

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

Silicon MOS IC

■ Features

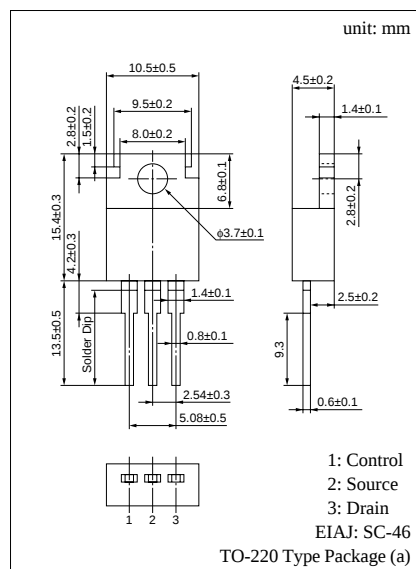
- Single chip IC with high breakdown voltage power MOS FET and CMOS control circuits
- Allowing to input worldwide mains (AC 85 to 274V)
- A pulse-by-pulse overcurrent protection circuit and a timer auto-restart circuit are integrated.

■ Applications

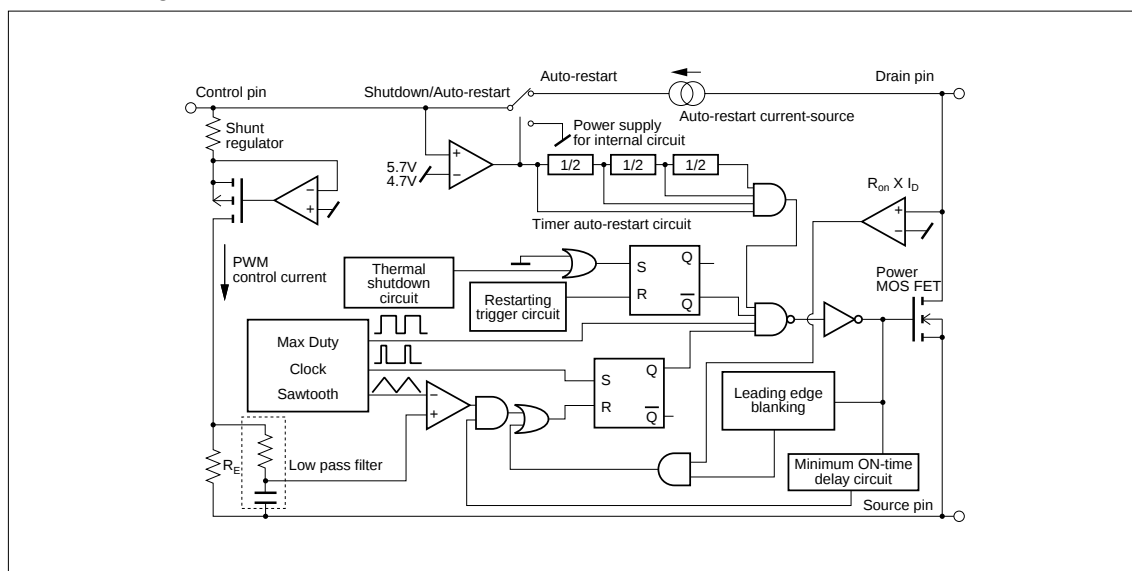
- Switching power supply (to 90W)
- AC adaptor
- Battery charger

■ Absolute Maximum Ratings (T_a = 25 ± 3°C)

Parameter	Symbol	Ratings		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	MIP0221SY	I _{LIMIT}		0.23	0.25	9.28	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	MIP0221SY	R _{DS(on)}	I _D = 0.025A		31.2	36	Ω
			MIP0222SY		I _D = 0.1A		15	18	
MIP0223SY			I _D = 0.2A			8.5	10		
MIP0224SY			I _D = 0.3A			5.8	6.7		
MIP0225SY			I _D = 0.3A			4	5		
MIP0226SY			I _D = 0.3A			3.3	4		
MIP0227SY			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	
			I _{CD2}	Output MOS FET disabled	0.5	0.8	1.1	mA	