

MIP160, MIP162, MIP163, MIP164, MIP165, MIP166

Silicon MOS IC

■ Features

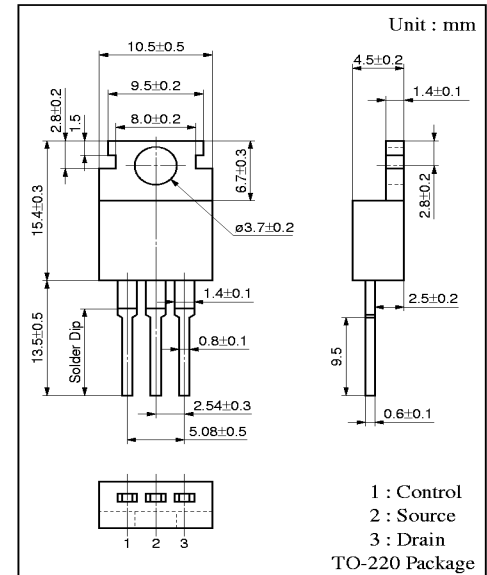
- Single chip IC with high breakdown voltage power MOS FET and CMOS control circuit
- Worldwide input (85 to 274VAC) possible
- Over-voltage protection at secondary section, pulse by pulse over-current protection, and intermittent operation timer at overload

■ Applications

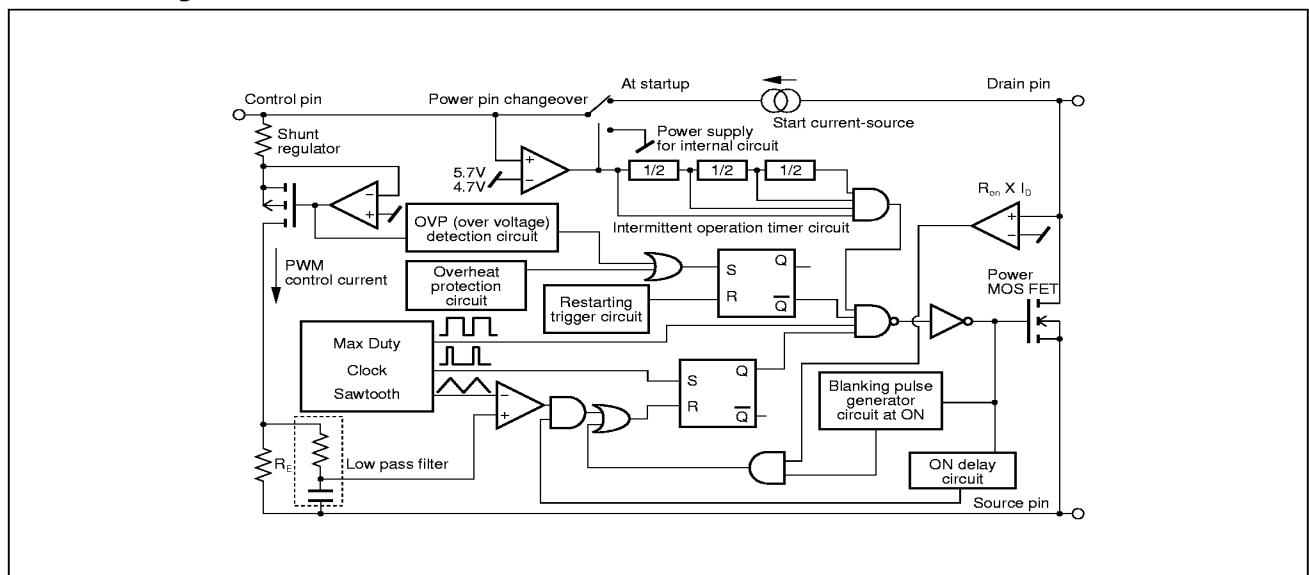
- Switching mode regulator (5 to 40W)
- AC adapter
- Battery charger

■ Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Drain voltage	V_D	700	V
Control voltage	V_C	8	V
Output current	I_D	I_{LIMIT}	A
Control current	I_C	0.1	A
Allowable power dissipation	P_D	1.7/12.5 * 1	W
Operating ambient temperature	T_{opr}	-20 to +85	$^\circ\text{C}$
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

* 1 : $T_C = 25^\circ\text{C}$ 

■ Block Diagram



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

Parameter		Symbol	Condition	Min	Typ	Max	Unit
Control function	Output frequency	f _{osc}	I _C = 4mA	90	100	110	kHz
	Maximum duty cycle	MAXDC	I _C = 2mA	64	67	70	%
	Minimum duty cycle	MINDC	I _C =10mA	1	2	3	%
Start up	Control pin charge current	I _C	V _C = 0V	- 2.4	-1.9	-1.2	mA
			V _C = 5V	- 2.0	-1.5	- 0.8	
	Control pin voltage at startup	V _{C (ON)}		5.0	5.7	6.3	V
	Control pin voltage at stop	V _{C (OFF)}		4.0	4.7	5.3	V
	Start/stop hysteresis voltage	ΔV _C		0.5	1.0	1.5	V
	Intermittent operation time-ratio	T _{SW} /T _{TIM}			5	8	%
	Intermittent operation frequency	f _{TIM}		0.5	1.2	2.0	Hz
Protection function	Over current protection/detection	MIP160	I _{LIMIT}	0.415	0.5	0.585	A
		MIP162		0.75	0.9	1.05	
		MIP163		1.12	1.35	1.57	
		MIP164		1.35	1.62	1.89	
		MIP165		1.88	2.25	2.63	
		MIP166		2.4	2.8	3.2	
	Blanking width at ON	t _{on(BLK)}	I _C = 4mA		0.25		μs
	Over current protection delay time	t _{d(OCL)}	I _C = 4mA		0.1		μs
	Over current protection temperature	T _{OTP}	I _C = 4mA	130	140	150	°C
	Over voltage protection/detection current	I _{ovp}		25	45	75	mA
	Latch reset voltage	V _{C reset}		2.3	3.3	4.2	V
Output	ON resistance	MIP160	R _{DS(ON)}	0.1A	15	18	Ω
		MIP162		0.3A	8.5	10	
		MIP163		0.3A	5.8	6.7	
		MIP164		0.5A	4.5	5.5	
		MIP165		0.8A	3.0	3.8	
		MIP166		1.0A	2.6	3.3	
	Drain pin leak current at OFF	I _{DSS}	V _{DS} = 650V, I _C = 4mA latch mode		0.5	0.9	mA
	Drain breakdown voltage	V _{DSS}	I _C = 4mA, I _D = 0.25mA latch mode	700			V
	Rise time	t _r			0.1	0.2	μs
	Fall time	t _f			0.1	0.2	μs
Supply voltage	Minimum drain voltage	V _{D(MIN)}		36			V
	Shunt regulator voltage	V _C	I _C = 4mA	5.5	5.8	6.1	V
	Control pin discharge current	I _{CD1}	at output MOS operation	0.7	1.4	1.8	mA
		I _{CD2}	at output MOS stop	0.5	0.8	1.1	mA