PRELIMINARY - October 5, 1999

TEL:805-498-2111 FAX:805-498-3804 WEB:http://www.semtech.com

DESCRIPTION

The SC1538 is a dual power supply controller designed to simplify power management on motherboards. It is part of Semtech's Smart LDO™ family of products. The SC1538CS15/18 can provide a 1.818V power supply for the I/O plane and a 1.515V power supply for the GTL+ and AGP planes. The SC1538CS25/25 can provide two 2.525V supplies for clock and memory.

SC1538 features include Enable controls for each linear FET controller and over current protection. Over current protection is provided by feedback to the sense pins. If any output drops below 1V (typical) for greater than 4ms (typical), that output will shut down.

The SC1538 is available in a SO-8 surface mount package.

FEATURES

- Dual power supplies
- 1.515V Supply for GTL+ and AGP planes/1.818V Supply for chipset I/O and memory termination
- Dual 2.525V supplies for clock and memory
- Individual Enable control of each supply
- Over current protection

APPLICATIONS

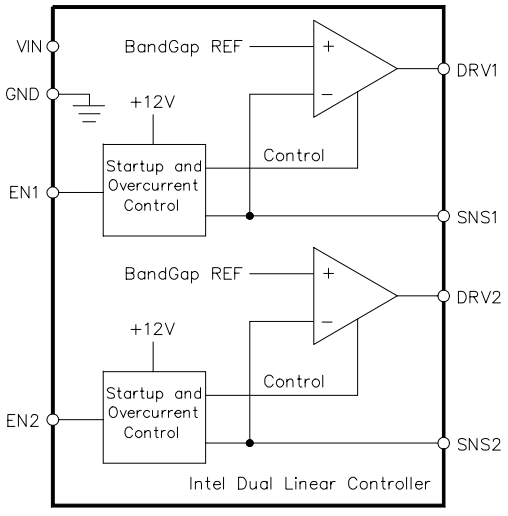
- Motherboards
- Simple dual power supplies

ORDERING INFORMATION

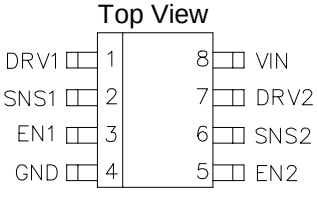
Part Number(1)	Output Voltages	Package
SC1538CS15/18	1.515V and 1.818V	SO-8
SC1538CS25/25	2.525V and 2.525V	SO-8

Note:
(1) Add suffix 'TR' for tape and reel packaging.

BLOCK DIAGRAM



PIN CONFIGURATION



(SO-8)

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Maximum	Units
Input Supply Voltage	VIN	-0.5 to +15	V
Input Pins		-0.5 to +7	V
Operating Temperature Range	T_A	0 to +70	°C
Operating Junction Temperature	T_J	0 to +125	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C
Lead Temperature (Soldering) 10 Sec	T_{LEAD}	300	°C
Thermal Temperature Junction to Ambient	θ_{JA}	130	°C/W
Thermal Impedance Junction to Case	θ_{JC}	47	°C/W
ESD Rating	ESD	2	kV

