System Reset (battery back-up)
Monolithic IC MM1290

Outline

These ICs protect S-RAM data in back-up mode (CS signal makes S-RAM CE pin low and $\overline{CE}$ pin high) when power supply voltage goes below a certain set voltage (detection voltage 4.6V typ.). Further, it switches from main power supply to battery back-up when power supply voltage drops. Conversely, when power supply rises, it first switches the S-RAM from battery back-up to main power supply (switching voltage 3.5V typ.), then from back-up mode to normal mode (CS signal makes S-RAM CE pin high and CE pin low). These signal processes provide reliable protection against data damage.

Features

1. Power supply switching circuit (switching between main power supply and battery)
2. CS control for S-RAM (normal mode : S-RAM can be accessed, back-up mode: S-RAM can not be accessed low current consumption mode)
3. Back-up output V01 and V02 output circuit built in.

Characteristics

1. Battery back-up			
1. Low IC current consumption (loss current)			2.7μA typ.
2. Drop voltage inside IC (input/output voltage difference)		I_O=100μA	0.03V typ.
3. Reverse current (reverse leak current)			0.5μA max.
2. Normal operation			
1. Drop voltage inside IC (input/output voltage difference)		I_O=50mA	0.2V typ.
2. Output voltage	V_{CC}=6V	I_{O1}=50mA	5.0V typ.
3. Output voltage2	V_{CC}=6V	I_{O2}=30mA	5.0V typ.
3. Detection voltage	$\overline{RESET}$	A : 2.55V typ.	
	$\overline{PREEND}$	B : 2.70V typ.	

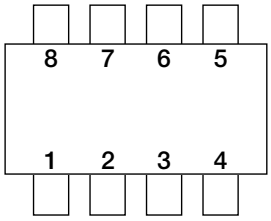
Package

SOP-8A

Applications

1. Memory cards (S-RAM cards)
2. PCs, word processors
3. Fax machines, photocopiers, other office equipment
4. Sequence controllers, other FA equipment
5. Video games and other equipment with S-RAMs

