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

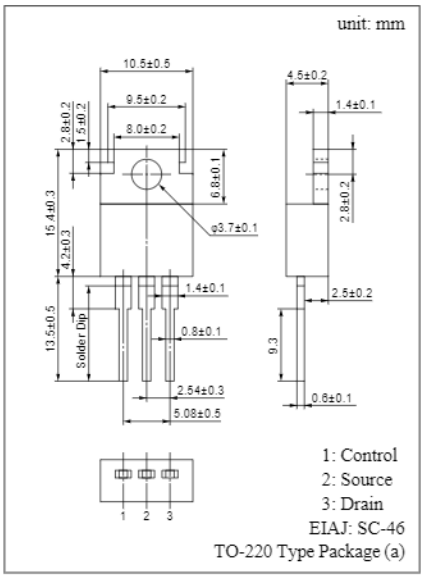
Silicon MOS IC

■ 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

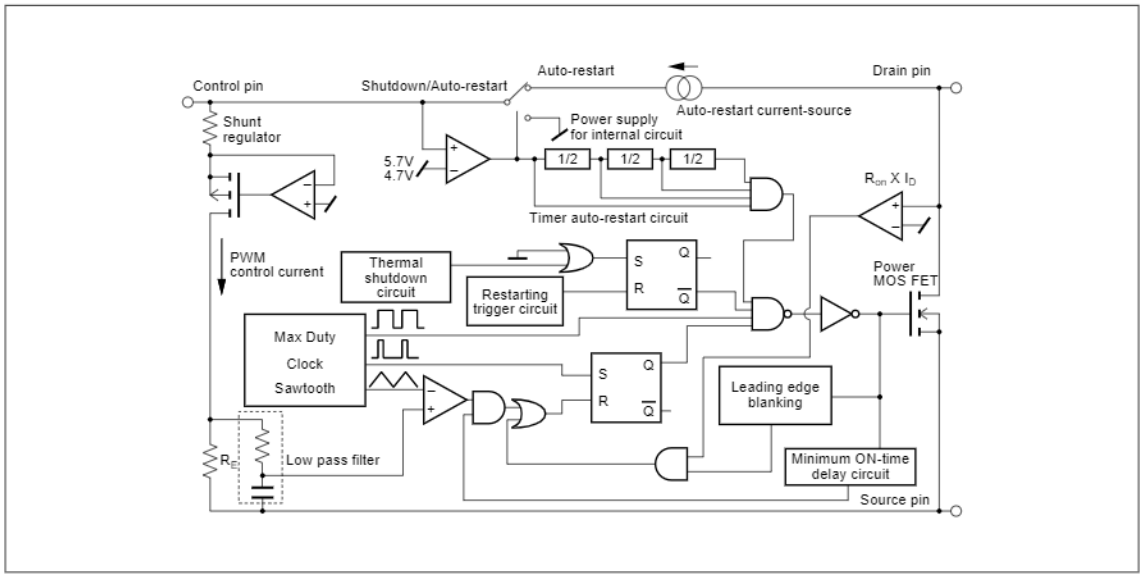
- Switching power supply (to 90W)
- AC adaptor
- Battery charger



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

Parameter	Symbol	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		∝s
	Current limit delay		$t_{d(OCL)}$	I_C = 3mA		0.1		∝s
	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	∝s
	Fall time		t_f			0.1	0.2	∝s
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