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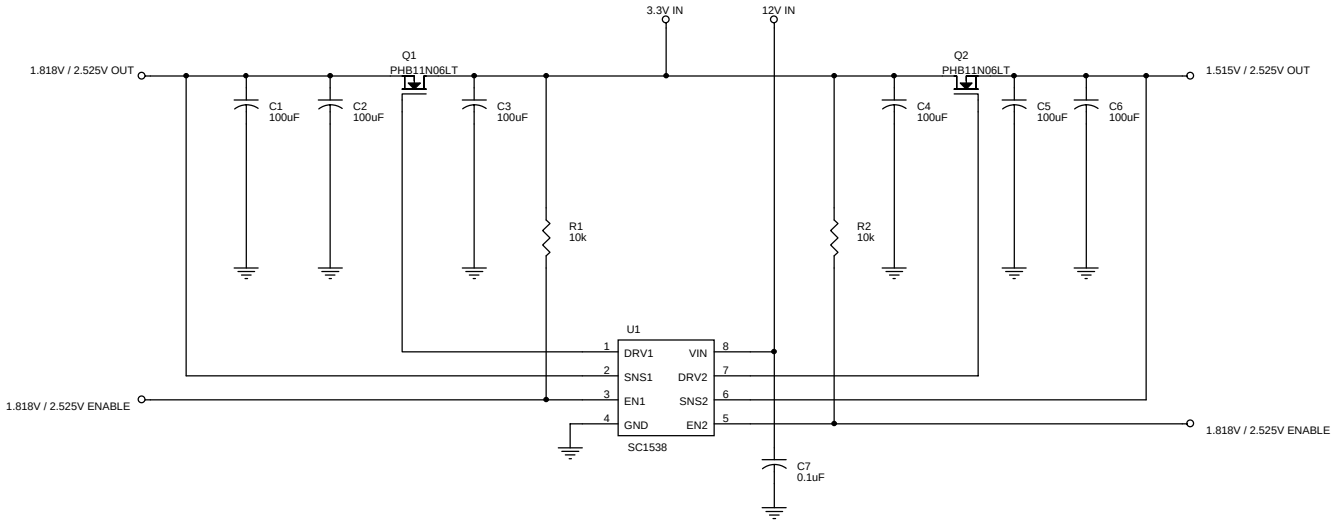
PIN DESCRIPTION

Pin	Pin Name	Pin Function
1	DRV1	Output of regulator #1. Drives the gate of an N-channel MOSFET to maintain 1.818V/ 2.525V.
2	SNS1	Regulator #1 Sense input. Use as a remote sense to the source of the N-channel MOSFET (Output 1).
3	EN1	Active high enable control with internal pullup. Output of regulator #1 turns off when EN1 is taken low.
4	GND	Ground
5	EN2	Active high enable control with internal pullup. Output of regulator #2 turns off when EN2 is taken low.
6	SNS2	Regulator #2 Sense input. Use as a remote sense to the source of the N-channel MOSFET (Output 2).
7	DRV2	Output of regulator #2. Drives the gate of an N-channel MOSFET to maintain 1.515V/ 2.525V.
8	VIN	+12V Supply.

APPLICATION CIRCUIT



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ELECTRICAL CHARACTERISTICS

Unless specified, T_A = 25°C. Values in **bold** apply over full operating temperature range.

Parameter	Symbol	Test Conditions	MIN	TYP	MAX	Units
VIN						
Supply Voltage	VIN		**11.28**	12.00	**12.72**	V
Quiescent Current	I_Q	Both EN High		2	3	mA
					4	
		One or both EN Low		1.5	2.0	mA
					2.5	
Undervoltage Lockout						
Start Threshold	UVLO		**7**	8	**9**	V
Enable						
Enable Pin Current	I_{EN}	Input = Low		50	100	µA
					150	
Threshold Voltage	V_{TH}	V_{EN} rising	**1.6**		**2.3**	V
Hysteresis	V_{HYST}		**100**	180	**300**	mV
Enable Delay Time(1)	$t_{D(ON)}$	EN = Low to High, measured from EN = V_{TH} to 10% DRV		500		ns
Disable Delay Time(1)	$t_{D(OFF)}$	EN = High to Low, measured from EN = V_{TH} to 90% DRV		150		ns
DRV						
Output Current	I_{DRV}		**5**	10		mA
Output Voltage	V_{DRV}	Full On	**9.0**	10.5		V
Rise Time(1)	t_r	EN = Low to High, measured from EN = V_{TH} to 90% DRV		1.6		ms
Fall Time(1)	t_f			550		ns
Output Voltage Regulation						
Output Voltage(1)	VO	3.0V ≤ V_{FET}(2) ≤ 3.6V, 1mA ≤ I_O ≤ 1A	-1.5%	VO	+1.5%	V
			-2.5%		**+2.5%**	
Overcurrent Protection						
Trip Threshold	V_{OC}		**-20%**	1.00	**+15%**	V
Power-up Output Short Circuit Immunity			1	5	60	ms
Output Short Circuit Glitch Immunity			0.5	4	6	ms
Control Section						
Bandwidth		DRV = 9V, THD = 5%, C_L = 600pF		5		MHz

