

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

Silicon MOS IC

■ **Features**

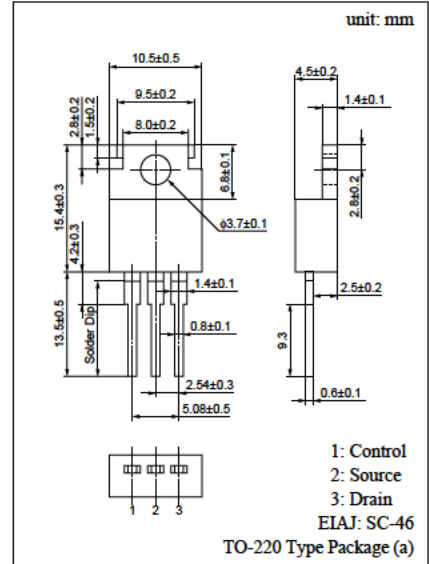
- Single chip IC with high breakdown voltage power MOS FET and CMOS control circuits
- Allowing to input worldwide mains (AC 85 to 274V)
- A pulse-by-pulse overcurrent protection circuit and a timer auto-restart circuit are integrated.

■ **Applications**

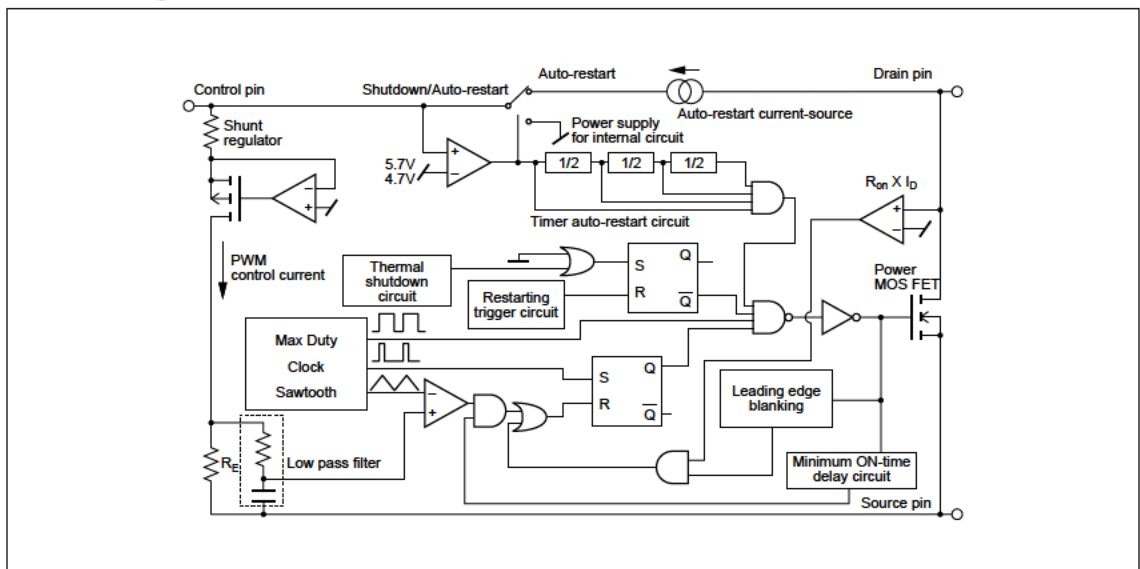
- Switching power supply (to 90W)
- AC adaptor
- Battery charger

■ **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	C	
Storage temperature	T_{stg}	-55 to +150	C	



■ **Block Diagram**



■ Electrical Characteristics (T_C = 25 ± 2°C)

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