SA56

PRELIMINARY

FEATURES

- DELIVERS UP TO 5A CONTINUOUS OUTPUT
- OPERATES AT SUPPLY VOLTAGES UP TO 55V
- TTL AND CMOS COMPATIBLE INPUTS
- NO "SHOOT-THROUGH" CURRENT
- THERMAL WARNING FLAG OUTPUT AT 145°C
- THERMAL SHUTDOWN (OUTPUTS OFF) AT 160°C
- INTERNAL CLAMP DIODES
- SHORTED LOAD PROTECTION
- INTERNAL CHARGE PUMP WITH EXTERNAL BOOTSTRAP CAPABILITY
- 45KHZ ONBOARD PWM

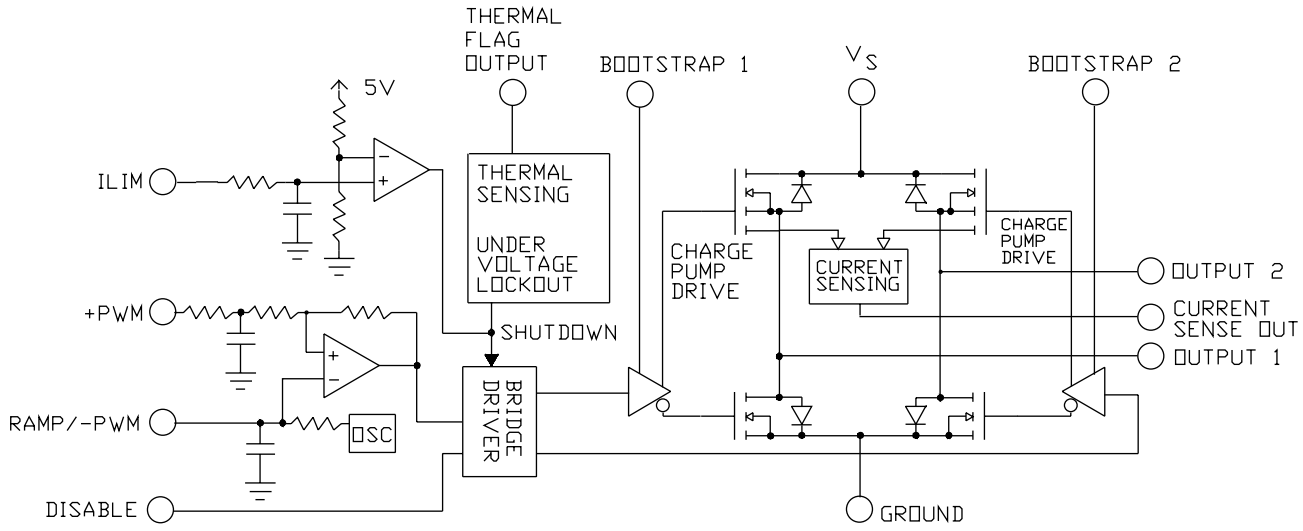
APPLICATIONS

- DC AND STEPPER MOTOR DRIVES
- POSITION AND VELOCITY SERVOMECHANISMS
- FACTORY AUTOMATION ROBOTS
- NUMERICALLY CONTROLLED MACHINERY
- COMPUTER PRINTERS AND PLOTTERS

DESCRIPTION

The SA56 is a 5A PWM Amplifier designed for motion control applications. The device is built using a multi-technology process which combines bipolar and CMOS control circuitry with DMOS power devices on the same monolithic structure. Ideal for driving DC and stepper motors; the SA56 accomodates peak output currents up to 10A. An innovative circuit which facilitates low-loss sensing of the output current has been implemented. On board PWM oscillator and comparator are used to convert an analog signal into PWM direction and magnitude for motor control applications, or to amplify audio signals using class D amplification.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

SUPPLY VOLTAGE, V_S, Pin 6	60V
VOLTAGE at Pins 3, 4, 5, 8 and 9	12V
VOLTAGE at Bootstrap Pins (Pins 1 and 11)	V_{OUT} ±16V
PEAK OUTPUT CURRENT (200mS)	10A
CONTINUOUS OUTPUT CURRENT (Note 2)	5A
POWER DISSIPATION (Note 3)	25W
POWER DISSIPATION (T_A = 25°C, Free Air)	3W
JUNCTION TEMPERATURE, $T_{J(MAX)}$	150°C
ESD SUSCEPTIBILITY (Note 4)	1500V
STORAGE TEMPERATURE, T_{STG}	–40°C to +150°C
LEAD TEMPERATURE (Soldering, 10 sec.)	300°C
JUNCTION TERMPERATURE, T_J	–40°C to +125°C
V_S SUPPLY VOLTAGE	+12V to +55V

SPECIFICATIONS

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
SWITCH ON RESISTANCE, R_{DS}(ON)	Output Current = 5A		0.33	0.6	Ω
CLAMP DIODE FORWARD DROP, V_{CLAMP}	Clamp Current = 5A		1.2	1.5	V
LOGIC LOW INPUT VOLTAGE, V_{IL}	Pins 3, 4, 5			–0.1	V
				0.8	V
LOGIC LOW INPUT CURRENT, I_{IL}	V_{IN} = –0.1V, Pins = 3, 4, 5			–10	µA
LOGIC HIGH INPUT VOLTAGE, V_{IH}	Pins 3, 4, 5			2	V
				12	V
LOGIC HIGH INPUT CURRENT, I_{IH}	V_{IN} = 12V, Pins = 3, 4, 5			10	µA
CURRENT SENSE OUTPUT	I_{OUT} = 1A		485	560	µA
CURRENT SENSE LINEARITY	1A ≤ I_{OUT} ≤ 5A		±6	±9	%
UNDERVOLTAGE LOCKOUT	Outputs Turn OFF			9	V
UNDERVOLTAGE LOCKOUT	Outputs Turn ON			11	V
WARNING FLAG TEMPERATURE, T_{JW}	Pin 9 ≤ 0.8V, I_L = 2 mA		145		°C
FLAG OUTPUT SATURATION VOLTAGE, V_F(ON)	T_J = T_{JW}, I_L = 2 mA		0.15		V
FLAG OUTPUT LEAKAGE, I_F(OFF)	V_F = 12V		0.2	10	µA
SHUTDOWN TEMPERATURE, T_{JSD}	Outputs Turn OFF		160	175	°C
QUIESCENT SUPPLY CURRENT, I_S	All Logic Inputs Low		13	25	mA
OUTPUT TURN-ON DELAY TIME, t_{Don}	Sourcing Outputs, I_{OUT} = 1A		300		ns
	Sinking Outputs, I_{OUT} = 1A		300		ns
OUTPUT TURN-ON SWITCHING TIME, t_{on}	Bootstrap Capacitor = 10 nF				
	Sourcing Outputs, I_{OUT} = 1A		100		ns
	Sinking Outputs, I_{OUT} = 1A		80		ns
OUTPUT TURN-OFF DELAY TIMES, t_{Doff}	Sourcing Outputs, I_{OUT} = 1A		200		ns
	Sinking Outputs, I_{OUT} = 1A		200		ns
OUTPUT TURN-OFF SWITCHING TIME, t_{off}	Bootstrap Capacitor = 10 nF				
	Sourcing Outputs, I_{OUT} = 1A		75		ns
	Sinking Outputs, I_{OUT} = 1A		70		ns
MINIMUM INPUT PULSE WIDTH, t_{pw}	Pins 3, 4, 5		1		µs
CHARGE PUMP RISE TIME, t_{cpr}	No Bootstrap Capacitor		20		µs

NOTE: These specifications apply for V_S = 42V, unless otherwise specified.

