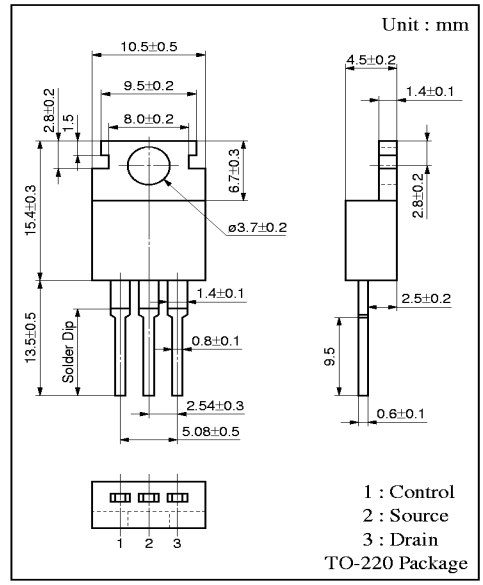
MIP160, MIP162, MIP163, MIP164, MIP165, MIP166

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

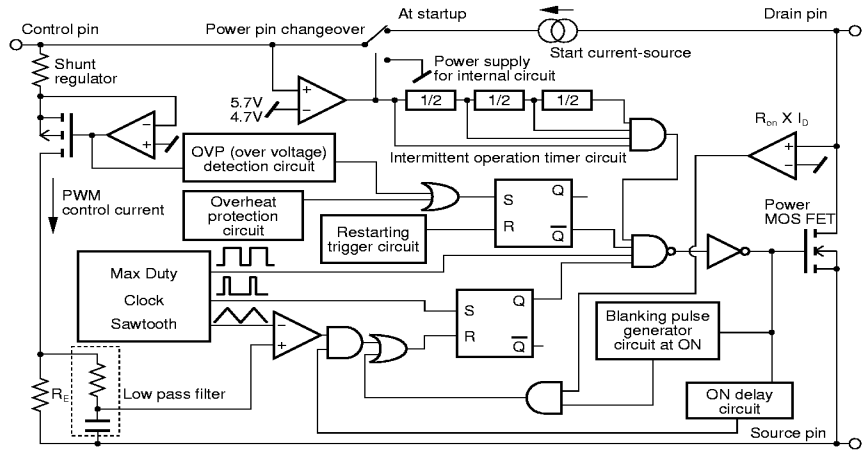
- Switching mode regulator (5 to 40W)
- AC adapter
- Battery charger

■ Absolute Maximum Ratings (Ta= 25°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	°C
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	– 55 to +150	°C

* 1 : T_C= 25°C

■ Block Diagram



■ Electrical Characteristics (Tc= 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_f			0.1	0.2	µs
	Fall time		t_r			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