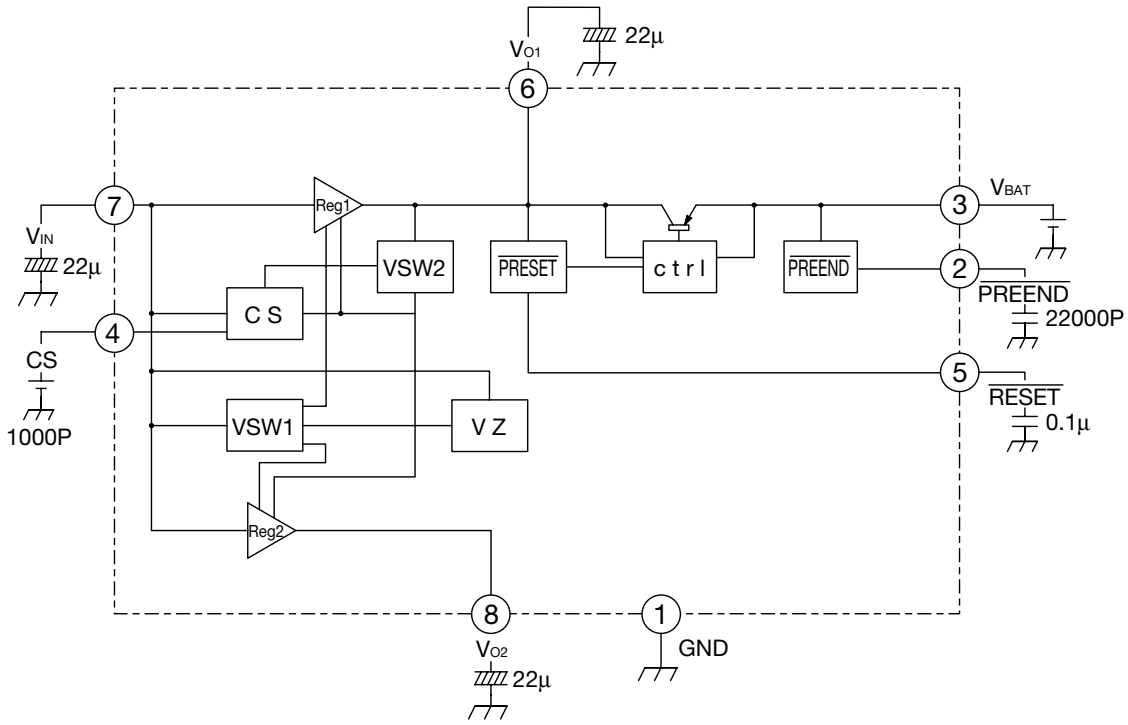
Pin Assignment



SOP-8A
(TOP VIEW)

Pin no.	Pin name
1	GND
2	$\overline{\text{PREEND}}$
3	V_{BAT}
4	CS
5	$\overline{\text{RESET}}$
6	V_{O1}
7	V_{IN}
8	V_{O2}

Block Diagram



Recommended Operating Conditions

Item	Symbol	Rating	Unit
Storage temperature	T_{STG}	–40~+125	°C
Operating temperature	T_{OPL}	–20~+75	°C
Allowable loss	Pd	300	mW

Absolute Maximum Ratings (Ta=25℃)

Item	Symbol	Rating	Unit
Power supply voltage 1	V_{IN} max.	−0.3~+16	V
Power supply voltage2 (BACK UP)	V_{BAT} max.	−0.3~+12	V
Pin Voltage	V_I max.	−0.3~+10	V
Output current 1	I_{O1}	0~80	mA
Output current 2	I_{O2}	0~60	mA

