élantec
HIGH PERFORMANCE ANALOG INTEGRATED CIRCUITS

EL7558C
Programmable CPU Power Supply Unit

Features

- Precision Internal 1% Reference
- 3.3V @8 amps continuous
- Internal FETs
- >90% Efficiency
- Synchronous Switching
- User adjustable Slope Compensation
- Internal Soft Start
- Over Temperature Indicator
- Low Current Sleep Mode
- Low parts count
- Pulse by Pulse Current Limiting
- High Efficiency at Light Load
- Operates up to 1MHz
- 1% Output Accuracy
- Sync Function
- Power Good Signal
- Power-Saver Mode
- Intel P54 and P55 Compatible
- VCC2DET Interface

Applications

- PC Motherboards
- Local High Power CPU supplies
- 5V to 1.0V DC-DC Conversion
- Portable Electronics/Instruments
- P54 and P55 Regulators

Ordering Information

Part No.	Temp. Range	Package	Outline #
EL7558CM	0°C to + 70°C	28-Pin SOIC	MDP0027

General Description

The EL7558C is an adjustable synchronous DC/DC switching regulator optimized for a 5V input and 1.0-3.8V output. By combining integrated NMOS power FETS with Thermal Slug packaging the EL7558C can supply up to 8A continuous output current without the use of external power devices or discrete heat sinks, thereby minimizing design effort and overall system cost.

On chip resistorless current sensing is used to achieve stable, highly efficient, current-mode control. The EL7558C also incorporates the VCC2DET function to directly interface with the Intel P54 and P55 microprocessors. Depending on the state of VCC2DET the output voltage is internally preset to 3.50V or a user-adjustable voltage using two external resistors. In both internal and external feedback mode the active-high PWRGD output indicates when the regulator output is within +/-10% of the programmed voltage. An on-board sensor monitors die temperature (OT) for over-temperature conditions and can be connected directly to OUTEN to provide automatic thermal shutdown. Adjustable oscillator frequency and slope compensation allow added flexibility in overall system design.

Connection Diagram

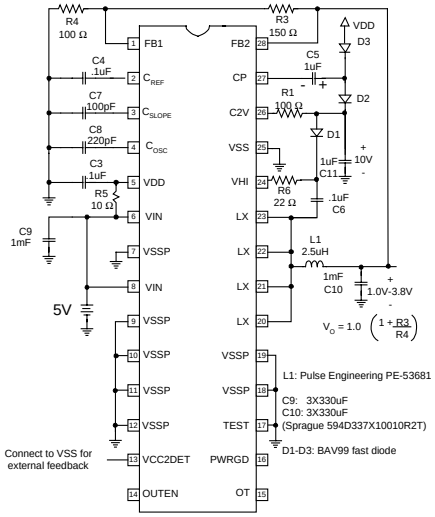

Fig 1.

PRELIMINARY

Absolute Maximum Ratings (T_A = 25°C)

Storage Temperature Range	-65°C to +150°C	Operating Junction Temperature	125°C
Supply (V_{IN})	6V	Peak Output Current	16A
Ambient Operating Temperature	0°C to +70°C	Power Dissipation	3W with heatsink
Output Pins	-0.3V below GND, +0.3V above V_{DD}		

Important Note:

All parameters having Min/Max specifications are guaranteed. The Test Level column indicates the specific device testing actually performed during production and Quality inspection. Elantec performs most electrical tests using modern high-speed automatic test equipment, specifically the LTX77 Series system. Unless otherwise noted, all tests are pulsed tests, therefore T_J=T_C=T_A.

Test Level	Test Procedure
I	100% production tested and QA sample tested per QA test plan QCX0002.
II	100% production tested at T_A = 25°C and QA sample tested at T_A = 25°C, T_{MAX} and T_{MIN} per QA test plan QCX0002.
III	QA sample tested per QA test plan QCX0002.
IV	Parameter is guaranteed (but not tested) by Design and Characterization Data.
V	Parameter is typical value at T_A = 25°C for information purposes only.

DC Electrical Characteristics

Parameter	Description	Condition	Min	Typ	Max	Test Level	Units
V_{2X}	Voltage Doubler Output	V_{DD}=5V, ILOAD=20mA	8.5	9	9.5	I	V
V_{REF}	Reference Absolute value	ILOAD=0	1.150	1.25	1.350	I	V
V_{REFTC}	Reference Voltage Tempco			50			ppm/C
$V_{REFLOAD}$	Reference Voltage Load Regulation	0<ILOAD<1mA	-.5%		.5	I	%
F_{OSC}	Oscillator Initial Accuracy	C_{OSC}=1000pF	90	100	110	I	kHz
F_{OSCTC}	Oscillator Tempco	0°C <TA<125°C C_{OSC}=1000pF	-.1		.1	V	%/deg
F_{RAMP}	Oscillator Ramp Amplitude	C_{OSC}=1000pF	1.1		1.4	V	V
M_{SS}	Soft Start Slope	F_{OSC}=500kHz	.1		.5	V	V/msec
VID_{BIAS}	VID Pull Up Current			10		V	uA
I_{CSLOPE}	CSLOPE Charging Current		10		14	I	uA
I_{DD}	Supply Current	OUTEN=4V		9	15	I	mA
I_{DDOFF}	Stdby Current	OUTEN=0		3	5	I	mA
R_{DSON}	Composite FET Resistance		15		25	I	mohms
V_{OUT}	Output Initial Acurracy	VCC2DET=High	3.465	3.5	3.535	I	V
I_{LMAX}	Maximum Current	V_{OUT}=0		11		V	amps
V_{OUTTC}	Output Tempco		-1	0	1	V	%

Parameter	Description	Condition	Min	Typ	Max	Test Level	Units
$V_{OUTLINE}$	Output Line Regulation	V_{OUT}=2.5 4<V_{IN}<5.5	-1		1	I	%
$V_{OUTLOAD}$	Output load regulation	1A<I_{LOAD}<10A	-1		1	V	%
V_{OUTTOT}	Output Total Variation		-2		2	V	%
T_{OFF}	Over Temperature Threshold			135		V	C
T_{HYS}	Over Temperature Hysteresis			15		V	C
V_{GOOD}	Power Good Threshold With Respect to Desired Output Woltage	VCC2DET=High	-9	-7	-5	I	%
V_{DDON}	Minimum V_{DD} for Startup				4	I	V
V_{DDOFF}	Maximum V_{DD} for Shutdown		3.75			I	V

Applications Information:

The EL7558C incorporates a VCC2DET function to directly interface with the Intel P54 and P55 microprocessors. When this pin is shorted to ground as in the P55 processor, the feedback path of EL7558C is internally switched to FB1. The regulator output is determined by the external resistor divider ratio, Vout = 1.0(1+R3/R4). When this pin is open as in the P54 processor, the feedback path of the EL7558C is switched to FB2. The regulator output is set internally to 3.5V nominal.