Receiver IC for infrared remote control (including photo-diode)

TSA9036/TSA9037

GENERAL DESCRIPTION

The TSA9036 and TSA9037 are remote control receivers containing, in the same package SOT294, a pin photo-diode and a bipolar integrated circuit. The photo-diode has 5 mm² sensitive area. The bipolar IC is designed to perform all filter, amplifier and pulse shaping functions required for a fully integrated IR-receiver. The typical signals sent from a IR-transmitter may be biphase coded (e.g. RC5) or pulse distance coded (RECS 80), based on a infrared wavelength of 950 ± 70 nm.

FEATURES

- Coded optical signal reception.
- On board voltage reference and ripple rejection.
- Automatic bias level control input stage providing rejection of sunlight and incandescent lamp interferences.
- Limiter.
- Band-pass filter with internal capacitors.
- Amplifiers with controlled gain (AGC) by means of an external capacitor.
- Pulse shaper.
- Active LOW output (TSA9036).
- Active HIGH output (TSA9037).

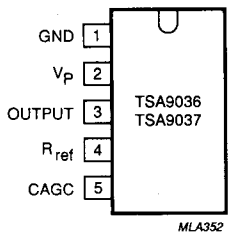

Fig.1 Pinning diagram.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_P	supply voltage range	4.5	5.0	5.5	V
I_P	supply current (see note 1)	-	-	2.2	mA
f_o	carrier frequency	-	36	-	kHz
T_{amb}	operating ambient temperature range	0	-	+85	°C

Note

1. In complete darkness without load on output.

PINNING

SYMBOL	PIN	DESCRIPTION
GND	1	ground
V_P	2	supply voltage
OUTPUT	3	output signal
R_{ref}	4	reference voltage and current input
CAGC	5	AGC control

ORDERING AND PACKAGE INFORMATION

EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
TSA9036, TSA9037	5	SIL	plastic	SOT294

LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_P	supply voltage		–0.3	6.5	V
V_O	output voltage		–0.3	6.5	V
I_O	output current DC		-	note 1	mA
P_d	total power dissipation		-	note 1	mW
T_{stg}	storage temperature range		–40	+85	°C
T_{amb}	operating ambient temperature range		0	+85	°C
T_j	operating junction temperature		-	150	°C

Note

1. Value to be fixed.

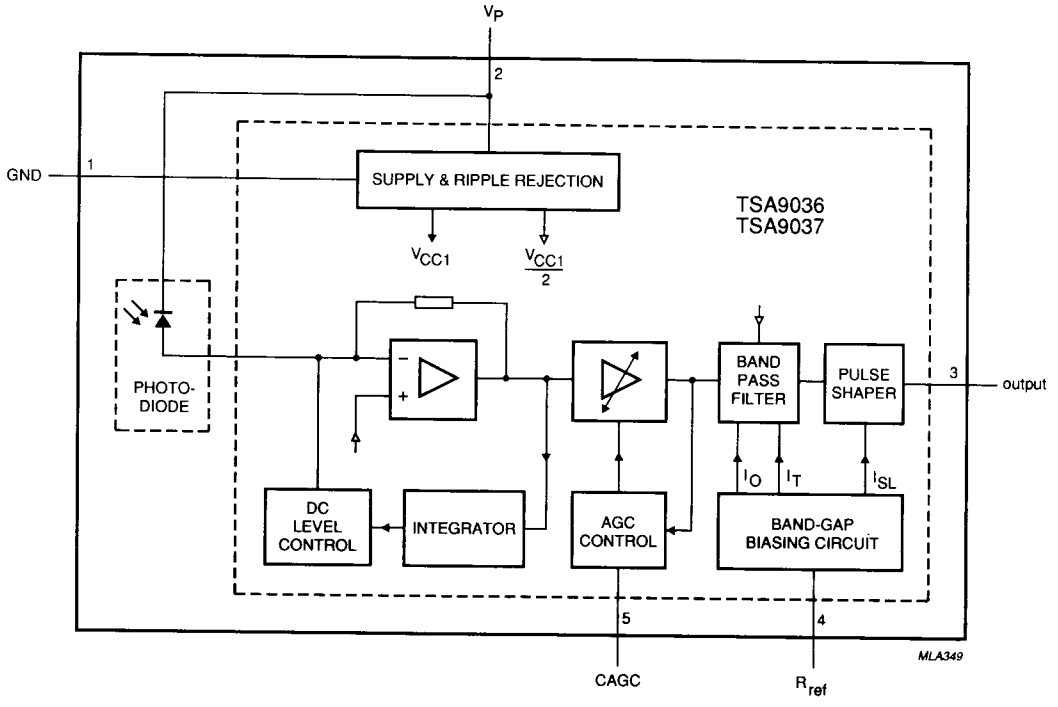

Fig.2 Block diagram.