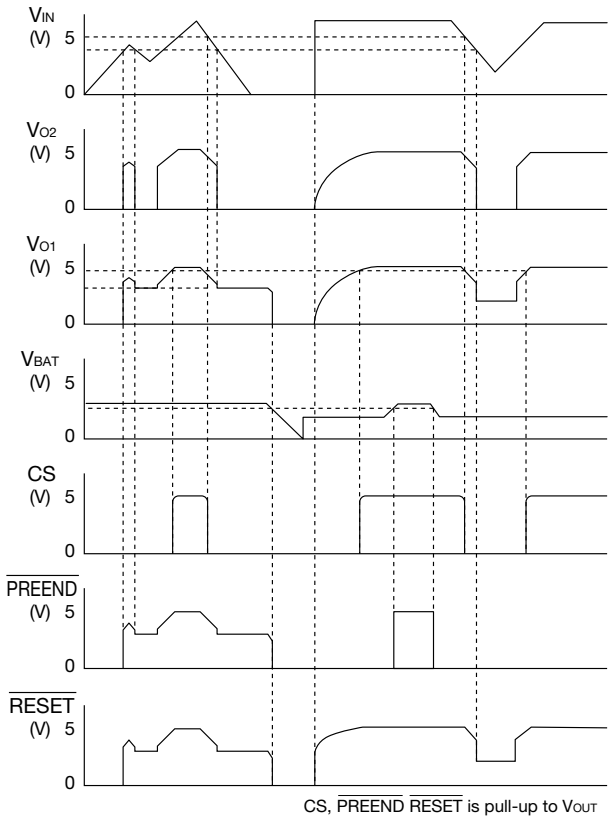
Electrical Characteristics (Except where noted otherwise, V_{IN}=6.0, Ta=25°C)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Unit
Synthesis						
Current consumption 1	I_{IN}	V_{IN}=6V		40	80	µA
Current consumption 2	I_{BAT1}	V_{BAT}=3V, V_{IN}=6V		0.3	0.6	µA
Current consumption 3	I_{BAT2}	V_{BAT}=3V Ta=25°C		2.7	4.5	µA
Regulator						
Output voltage1	V_{O1}	V_{IN}=6V, I_{O1}=50mA	4.85	5.0	5.15	V
Input-Output differential Voltage1	V_{IO1}	V_{IN}=6V, I_{O1}=50mA		0.2	0.35	V
Load Regulation1	ΔV_{O1}	I_{O1}=0~50mA		±0.01	±0.03	%/mA
Line Regulation1	ΔV_{I1}	I_{O1}=50mA		±0.01	±0.2	%/V
V_{OUT} Temperature Coefficient1	$\frac{\Delta V_{O1}}{\Delta Ta}$	Ta=−20~+75°C		±0.01		%/°C
Output voltage2	V_{O2}	V_{IN}=V_O+1V, I_{O2}=30mA	4.85	5.0	5.15	V
Input-Output differential Voltage2	V_{IO2}	V_{IN}=4.5V, I_{O2}=30mA		0.2	0.35	V
Load Regulation2	ΔV_{O2}	I_{O2}=0~30mA		±0.01	±0.03	%/mA
Line Regulation2	ΔV_{I2}	I_{O2}=30mA		±0.01	±0.2	%/V
V_{OUT} Temperature Coefficient2	$\frac{\Delta V_{O2}}{\Delta Ta}$	Ta=−20~+75°C		±0.01	±0.20	%/°C
Reset						
CS detection voltage	V_{SL1}	V_{IN}=H→L	4.485	4.600	4.715	V
Detection voltage temperature coefficient 1	$\frac{\Delta V_{g1}}{\Delta Ta}$	Ta=−20~+75°C		±0.01		%/°C
CS sync current	I_{SINK1}	V_O=0.5V, V_{IN}=V_{BAT}=2V	1.5			mA
CS operating voltage	V_{OPL1}	V_{IN} or V_{BAT} I_{CS}=50µA, V_{OP}=0.4V	1.6		16	V
$\overline{\text{RESET}}$ detection voltage	V_{SL2}	V_{O1}=H→L	2.499	2.550	2.601	V
$\overline{\text{RESET}}$ hysteresis	ΔV_{S2}	V_{O1}=H→L→H	45	90	180	mV
Detection voltage temperature coefficient 2	$\frac{\Delta V_{SL2}}{\Delta Ta}$	Ta=−20~+75°C		±0.01		%/°C
$\overline{\text{RESET}}$ sync current	I_{SINK2}	V_{OP}=0.4V, V_{IN}=V_{BAT}=2V	1.5			mA
$\overline{\text{PREEND}}$ detection voltage	V_{SL3}	V_{BAT}=H→L	2.646	2.700	2.754	V
$\overline{\text{PREEND}}$ hysteresis	ΔV_{S3}	V_{BAT}=H→L→H	110	140	250	mV
Detection voltage temperature coefficient 3	$\frac{\Delta V_{S3}}{\Delta Ta}$	Ta=−20~+75°C		±0.01		%/°C
$\overline{\text{PREEND}}$ sync current	I_{SINK3}	V_{OP}=0.4V, V_{IN}=V_{BAT}=2V	1.5			mA
$\overline{\text{RESET}}$, $\overline{\text{PREEND}}$ operating voltage	V_{OPL2}	V_{IN} or V_{BAT} V_{OP}=0.4V IR=IP=50µA	1.6		16	V

Electrical Characteristics (Except where noted otherwise, V_{IN}=6.0, Ta=25°C)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Unit
Switch						
Switch voltage	V_{SW1}	V_{BAT}=3V, V_{IN} voltage detection	3.400	3.500	3.600	V
CS output prohibition voltage	V_{SW2}	V_{BAT}=3V, V_{O1} voltage detection	4.550	4.700	4.850	V
V_{BAT} SW Leakage Current	I_{LEAK}	V_{IN}=6V, V_{BAT}=0V			0.5	µA
Input-Output differential Voltage	V_{IOSW}	V_{IN}=OPEN, V_{BAT}=2.65V, I_{OUT}=100µA		30	60	mV
Switch Temperature Coefficient	$\frac{\Delta V_{SW1}}{\Delta Ta}$	Ta=–20~+75°C		±0.01		%/°C
CS voltage prohibition Temperature Coefficient	$\frac{\Delta V_{SW2}}{\Delta Ta}$	Ta=–20~+75°C		±0.01		%/°C

Timing Chart



CS, $\overline{\text{PREEND}}$ $\overline{\text{RESET}}$ is pull-up to V_{OUT}