

MIP0221SY, MIP0222SY, MIP0223SY, MIP0224SY, MIP0225SY, MIP0226SY, MIP0227SY

Silicon MOS IC

■ Features

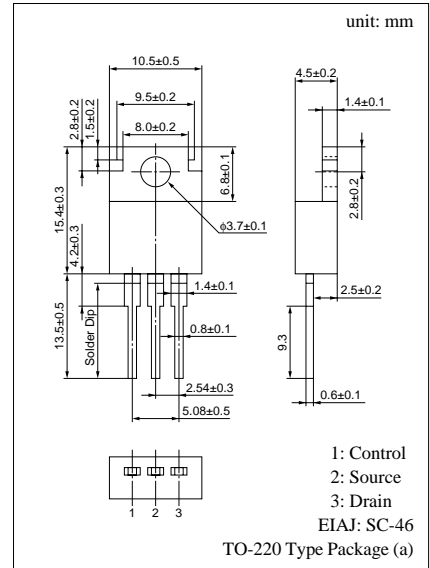
- Single chip IC with high breakdown voltage power MOS FET and CMOS control circuits
- Allowing to input worldwide mains (AC 85 to 274V)
- A pulse-by-pulse overcurrent protection circuit and a timer auto-restart circuit are integrated.

■ Applications

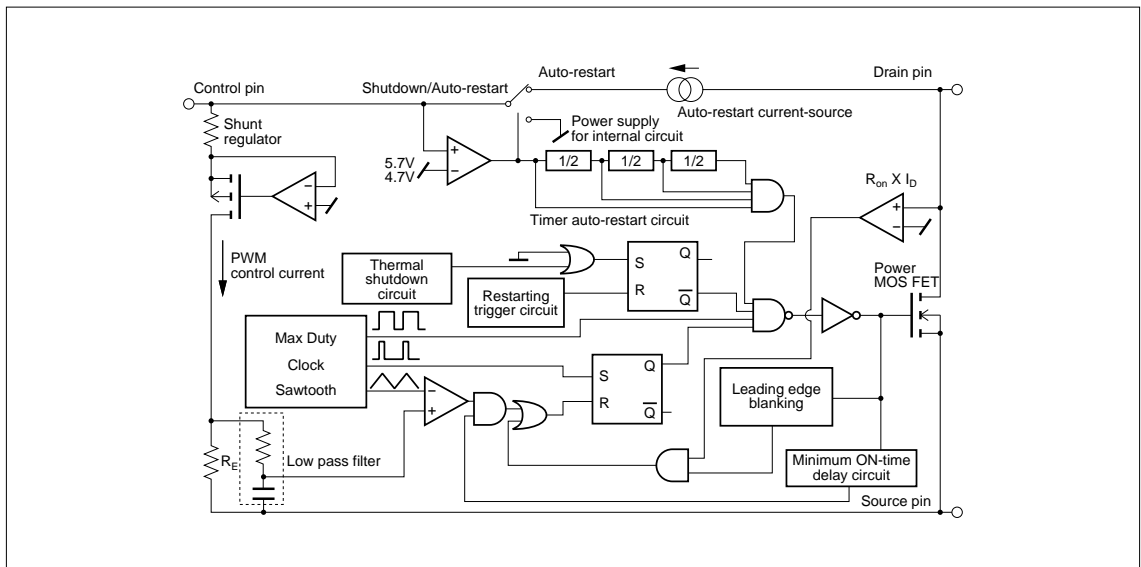
- Switching power supply (to 90W)
- AC adaptor
- Battery charger

■ Absolute Maximum Ratings ( $T_a = 25 \pm 3^\circ\text{C}$ )

Parameter	Symbol	Rated	Unit	
Drain voltage	$V_D$	700	V	
Control voltage	$V_C$	8	V	
Output current	$I_D$	MIP0221SY	0.3	A
		MIP0222SY	0.585	
		MIP0223SY	1.15	
		MIP0224SY	1.72	
		MIP0225SY	2.4	
		MIP0226SY	2.9	
		MIP0227SY	3.5	
Control current	$I_C$	0.1	mA	
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$	



■ Block Diagram



### ■ Electrical Characteristics (T<sub>C</sub> = 25 ± 2°C)

	Parameter	Symbol	Conditions	min	typ	max	Unit
Control functions	Output frequency	f <sub>OSC</sub>	I <sub>C</sub> = 2mA	90	100	110	kHz
	Maximum duty cycle	MAXDC	I <sub>C</sub> = 2mA	64	67	70	%
	Minimum duty cycle	MINDC	I <sub>C</sub> = 10mA			3	%
Auto-restart	Control pin charging current	I <sub>C</sub>	V <sub>C</sub> = 0	-2.4	-1.9	-1.2	mA
			V <sub>C</sub> = 5V	-2	-1.5	-0.8	
	Auto-restart threshold voltage	V <sub>C(on)</sub>		5	5.7	6.3	V
	Lockout threshold voltage	V <sub>C(off)</sub>		4	4.7	5.3	V
	Auto-restart hysteresis voltage	ΔV <sub>C</sub>		0.5	1	1.5	V
	Auto-restart duty cycle	T <sub>SW</sub> /T <sub>TIM</sub>			5	8	%
	Auto-restart frequency	f <sub>TIM</sub>			1.2		Hz
Circuit protection	Self-protection current limit	I <sub>LIMIT</sub>	MIP0221SY	0.23	0.25	0.28	A
			MIP0222SY	0.45	0.5	0.55	
			MIP0223SY	0.9	1	1.1	
			MIP0224SY	1.35	1.5	1.65	
			MIP0225SY	1.8	2	2.2	
			MIP0226SY	2.25	2.5	2.75	
			MIP0227SY	2.7	3	3.3	
	Leading edge blanking delay	t <sub>on(BLK)</sub>	I <sub>C</sub> = 3mA		0.25		μs
	Current limit delay	t <sub>d(OCL)</sub>	I <sub>C</sub> = 3mA		0.1		μs
	Thermal shutdown temperature	T <sub>OTP</sub>	I <sub>C</sub> = 3mA	130	140	150	°C
	Power-up reset threshold voltage	V <sub>C reset</sub>		2.3	3.3	4.2	V
	Output	ON-state resistance	R <sub>DS(on)</sub>	I <sub>D</sub> = 0.025A		31.2	36
I <sub>D</sub> = 0.1A					15	18	
I <sub>D</sub> = 0.2A					8.5	10	
I <sub>D</sub> = 0.3A					5.8	6.7	
I <sub>D</sub> = 0.3A					4	5	
I <sub>D</sub> = 0.3A					3.3	4	
I <sub>D</sub> = 0.3A					2.6	3	
OFF-state current		I <sub>DSS</sub>	V <sub>DS</sub> = 650V, Output MOS FET disabled		0.01	0.25	mA
Breakdown voltage		V <sub>DSS</sub>	I <sub>D</sub> = 0.25mA, Output MOS FET disabled	700			V
Rise time		t <sub>r</sub>			0.1	0.2	μs
Fall time	t <sub>f</sub>			0.1	0.2	μs	
Power supply voltage	Drain supply voltage	V <sub>D(MIN)</sub>		36			V
	Shunt regulator voltage	V <sub>C</sub>	I <sub>C</sub> = 3mA	5.4	5.7	6.1	V
	Control supply/discharge current	I <sub>CD1</sub>	Output MOS FET enabled	0.7	1.4	1.8	mA
			Output MOS FET disabled	0.5	0.8	1.1	mA

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