

Features

- Complete PWM power control circuitry
- Uncommitted outputs for 200mA sink or source current
- OUTPUT CONTROL selects single-ended or push-pull
- Internal circuitry prohibits double pulse at either output
- Variable dead-time provides control the total range
- Internal regulator provides 5V reference supply, 1%
- Circuit architecture allows easy synchronization

Applications

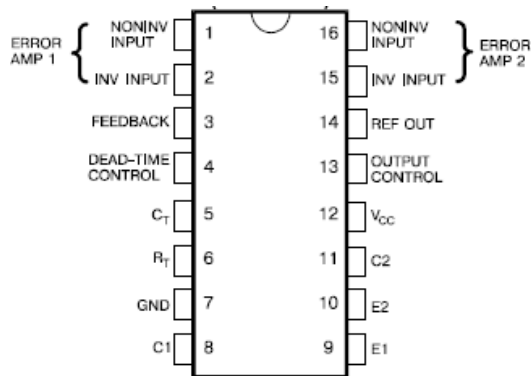
- Power supply control

General Description

The LD6211 incorporate on a single monolithic chip all the functions required in the construction of a pulse-width-modulation control circuit. Designed primarily for power supply control, these devices offer the systems engineer a flexibility to tailor the power supply control circuitry to one's application.

The LD6211 contain an error amplifier, an on-chip adjustable oscillator, a dead-time control comparator, a pulse-steering control flip-flop, a 5-volt regulator (1% precision) and output control circuits. The error amplifier exhibits a common-mode voltage range from -0.3V to $V_{CC}-2V$. The dead-time control comparator has a fixed offset that provides approximately 5% dead time when externally altered. The on-chip oscillator may be bypassed by terminating R_T (pin 6) to the reference output and providing a sawtooth input to C_T (pin 5), or it may be used to drive the common circuits in synchronous multiple-rail power supplies. The uncommitted output transistors provide either common-emitter or emitter-follower output capability. Each device provides for push-pull or single-ended output operation, which may be selected through the output-control function. The architecture of these devices prohibits the possibility of either output being pulsed twice during push-pull operation

Package Pin Out



Ordering Information

Part No.	Package	Packing Options	
		Tube (TU)	Tape & Reel (TR)
LD6211	SOP-16	LD6211S3-TU	LD6211S3-TR

- Package material default is "Green" package.

Product Marking

LD8888	◇ Line 1 – "LD" is a fixed character
SSSSS...	8888: product name
●	◇ Line 2 – SSSSS...: lot number

Absolute Maximum Ratings

Parameter	Maximum	Unit
Supply voltage, V_{CC}	+41	V
Amplifier input voltage, V_I	$V_{CC}+0.3$	V
Collector output voltage, V_O	+41	V
Collector output current, I_O	250	mA
Operation temperature range	-40 to +125	°C
Storage Temperature	-65 to +150	°C

The values beyond the boundaries of absolute maximum rating may cause the damage to the device. Functional operation in this context is not implied. Continuous use of the device at the absolute rating level might influence device reliability. All voltages have their reference to device ground.

