

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

Silicon MOS IC

■ Features

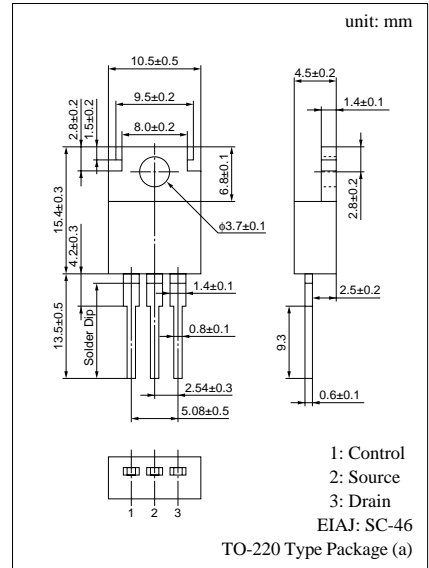
- Single chip IC with high breakdown voltage power MOS FET and CMOS control circuits
- Allowing to input worldwide mains (AC 85 to 274V)
- A pulse-by-pulse overcurrent protection circuit and a timer auto-restart circuit are integrated.

■ Applications

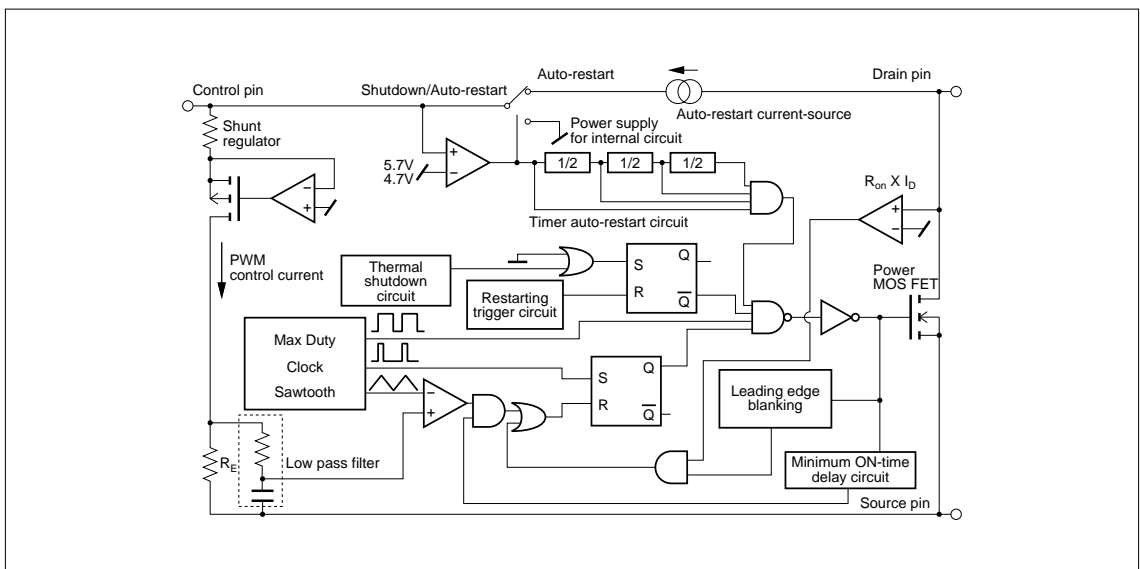
- Switching power supply (to 90W)
- AC adaptor
- Battery charger

■ Absolute Maximum Ratings (Ta = 25 ± 3°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 ($T_C = 25 \pm 2^\circ\text{C}$)

	Parameter	Symbol	Conditions	min	typ	max	Unit	
Control functions	Output frequency	f_{OSC}	$I_C = 2\text{mA}$	90	100	110	kHz	
	Maximum duty cycle	MAXDC	$I_C = 2\text{mA}$	64	67	70	%	
	Minimum duty cycle	MINDC	$I_C = 10\text{mA}$			3	%	
Auto-restart	Control pin charging current	I_C	$V_C = 0$	-2.4	-1.9	-1.2	mA	
			$V_C = 5\text{V}$	-2	-1.5	-0.8		
	Auto-restart threshold voltage	$V_{C(\text{on})}$		5	5.7	6.3	V	
	Lockout threshold voltage	$V_{C(\text{off})}$		4	4.7	5.3	V	
	Auto-restart hysteresis voltage	ΔV_C		0.5	1	1.5	V	
	Auto-restart duty cycle	$T_{\text{SW}}/T_{\text{TIM}}$			5	8	%	
	Auto-restart frequency	f_{TIM}			1.2		Hz	
Circuit protection	Self-protection current limit	I_{LIMIT}	MIP0221SY		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	$t_{\text{on(BLK)}}$	$I_C = 3\text{mA}$		0.25		μs	
	Current limit delay	$t_{\text{d(OCL)}}$	$I_C = 3\text{mA}$		0.1		μs	
	Thermal shutdown temperature	T_{OTP}	$I_C = 3\text{mA}$	130	140	150	$^\circ\text{C}$	
	Power-up reset threshold voltage	$V_{C\text{ reset}}$		2.3	3.3	4.2	V	
	Output	ON-state resistance	$R_{\text{DS(on)}}$	$I_D = 0.025\text{A}$		31.2	36	Ω
$I_D = 0.1\text{A}$					15	18		
$I_D = 0.2\text{A}$					8.5	10		
$I_D = 0.3\text{A}$					5.8	6.7		
$I_D = 0.3\text{A}$					4	5		
$I_D = 0.3\text{A}$					3.3	4		
$I_D = 0.3\text{A}$					2.6	3		
OFF-state current		I_{DSS}	$V_{\text{DS}} = 650\text{V}$, Output MOS FET disabled		0.01	0.25	mA	
Breakdown voltage		V_{DSS}	$I_D = 0.25\text{mA}$, 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	$V_{\text{D(MIN)}}$		36			V	
	Shunt regulator voltage	V_C	$I_C = 3\text{mA}$	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	