NOTES:
(1) See Application Circuit
(2) Connected to FET drains.

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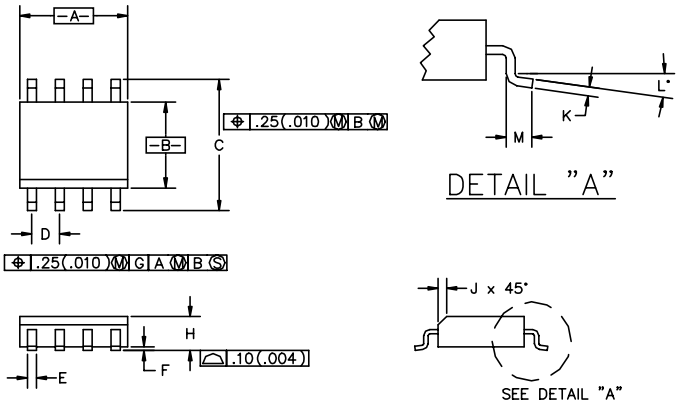
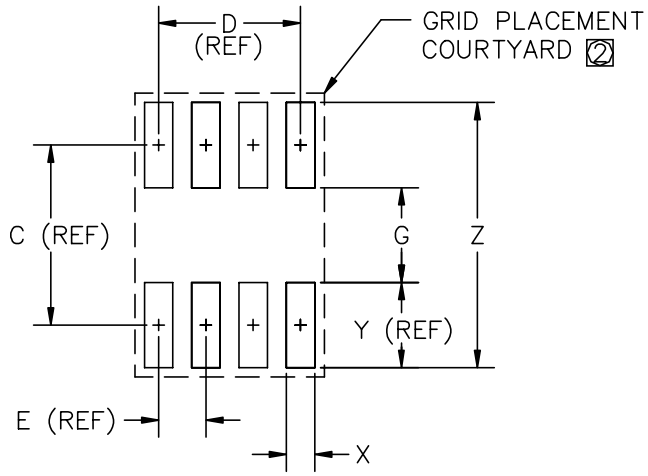
OUTLINE DRAWING - SO-8



JEDEC
REF: MS-012AA

DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.188	.197	4.80	5.00	
B	.149	.158	3.80	4.00	
C	.228	.244	5.80	6.20	
D	.050	BSC	1.27	BSC	
E	.013	.020	0.33	0.51	
F	.004	.010	0.10	0.25	
H	.053	.069	1.35	1.75	
J	.011	.019	0.28	0.48	
K	.007	.010	.19	.25	
L	0°	8°	0°	8°	
M	.016	.050	0.40	1.27	

LAND PATTERN - SO-8



DIMENSIONS (1)					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
C	–	.19	–	5.00	–
D	–	.15	–	3.81	–
E	–	.05	–	1.27	–
G	.10	.11	2.60	2.80	–
X	.02	.03	.60	.80	–
Y	–	.09	–	2.40	–
Z	–	.29	7.20	7.40	–

(2) GRID PLACEMENT COURTYARD IS 12x16 ELEMENTS (6 mm X 8mm) IN ACCORDANCE WITH THE INTERNATIONAL GRID DETAILED IN IEC PUBLICATION 97.

(1) CONTROLLING DIMENSION: MILLIMETERS

ECN99-633 - 10-5-99