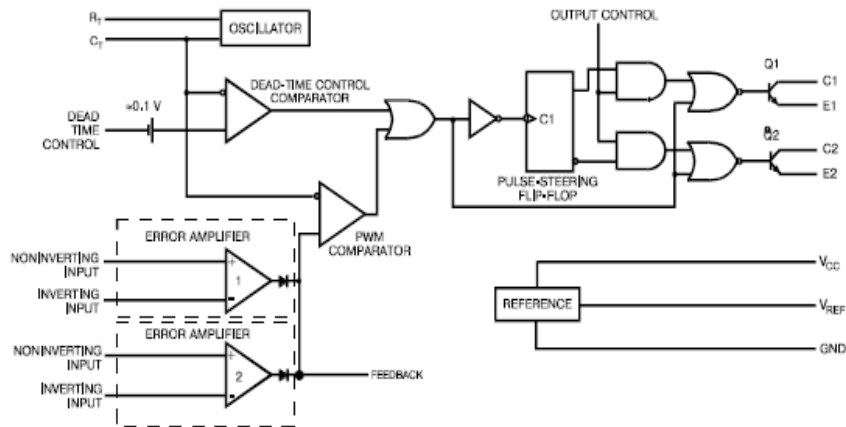
Electrical Characteristics

$V_{CC}=15V$, $f=10K$, $T_A=25^\circ C$ unless specified, otherwise minimum and maximum values are guaranteed by production testing requirements.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	
Reference							
Reference output voltage	V_{REF}	$I_O = 1mA$, $T_A > 25^\circ C$	4.9	5	5.1	V	
		$I_O = 1mA$	4.95	5	5.05		
Line regulation	$V_{REFLINE}$	$V_{CC} = 7V$ to 40V	–	2	25	mV	
Load regulation	$V_{REFLOAD}$	$I_O = 1mA$ to 10mA	–	1	15	mV	
Short circuit output current	I_S	$V_{REF} = 0$	10	35	50	mA	
Oscillator							
Oscillator frequency	F_{OSC}	$C_T = 0.01\mu F$, $R_T = 12K\Omega$	9.2	10	10.8	KHz	
		$C_T = 0.01\mu F$, $R_T = 12K\Omega$, $T_A > 25^\circ C$	9.0	–	12		
Frequency change with temperature	ΔF_{OSC}	$\Delta T_A = -40$ to $125^\circ C$	–	–	2	KHz	
Error Amplifier							
Input offset voltage	V_{IOFST}	$V_{FB} = 2.5V$	–	2	10	V	
Input offset current	I_{IOFST}	$V_{FB} = 2.5V$	–	25	25	nA	
Input bias current	I_{IBIAS}	$V_{FB} = 2.5V$	–	0.2	1	μA	
Common mode input voltage range	V_{ICOMM}	$V_{CC} = 7V$ to 40V	-0.3 ~ $V_{CC}-2$	–	–	V	
Open loop voltage amplifier	G_{OL}	$\Delta V_O = 3V$, $R_L = 2K\Omega$, $V_O = 0.5V$ to 3.5 V	70	95	–	dB	
Unit gain bandwidth	G_{BW}	–	–	650	–	KHz	
Output Transistors							
Collector off-state current	V_{COFF}	$V_{CE} = 40V$, $V_{CC} = 40V$	–	2	100	μA	
Emitter off-state current	V_{EOFF}	$V_{CC} = V_C = 40V$, $V_E = 0$	–	–	-100	μA	
Collector to Emitter saturation voltage	Common emitter	V_{CESAT}	$V_E = 0$, $I_C = 200mA$	–	1.1	1.3	V
			Emitter follower	$V_C = 15V$, $I_E = -200mA$	–	1.5	
Output control input current	I_{IOC}	$V_I = V_{REF}$	–	–	3.5	mA	
Dead Time Control							
Input bias current	$I_{DTIBIAS}$	$V_I = 0V$ to 5.25V	–	-2	-10	μA	
Max. duty cycle	D_{CYCLE}	$V_I = 0V$, $O.C. = V_{REF}$	45	–	–	%	
Input threshold voltage	V_{DTITH}	Zero duty cycle	–	3	3.3	V	
		Max. duty cycle	0	–	–		
PWM Comparator							
Input threshold voltage	V_{PWNITH}	Zero duty cycle	–	4	4.5	V	
Input threshold current	I_{PWNITH}	$V_{FB} = 0.7V$	0.3	0.7	–	mA	

Supply Current						
Standby supply current	I_{CCSTB}	$V_{RT} = V_{REF}, V_{CC} = 15V$	–	6	10	mA
Switching Time						
Output voltage rise time	T_{CRISE}	Common emitter configuration	–	100	200	ns
Output fall time	T_{CFALL}		–	25	100	ns
Output voltage rise time	T_{ERISE}	Emitter follower configuration	–	100	200	ns
Output fall time	T_{EFALL}		–	25	100	ns

