

MIP0122SY, MIP0123SY, MIP0124SY, MIP0125SY

Silicon MOS IC

■ Features

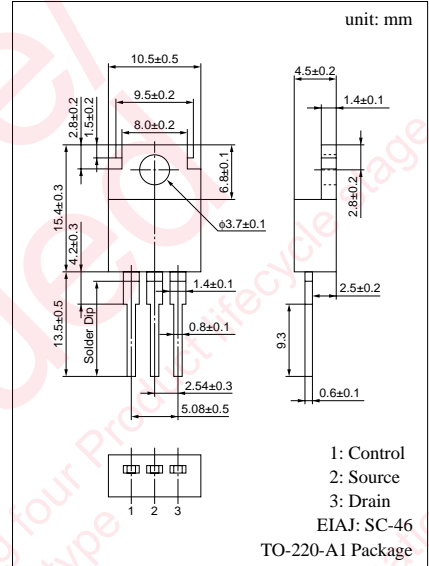
- Single chip IC with high breakdown voltage power MOS FET and CMOS control circuits
- A pulse-by-pulse overcurrent protection circuit and a timer auto-restart circuit are integrated.

■ Applications

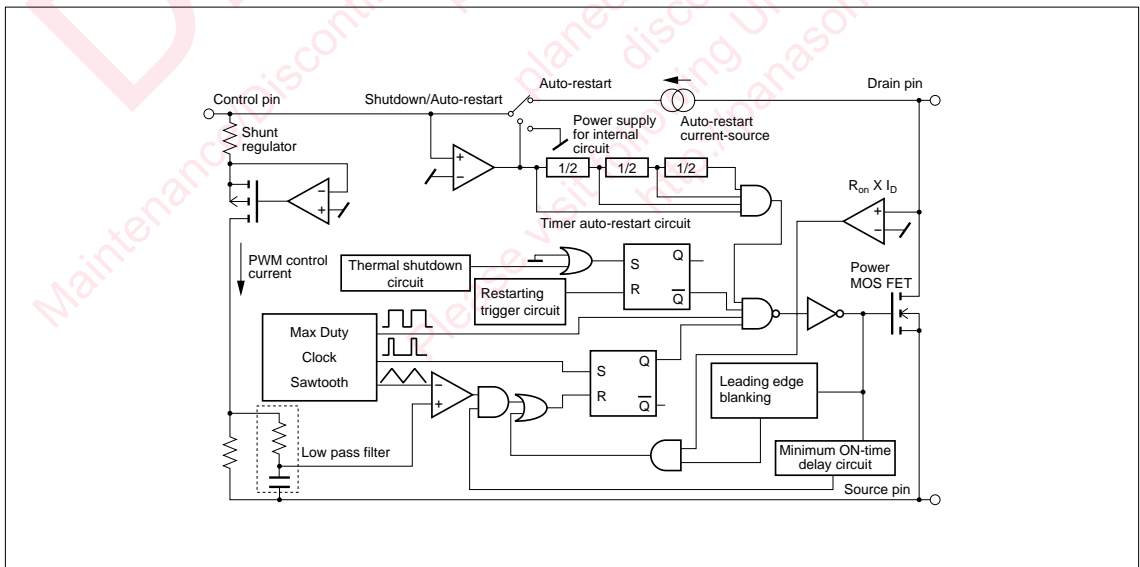
- Switching power supply (to 60W)
- AC adaptor
- Battery charger

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

Parameter	Symbol	Rated	Unit
Drain voltage	V _D	400	V
Control voltage	V _C	8	V
Output current	I _D	MIP0122SY	1.25
		MIP0123SY	2.15
		MIP0124SY	3.1
		MIP0125SY	4.6
Control current	I _C	0.1	A
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	$I_C = 10\text{mA}$	0.7	1.7	3	%	
	PWM gain	GPWM		-21	-16	-11	%/mA	
	Circuit current	I_S		0.8	2	3.3	mA	
	Dynamic impedance	ZC	$I_C = 3\text{mA}$	10	15	22	Ω	
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	MIP0122SY	I_{LIMIT}		1		1.25	A
		MIP0123SY			1.75		2.15	
		MIP0124SY			2.5		3.1	
		MIP0125SY			3.75		4.6	
	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	MIP0122SY	$R_{\text{DS(on)}}$	$I_D = 0.11\text{A}$		6.4	7.5	Ω
		MIP0123SY		$I_D = 0.19\text{A}$		3.6	4.3	
		MIP0124SY		$I_D = 0.27\text{A}$		2.6	3	
		MIP0125SY		$I_D = 0.4\text{A}$		1.7	2	
	OFF-state current	I_{DSS}	$V_{\text{DS}} = 280\text{V}$			0.5	mA	
	Breakdown voltage	V_{DSS}	$I_D = 0.5\text{mA}$	400				
	Rise time	t_r			0.1	0.2	μs	
	Fall time	t_f			0.1	0.2	μs	

■ Electrical Characteristics ($T_C = 25 \pm 2^\circ\text{C}$) (Continued)

	Parameter	Symbol	Conditions	min	typ	max	Unit	
Power supply voltage	Drain supply voltage	$V_{D(MIN)}$		36			V	
	Shunt regulator voltage	V_C	$I_C = 3\text{mA}$	5.4	5.7	6.1	V	
	Control supply/ discharge current	MIP0122SY	I_{CD1}	Output MOS FET enabled	0.7	1.2	1.7	mA
		MIP0123SY						
		MIP0124SY						
MIP0125SY								
	I_{CD2}	Output MOS FET disabled	0.5	0.8	1.1	mA		
	Thermal resistance (ch-c)	$R_{th(ch-c)}$		3		$^\circ\text{C/W}$		
	Thermal resistance (ch-a)	$R_{th(ch-a)}$		70		$^\circ\text{C/W}$		

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Attached table "IPD availability by customer"

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MIP13□ MIP14□ MIP15□ MIP16□	MIP17□ MIP18□ MIP01□□ MIP02□□	MIP2□□□ MIP3□□□ MIP4□□□ MIP9A□□	· Japanese companies in Japan · Japanese companies in Asia (50% or more owned)	· Companies in European and American countries · Asian companies in Asia · Other local companies	· For power supply · For DC-DC converter
MIP10□ MIP11□ MIP803/804/806 MIP9E□□	MIP811/812 MIP814/815/816 MIP82□ MIP55□		· Japanese companies in Japan · Japanese companies in Asia (50% or more owned) · Asian companies in Asia	· Companies in European and American countries · Other local companies	· For power supply · For EL driver · For LED lighting driver
MIP50□ MIP51□	MIP7□□		· No restrictions in terms of contract	· No restrictions in terms of contract	· For lamp driver/ car electronics accessories

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