CHARACTERISTICS

V_P = +5 V; T_{amb} = +25 °C, unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply						
V_P	supply voltage		4.5	5.0	5.5	V
I_P	supply current	note 1	-	-	note 4	mA
Input stage						
-	DC voltage		-	1.4	-	V
-	compensated DC signal		-	-	3	mA
-	AC signal		-	note 4	-	
Z_I	imput impedance		-	note 4	-	
-	sensitivity	note 2	-	note 4	-	nA
Band-pass filter						
f_0	centre frequency		-	36	-	kHz
$\left\|\frac{\Delta\phi_0}{f_0}\right\|$	tolerance on f_0	R_{ref} = note 4	-	15	-	%
BW	bandwidth (−3 dB)		-	note 4	-	MHz
AGC detector						
V_{AGC}	control voltage		note 4	-	note 4	V
A_{AGC}	AGC control range		55	60	65	dB
t_{attack}	attack time, see Fig.3	CAGC = note 4	-	150	-	µs
t_{hold}	hold time see, Fig.3	CAGC = note 4	-	10	-	ms
Optical sensitivity						
E_e	irradiance	note 3	-	0.25	0.5	mW/m²
Output						
V_{OH}	signal output voltage, HIGH		3.5	-	-	V
I_{OH}	signal output current, HIGH		−200	-	-	µA
V_{OL}	output voltage , LOW		0	-	0.8	V
I_{OL}	signal output current, LOW		-	-	1	mA
Switching time (see Fig.4)						
t_r	rise time	C_L = 15 pF	-	note 4	-	ns
t_f	fall time	C_L = 15 pF	-	note 4	-	ns

Notes

1. In complete darkness without load on output.
2. Peak value of current pulses at f_0 necessary to create correct data at the output. Duty factor = 50%; I_{DC} = 0.
3. The receiver sensitivity is the irradiance E_e (radiometric) necessary to create a correct data output (according to UAW 0422 par.4 at 0 deg off-axis).
4. Value to be fixed.

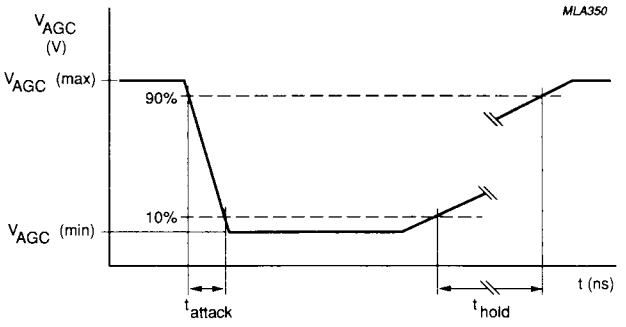

Fig.3 AGC attack and hold times.

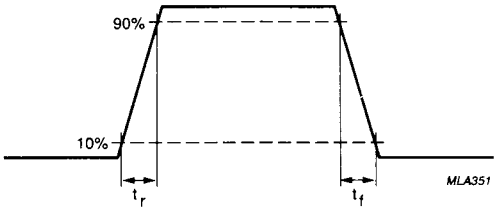

Fig.4 Switching times with a C_L = 15 pF at the output.

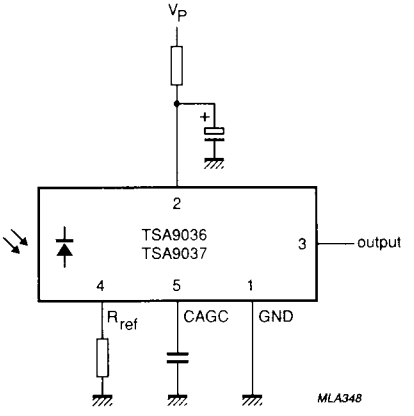

Fig.5 Typical application diagram.