Block Diagram



PARAMETER MEASUREMENT INFORMATION

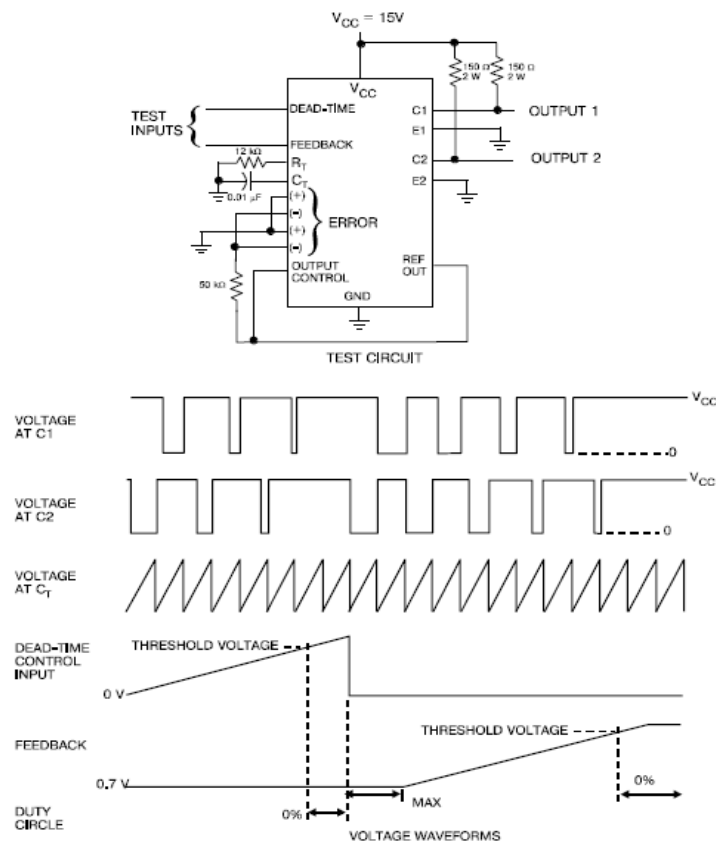


Fig. 1 Operational test circuit and waveforms

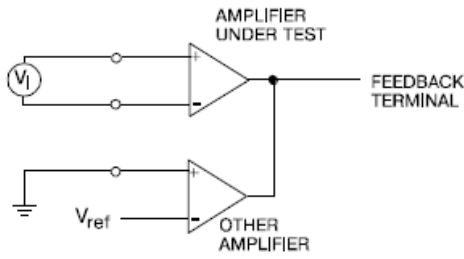


Fig. 2 Amplifier characteristics

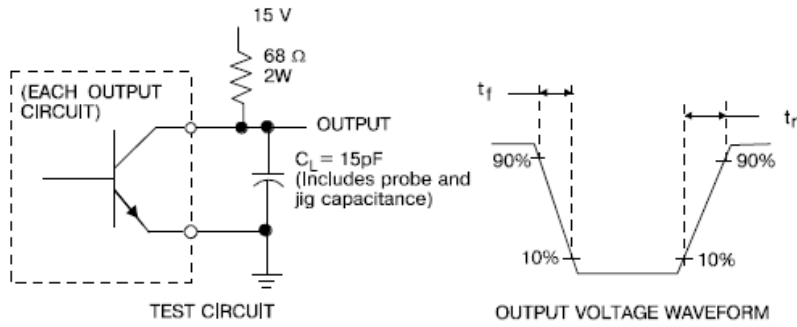


Fig. 3 Common-Emitter configuration

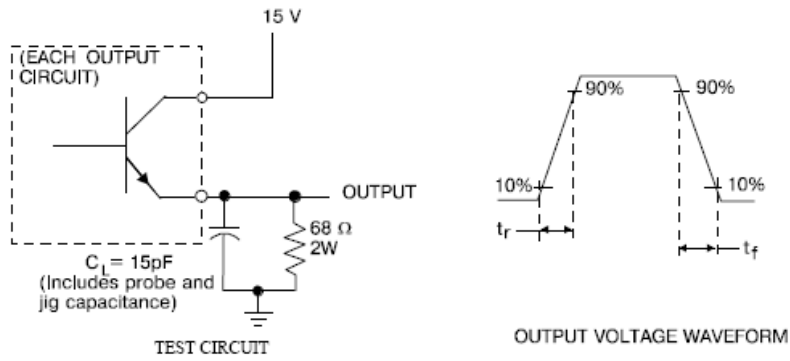
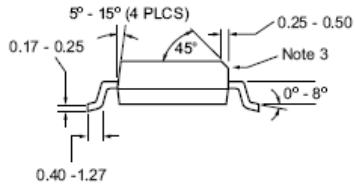
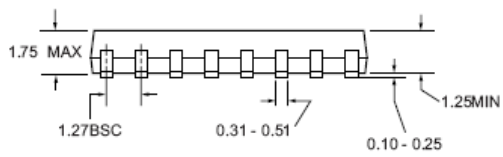
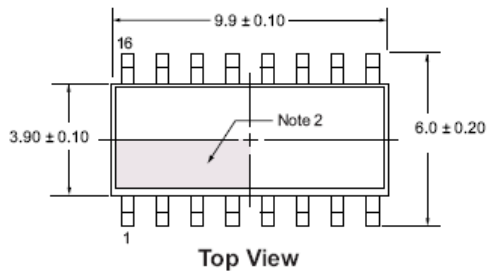


Fig. 4 Emitter-follower configuration

Package Outline



Unit: Millimeters

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