

Overcurrent protection is provided by duty cycle control. When the Output current exceeds the current limit threshold, the output enters duty cycle mode to reduce power dissipation of the IC to a safe level. The higher the threshold is exceeded the lower the duty cycle becomes.

A 33 V on-chip zener diode on the Output pin protects the device from flyback pulses when a relay is turned off. The saturation voltage of this pin will not exceed 1.5 V at 350 mA.

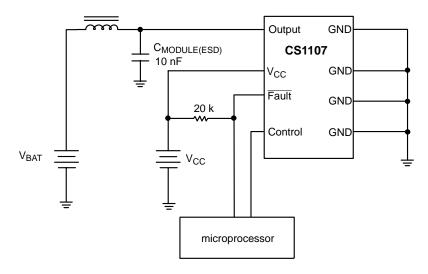


Figure 2. Applications Diagram

PACKAGE DIMENSIONS

SO-8 DF SUFFIX CASE 751-07 ISSUE V B 1 C SEATING PLANE D 0.10 (0.004) M

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
Α	4.80	5.00	0.189	0.197
В	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
Н	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0 °	8 °	0 °	8 °
N	0.25	0.50	0.010	0.020
S	5.80	6 20	0.228	0.244

PACKAGE THERMAL DATA

0.25 (0.010) M Z Y S

Parameter		SO-8	Unit	
$R_{\Theta JC}$	Typical	25	°C/W	
$R_{\Theta JA}$	Typical	110	°C/W	

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